ICAO

Doc 9284

Technical Instructions for the Safe Transport of Dangerous Goods by Air

2023–2024 Edition

Approved and published by decision of the Council of ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

The "One Stop Dangerous Goods Service" ™

Our products and services are exported and distributed to over 160 countries across all continents.

LABELINE
THE DANGEROUS GOODS CO.

.....BREAKING NEWS.....Congratulations Labeline for being IATA's best performing distributor Worldwide for 13 years running.....

Why Choose Labeline:-

❒ ✓ Leading and best performing authorized regulatory distributor worldwide,

❒ ✓ Preferred supplier to MOD, DGSA's and Trainers.

❒ ✓ Compliant regulatory products and services, annual updates, compliant labelling, documentation and UN packaging for IATA, ICAO, IMO, UN ADR and DoT.

❒ ✓ Leading proactive worldwide DG specialist covering a wide range of industries.

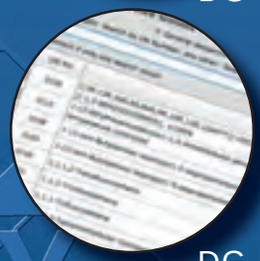
❒ ✓ Specialist DG Training Courses compiled and delivered by some of the most experienced Trainers in the business.

❒ ✓ Fast international deliveries 1-3 days

When you need dangerous goods support, products or services Labeline.com will be be there for you.

Labeline International Ltd
www.labeline.com sales@labeline.com

DG Training



DG Integrated Software

DG Regulatory Products

DG Authorized Distributor

DG Packaging, Labelling and Documents

LABELINE.COM

ICAO

Doc 9284

Technical Instructions for the Safe Transport of Dangerous Goods by Air

2023–2024 Edition

Approved and published by decision of the Council of ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Published in separate English, Chinese, French,
Russian and Spanish editions by the
INTERNATIONAL CIVIL AVIATION ORGANIZATION
999 Robert-Bourassa Boulevard, Montréal, Quebec, Canada H3C 5H7

For ordering information and for a complete listing of sales agents
and booksellers, please go to the ICAO website at www.icao.int

2023–2024 Edition

Doc 9284, Technical Instructions for the Safe Transport of Dangerous Goods by Air
Order Number: Doc 9284
ISBN 978-92-9265-688-1 (print version)
ISSN 1726-6181

FOREWORD

RELATIONSHIP TO ANNEX 18 TO THE CHICAGO CONVENTION

The broad principles governing the international transport of dangerous goods by air are contained in Annex 18 to the Convention on International Civil Aviation — *The Safe Transport of Dangerous Goods by Air*. These Technical Instructions amplify the basic provisions of Annex 18 and contain all the detailed instructions necessary for the safe international transport of dangerous goods by air. Interested persons may purchase copies of Annex 18 from ICAO at the following address:

International Civil Aviation Organization
Customer Services Unit
999 Robert-Bourassa Boulevard, Montréal, Quebec, Canada, H3C 5H7
Tel.: +1 514-954-8219
Fax: +1 514-954-6769
Email: sales@icao.int
Internet home page: www.icao.int

VARIATIONS FROM THE TECHNICAL INSTRUCTIONS

In accordance with the provisions of Annex 18, 2.5, Contracting States are required to notify ICAO of those cases where they have adopted provisions different from those contained in these Instructions. The variations which have been notified by States are listed in Attachment 3, together with notified variations from airline operators.

UPDATING PROCEDURE

It is intended that the Technical Instructions be kept up to date by an ICAO body of experts. For this purpose, the ICAO Dangerous Goods Panel will continue to meet periodically to review comments received from States and interested international organizations, to consider any changed recommendations of the United Nations Subcommittee of Experts on the Transport of Dangerous Goods or the International Atomic Energy Agency, and to prepare revised editions of the Technical Instructions. Amendments recommended by the Dangerous Goods Panel will be reviewed by the Air Navigation Commission. The Council of ICAO will then consider, with a view to approval, the amended version of the Technical Instructions and authorize its publication. Amendments will be made available on www.icao.int/safety/dangerousgoods.

OPERATIONAL USE OF THE TECHNICAL INSTRUCTIONS

≠ This edition of the Technical Instructions is required to be used for operations from 1 January 2023 and will remain valid until 31 December 2024 or until such later time as a new edition becomes valid.

GENERAL PRINCIPLES USED IN DEVELOPING THE PROVISIONS OF THE TECHNICAL INSTRUCTIONS

Dangerous goods can be carried safely by air transport providing certain principles are adopted. These principles have been used in developing these Technical Instructions and are set out below; they are intended to facilitate transport while giving a level of safety such that dangerous goods can be carried without placing an aircraft or its occupants at risk, providing all the requirements are fulfilled. They try to ensure that should an incident occur it cannot lead to an accident.

In general, dangerous goods are divided into various classes or divisions according to the hazard they present. A detailed list of individual commodities is shown which indicates the class or division into which each commodity falls as well as its acceptability for transport by air and under what conditions. Since such a list cannot be exhaustive, it also includes various generic or "not otherwise specified" entries to assist in the transport of those commodities not specifically listed by name.

Some dangerous goods are identified as too dangerous ever to be carried on any aircraft; some are forbidden in normal circumstances but may be carried with specific approval from the States concerned; some are restricted to carriage only on all-cargo aircraft; but most may be carried on both passenger and all-cargo aircraft, subject to meeting the required conditions. Those restricted to all-cargo aircraft are either in larger quantities than allowed on passenger aircraft or are forbidden on such aircraft; their transport is permitted due to their being usually accessible in flight and to the ability of the flight crew to consider a greater range of actions in an emergency than is possible on passenger aircraft.

≠ The provisions are based on the United Nations Model Regulations on the Transport of Dangerous Goods, which include material from the International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material and references to the UN *Manual of Tests and Criteria*. Using a United Nations system ensures compatibility between the international modes of transport so a consignment may be carried by more than one mode without intermediate reclassification and repacking. Modifications are made to the system to take account of the peculiarities of air transport, while keeping in mind the need to ensure modal compatibility.

There are packing requirements of a general nature and packing instructions which, together, are intended to ensure that the safety of dangerous goods in air transport is assured by their packagings and the way in which they are packed. The packing requirements apply in almost all circumstances; the packing instructions mostly use UN packagings but sometimes these are not required, for instance when dangerous goods are in limited quantities. There is usually a wide choice of inner and outer packagings and single packagings are often permitted; sometimes, however, very restrictive packagings or only one or two types are permitted, or triple packagings are required. Generally, the quantity which can be put into an inner packaging and a complete package is strictly controlled. This is to minimize the inherent risk presented by the dangerous goods so that if an incident should occur, the situation would not produce an unacceptable hazard or lead to injury or major property damage.

After dangerous goods have been packed, the packages are marked with essential information, including the proper shipping name and UN number, and labels depicting all the potential hazard(s) of the contents are affixed. This is to ensure packages containing dangerous goods can be recognized and warning given of the potential hazard(s) without relying on information on accompanying documents. A dangerous goods transport document accompanies most consignments to provide detailed information about the goods so that, if required, there is a separate means of identifying the contents of packages.

There is generally no restriction on the number of packages of dangerous goods which can be loaded on an aircraft but there are provisions for their stowage. Incompatible dangerous goods are segregated and most are separated from passengers. The pilot-in-command is informed of what is on board an aircraft since, among other things, in an emergency the dangerous goods need to be considered when deciding on action. If an in-flight emergency does occur, the pilot-in-command needs to convey information to the air traffic services, in order to aid the response to such an accident or incident. In the event of an accident or incident, information is provided by the operator to the relevant authority as quickly as possible so as to ensure that any hazard arising from damage to the dangerous goods is minimized.

Dangerous goods accidents and incidents have to be reported so that an investigation by a relevant authority can establish the cause and take action to prevent a recurrence, wherever possible. In particular, any weakness or error in the Technical Instructions has to be identified.

Training is an important aid to achieving an understanding of the philosophy and requirements of the Technical Instructions. There is a need for everyone concerned to receive training on the subject either for general familiarization or to provide detailed knowledge, so that the responsibilities of the individual can be met. Dangerous goods are very unlikely to cause a problem when they are prepared and handled in compliance with the Technical Instructions.

USE OF THE TECHNICAL INSTRUCTIONS

The Technical Instructions are divided into eight Parts and five Attachments, with each Part and Attachment divided into Chapters and each Chapter divided into paragraphs and subparagraphs.

Within each Chapter, the Chapter number is incorporated into all of the paragraph numbers; thus, in Chapter 3, paragraph 2 carries the number “3.2”. When referring to a paragraph, it is necessary to identify the appropriate Part or Attachment; if the above example were located in Part 2, the reference to it would be shown as “2;3.2” (that is, Part 2; Chapter 3, paragraph 3.2). If the above example were located in Attachment 3, the reference would be shown as “A3;3.2” (that is, Attachment 3; Chapter 3, paragraph 3.2).

Figures and Tables are numbered sequentially within the Part or Attachment in which they appear. Thus, the second figure appearing in Part 5 is identified as “Figure 5-2” and the first table appearing in Part 3 is identified as “Table 3-1”. The first table appearing in the Attachments is identified as “Table A-1”.

Use of the Technical Instructions will be facilitated by reference to the detailed Index in Attachment 4.

The detailed content of the Technical Instructions gives all the necessary provisions to enable a consignment of dangerous goods to be correctly prepared for air transport. However, to assist the user of this document, the following step-by-step procedure is given for guidance to ensure all the applicable requirements for classifying, packing, labelling, marking and documenting are met.

It should be noted that the information given below is for guidance only and the relevant sections should be checked to ascertain their relevance to each consignment.

1. Determine the correct technical name or composition of the substance or the description of the article.

2. Ascertain whether the name or composition of the substance or article appears in Table 3-1 and if so what is the proper shipping name.

3. If the substance or article does not appear in Table 3-1, determine the class or division into which it falls by comparing its known properties with the definitions for the various classes, which are given in Part 2, Chapters 1 to 9. If the properties are not known, tests should be carried out to determine the appropriate class or division. If the article or substance is not listed by name in Table 3-1 and does not meet the definition of any of the classes, it is not subject to these requirements for the transport of dangerous goods. For substances or articles with multiple hazards, the provisions of Part 2, Introductory Chapter should be followed. Once all the properties of the substance or article are known, determine whether it is forbidden for transport under any circumstance according to the provisions of 1;2.1. If the substance or article does not come within the provisions of 1;2.1, determine the proper shipping name from the most appropriate of the n.o.s. entries in Table 3-1. Information on n.o.s. entries is given in Part 2, Introductory Chapter.

4. If it is desired to transport the substance or article under the provisions for excepted quantities, all the requirements of 3;5 must be met. The substance or article will then not be subject to any of the other requirements of the Technical Instructions other than those listed in 3;5.1.1.

5. If it is desired to transport the substance or article under the provisions for limited quantities, all the requirements of 3;4 must be met and also all the applicable requirements of the Technical Instructions, except where otherwise provided for in 3;4.

6. If the substance or article is not to be transported as an excepted quantity or a limited quantity, determine whether it is desired to transport it on passenger or cargo aircraft.

7. From the information given in columns 10 to 13 of Table 3-1, ascertain whether or not the substance or article is forbidden for transport on passenger aircraft or on both passenger and cargo aircraft.

8. If the substance or article is shown as forbidden for transport on either passenger aircraft or both passenger and cargo aircraft, ascertain whether it could be subject to an exemption under the provisions of 1;1.1.3, by consulting the appropriate national authority. If the substance or article is forbidden for transport on passenger aircraft, determine whether it can be transported on cargo aircraft.

9. If it is desired to transport the substance or article on passenger aircraft and this is not forbidden and the quantity per package does not exceed the permitted maximum net quantity per package given in column 11 of Table 3-1, determine the packing instruction number, quantity limitation, special provisions and any State or operator variations as shown in Tables 3-1 and 3-2 and Attachment 3.

10. If it is desired to transport the substance or article on a cargo aircraft or if it can only be carried on such aircraft, determine the packing instruction number, quantity limitation, special provisions and any State or operator variations as shown in Tables 3-1 and 3-2 and Attachment 3.

11. Determine the packing details from the relevant information or packing instruction in Part 4 and any special requirements from Part 2, Chapters 1 to 9 and Part 5, Chapter 1.

12. Select, where permitted, a method of packing from the packing instruction, or ascertain the provisions of the instruction and ensure the packagings to be used meet all the relevant requirements of Part 4, Chapter 1 and Part 6.

13. Prepare the consignment in accordance with all the relevant requirements of paragraphs 9 to 12 above.

14. Ensure all the appropriate labels and markings are affixed to or printed on the packages according to Part 5, Chapters 2 and 3.

15. Make any appropriate advance arrangements in accordance with Part 5, Chapter 1.

16. Prepare the transport documents and complete and sign the dangerous goods transport document in accordance with Part 5, Chapter 4.

17. Offer the complete consignment for transport by air.

THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS

A Supplement to the Technical Instructions provides information on the safe transport of dangerous goods by air that is primarily of interest to States. Publishing this information in a separate document eliminates from the Technical Instructions material which the average user has neither the need nor the desire to know. The size and complexity of the Technical Instructions is thereby reduced and its comprehensibility enhanced. Examples of the subjects dealt with in the Supplement are guidance for the issue of certain exemptions or approvals by States and the reporting of dangerous goods accidents and incidents to ICAO by Contracting States.

The Supplement is published at the same time as the Technical Instructions and is distributed to the aviation administrations of all the Contracting States of ICAO. However, it is recognized that there may be occasions when the information in the Supplement might be helpful to other readers. Copies can be purchased from the Regional Offices of ICAO or from the Headquarters of ICAO using the following address:

International Civil Aviation Organization
Customer Services Unit
999 Robert-Bourassa Boulevard, Montréal, Quebec, Canada, H3C 5H7
Tel.: +1 514-954-8219
Fax: +1 514-954-6769
Email: sales@icao.int
Internet home page: www.icao.int

≠ **THE 2023–2024 EDITION**

≠ This is the eighteenth biennial edition of the Technical Instructions and it will be valid for two years, that is from 1 January 2023 to 31 December 2024. It incorporates amendments necessary to maintain alignment, as far as possible, with the twenty-second revised edition of the UN Model Regulations, address air-specific safety risks and facilitate air transport while maintaining safety.

≠ The amendments include the following:

— revisions to general provisions including:

  — addition of new exception for alcohol-based hand sanitizers and cleaning products carried by the operator (added through Addendum No. 1 to the 2021–2022 Edition) (1;2.2.1 d));
  — removal of provision allowing for the training provisions contained in the 2019–2020 Edition of the Instructions to be used (Part 1;4);

— revisions to classification criteria including:

  — revisions to radioactive material criteria to align with the International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material (2;7);
  — revision to corrosive substances criteria for packing group assignment (2;8.3);
  — addition of an exception for button cells installed in equipment from the requirement for lithium battery manufacturers and subsequent distributors to make available a summary of the required test for lithium batteries (2;9.3);

— revisions to Table 3-1 including:

  — addition of new entry for UN 3550 — **Cobalt dihydroxide powder**, containing not less than 10% respirable particles;
  — deletion of entry for UN 1169 — **Extracts, aromatic, liquid**;
  — renaming of UN 1197 — **Extracts, flavouring, liquid** to **Extracts, liquid**, for flavour or aroma;
  — renaming of UN 2913 — **Radioactive material, surface contaminated objects (SCO-I or SCO-II)**, non-fissile or fissile excepted to **Radioactive material, surface contaminated objects (SCO-I, SCO-II or SCO-III)**, non-fissile or fissile excepted in Table 3-1;
  — revision to entries for UN 3221 — **Self-reactive liquid type B*** and UN 3231 — **Self-reactive liquid type B, temperature controlled*** to make them forbidden for transport under any circumstance;
  — revision to class and subsidiary hazard in columns 3 and 4 and consequential revisions to values in remaining columns for UN 1891 — **Ethyl bromide**;

— revision to special provisions including:

  — Special Provisions A1 and A2: addition of requirement for transport in accordance with the special provision to be noted on the dangerous goods transport document;
  — Special Provision A4: revised to address an inconsistency between the maximum net quantity per package permitted by the special provision and the maximum net quantity per package permitted for some substances in Table 3-1;
  — Special Provision A19: addition of a note to clarify the scope of what is considered a portable fire extinguisher;
  — Special Provision A35: revised to clarify that particle sizes equal to 53 microns (mechanically produced) or 840 microns (chemically produced) were included in the exception from the Technical Instructions for UN 1326 — **Hafnium powder, wetted,** UN 1352 — **Titanium powder, wetted** and UN 1358 — **Zirconium powder, wetted**;
  — Special Provisions A61: addition of requirement for “not restricted” and the special provision number to be provided on the air waybill when issued;
  — Special Provision A117: revised to include UN 3549 — **Medical waste, Category A, affecting humans** or **Medical waste, Category A, affecting animals** with UN 2814 and UN 2900 as the applicable entries for wastes containing Category A infectious substances;
  — Special Provision A132: revised to remove the transition period during which an exception from the requirement for articles containing smoke-producing substance(s) corrosive according to criteria for Class 8 to be labelled with a toxic subsidiary label could be applied;
  — Special Provision A176: addition of requirement for transport in accordance with the special provision to be noted on the dangerous goods transport document;
  — Special Provision A180: inclusion of a formaldehyde solution in criteria for an exception for non-infectious specimens;

— addition of the following new special provisions:

  — Special Provision A221: new provision to clarify scope of classification criteria for UN1002 — **Air, compressed**;
  — Special Provision A222: new provision to clarify what can be classified as UN 1012 — **Butylene;**
  — Special Provision A223: criteria for excepting life-saving appliances containing only small cartridges of a Division 2.2 gas from the Technical Instructions that is moved from Packing Instruction 955;
  — Special Provision A224: criteria for allowing UN 3548 — **Articles containing miscellaneous dangerous goods, n.o.s.*** to be transported on passenger and cargo aircraft;
  — Special Provision A225: criteria for allowing UN 3538 — **Articles containing non-flammable, non toxic gas, n.o.s.*** to be transported on passenger and cargo aircraft;

— revision to list of classes, divisions and packing groups for which dangerous goods in limited quantities are permitted (3;4.1.2);

— revision to general packing requirements and packing instructions:

  — clarification of scope for mass and volume limits of packagings not subject to design type testing (4;2.3);
  — revision to general requirements for filling of cylinders and closed cryogenic receptacles to take into account components with varying pressure ratings (4;4.1.1.6);
  — updating of references to ISO standards (4;4.1.1.8, Packing Instruction 214 and Packing Instruction 219);
  — revisions to provisions for aerosols to address inconsistencies with the UN Model Regulations (Packing Instructions 203, Y203 and Y963);
  — addition of packing requirements for engines and machinery in Packing Instructions 220 and 378 to align with text in the associated packing instruction in the UN Model Regulations (P005) and in Packing Instruction 972;
  — addition of existing provision prohibiting lithium batteries identified as being damaged or defective from transport to packing instructions for engines, machinery, vehicles, battery-powered equipment, and life-saving appliances (Packing Instructions 220, 378, 950, 951, 952, 955);
  — clarification of scope of exception from the requirements of Part 2;9.3 for lithium batteries installed in engines, machinery or vehicles to be transported under State approval (Packing Instructions 220, 378, 950, 951, 952);
  — addition of packing instruction for UN 3538 — **Articles containing non-flammable, non toxic gas, n.o.s.*** (Packing Instruction 222);
  — establishment of a total quantity per package limit for UN 3292 — **Cells, containing sodium** for transport on cargo aircraft to align with the maximum quantity limitations of packagings permitted (Packing Instruction 492);
  — revisions to Packing Instruction 621 to include packagings with non-removeable heads for drums and jerricans and to align with standard packing instructions and corresponding provisions in the UN Model Regulations (Packing Instruction 621);
  — revisions to Packing Instruction 870 to establish a total quantity per package limit for UN 2794 — **Batteries, wet, filled with acid** and UN 2795 — **Batteries, wet, filled with alkali** for transport on cargo aircraft to align with the maximum quantity limitations of packagings permitted and to remove packing conditions for these batteries when installed in equipment since batteries installed in equipment are classified under a different UN number and subject to a different packing instruction;
  — revisions to packing instructions for lithium batteries including:

    — removal of exceptions from full regulation provided in accordance with Section II of Packing Instructions 965 and 968 by deletion of that section;
    — addition of a requirement for a stack test in Section IB of Packing Instructions 965 and 968;
    — revision to clarify the requirements for protection against short circuits in Sections I and II of Packing Instructions 966 and 969;
    — addition of a requirement in Section II of Packing Instructions 966, 967, 969 and 970 for packages placed in overpacks to be secured and the intended function of each package not impaired by the overpack;
    — addition of a requirement in Sections I and II of Packing Instructions 967 and 970 to ensure that multiple pieces of equipment packed into the same outer packaging are packed so as to prevent damage due to contact between the pieces of equipment;

  — addition of packing instruction for UN 3548 — **Articles containing miscellaneous dangerous goods, n.o.s.*** (Packing Instruction 975);

— revision to shipper responsibilities including:

  — removal of requirement for a telephone number for additional information to appear on the lithium battery mark (5;2.4.16.2 and Figure 5-3);
  — addition of a requirement for supplementary information to be included on the dangerous goods transport document when unknown radionuclides or mixtures are offered for transport (5;4.1.5.8 g));
  — addition of a requirement for additional information required by a special provision to be included on the dangerous goods transport document (5;4.1.5.10);

— revision to packaging requirements and tests including:

  — revision to provisions for metal receptacles (aerosols), non-refillable (Table 6-3, 6;3 and 6;5);
  — revisions to distinguish between cylinder shells, inner vessels and closed cryogenic receptacles (6;5);
  — revision to the design and construction provisions for cylinders and closed cryogenic receptacles to include “intended use” as one of the conditions they must be designed, manufactured, tested and equipped to withstand (6;5.1.1.1);

- addition of provisions for parts of cylinders and closed cryogenic receptacles to be conformity assessed separately (6;5.1.4 and 6;5.2.5);
- revision to the procedures for design type approval of cylinders and closed cryogenic receptacles (6;5.2.5);
- revision to marking provisions for UN cylinders and closed cryogenic receptacles (5;2.7 and 5;2.8);

— revisions to operator responsibilities including:

- revision to extend existing requirement for operators to replace labels that are lost, detached or illegible to marks (7;2.7);
- revision to provisions for loading of battery-powered mobility aids by passengers or crew (7;2.13);
- revision to list of dangerous goods not required to appear in the information to the pilot-in-command (Table 7-9).

ABBREVIATIONS AND SYMBOLS

The abbreviations and symbols in the following table are used throughout the Instructions, or in the particular sections indicated, and have the meanings shown below.

Abbreviation or symbol	*Meaning*
A/m	amperes per metre
Bq	becquerel
cm	centimetre
°C	degree Celsius
g	gram
G	gross mass as prepared for transport (as used in column 11 of Table 3-1)
g/m^2	grams per square metre
Gy	gray
Hz	hertz
IAEA	International Atomic Energy Agency
IP	inner packaging
ISO	the International Organization for Standardization
J/g	joules per gram
J/kg	joules per kilogram
K	kelvin
kg	kilogram
kgf	kilogram-force
kPa	kilopascal
L	litre
LC	lethal concentration
LD	lethal dose
L/kg	litres per kilogram
m	metre
mL	millilitre
mm	millimetre
mS/m	millisiemens per metre
N	newton
n.o.s.	not otherwise specified
Ω/m	ohm per metre
SI	the International System of Units developed by the General Conference of Weights and Measures (Système international d'unités)
Sv	sievert
UN	the United Nations Committee of Experts on the Transport of Dangerous Goods
W/m^2	watts per square metre
W/m/K	Watts per metre per Kelvin
µm	micrometre
≠	this symbol indicates changed text
+	this symbol indicates new or relocated text
>	this symbol indicates deleted text
*	this symbol is used in Table 3-1 to indicate an entry which requires the addition of a technical name according to 3;1.2.7
†	this symbol is used in Table 3-1 to indicate an entry for which there is an explanation in Attachment 2
≈	this symbol is used in Table 3-2 to indicate wording in a special provision that is related to but not equivalent to that in the UN Model Regulations

CONTENTS

Page

Part 1. GENERAL

Chapter 1. Scope and applicability 1-1-1

1.1 General applicability 1-1-1
1.2 General transport requirements 1-1-3
1.3 Application of Standards 1-1-3
1.4 Dangerous goods packages opened by customs and other authorities 1-1-3
1.5 Relationship to Annex 18 1-1-3
1.6 Requests for amendments to the Technical Instructions 1-1-4

Chapter 2. Limitation of dangerous goods on aircraft 1-2-1

2.1 Dangerous goods forbidden for transport by air under any circumstance 1-2-1
2.2 Exceptions for dangerous goods of the operator 1-2-1
2.3 Transport of dangerous goods by post 1-2-2
2.4 Dangerous goods in excepted quantities 1-2-2
2.5 Exceptions for dangerous goods packed in limited quantities 1-2-2
2.6 Lamps containing dangerous goods 1-2-2

Chapter 3. General information 1-3-1

3.1 Definitions 1-3-1
3.2 Units of measurement and conversion factors 1-3-10

Chapter 4. Dangerous goods training 1-4-1

4.1 Establishment of dangerous goods training programmes 1-4-1
4.2 Objective of dangerous goods training 1-4-1
4.3 Recurrent training and assessment 1-4-1
4.4 Training and assessment records 1-4-2
4.5 Approval of training programmes 1-4-2
4.6 Instructor qualifications and competencies 1-4-2
4.7 Designated postal operators 1-4-2

Chapter 5. Dangerous goods security 1-5-1

5.1 General security provisions 1-5-1
5.2 Dangerous goods security training 1-5-1
5.3 Provisions for high consequence dangerous goods 1-5-1
5.4 Security plans 1-5-3
5.5 Radioactive material 1-5-4

Chapter 6. General provisions concerning radioactive material 1-6-1

6.1 Scope and application 1-6-1
6.2 Radiation protection programme 1-6-2
6.3 Management system 1-6-3
6.4 Special arrangement 1-6-3
6.5 Radioactive material possessing other dangerous properties 1-6-3
6.6 Non-compliance 1-6-3

Chapter 7. Incident and accident reporting 1-7-1

Part 2. CLASSIFICATION OF DANGEROUS GOODS

Introductory Chapter 2-0-1
1. Responsibilities 2-0-1
2. Classes, divisions, packing groups — definitions 2-0-1
3. UN numbers and proper shipping names 2-0-2
4. Precedence of hazard characteristics 2-0-4
5. Transport of samples 2-0-4
6. Classification of articles as articles containing dangerous goods n.o.s. 2-0-5

Page

Chapter 1. Class 1 — Explosives 2-1-1

1.1 Definitions and general provisions 2-1-1
1.2 Definitions 2-1-1
1.3 Divisions 2-1-2
1.4 Compatibility groups 2-1-2
1.5 Classification of explosives 2-1-4

Chapter 2. Class 2 — Gases 2-2-1

2.1 Definitions and general provisions 2-2-1
2.2 Divisions 2-2-1
2.3 Hazard precedence 2-2-2
2.4 Mixtures of gases 2-2-2
2.5 Aerosols 2-2-3
2.6 Gases forbidden for transport 2-2-3

Chapter 3. Class 3 — Flammable liquids 2-3-1

Introductory Notes 2-3-1

3.1 Definition and general provisions 2-3-1
3.2 Assignment of packing groups 2-3-1
3.3 Determination of flash point 2-3-2
3.4 Determination of initial boiling point 2-3-3
3.5 Substances forbidden for transport 2-3-3

Chapter 4. Class 4 — Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases 2-4-1

Introductory Notes 2-4-1

4.1 Definitions and general provisions 2-4-1
4.2 Flammable solids, self-reactive substances, desensitized explosives and polymerizing substances 2-4-2
4.3 Substances liable to spontaneous combustion (Division 4.2) 2-4-7
4.4 Substances which, in contact with water, emit flammable gases (Division 4.3) 2-4-8
4.5 Classification of organometallic substances 2-4-9

Chapter 5. Class 5 — Oxidizing substances; organic peroxides 2-5-1

Introductory Note 2-5-1

5.1 Definitions and general provisions 2-5-1
5.2 Oxidizing substances (Division 5.1) 2-5-1
5.3 Organic peroxides (Division 5.2) 2-5-3

Chapter 6. Class 6 — Toxic and infectious substances 2-6-1

Introductory Note 2-6-1

6.1 Definitions 2-6-1
6.2 Division 6.1 — Toxic substances 2-6-1
6.3 Division 6.2 — Infectious substances 2-6-5

Chapter 7. Class 7 — Radioactive material 2-7-1

7.1 Definitions 2-7-1
7.2 Classification 2-7-2

Chapter 8. Class 8 — Corrosive substances 2-8-1

8.1 Definition and general provisions 2-8-1
8.2 General classification provisions 2-8-1
8.3 Packing group assignment for substances and mixtures 2-8-1
8.4 Alternative packing group assignment methods for mixtures: Step-wise approach 2-8-2
8.5 Substances forbidden for transport 2-8-6

Page

Chapter 9. Class 9 — Miscellaneous dangerous substances and articles, including environmentally hazardous substances 2-9-1

9.1 Definition 2-9-1
9.2 Assignment to Class 9 2-9-1
9.3 Lithium batteries 2-9-4

Part 3. DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

Chapter 1. General 3-1-1

1.1 General 3-1-1
1.2 Proper shipping name 3-1-1
1.3 Mixtures or solutions 3-1-2

Chapter 2. Arrangement of the dangerous goods list (Table 3-1) 3-2-1

2.1 Arrangement of the dangerous goods list (Table 3-1) 3-2-1

Chapter 3. Special provisions 3-3-1

Chapter 4. Dangerous goods in limited quantities 3-4-1

4.1 Applicability 3-4-1
4.2 Packing and packagings 3-4-2
4.3 Quantity limitations 3-4-2
4.4 Package testing 3-4-2
4.5 Package marking 3-4-3
4.6 Package labelling 3-4-4
4.7 Dangerous goods transport document 3-4-4

Chapter 5. Dangerous goods packed in excepted quantities 3-5-1

5.1 Excepted quantities 3-5-1
5.2 Packagings 3-5-2
5.3 Tests for packages 3-5-2
5.4 Marking of packages 3-5-2
5.5 Documentation 3-5-3
5.6 De minimis quantities 3-5-3

Part 4. PACKING INSTRUCTIONS

Introductory Notes ..... 4-(i)

Chapter 1. General packing requirements 4-1-1

1.1 General requirements applicable to all classes except Class 7 4-1-1
1.2 Packing group 4-1-5
1.3 Transitional packaging arrangements for radioactive material 4-1-6
1.4 Salvage packagings 4-1-6

Chapter 2. General 4-2-1

Chapter 3. Class 1 — Explosives 4-3-1

3.1 Packing group 4-3-1
3.2 General requirements 4-3-1
3.3 General packing provisions 4-3-1
3.4 Packing instructions 4-3-2

Chapter 4. Class 2 — Gases 4-4-1

4.1 Special packing provisions for dangerous goods of Class 2 4-4-1
4.2 Packing instructions 4-4-2

Page

Chapter 5. Class 3 — Flammable liquids 4-5-1

5.1 Packing instructions 4-5-1

Chapter 6. Class 4 — Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases 4-6-1

6.1 General requirements for self-reactive substances 4-6-1
6.2 Packing instructions 4-6-1

Chapter 7. Class 5 — Oxidizing substances; organic peroxides 4-7-1

7.1 General requirements for organic peroxides 4-7-1
7.2 Packing instructions 4-7-1

Chapter 8. Class 6 — Toxic and infectious substances 4-8-1

8.1 Packing instructions 4-8-1

Chapter 9. Class 7 — Radioactive material 4-9-1

9.1 General 4-9-1
9.2 Requirements and controls for transport of LSA material and SCO 4-9-2
9.3 Packages containing fissile material 4-9-3

Chapter 10. Class 8 — Corrosive substances 4-10-1

10.1 Packing instructions 4-10-1

Chapter 11. Class 9 — Miscellaneous dangerous goods 4-11-1

11.1 Packing instructions 4-11-1

Part 5. SHIPPER'S RESPONSIBILITIES

Chapter 1. General 5-1-1

1.1 General requirements 5-1-1
1.2 General provisions for Class 7 5-1-2
1.3 Information to employees 5-1-5
1.4 Training 5-1-5
1.5 Salvage packagings 5-1-6
1.6 Empty packagings 5-1-6
1.7 Mixed packing 5-1-6

Chapter 2. Marking 5-2-1

2.1 The requirement to mark 5-2-1
2.2 Application of marks 5-2-1
2.3 Prohibited marks 5-2-1
2.4 Marking specifications and requirements 5-2-1
2.5 Languages to be used 5-2-5

Chapter 3. Labelling 5-3-1

3.1 The requirement to label 5-3-1
3.2 Application of labels 5-3-1
3.3 Labelling of overpacks 5-3-3
3.4 Prohibited labelling 5-3-3
3.5 Label specifications 5-3-3
3.6 Placarding of large freight containers containing radioactive material 5-3-5

Chapter 4. Documentation 5-4-1

4.1 Dangerous goods transport information 5-4-1
4.2 Air waybill 5-4-6
4.3 Additional documentation for other than radioactive material 5-4-6
4.4 Retention of dangerous goods transport information 5-4-6

Page

Part 6. PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

Chapter 1. Applicability, nomenclature and codes 6-1-1

1.1 Applicability 6-1-1
1.2 Codes for designating types of packagings 6-1-1
1.3 Index of packagings 6-1-2

Chapter 2. Marking of packagings other than inner packagings 6-2-1

Introductory Notes 6-2-1

2.1 Marking requirements for packagings other than inner packagings 6-2-1

Chapter 3. Requirements for packagings 6-3-1

3.1 Requirements for packagings other than inner packagings 6-3-1
3.2 Requirements for inner packagings 6-3-8

Chapter 4. Packaging performance tests 6-4-1

Introductory Notes 6-4-1

4.1 Performance and frequency of tests 6-4-1
4.2 Preparation of packagings for testing 6-4-2
4.3 Drop test 6-4-2
4.4 Leakproofness test 6-4-4
4.5 Internal pressure (hydraulic) test 6-4-5
4.6 Stacking test 6-4-5
4.7 Test report 6-4-6
4.8 Test requirements for salvage packaging 6-4-6

Chapter 5. Requirements for the construction and testing of cylinders and closed cryogenic receptacles, aerosol dispensers and small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas 6-5-1

5.1 General requirements 6-5-1
5.2 Requirements for UN cylinders and closed cryogenic receptacles 6-5-7
5.3 Requirements for non-UN cylinders and non-UN closed cryogenic receptacles 6-5-24
5.4 Requirements for aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas 6-5-24

Chapter 6. Packagings for infectious substances of Category A (UN 2814 and UN 2900) 6-6-1

6.1 General 6-6-1
6.2 Requirements for packagings 6-6-1
6.3 Code for designating types of packagings 6-6-1
6.4 Marking 6-6-1
6.5 Test requirements for packagings 6-6-2

Chapter 7. Requirements for the construction, testing and approval of packages for radioactive material and for the approval of such material 6-7-1

7.1 General requirements 6-7-1
7.2 Additional requirements for packages transported by air 6-7-1
7.3 Requirements for excepted packages 6-7-2
7.4 Requirements for industrial packages 6-7-2
7.5 Requirements for packages containing uranium hexafluoride 6-7-2
7.6 Requirements for Type A packages 6-7-3
7.7 Requirements for Type B(U) packages 6-7-4
7.8 Requirements for Type B(M) packages 6-7-6
7.9 Requirements for Type C packages 6-7-6
7.10 Requirements for packages containing fissile material 6-7-6
7.11 Test procedures and demonstration of compliance 6-7-9
7.12 Testing the integrity of the containment system and shielding and evaluating criticality safety 6-7-10
7.13 Target for drop tests 6-7-10
7.14 Tests for demonstrating ability to withstand normal conditions of transport 6-7-10
7.15 Additional tests for Type A packages designed for liquids and gases 6-7-11
7.16 Tests for demonstrating the ability to withstand accident conditions in transport 6-7-11

Page

7.17 Enhanced water immersion test for Type B(U) and Type B(M) packages containing more than 10^5 A_2, and Type C packages ... 6-7-12
7.18 Water leakage test for packages containing fissile material ... 6-7-12
7.19 Tests for Type C packages ... 6-7-13
7.20 Tests for packagings designed to contain uranium hexafluoride ... 6-7-13
7.21 Approvals of package designs and materials ... 6-7-13
7.22 Applications and approvals for radioactive material transport ... 6-7-14
7.23 Registration of serial numbers and validation ... 6-7-14
7.24 Transitional measures for Class 7 ... 6-7-14

Chapter 8. Requirements for intermediate bulk containers ... 6-8-1

8.1 Marking of packaging for intermediate bulk containers ... 6-8-1

Part 7. OPERATOR'S RESPONSIBILITIES

Introductory Notes ... 7-(i)

Chapter 1. Acceptance procedures ... 7-1-1

1.1 Cargo acceptance procedures ... 7-1-1
1.2 Acceptance of dangerous goods by operators ... 7-1-1
1.3 The acceptance check ... 7-1-1
1.4 Acceptance of freight containers and unit load devices ... 7-1-2
1.5 Special responsibilities in accepting infectious substances ... 7-1-2
1.6 Undeliverable consignments of radioactive material ... 7-1-3
1.7 Conducting safety risk assessments ... 7-1-3

Chapter 2. Storage and loading ... 7-2-1

2.1 Loading restrictions on the flight deck and for passenger aircraft ... 7-2-1
2.2 Incompatible dangerous goods ... 7-2-1
2.3 Handling and loading of packages containing liquid dangerous goods ... 7-2-3
2.4 Loading and securing of dangerous goods ... 7-2-3
2.5 Damaged packages of dangerous goods ... 7-2-4
2.6 Visibility of markings and labels ... 7-2-4
2.7 Replacement of marks and labels ... 7-2-4
2.8 Identification of unit load devices containing dangerous goods ... 7-2-4
2.9 Special provisions applicable to the carriage of radioactive material ... 7-2-4
2.10 Loading of magnetized materials ... 7-2-8
2.11 Loading of dry ice ... 7-2-9
2.12 Loading of UN 2211, polymeric beads, expandable or UN 3314, plastics moulding compound ... 7-2-9
2.13 Loading of battery-powered mobility aids carried under the provisions of Part 8 ... 7-2-9
2.14 Handling of self-reactive substances and organic peroxides ... 7-2-11
2.15 Handling and loading of intermediate bulk containers (IBCs) ... 7-2-11

Chapter 3. Inspection and decontamination ... 7-3-1

3.1 Inspection for damage or leakage ... 7-3-1
3.2 Damaged or leaking packages of radioactive material, contaminated packagings ... 7-3-1
3.3 Dealing with suspected contaminated baggage or cargo ... 7-3-2

Chapter 4. Provision of information ... 7-4-1

Introductory Note ... 7-4-1

4.1 Information to the pilot-in-command ... 7-4-1
4.2 Information to be provided to employees ... 7-4-3
4.3 Information to be provided by the pilot-in-command in case of in-flight emergency ... 7-4-3
4.4 Reporting of dangerous goods accidents and incidents ... 7-4-3
4.5 Reporting of undeclared or misdeclared dangerous goods ... 7-4-3
4.6 Reporting of dangerous goods occurrences ... 7-4-4
4.7 Information by the operator in case of an aircraft accident or incident ... 7-4-4
4.8 Cargo acceptance areas — Provision of information ... 7-4-4
4.9 Emergency response information ... 7-4-4
4.10 Training ... 7-4-4
4.11 Retention of documents or information ... 7-4-5

Page

Chapter 5. Provisions concerning passengers and crew 7-5-1

5.1 Information to passengers 7-5-1
5.2 Passenger check-in procedures 7-5-1

Chapter 6. Provisions to aid recognition of undeclared dangerous goods 7-6-1

Chapter 7. Helicopter operations 7-7-1

Part 8. PROVISIONS CONCERNING PASSENGERS AND CREW

Chapter 1. Provisions for dangerous goods carried by passengers or crew 8-1-1

1.1 Dangerous goods carried by passengers or crew 8-1-1

ATTACHMENTS

ATTACHMENT 1. Lists of proper shipping names

Chapter 1. List of UN numbers with associated proper shipping names A1-1-1
Chapter 2. List of n.o.s. and generic proper shipping names A1-2-1

ATTACHMENT 2. Glossary of terms

Glossary of terms A2-1

ATTACHMENT 3. Notified variations from the Instructions

Chapter 1. Variations notified by States A3-1-1
Chapter 2. Variations notified by airline operators A3-2-1

ATTACHMENT 4. Index and list of tables and figures

Index A4-1
List of tables A4-14
List of figures A4-15

Part 1

GENERAL

Chapter 1

SCOPE AND APPLICABILITY

Parts of this Chapter are affected by State Variations AE 3, AE 7, AE 8, BE 2, BE 4, BR 4, CA 6, CH 3, DE 1, DE 4, DK 2, FR 2, GH 3, HR 3, HR 4, HR 5, IN 1, IR 1, IT 1, IT 5, KH 1, KW 1, NL 6, OM 4, RO 1, RO 2, RO 3, US 1, VC 1, VC 2, VC 3, VE 1, VE 4, VE 8, VU 2; see Table A-1

≠ *Note.— Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these Instructions, are published as a separate Manual (UN* Manual of Tests and Criteria*) (ST/SG/AC.10/11/Rev.7 and Amend. 1), the contents of which are:*

Part I. Classification procedures, test methods and criteria relating to explosives of Class 1;

Part II. Classification procedures, test methods and criteria relating to self-reactive and polymerizing substances of Division 4.1 and organic peroxides of Division 5.2;

Part III. Classification procedures, test methods and criteria relating to substances or articles of Class 2, Class 3, Class 4, Division 5.1, Class 8 and Class 9;

Part IV. Test methods concerning transport equipment; and

Part V. Classification procedures, test methods and criteria relating to sectors other than transport.

Appendices. Information common to a number of different types of tests and national contacts for test details.

1.1 GENERAL APPLICABILITY

1.1.1 These *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, referred to herein as the "Instructions", prescribe the detailed requirements applicable to the international civil transport of dangerous goods by air by any aircraft (including both internal and external carriage). Any addenda to this edition of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* issued by ICAO constitute part of these Instructions.

1.1.2 Where specifically provided for in these Instructions, the States concerned may grant an approval provided that in such instances an overall level of safety in transport which is equivalent to the level of safety provided for in these Instructions is achieved.

1.1.3 In instances:

a) of extreme urgency; or

b) when other forms of transport are inappropriate; or

c) when full compliance with the prescribed requirements is contrary to public interest,

the States concerned may grant an exemption from the provisions of the Instructions provided that in such instances every effort is made to achieve an overall level of safety in transport which is at least equivalent to the level of safety provided for in these Instructions.

1.1.4 For the State of overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.

Note 1.— For the purpose of approvals, "States concerned" are the States of Origin and the Operator, unless otherwise specified in these Instructions.

Note 2.— For the purpose of exemptions, "States concerned" are the States of Origin, Operator, Transit, Overflight and Destination.

Note 3.— Guidance for the processing of exemptions, including examples of extreme urgency, may be found in the Supplement to the Technical Instructions *(Part S-1;1.2 and 1.3).*

Note 4.— Refer to 1;2.1 for dangerous goods forbidden for transport by air under any circumstance.

Note 5.— Due to the differences in the type of operations carried out by helicopters compared with aeroplanes, some additional considerations need to be made when dangerous goods are carried by helicopter, as described in 7;7.

1.1.5 General exceptions

1.1.5.1 Except for 7;4.2, these Instructions do not apply to dangerous goods carried by an aircraft where the dangerous goods are:

a) to provide, during flight, medical aid to a patient or to preserve tissues or organs intended for use in transplantation when those dangerous goods:

   1) have been placed on board with the approval of the operator; or

   2) form part of the permanent equipment of the aircraft when it has been adapted for specialized use;

   providing that:

   1) gas cylinders have been manufactured specifically for the purpose of containing and transporting that particular gas;

   2) equipment containing wet cell batteries is kept and, when necessary, secured in an upright position to prevent spillage of the electrolyte;

   3) lithium metal or lithium ion cells or batteries meet the provisions of 2;9.3 and spare lithium batteries are individually protected so as to prevent short circuits when not in use;

   Note.— For dangerous goods that passengers are permitted to carry as medical aid, see 8;1.1.2.

b) to provide, during flight, veterinary aid or a humane killer for an animal;

c) for dropping in connection with agricultural, horticultural, forestry, ice jam control, landslide clearance, pollution control activities or pest management activities;

d) for dropping or triggering in connection with avalanche control activities;

e) to provide, during flight, or related to the flight, aid in connection with search and rescue operations;

f) vehicles carried in aircraft designed or modified for vehicle ferry operations and all of the following requirements are met:

   1) authorization has been given by the appropriate authorities of the States concerned, and such authorities have prescribed specific terms and conditions for the particular operator's operation;

   2) vehicles are secured in an upright position;

   3) fuel tanks are so filled as to prevent spillage of fuel during loading, unloading and transit; and

   4) adequate ventilation rates are maintained in the aircraft compartment in which the vehicle is carried;

g) required for the propulsion of the means of transport or the operation of its specialized equipment during transport (e.g. refrigeration units) or that are required in accordance with the operating regulations (e.g. fire extinguishers) (see 2.2).

   Note.— This exception is only applicable to the means of transport performing the transport operation.

h) contained within items of excess baggage being sent as cargo provided that:

   1) the excess baggage has been consigned as cargo by or on behalf of a passenger;

   2) the dangerous goods may only be those that are permitted by and in accordance with 8;1.1.2 to be carried in checked baggage;

   3) the excess baggage is marked with the words "Excess baggage consigned as cargo".

1.1.5.2 Provision must be made to stow and secure dangerous goods transported under 1.1.5.1 a), b), c), d) and e) during take-off and landing and at all other times when deemed necessary by the pilot-in-command.

1.1.5.3 The dangerous goods must be under the control of trained personnel during the time when they are in use on the aircraft.

1.1.5.4 Dangerous goods transported under 1.1.5.1 a), b), c), d) and e) may be carried on a flight made by the same aircraft before or after a flight for the purposes identified above, when it is impracticable to load or unload the dangerous goods immediately before or after the flight, subject to the following conditions:

a) the dangerous goods must be capable of withstanding the normal conditions of air transport;

b) the dangerous goods must be appropriately identified (e.g. by marking or labelling);

c) the dangerous goods may only be carried with the approval of the operator;

d) the dangerous goods must be inspected for damage or leakage prior to loading;

e) loading must be supervised by the operator;

f) the dangerous goods must be stowed and secured in the aircraft in a manner that will prevent any movement in flight which would change their orientation;

g) the pilot-in-command must be notified of the dangerous goods loaded on board the aircraft and their loading location. In the event of a crew change, this information must be passed to the next crew;

h) all personnel must be trained commensurate with the functions for which they are responsible;

i) the provisions of 7;4.2 and 7;4.4 apply.

1.1.5.5 Dangerous goods transported under 1.1.5.1 a), b), c), d) and e) may be carried on flights made by the same aircraft for other purposes (e.g. training flights and positioning flights prior to or after maintenance), subject to the conditions in 1.1.5.4 a) to i).

1.2 GENERAL TRANSPORT REQUIREMENTS

Except as otherwise provided for in these Instructions, no person may offer or accept dangerous goods for international civil transport by air unless those goods are properly classified, documented, certificated, described, packaged, marked, labelled and in the condition for shipment required by these Instructions. If a person performs a function required by these Instructions on behalf of the person who offers the dangerous goods for transport by air or on behalf of the operator, that person must perform that function in accordance with the requirements of these Instructions. No person may transport dangerous goods by air unless those goods are accepted, handled and transported in accordance with these Instructions. No person may label, mark, certify or offer a packaging as meeting the requirements of these Instructions unless that packaging is manufactured, fabricated, marked, maintained, reconditioned or repaired as required by these Instructions. No person shall carry dangerous goods or cause dangerous goods to be carried aboard an aircraft in either checked or carry-on baggage or on his/her person, unless permitted by 8;1.1.2.

Note.— When dangerous goods intended for air transport are carried by surface transport to or from an aerodrome, any other applicable national or modal transport requirements should be met in addition to those that are applicable for the goods when carried by air.

1.3 APPLICATION OF STANDARDS

Where the application of a standard is required and there is any conflict between the standard and these Instructions, the Instructions take precedence. The requirements of the standard that do not conflict with these Instructions must be applied as specified, including the requirements of any other standard, or part of a standard, referenced within that standard as normative.

1.4 DANGEROUS GOODS PACKAGES OPENED BY CUSTOMS AND OTHER AUTHORITIES

Any package opened during an inspection must, before being forwarded to the consignee, be restored by qualified persons to a condition that complies with these Instructions.

1.5 RELATIONSHIP TO ANNEX 18

ICAO Standards and Recommended Practices related to the transport of dangerous goods are contained in Annex 18 to the Convention on International Civil Aviation. These Instructions contain the detailed technical material needed to support the broad provisions of Annex 18 (Fourth Edition) in order to provide a fully comprehensive set of international regulations.

1.6 REQUESTS FOR AMENDMENTS TO THE TECHNICAL INSTRUCTIONS

Any request for an amendment to the Technical Instructions must be submitted to the appropriate national authority. Requests for amendments should include the following information:

a) the text or substance of the amendment proposed or identification of the provision the petitioner seeks to have repealed, as appropriate;

b) a statement of the interest of the petitioner in the action requested; and

c) any information and arguments to support the action sought.

Chapter 2

LIMITATION OF DANGEROUS GOODS ON AIRCRAFT

Parts of this Chapter are affected by State Variations BN 3, CA 5, DQ 3, FR 6, GB 5, NL 3, OM 3, US 2, VC 4, ZA 4; see Table A-1

2.1 DANGEROUS GOODS FORBIDDEN FOR TRANSPORT BY AIR UNDER ANY CIRCUMSTANCE

Any article or substance which, as presented for transport, is liable to explode, dangerously react, produce a flame or dangerous evolution of heat or dangerous emission of toxic, corrosive or flammable gases or vapours under conditions normally encountered in transport must not be carried on aircraft under any circumstance.

Note 1.— Certain dangerous goods known to meet the description above have been included in the Dangerous Goods List (Table 3-1) with the word "Forbidden" shown in columns 2 and 3. It must be noted, however, that it would be impossible to list all dangerous goods which are forbidden for transport by air under any circumstance. Therefore, it is essential that appropriate care be exercised to ensure that no goods meeting the above description are offered for transport.

Note 2.— Paragraph 2.1 is intended to include articles being returned to the manufacturer for safety reasons.

2.2 EXCEPTIONS FOR DANGEROUS GOODS OF THE OPERATOR

2.2.1 The provisions of these Instructions do not apply to the following:

a) articles and substances which would otherwise be classified as dangerous goods but which are required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations or that are authorized by the State of the Operator to meet special requirements;

b) aerosols, alcoholic beverages, perfumes, colognes, liquefied gas lighters and portable electronic devices containing lithium metal or lithium ion cells or batteries provided that the batteries meet the provisions of Table 8-1, Item 1) carried aboard an aircraft by the operator for use or sale on the aircraft during the flight or series of flights, but excluding non-refillable gas lighters and those lighters liable to leak when exposed to reduced pressure;

c) dry ice intended for use in food and beverage service aboard the aircraft;

+ d) alcohol-based hand sanitizers and cleaning products carried aboard an aircraft by the operator for use on the aircraft during the flight or series of flights for the purposes of passenger and crew hygiene;

e) electronic devices, such as electronic flight bags, personal entertainment devices, and credit card readers, containing lithium metal or lithium ion cells or batteries and spare lithium batteries for such devices carried aboard an aircraft by the operator for use on the aircraft during the flight or series of flights, provided that the batteries meet the provisions of Table 8-1, Item 1). Spare lithium batteries must be individually protected so as to prevent short circuits when not in use. Conditions for the carriage and use of these electronic devices and for the carriage of spare batteries must be provided in the operations manual and/or other appropriate manuals as will enable flight crew, cabin crew and other employees to carry out the functions for which they are responsible.

2.2.2 Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in 2.2.1 a), or articles and substances referred to in 2.2.1 a) which have been removed for replacement, must be transported in accordance with the provisions of these Instructions, except that when consigned by operators, they may be carried in containers specially designed for their transport, provided such containers are capable of meeting at least the requirements for the packagings specified in these Instructions for the items packed in the containers.

≠ 2.2.3 Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in 2.2.1 b), c) and d) must be transported in accordance with the provisions of these Instructions.

≠ 2.2.4 Unless otherwise authorized by the State of the Operator, battery-powered devices with installed batteries and spare batteries intended as replacements for those referred to in 2.2.1 e) must be transported in accordance with the provisions of these Instructions.

2.3 TRANSPORT OF DANGEROUS GOODS BY POST

2.3.1 In accordance with the Universal Postal Union (UPU) Convention, dangerous goods as defined in these Instructions, with the exception of those listed below, are not permitted in mail. Appropriate national authorities should ensure that the provisions are complied with in relation to the transport of dangerous goods by air.

2.3.2 The following dangerous goods may be acceptable in mail for air carriage subject to the provisions of the appropriate national authorities concerned and these Instructions:

a) patient specimens as defined in 2;6.3.1.4 provided that they are classified, packed and marked as required by 2;6.3.2.3.8 a), b), c) and d);

b) infectious substances assigned to category B (UN 3373) only, when packed in accordance with the requirements of Packing Instruction 650, and solid carbon dioxide (dry ice) when used as a refrigerant for UN 3373. Where dry ice is used as a refrigerant for UN 3373, all applicable requirements of Packing Instruction 954 must be met. Mail containing dry ice as a refrigerant for UN 3373 must be offered separately to the operator by the designated postal operator so that the operator can comply with all applicable requirements of Part 7;

c) radioactive material in an excepted package, UN Nos. 2910 and 2911 only, the activity of which does not exceed one-tenth of that listed in Part 2, Chapter 7, Table 2-14, and that does not meet the definitions and criteria of classes, other than Class 7, or divisions, as defined in Part 2. The package must be marked with the name of the shipper and the consignee, the package must be marked “radioactive material — quantities permitted for movement by post” and must bear the radioactive material, excepted package label (Figure 5-33);

d) lithium ion batteries contained in equipment (UN 3481) meeting the provisions of Section II of Packing Instruction 967. No more than four cells or two batteries may be mailed in any single package; and

e) lithium metal batteries contained in equipment (UN 3091) meeting the provisions of Section II of Packing Instruction 970. No more than four cells or two batteries may be mailed in any single package.

2.3.3 The procedures of designated postal operators (DPOs) for controlling the introduction of dangerous goods in mail into air transport are subject to review and approval by the civil aviation authority of the State where the mail is accepted.

2.3.4 The DPO must have received specific approval from the civil aviation authority before the DPO can introduce the acceptance of lithium batteries as identified in 2.3.2 d) and e).

Note 1.— Designated postal operators may accept the dangerous goods identified in 2.3.2 a), b) and c) without receiving specific approval from the civil aviation authority.

Note 2.— Guidelines for appropriate national authorities and civil aviation authorities are contained in the Supplement to these Instructions (S-1;3).

2.4 DANGEROUS GOODS IN EXCEPTED QUANTITIES

Small quantities of dangerous goods, as defined in Part 3, Chapter 5, are excepted from certain provisions of these Instructions subject to the conditions laid down in that chapter.

2.5 EXCEPTIONS FOR DANGEROUS GOODS PACKED IN LIMITED QUANTITIES

Dangerous goods packed in limited quantities are excepted from certain provisions of these Instructions subject to the conditions laid down in Part 3, Chapter 4.

2.6 LAMPS CONTAINING DANGEROUS GOODS

The following lamps are not subject to these Instructions provided that they do not contain radioactive material:

a) lamps each containing not more than 1 g of dangerous goods and packaged so that there is not more than 30 g of dangerous goods per package, provided that:

1) the lamps are certified to a manufacturer’s quality management system; and

Note.— The application of ISO 9001:2008 may be considered acceptable for this purpose.

2) each lamp is either individually packed in inner packagings, separated by dividers, or surrounded with cushioning material to protect the lamps and packed into strong outer packagings meeting the general provisions of 4;1.1.1 and capable of passing a 1.2 m drop test; and

b) lamps containing only gases of Division 2.2 (according to 2;2.2.1) provided they are packaged so that the projectile effects of any rupture of the bulb will be contained within the package.

Note.— Lamps containing radioactive material are addressed in 2;7.2.2.2 b).

Chapter 3

GENERAL INFORMATION

Parts of this Chapter are affected by State Variation BE 1; see Table A-1

3.1 DEFINITIONS

3.1.1 The following is a list of definitions of commonly used terms in these Instructions. Definitions of terms which have their usual dictionary meanings or are used in the common technical sense are not included. Definitions of additional terms used solely in conjunction with radioactive material are contained in 2;7.1.3.

≠ ***Aerosol or aerosol dispenser.*** An article consisting of a non-refillable receptacle meeting the requirements of 6;5.4, made of metal, glass or plastics and containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.

Animal material. Animal carcasses, animal body parts, foodstuffs or feedstuffs derived from animals.

Appropriate national authority. Any authority designated, or otherwise recognized, by a State to perform specific functions related to provisions contained in these Instructions.

Approval. An authorization granted by the appropriate national authority for:

a) the transport of dangerous goods forbidden on passenger and/or cargo aircraft where the Technical Instructions state that such goods may be carried with an approval; or

b) other purposes as provided for in the Technical Instructions.

Note.— In the absence of a specific reference in the Technical Instructions allowing the granting of an approval, an exemption may be sought.

Approval. For the transport of radioactive material:

Multilateral approval. The approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country.

Unilateral approval. The approval of a design which is required to be given by the competent authority of the country of origin of the design only.

ASTM. The American Society for Testing and Materials (ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States).

Baggage. Personal property of passengers or crew carried on an aircraft by agreement with the operator.

Bag. A flexible packaging made of paper, plastic film, textiles, woven material or other suitable materials.

Box. A packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fibreboard, plastic or other suitable material. Small holes for purposes such as ease of handling or opening, or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during transport.

≠ ***Bundle of cylinders.*** Not permitted for air transport. A pressure receptacle comprising an assembly of cylinders or cylinder shells that are fastened together and which are interconnected by a manifold and transported as a unit.

Cargo. For the purposes of these Instructions, any property carried on an aircraft other than mail and accompanied or mishandled baggage.

Note.— This definition differs from the definition of "cargo" given in Annex 9 — Facilitation.

Cargo aircraft. Any aircraft, other than a passenger aircraft, which is carrying goods or property.

Cargo transport unit. A multimodal freight container or portable tank.

Closed cargo transport unit. A cargo transport unit which totally encloses the contents by permanent structures with complete and rigid surfaces. Cargo transport units with fabric sides or tops are not considered closed cargo transport units.

≠ ***Closed cryogenic receptacle.*** A thermally insulated pressure receptacle for refrigerated liquefied gases of a water capacity of not more than 1 000 litres.

Closure. A device which closes an opening in a receptacle.

\+ *Note.— Examples of closures for pressure receptacles are valves, pressure relief devices, pressure gauges or level indicators.*

Combination packaging. A combination of packagings for transport purposes, consisting of one or more inner packagings secured in an outer packaging in accordance with the relevant provisions of Part 4.

Competent authority. Any body or authority designated or otherwise recognized as such for any purpose in connection with these Instructions.

Note.— This applies to radioactive material only.

Compliance assurance. A systematic programme of measures applied by an appropriate authority which is aimed at ensuring that the provisions of these Instructions are met in practice.

Composite packaging. A packaging consisting of an outer packaging and an inner receptacle so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled, it remains thereafter an integrated single unit; it is filled, stored, transported and emptied as such.

Note.— Composite packagings for the purpose of these Instructions are regarded as single packagings.

Confinement system. For the transport of radioactive material, the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety.

Consignee. Any person, organization or government which is entitled to take delivery of a consignment.

Consignment. One or more packages of dangerous goods accepted by an operator from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

Containment system. For the transport of radioactive material, the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport.

Control temperature. The maximum temperature at which the substance can be safely transported. It is assumed that during transport the temperature of the immediate surroundings of the package does not exceed 55°C and attains this value for a relatively short time only during each period of 24 hours.

Crate. An outer packaging with incomplete surfaces.

Note.— For air transport, crates may not be used as outer packagings of composite packagings.

Crew member. A person assigned by an operator to duty on an aircraft during a flight duty period.

Critical temperature. The temperature above which the substance cannot exist in the liquid state.

Criticality safety index (CSI) assigned to a package, overpack or freight container containing fissile material. For the transport of radioactive material, a number which is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material.

≠ ***Cylinder.*** A pressure receptacle of a water capacity not exceeding 150 litres.

Dangerous goods. Articles or substances which are capable of posing a hazard to health, safety, property or the environment and which are shown in the list of dangerous goods in these Instructions, or which are classified according to these Instructions.

Dangerous goods accident. An occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property or environmental damage.

Dangerous goods incident. An occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, which results in injury to a person, property or environmental damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardizes the aircraft or its occupants is also deemed to be a dangerous goods incident.

Note.— A dangerous goods accident or incident may also constitute an aircraft accident or incident as specified in Annex 13 — Aircraft Accident and Incident Investigation.

Dangerous goods security. Measures or precautions to be taken by operators**,** shippers and others involved in the transport of dangerous goods aboard aircraft to minimize theft or misuse of dangerous goods that may endanger persons or property.

Design. For the transport of radioactive material, the description of fissile material excepted under 2;7.2.3.5.1 f), special form radioactive material, low dispersible radioactive material, package or packaging which enables such items to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.

Design life. For composite cylinders and tubes, the maximum life (in number of years) to which the cylinder or tube is designed and approved in accordance with the applicable standard.

Designated postal operator. Any governmental or non-governmental entity officially designated by a Universal Postal Union (UPU) member country to operate postal services and to fulfil the related obligations arising from the acts of the UPU Convention on its territory.

Dose rate. The ambient dose equivalent or the directional dose equivalent, as appropriate, per unit time, measured at the point of interest.

Drum. A flat-ended or convex-ended cylindrical packaging made of metal, fibreboard, plastic, plywood or other suitable materials. This definition also includes packagings of other shapes, e.g. round taper-necked packagings, or pail-shaped packagings. Jerricans are not covered by this definition.

Elevated temperature substance. A substance which is transported or offered for transport:

— in the liquid state at a temperature at or above 100°C;

— in the liquid state with a flashpoint above 60°C and which is intentionally heated to a temperature above its flashpoint; or

— in a solid state and at a temperature at or above 240°C.

EN *(standard)*. A European standard published by the European Committee for Standardization (CEN) (CEN — 36 rue de Stassart, B-1050 Brussels, Belgium).

Exception. A provision in these Instructions which excludes a specific item of dangerous goods from the requirements normally applicable to that item.

Excess baggage. Baggage which a passenger has presented to check-in as accompanied checked baggage, but which exceeds the passenger's baggage allowance specified by the operator and which is consequently consigned as cargo in order to be sent to the same destination as the passenger.

Exclusive use. For the transport of radioactive material, the sole use, by a single shipper, of an aircraft or of a large freight container, in respect of which all initial, intermediate and final loading and unloading and shipment are carried out in accordance with the directions of the shipper or consignee, where so required by these Instructions.

Exemption. An authorization, other than an approval, granted by an appropriate national authority providing relief from the provisions of the Technical Instructions.

Note.— The requirements for exemptions are given in 1;1.1.3.

Explosive article. An article containing one or more explosive substances.

Explosive substance. A solid or liquid substance (or a mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Included are pyrotechnic substances even when they do not evolve gases. A substance which is not itself an explosive but which can form an explosive atmosphere of gas, vapour or dust is not included.

External carriage. Any load suspended from a helicopter or in equipment attached to a helicopter.

Filling ratio. The ratio of the mass of gas to the mass of water at 15°C that would fill completely a pressure receptacle fitted ready for use.

Flash point. The lowest temperature of a liquid at which flammable vapour is given off in a test vessel in sufficient concentration to be ignited in air when exposed momentarily to a source of ignition.

Note.— Some test methods are listed in 2;3.3.

Flight crew member. A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

Freight container. See unit load device.

Note.— For the definition of freight container for radioactive material, see 2;7.1.3.

Freight container in the case of radioactive material transport. See 2;7.1.3.

Freight forwarder. A person or organization who offers the service of arranging the transport of cargo by air.

Fuel cell. An electrochemical device that converts the chemical energy of a fuel to electrical energy, heat and reaction products.

Fuel cell engine. A device used to power equipment and which consists of a fuel cell and its fuel supply, whether integrated with or separate from the fuel cell, and includes all appurtenances necessary to fulfil its function.

≠ ***GHS.*** The ninth revised edition of the *Globally Harmonized System of Classification and Labelling of Chemicals*, published by the United Nations as document ST/SG/AC.10/30/Rev.9.

Gross mass. The total mass of the package.

IAEA. The International Atomic Energy Agency (IAEA, P.O. Box 100 — A 1400 Vienna, Austria).

\+ ***IAEA Regulations for the Safe Transport of Radioactive Material.*** One of the editions of those Regulations, as follows:

a) for the 1985, 1985 (as amended 1990) editions: IAEA Safety Series No. 6;

b) for the 1996 edition: IAEA Safety Series No. ST-1;

c) for the 1996 (revised) edition: IAEA Safety Series No. TS-R-1 (ST-1, Revised);

d) for the 1996 (as amended 2003), 2005, 2009 editions: IAEA Safety Standards Series No. TS-R-1;

e) for the 2012 edition: IAEA Safety Standards Series No. SSR-6; or

f) for the 2018 edition: IAEA Safety Standards Series No. SSR-6 (Rev.1).

ID number. A temporary identification number for entries in Table 3-1 — Dangerous Goods List — which have not been assigned a UN number.

IEC. The International Electrotechnical Commission (IEC, 3, rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, Switzerland).

IMO. The International Maritime Organization (IMO, 4 Albert Embankment, London SE1 7SR, United Kingdom).

Incompatible. Describing dangerous goods which, if mixed, would be liable to cause a dangerous evolution of heat or gas or produce a corrosive substance.

Inner packaging. A packaging for which an outer packaging is required for transport.

Inner receptacle. A receptacle which requires an outer packaging in order to perform its containment function.

\+ ***Inner vessel.*** For a closed cryogenic receptacle, the pressure vessel intended to contain the refrigerated liquefied gas.

Inspection body. An independent inspection and testing body approved by the appropriate national authority.

Intermediate bulk container (IBC). Any rigid or flexible portable packaging, other than those specified in Part 6;3 of these Instructions, as described in Chapter 6.5 of the UN Model Recommendations, that is designed for mechanical handling and is resistant to the stresses produced in handling and transport, as determined by tests.

Note.— IBCs are only authorized by these Instructions for UN 3077, ***Environmentally hazardous substance, solid, n.o.s.*** *as provided in Packing Instruction 956.*

Intermediate packaging. A packaging placed between inner packagings or articles and an outer packaging.

International System of Units (SI). A rational and coherent system of units which provides the basis for the units of measurement used for air and ground operations as contained in Annex 5 to the Convention on International Civil Aviation.

ISO (standard). An international standard published by the International Organization for Standardization (ISO — 1, ch. de la Voie-Creuse, CH-1211 Geneva 20, Switzerland).

Jerrican. A metal or plastic packaging of rectangular or polygonal cross-section.

Large packaging. A packaging consisting of an outer packaging which contains articles or inner packagings and which:

a) is designed for mechanical handling; and

b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m^3;

Note.— Large packagings are only permitted as provided for in Part 4, Introductory Note 12 and S-4;13 of the Supplement.

Large salvage packaging. (Not permitted for air transport.) A special packaging which:

a) is designed for mechanical handling; and

b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m³;

into which damaged, defective, leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked are placed for purposes of transport for recovery or disposal.

Liner. A separate tube or bag inserted into a packaging but not forming an integral part of it, including the closures of its openings.

≠ ***Liquid.*** A substance classified as dangerous goods which at 50°C has a vapour pressure of not more than 300 kPa (3 bar), which is not completely gaseous at 20°C and at a pressure of 101.3 kPa, and which has a melting point or initial melting point of 20°C or less at a pressure of 101.3 kPa. A viscous substance for which a specific melting point cannot be determined must be subjected to the ASTM D 4359-90 test; or to the test for determining fluidity (penetrometer test) prescribed in section 2.3.4 of Annex A of the *Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)* (United Nations publication: ECE/TRANS/300 (Sales No. E.21.VIII.1).

Low dispersible radioactive material. A solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

Mail. Dispatches of correspondence and other items tendered by, and intended for delivery to, postal services in accordance with the rules of the Universal Postal Union (UPU).

Management system for the transport of radioactive material. A set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner.

≠ ***Manual of Tests and Criteria.*** The seventh revised edition of the United Nations publication bearing this title (ST/SG/AC.10/11/Rev.7 and Amend. 1).

Maximum capacity. The maximum inner volume of receptacles or packagings expressed in litres.

Maximum net mass. The maximum net mass of contents in a single packaging or maximum combined mass of inner packagings and the contents thereof expressed in kilograms.

Maximum normal operating pressure. For the transport of radioactive material, the maximum pressure above atmospheric pressure at mean sea level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during transport.

≠ ***Metal hydride storage system.*** A single complete hydrogen storage system, including a pressure receptacle shell, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transport of hydrogen only.

\+ ***Model Regulations.*** The twenty-second revised edition of the United Nations publication entitled *Recommendations on the Transport of Dangerous Goods: Model Regulations* (ST/SG/AC.10/1/Rev.22).

Multiple-element gas container (MEGC). (Not permitted for air transport.) A multimodal assembly of cylinders, tubes or bundles of cylinders which are interconnected by a manifold and which are assembled within a framework. The MEGC includes service equipment and structural equipment necessary for the transport of gases.

Net explosive mass (NEM). The total mass of the explosive substances, without the packagings, casings, etc. (net explosive quantity (NEQ), net explosive contents (NEC), or net explosive weight (NEW) are often used to convey the same meaning).

Net quantity. Either:

a) the mass or volume of the dangerous goods contained in a package excluding the mass or volume of any packaging material; or

b) the mass of an unpackaged article of dangerous goods (e.g. UN 3166).

For the purposes of this definition, “dangerous goods” means the substance or article as described by the proper shipping name shown in Table 3-1, e.g. for “Fire extinguishers”, the net quantity is the mass of the fire extinguisher. For articles packed with equipment or contained in equipment, the net quantity is the net mass of the article, e.g. for lithium ion batteries contained in equipment, the net quantity is the net mass of the lithium ion batteries in the package.

Neutron radiation detector. A device that detects neutron radiation. In such a device, a gas may be contained in a hermetically sealed electron tube transducer that converts neutron radiation into a measureable electric signal.

Open cryogenic receptacle. A transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated liquefied gas.

Operator. A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Outer packaging. The outer protection of a composite or combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings.

Overpack. An enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage.

Note.— A unit load device is not included in this definition.

Package. The complete product of the packing operation, consisting of the packaging and its contents prepared for transport.

Packaging. One or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions.

Note.— For radioactive material, see 2;7.1.3.

Passenger aircraft. An aircraft that carries any person other than a crew member, an operator's employee in an official capacity, an authorized representative of an appropriate national authority or a person accompanying a consignment or other cargo.

Pilot-in-command. The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

Portable tank. For the definition of portable tanks, see Part S-4, Chapter 12 of the Supplement.

≠ ***Pressure drum.*** (Not permitted for air transport.) A welded pressure receptacle of a water capacity exceeding 150 litres and of not more than 1 000 litres (e.g. cylindrical receptacles equipped with rolling hoops, spheres on skids).

≠ ***Pressure receptacle.*** A transportable receptacle intended for holding substances under pressure including its closure(s) and other service equipment and a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems, bundles of cylinders and salvage pressure receptacles.

\+ ***Pressure receptacle shell.*** A cylinder, a tube, a pressure drum or a salvage pressure receptacle without its closures or other service equipment, but including any permanently attached device(s) such as a neck ring or a foot ring.

Note.— The terms "cylinder shell", "pressure drum shell" and "tube shell" are also used.

Pyrotechnic substance. A mixture or compound designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative, self-sustaining, exothermic, chemical reactions.

Quality assurance. A systematic programme of controls and inspections applied by any organization or body which is aimed at providing adequate confidence that the standard of safety prescribed by these Instructions is achieved in practice.

Radiation detection system. An apparatus that contains radiation detectors as components.

Radioactive contents. For the transport of radioactive material, the radioactive material together with any contaminated or activated solids, liquids, and gases within the packaging.

Receptacle. A containment vessel for receiving and holding substances or articles, including any means of closing.

Reconditioned packagings include:

a) metal drums that are:

   i) cleaned to original materials of construction, with all former contents, internal and external corrosion, and external coatings and labels removed;

   ii) restored to original shape and contour, with chimes (if any) straightened and sealed, and all non-integral gaskets replaced; and

   iii) inspected after cleaning but before painting, with rejection of packagings with visible pitting, significant reduction in material thickness, metal fatigue, damaged threads or closures, or other significant defects;

b) plastic drums and jerricans that:

   i) are cleaned to original materials of construction, with all former contents, external coatings and labels removed;

   ii) have all non-integral gaskets replaced; and

   iii) are inspected after cleaning with rejection of packagings with visible damage such as tears, creases or cracks, or damaged threads or closures or other significant defects.

Note.— It is anticipated that further examples will be added in future.

Recycled plastic material. Material recovered from used industrial packagings that has been cleaned and prepared for processing into new packagings. The specific properties of the recycled material used for production of new packagings must be assured and documented regularly as part of a quality assurance programme recognized by the appropriate national authority. The quality assurance programme must include a record of proper pre-sorting and verification that each batch of recycled plastic material has the proper melt flow rate, density, and tensile yield strength, consistent with that of the design type manufactured from such recycled material. This necessarily includes knowledge about the packaging material from which the recycled plastic has been derived, as well as awareness of the prior contents of those packagings if those prior contents might reduce the capability of new packagings produced using that material. In addition, the packaging manufacturer's quality assurance programme must include performance of the mechanical design type test in Part 6, Chapter 4 on packagings manufactured from each batch of recycled plastic material. In this testing, stacking performance may be verified by appropriate dynamic compression testing rather than static load testing.

≠ *Note.— ISO 16103:2005 "Packaging — Transport packages for dangerous goods — Recycled plastics material", provides additional guidance on procedures to be followed in approving the use of recycled plastics material. These guidelines have been developed based on the experience of the manufacturing of drums and jerricans from recycled plastics material and as such may need to be adapted for other types of packagings, IBCs and large packagings made of recycled plastics material.*

Remanufactured large packaging. (Not permitted for air transport.) A metal or rigid plastics large packaging that:

a) is produced as a UN type from a non-UN type; or

b) is converted from one UN design type to another UN design type.

Remanufactured large packagings are subject to the same requirements of the UN Model Regulations that apply to new large packagings of the same type (see also design type definition in 6.6.5.1.2 of the UN Model Regulations).

Remanufactured packagings include:

a) metal drums that:
   i) are produced as a UN type from a non-UN type;

   ii) are converted from one UN type to another UN type; or

   iii) undergo the replacement of integral structural components (such as non-removable heads);

b) plastic drums that:

   i) are converted from one UN type to another UN type (e.g. 1H1 to 1H2); or

   ii) undergo the replacement of integral structural components.

Remanufactured drums are subject to the same requirements of these Instructions as apply to a new drum of the same type.

Reused large packaging. (Not permitted for air transport.) A large packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests: the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the consignor of the product.

Reused packaging. A packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests; the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the shipper of the product.

Salvage packaging. A special packaging into which damaged, defective, leaking or nonconforming dangerous goods packages, or dangerous goods that have spilled or leaked, are placed for purposes of transport for recovery or disposal.

Salvage pressure receptacle. (Not permitted for air transport.) A pressure receptacle with a water capacity not exceeding 3 000 litres into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of transport, e.g. for recovery or disposal.

Self-accelerating decomposition temperature (SADT). The lowest temperature at which self-accelerating decomposition may occur in a substance in the packaging, IBC or portable tank as offered for transport. The SADT must be determined in accordance with the test procedures given in Part II, Section 28 of the UN *Manual of Tests and Criteria*.

Note.— IBC and portable tanks are not permitted for transport by air unless otherwise provided for in these Instructions.

Self-accelerating polymerization temperature (SAPT). The lowest temperature at which self-accelerating polymerization may occur with a substance in the packaging, IBC or portable tank as offered for transport. The SAPT must be determined in accordance with the test procedures established for the self-accelerating decomposition temperature for self-reactive substances in accordance with Part II, Section 28 of the UN *Manual of Tests and Criteria.*

Note.— IBC and portable tanks are not permitted for transport by air unless otherwise provided for in these Instructions.

Serious injury. An injury which is sustained by a person in an accident and which:

a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; or

b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or

c) involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage; or

d) involves injury to any internal organ; or

e) involves second or third degree burns, or any burns affecting more than 5 per cent of the body surface; or

f) involves verified exposure to infectious substances or injurious radiation.

+ ***Service equipment.*** For pressure receptacles, includes:

a) closure(s);

b) manifold(s);

c) piping;

d) porous, absorbent or adsorbent material; and

e) any structural devices such as those used for handling.

Service life. For composite cylinders and tubes, the number of years the cylinder or tube is permitted to be in service.

Settled pressure. The pressure of the contents of a pressure receptacle in thermal and diffusive equilibrium.

Shipment. The specific movement of a consignment from origin to destination.

Siftproof packaging. A packaging impermeable to dry contents including fine solid material produced during transport.

Single packaging. A packaging which does not require any inner packaging to perform its containment function during transport.

Solid dangerous goods. Dangerous goods, other than gases, that do not meet the definition of Liquid dangerous goods.

State of Destination. The State in the territory of which the consignment is finally to be unloaded from an aircraft.

State of Origin. The State in the territory of which the consignment is first to be loaded on an aircraft.

State of Registry. The State on whose register the aircraft is entered.

State of the Operator. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Stores (supplies). a) Stores (supplies) for consumption; and b) Stores (supplies) to be taken away.

Stores (supplies) for consumption. Goods, whether or not sold, intended for consumption by the passengers and the crew on board aircraft, and goods necessary for the operation and maintenance of aircraft, including fuel and lubricants.

Stores (supplies) to be taken away. Goods for sale to the passengers and the crew of aircraft with a view to being landed.

Items that meet the classification as dangerous goods and which are transported in accordance with Part 1;2.2.2, Part 1;2.2.3 or Part 1;2.2.4 are considered as "cargo".

Tank. A tank container, portable tank, a road tank-vehicle, a rail tank-wagon or a receptacle intended to contain solids, liquids, or gases and has a capacity of not less than 450 litres when used for the transport of gases as defined in 2;2.1.1.

Note. — These Technical Instructions *do not permit the use of a tank for the transport of radioactive material by air.*

Test pressure. The required pressure applied during a pressure test for qualification or re-qualification.

Transport index (TI) assigned to a package, overpack or freight container, or to unpackaged LSA-I, SCO-I or SCO-III. For the transport of radioactive material, a number which is used to provide control over radiation exposure.

Note.— Unpackaged LSA-I, SCO-I or SCO-III material are not permitted for transport by air.

Through or into. For the transport of radioactive material, through or into the countries in which a consignment is transported but specifically excluding countries "over" which a consignment is carried by air, provided that there are no scheduled stops in those countries.

≠ ***Tube.*** (Not permitted for air transport.) A pressure receptacle of seamless or composite construction having a water capacity exceeding 150 litres but not more than 3 000 litres.

UNECE. The United Nations Economic Commission for Europe (UNECE, Palais des Nations, 8-14 avenue de la Paix, CH-1211 Geneva 10, Switzerland).

Unit load device. Any type of freight container, aircraft container, aircraft pallet with a net or aircraft pallet with a net over an igloo.

Note 1.— An overpack is not included in this definition.

Note 2.— A freight container for radioactive material is not included in this definition (see 2;7.1.3).

UN number. The four-digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals to identify an article or substance or a particular group of articles or substances.

≠ ***Working pressure.*** Either:

a) for a compressed gas, the settled pressure at a reference temperature of 15°C in a full pressure receptacle;

b) for UN 1001 acetylene, dissolved, the calculated settled pressure at a uniform reference temperature of 15°C in an acetylene cylinder containing the specified solvent content and the maximum acetylene content; or

c) for UN 3374 acetylene, solvent free, the working pressure which was calculated for the equivalent cylinder for UN 1001 acetylene, dissolved.

3.1.2 Clarifying examples for certain defined terms

The following explanations and examples are meant to assist in clarifying the use of some of the packaging terms defined in this section.

The definitions in this section are consistent with the use of defined terms throughout the Instructions. However, some of the defined terms are commonly used in other ways. This is particularly evident in respect of the term "inner receptacle" which has often been used to describe the "inners" of a combination packaging.

The "inners" of "combination packagings" are always termed "inner packagings" not "inner receptacles". A glass bottle is an example of such an "inner packaging".

The "inners" of "composite packagings" are normally termed "inner receptacles". For example, the "inner" of a 6HA1 composite packaging (plastic material) is such an "inner receptacle" since it is normally not designed to perform a containment function without its "outer packaging" and is therefore not an "inner packaging".

3.2 UNITS OF MEASUREMENT AND CONVERSION FACTORS

3.2.1 Units of measurement

The units of measurement to be used in the transport of dangerous goods by air are those specified by the International System (SI) as modified for international civil aviation by Annex 5 to the Chicago Convention. The primary units of mass and volume will be the kilogram (kg) and the litre (L) and the unit of pressure will be the kilopascal (kPa). Except as specifically provided for in these Instructions, only those abbreviations for units of measurement that are indicated in this paragraph, or in Annex 5 to the Chicago Convention, may be used in the transport of dangerous goods by air.

Note.— Where measurements relating to radioactivity occur in these Instructions, the value is given in SI units followed, in parentheses, by the non-SI equivalent.

3.2.2 Non-SI equivalents

It is recognized that there are in existence many packagings which were designed and constructed for use with non-SI quantity limitations and that such packagings will continue to be used for some time to come. Table 1-1 therefore contains a list of authorized non-SI equivalents for quantity limitations expressed in SI units. It is stressed that these are not precise equivalents but are nevertheless acceptable based upon the likely availability of packaging.

3.2.3 Conversion factors

Precise conversion factors for commonly used SI units are given in Annex 5 to the Chicago Convention. Tables 1-2 and 1-3 show conversion factors, to four significant figures, for some units widely used in dangerous goods transport.

Table 1-1. Authorized equivalents

Volume		
Litres	*Imperial*	*U.S.*
0.5	1 pt	1 pt
1	1 qt	1 qt
2	2 qt	2 qt
2.5	5 pt	5 pt
5	1 gal	1.25 gal
10	2 gal	2.5 gal
15	3 gal	3.75 gal
20	4.25 gal	5 gal
25	5.5 gal	6.25 gal
30	6.5 gal	7.5 gal
42	9 gal	11 gal
50	11 gal	13 gal
60	13 gal	15 gal
100	22 gal	25 gal
120	26 gal	30 gal
220	48 gal	55 gal
250	55 gal	62.5 gal

Note.— Where quantities are specified in SI units of mass, for 500 kg or less, quantities expressed in pounds may be substituted on the basis of one pound per 500 grams.

Table 1-2. Conversion to SI units*

To convert	*to*	*Multiply by*
bar	kilopascals (kPa)	100.0
curie (Ci)	gigabecquerel (GBq)	37.00
degrees Fahrenheit	degrees Celsius (°C)	subtract 32°F and multiply by 5/9
feet	metres (m)	0.304 8
gallons (Imperial)	litres (L)	4.546
gallons (U.S. liquid)	litres (L)	3.785
inches	millimetres (mm)	25.40
kilogram-force (kgf)	newton (N)	9.807
kilograms per square centimetre	kilopascals (kPa)	98.07
oersted	amperes per metre (A/m)	79.58
ounces, fluid (Imperial)	millilitres (mL)	28.41
ounces, fluid (U.S.)	millilitres (mL)	29.57
pints (Imperial)	litres (L)	0.568 3
pints (U.S.)	litres (L)	0.473 2
pounds (avoirdupois)	kilograms (kg)	0.453 6
pounds per square inch	kilopascals (kPa)	6.895
quarts (Imperial)	litres (L)	1.137
quarts (U.S.)	litres (L)	0.946 4
rad	gray (Gy)	0.010 00
rem	sievert (Sv)	0.010 00

Table 1-3. Conversion from SI units*

To convert	*to*	*Multiply by*
amperes per metre (A/m)	oersted	0.012 57
≠ degrees Celsius (°C)	degrees Fahrenheit (°F)	multiply by 9/5 and add 32°F
gray (Gy)	rad	100.0
kilograms (kg)	pounds	2.205
kilopascals (kPa)	bar	0.010 00
kilopascals (kPa)	kilograms per square centimetre	0.010 20
kilopascals (kPa)	pounds per square inch	0.145 0
litres (L)	gallons (Imperial)	0.220 0
litres (L)	gallons (U.S. liquid)	0.264 2
litres (L)	pints (Imperial)	1.760
litres (L)	pints (U.S.)	2.113
litres (L)	quarts (Imperial)	0.879 9
litres (L)	quarts (U.S.)	1.057
metres (m)	feet	3.281
millilitres (mL)	ounces, fluid (Imperial)	0.035 20
millilitres (mL)	ounces, fluid (U.S.)	0.033 81
millimetres (mm)	inches	0.039 37
newton (N)	kilogram-force (kgf)	0.1020
sievert (Sv)	rem	100.0
terabecquerel (TBq)	curie (Ci)	27.03

* Where a prefix is used, it indicates a multiplying factor as follows:

tera (T)	$\times 10^{12}$
giga (G)	$\times 10^{9}$
mega (M)	$\times 10^{6}$
kilo (k)	$\times 10^{3}$
milli (m)	$\times 10^{-3}$
micro (μ)	$\times 10^{-6}$
nano (n)	$\times 10^{-9}$

Chapter 4

DANGEROUS GOODS TRAINING

Parts of this Chapter are affected by State Variations AE 2, BR 7, CA 11, HK 1, OM 2, VE 5, VE 6; see Table A-1

>

4.1 ESTABLISHMENT OF DANGEROUS GOODS TRAINING PROGRAMMES

Note.— A training programme includes elements such as design methodology, assessment, initial and recurrent training, instructor qualifications and competencies, training records and evaluation of the effectiveness of training.

4.1.1 The employer of personnel that perform functions aimed at ensuring that dangerous goods are transported in accordance with these Instructions must establish and maintain a dangerous goods training programme.

Note 1.— An approach to ensuring personnel are competent to perform any function for which they are responsible is provided in Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment *(Doc 10147).*

Note 2.— Security personnel who are involved with the screening of passengers and crew and their baggage and cargo or mail are required to be trained irrespective of whether the operator on which the passenger or cargo is to be transported carries dangerous goods as cargo.

4.1.2 All operators must establish a dangerous goods training programme regardless of whether or not they are approved to transport dangerous goods as cargo.

4.1.3 Training courses may be developed and delivered by or for the employer.

4.2 OBJECTIVE OF DANGEROUS GOODS TRAINING

4.2.1 The employer must ensure that personnel are competent to perform any function for which they are responsible prior to performing any of these functions. This must be achieved through training and assessment commensurate with the functions for which they are responsible. Such training must include:

a) general awareness/familiarization training — Personnel must be trained to be familiar with the general provisions;

b) function-specific training — Personnel must be trained to perform competently any function for which they are responsible; and

c) safety training — Personnel must be trained on how to recognize the hazards presented by dangerous goods, on the safe handling of dangerous goods, and on emergency response procedures.

Note.— General information on the provisions for dangerous goods carried by passengers and crew (see Part 8) should be included in training courses, as appropriate.

4.2.2 Personnel who have received training but who are assigned to new functions must be assessed to determine their competence in respect of their new function. If competency is not demonstrated, appropriate additional training must be provided.

4.2.3 Personnel must be trained to recognize the hazards presented by dangerous goods, to safely handle them and to apply appropriate emergency response procedures.

4.3 RECURRENT TRAINING AND ASSESSMENT

Personnel must receive recurrent training and assessment within 24 months of previous training and assessment to ensure that competency has been maintained. However, if recurrent training and assessment is completed within the final three months of validity of the previous training and assessment, the period of validity extends from the month on which the recurrent training and assessment was completed until 24 months from the expiry month of that previous training and assessment.

≠ *Note.— An example would be the following: If recurrent training is required by the end of May 2022, then any training occurring between March 2022 and the end of May 2022 will result in a new recurrent training date of May 2024.*

4.4 TRAINING AND ASSESSMENT RECORDS

4.4.1 The employer must maintain a record of training and assessment for personnel.

4.4.2 The record of training and assessment must include:

a) the individual's name;

b) the month of completion of the most recent training and assessment;

c) a description, copy or reference to training and assessment materials used to meet the training and assessment requirements;

d) the name and address of the organization providing the training and assessment; and

e) evidence which shows that the personnel have been assessed as competent.

4.4.3 Training and assessment records must be retained by the employer for a minimum period of 36 months from the most recent training and assessment completion month and must be made available upon request to personnel or the appropriate national authority.

4.5 APPROVAL OF TRAINING PROGRAMMES

4.5.1 Dangerous goods training programmes for operators must be approved by the appropriate authority of the State of the Operator in accordance with the provisions of Annex 6 — *Operation of Aircraft*.

4.5.2 Dangerous goods training programmes required for entities other than operators and designated postal operators should be approved as determined by the appropriate national authority.

Note.— See 4.7 for approval of training programmes for designated postal operators.

4.6 INSTRUCTOR QUALIFICATIONS AND COMPETENCIES

4.6.1 Unless otherwise provided for by the appropriate national authority, instructors of initial and recurrent dangerous goods training must demonstrate or be assessed as competent in instruction and the function(s) that they will instruct prior to delivering such training.

4.6.2 Instructors delivering initial and recurrent dangerous goods training must deliver such courses at least every 24 months, or in the absence of this, attend recurrent training.

4.7 DESIGNATED POSTAL OPERATORS

4.7.1 Staff of designated postal operators must be trained commensurate with their responsibilities. The subject matter with which their various categories of staff should be familiar is indicated in Table 1-4.

4.7.2 Dangerous goods training programmes for designated postal operators must be subjected to review and approval by the civil aviation authority of the State where the mail was accepted by the designated postal operator.

Table 1-4. Content of training courses for staff of designated postal operators

Aspects of transport of dangerous goods by air with which they should be familiar, as a minimum	*Designated postal operators*		
	Categories of staff		
	A	B	C
General philosophy	x	x	x
Limitations	x	x	x
General requirements for shippers	x		
Classification	x		
List of dangerous goods	x		
Packing requirements	x		
Labelling and marking	x	x	x
Dangerous goods transport document and other relevant documentation	x	x	
Acceptance of the dangerous goods listed in 1;2.3.2	x		
Recognition of undeclared dangerous goods	x	x	x
Storage and loading procedures			x
Provisions for passengers and crew	x	x	x
Emergency procedures	x	x	x

CATEGORIES

A — Staff of designated postal operators involved in accepting mail containing dangerous goods.
B — Staff of designated postal operators involved in processing mail (other than dangerous goods).
C — Staff of designated postal operators involved in the handling, storage and loading of mail.

Note.— Guidance on the aspects of training to be covered by staff of designated postal operators can be found in S-1;3.

Chapter 5

DANGEROUS GOODS SECURITY

Parts of this Chapter are affected by State Variation RU 2, US 17, VC 5; see Table A-1

≠ *Note 1.— This Chapter addresses the security responsibilities of operators, shippers and others involved in the transport of dangerous goods aboard aircraft. It should be noted that Annex 17 —* Aviation Security*, provides comprehensive requirements for implementation of security measures by States to prevent unlawful interference with civil aviation or when such interference has been committed. In addition, the* Aviation Security Manual *(Doc 8973 — Restricted) provides procedures and guidance on aspects of aviation security and is intended to assist States in the implementation of their respective national civil aviation security programmes. The requirements in this Chapter are intended to supplement the requirements of Annex 17 and to implement measures to be taken to minimize theft or misuse of dangerous goods that may endanger persons or property. The provisions of this Chapter do not supersede requirements of Annex 17 or the* Aviation Security Manual.

Note 2.— In addition to the security provisions of these Instructions, appropriate national authorities may implement further security provisions for reasons other than safety of dangerous goods during transport. In order to not impede international and multimodal transport by different explosives security marks, it is recommended that such marks be formatted consistent with an internationally harmonized standard (e.g. European Union Commission Directive 2008/43/EC).

5.1 GENERAL SECURITY PROVISIONS

5.1.1 All persons engaged in the transport of dangerous goods should consider security requirements for the dangerous goods commensurate with their responsibilities.

5.1.2 Dangerous goods should only be offered to operators that have been appropriately identified.

5.1.3 The provisions of this chapter do not apply to:

a) UN 2908 and UN 2909 excepted packages;

b) UN 2910 and UN 2911 excepted packages with an activity level not exceeding the A_2 value; and

c) UN 2912 LSA-I and UN 2913 SCO-I.

5.2 DANGEROUS GOODS SECURITY TRAINING

5.2.1 The training specified in 4.2 should include elements of security awareness.

5.2.2 Security awareness training should address the nature of security risks, recognizing security risks methods to address and reduce such risks, and actions to be taken in the event of a security breach. It should include awareness of security plans (if appropriate) commensurate with the responsibilities of individuals and their part in implementing security plans.

Note.— Persons who have received security training in accordance with the requirements of a national security plan or other security requirements that fulfil the elements of 5.2.2 need not receive additional training.

5.2.3 Such training should be provided or verified upon employment in a position involving dangerous goods transport. Recurrent training should take place within 24 months of previous training to ensure knowledge is current.

5.2.4 Records of all dangerous goods security training undertaken should be kept by the employer and made available to the employee or appropriate national authority upon request. Records should be kept by the employer for a period of time established by the appropriate national authority.

5.3 PROVISIONS FOR HIGH CONSEQUENCE DANGEROUS GOODS

5.3.1 Definition of high consequence dangerous goods

5.3.1.1 High consequence dangerous goods are those which have the potential for misuse in a terrorist event and which may, as a result, produce serious consequences such as mass casualties, mass destruction or, particularly for Class 7, mass socio-economic disruption.

5.3.1.2 An indicative list of high consequence dangerous goods in classes and divisions other than Class 7 is given in Table 1-5.

Table 1-5. Indicative list of high consequence dangerous goods

Class 1 Division 1.1 explosives
Class 1 Division 1.2 explosives
Class 1 Division 1.3 compatibility group C explosives
Class 1 Division 1.4 UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456, 0500, 0512 and 0513
Class 1 Division 1.5 explosives
Class 1 Division 1.6 explosives
Division 2.3 toxic gases (excluding aerosols)
Class 3 desensitized explosives
Division 4.1 desensitized explosives
Division 6.1 substances of Packing Group I; except when transported under the excepted quantity provisions in 3;5
Division 6.2 infectious substances of Category A (UN Nos. 2814 and 2900) and medical waste of Category A (UN 3549)

5.3.1.3 For dangerous goods of Class 7, high consequence radioactive material is that with an activity equal to or greater than a transport security threshold of 3 000 A_2 per single package (see also 2;7.2.2.1) except for the following radionuclides where the transport security threshold is given in Table 1-6 below.

Table 1-6. Transport security thresholds for specific radionuclides

Element	*Radionuclide*	*Transport security threshold (TBq)*
Americium	Am-241	0.6
Gold	Au-198	2
Cadmium	Cd-109	200
Californium	Cf-252	0.2
Curium	Cm-244	0.5
Cobalt	Co-57	7
Cobalt	Co-60	0.3
Caesium	Cs-137	1
Iron	Fe-55	8000
Gadolinium	Gd-153	10
Germanium	Ge-68	7
Iridium	Ir-192	0.8
Nickel	Ni-63	600
Palladium	Pd-103	900
Promethium	Pm-147	400
Polonium	Po-210	0.6
Plutonium	Pu-238	0.6
Plutonium	Pu-239	0.6

Element	*Radionuclide*	*Transport security threshold (TBq)*
Radium	Ra-226	0.4
Ruthenium	Ru-106	3
Selenium	Se-75	2
Strontium	Sr-90	10
Thallium	Tl-204	200
Thulium	Tm-170	200
Ytterbium	Yb-169	3

5.3.1.4 For mixtures of radionuclides, determination of whether or not the transport security threshold has been met or exceeded can be calculated by summing the ratios of activity present for each radionuclide divided by the transport security threshold for that radionuclide. If the sum of the fractions is less than 1, then the radioactivity threshold for the mixture has not been met nor exceeded.

This calculation can be made with the formula:

$$\sum_i \frac{A_i}{T_i} < 1$$

Where:

A_i = activity of radionuclide *i* that is present in a package (TBq)

T_i = transport security threshold for radionuclide *i* (TBq).

5.3.1.5 When radioactive material possess subsidiary hazards of other classes or divisions, the criteria of Table 1-5 should also be taken into account (see also 1;6.5).

5.4 SECURITY PLANS

5.4.1 Operators, shippers and others (including infrastructure managers) engaged in the transport of high consequence dangerous goods (see 5.3.1) should adopt, implement and comply with a security plan that addresses at least the elements specified in 5.4.2.

Note.— When national authorities issue exemptions, they should consider all of the provisions in this Chapter.

5.4.2 The security plan should comprise at least the following elements:

a) specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities;

b) records of dangerous goods or types of dangerous goods transported;

c) review of current operations and assessment of vulnerabilities, including inter-modal transfer, temporary transit storage, handling, and distribution, as appropriate;

≠ d) clear statement of measures including training policies (including response to higher threat conditions, new employee/ employment verifications, etc.), operating practices (e.g. access to dangerous goods in temporary storage, proximity to vulnerable infrastructure, etc.), equipment and resources that are to be used to reduce security risks;

e) effective and up-to-date procedures for reporting and dealing with security threats, breaches of security or security incidents;

f) procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans;

g) measures to ensure the security of transport information contained in the plan; and

≠ h) measures to ensure that the distribution of the transport information is limited as far as possible. (Such measures must not preclude provision of the transport documentation required by Part 5, Chapter 4 of these Instructions.)

Note.— Operators, shippers and others with responsibilities for the safe and secure transport of dangerous goods should cooperate with each other and with appropriate authorities to exchange threat information, apply appropriate security measures and respond to security incidents.

5.5 RADIOACTIVE MATERIAL

≠ For radioactive material, the provisions of this Chapter are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material (INFCIRC/274/Rev.1, IAEA, Vienna (1980)) and the IAEA circular on “Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities” INFCIRC/225/Rev.5, IAEA, Vienna (2011) are applied.

Chapter 6

GENERAL PROVISIONS CONCERNING RADIOACTIVE MATERIAL

Parts of this Chapter are affected by State Variations BR 8, JP 3, JP 23, VC 7; see Table A-1

6.1 SCOPE AND APPLICATION

≠ 6.1.1 These Instructions establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to people, property and the environment that are associated with the transport of radioactive material. These Instructions are based on the IAEA *Regulations for the Safe Transport of Radioactive Material*, 2018 Edition. Explanatory material can be found in *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material* (2018 Edition), Safety Standard Series No. SSG-26 (Rev.1), IAEA, Vienna (2019). The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risk.

6.1.2 The objective of these Instructions is to establish requirements that must be satisfied to ensure safety and to protect people, property and the environment from harmful effects of ionizing radiation during the transport of radioactive material. This protection is achieved by requiring:

a) containment of the radioactive contents;

b) control of external dose rate;

c) prevention of criticality; and

d) prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to the limits of the contents for packages and aircraft and to the performance standards, which are applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing conditions on the design and operation of packages and on the maintenance of the packagings, including consideration of the nature of the radioactive contents. Thirdly, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities. Finally, further protection is provided by making arrangements for planning and preparing emergency response to protect people, property and the environment.

6.1.3 These Instructions apply to the transport of radioactive material by air, including transport that is incidental to the use of the radioactive material. Transport comprises all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of the radioactive material and packages. A graded approach is applied to the performance standards in these Instructions that are characterized by three general severity levels:

a) routine conditions of transport (incident free);

b) normal conditions of transport (minor mishaps); and

c) accident conditions of transport.

6.1.4 These Instructions do not apply to any of the following:

a) radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;

b) radioactive material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of or contamination from radioactive material, taking into account the necessary radiological protection measures with respect to other passengers and crew, subject to approval by the operator;

Note.— Guidance material may be found on www.icao.int/safety/DangerousGoods/Pages/Guidance-Material.aspx.

c) radioactive material in consumer products which have received regulatory approval, following their sale to the end user;

d) natural material and ores containing naturally occurring radionuclides (which may have been processed), provided the activity concentration of the material does not exceed 10 times the values specified in Table 2-12 or calculated in accordance with 2;7.2.2.2 a) and 2;7.2.2.3 to 2;7.2.2.6. For natural materials and ores containing naturally occurring radionuclides that are not in secular equilibrium, the calculation of the activity concentration must be performed in accordance with 2;7.2.2.4;

e) non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit specified in the definition of contamination in 2;7.1.

6.1.5 Specific provisions for the transport of excepted packages

6.1.5.1 Excepted packages which may contain radioactive material as specified in 2;7.2.4.1.1 are subject only to the following provisions of Parts 5 to 7:

a) the applicable provisions specified in 5;1.1 (as applicable), 5;1.2.2.2, 5;1.2.2.3, 5;1.2.4, 5;1.4, 5;1.6.3, 5;2.2, 5;2.4.10, 5;3.2.12 e), 5;3.3, 5;4.1.5.7.1 f) 1), 5;4.1.5.7.1 f) 2), 5;4.4, 7;1.6, 7;2.5, 7;2.9.3.1, 7;3.2.1, 7;3.2.4, 7;4.4 and 7;4.5; and

b) the requirements for excepted packages specified in 6;7.3;

except when the radioactive material possesses other hazardous properties and has to be classified in a class other than Class 7 in accordance with Special Provision A130 or A194, where the provisions listed in a) and b) above apply only as relevant and in addition to those relating to the main class or division.

6.1.5.2 Excepted packages are subject to the relevant provisions of all other parts of these Instructions.

6.2 RADIATION PROTECTION PROGRAMME

6.2.1 The transport of radioactive material must be subject to a radiation protection programme, which must consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

6.2.2 Doses to persons must be below the relevant dose limits. Protection and safety must be optimized in order that the magnitude of individual doses, the number of persons exposed and the likelihood of incurring exposure must be kept as low as reasonably achievable, economic and social factors being taken into account, within the restriction that the doses to individuals are subject to dose constraints. A structured and systematic approach must be adopted and must include consideration of the interfaces between transport and other activities.

6.2.3 The nature and extent of the measures to be employed in the programme must be related to the magnitude and likelihood of radiation exposure. The programme must incorporate the requirements in 6.2.2 and 6.2.4 to 6.2.7, 7;2.9.1.1 and 7;2.9.1.2. Programme documents must be available, on request, for inspection by the relevant competent authority.

6.2.4 For occupational exposure arising from transport activities, where it is assessed that the effective dose either:

a) is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring must be conducted; or

b) is likely to exceed 6 mSv in a year, individual monitoring must be conducted.

When workplace monitoring or individual monitoring is conducted, appropriate records must be kept.

Note.— For occupational exposure arising from transport activities, where it is assessed that the effective dose is most unlikely to exceed 1 mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record-keeping need be required.

6.2.5 In the event of a nuclear or radiological emergency during the transport of radioactive material, provisions, as established by relevant national and/or international organizations, must be observed to protect people, property and the environment. This includes arrangements for preparedness and response established in accordance with the national and/or international requirements and in a consistent and coordinated manner with the national and/or international emergency arrangements.

6.2.6 The arrangements for preparedness and response must be based on the graded approach and take into consideration the identified hazards and their potential consequences, including the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of a nuclear or radiological emergency. Guidance for the establishment of such arrangements is contained in *Preparedness and Response for a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015); *Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011); *Arrangements for Preparedness for a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2007), and *Arrangements for the Termination of a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018).

6.2.7 Personnel must be appropriately trained in the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that of other persons who might be affected by their actions.

6.3 MANAGEMENT SYSTEM

A management system based on international, national or other standards acceptable to the competent authority must be established and implemented for all activities within the scope of the Instructions, as identified in 1;6.1.3, to ensure compliance with the relevant provisions of these Instructions. Certification that the design specification has been fully implemented must be available to the competent authority. The manufacturer, shipper or user must be prepared to:

a) provide facilities for inspection during manufacture and use; and

b) demonstrate compliance with these Instructions to the competent authority.

Where competent authority approval is required, such approval must take into account and be contingent upon the adequacy of the management system.

6.4 SPECIAL ARRANGEMENT

6.4.1 Special arrangement means those provisions, approved by the competent authority, under which consignments which do not satisfy all the requirements of these Instructions applicable to radioactive material may be transported.

6.4.2 Consignments for which conformity with any provision applicable to radioactive material is impracticable must not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the radioactive material provisions of these Instructions is impracticable and that the requisite standards of safety established by these Instructions have been demonstrated through means alternative to the other provisions of these Instructions, the competent authority may approve special arrangement transport operations for a single consignment or a planned series of multiple consignments. The overall level of safety in transport must be at least equivalent to that which would be provided if all the applicable requirements in these Instructions had been met. For international consignments of this type, multilateral approval must be required.

6.5 RADIOACTIVE MATERIAL POSSESSING OTHER DANGEROUS PROPERTIES

In addition to the radioactive and fissile properties, any subsidiary hazard of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, must also be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and transport, in order to be in compliance with all relevant provisions for dangerous goods of these Instructions.

6.6 NON-COMPLIANCE

In the event of non-compliance with any limit in these Instructions applicable to dose rate or contamination:

a) the shipper, consignee, operator and any organization involved during transport, who may be affected, as appropriate, must be informed of the non-compliance:

   i) by the operator if the non-compliance is identified during transport; or

   ii) by the consignee if the non-compliance is identified at receipt;

b) the shipper, operator or consignee, as appropriate, must:

   i) take immediate steps to mitigate the consequences of the non-compliance;

   ii) investigate the non-compliance and its causes, circumstances and consequences;

   iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of causes and circumstances similar to those that led to the non-compliance; and

   iv) communicate to the relevant competent authority(ies) the causes of the non-compliance and the corrective or preventative actions taken or to be taken;

c) the communication of the non-compliance to the shipper and relevant competent authority(ies), respectively, must be made as soon as practicable and it must be immediate whenever an emergency exposure situation has developed or is developing.

Chapter 7

INCIDENT AND ACCIDENT REPORTING

Entities other than operators who are in possession of dangerous goods at the time a dangerous goods accident or incident occurs or at the time a dangerous goods incident is discovered to have occurred should follow the reporting requirements of Part 7;4.4. Entities other than operators who discover undeclared or misdeclared dangerous goods should follow the reporting requirements of Part 7;4.5. These entities may include, but are not limited to, freight forwarders, customs authorities and security screening providers.

_____

Part 2

CLASSIFICATION OF DANGEROUS GOODS

INTRODUCTORY CHAPTER

Parts of this Chapter are affected by State Variations DE 5, NL 4; see Table A-1

1. RESPONSIBILITIES

1.1 Classification must be made by the appropriate national authority when so required or may otherwise be made by the shipper.

1.2 A shipper who has identified, on the basis of test data, that a substance listed by name in column 1 of the Dangerous Goods List in Part 3, Chapter 2, Table 3-1 meets classification criteria for a hazard class or division that is not identified in the list, may, with the approval of the appropriate national authority, consign the substance:

a) under the most appropriate generic or not otherwise specified (n.o.s.) entry reflecting all hazards; or

b) under the same UN number and name but with additional hazard communication information as appropriate to reflect the additional subsidiary hazard(s) (documentation, label) provided that the primary hazard class remains unchanged and that any other transport conditions (e.g. limited quantity, packaging provisions) that would normally apply to substances possessing such a combination of hazards are the same as those applicable to the substance listed.

1.2.1 A copy of the document of approval must accompany the consignment.

Note.— When an appropriate national authority grants such approvals, it should inform the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods accordingly and submit a relevant proposal of amendment to the Dangerous Goods List. Should the proposed amendment be rejected, the appropriate national authority should withdraw its approval.

2. CLASSES, DIVISIONS, PACKING GROUPS — DEFINITIONS

2.1 Substances (including mixtures and solutions) and articles subject to these Instructions are assigned to one of nine classes according to the hazard or the most predominant of the hazards they present. Some of these classes are subdivided into divisions. These classes and divisions are:

Class 1: Explosives

Division 1.1: Substances and articles which have a mass explosion hazard
Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard
Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
Division 1.4: Substances and articles which present no significant hazard
Division 1.5: Very insensitive substances which have a mass explosion hazard
Division 1.6: Extremely insensitive articles which do not have a mass explosion hazard

Class 2: Gases

Division 2.1: Flammable gases
Division 2.2: Non-flammable, non-toxic gases
Division 2.3: Toxic gases

Class 3: Flammable liquids

Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases

Division 4.1: Flammable solids, self-reactive and related substances and solid desensitized explosives and polymerizing substances
Division 4.2: Substances liable to spontaneous combustion
Division 4.3: Substances which, in contact with water, emit flammable gases

Class 5: Oxidizing substances and organic peroxides

Division 5.1: Oxidizing substances
Division 5.2: Organic peroxides

Class 6: Toxic and infectious substances

Division 6.1: Toxic substances
Division 6.2: Infectious substances

Class 7: Radioactive material

Class 8: Corrosive substances

Class 9: Miscellaneous dangerous substances and articles, including environmentally hazardous substances

The numerical order of the classes and divisions is not that of the degree of danger.

2.2 Many of the substances assigned to Classes 1 to 9 are deemed, without additional labelling, as being environmentally hazardous.

2.3 Wastes must be transported under the requirements of the appropriate class considering their hazards and the criteria in these Instructions. Wastes not otherwise subject to these Instructions, but covered under the Basel Convention, may be transported under Class 9.

2.4 For packing purposes, dangerous goods other than those of Classes 1, 2 and 7, Divisions 5.2 and 6.2 and self-reactive substances of Division 4.1 are assigned to three packing groups in accordance with the degree of danger they present:

Packing Group I: Substances presenting high danger

Packing Group II: Substances presenting medium danger

Packing Group III: Substances presenting low danger

The packing group to which a substance is assigned is indicated in the Dangerous Goods List in Part 3, Chapter 2, Table 3-1.

Articles are not assigned to packing groups. For packing purposes, any requirement for a specific packaging performance level is set out in the applicable packing instruction.

2.5 Dangerous goods are determined to present one or more of the dangers represented by Classes 1 to 9 and divisions and, if applicable, the degree of danger on the basis of the requirements in Part 2, Chapters 1 to 9.

2.6 Dangerous goods presenting a danger of a single class and division are assigned to that class and division and the degree of danger (packing group), if applicable, determined. When an article or substance is specifically listed by name in the Dangerous Goods List (Table 3-1), its class or division, its subsidiary hazard(s) and, when applicable, its packing group are taken from this list.

2.7 Dangerous goods meeting the defining criteria of more than one hazard class or division and which are not listed by name in Table 3-1 are assigned to a class and division and subsidiary hazard(s) on the basis of the precedence of hazards in 4.

3. UN NUMBERS AND PROPER SHIPPING NAMES

3.1 Dangerous goods are assigned to UN numbers and proper shipping names according to their hazard classification and their composition.

3.2 Dangerous goods commonly carried are listed in Table 3-1. Where an article or substance is specifically listed by name, it must be identified in transport by the proper shipping name in Table 3-1. Such substances may contain technical impurities (for example, those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification must be considered a mixture or solution (see 3.5). For dangerous goods not specifically listed by name, “generic” or “not otherwise specified (n.o.s.)” entries are provided (see 3.8) to identify the article or substance in transport. The substances listed by name in column 1 of Table 3-1 must be transported according to their classification in the list or under the conditions specified in 1.2. Each entry in Table 3-1 is characterized by a UN number. Table 3-1 also contains relevant information for each entry, such as hazard class, subsidiary hazard(s) (if any), packing group (where assigned), packing requirements, passenger and cargo aircraft requirements, etc. Entries in Table 3-1 are of the following four types:

a) Single entries for well-defined substances or articles

e.g. **Acetone** UN 1090

Ethyl nitrite solution UN 1194

b) Generic entries for a well-defined group of substances or articles

e.g.	**Adhesives**	UN 1133
	Perfumery products	UN 1266
	Carbamate pesticide, solid, toxic	UN 2757

c) Specific n.o.s. entries covering a group of substances or articles of a particular chemical or technical nature

e.g.	**Nitrates, inorganic, n.o.s.**	UN 1477
	Alcohols, n.o.s.	UN 1987

d) General n.o.s. entries covering a group of substances or articles meeting the criteria of one or more classes or divisions

e.g.	**Flammable solid, organic, n.o.s.**	UN 1325
	Flammable liquid, n.o.s.	UN 1993

3.3 All self-reactive substances of Division 4.1 are assigned to one of twenty generic entries in accordance with the classification principles and flow chart described in the UN Recommendations, 2.4.2.3.3.

3.4 All organic peroxides of Division 5.2 are assigned to one of twenty generic entries in accordance with the classification principles and flow chart described in the UN Recommendations, 2.5.3.3.

3.5 A mixture or solution meeting the classification criteria of these Instructions and composed of a single predominant substance identified by name in Table 3-1 and one or more substances not subject to these Instructions and/or traces of one or more substances identified by name in Table 3-1 must be assigned the UN number and proper shipping name of the predominant substance named in Table 3-1, unless:

a) the mixture or solution is identified by name in Table 3-1 in which case this name must be applied; or

b) the name and description of the substance named in Table 3-1 specifically indicates that it applies only to the pure substance; or

c) the hazard class or division, subsidiary hazard(s), physical state or packing group of the solution or mixture is different from that of the substance named in Table 3-1; or

d) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Table 3-1.

If b), c) or d) is applicable, the mixture or solution must be treated as a dangerous substance not specifically listed by name in Table 3-1.

Note.— Although traces of substances may not need to be taken into account for classification purposes, those traces may affect the properties of the substance and do need to be taken into account when considering the compatibility requirements of 4;1.1.3.

3.6 For a solution or mixture when the hazard class, the physical state or the packing group is changed in comparison with the listed substance, the appropriate n.o.s. entry must be used including its packaging and labelling provisions.

3.7 A mixture or solution containing one or more substances identified by name in Table 3-1 or classified under an n.o.s. entry and one or more substances not subject to these Instructions is not subject to these Instructions if the hazard characteristics of the mixture or solution are such that they do not meet the criteria (including human experience criteria) for any class.

3.8 Substances or articles which are not specifically listed by name in Table 3-1 must be classified under a “generic” or “n.o.s.” entry. The substance or article must be classified according to the class definitions and test criteria in this Part, and is then assigned the “generic” or “n.o.s.” entry in Table 3-1 which most appropriately describes the article or substance.[1] This means that a substance is to be assigned to an entry of type c), as defined in 3.2, only if it cannot be assigned to an entry of type b), and to an entry of type d) only if it cannot be assigned to an entry of type b) or c)[1].

3.9 A mixture or solution meeting the classification criteria of these Instructions that is not identified by name in Table 3-1 and that is composed of two or more dangerous goods must be assigned to an entry that has the proper shipping name, description, hazard class or division, subsidiary hazard(s) and packing group that most precisely describe the mixture or solution.

1. See also the “List of n.o.s. and generic proper shipping names” in Attachment 1, Chapter 2.

4. PRECEDENCE OF HAZARD CHARACTERISTICS

4.1 The precedence of hazards table (Table 2-1) must be used to determine the class of a substance, mixture or solution having more than one hazard, when it is not named in Table 3-1 or to assign the appropriate entry for articles containing dangerous goods n.o.s (UN Nos. 3537 to 3548, see 6). For goods having multiple hazards, which are not specifically listed by name in Table 3-1, the most stringent packing group denoted to the respective hazards of the goods takes precedence over other packing groups, irrespective of Table 2-1. The correct class or division to be used is shown at the point at which the column and row intersect in Table 2-1. The correct packing group to be used is also shown at the point at which the column and row intersect. The precedence of hazard characteristics of the following have not been dealt with in Table 2-1, as the primary characteristics always take precedence:

a) substances and articles of Class 1;

b) gases of Class 2;

c) liquid desensitized explosives of Class 3;

d) self-reactive substances and solid desensitized explosives of Division 4.1;

e) pyrophoric substances of Division 4.2;

f) substances of Division 5.2;

g) substances of Division 6.1 with a Packing Group I inhalation toxicity. Except for substances or preparations meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC_{50}) in the range of Packing Group I, but toxicity through oral ingestion or dermal contact only in the range of Packing Group III or less, which must be allocated to Class 8;

h) substances of Division 6.2; and

i) material of Class 7.

4.2 Apart from radioactive material in excepted packages (where the other hazardous properties take precedence), radioactive material having other hazardous properties must always be classified in Class 7 and the subsidiary hazard must also be identified. For radioactive material in excepted packages, except for UN 3507, **Uranium hexafluoride, radioactive material, excepted package**, Special Provision A130 applies.

4.3 An article which, apart from its other hazards, also meets the criterion for a magnetized material, must be identified in accordance with the provisions of this section and in addition as a magnetized material.

5. TRANSPORT OF SAMPLES

5.1 When the hazard class of a substance is uncertain and it is being transported for further testing, a tentative hazard class, proper shipping name and identification number must be assigned on the basis of the shipper's knowledge of the substance and application of:

a) the classification criteria of these Instructions; and

b) the precedence of hazards given above.

The most severe packing group possible for the shipping name chosen must be used.

5.2 Where this provision is used, the proper shipping name must be supplemented with the word "sample" (e.g. **Flammable liquid, n.o.s., sample**). In certain instances, where a specific proper shipping name is provided for a sample of a substance considered to meet certain classification criteria (e.g. **Gas sample, non-pressurized, flammable**, UN 3167), that proper shipping name must be used. When an n.o.s. entry is used to transport the sample, the proper shipping name need not be supplemented with the technical name.

5.3 Samples of the substance must be transported in accordance with the requirements applicable to the tentative assigned proper shipping name provided:

a) the substance is not considered to be a substance forbidden for transport by 1;2.1;

b) the substance is not considered to meet the criteria for Class 1 or considered to be an infectious substance or a radioactive material;

c) the substance is in compliance with 4.2.3.2.6 or 5.3.2.5, if it is a self-reactive substance or an organic peroxide, respectively;

d) the sample is transported in a combination packaging with a net mass per package not exceeding 2.5 kg; and

e) the sample is not packed together with other goods.

5.4 Samples of energetic materials for testing purposes

Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the UN *Manual of Tests and Criteria* may be transported under UN 3224 (self-reactive solid type C) or UN 3223 (self-reactive liquid type C), as applicable, of Division 4.1 provided that:

a) the samples do not contain any:

   i) known explosives;

   ii) substances showing explosive effects in testing;

   iii) compounds designed with the view of producing a practical explosive or pyrotechnic effect; or

   iv) components consisting of synthetic precursors of intentional explosives;

b) for mixtures, complexes or salts of inorganic oxidizing substances of Division 5.1 with organic material(s), the concentration of the inorganic oxidizing substance is:

   i) less than 15 per cent, by mass, if assigned to Packing Group I (high hazard) or II (medium hazard); or

   ii) less than 30 per cent, by mass, if assigned to Packing Group III (low hazard);

c) available data do not allow a more precise classification;

d) the sample is not packed together with other goods;

e) the sample is packed in accordance with Packing Instruction 459; and

f) the proper shipping name is supplemented with the word “sample”.

6. CLASSIFICATION OF ARTICLES AS ARTICLES CONTAINING DANGEROUS GOODS N.O.S.

6.0 Articles which do not have an existing proper shipping name and which contain only dangerous goods as a residue or as an integral element of the machinery or apparatus must be classified as follows:

a) where the dangerous goods meet the provisions of Packing Instruction 962: UN 3363 — **Dangerous goods in apparatus** or **Dangerous goods in machinery**; or

b) where the net quantity of dangerous goods in the machinery or apparatus exceeds the limits of Packing Instruction 962 but contains dangerous goods permitted as limited quantities within the quantity limits specified in column 7(a) of the UN Model Regulations, see Special Provision A107; or

c) in accordance with paragraphs 6.1 to 6.6 of this section, as applicable.

6.1 Articles containing dangerous goods may be classified as otherwise provided by these Instructions under the proper shipping name for the dangerous goods they contain or in accordance with this section. For the purposes of this section “article” means machinery, apparatus or other devices containing one or more dangerous goods (or residues thereof) that are an integral element of the article, necessary for its functioning and that cannot be removed for the purpose of transport. An inner packaging is not an article.

6.2 Such articles may in addition contain batteries. Lithium batteries that are integral to the article must be of a type proven to meet the testing requirements of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3, except when otherwise specified by these Instructions (e.g. for pre-production prototype articles containing lithium batteries or for a small production run, consisting of not more than 100 such articles).

6.3 This section does not apply to articles for which a more specific proper shipping name already exists in Table 3-1.

6.4 This section does not apply to dangerous goods of Class 1, Division 6.2, Class 7 or radioactive material contained in articles. However, this section applies to articles containing explosives which are excluded from Class 1 in accordance with 2;1.5.2.4.

6.5 Articles containing dangerous goods must be assigned to the appropriate class or division determined by the hazards present using, where applicable, Table 2-1 for each of the dangerous goods contained in the article. If dangerous goods classified as Class 9 are contained within the article, all other dangerous goods present in the article must be considered to present a higher hazard.

6.6 Subsidiary hazards must be representative of the primary hazard posed by the other dangerous goods contained within the article. When only one item of dangerous goods is present in the article, the subsidiary hazard(s), if any, is the subsidiary hazard(s) identified in column 4 of Table 3-1. If the article contains more than one item of dangerous goods and these could react dangerously with one another during transport, each of the dangerous goods must be enclosed separately (see 4;1.1.8).

Table 2-1. Precedence of hazards and packing groups for Classes 3, 4 and 8 and for Divisions 5.1 and 6.1

Class or division and packing group	*Class or division and packing group*																	
	4.2 II	4.2 III	4.3 I	4.3 II	4.3 III	5.1 I	5.1 II	5.1 III	6.1 I (d)	6.1 I (o)	6.1 II	6.1 III	8 I (l)	8 I (s)	8 II (l)	8 II (s)	8 III (l)	8 III (s)
3 I*			4.3,I	4.3,I	4.3,I	—	—	—	3,I	3,I	3,I	3,I	3,I	—	3,I	—	3,I	—
3 II*			4.3,I	4.3,II	4.3,II	—	—	—	3,I	3,I	3,II	3,II	8,I	—	3,II	—	3,II	—
3 III*			4.3,I	4.3,II	4.3,III	—	—	—	6.1,I	6.1,I	6.1,II	3,III**	8,I	—	8,II	—	3,III	—
4.1 II*	4.2,II	4.2,II	4.3,I	4.3,II	4.3,II	5.1,I	4.1,II	4.1,II	6.1,I	6.1,I	4.1,II	4.1,II	—	8,I	—	4.1,II	—	4.1,II
4.1 III*	4.2,II	4.2,III	4.3,I	4.3,II	4.3,III	5.1,I	4.1,II	4.1,III	6.1,I	6.1,I	6.1,II	4.1,III	—	8,I	—	8,II	—	4.1,III
4.2 II			4.3,I	4.3,II	4.3,II	5.1,I	4.2,II	4.2,II	6.1,I	6.1,I	4.2,II	4.2,II	8,I	8,I	4.2,II	4.2,II	4.2,II	4.2,II
4.2 III			4.3,I	4.3,II	4.3,III	5.1,I	5.1,II	4.2,III	6.1,I	6.1,I	6.1,II	4.2,III	8,I	8,I	8,II	8,II	4.2,III	4.2,III
4.3 I						5.1,I	4.3,I	4.3,I	6.1,I	4.3,I	4.3,I	4.3,I	4.3,I	4.3,I	4.3,I	4.3,I	4.3,I	4.3,I
4.3 II						5.1,I	4.3,II	4.3,II	6.1,I	4.3,I	4.3,II	4.3,II	8,I	8,I	4.3,II	4.3,II	4.3,II	4.3,II
4.3 III						5.1,I	5.1,II	4.3,III	6.1,I	6.1,I	6.1,II	4.3,III	8,I	8,I	8,II	8,II	4.3,III	4.3,III
5.1 I									5.1,I	5.1,I	5.1,I	5.1,I	5.1,I	5.1,I	5.1,I	5.1,I	5.1,I	5.1,I
5.1 II									6.1,I	5.1,I	5.1,II	5.1,II	8,I	8,I	5.1,II	5.1,II	5.1,II	5.1,II
5.1 III									6.1,I	6.1,I	6.1,II	5.1,III	8,I	8,I	8,II	8,II	5.1,III	5.1,III
6.1 I (d)													8,I	6.1,I	6.1,I	6.1,I	6.1,I	6.1,I
6.1 I (o)													8,I	6.1,I	6.1,I	6.1,I	6.1,I	6.1,I
6.1 II (i)													8,I	6.1,I	6.1,II	6.1,II	6.1,II	6.1,II
6.1 II (d)													8,I	6.1,I	8,II	6.1,II	6.1,II	6.1,II
6.1 II (o)													8,I	8,I	8,II	6.1,II	6.1,II	6.1,II
6.1 III													8,I	8,I	8,II	8,II	8,III	8,III

(l) = liquid; (s) = solid; (i) = inhalation; (d) = dermal; (o) = oral; — denotes an impossible combination

* Substances of Division 4.1 other than self-reactive substances, and solid desensitized explosives and substances of Class 3 other than liquid desensitized explosives.
** For pesticides only, the primary hazard must be Division 6.1.

Note.— For hazards not shown in this table, see 4.

Chapter 1

CLASS 1 — EXPLOSIVES

Parts of this Chapter are affected by State Variations BE 2, CA 13, DK 2, DQ 2, GB 1, GH 3, HK 3, HR 5, KG 2, PE 1, US 5; see Table A-1

Note 1.— Class 1 is a restricted class, that is, only those explosive substances and articles that are listed in the Dangerous Goods List may be accepted for transport. However, the appropriate authorities of the States concerned retain the right by mutual agreement to approve transport of explosive substances and articles for special purposes under special conditions. Therefore, entries have been included in the Dangerous Goods List for "Substances, explosive, n.o.s." and "Articles, explosive, n.o.s.". It is intended that these entries be used only when no other method of operation is possible.

Note 2.— General entries, such as "Explosive, blasting, Type A", are used to allow for the transport of new substances. In preparing these requirements, military ammunition and explosives have been taken into consideration to the extent that they are likely to be transported by civil aircraft.

Note 3.— A number of substances and articles which are in Class 1 are described in Attachment 2 to these Instructions. These descriptions are given because a term may not be well known or may be at variance with its usage for regulatory purposes.

Note 4.— Class 1 is unique in that the type of packaging frequently has a decisive effect on the hazard and therefore on the assignment to a particular division. The correct division is determined by use of the procedures provided in this Chapter.

Note 5.— Most of the explosives listed in Table 3-1 are not normally permitted for transport by air. Information concerning these explosives is included in Table 3-1 and in the Supplement to these Instructions to provide guidance for States in those cases where consideration is being given to granting exemptions in accordance with 1;1.1.3.

1.1 DEFINITIONS AND GENERAL PROVISIONS

Class 1 comprises:

a) explosive substances (a substance that is not itself an explosive but which can form an explosive atmosphere of gas, vapour or dust is not included in Class 1), except those that are too dangerous to transport or those where the predominant hazard is appropriate to another class;

b) explosive articles, except devices containing explosive substances in such quantity or of such a character that their inadvertent or accidental ignition or initiation during transport will not cause any effect external to the device either by projection, fire, smoke, heat or loud noise (see 1.5.2); and

c) substances and articles not mentioned under 1.1 a) and b), which are manufactured with a view to producing a practical explosive or pyrotechnic effect.

1.2 DEFINITIONS

For the purposes of these Instructions, the following definitions apply:

a) ***Explosive substance*** is a solid or liquid substance (or a mixture of substances) which is in itself capable, by chemical reaction, of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.

b) ***Pyrotechnic substance*** is a substance or a mixture of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative, self-sustaining, exothermic, chemical reactions.

c) ***Explosive article*** is an article containing one or more explosive substances.

d) ***Phlegmatized*** means that a substance (or "phlegmatizer") has been added to an explosive to enhance its safety in handling and transport. The phlegmatizer renders the explosive insensitive, or less sensitive, to the following actions: heat, shock, impact, percussion or friction. Typical phlegmatizing agents include, but are not limited to: paper, wax, water, polymers (such as chlorofluoropolymers), alcohol and oils (such as petroleum jelly and paraffin).

Note.— Explanations for a number of other terms used in connection with explosives can be found in Attachment 2 to these Instructions.

1.3 DIVISIONS

1.3.1 Class 1 is divided into six divisions:

a) Division 1.1 — Substances and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire load virtually instantaneously).

b) Division 1.2 — Substances and articles which have a projection hazard but not a mass explosion hazard.

c) Division 1.3 — Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

This division comprises substances and articles which:

i) give rise to considerable radiant heat, or

ii) burn one after another, producing minor blast or projection effects or both.

d) Division 1.4 — Substances and articles which present no significant hazard.

This division comprises substances and articles which present only a small hazard in the event of ignition or initiation during transport. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Note.— Substances and articles of this division are in Compatibility Group S if they are so packaged or designed that any hazardous effects arising from accidental functioning are confined within the package, unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder fire fighting or other emergency response efforts in the immediate vicinity of the package.

e) Division 1.5 — Very insensitive substances which have a mass explosion hazard.

This division comprises substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Note.— For the normal conditions of transport, see Notes 2 to 4 of the Introductory Notes to Part 4.

f) Division 1.6 — Extremely insensitive articles which do not have a mass explosion hazard.

This division comprises articles which predominantly contain extremely insensitive substances and which demonstrate a negligible probability of accidental initiation or propagation.

Note.— The hazard from articles of Division 1.6 is limited to the explosion of a single article.

1.3.2 Any substance or article having or suspected of having explosive characteristics must first be considered for classification in Class 1 in accordance with the procedures in 1.5.1.1 to 1.5.1.3. Goods are not classified in Class 1 when:

a) unless specially authorized, the transport of an explosive substance is forbidden because sensitivity of the substance is excessive;

b) the substance or article comes within the scope of those explosive substances and articles which are specifically excluded from Class 1 by the definition of this class; or

c) the substance or article has no explosive properties.

1.4 COMPATIBILITY GROUPS

≠ 1.4.1 Goods of Class 1 are assigned to one of six divisions, depending on the type of hazard they present (see 1.3.1), and to one of thirteen compatibility groups which identify the kinds of explosive substances and articles that are deemed to be compatible. Tables 2-2 and 2-3 show the scheme of classification into compatibility groups, the possible hazard divisions associated with each group, and the consequential classification codes.

1.4.2 The definitions of compatibility groups in Table 2-2 are intended to be mutually exclusive, except for a substance or article which qualifies for Compatibility Group S. Since the criterion of Compatibility Group S is an empirical one, assignment to this group is necessarily linked to the tests for assignment to Division 1.4.

1.4.2.1 Certain Division 1.4S explosives, identified by Special Provision A165 in Table 3-1, are subject to Test Series 6 (d) of Part I of the UN *Manual of Tests and Criteria* to demonstrate that any hazardous effects arising from functioning are confined within the package. Evidence of a hazardous effect outside the package includes:

a) denting or perforation of the witness plate beneath the package;

b) a flash or flame capable of igniting such as a sheet of 80 ± 3 g/m² paper at a distance of 25 cm from the package;

c) disruption of the package causing projection of the explosives contents; or

d) a projection which passes completely through the packaging (a projection or fragment retained or stuck in the wall of the packaging is considered as non-hazardous).

The appropriate national authority may wish to take into account the expected effect of the initiator when assessing the results of the test, if these are expected to be significant when compared to the articles being tested. If there are hazardous effects outside the package, then the product is excluded from Compatibility Group S.

Table 2-2. Classification codes

	Description of substance or article to be classified	*Compatibility group*	*Classification code*
	Primary explosive substance	A	1.1A
≠	Article containing a primary explosive substance and not containing two or more effective protective features. Some articles, such as detonators for blasting, detonator assemblies for blasting and primers, cap-type, are included even though they do not contain primary explosives	B	1.1B 1.2B 1.4B
	Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance	C	1.1C 1.2C 1.3C 1.4C
	Secondary detonating explosive substance or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and containing two or more effective protective features	D	1.1D 1.2D 1.4D 1.5D
	Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids)	E	1.1E 1.2E 1.4E
	Article containing a secondary detonating explosive substance with its own means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge	F	1.1F 1.2F 1.3F 1.4F
	Pyrotechnic substance, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel, or hypergolic liquids)	G	1.1G 1.2G 1.3G 1.4G
	Article containing both an explosive substance and white phosphorus	H	1.2H 1.3H
	Article containing both an explosive substance and a flammable liquid or gel	J	1.1J 1.2J 1.3J
	Article containing both an explosive substance and a toxic chemical agent	K	1.2K 1.3K

Description of substance or article to be classified	*Compatibility group*	*Classification code*
Explosive substance or article containing an explosive substance and presenting a special hazard (e.g. due to water activation or presence of hypergolic liquids, phosphides or a pyrophoric substance) and needing isolation of each type	L	1.1L 1.2L 1.3L
Articles predominantly containing extremely insensitive substances	N	1.6N
Substances or articles so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response in the immediate vicinity of the package	S	1.4S

Note 1.— Articles of Compatibility Groups D and E may be fitted or packed together with their own means of initiation provided that such means have at least two effective protective features designed to prevent an explosion in the event of accidental functioning of the means of initiation. Such articles and packages must be assigned to Compatibility Groups D or E.

Note 2.— Articles of Compatibility Groups D and E may be packed together with their own means of initiation, which do not have two effective protective features when, in the opinion of the appropriate national authority of the State of Origin, the accidental functioning of the means of initiation does not cause the explosion of an article under normal conditions of transport. Such packages must be assigned to Compatibility Groups D or E.

Table 2-3. Scheme of classification of explosives, combination of hazard division with compatibility group

	Compatibility Group													
Hazard	A	B	C	D	E	F	G	H	J	K	L	N	S	A-S Σ
1.1	1.1A	1.1B	1.1C	1.1D	1.1E	1.1F	1.1G		1.1J		1.1L			9
1.2		1.2B	1.2C	1.2D	1.2E	1.2F	1.2G	1.2H	1.2J	1.2K	1.2L			10
1.3			1.3C			1.3F	1.3G	1.3H	1.3J	1.3K	1.3L			7
1.4		1.4B	1.4C	1.4D	1.4E	1.4F	1.4G						1.4S	7
1.5				1.5D										1
1.6												1.6N		1
1.1-1.6 Σ		3	4	4	3	4	4	2	3	2	3	1	1	35

1.5 CLASSIFICATION OF EXPLOSIVES

Note.— For additional information regarding classification of explosives, see UN Recommendations, 2.1.3.1.4, 2.1.3.1.5 and 2.1.3.4.

1.5.1.1 Any substance or article having or suspected of having explosive characteristics must be considered for classification in Class 1 in accordance with the tests, procedures and criteria prescribed in Part I of the *UN Manual of Tests and Criteria*. Substances and articles classified in Class 1 must be assigned to the appropriate division and compatibility group in accordance with the procedures and criteria prescribed in that document.

1.5.1.2 The classification of fireworks must be based on paragraph 2.1.3.5 of the UN Recommendations.

1.5.1.3 Except for substances that are listed by their proper shipping name in the Dangerous Goods List (Table 3-1), goods must not be offered for transport as Class 1 until they have been subjected to the classification procedure prescribed in this Chapter. In addition, the classification procedure must be undertaken before a new product is offered for transport. In this context, a new product is one which, in the opinion of the appropriate national authority, involves any of the following:

a) a new explosive substance or a combination or a mixture of explosive substances which is considered to be significantly different from other combinations or mixtures already classified;

b) a new design of article or an article containing a new explosive substance or a new combination or mixture of explosive substances;

c) a new design of package for an explosive substance or article including a new type of inner packaging.

Note.— The importance of this can be overlooked unless it is realized that a relatively minor change in an inner or outer packaging can be critical and can convert a lesser hazard into a mass explosion hazard.

1.5.1.4 The producer or other applicant for classification of the product must provide adequate information concerning the names and characteristics of all explosive substances in the product and must furnish the results of all relevant tests which have been done. It is assumed that all the explosive substances in a new article have been properly tested and then approved.

1.5.2 Exclusion from Class 1

1.5.2.1 The appropriate national authority may exclude an article or substance from Class 1 by virtue of test results and the Class 1 definition.

1.5.2.2 Where a substance provisionally accepted into Class 1 is excluded from Class 1 by performing Test Series 6 on a specific type and size of package, this substance, when meeting the classification criteria or definition for another class or division, should be listed in the Dangerous Goods List in that class or division with a special provision restricting it to the type and size of package tested.

1.5.2.3 Where a substance is assigned to Class 1 but is diluted to be excluded from Class 1 by Test Series 6, this diluted substance (hereafter referred to as desensitized explosive) should be listed in the Dangerous Goods List with an indication of the highest concentration which excluded it from Class 1 (see 2;3.1.4 and 2;4.2.4) and if applicable, the concentration below which it is no longer deemed subject to these Instructions. New solid desensitized explosives subject to these Instructions should be listed in Division 4.1, and new liquid desensitized explosives should be listed in Class 3. When the desensitized explosive meets the criteria or definition for another class or division, the corresponding subsidiary hazard(s) should be assigned to it.

1.5.2.4 An article may be excluded from Class 1 when three unpackaged articles, each individually activated by its own means of initiation or ignition or external means to function in the designed mode, meet the following test criteria:

a) no external surface has a temperature of more than 65ºC. A momentary spike in temperature up to 200ºC is acceptable;

b) no rupture or fragmentation of the external casing or movement of the article or detached parts thereof of more than one metre in any direction;

Note.— Where the integrity of the article may be affected in the event of an external fire, these criteria must be examined by a fire test. One such method is described in ISO 14451-2 using a heating rate of 80 K/min.

c) no audible report exceeding 135 dB(C) peak at a distance of one metre;

d) no flash or flame capable of igniting a material such as a sheet of 80 ± 10 g/m² paper in contact with the article; and

e) no production of smoke, fumes or dust in such quantities that the visibility in a one cubic metre chamber equipped with appropriately sized blow out panels is reduced more than 50 per cent as measured by a calibrated light (lux) meter or radiometer located one metre from a constant light source located at the midpoint on opposite walls. The general guidance on optical density testing in ISO 5659-1 and the general guidance on the photometric system described in Section 7.5 in ISO 5659-2 may be used or similar optical density measurement methods designed to accomplish the same purpose may also be employed. A suitable hood cover surrounding the back and sides of the light meter must be used to minimize effects of scattered or leaking light not emitted directly from the source.

Note 1.— If during the tests addressing criteria a), b), c) and d), no smoke, or very little smoke is observed, the test described in e) may be waived.

Note 2.— The appropriate national authority may require testing in packaged form if it is determined that, as packaged for transport, the article may pose a greater hazard.

1.5.3 Classification documentation

1.5.3.1 An appropriate national authority assigning an article or substance into Class 1 should confirm with the applicant that classification in writing.

1.5.3.2 An appropriate national authority classification document may be in any form and may consist of more than one page, provided pages are numbered consecutively. The document should have a unique reference.

1.5.3.3 The information provided must be easy to identify, legible and durable.

1.5.3.4 Examples of the information that may be provided in the classification documents are as follows:

a) the name of the appropriate national authority and the provisions in national legislation under which it is granted its authority;

b) the modal or national regulations for which the classification document is applicable;

c) confirmation that the classification has been approved, made or agreed in accordance with the UN Model Regulations or these Instructions;

d) the name and address of the person in law to which the classification has been assigned and any company registration which uniquely identifies a company or other body corporate under national legislation;

e) the name under which the explosives will be placed onto the market or otherwise supplied for transport;

f) the proper shipping name, UN number, class, hazard division and corresponding compatibility group of the explosives;

g) where appropriate, the maximum net explosive mass of the package or article;

h) the name, signature, stamp, seal or other identification of the person authorized by the appropriate national authority to issue the classification document is clearly visible;

i) where safety in transport or the hazard division is assessed as being dependent upon the packaging, the packaging mark or a description of the permitted:

   i) inner packagings;

   ii) intermediate packagings; and

   iii) outer packagings;

j) the classification document states the part number, stock number or other identifying reference under which the explosives will be placed onto the market or otherwise supplied for transport;

k) the name and address of the person in law who manufactured the explosives and any company registration which uniquely identifies a company or other body corporate under national legislation;

l) any additional information regarding the applicable packing instruction and special packing provisions where appropriate;

m) the basis for assigning the classification, i.e. whether on the basis of test results, default for fireworks, analogy with classified explosive, by definition from the Dangerous Goods List, etc.;

n) any special conditions or limitations that the appropriate national authority has identified as relevant to the safety for transport of the explosives, the communication of the hazard and international transport; and

o) the expiry date of the classification document is given where the appropriate national authority considers one to be appropriate.

———————

Chapter 2

CLASS 2 — GASES

Parts of this Chapter are affected by State Variation US 6;
see Table A-1

2.1 DEFINITIONS AND GENERAL PROVISIONS

2.1.1 A gas is a substance which:

a) at 50°C has a vapour pressure greater than 300 kPa; or

b) is completely gaseous at 20°C at a standard pressure of 101.3 kPa.

2.1.2 The transport condition of a gas is described according to its physical state as:

a) compressed gas — a gas which when packaged under pressure for transport is entirely gaseous at –50°C; this category includes all gases with a critical temperature less than or equal to –50°C;

b) liquefied gas — a gas which when packaged under pressure for transport is partially liquid at temperatures above –50°C. A distinction is made between:

High pressure liquefied gas: a gas with a critical temperature between –50°C and +65°C, and

Low pressure liquefied gas: a gas with a critical temperature above +65°C;

c) refrigerated liquefied gas — a gas which when packaged for transport is made partially liquid because of its low temperature;

d) dissolved gas — a gas which when packaged under pressure for transport is dissolved in a liquid phase solvent; or

e) adsorbed gas — a gas which when packaged for transport is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20°C and less than 300 kPa at 50°C.

2.1.3 This class comprises compressed gases; liquefied gases; dissolved gases; refrigerated liquefied gases; mixtures of one or more gases with one or more vapours of substances of other classes; articles charged with a gas, aerosols and chemicals under pressure. (For aerosols, see 1;3.1.)

Note.—"Cryogenic liquid" means the same as "refrigerated liquefied gas".

2.1.4 Pressures of all kinds relating to receptacles (such as test pressure, internal pressure, safety-valve opening pressure) are always indicated in gauge pressure (pressure in excess of atmospheric pressure); however, the vapour pressure of substances is always expressed in absolute pressure.

2.2 DIVISIONS

2.2.1 Substances of Class 2 are assigned to one of three divisions based on the primary hazard of the gas during transport.

*Note.— UN 1950 — **Aerosols,** UN 2037 — **Receptacles, small, containing gas** and UN 2037 — **Gas cartridges** must be regarded as being in Division 2.1 when the criteria in 2.5.1 a) are met. For chemicals under pressure of UN Nos. 3500 to 3505, see Special Provision A187.*

a) Division 2.1 — Flammable gases.

Gases which at 20°C and a standard pressure of 101.3 kPa:

i) are ignitable when in a mixture of 13 per cent or less by volume with air; or

ii) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:2017). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority must be used.

b) Division 2.2 — Non-flammable, non-toxic gases.

Gases which:

i) are asphyxiant — gases which dilute or replace the oxygen normally in the atmosphere; or

ii) are oxidizing — gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does; or

iii) do not come under the other divisions.

Note.— In 2.2.1 b) ii), "gases which cause or contribute to the combustion of other material more than air does" means pure gases or gas mixtures with an oxidizing power greater than 23.5 per cent as determined by a method specified in ISO 10156:2017.

c) Division 2.3 — Toxic gases.

Gases which:

i) are known to be so toxic or corrosive to humans as to pose a hazard to health; or

ii) are presumed to be toxic or corrosive to humans because they have an LC_{50} value equal to or less than 5 000 mL/m^3 (ppm) when tested in accordance with 6.2.1.3.

Note.— Gases meeting the above criteria owing to their corrosivity are to be classified as toxic with a subsidiary corrosive hazard.

2.2.2 Gases of Division 2.2 are not subject to these Instructions if they are transported at a pressure less than 200 kPa at 20°C and are not liquefied or refrigerated liquefied gases.

2.2.3 Gases of Division 2.2 are not subject to these Instructions when contained in the following:

a) foodstuffs, including carbonated beverages (except UN 1950);

b) balls intended for use in sports; or

c) tyres which meet the provisions of Special Provision A59.

Note.— This exception does not apply to lamps. For lamps see 1;2.6.

2.3 HAZARD PRECEDENCE

Gases and gas mixtures with hazards associated with more than one division take the following precedence:

a) Division 2.3 takes precedence over all other divisions;

b) Division 2.1 takes precedence over Division 2.2.

2.4 MIXTURES OF GASES

For the classification of gas mixtures into one of the three divisions (including vapours of substance from other classes), the following principles must be used:

a) Flammability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:2017). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority may be used.

b) The level of toxicity is determined by either tests in accordance with 6.2.1.3 or a calculation method using the following formula:

$$LC_{50}\text{Toxic (mixture)} = \frac{1}{\sum_{i=1}^{n} \frac{f_i}{T_i}}$$

where f_i = mole fraction of the i^{th} component substance of the mixture, and

where T_i = toxicity index of the i^{th} component substance of the mixture (the T_i equals the LC_{50} value when available).

When LC_{50} values are unknown, the toxicity index is determined by using the lowest LC_{50} value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

c) A gas mixture has a subsidiary hazard of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membranes or when the LC_{50} value of the mixture's corrosive components is equal to or less than 5 000 mL/m^3 (ppm) when the LC_{50} value is calculated by the formula:

$$LC_{50}\text{Corrosive (mixture)} = \frac{1}{\sum_{i=1}^{n} \frac{f_{ci}}{T_{ci}}}$$

where f_{ci} = mole fraction of the i^{th} corrosive component substance of the mixture, and

where T_{ci} = Toxicity index of the i^{th} corrosive component substance of the mixture (the T_{ci} equals the LC_{50} value when available).

d) Oxidizing ability is determined either by tests or by calculation methods adopted by the International Standards Organization (see the Note in 2.2.1 b) and ISO 10156:2017).

2.5 AEROSOLS

2.5.1 For aerosols, the division of Class 2 and the subsidiary hazards depend on the nature of the contents of the aerosol dispenser. The following provisions must apply:

a) Division 2.1 applies if the contents include 85 per cent by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more;

b) Division 2.2 applies if the content contains 1 per cent by mass or less flammable components and the heat of combustion is less than 20 kJ/g;

c) otherwise the product must be classified as tested by the tests described in the UN *Manual of Tests and Criteria*, Part III, section 31. Extremely flammable and flammable aerosols must be classified in Division 2.1; non-flammable in Division 2.2;

d) gases of Division 2.3 must not be used as a propellant in an aerosol dispenser;

e) where the contents other than the propellant of aerosol dispensers to be ejected are classified as Division 6.1, Packing Groups II or III or Class 8, Packing Groups II or III, the aerosol must have a subsidiary hazard of Division 6.1 or Class 8;

f) aerosols with contents meeting the criteria of Packing Group I for toxicity or corrosivity are forbidden from transport.

2.5.2 Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of subsections 31.1.3 of Part III of the UN *Manual of Tests and Criteria*. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion must be determined by one of the following methods: ASTM D 240, ISO/FDIS 13943: 1999 (E/F) 86.1 to 86.3 or NFPA 30B.

2.6 GASES FORBIDDEN FOR TRANSPORT

Chemically unstable gases of Class 2 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end, particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

Chapter 3

CLASS 3 — FLAMMABLE LIQUIDS

INTRODUCTORY NOTES

Note 1.— The word "flammable" has the same meaning as "inflammable".

Note 2.— The flash point of a flammable liquid may be altered by the presence of an impurity. The substances listed in Class 3 in the Dangerous Goods List in Part 3 must generally be regarded as chemically pure. Since commercial products may contain added substances or impurities, flash points may vary, and this may have an effect on classification or determination of the packing group for the product. In the event of doubt regarding the classification or packing group of a substance, the flash point of the substance must be determined experimentally.

3.1 DEFINITION AND GENERAL PROVISIONS

3.1.1 Class 3 includes the following substances:

a) Flammable liquids (see 3.1.2 and 3.1.3);

b) Liquid desensitized explosives (see 3.1.4).

3.1.2 Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60°C, closed-cup test, or not more than 65.6°C, open-cup test, normally referred to as the flash point. This class also includes:

a) liquids offered for transport at temperatures at or above their flash point; and

b) substances that are transported or offered for transport at elevated temperatures in a liquid state and which give off a flammable vapour at a temperature at or below the maximum transport temperature (i.e. the maximum temperature likely to be encountered by the substance in transport).

Note. — Since the results of open-cup tests and of closed-cup tests are not strictly comparable and even individual results by the same test are often variable, regulations varying from the above figures to make allowance for such differences would be within the spirit of this definition.

3.1.3 Liquids meeting the definition in 3.1.2 above with a flash point of more than 35°C which do not sustain combustion need not be considered as flammable liquids for the purposes of these Instructions. Liquids are considered to be unable to sustain combustion for the purposes of these Instructions (i.e. they do not sustain combustion under defined test conditions) if:

a) they have passed a suitable combustibility test (see Sustained Combustibility Test prescribed in the UN *Manual of Tests and Criteria*, Part III, subsection 32.5.2); or

b) their fire point according to ISO 2592:2000 is greater than 100°C; or

c) they are miscible solutions with a water content of more than 90 per cent by mass.

3.1.4 Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form homogeneous liquid mixture to suppress their explosive properties (see 1.5.2.3). Entries in the Dangerous Goods List (Table 3-1) for liquid desensitized explosives are: UN 1204, UN 2059, UN 3064, UN 3343, UN 3357 and UN 3379.

3.2 ASSIGNMENT OF PACKING GROUPS

3.2.1 Table 2-4 should be used for the determination of the packing group of a liquid that presents a hazard due to flammability. For liquids whose only hazard is flammability, the packing group for the liquid is the packing group shown in Table 2-4. For a liquid possessing an additional hazard(s), the packing group, determined by using Table 2-4, and the packing group based on the severity of the additional hazard(s), must be considered. In such cases, the table of precedence of hazard characteristics appearing in Table 2-1 should be used to determine the correct classification of the liquid.

3.2.2 Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash point of less than 23°C may be assigned to Packing Group III in conformity with the procedures prescribed in Part III, subsection 32.3 of the UN *Manual of Tests and Criteria* provided that:

a) the viscosity[2] and flash point are in accordance with Table 2-5;

b) less than 3 per cent of the clear solvent layer separates in the solvent separation test;

c) the mixture or any separated solvent does not meet the criteria for Division 6.1 or Class 8;

d) the net quantity per package does not exceed 30 L for passenger aircraft or 100 L for cargo aircraft.

3.2.3 Substances classified as flammable liquids due to their being transported or offered for transport at elevated temperatures are included in Packing Group III.

Table 2-4. Packing group based on flammability

Packing group	*Flash point (closed-cup)*	*Initial boiling point*
I	—	≤35°C
II	<23°C	>35°C
III	≥23°C, ≤60°C	>35°C

Table 2-5. Viscosity and flashpoints

Kinematic viscosity (extrapolated) v (at near-zero shear rate) mm²/s at 23°C	*Flow time t in seconds*	*Jet diameter in mm*	*Flash point in °C (closed-cup)*
20 < *v* ≤ 80	20 < t ≤ 60	4	above 17
80 < *v* ≤ 135	60 < t ≤100	4	above 10
135 < *v* ≤ 220	20 < t ≤32	6	above 5
220 < *v* ≤ 300	32 < t ≤44	6	above –1
300 < *v* ≤ 700	44 < t ≤100	6	above –5
700 < *v*	100 < t	6	–5 and below

3.3 DETERMINATION OF FLASH POINT

The following methods for determining the flash point of flammable liquids may be used:

International standards

— ISO 1516
— ISO 1523
— ISO 2719
— ISO 13736
— ISO 3679
— ISO 3680

National standards

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959

— ASTM D-3828-93, Standard Test Methods for Flash Point by Small Scale Closed Tester
— ASTM D-56-93, Standard Test Method for Flash Point by Tag Closed Tester

2. Viscosity determination: Where the substance concerned is non-Newtonian, or where a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer must be used to determine the dynamic viscosity coefficient of the substance, at 23°C, at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.

— ASTM D-3278-96, Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus
— ASTM D-0093-96, Standard Test Methods for Flash Point by Pensky-Martens Closed-Cup Tester.

Association française de normalisation, AFNOR, 11, rue Francis de Pressensé, 93571 La Plaine Saint-Denis Cedex, France

— French Standard NF M 07–019
— French Standards NF M 07–011 / NF T 30–050 / NF T 66–009
— French Standard NF M 07–036

Deutsches Institut für Normung, Burggrafenstrasse 6, D-10787 Berlin

— Standard DIN 51755 (flash points below 65°C)

State Committee of the Council of Ministers for Standardization, 113813, GSP, Moscow, M-49 Leninsky Prospect, 9

— GOST 12.1.044-84

3.4 DETERMINATION INITIAL BOILING POINT

The following methods for determining the initial boiling point of flammable liquids may be used:

International standards

— ISO 3924
— ISO 4626
— ISO 3405

National standards

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959

— ASTM D-86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure
— ASTM D-1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids

Further acceptable methods

— Method A.2 as described in Part A of the Annex to Commission Regulation (EC) No 440/2008[3]

3.5 SUBSTANCES FORBIDDEN FOR TRANSPORT

Chemically unstable substances of Class 3 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end, particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

3. Commission Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Official Journal of the European Union, No. L 142 of 31.05.2008, p.1-739 and No. L 143 of 03.06.2008, p.55).

Chapter 4

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

INTRODUCTORY NOTES

Note 1.— Where the term "water-reactive" is used in these Instructions, it refers to a substance which, in contact with water, emits flammable gas.

Note 2.— Because of the different properties exhibited by the dangerous goods within Divisions 4.1 and 4.2, it is impracticable to establish a single criterion for classification in either of these divisions. Tests and criteria for assignment to the three divisions of Class 4 are addressed in this chapter and in the UN Manual of Tests and Criteria, *Part III, section 33.*

Note 3.— Since organometallic substances can be classified in Divisions 4.2 or 4.3 with additional subsidiary hazards, depending on their properties, a specific classification flowchart for these substances is given in 2.4.5 of the UN Recommendations on the Transport of Dangerous Goods.

4.1 DEFINITIONS AND GENERAL PROVISIONS

4.1.1 Class 4 is divided into three divisions as follows:

a) Division 4.1 — Flammable solids.

Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive substances and polymerizing substances which are liable to undergo a strongly exothermic reaction; desensitized explosives which may explode if not diluted sufficiently.

b) Division 4.2 — Substances liable to spontaneous combustion.

Substances which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire.

c) Division 4.3 — Substances which, in contact with water, emit flammable gases.

Substances which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

4.1.2 As referenced in this Chapter, test methods and criteria, with advice on application of the tests, are given in the current edition of the UN *Manual of Tests and Criteria*, for the classification of the following types of substances of Class 4:

a) Flammable solids (Division 4.1);

b) Self-reactive substances (Division 4.1);

c) Polymerizing substances (Division 4.1);

d) Pyrophoric solids (Division 4.2);

e) Pyrophoric liquids (Division 4.2);

f) Self-heating substances (Division 4.2); and

g) Substances which, in contact with water, emit flammable gases (Division 4.3).

Test methods and criteria for self-reactive substances and polymerizing substances are given in Part II of the UN *Manual of Tests and Criteria*, and test methods and criteria for the other types of substances of Class 4 are given in Part III, section 33 of the UN *Manual of Tests and Criteria*.

4.2 FLAMMABLE SOLIDS, SELF-REACTIVE SUBSTANCES, DESENSITIZED EXPLOSIVES AND POLYMERIZING SUBSTANCES

4.2.1 General

Division 4.1 includes the following types of substances:

a) flammable solids (see 4.2.2);

b) self-reactive substances (see 4.2.3);

c) solid desensitized explosives (see 4.2.4); and

d) polymerizing substances (see 4.2.5).

4.2.2 Division 4.1 — Flammable solids

4.2.2.1 *Definitions and properties*

4.2.2.1.1 Flammable solids are readily combustible solids and solids which may cause fire through friction.

4.2.2.1.2 Readily combustible solids are powdered, granular or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly. The danger may not only come from the fire but also from toxic combustion products. Metal powders are especially dangerous because of the difficulty of extinguishing a fire since normal extinguishing agents such as carbon dioxide or water can increase the hazard.

4.2.2.2 *Classification of flammable solids*

4.2.2.2.1 Powdered, granular or pasty substances must be classified as readily combustible solids of Division 4.1 when the time of burning of one or more of the test runs, performed in accordance with the test methods and criteria in the UN *Manual of Tests and Criteria,* Part III, subsection 33.2.1, is less than 45 seconds or the rate of burning is more than 2.2 mm/s. Powders of metals or metal alloys must be classified in Division 4.1 when they can be ignited and the reaction spreads over the whole length of the sample in 10 minutes or less.

4.2.2.2.2 Solids which may cause fire through friction must be classified in Division 4.1 by analogy with existing entries (e.g. matches) until definitive criteria are established.

4.2.2.3 *Assignment of packing groups*

4.2.2.3.1 Packing groups are assigned on the basis of the test methods referred to in 4.2.2.2.1. For readily combustible solids (other than metal powders), Packing Group II must be assigned if the burning time is less than 45 seconds and the flame passes the wetted zone. Packing Group II must be assigned to powders of metal or metal alloys if the zone of reaction spreads over the whole length of the sample in 5 minutes or less.

4.2.2.3.2 Packing groups are assigned on the basis of the test methods referred to in 4.2.2.2.1. For readily combustible solids (other than metal powders), Packing Group III must be assigned if the burning time is less than 45 seconds and the wetted zone stops the flame propagation for at least 4 minutes. Packing Group III must be assigned to metal powders if the reaction spreads over the whole length of the sample in more than 5 minutes but not more than 10 minutes.

4.2.2.3.3 Solids which may cause fire through friction must be assigned to a packing group by analogy with existing entries or in accordance with any appropriate special provision (see Table 3-2).

4.2.3 Division 4.1 — Self-reactive substances

4.2.3.1 *Definitions and properties*

4.2.3.1.1 Definitions

For the purposes of these Instructions:

Self-reactive substances are thermally unstable substances liable to undergo a strongly exothermic decomposition even without the participation of oxygen (air). The following substances must not be considered to be self-reactive substances of Division 4.1 if:

a) they are explosives according to the criteria of Class 1;

b) they are oxidizing substances according to the classification procedure for Division 5.1 (see 5.2.1.1) except that mixtures of oxidizing substances which contain 5.0 per cent or more of combustible organic substances must be subjected to the classification procedure defined in Note 3;

c) they are organic peroxides according to the criteria of Division 5.2;

d) their heat of decomposition is less than 300 J/g; or

e) their self-accelerating decomposition temperature is greater than 75°C for a 50 kg package.

Note 1.— The heat of decomposition can be determined by using any internationally recognized method, e.g. differential scanning calorimetry and adiabatic calorimetry.

Note 2. — Any substance which shows the properties of a self-reactive substance must be classified as such, even if this substance gives a positive test result, according to 4.3.2 for inclusion in Division 4.2.

Note 3.— Mixtures of oxidizing substances meeting the criteria of Division 5.1 which contain 5.0 per cent or more of combustible organic substances, which do not meet the criteria mentioned in a), c), d) or e) above, must be subjected to the self-reactive substance classification procedure.

A mixture showing the properties of a self-reactive substance, type B to F, must be classified as a self-reactive substance of Division 4.1.

A mixture showing the properties of a self-reactive substance, type G, according to the principle of 2.4.2.3.3.2 (g) of the UN Recommendations must be considered for classification as a substance of Division 5.1 (see 5.2.1.1).

4.2.3.1.2 Properties

The decomposition of self-reactive substances can be initiated by heat, contact with catalytic impurities (e.g. acids, heavy-metal compounds, bases), friction or impact. The rate of decomposition increases with temperature and varies with the substance. Decomposition, particularly if no ignition occurs, may result in the evolution of toxic gases or vapours. For certain self-reactive substances, the temperature must be controlled. Some self-reactive substances may decompose explosively, particularly if confined; this characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Some self-reactive substances burn vigorously. Self-reactive substances include some of the following types of compounds:

a) aliphatic azo compounds (—C—N=N—C—);

b) organic azides (—C—N_3);

c) diazonium salts (—$CN_2^+Z^-$);

d) N-nitroso compounds (—N—N=O); and

e) aromatic sulphohydrazides (—SO_2—NH—NH_2).

This list is not exhaustive and substances with other reactive groups and some mixtures of substances may have similar properties.

4.2.3.2 *Classification of self-reactive substances*

≠ 4.2.3.2.1 Self-reactive substances are classified into seven types according to the degree of danger they present. The types of self-reactive substance range from type A, which is forbidden in any mode of transport, to type G, which is not subject to the provisions for self-reactive substances of Division 4.1. The classification of types B to F is directly related to the maximum quantity allowed in one packaging.

4.2.3.2.2 Related substances are specifically listed by name in the Dangerous Goods List (Table 3-1). Related substances are UN 2956, UN 3242 and UN 3251.

4.2.3.2.3 Self-reactive substances permitted for transport are listed in 4.2.3.2.4. For each permitted substance listed, the appropriate generic entry of the Dangerous Goods List (UN 3221 to 3240) is assigned, and appropriate subsidiary hazard(s) and remarks providing relevant information are given. The generic entries specify:

— the self-reactive substance type (B to F);

— the physical state (i.e. liquid/solid); and

— when temperature control is required.

≠ 4.2.3.2.4 List of currently assigned self-reactive substances in packagings

≠ The following table (Table 2-6) is reproduced from 2.4.2.3.2.3 of the UN Model Regulations, with irrelevant material removed.

Table 2-6. List of currently assigned self-reactive substances in packagings

Note.— Self-reactive substances to be transported must fulfil the classification and the control and emergency temperatures (derived from the self-accelerating decomposition temperature (SADT)) as listed.

Self-reactive substance	*Concentration (%)*	*Control temperature (°C)*	*Emergency temperature (°C)*	*UN generic entry*	*Notes*
Acetone-pyrogallol copolymer 2-diazo-1-naphthol-5-sulphonate	100			3228	
Azodicarbonamide formulation type B, temperature controlled	<100			FORBIDDEN	1, 2
Azodicarbonamide formulation type C	<100			3224	3
Azodicarbonamide formulation type C, temperature controlled	<100			3234	3
Azodicarbonamide formulation type D	<100			3226	4
Azodicarbonamide formulation type D, temperature controlled	<100			3236	4
2,2'-Azodi (2,4-dimethyl-4-methoxyvaleronitrile)	100	–5	+5	3236	
2,2'-Azodi (2,4-dimethyl-valeronitrile)	100	+10	+15	3236	
2,2'-Azodi (ethyl-2-methylpropionate)	100	+20	+25	3235	
1,1'-Azodi (hexahydrobenzonitrile)	100			3226	
2,2'-Azodi (isobutyronitrile)	100	+40	+45	3234	
2,2'-Azodi (isobutyronitrile) as a water-based paste	≤50			3224	
2,2'-Azodi (2-methylbutyronitrile)	100	+35	+40	3236	
Benzene-1,3-disulphonyl hydrazide, as a paste	52			3226	
Benzenesulphonyl hydrazide	100			3226	
4-(Benzyl(ethyl)amino)-3-ethoxybenzenediazonium zinc chloride	100			3226	
4-(Benzyl(methyl)amino)-3-ethoxybenzenediazonium zinc chloride	100	+40	+45	3236	
3-Chloro-4-diethylaminobenzenediazonium zinc chloride	100			3226	
2-Diazo-1-naphthol-4-sulphonyl chloride	100			FORBIDDEN	2
2-Diazo-1-naphthol-5-sulphonyl chloride	100			FORBIDDEN	2
2-Diazo-1-naphthol sulphonic acid ester mixture, type D	<100			3226	7
2,5-Dibutoxy-4-(4-morpholinyl)-benzenediazonium, tetrachlorozincate (2:1)	100			3228	
2,5-Diethoxy-4-morpholinobenzenediazonium tetrafluoroborate	100	+30	+35	3236	
2,5-Diethoxy-4-morpholinobenzenediazonium zinc chloride	67-100	+35	+40	3236	
2,5-Diethoxy-4-morpholinobenzenediazonium zinc chloride	66	+40	+45	3236	
2,5-Diethoxy-4-(4-morpholinyl)-benzenediazonium sulphate	100			3226	

Self-reactive substance	*Concentration (%)*	*Control temperature (°C)*	*Emergency temperature (°C)*	*UN generic entry*	*Notes*
2,5-Diethoxy-4-(phenylsulphonyl) benzenediazonium zinc chloride	67	+40	+45	3236	
Diethyleneglycol bis (allyl carbonate) + Di-isopropyl-peroxydicarbonate	≥88 + ≤12	–10	0	3237	
2,5-Dimethoxy-4-(4-methylphenylsulphonyl) benzenediazonium zinc chloride	79	+40	+45	3236	
4-(Dimethylamino)-benzenediazonium trichlorozincate (-1)	100			3228	
4-Dimethylamino-6-(2-dimethylaminoethoxy) toluene-2-diazonium zinc chloride	100	+40	+45	3236	
N,N'-Dinitroso-N,N'-dimethyl terephthalamide, as a paste	72			3224	
N,N'-Dinitrosopentamethylenetetramine	82			3224	5
Diphenyloxide-4,4'-disulphonyl hydrazide	100			3226	
4-Dipropylaminobenzenediazonium zinc chloride	100			3226	
≠ 2-(N,N-Ethoxycarbonylphenylamino)-3-methoxy-4-(N-methyl-N-cyclohexylamino) benzenediazonium zinc chloride	63-92	+40	+45	3236	
≠ 2-(N,N-Ethoxycarbonylphenylamino)-3-methoxy-4-(N-methyl-N-cyclohexylamino) benzenediazonium zinc chloride	62	+35	+40	3236	
N-Formyl-2-(nitromethylene)-1,3-perhydrothiazine	100	+45	+50	3236	
2-(2-Hydroxyethoxy)-1-(pyrrolidin-1-yl) benzene-4-diazonium zinc chloride	100	+45	+50	3236	
3-(2-Hydroxyethoxy)-4-(pyrrolidin-1-yl) benzenediazonium zinc chloride	100	+40	+45	3236	
+ (7-Methoxy-5-methyl-benzothiophen-2-yl) boronic acid	88-100			3230	9
≠ 2-(N,N-Methylaminoethylcarbonyl)-4-(3,4-dimethylphenylsulphonyl) benzenediazonium hydrogen sulphate	96	+45	+50	3236	
4-Methylbenzenesulphonylhydrazide	100			3226	
3-Methyl-4-(pyrrolidin-1-yl) benzenediazonium tetrafluoroborate	95	+45	+50	3234	
4-Nitrosophenol	100	+35	+40	3236	
Phosphorothioic acid, O-[(cyanophenyl methylene) azanyl] O,O-diethylester	82-91 (Z isomer)			3227	8
Self-reactive liquid, sample				3223	6
Self-reactive liquid, sample temperature controlled				3233	6
Self-reactive solid, sample				3224	6
Self-reactive solid, sample temperature controlled				3234	6
Sodium 2-diazo-1-naphthol-4-sulphonate	100			3226	
Sodium 2-diazo-1-naphthol-5-sulphonate	100			3226	
Tetramine palladium (II) nitrate	100	+30	+35	3234	

≠ *NOTES:*

1. Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2 (b) of the UN Model Regulations.
2. "EXPLOSIVE" subsidiary hazard label required and consequently forbidden for transport by air under any circumstance.
3. Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2 (c) of the UN Model Regulations.
4. Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2 (d) of the UN Model Regulations.
5. With a compatible diluent having a boiling point of not less than 150°C.
6. See 4.2.3.2.6.
7. This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1-naphthol-5-sulphonic acid meeting the criteria of 2.4.2.3.3.2 d) of the UN Model Regulations.
8. This entry applies to the technical mixture in n-butanol within the specified concentration limits of the (Z) isomer.
9. The technical compound with the specified concentration limits may contain up to 12% water and up to 1% organic impurities.

4.2.3.2.5 Classification of self-reactive substances not listed in Table 2-6 and assignment to a generic entry must be made by the appropriate authority of the State in which the dangerous goods were manufactured on the basis of a test report. Principles applying to the classification of such substances are provided in 2.4.2.3.3 of the UN Recommendations. The applicable classification procedures, test methods and criteria, and an example of a suitable test report, are given in the current edition of the UN *Manual of Tests and Criteria*, Part II. The statement of approval must contain the classification and the relevant transport conditions.

4.2.3.2.6 Samples of self-reactive substances not listed in Table 2-6, for which a complete set of test results is not available and which are to be transported for further testing or evaluation, may be assigned to one of the appropriate entries for self-reactive substances type C provided the following conditions are met:

a) the available data indicate that the sample would be no more dangerous than self-reactive substances type B;

b) the sample is packed in a combination packaging consisting of a plastic IP.2 inner packaging with a capacity not exceeding 0.5 L or 0.5 kg which is placed in a wooden box (4C1), plywood box (4D) or fibreboard box (4G) with the maximum net quantity per package not exceeding 1 L or 1 kg; and

c) the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

4.2.3.3 *Temperature control requirements*

≠ With the exception of self-reactive solids of type B, which are forbidden for transport by air under any circumstance, self-reactive substances which require temperature control during transport are forbidden for transport by air unless exempted (see 1;1.1.3). Self-reactive substances must be subject to temperature control if their self-accelerating decomposition temperature (SADT) is less than or equal to 55°C. Test methods for determining the SADT are given in the current edition of the UN *Manual of Tests and Criteria*. The test selected must be conducted in a manner which is representative of the package to be transported both in size and material of construction.

4.2.3.4 *Desensitization of self-reactive substances*

4.2.3.4.1 In order to ensure safety in transport, self-reactive substances may be desensitized by the use of a diluent. When a diluent is used, the self-reactive substance must be tested with the diluent present in the concentration and form to be used in transport.

4.2.3.4.2 Diluents, which may allow a self-reactive substance to concentrate to a dangerous extent in the event of leakage from a package, must not be used.

4.2.3.4.3 The diluent used must be compatible with the self-reactive substance. In this regard, compatible diluents are those solids or liquids which have no detrimental influence on the thermal stability and hazard type of the self-reactive substance.

4.2.4 Division 4.1 — Solid desensitized explosives

4.2.4.1 *Definition*

Solid desensitized explosives are explosive substances which are wetted with water or alcohols or are diluted with other substances to form a homogeneous solid mixture to suppress their explosive properties. Entries in the Dangerous Goods List for solid desensitized explosives are UN 1310, 1320, 1321, 1322, 1336, 1337, 1344, 1347, 1348, 1349, 1354, 1355, 1356, 1357, 1517, 1571, 2555, 2556, 2557, 2852, 2907, 3317, 3319, 3344, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3376, UN 3380 and UN 3474.

4.2.4.2 Substances that:

a) have been provisionally accepted into Class 1 according to Test Series 1 and 2 but exempted from Test Series 6;

b) are not self-reactive substances of Division 4.1;

≠ c) are not substances of Class 5;

are also assigned to Division 4.1. UN 2956, UN 3241, UN 3242 and UN 3251 are such entries.

4.2.5 Division 4.1 — Polymerizing substances and mixtures (stabilized)

4.2.5.1 *Definitions and properties*

4.2.5.1.1 Polymerizing substances are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in transport. Such substances are considered to be polymerizing substances of Division 4.1 when:

a) their self-accelerating polymerization temperature (SAPT) is 75°C or less under the conditions (with or without chemical stabilization as offered for transport) and in the packaging in which the substance or mixture is to be transported;

b) they exhibit a heat of reaction of more than 300 J/g; and

c) they do not meet any other criteria for inclusion in Classes 1 to 8.

4.2.5.1.2 A mixture meeting the criteria of a polymerizing substance must be classified as a polymerizing substance of Division 4.1.

4.2.5.1.3 Polymerizing substances are subject to temperature control in transport if their self-accelerating polymerization temperature (SAPT) is 50 °C or less in the packaging in which the substance is to be transported.

Note.—Substances meeting the criteria of a polymerizing substance and also for inclusion in Classes 1 to 8 are subject to the requirements of Special Provision A209.

4.3 SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION (DIVISION 4.2)

4.3.1 Definitions and properties

4.3.1.1 Division 4.2 includes:

a) pyrophoric substances: substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite within 5 minutes of coming into contact with air. These substances are the most liable to spontaneous combustion and are called pyrophoric substances; and

b) self-heating substances: other substances which in contact with air without energy supply are liable to self-heating. These substances will ignite only when in large amounts (kilograms) and after long periods of time (hours or days) and are called self-heating substances.

4.3.1.2 Self-heating of a substance is a process where the gradual reaction of that substance with oxygen (in the air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion.

4.3.2 Classification in Division 4.2

4.3.2.1 Solids are considered pyrophoric solids which must be classified in Division 4.2 if, in tests performed in accordance with the test method given in the current edition of the UN *Manual of Tests and Criteria*, Part III, subsection 33.3.1.4, the sample ignites in one of the tests.

4.3.2.2 Liquids are considered pyrophoric liquids which must be classified in Division 4.2 if, in tests performed in accordance with the test method given in the current edition of the UN *Manual of Tests and Criteria*, Part III, subsection 33.3.1.5, the liquid ignites in the first part of the test, or if it ignites or chars the filter paper.

4.3.2.3 *Self-heating substances*

4.3.2.3.1 A substance must be classified as a self-heating substance of Division 4.2 if, in tests performed in accordance with the test method given in the current edition of the UN *Manual of Tests and Criteria*, Part III, subsection 33.3.1.6:

a) a positive result is obtained using a 25 mm sample cube at 140°C;

b) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 100 mm sample cube at 120°C and the substance is to be transported in packages with a volume of more than 3 m^3;

c) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 100 mm sample cube at 100°C and the substance is to be transported in packages with a volume of more than 450 L;

d) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a positive result is obtained using a 100 mm sample cube at 100°C.

Self-reactive substances which also give a positive result according to this test method must not be classified in Division 4.2 but in Division 4.1 (see 4.2.3.1.1).

4.3.2.3.2 A substance must not be classified in Division 4.2 if:

a) a negative result is obtained in a test using a 100 mm sample cube at 140°C;

b) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm sample cube at 140°C, a negative result is obtained in a test using a 100 mm sample cube at 120°C and the substance is to be transported in packages with a volume of not more than 3 cubic metres; or

c) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm sample cube at 140°C, a negative result is obtained in a test using a 100 mm sample cube at 100°C and the substance is to be transported in packages with a volume of not more than 450 L.

4.3.3 Assignment of packing groups

4.3.3.1 Packing Group I must be assigned to all pyrophoric liquids and solids.

4.3.3.2 Packing Group II must be assigned to self-heating substances which give positive results in a test using a 25 mm sample cube at 140°C.

4.3.3.3 Packing Group III must be assigned to self-heating substances if:

a) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm sample cube at 140°C and the substance is to be transported in packages with a volume of more than 3 cubic metres;

b) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm sample cube at 140°C, a positive result is obtained in a test using a 100 mm sample cube at 120°C and the substance is to be transported in packages with a volume of more than 450 L; or

c) a positive result is obtained in a test using a 100 mm sample cube at 140°C and a negative result is obtained in a test using a 25 mm sample cube at 140°C and a positive result is obtained in a test using a 100 mm sample cube at 100°C.

4.4 SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES (DIVISION 4.3)

4.4.1 Definitions and properties

Certain substances in contact with water emit flammable gases which can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example, naked lights, sparking handtools or unprotected lamps. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 4.4.2 must be used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. It must not be applied to pyrophoric substances.

4.4.2 Classification in Division 4.3

Substances which, in contact with water, emit flammable gases must be classified in Division 4.3 if, in tests performed in accordance with the test method given in the UN *Manual of Tests and Criteria*, Part III, subsection 33.4.1:

a) spontaneous ignition takes place in any step of the test procedure; or

b) there is an evolution of a flammable gas at a rate greater than 1 L/kg of the substance per hour.

4.4.3 Assignment of packing groups

4.4.3.1 Packing Group I must be assigned to any substance which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 L/kg of substance over any one minute.

4.4.3.2 Packing Group II must be assigned to any substance which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 L/kg of substance per hour, and which does not meet the criteria for Packing Group I.

4.4.3.3 Packing Group III must be assigned to any substance which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is greater than 1 L/kg of substance per hour, and which does not meet the criteria for Packing Groups I or II.

4.5 CLASSIFICATION OF ORGANOMETALLIC SUBSTANCES

Depending on their properties, organometallic substances may be classified in Divisions 4.2 or 4.3, as appropriate, in accordance with the flowchart scheme given in Figure 2.4.2 of the UN *Recommendations on the Transport of Dangerous Goods*.

Chapter 5

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

INTRODUCTORY NOTE

Because of the different properties exhibited by dangerous goods within Divisions 5.1 and 5.2, it is impracticable to establish a single criterion for classification in either division. Tests and criteria for assignment to the two divisions of Class 5 are addressed in this Chapter and in the UN *Manual of Tests and Criteria*.

5.1 DEFINITIONS AND GENERAL PROVISIONS

Class 5 is divided into two divisions as follows:

a) Division 5.1 — Oxidizing substances

Substances which, in themselves are not necessarily combustible, may generally, by yielding oxygen, cause or contribute to the combustion of other material. Such substances may be contained in an article.

b) Division 5.2 — Organic peroxides

Organic substances which contain the bivalent —O—O— structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. Organic peroxides are thermally unstable substances, which may undergo exothermic, self-accelerating decomposition. In addition, they may have one or more of the following properties:

i) be liable to explosive decomposition;

ii) burn rapidly;

iii) be sensitive to impact or friction;

iv) react dangerously with other substances;

v) cause damage to the eyes.

5.2 OXIDIZING SUBSTANCES (DIVISION 5.1)

5.2.1 Classification in Division 5.1

5.2.1.1 Oxidizing substances are classified in Division 5.1 in accordance with the test methods, procedures and criteria in 5.2.2, 5.2.3 and the UN *Manual of Tests and Criteria,* Part III, section 34. In the event of divergence between test results and known experience, the appropriate authority of the State in which the dangerous goods were manufactured must be consulted to establish the appropriate classification and packing group.

Note.— Where substances of this division are listed in the Dangerous Goods List in 3;2, reclassification of those substances in accordance with these criteria need only be undertaken when this is necessary for safety.

5.2.1.2 By exception, solid ammonium nitrate based fertilizers must be classified in accordance with the procedure as set out in the UN *Manual of Tests and Criteria*, Part III, section 39.

5.2.1.3 For substances having other hazards, e.g. toxicity or corrosivity, the requirements of Part 2, Introductory Chapter must be met.

5.2.2 Oxidizing solids

5.2.2.1 *Criteria for classification in Division 5.1*

5.2.2.1.1 Tests are performed to measure the potential for a solid substance to increase the burning rate or burning intensity of a combustible substance when the two are thoroughly mixed. The procedure is given in the UN *Manual of Tests and Criteria*, Part III, subsection 34.4.1 (test O.1) or alternatively, in subsection 34.4.3 (test O.3). Tests are conducted on the substance to be evaluated mixed with dry fibrous cellulose in mixing ratios of 1:1 and 4:1, by mass, of sample to cellulose. The burning characteristics of the mixtures are compared:

a) in the test O.1, with the standard 3:7 mixture, by mass, of potassium bromate to cellulose. If the burning time is equal to or less than this standard mixture, the burning times should be compared with those from the Packing Group I or II reference standards, 3:2 and 2:3 ratios, by mass, of potassium bromate to cellulose, respectively; or

b) in the test O.3, with the standard 1:2 mixture, by mass, of calcium peroxide to cellulose. If the burning rate is equal to or greater than this standard mixture, the burning rates must be compared with those from the Packing Group I or II reference standards 3:1 and 1:1 ratios, by mass, of calcium peroxide to cellulose, respectively.

5.2.2.1.2 The classification test results are assessed on the basis of:

a) the comparison of the mean burning time (for the test O.1) or burning rate (for the test O.3) with those of the reference mixtures; and

b) whether the mixture of substance and cellulose ignites and burns.

5.2.2.1.3 A solid substance is classified in Division 5.1 if the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits:

a) in the test O.1, a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; or

b) in the test O.3, a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose.

5.2.2.2 Assignment of packing groups

Solid oxidizing substances are assigned to a packing group according to one of the test procedures in the UN *Manual of Tests and Criteria*, Part III, section 34.4.1 (Test O.1) or alternatively, in subsection 34.4.3 (Test O.3), in accordance with the following criteria:

a) Test O.1:

   i) Packing Group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose;

   ii) Packing Group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Packing Group I are not met;

   iii) Packing Group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Packing Groups I and II are not met;

   iv) Not Division 5.1: any substance which, in both the 4:1 and 1:1 sample-to-cellulose ratio (by mass) tested, does not ignite and burn, or exhibits mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose.

b) Test O.3:

   i) Packing Group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose;

   ii) Packing Group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose, and the criteria for Packing Group I are not met;

   iii) Packing Group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose, and the criteria for Packing Groups I and II are not met;

   iv) Not Division 5.1: any substance which, in both the 4:1 and 1:1 sample-to-cellulose ratio (by mass) tested, does not ignite and burn, or exhibits a mean burning rate less than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose.

5.2.3 Oxidizing liquids

5.2.3.1 *Criteria for classification in Division 5.1*

5.2.3.1.1 A test is performed to determine the potential for a liquid substance to increase the burning rate or burning intensity of a combustible substance or for spontaneous ignition to occur when the two are thoroughly mixed. The procedure is given in the UN *Manual of Tests and Criteria*, Part III, subsection 34.4.2 (Test O.2). It measures the pressure rise time during combustion. Whether a liquid is an oxidizing substance of Division 5.1 and, if so, whether Packing Group I, II or III must be assigned, is decided on the basis of the test result (see also precedence of hazards characteristics).

5.2.3.1.2 The classification test results are assessed on the basis of:

a) whether the mixture of substance and cellulose spontaneously ignites;

b) the comparison of the mean time taken for the pressure to rise from 690 kPa to 2 070 kPa gauge with those of the reference substances.

5.2.3.1.3 A liquid substance is classified in Division 5.1 if the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65 per cent aqueous nitric acid and cellulose.

5.2.3.2 *Assignment of packing groups*

Liquid oxidizing substances are assigned to a packing group according to the test procedure in the UN *Manual of Tests and Criteria*, Part III, section 34.4.2, in accordance with the following criteria:

Packing Group I: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50 per cent perchloric acid and cellulose.

Packing Group II: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 40 per cent aqueous sodium chlorate solution and cellulose; and the criteria for Packing Group I are not met.

Packing Group III: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65 per cent aqueous nitric acid and cellulose; and the criteria for Packing Groups I and II are not met.

Not Division 5.1: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a pressure rise of less than 2 070 kPa gauge; or exhibits a mean pressure rise time greater than the mean pressure rise time of a 1:1 mixture, by mass, of 65 per cent aqueous nitric acid and cellulose.

5.3 ORGANIC PEROXIDES (DIVISION 5.2)

5.3.1 Properties

5.3.1.1 Organic peroxides are liable to exothermic decomposition which can be started by heat, contact with impurities (e.g. acids, heavy metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the peroxide formulation. Decomposition may result in the evolution of harmful or flammable gases or vapours. For certain organic peroxides the temperature must be controlled during transport. Some organic peroxides decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Many organic peroxides burn vigorously.

5.3.1.2 Contact of organic peroxides with the eyes should be avoided. Some organic peroxides will cause serious injury to the cornea, even after brief contact, or will be corrosive to the skin.

5.3.2 Classification of organic peroxides

5.3.2.1 Any organic peroxide must be considered for classification in Division 5.2 unless the organic peroxide formulation contains:

a) not more than 1.0 per cent available oxygen from the organic peroxides when containing not more than 1.0 per cent hydrogen peroxide; or

b) not more than 0.5 per cent available oxygen from the organic peroxides when containing more than 1.0 per cent but not more than 7.0 per cent hydrogen peroxide.

Note.— The available oxygen content (per cent) of an organic peroxide formulation is given by the formula

$$16 \times \Sigma \, (n_i \times c_i / m_i)$$

where n_i *= number of peroxygen groups per molecule of organic peroxide i;*

c_i *= concentration (mass in percentage) of organic peroxide i; and*

m_i *= molecular mass of organic peroxide i.*

≠ 5.3.2.2 Organic peroxides are classified into seven types according to the degree of danger they present. The types of organic peroxide range from type A, which is forbidden in any mode of transport, to type G, which is not subject to the provisions for organic peroxides of Division 5.2. The classification of types B to F is directly related to the maximum quantity allowed in one packaging.

5.3.2.3 Organic peroxides permitted for transport are listed in 5.3.2.4. For each permitted substance, Table 2-7 assigns the appropriate generic entry in the Dangerous Goods List (UN 3103 to 3120) and provides relevant information. The generic entries specify:

a) organic peroxide type (B to F);

b) physical state (liquid or solid); and

c) temperature control, when required (see 5.3.3).

5.3.2.3.1 Mixtures of the listed formulations may be classified as the same type of organic peroxide as that of the most dangerous component and be transported under the conditions of transport given for this type. However, as two stable components can form a thermally less stable mixture, the self-accelerating decomposition temperature (SADT) of the mixture must be determined and, if necessary, temperature control applied as required by 5.3.3.

5.3.2.4 *List of currently assigned organic peroxides in packagings*

Table 2-7 provides a list of currently assigned organic peroxides in packagings. Classification of organic peroxides not listed in Table 2-7 and assignment to a generic entry must be made by the appropriate authority of the State in which the dangerous goods were manufactured on the basis of a test report. Principles applying to the classification of such substances are provided in 2.5.3.3 of the UN Recommendations. The applicable classification procedures, test methods and criteria, and an example of a suitable test report, are given in the current edition of the UN *Manual of Tests and Criteria*, Part II. The statement of approval must contain the classification and the relevant transport conditions.

5.3.2.5 Samples of new formulations of organic peroxides not listed in Table 2-7 for which complete test data are not available and which are to be transported for further testing or evaluation may be assigned to one of the appropriate entries for **Organic peroxide Type C** provided that the following conditions are met:

a) the available data indicate that the sample would be no more dangerous than organic peroxide type B;

b) it is packed in a combination packaging consisting of a plastic IP.2 inner packaging with a capacity not exceeding 0.5 L or 0.5 kg which is placed in a wooden box (4C1), plywood box (4D) or fibreboard box (4G) with the maximum net quantity per package not exceeding 1 L or 1 kg; and

c) the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

5.3.3 Temperature control requirements

≠ 5.3.3.1 An organic peroxide formulation must be regarded as possessing explosive properties when, in laboratory testing, the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement. With the exception of organic peroxides of type B, which are forbidden for transport by air under any circumstance, organic peroxides requiring temperature control during transport are forbidden for transport by air unless approved or exempted, as applicable (see 1;1.1.2 and 1;1.1.3).

5.3.3.2 The following organic peroxides must be subjected to temperature control during carriage:

a) organic peroxides types B and C with an SADT ≤50°C;

b) organic peroxides type D showing a medium effect when heated under confinement with an SADT ≤50°C or showing a low or no effect when heated under confinement with an SADT ≤45°C; and

c) organic peroxides types E and F with an SADT ≤45°C.

5.3.3.3 Test methods for determining the SADT are given in the UN *Manual of Tests and Criteria*, Part III, section 28. The test selected must be conducted in a manner which is representative of the package to be transported.

5.3.3.4 Test methods for determining the flammability are given in the UN *Manual of Tests and Criteria*, Part III, subsection 32.4.

5.3.4 Desensitization of organic peroxides

5.3.4.1 In order to ensure safety during transport, organic peroxides are, in many cases, desensitized by organic liquids or solids, inorganic solids or water. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. In general, desensitization should be such that in case of spillage or fire, the organic peroxide may not concentrate to a dangerous extent.

5.3.4.2 Unless otherwise stated for the individual organic peroxide formulation, the following definitions apply for diluents used for desensitization:

a) *Diluents type A* are organic liquids which are compatible with the organic peroxide and which have a boiling point of not less than 150°C. Type A diluents may be used for desensitizing all organic peroxides;

≠ b) *Diluents type B* are organic liquids which are compatible with the organic peroxide and which have a boiling point of less than 150°C but not less than 60°C and a flash point of not less than 5°C. Type B diluents may be used for desensitization of all organic peroxides provided that the boiling point of the liquid is at least 60°C higher than the SADT in a 50 kg package.

5.3.4.3 Diluents, other than type A or type B, may be added to organic peroxide formulations as listed in Table 2-7 provided that they are compatible. However, replacement of all or part of a type A or type B diluent by another diluent with differing properties requires that the organic peroxide formulation be reassessed in accordance with the normal acceptance procedure for Division 5.2.

5.3.4.4 Water may only be used for the desensitization of organic peroxides which are shown in Table 2-7 or in the statement of approval according to 5.3.2.4 with the approval of the appropriate authority of the State of Manufacture or when the organic peroxide formulation is specified as being with water or as a stable dispersion in water.

5.3.4.5 Organic and inorganic solids may be used for desensitization of organic peroxides provided that they are compatible.

5.3.4.6 Compatible liquids and solids are those which have no detrimental influence on the thermal stability and hazard type of the organic peroxide formulation.

Table 2-7. List of currently assigned organic peroxides in packagings

Note.— Peroxides to be transported must fulfil the classification and the control and emergency temperatures (derived from the self-accelerating decomposition temperature (SADT)) as listed.

	Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control temperature (°C)*	*Emergency temperature (°C)*	*UN generic entry*	*Subsidiary hazards and notes*
-										
	Acetyl acetone peroxide	≤42	≥48			≥8			3105	2
+	Acetyl acetone peroxide	≤35	≥57			≥8			3107	32
	Acetyl acetone peroxide	≤32 as a paste							3106	20
	Acetyl cyclohexanesulphonyl peroxide	≤82				≥12	–10	0	FORBIDDEN	3
	Acetyl cyclohexanesulphonyl peroxide	≤32		≥68			–10	0	3115	
	tert-Amyl hydroperoxide	≤88	≥6			≥6			3107	
	tert-Amyl peroxyacetate	≤62	≥38						3105	
	tert-Amyl peroxybenzoate	≤100							3103	
	tert-Amyl peroxy-2-ethylhexanoate	≤100					+20	+25	3115	
	tert-Amyl peroxy-2-ethylhexyl carbonate	≤100							3105	
	tert-Amylperoxy isopropyl carbonate	≤77	≥23						3103	
	tert-Amyl peroxyneodecanoate	≤77		≥23			0	+10	3115	

	Organic peroxide	Concentration (per cent)	Diluent type A (per cent)	Diluent type B (per cent) (Note 1)	Inert solid (per cent)	Water (per cent)	Control tempera-ture (°C)	Emergency tempera-ture (°C)	UN generic entry	Sub-sidiary hazards and notes
	tert-Amyl peroxyneodecanoate	≤47	≥53				0	+10	3119	
	tert-Amyl peroxypivalate	≤77		≥23			+10	+15	3113	
	tert-Amylperoxy-3,5,5-trimethylhexanoate	≤100							3105	
	tert-Butyl cumyl peroxide	>42-100							3109	
	tert-Butyl cumyl peroxide	≤52			≥48				3108	
	n-Butyl-4,4-di-(tert-butylperoxy) valerate	>52-100							3103	
	n-Butyl-4,4-di-(tert-butylperoxy) valerate	≤52			≥48				3108	
	tert-Butyl hydroperoxide	>79-90				≥10			3103	13
	tert-Butyl hydroperoxide	≤80	≥20						3105	4,13
	tert-Butyl hydroperoxide	≤79				>14			3107	13,23
	tert-Butyl hydroperoxide	≤72				≥28			3109	13
	tert-Butyl hydroperoxide + Di-tert-butylperoxide	<82 + >9				≥7			3103	13
	tert-Butyl monoperoxymaleate	>52-100							FORBIDDEN	3
	tert-Butyl monoperoxymaleate	≤52	≥48						3103	
	tert-Butyl monoperoxymaleate	≤52			≥48				3108	
	tert-Butyl monoperoxymaleate	≤52 as a paste							3108	
	tert-Butyl peroxyacetate	>52-77	≥23						FORBIDDEN	3
	tert-Butyl peroxyacetate	>32-52	≥48						3103	
	tert-Butyl peroxyacetate	≤32		≥68					3109	
	tert-Butyl peroxybenzoate	>77-100							3103	
	tert-Butyl peroxybenzoate	>52-77	≥23						3105	
	tert-Butyl peroxybenzoate	≤52			≥48				3106	
	tert-Butyl peroxybutyl fumarate	≤52	≥48						3105	
	tert-Butyl peroxycrotonate	≤77	≥23						3105	
	tert-Butyl peroxydiethylacetate	≤100					+20	+25	3113	
	tert-Butyl peroxy-2-ethylhexanoate	>52-100					+20	+25	3113	
	tert-Butyl peroxy-2-ethylhexanoate	>32-52		≥48			+30	+35	3117	
	tert-Butyl peroxy-2-ethylhexanoate	≤52			≥48		+20	+25	3118	
	tert-Butyl peroxy-2-ethylhexanoate	≤32		≥68			+40	+45	3119	
	tert-Butyl peroxy-2-ethylhexanoate + 2,2-Di-(tert-butylperoxy) butane	≤12 + ≤14	≥14		≥60				3106	
	tert-Butyl peroxy-2-ethylhexanoate + 2,2-Di-(tert-butylperoxy) butane	≤31 + ≤36	≥14	≥33			+35	+40	3115	
	tert-Butyl peroxy-2-ethylhexylcarbonate	≤100							3105	
	tert-Butyl peroxyisobutyrate	>52-77		≥23			+15	+20	FORBIDDEN	3
	tert-Butyl peroxyisobutyrate	≤52		≥48			+15	+20	3115	
	tert-Butylperoxy isopropylcarbonate	≤77	≥23						3103	
	1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	≤77	≥23						3105	
+	tert-Butylperoxy isopropylcarbonate	≤62		≥38					3105	

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	≤42			≥58				3108	
tert-Butyl peroxy-2-methylbenzoate	≤100							3103	
tert-Butyl peroxyneodecanoate	>77-100					–5	+5	3115	
tert-Butyl peroxyneodecanoate	≤77		≥23			0	+10	3115	
tert-Butyl peroxyneodecanoate	≤52 as a stable dispersion in water					0	+10	3119	
tert-Butyl peroxyneodecanoate	≤42 as a stable dispersion in water (frozen)					0	+10	3118	
tert-Butyl peroxyneodecanoate	≤32	≥68				0	+10	3119	
tert-Butyl peroxyneoheptanoate	≤77	≥23				0	+10	3115	
tert-Butyl peroxyneoheptanoate	≤42 as a stable dispersion in water					0	+10	3117	
tert-Butyl peroxypivalate	>67-77	≥23				0	+10	3113	
tert-Butyl peroxypivalate	>27-67		≥33			0	+10	3115	
tert-Butyl peroxypivalate	≤27		≥73			+30	+35	3119	
tert-Butylperoxy stearylcarbonate	≤100							3106	
tert-Butyl peroxy-3,5,5- trimethylhexanoate	>37-100							3105	
tert-Butyl peroxy-3,5,5- trimethylhexanoate	≤42			≥58				3106	
tert-Butyl peroxy-3,5,5- trimethylhexanoate	≤37		≥63					3109	
3-Chloroperoxybenzoic acid	>57-86			≥14				FORBIDDEN	3
3-Chloroperoxybenzoic acid	≤57			≥3	≥40			3106	
3-Chloroperoxybenzoic acid	≤77			≥6	≥17			3106	
Cumyl hydroperoxide	>90-98	≤10						3107	13
Cumyl hydroperoxide	≤90	≤10						3109	13,18
Cumyl peroxyneodecanoate	≤77		≥23			–10	0	3115	
Cumyl peroxyneodecanoate	≤87	≥13				–10	0	3115	
Cumyl peroxyneodecanoate	≤52 as a stable dispersion in water					–10	0	3119	
Cumyl peroxyneoheptanoate	≤77	≥23				–10	0	3115	
Cumyl peroxypivalate	≤77		≥23			–5	+5	3115	
Cyclohexanone peroxide(s)	≤91				≥9			3104	13
Cyclohexanone peroxide(s)	≤72	≥28						3105	5
Cyclohexanone peroxide(s)	≤72 as a paste							3106	5,20
Cyclohexanone peroxide(s)	≤32			≥68				Exempt	29
([3r-(3r,5as,6s,8as,9r,10r,12s,12ar**)]-Decahydro-10-methoxy-3,6,9-trimethyl-3,12-epoxy-12h-pyrano[4,3-j]-1,2-benzodioxepin)	≤100							3106	
Diacetone alcohol peroxides	≤57		≥26		≥8	+40	+45	3115	6
Diacetyl peroxide	≤27		≥73			+20	+25	3115	7,13

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
Di-tert-amyl peroxide	≤100							3107	
1,1-Di-(tert-amylperoxy) cyclohexane	≤82	≥18						3103	
Dibenzoyl peroxide	>52-100			≤48				FORBIDDEN	3
Dibenzoyl peroxide	>77-94				≥6			FORBIDDEN	3
Dibenzoyl peroxide	≤77				≥23			3104	
Dibenzoyl peroxide	≤62			≥28	≥10			3106	
Dibenzoyl peroxide	>52-62 as a paste							3106	20
Dibenzoyl peroxide	>35-52			≥48				3106	
Dibenzoyl peroxide	>36-42	≥18			≤40			3107	
Dibenzoyl peroxide	≤56.5 as a paste				≥15			3108	
Dibenzoyl peroxide	≤52 as a paste							3108	20
Dibenzoyl peroxide	≤42 as a stable dispersion in water							3109	
Dibenzoyl peroxide	≤35			≥65				Exempt	29
Di-(4-tert-butylcyclohexyl) peroxydicarbonate	≤100					+30	+35	3114	
Di-(4-tert-butylcyclohexyl) peroxydicarbonate	≤42 as a paste					+35	+40	3118	
Di-(4-tert-butylcyclohexyl) peroxydicarbonate	≤42 as a stable dispersion in water					+30	+35	3119	
Di-tert-butyl peroxide	>52-100							3107	
Di-tert-butyl peroxide	≤52	≥48						3109	25
Di-tert-butyl peroxyazelate	≤52	≥48						3105	
2,2-Di-(tert-amylperoxy)butane	≤57	≥43						3105	
2,2-Di-(tert-butylperoxy)butane	≤52	≥48						3103	
1,6-Di-(tert-butylperoxycarbonyloxy) hexane	≤72	≥28						3103	
1,1-Di-(tert-butylperoxy)cyclohexane	>80-100							FORBIDDEN	3
1,1-Di-(tert-butylperoxy)cyclohexane	>52-80	≥20						3103	
1,1-Di-(tert-butylperoxy)cyclohexane	≤72		≥28					3103	30
1,1-Di-(tert-butylperoxy)cyclohexane	>42-52	≥48						3105	
1,1-Di-(tert-butylperoxy)cyclohexane	≤42	≥13		≥45				3106	
1,1-Di-(tert-butylperoxy)cyclohexane	≤42	≥58						3109	
1,1-Di-(tert-butylperoxy)cyclohexane	≤27	≥25						3107	21
1,1-Di-(tert-butylperoxy)cyclohexane	≤13	≥13	≥74					3109	
1,1-Di-(tert-butylperoxy)cyclohexane + tert-butyl peroxy-2-ethylhexanoate	≤43+≤16	≥41						3105	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	≤90		≥10					3103	30
Di-n-butyl peroxydicarbonate	>27-52		≥48			–15	–5	3115	

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
Di-n-butyl peroxydicarbonate	≤42 as a stable dispersion in water (frozen)					–15	–5	3118	
Di-n-butyl peroxydicarbonate	≤27		≥73			–10	0	3117	
Di-sec-butyl peroxydicarbonate	>52-100					–20	–10	3113	
Di-sec-butyl peroxydicarbonate	≤52		≥48			–15	–5	3115	
Di-(tert-butylperoxyisopropyl) benzene(s)	>42-100			≤57				3106	
Di-(tert-butylperoxyisopropyl) benzene(s)	≤42			≥58				Exempt	29
Di-(tert-butylperoxy)phthalate	>42-52	≥48						3105	
Di-(tert-butylperoxy)phthalate	≤52 as a paste							3106	20
Di-(tert-butylperoxy)phthalate	≤42	≥58						3107	
2,2-Di-(tert-butylperoxy)propane	≤52	≥48						3105	
2,2-Di-(tert-butylperoxy)propane	≤42	≥13		≥45				3106	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	>90-100							FORBIDDEN	3
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	>57-90	≥10						3103	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	≤77		≥23					3103	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	≤57			≥43				3110	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	≤57	≥43						3107	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	≤32	≥26	≥42					3107	
Dicetyl peroxydicarbonate	≤100					+30	+35	3120	
Dicetyl peroxydicarbonate	≤42 as a stable dispersion in water					+30	+35	3119	
Di-4-chlorobenzoyl peroxide	≤77				≥23			FORBIDDEN	3
Di-4-chlorobenzoyl peroxide	≤52 as a paste							3106	20
Di-4-chlorobenzoyl peroxide	≤32			≥68				Exempt	29
Dicumyl peroxide	>52-100							3110	12
Dicumyl peroxide	≤52			≥48				Exempt	29
Dicyclohexyl peroxydicarbonate	>91-100					+10	+15	FORBIDDEN	3
Dicyclohexyl peroxydicarbonate	≤91				≥9	+10	+15	3114	
Dicyclohexyl peroxydicarbonate	≤42 as a stable dispersion in water					+15	+20	3119	
Didecanoyl peroxide	≤100					+30	+35	3114	
2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl) propane	≤42			≥58				3106	
2,2-Di-(4,4-Di-(tert-butylperoxy)cyclohexyl) propane	≤22		≥78					3107	

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
Di-2,4-dichlorobenzoyl peroxide	≤77				≥23			FORBIDDEN	3
Di-2,4-dichlorobenzoyl peroxide	≤52 as a paste with silicon oil							3106	
Di-2,4-dichlorobenzoyl peroxide	≤52 as a paste					+20	+25	3118	
Di-(2-ethoxyethyl) peroxydicarbonate	≤52		≥48			–10	0	3115	
Di-(2-ethylhexyl)peroxydicarbonate	>77-100					–20	–10	3113	
Di-(2-ethylhexyl)peroxydicarbonate	≤77		≥23			–15	–5	3115	
Di-(2-ethylhexyl)peroxydicarbonate	≤62 as a stable dispersion in water					–15	–5	3119	
Di-(2-ethylhexyl)peroxydicarbonate	≤52 as a stable dispersion in water (frozen)					–15	–5	3120	
2,2-Dihydroperoxypropane	≤27			≥73				FORBIDDEN	3
Di-(1-hydroxycyclohexyl)peroxide	≤100							3106	
Diisobutyryl peroxide	>32-52		≥48			–20	–10	FORBIDDEN	3
Diisobutyryl peroxide	≤42 as a stable dispersion in water					–20	–10	3119	
Diisobutyryl peroxide	≤32		≥68			–20	–10	3115	
Diisopropylbenzene dihydroperoxide	≤82	≥5			≥5			3106	24
Diisopropyl peroxydicarbonate	>52-100					–15	–5	FORBIDDEN	3
Diisopropyl peroxydicarbonate	≤52		≥48			–20	–10	3115	
Diisopropyl peroxydicarbonate	≤32	≥68				–15	–5	3115	
Dilauroyl peroxide	≤100							3106	
Dilauroyl peroxide	≤42 as a stable dispersion in water							3109	
Di-(3-methoxybutyl) peroxydicarbonate	≤52		≥48			–5	5	3115	
Di-(2-methylbenzoyl) peroxide	≤87				≥13	+30	+35	FORBIDDEN	3
Di-(3-methylbenzoyl) peroxide + Benzoyl (3-methylbenzoyl) peroxide + dibenzoyl peroxide	≤20+≤18+≤4		≥58			35	40	3115	
Di-(4-methylbenzoyl) peroxide	≤52 as a paste with silicon oil							3106	
2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	>82-100							FORBIDDEN	3
2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	≤82			≥18				3106	
2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane	≤82				≥18			3104	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	>90-100							3103	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	>52-90	≥10						3105	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	≤77			≥23				3108	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	≤52	≥48						3109	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	≤47 as a paste							3108	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	>86-100							FORBIDDEN	3

	Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	>52-86	≥14						3103	26
	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	≤52			≥48				3106	
	2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy)hexane	≤100					+20	+25	3113	
	2,5-Dimethyl-2,5-dihydroperoxyhexane	≤82				≥18			3104	
	2,5-Dimethyl-2,5-di-(3,5,5-trimethylhexanoylperoxy)hexane	≤77	≥23						3105	
	1,1-Dimethyl-3-hydroxybutyl peroxyneoheptanoate	≤52	≥48				0	+10	3117	
	Dimyristyl peroxydicarbonate	≤100					+20	+25	3116	
	Dimyristyl peroxydicarbonate	≤42 as a stable dispersion in water					+20	+25	3119	
	Di-(2-neodecanoylperoxyisopropyl) benzene	≤52	≥48				–10	0	3115	
	Di-n-nonanoyl peroxide	≤100					0	+10	3116	
	Di-n-octanoyl peroxide	≤100					+10	+15	3114	
	Di-(2-phenoxyethyl)peroxydicarbonate	>85-100							FORBIDDEN	3
	Di-(2-phenoxyethyl)peroxydicarbonate	≤85				≥15			3106	
	Dipropionyl peroxide	≤27		≥73			+15	+20	3117	
	Di-n-propyl peroxydicarbonate	≤100					–25	–15	3113	
	Di-n-propyl peroxydicarbonate	≤77	≥23				–20	–10	3113	
	Disuccinic acid peroxide	>72-100							FORBIDDEN	3,17
	Disuccinic acid peroxide	≤72				≥28	+10	+15	3116	
	Di-(3,5,5-trimethylhexanoyl) peroxide	>52-82	≥18				0	+10	3115	
	Di-(3,5,5-trimethylhexanoyl) peroxide	≤52 as a stable dispersion in water					+10	+15	3119	
	Di-(3,5,5-trimethylhexanoyl) peroxide	≤38	≥62				+20	+25	3119	
	Ethyl 3,3-di-(tert-amylperoxy)butyrate	≤67	≥33						3105	
	Ethyl 3,3-di-(tert-butylperoxy)butyrate	>77-100							3103	
	Ethyl 3,3-di-(tert-butylperoxy)butyrate	≤77	≥23						3105	
	Ethyl 3,3-di-(tert-butylperoxy)butyrate	≤52			≥48				3106	
	1-(2-Ethylhexanoylperoxy)-1,3-dimethylbutyl peroxypivalate	≤52	≥45	≥10			-20	-10	3115	
	tert-Hexyl Peroxyneodecanoate	≤71	≥29				0	+10	3115	
	tert-Hexyl Peroxypivalate	≤72		≥28			+10	+15	3115	
+	tert-Hexyl Peroxypivalate	≤52 as a stable dispersion in water					+15	+20	3117	
	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	≤77	≥23				–5	+5	3115	
	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	≤52 as a stable dispersion in water					–5	+5	3119	

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate	≤52	≥48				–5	+5	3117	
Isopropyl sec-butyl peroxydicarbonate +di-sec-butyl peroxydicarbonate +di-isopropyl peroxydicarbonate	≤32 + ≤15-18 + ≤12-15	≥38				–20	–10	3115	
Isopropyl sec-butyl peroxydicarbonate +di-sec-butyl peroxydicarbonate +di-isopropyl peroxydicarbonate	≤52 + ≤28 + ≤22					–20	–10	FORBIDDEN	3
Isopropylcumyl hydroperoxide	≤72	≥28						3109	13
p-Menthyl hydroperoxide	>72-100							3105	13
p-Menthyl hydroperoxide	≤72	≥28						3109	27
Methylcyclohexanone peroxide(s)	≤67		≥33			+35	+40	3115	
Methyl ethyl ketone peroxide(s)	see remark 8)	≥48						FORBIDDEN	3,8,13
Methyl ethyl ketone peroxide(s)	see remark 9)	≥55						3105	9
Methyl ethyl ketone peroxide(s)	see remark 10)	≥60						3107	10
Methyl isobutyl ketone peroxide(s)	≤62	≥19						3105	22
Methyl isopropyl ketone peroxide(s)	see remark 31)	≥70						3109	31
Organic peroxide, liquid, sample								3103	11
Organic peroxide, liquid, sample, temperature controlled								3113	11
Organic peroxide, solid, sample								3104	11
Organic peroxide, solid, sample, temperature controlled								3114	11
3,3,5,7,7-pentamethyl-1,2,4-trioxepane	≤100							3107	
Peroxyacetic acid, type D, stabilized	≤43							3105	13,14, 19
Peroxyacetic acid, type E, stabilized	≤43							3107	13,15, 19
Peroxyacetic acid, type F, stabilized	≤43							3109	13,16, 19
Peroxylauric acid	≤100					+35	+40	3118	
1-Phenylethyl hydroperoxide	≤38		≥62					3109	
Pinanyl hydroperoxide	>56-100							3105	13
Pinanyl hydroperoxide	≤56	≥44						3109	
Polyether poly-tert-butylperoxycarbonate	≤52		≥23					3107	
1,1,3,3-Tetramethylbutyl hydroperoxide	≤100							3105	
1,1,3,3-Tetramethylbutylperoxy-2 ethylhexanoate	≤100					+15	+20	3115	
1,1,3,3-Tetramethylbutyl peroxyneodecanoate	≤72		≥28			–5	+5	3115	
1,1,3,3-Tetramethylbutyl peroxyneodecanoate	≤52 as a stable dispersion in water					–5	+5	3119	
1,1,3,3-Tetramethylbutyl peroxypivalate	≤77	≥23				0	+10	3115	
3,6,9-Triethyl-3,6,9-trimethyl-1,4,7 triperoxonane	≤17	≥18		≥65				3110	

	Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Sub-sidiary hazards and notes*
	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	≤42	≥58						3105	28
+	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7 triperoxonane	≤27	≥83						3109	

Notes:

1. Diluent type B may always be replaced by diluent type A. Boiling point diluent type B should be at least 60°C higher than the SADT of the organic peroxide.
2. Available oxygen ≤4.7 per cent.
3. "EXPLOSIVE" subsidiary hazard label required and consequently forbidden for transport by air under any circumstance.
4. Diluent may be replaced by Di-tert-butyl peroxide.
5. Available oxygen ≤9 per cent.
6. With ≤9 per cent hydrogen peroxide; available oxygen ≤10 per cent.
7. Only non-metallic packagings allowed.
8. Available oxygen >10 per cent and ≤10.7 per cent, with or without water.
9. Available oxygen ≤10 per cent, with or without water.
10. Available oxygen ≤8.2 per cent, with or without water.
11. See 5.3.2.5.
12. Not used.
13. "CORROSIVE" subsidiary hazard label required (see Figure 5-24).
14. Peroxyacetic acid formulations which fulfil the criteria of 5.3.2.4.
15. Peroxyacetic acid formulations which fulfil the criteria of 5.3.2.4.
16. Peroxyacetic acid formulations which fulfil the criteria of 5.3.2.4.
17. Addition of water to this organic peroxide will decrease its thermal stability.
18. No "CORROSIVE" subsidiary hazard label required for concentrations below 80 per cent.
19. Mixtures with hydrogen peroxide, water and acid(s).
20. With diluent type A, with or without water.
21. With ≥25 per cent diluent type A by mass, and in addition ethylbenzene.
22. With ≥19 per cent diluent type A by mass, and in addition methyl isobutyl ketone.
23. With <6 per cent di-tert-butyl peroxide.
24. With ≤8 per cent 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.
25. Diluent type B with boiling point >110°C.
26. With <0.5 per cent hydroperoxides content.
27. For concentrations more than 56 per cent, "CORROSIVE" subsidiary hazard label required (see Figure 5-24).
28. Available active oxygen ≤7.6 per cent in diluent type A having a 95 per cent boil-off point in the range of 200-260°C.
29. Not subject to the requirements of these Instructions for Division 5.2.
30. Diluent type B with boiling point >130°C.
31. Active oxygen ≤6.7 per cent.

+ 32. Active oxygen ≤4.15 per cent.

Chapter 6

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

Parts of this Chapter are affected by State Variation CA 8

INTRODUCTORY NOTE

≠ *Note.— Toxins from plant, animal or bacterial sources which do not contain any infectious substances or toxins that are not contained in substances which are infectious substances should be considered for classification in Division 6.1 and assignment to UN 3172 or UN 3462.*

6.1 DEFINITIONS

Class 6 is divided into two divisions as follows:

a) Division 6.1 — Toxic substances.

Substances liable either to cause death or injury or to harm human health if swallowed, if inhaled or by skin contact.

Note.— In these Instructions "poisonous" has the same meaning as "toxic".

b) Division 6.2 — Infectious substances.

Substances known to contain, or reasonably expected to contain, pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

6.2 DIVISION 6.1 — TOXIC SUBSTANCES

6.2.1 Definitions

For the purposes of these Instructions:

6.2.1.1 *LD_{50} (median lethal dose) for acute oral toxicity* is the statistically derived single dose of a substance that can be expected to cause death within 14 days in 50 per cent of young adult albino rats when administered by the oral route. The LD_{50} value is expressed in terms of mass of test substance per mass of test animal (mg/kg).

6.2.1.2 *LD_{50} for acute dermal toxicity* is that dose of the substance which, administered by continuous contact for 24 hours with the bare skin of albino rabbits, is most likely to cause death within 14 days in half of the animals tested. The number of animals tested must be sufficient to give a statistically significant result and be in conformity with good pharmacological practices. The result is expressed in mg/kg body mass.

6.2.1.3 *LC_{50} for acute toxicity on inhalation* is that concentration of vapour, mist or dust which, administered by continuous inhalation for one hour to both male and female young adult albino rats, is most likely to cause death within 14 days in half of the animals tested. A solid substance should be tested if at least 10 per cent (by mass) of its total mass is likely to be dust in a respirable range, e.g. the aerodynamic diameter of that particle-fraction is 10 µm or less. A liquid substance should be tested if a mist is likely to be generated in a leakage of the transport containment. Both for solid and liquid substances more than 90 per cent (by mass) of a specimen prepared for inhalation toxicity should be in the respirable range as defined above. The result is expressed in mg/L of air for dusts and mists or in mL/m^3 of air (parts per million) for vapours.

6.2.2 Assignment of packing groups

6.2.2.1 Substances of Division 6.1, including pesticides, are allocated among the three packing groups, according to the degree of their toxic hazards in transport as follows:

a) Packing Group I — Substances and preparations presenting a very severe toxicity hazard;

b) Packing Group II — Substances and preparations presenting a serious toxicity hazard;

c) Packing Group III — Substances and preparations presenting a relatively low toxicity hazard.

6.2.2.2 In making this grouping, account must be taken of human experience in instances of accidental poisoning, and of special properties possessed by any individual substance, such as liquid state, high volatility, any special likelihood of penetration, and special biological effects.

6.2.2.3 In the absence of human experience, the grouping must be based on the available data from animal experiments. Three possible routes of administrations must be examined. These routes are exposure through:

a) oral ingestion;

b) dermal contact; and

c) inhalation of dusts, mists, or vapours.

6.2.2.3.1 Appropriate animal tests for the various routes of exposure are described in 6.2.1. When a substance exhibits a different order of toxicity by two or more of these routes of administration, the highest degree of danger must be assigned.

6.2.2.4 The criteria to be applied for grouping a substance according to the toxicity it exhibits by all three routes of administration are presented in the following paragraphs.

6.2.2.4.1 The grouping criteria for the oral and dermal routes as well as for inhalation of dusts and mists are as shown in Table 2-8.

Note. — Substances meeting the criteria of Class 8 and with an inhalation toxicity of dusts and mists (LC_{50}) leading to Packing Group I are only accepted for an allocation to Division 6.1 if the toxicity through oral ingestion or dermal contact is at least in the range of Packing Group I or II. Otherwise, an allocation to Class 8 is made when appropriate (see 8.2.4).

6.2.2.4.2 The criteria for inhalation toxicity of dusts and mists in 6.2.2.4.1 are based on LC_{50} data relating to 1-hour exposures, and where such information is available, it must be used. However, where only LC_{50} data relating to 4-hour exposures to dusts and mists are available, such figures can be multiplied by four and the product substituted in the above criteria, i.e. LC_{50} (4 h) × 4 is considered the equivalent of LC_{50} (1 h).

6.2.2.4.3 Liquids having toxic vapours must be assigned to the packing groups shown in Table 2-9, where V is that saturated vapour concentration in the air of the substance in mL/m^3 at 20°C and standard atmospheric pressure.

6.2.2.4.4 In Figure 2-1, the criteria according to 6.2.2.4.3 are expressed in graphical form, as an aid to easy classification. However, because of approximations inherent in the use of graphs, substances on or near packing group borderlines must be checked using numerical criteria.

Table 2-8. Grouping criteria for administration through oral ingestion, dermal contact and inhalation of dusts and mists

Packing group	*Oral toxicity LD_{50} (mg/kg)*	*Dermal toxicity LD_{50} (mg/kg)*	*Inhalation toxicity by dusts and mists LC_{50} (mg/L)*
I	≤5.0	≤50	≤0.2
II	>5.0 and ≤50	>50 and ≤200	>0.2 and ≤2.0
III[a]	>50 and ≤300	>200 and ≤1 000	>2.0 and ≤4.0

a. Tear gas substances must be included in Packing Group II even if their toxicity data correspond to Packing Group III values.

Table 2-9. Criteria for inhalation

Packing Group I	$V \geq 10\ LC_{50}$ and $LC_{50} \leq 1\ 000\ mL/m^3$
Packing Group II	$V \geq LC_{50}$ and $LC_{50} \leq 3\ 000\ mL/m^3$ and not meeting the criteria for Packing Group I
Packing Group III	$V \geq 0.2\ LC_{50}$ and $LC_{50} \leq 5\ 000\ mL/m^3$ and not meeting the criteria for Packing Groups I and II

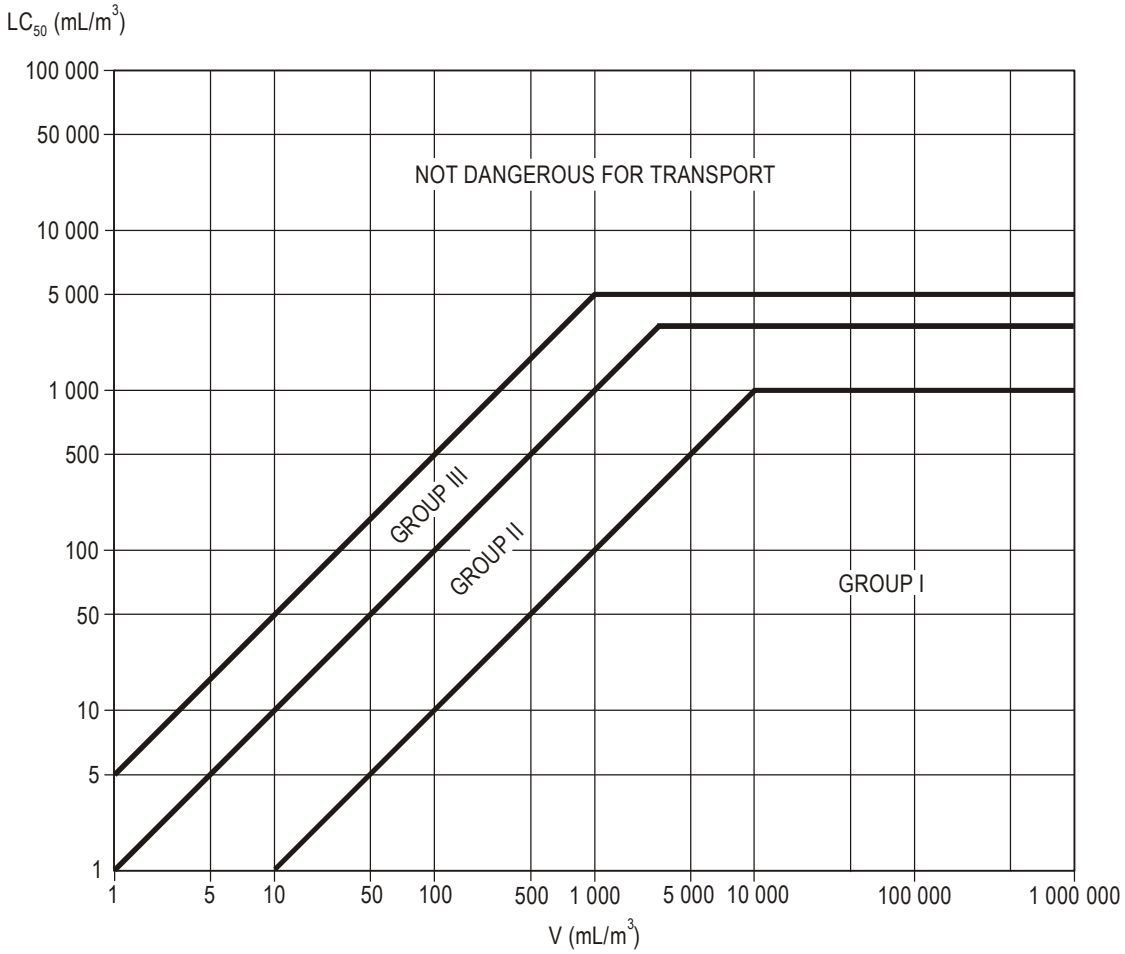


Figure 2-1. Criteria for inhalation of vapours

6.2.2.4.5 The criteria for inhalation toxicity of vapours in 6.2.2.4.3 are based on LC_{50} data relating to 1-hour exposures, and where such information is available, it must be used. However, where only LC_{50} data relating to 4-hour exposures to the vapours are available, such figures can be multiplied by two and the product substituted in the above criteria, i.e. LC_{50} (4 h) × 2 is considered the equivalent of LC_{50} (1 h).

6.2.2.4.6 Mixtures of liquids that are toxic by inhalation must be assigned to packing groups according to 6.2.2.4.7 or 6.2.2.4.8.

6.2.2.4.7 If LC_{50} data is available for each of the toxic substances comprising a mixture, the packing group may be determined as follows:

a) Estimate the LC_{50} of the mixture using the formula:

$$LC_{50}\ (\text{mixture}) = \frac{1}{\sum_{i=1}^{n} \frac{f_i}{LC_{50_i}}}$$

where f_i = mole fraction of the i^{th} component substance of the liquid, and

where LC_{50_i} = mean lethal concentration of the i^{th} component substance in mL/m^3

b) Estimate the volatility of each component substance using the formula:

$$V_i = \left(\frac{P_i \times 10^6}{101.3}\right) ml/m^3$$

where P_i = partial pressure of the i^{th} component substance in kPa at 20°C and one atmosphere pressure.

c) Calculate the ratio of the volatility to the LC_{50} using the formula:

$$R = \sum_{i=1}^{n} \frac{V_i}{LC_{50_i}}$$

d) Using the calculated values LC_{50} (mixture) and R, the packing group for the mixture is determined:

Packing Group I: R ≥ 10 and LC_{50} (mixture) ≤ 1 000 mL/m^3

Packing Group II: R ≥ 1 and LC_{50} (mixture) ≤ 3 000 mL/m^3 and not meeting criteria for Group I

Packing Group III: R ≥ 1/5 and LC_{50} (mixture) ≤ 5 000 mL/m^3 and not meeting criteria for Group I or II.

6.2.2.4.8 In the absence of LC_{50} data on the toxic constituent substances, the mixture may be assigned a packing group based on the following simplified threshold toxicity tests. When these threshold tests are used, the most restrictive packing group must be determined and used for transporting the mixture.

a) A mixture is assigned to Packing Group I only if it meets both of the following criteria:

i) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 1 000 mL/m^3 vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If 5 or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than 1 000 mL/m^3.

ii) A sample of the vapour in equilibrium with the liquid mixture at 20°C is diluted with 9 equal volumes of air to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If 5 or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than 10 times the mixture LC_{50}.

b) A mixture is assigned to Packing Group II only if it meets both of the following criteria, and the mixture does not meet the criteria for Packing Group I:

i) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 3 000 mL/m^3 vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If 5 or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than 3 000 mL/m^3.

ii) A sample of the vapour in equilibrium with the liquid mixture at 20°C is used to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If 5 or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than the mixture LC_{50}.

c) A mixture is assigned to Packing Group III only if it meets both of the following criteria, and the mixture does not meet the criteria for Packing Groups I or II:

i) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 5 000 mL/m^3 vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If 5 or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than 5 000 mL/m^3.

ii) The vapour pressure of the liquid mixture is measured and if the vapour pressure is equal to or greater than 1 000 mL/m^3, the mixture is presumed to have a volatility equal to or greater than 1/5 the mixture LC_{50}.

6.2.3 Methods for determining oral and dermal toxicity of mixtures

6.2.3.1 When classifying and assigning the appropriate packing group to mixtures in Division 6.1, in accordance with the oral and dermal toxicity criteria in Table 2-8, it is necessary to determine the acute LD_{50} of the mixture.

6.2.3.2 If a mixture contains only one active substance, and the LD_{50} of that constituent is known, in the absence of reliable acute oral and dermal toxicity data on the actual mixture to be transported, the oral or dermal LD_{50} may be obtained by the following method:

LD_{50} value of preparation =

$$\frac{LD_{50} \text{ value of active substance} \times 100}{\text{percentage of active substance by mass}}$$

6.2.3.3 If a mixture contains more than one active constituent, there are three possible approaches that may be used to determine the oral or dermal LD_{50} of the mixture. The preferred method is to obtain reliable acute oral and dermal toxicity data on the actual mixture to be transported. If reliable and accurate data are not available, then either of the following methods may be performed:

a) classify the formulation according to the most hazardous constituent of the mixture as if that constituent were present in the same concentration as the total concentration of all active constituents; or

b) apply the formula:

$$\frac{C_A}{T_A} + \frac{C_B}{T_B} + \frac{C_Z}{T_Z} = \frac{100}{T_M}$$

where:

C = the per cent concentration of constituent A, B ... Z in the mixture

T = the oral LD_{50} values of constituent A, B ... Z

T_M = the oral LD_{50} value of the mixture.

Note.— This formula can also be used for dermal toxicities provided that this information is available on the same species for all constituents. The use of this formula does not take into account any potentiation or protective phenomena.

6.2.4 Classification of pesticides

6.2.4.1 All active pesticide substances and their preparations for which the LC_{50} and/or LD_{50} values are known and which are classified in Division 6.1 must be classified under appropriate packing groups in accordance with the criteria given in 6.2.2. Substances and preparations which are characterized by subsidiary hazards must be classified according to the precedence of hazards table (Table 2-1) with the assignment of appropriate packing groups.

6.2.4.2 If the oral or dermal LD_{50} value for a pesticide preparation is not known, but the LD_{50} value of its active substance(s) is known, the LD_{50} value for the preparation may be obtained by applying the procedures in 6.2.3.

Note.— LD_{50} toxicity data for a number of common pesticides may be obtained from the most current edition of the document The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification *available from the International Programme on Chemical Safety, World Health Organization (WHO), 1211 Geneva 27, Switzerland. While that document may be used as a source of LD_{50} data for pesticides, its classification system should not be used for purposes of transport classification of, or assignment of packing groups to, pesticides which must be in accordance with these Instructions.*

6.2.4.3 The proper shipping name used in the transport of the pesticide must be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary hazards it may exhibit.

6.2.5 Substances forbidden for transport

Chemically unstable substances of Division 6.1 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end, particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

6.3 DIVISION 6.2 — INFECTIOUS SUBSTANCES

6.3.1 Definitions

For the purposes of these Instructions:

6.3.1.1 *Infectious substances* are substances which are known to contain, or are reasonably expected to contain, pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

6.3.1.2 *Biological products* are those products derived from living organisms which are manufactured and distributed in accordance with the requirements of appropriate national authorities, which may have special licensing requirements, and are used either for prevention, treatment or diagnosis of disease in humans or animals, or for development, experimental or investigational purposes related thereto. They include, but are not limited to, finished or unfinished products such as vaccines.

6.3.1.3 *Cultures* are the result of a process by which pathogens are intentionally propagated. This definition does not include patient specimens as defined in 6.3.1.4.

6.3.1.4 *Patient specimens* are those collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being transported for purposes such as research, diagnosis, investigational activities, and disease treatment and prevention.

6.3.1.5 *Medical or clinical wastes* are wastes derived from the veterinary treatment of animals, the medical treatment of humans or from bio-research.

6.3.2 Classification of infectious substances

6.3.2.1 Infectious substances must be classified in Division 6.2 and assigned to UN 2814, UN 2900, UN 3291, UN 3373 or UN 3549 as appropriate.

6.3.2.2 Infectious substances are divided into the following categories:

6.3.2.2.1 *Category A:* An infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Indicative examples of substances that meet these criteria are given in Table 2-10.

Note. — An exposure occurs when an infectious substance is released outside of the protective packaging resulting in physical contact with humans or animals.

a) Infectious substances meeting these criteria which cause disease in humans or in both humans and animals must be assigned to UN 2814. Infectious substances which cause disease only in animals must be assigned to UN 2900.

b) Assignments to UN 2814 or UN 2900 must be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal.

Note 1.— The proper shipping name for UN 2814 is ***Infectious substance, affecting humans*****.** *The proper shipping name for UN 2900 is* ***Infectious substance, affecting animals*** *only*.

Note 2.— Table 2-10 is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in Table 2-10 but which meet the same criteria must be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it must be included in Category A.

Note 3.— In Table 2-10, the micro-organisms written in italics are bacteria or fungi.

6.3.2.2.2 *Category B:* An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B must be assigned to UN 3373.

≠ *Note.— The proper shipping name of UN 3373 is* ***Biological substance, Category B****.*

6.3.2.3 *Exceptions*

6.3.2.3.1 Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals are not subject to these Instructions unless they meet the criteria for inclusion in another class.

6.3.2.3.2 Substances containing micro-organisms which are non-pathogenic to humans or animals are not subject to these Instructions unless they meet the criteria for inclusion in another class.

6.3.2.3.3 Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk are not subject to these Instructions unless they meet the criteria for inclusion in another class.

6.3.2.3.4 Environmental samples (including food and water samples) which are not considered to pose a significant risk of infection are not subject to these Instructions unless they meet the criteria for inclusion in another class.

Table 2-10. Indicative examples of infectious substances included in Category A in any form unless otherwise indicated (6.3.2.2.1 a))

UN Number and Proper Shipping Name	Micro-organism
UN 2814 **Infectious substances affecting humans**	*Bacillus anthracis (cultures only)* *Brucella abortus (cultures only)* *Brucella melitensis (cultures only)* *Brucella suis (cultures only)* *Burkholderia mallei – Pseudomonas mallei* – Glanders *(cultures only)* *Burkholderia pseudomallei – Pseudomonas pseudomallei (cultures only)* *Chlamydia psittaci* – avian strains (cultures only) *Clostridium botulinum (cultures only)* *Coccidioides immitis (cultures only)* *Coxiella burnetii (cultures only)* Crimean-Congo hemorrhagic fever virus Dengue virus (cultures only) Eastern equine encephalitis virus (cultures only) *Escherichia coli*, verotoxigenic (cultures only) Ebola virus Flexal virus *Francisella tularensis (cultures only)* Guanarito virus Hantaan virus Hantaviruses causing haemorrhagic fever with renal syndrome Hendra virus Hepatitis B virus (cultures only) Herpes B virus (cultures only) Highly pathogenic avian influenza virus (cultures only) Human immunodeficiency virus (cultures only) Japanese Encephalitis virus (cultures only) Junin virus Kyasanur Forest disease virus Lassa virus Machupo virus Marburg virus Monkeypox virus *Mycobacterium tuberculosis (cultures only)* Nipah virus Omsk hemorrhagic fever virus Poliovirus (cultures only) Rabies virus (cultures only) *Rickettsia prowazekii (cultures only)* *Rickettsia rickettsii* (cultures only) Rift Valley fever virus (cultures only) Russian spring-summer encephalitis virus (cultures only) Sabia virus *Shigella dysenteriae type 1 (cultures only)* Tick-borne encephalitis virus (cultures only) Variola virus Venezuelan equine encephalitis virus (cultures only) West Nile virus (cultures only) Yellow fever virus (cultures only) *Yersinia pestis* (cultures only)
UN 2900 **Infectious substances affecting animals only**	African swine fever virus (cultures only) Avian paramyxovirus Type 1 – Velogenic Newcastle disease virus (cultures only) Classical swine fever virus (cultures only) Foot and mouth disease virus (cultures only) Goatpox virus (cultures only) Lumpy skin disease virus (cultures only) *Mycoplasma mycoides* – Contagious bovine pleuropneumonia (cultures only) Peste des petits ruminants virus (cultures only) Rinderpest virus (cultures only) Sheep-pox virus (cultures only) Swine vesicular disease virus (cultures only) Vesicular stomatitis virus (cultures only)

6.3.2.3.5 Dried blood spots, collected by applying a drop of blood onto absorbent material, are not subject to these Instructions.

6.3.2.3.6 Faecal occult blood screening samples are not subject to these Instructions.

6.3.2.3.7 Blood or blood components that have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation as well as samples drawn in connection with such purposes are not subject to these Instructions.

6.3.2.3.8 Patient specimens for which there is minimal likelihood that pathogens are present are not subject to other provisions of these Instructions provided the following conditions are met:

a) The specimen must be transported in a packaging which will prevent any leakage and which must be marked with the words “Exempt human specimen” or “Exempt animal specimen”, as appropriate;

b) The packaging must consist of three components:

i) a leakproof primary receptacle(s);

ii) a leakproof secondary packaging; and

iii) an outer packaging of adequate strength for its capacity, mass and intended use, and with at least one surface having minimum dimensions of 100 mm × 100 mm;

c) For liquids, absorbent material in sufficient quantity to absorb the entire contents must be placed between the primary receptacle(s) and the secondary packaging so that, during transport, any release or leak of a liquid substance will not reach the outer packaging and will not compromise the integrity of the cushioning material;

d) When multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent contact between them.

e) If refrigerated or frozen specimens are to be transported, the following conditions must be met:

i) when dry ice or liquid nitrogen is used to keep specimens cold, all applicable requirements of these Instructions must be met. When used, ice or dry ice must be placed outside the secondary packaging or in the outer packaging. Interior supports must be provided to secure the secondary packaging in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging must be leakproof. If carbon dioxide, solid (dry ice) is used, the packaging must be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings;

ii) the primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

Note.— In determining whether a patient specimen has a minimum likelihood that pathogens are present, an element of professional judgement is required to determine if a substance is exempt under this paragraph. That judgement should be based on the known medical history, symptoms and individual circumstances of the source, human or animal, and endemic local conditions. Examples of specimens which may be transported under this paragraph include blood or urine tests to monitor cholesterol levels, blood glucose levels, hormone levels, or prostate specific antibodies (PSA); tests required to monitor organ function such as heart, liver or kidney function for humans or animals with non-infectious diseases, or therapeutic drug monitoring; tests conducted for insurance or employment purposes and are intended to determine the presence of drugs or alcohol; pregnancy tests; biopsies to detect cancer; and antibody detection in humans or animals in the absence of any concern for infection (e.g. evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.).

6.3.2.3.9 Except for:

a) medical waste (UN 3291 and UN 3549);

b) medical devices or equipment contaminated with or containing infectious substances in Category A (UN 2814 or UN 2900); and

c) medical devices or equipment contaminated with or containing other dangerous goods that meet the definition of another hazard class,

medical devices or equipment potentially contaminated with or containing infectious substances which are being transported for disinfection, cleaning, sterilization, repair, or equipment evaluation are not subject to the provisions of these Instructions if packed in packagings designed and constructed in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. Packagings must be designed to meet the construction requirements listed in 6;3.

6.3.2.3.9.1 Medical devices or equipment must be drained of free liquid to the extent practicable. They must be packed in a strong rigid outer packaging fitted with sufficient cushioning material to prevent movement within the outer packaging. These packagings must meet the general packing requirements of 4;1.1.1, 4;1.1.3.1 and 4;1.1.4 (with the exception of 4;1.1.4.1). If the

outer packaging is not liquid tight and the medical devices or equipment are contaminated with or contain liquid infectious substances, a means of containing the liquid in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally effective means of containment. These packagings must be capable of retaining the medical devices and equipment when dropped from a height of 1.2 m.

Note.— A packaging's capability of retaining medical devices or equipment when dropped from a height of 1.2 m should be determined through testing a sample package as prepared for transport or through alternative means such as non-destructive testing and engineering analysis, testing with an article of similar mass and size, or other equivalent means.

6.3.2.3.9.2 Packages must be marked "Used medical device" or "Used medical equipment". When an overpack is used, it must be marked with the words "Used medical device" or "Used medical equipment" unless the markings are visible.

6.3.3 Biological products

For the purposes of these Instructions, biological products are divided into the following groups:

a) Those which are manufactured and packaged in accordance with the requirements of appropriate national authorities and transported for the purposes of final packaging or distribution, and use for personal health care by medical professionals or individuals. Substances in this group are not subject to these Instructions.

b) Those which do not fall under paragraph a) and are known or reasonably believed to contain infectious substances and which meet the criteria for inclusion in Category A or Category B. Substances in this group must be assigned to UN 2814, UN 2900 or UN 3373, as appropriate.

Note.— Some licensed biological products may present a biohazard only in certain parts of the world. In that case, appropriate national authorities may require these biological products to be in compliance with local requirements for infectious substances or may impose other restrictions.

6.3.4 Genetically modified micro-organisms and organisms

Genetically modified micro-organisms not meeting the definition of infectious substances must be classified according to Chapter 9.

6.3.5 Medical or clinical wastes

6.3.5.1 Medical or clinical wastes containing:

a) Category A infectious substances must be assigned to UN 2814, UN 2900 or UN 3549, as appropriate. Solid medical waste containing Category A infectious substances generated from the medical treatment of humans or veterinary treatment of animals may be assigned to UN 3549. The UN 3549 entry must not be used for waste from bio-research or liquid waste.

b) Category B infectious substances must be assigned to UN 3291.

6.3.5.2 Medical or clinical wastes that are reasonably believed to have a low probability of containing infectious substances must be assigned to UN 3291. For the assignment, international, regional or national waste catalogues may be taken into account.

Note.— The proper shipping name for UN 3291 is ***Clinical waste, unspecified, n.o.s.*** *or* ***Biomedical waste, n.o.s.*** *or* ***Medical waste, n.o.s.*** *or* ***Regulated medical waste, n.o.s.***

6.3.5.3 Decontaminated medical or clinical wastes that previously contained infectious substances are not subject to these Instructions unless they meet the criteria for inclusion in another class.

6.3.6 Infected animals

6.3.6.1 *Infected live animals*

Live animals must not be used to consign infectious substances unless such a substance cannot be consigned by any other means. A live animal that has been intentionally infected and is known or suspected to contain an infectious substance may only be transported by air under the terms and conditions of an approval granted by the appropriate national authorities of the States of Origin, Transit, Destination and Operator in accordance with the Supplement to these Instructions (Part S-1;2).

6.3.6.2 *Deleted*

6.3.7 Patient specimens

Patient specimens must be assigned to UN 2814, UN 2900 or UN 3373 as appropriate except if they comply with 6.3.2.3.

Chapter 7

CLASS 7 — RADIOACTIVE MATERIAL

≠ *Parts of this Chapter are affected by State Variations BE 4, CA 1, CA 3, CA 4, CH 4, DE 3, DK 1, DQ 1, IR 4, JP 26, KG 1; see Table A-1*

Note.— For Class 7, the type of packaging may have a decisive effect on classification.

7.1 DEFINITIONS

7.1.1 *Radioactive material*. Any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 7.2.2.1 to 7.2.2.6.

7.1.2 Contamination

Contamination. The presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm^2 for all other alpha emitters.

Non-fixed contamination. Contamination that can be removed from a surface during routine conditions of transport.

Fixed contamination. Contamination other than non-fixed contamination.

7.1.3 Definitions of specific terms

A_1 and *A_2:*

A_1. The activity value of special form radioactive material, which is listed in Table 2-12 or derived in 7.2.2.2 and is used to determine the activity limits for the requirements of these Instructions.

A_2. The activity value of radioactive material, other than special form radioactive material, which is listed in Table 2-12 or derived in 7.2.2.2 and is used to determine the activity limits for the requirements of these Instructions.

Fissile nuclides. Uranium-233, uranium-235, plutonium-239 and plutonium-241. Fissile material is a material containing any of the fissile nuclides. Excluded from the definition of fissile material are the following:

a) natural uranium or depleted uranium which is unirradiated;

b) natural uranium or depleted uranium which has been irradiated in thermal reactors only;

c) material with fissile nuclides less than a total of 0.25 g;

d) any combination of a), b) and/or c).

These exclusions are only valid if there is no other material with fissile nuclides in the package.

Freight container in the case of radioactive material transport. An article of transport equipment designed to facilitate the transport of packaged goods by one or more modes of transport without intermediate reloading, which is of a permanent enclosed character, rigid and strong enough for repeated use, and must be fitted with devices facilitating its handling, particularly in transfer between aircraft and from one mode of transport to another. In addition, a small freight container is that which has an internal volume of not more than 3 m^3. A large freight container is that which has an internal volume of more than 3 m^3. For the transport of radioactive material, a freight container may be used as a packaging.

Low dispersible radioactive material. A solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

Low specific activity (LSA) material. Radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material must not be considered in determining the estimated average specific activity.

Low toxicity alpha emitters. Natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Packaging in the case of radioactive material. The assembly of components necessary to enclose the radioactive contents completely. It may, in particular, consist of one or more receptacles, absorbent materials, spacing structures, radiation shielding and service equipment for filling, emptying, venting and pressure relief; devices for cooling, absorbing mechanical shocks, handling and tie-down, thermal insulation; and service devices integral to the package. The packaging may be a box, drum or similar receptacle, or may also be a freight container.

Note.— For packagings for other dangerous goods, see definitions under 1;3.1.1.

Special form radioactive material. Either:

a) an indispersible solid radioactive material; or

b) a sealed capsule containing radioactive material.

Specific activity of a radionuclide. The activity per unit mass of that nuclide. The specific activity of a material must mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

Surface contaminated object (SCO). A solid object which is not itself radioactive but which has radioactive material distributed on its surface.

Transport index (TI) assigned to a package, overpack or freight container, or to unpackaged LSA-I, SCO-I or SCO-III. A number which is used to provide control over radiation exposure.

Note.— Unpackaged LSA-I, SCO-I or SCO-III material are not permitted for transport by air.

Unirradiated thorium. Thorium containing not more than 10^{-7} g of uranium-233 per gram of thorium-232.

Unirradiated uranium. Uranium containing not more than 2×10^3 Bq of plutonium per gram of uranium-235, not more than 9×10^6 Bq of fission products per gram of uranium-235 and not more than 5×10^{-3} g of uranium-236 per gram of uranium-235.

Uranium — natural, depleted, enriched:

Natural uranium. Uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28 per cent uranium-238, and 0.72 per cent uranium-235 by mass).

Depleted uranium. Uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium. Uranium containing a greater mass percentage of uranium-235 than 0.72 per cent. In all cases, a very small mass percentage of uranium-234 is present.

7.2 CLASSIFICATION

7.2.1 General provisions

7.2.1.1 Radioactive material must be assigned to one of the UN numbers specified in Table 2-11 in accordance with 7.2.4 to 7.2.5, taking into account the material characteristics determined in 7.2.3.

Table 2-11. Assignment of UN numbers

UN number	*Proper shipping name and description*[a]
Excepted packages (1;6.1.5)	
UN 2908	**Radioactive material, excepted package — empty packaging**
UN 2909	**Radioactive material, excepted package — articles manufactured from natural uranium** or **depleted uranium** or **natural thorium**
UN 2910	**Radioactive material, excepted package — limited quantity of material**
UN 2911	**Radioactive material, excepted package — instruments** or **articles**
UN 3507	**Uranium hexafluoride, radioactive material, excepted package**, less than 0.1 kg per package, non-fissile or fissile-excepted[b,c]
Low specific activity radioactive material (7.2.3.1)	
UN 2912	**Radioactive material, low specific activity (LSA-I)**, non-fissile or fissile excepted[b]

UN number	*Proper shipping name and description*[a]
UN 3321	**Radioactive material, low specific activity (LSA-II)**, non-fissile or fissile excepted[b]
UN 3322	**Radioactive material, low specific activity (LSA-III)**, non-fissile or fissile excepted[b]
UN 3324	**Radioactive material, low specific activity (LSA-II) fissile**
UN 3325	**Radioactive material, low specific activity (LSA-III) fissile**
Surface contaminated objects (7.2.3.2)	
UN 2913	**Radioactive material, surface contaminated objects (SCO-I, SCO-II** or **SCO-III)**, non-fissile or fissile excepted[b]
UN 3326	**Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**
Type A packages (7.2.4.4)	
UN 2915	**Radioactive material, Type A package**, non-special form, non-fissile or fissile excepted[b]
UN 3327	**Radioactive material, Type A package, fissile**, non-special form
UN 3332	**Radioactive material, Type A package, special form**, non-fissile or fissile excepted[b]
UN 3333	**Radioactive material, Type A package, special form, fissile**
Type B(U) package (7.2.4.6)	
UN 2916	**Radioactive material, Type B(U) package**, non-fissile or fissile excepted[b]
UN 3328	**Radioactive material, Type B(U) package, fissile**
Type B(M) package (7.2.4.6)	
UN 2917	**Radioactive material, Type B(M) package**, non-fissile or fissile excepted[b]
UN 3329	**Radioactive material, Type B(M) package, fissile**
Type C package (7.2.4.6)	
UN 3323	**Radioactive material, Type C package**, non-fissile or fissile excepted[b]
UN 3330	**Radioactive material, Type C package, fissile**
Special arrangement (7.2.5)	
UN 2919	**Radioactive material, transported under special arrangement**, non-fissile or fissile excepted[b]
UN 3331	**Radioactive material, transported under special arrangement, fissile**
Uranium hexafluoride (7.2.4.5)	
UN 2977	**Radioactive material, uranium hexafluoride, fissile**
UN 2978	**Radioactive material, uranium hexafluoride**, non-fissile or fissile excepted[b]
UN 3507	**Uranium hexafluoride, radioactive material, excepted package,** less than 0.1 kg per package, non-fissile or fissile-excepted[b,c]

a. The proper shipping name is found in the column “proper shipping name and description” and is restricted to that part shown in bold letters. In the cases of UN Nos. 2909, 2911, 2913 and 3326, where alternative proper shipping names are separated by the word “or”, only the relevant proper shipping name must be used.

b. The term “fissile-excepted” refers only to material excepted under 7.2.3.5.

c. For UN No. 3507, see also Special Provision A194.

7.2.2 Determination of basic radionuclide values

7.2.2.1 The following basic values for individual radionuclides are given in Table 2-12:

a) A_1 and A_2 in TBq;

b) activity concentration limits for exempt material in Bq/g; and

c) activity limits for exempt consignments in Bq.

7.2.2.2 For individual radionuclides:

a) which are not listed in Table 2-12, determination of the basic radionuclide values referred to in 7.2.2.1 requires multilateral approval. For these radionuclides, activity concentration limits for exempt material and activity limits for exempt consignments must be calculated in accordance with the principles established in the Radiation Protection and Safety of Radiation Sources: *International Basic Safety Standards*, IAEA Safety Standards Series No.GSR Part 3, IAEA, Vienna (2014). It is permissible to use the A_2 value calculated using a dose coefficient for the appropriate lung absorption type as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 2-13 may be used without obtaining competent authority approval.

b) in instruments or articles in which the radioactive material is enclosed or is included as a component part of the instrument or other manufactured article and which meet 7.2.4.1.1.3 c), alternative basic radionuclide values to those in Table 2-12 for the activity limit for an exempt consignment are permitted and require multilateral approval. Such alternative activity limits for an exempt consignment must be calculated in accordance with the principles set out in GSR Part 3.

7.2.2.3 In the calculations of A_1 and A_2 for a radionuclide not in Table 2-12, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no progeny nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, must be considered as a single radionuclide; and the activity to be taken into account and the A_1 or A_2 value to be applied must be that corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any progeny nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such progeny nuclides must be considered as mixtures of different nuclides.

7.2.2.4 For mixtures of radionuclides, the basic radionuclide values referred to in 7.2.2.1 may be determined as follows:

$$X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$$

where,

f(i) is the fraction of activity or activity concentration of radionuclide i in the mixture;

X(i) is the appropriate value of A_1 or A_2 or the activity concentration limit for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide i; and

X_m is the derived value of A_1 or A_2 or the activity concentration limit for exempt material or the activity limit for an exempt consignment in the case of a mixture.

7.2.2.5 When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate, for the radionuclides in each group may be used in applying the formulas in 7.2.2.4 and 7.2.4.4. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.

7.2.2.6 For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 2-13 must be used.

Table 2-12. Basic radionuclides values for individual radionuclides

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Actinium (89)				
Ac-225 (a)	8×10^{-1}	6×10^{-3}	1×10^{1}	1×10^{4}
Ac-227 (a)	9×10^{-1}	9×10^{-5}	1×10^{-1}	1×10^{3}
Ac-228	6×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Silver (47)				
Ag-105	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ag-108m (a)	7×10^{-1}	7×10^{-1}	1×10^{1} (b)	1×10^{6} (b)
Ag-110m (a)	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Ag-111	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Aluminium (13)				
Al-26	1×10^{-1}	1×10^{-1}	1×10^{1}	1×10^{5}
Americium (95)				
Am-241	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Am-242m (a)	1×10^{1}	1×10^{-3}	1×10^{0} (b)	1×10^{4} (b)
Am-243 (a)	5×10^{0}	1×10^{-3}	1×10^{0} (b)	1×10^{3} (b)
Argon (18)				
Ar-37	4×10^{1}	4×10^{1}	1×10^{6}	1×10^{8}
Ar-39	4×10^{1}	2×10^{1}	1×10^{7}	1×10^{4}
Ar-41	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{9}
Arsenic (33)				
As-72	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
As-73	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{7}
As-74	1×10^{0}	9×10^{-1}	1×10^{1}	1×10^{6}
As-76	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
As-77	2×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
Astatine (85)				
At-211 (a)	2×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
Gold (79)				
Au-193	7×10^{0}	2×10^{0}	1×10^{2}	1×10^{7}
Au-194	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Au-195	1×10^{1}	6×10^{0}	1×10^{2}	1×10^{7}
Au-198	1×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Au-199	1×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Barium (56)				
Ba-131 (a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ba-133	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Ba-133m	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Ba-135m	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Ba-140 (a)	5×10^{-1}	3×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
Beryllium (4)				
Be-7	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
Be-10	4×10^{1}	6×10^{-1}	1×10^{4}	1×10^{6}
Bismuth (83)				
Bi-205	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Bi-206	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Bi-207	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Bi-210	1×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Bi-210m(a)	6×10^{-1}	2×10^{-2}	1×10^{1}	1×10^{5}
Bi-212 (a)	7×10^{-1}	6×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
Berkelium (97)				
Bk-247	8×10^{0}	8×10^{-4}	1×10^{0}	1×10^{4}
Bk-249 (a)	4×10^{1}	3×10^{-1}	1×10^{3}	1×10^{6}
Bromine (35)				
Br-76	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Br-77	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Br-82	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Carbon (6)				
C-11	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
C-14	4×10^{1}	3×10^{0}	1×10^{4}	1×10^{7}
Calcium (20)				
Ca-41	Unlimited	Unlimited	1×10^{5}	1×10^{7}
Ca-45	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
Ca-47 (a)	3×10^{0}	3×10^{-1}	1×10^{1}	1×10^{6}
Cadmium (48)				
Cd-109	3×10^{1}	2×10^{0}	1×10^{4}	1×10^{6}
Cd-113m	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{6}
Cd-115 (a)	3×10^{0}	4×10^{-1}	1×10^{2}	1×10^{6}
Cd-115m	5×10^{-1}	5×10^{-1}	1×10^{3}	1×10^{6}
Cerium (58)				
Ce-139	7×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ce-141	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{7}
Ce-143	9×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{6}
Ce-144 (a)	2×10^{-1}	2×10^{-1}	1×10^{2} (b)	1×10^{5} (b)

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Californium (98)				
Cf-248	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
Cf-249	3×10^{0}	8×10^{-4}	1×10^{0}	1×10^{3}
Cf-250	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
Cf-251	7×10^{0}	7×10^{-4}	1×10^{0}	1×10^{3}
Cf-252	1×10^{-1}	3×10^{-3}	1×10^{1}	1×10^{4}
Cf-253 (a)	4×10^{1}	4×10^{-2}	1×10^{2}	1×10^{5}
Cf-254	1×10^{-3}	1×10^{-3}	1×10^{0}	1×10^{3}
Chlorine (17)				
Cl-36	1×10^{1}	6×10^{-1}	1×10^{4}	1×10^{6}
Cl-38	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
Curium (96)				
Cm-240	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
Cm-241	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Cm-242	4×10^{1}	1×10^{-2}	1×10^{2}	1×10^{5}
Cm-243	9×10^{0}	1×10^{-3}	1×10^{0}	1×10^{4}
Cm-244	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
Cm-245	9×10^{0}	9×10^{-4}	1×10^{0}	1×10^{3}
Cm-246	9×10^{0}	9×10^{-4}	1×10^{0}	1×10^{3}
Cm-247 (a)	3×10^{0}	1×10^{-3}	1×10^{0}	1×10^{4}
Cm-248	2×10^{-2}	3×10^{-4}	1×10^{0}	1×10^{3}
Cobalt (27)				
Co-55	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Co-56	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Co-57	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{6}
Co-58	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Co-58m	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Co-60	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Chromium (24)				
Cr-51	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Caesium (55)				
Cs-129	4×10^{0}	4×10^{0}	1×10^{2}	1×10^{5}
Cs-131	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{6}
Cs-132	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{5}
Cs-134	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{4}
Cs-134m	4×10^{1}	6×10^{-1}	1×10^{3}	1×10^{5}
Cs-135	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Cs-136	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Cs-137 (a)	2×10^{0}	6×10^{-1}	1×10^{1} (b)	1×10^{4} (b)
Copper (29)				
Cu-64	6×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Cu-67	1×10^{1}	7×10^{-1}	1×10^{2}	1×10^{6}
Dysprosium (66)				
Dy-159	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
Dy-165	9×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Dy-166 (a)	9×10^{-1}	3×10^{-1}	1×10^{3}	1×10^{6}
Erbium (68)				
Er-169	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
Er-171	8×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{6}
Europium (63)				
Eu-147	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Eu-148	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Eu-149	2×10^{1}	2×10^{1}	1×10^{2}	1×10^{7}
Eu-150 (short-lived)	2×10^{0}	7×10^{-1}	1×10^{3}	1×10^{6}
Eu-150 (long-lived)	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Eu-152	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Eu-152m	8×10^{-1}	8×10^{-1}	1×10^{2}	1×10^{6}
Eu-154	9×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Eu-155	2×10^{1}	3×10^{0}	1×10^{2}	1×10^{7}
Eu-156	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Fluorine (9)				
F-18	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
Iron (26)				
Fe-52 (a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{6}
Fe-55	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{6}
Fe-59	9×10^{-1}	9×10^{-1}	1×10^{1}	1×10^{6}
Fe-60 (a)	4×10^{1}	2×10^{-1}	1×10^{2}	1×10^{5}
Gallium (31)				
Ga-67	7×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Ga-68	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Ga-72	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Gadolinium (64)				
Gd-146 (a)	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Gd-148	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Gd-153	1×10^{1}	9×10^{0}	1×10^{2}	1×10^{7}
Gd-159	3×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Germanium (32)				
Ge-68 (a)	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Ge-69	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Ge-71	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
Ge-77	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Hafnium (72)				
Hf-172 (a)	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Hf-175	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Hf-181	2×10^{0}	5×10^{-1}	1×10^{1}	1×10^{6}
Hf-182	Unlimited	Unlimited	1×10^{2}	1×10^{6}
Mercury (80)				
Hg-194 (a)	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Hg-195m (a)	3×10^{0}	7×10^{-1}	1×10^{2}	1×10^{6}
Hg-197	2×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Hg-197m	1×10^{1}	4×10^{-1}	1×10^{2}	1×10^{6}
Hg-203	5×10^{0}	1×10^{0}	1×10^{2}	1×10^{5}
Holmium (67)				
Ho-166	4×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{5}
Ho-166m	6×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Iodine (53)				
I-123	6×10^{0}	3×10^{0}	1×10^{2}	1×10^{7}
I-124	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
I-125	2×10^{1}	3×10^{0}	1×10^{3}	1×10^{6}
I-126	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
I-129	Unlimited	Unlimited	1×10^{2}	1×10^{5}
I-131	3×10^{0}	7×10^{-1}	1×10^{2}	1×10^{6}
I-132	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
I-133	7×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
I-134	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
I-135 (a)	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Indium (49)				
In-111	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
In-113m	4×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
In-114m (a)	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
In-115m	7×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Iridium (77)				
Ir-189 (a)	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Ir-190	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Ir-192	1×10^{0}(c)	6×10^{-1}	1×10^{1}	1×10^{4}
Ir-193m	4×10^{1}	4×10^{0}	1×10^{4}	1×10^{7}
Ir-194	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Potassium (19)				
K-40	9×10^{-1}	9×10^{-1}	1×10^{2}	1×10^{6}
K-42	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{6}
K-43	7×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Krypton (36)				
Kr-79	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{5}
Kr-81	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Kr-85	1×10^{1}	1×10^{1}	1×10^{5}	1×10^{4}
Kr-85m	8×10^{0}	3×10^{0}	1×10^{3}	1×10^{10}
Kr-87	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{9}
Lanthanum (57)				
La-137	3×10^{1}	6×10^{0}	1×10^{3}	1×10^{7}
La-140	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Lutetium (71)				
Lu-172	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Lu-173	8×10^{0}	8×10^{0}	1×10^{2}	1×10^{7}
Lu-174	9×10^{0}	9×10^{0}	1×10^{2}	1×10^{7}
Lu-174m	2×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Lu-177	3×10^{1}	7×10^{-1}	1×10^{3}	1×10^{7}
Magnesium (12)				
Mg-28 (a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Manganese (25)				
Mn-52	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Mn-53	Unlimited	Unlimited	1×10^{4}	1×10^{9}
Mn-54	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Mn-56	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Molybdenum (42)				
Mo-93	4×10^{1}	2×10^{1}	1×10^{3}	1×10^{8}
Mo-99 (a)	1×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Nitrogen (7)				
N-13	9×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{9}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Sodium (11)				
Na-22	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Na-24	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
Niobium (41)				
Nb-93m	4×10^{1}	3×10^{1}	1×10^{4}	1×10^{7}
Nb-94	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Nb-95	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Nb-97	9×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Neodymium (60)				
Nd-147	6×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Nd-149	6×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{6}
Nickel (28)				
Ni-57	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Ni-59	Unlimited	Unlimited	1×10^{4}	1×10^{8}
Ni-63	4×10^{1}	3×10^{1}	1×10^{5}	1×10^{8}
Ni-65	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Neptunium (93)				
Np-235	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{7}
Np-236 (short-lived)	2×10^{1}	2×10^{0}	1×10^{3}	1×10^{7}
Np-236 (long-lived)	9×10^{0}	2×10^{-2}	1×10^{2}	1×10^{5}
Np-237	2×10^{1}	2×10^{-3}	1×10^{0} (b)	1×10^{3} (b)
Np-239	7×10^{0}	4×10^{-1}	1×10^{2}	1×10^{7}
Osmium (76)				
Os-185	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Os-191	1×10^{1}	2×10^{0}	1×10^{2}	1×10^{7}
Os-191m	4×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Os-193	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Os-194 (a)	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Phosphorus (15)				
P-32	5×10^{-1}	5×10^{-1}	1×10^{3}	1×10^{5}
P-33	4×10^{1}	1×10^{0}	1×10^{5}	1×10^{8}
Protactinium (91)				
Pa-230 (a)	2×10^{0}	7×10^{-2}	1×10^{1}	1×10^{6}
Pa-231	4×10^{0}	4×10^{-4}	1×10^{0}	1×10^{3}
Pa-233	5×10^{0}	7×10^{-1}	1×10^{2}	1×10^{7}
Lead (82)				
Pb-201	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Pb-202	4×10^{1}	2×10^{1}	1×10^{3}	1×10^{6}
Pb-203	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Pb-205	Unlimited	Unlimited	1×10^{4}	1×10^{7}
Pb-210 (a)	1×10^{0}	5×10^{-2}	1×10^{1} (b)	1×10^{4} (b)
Pb-212 (a)	7×10^{-1}	2×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
Palladium (46)				
Pd-103 (a)	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{8}
Pd-107	Unlimited	Unlimited	1×10^{5}	1×10^{8}
Pd-109	2×10^{0}	5×10^{-1}	1×10^{3}	1×10^{6}
Promethium (61)				
Pm-143	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Pm-144	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Pm-145	3×10^{1}	1×10^{1}	1×10^{3}	1×10^{7}
Pm-147	4×10^{1}	2×10^{0}	1×10^{4}	1×10^{7}
Pm-148m (a)	8×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Pm-149	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Pm-151	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Polonium (84)				
Po-210	4×10^{1}	2×10^{-2}	1×10^{1}	1×10^{4}
Praseodymium (59)				
Pr-142	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
Pr-143	3×10^{0}	6×10^{-1}	1×10^{4}	1×10^{6}
Platinum (78)				
Pt-188 (a)	1×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
Pt-191	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Pt-193	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Pt-193m	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
Pt-195m	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
Pt-197	2×10^{1}	6×10^{-1}	1×10^{3}	1×10^{6}
Pt-197m	1×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
Plutonium (94)				
Pu-236	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
Pu-237	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
Pu-238	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Pu-239	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Pu-240	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{3}
Pu-241 (a)	4×10^{1}	6×10^{-2}	1×10^{2}	1×10^{5}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Pu-242	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Pu-244 (a)	4×10^{-1}	1×10^{-3}	1×10^{0}	$1 \times 1\ 10^{4}$
Radium (88)				
Ra-223 (a)	4×10^{-1}	7×10^{-3}	1×10^{2} (b)	1×10^{5} (b)
Ra-224 (a)	4×10^{-1}	2×10^{-2}	1×10^{1}(b)	1×10^{5} (b)
Ra-225 (a)	2×10^{-1}	4×10^{-3}	1×10^{2}	1×10^{5}
Ra-226 (a)	2×10^{-1}	3×10^{-3}	1×10^{1} (b)	1×10^{4} (b)
Ra-228 (a)	6×10^{-1}	2×10^{-2}	1×10^{1} (b)	1×10^{5} (b)
Rubidium (37)				
Rb-81	2×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
Rb-83 (a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Rb-84	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Rb-86	5×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{5}
Rb-87	Unlimited	Unlimited	1×10^{4}	1×10^{7}
Rb(nat)	Unlimited	Unlimited	1×10^{4}	1×10^{7}
Rhenium (75)				
Re-184	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Re-184m	3×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Re-186	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Re-187	Unlimited	Unlimited	1×10^{6}	1×10^{9}
Re-188	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
Re-189 (a)	3×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Re(nat)	Unlimited	Unlimited	1×10^{6}	1×10^{9}
Rhodium (45)				
Rh-99	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Rh-101	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{7}
Rh-102	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Rh-102m	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Rh-103m	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
Rh-105	1×10^{1}	8×10^{-1}	1×10^{2}	1×10^{7}
Radon (86)				
Rn-222 (a)	3×10^{-1}	4×10^{-3}	1×10^{1} (b)	1×10^{8} (b)
Ruthenium (44)				
Ru-97	5×10^{0}	5×10^{0}	1×10^{2}	1×10^{7}
Ru-103 (a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Ru-105	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
Ru-106 (a)	2×10^{-1}	2×10^{-1}	1×10^{2} (b)	1×10^{5} (b)

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Sulphur (16)				
S-35	4×10^{1}	3×10^{0}	1×10^{5}	1×10^{8}
Antimony (51)				
Sb-122	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{4}
Sb-124	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
Sb-125	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
Sb-126	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Scandium (21)				
Sc-44	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
Sc-46	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Sc-47	1×10^{1}	7×10^{-1}	1×10^{2}	1×10^{6}
Sc-48	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Selenium (34)				
Se-75	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Se-79	4×10^{1}	2×10^{0}	1×10^{4}	1×10^{7}
Silicon (14)				
Si-31	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Si-32	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{6}
Samarium (62)				
Sm-145	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
Sm-147	Unlimited	Unlimited	1×10^{1}	1×10^{4}
Sm-151	4×10^{1}	1×10^{1}	1×10^{4}	1×10^{8}
Sm-153	9×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Tin (50)				
Sn-113 (a)	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{7}
Sn-117m	7×10^{0}	4×10^{-1}	1×10^{2}	1×10^{6}
Sn-119m	4×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Sn-121m (a)	4×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
Sn-123	8×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Sn-125	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
Sn-126 (a)	6×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Strontium (38)				
Sr-82 (a)	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
Sr-83	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Sr-85	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Sr-85m	5×10^{0}	5×10^{0}	1×10^{2}	1×10^{7}
Sr-87m	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Sr-89	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Sr-90 (a)	3×10^{-1}	3×10^{-1}	1×10^{2} (b)	1×10^{4} (b)
Sr-91 (a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
Sr-92 (a)	1×10^{0}	3×10^{-1}	1×10^{1}	1×10^{6}
Tritium (1)				
T(H-3)	4×10^{1}	4×10^{1}	1×10^{6}	1×10^{9}
Tantalum (73)				
Ta-178 (long-lived)	1×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
Ta-179	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
Ta-182	9×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{4}
Terbium (65)				
Tb-149	8×10^{-1}	8×10^{-1}	1×10^{1}	1×10^{6}
Tb-157	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Tb-158	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Tb-160	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
Tb-161	3×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
Technetium (43)				
Tc-95m (a)	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Tc-96	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Tc-96m (a)	4×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{7}
Tc-97	Unlimited	Unlimited	1×10^{3}	1×10^{8}
Tc-97m	4×10^{1}	1×10^{0}	1×10^{3}	1×10^{7}
Tc-98	8×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
Tc-99	4×10^{1}	9×10^{-1}	1×10^{4}	1×10^{7}
Tc-99m	1×10^{1}	4×10^{0}	1×10^{2}	1×10^{7}
Tellurium (52)				
Te-121	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Te-121m	5×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Te-123m	8×10^{0}	1×10^{0}	1×10^{2}	1×10^{7}
Te-125m	2×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
Te-127	2×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
Te-127m (a)	2×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
Te-129	7×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{6}
Te-129m (a)	8×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{6}
Te-131m (a)	7×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
Te-132 (a)	5×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{7}
Thorium (90)				

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Th-227	1×10^{1}	5×10^{-3}	1×10^{1}	1×10^{4}
Th-228 (a)	5×10^{-1}	1×10^{-3}	1×10^{0} (b)	1×10^{4} (b)
Th-229	5×10^{0}	5×10^{-4}	1×10^{0} (b)	1×10^{3} (b)
Th-230	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
Th-231	4×10^{1}	2×10^{-2}	1×10^{3}	1×10^{7}
Th-232	Unlimited	Unlimited	1×10^{1}	1×10^{4}
Th-234 (a)	3×10^{-1}	3×10^{-1}	1×10^{3} (b)	1×10^{5} (b)
Th(nat)	Unlimited	Unlimited	1×10^{0} (b)	1×10^{3} (b)
Titanium (22)				
Ti-44 (a)	5×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
Thallium (81)				
Tl-200	9×10^{-1}	9×10^{-1}	1×10^{1}	1×10^{6}
Tl-201	1×10^{1}	4×10^{0}	1×10^{2}	1×10^{6}
Tl-202	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Tl-204	1×10^{1}	7×10^{-1}	1×10^{4}	1×10^{4}
Thulium (69)				
Tm-167	7×10^{0}	8×10^{-1}	1×10^{2}	1×10^{6}
Tm-170	3×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
Tm-171	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
Uranium (92)				
U-230 (fast lung absorption) (a)(d)	4×10^{1}	1×10^{-1}	1×10^{1} (b)	1×10^{5} (b)
U-230 (medium lung absorption)(a)(e)	4×10^{1}	4×10^{-3}	1×10^{1}	1×10^{4}
U-230 (slow lung absorption) (a)(f)	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
U-232 (fast lung absorption) (d)	4×10^{1}	1×10^{-2}	1×10^{0} (b)	1×10^{3} (b)
U-232 (medium lung absorption) (e)	4×10^{1}	7×10^{-3}	1×10^{1}	1×10^{4}
U-232 (slow lung absorption) (f)	1×10^{1}	1×10^{-3}	1×10^{1}	1×10^{4}
U-233 (fast lung absorption) (d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
U-233 (medium lung absorption) (e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-233 (slow lung absorption) (f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
U-234 (fast lung absorption) (d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
U-234 (medium lung absorption) (e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-234 (slow lung absorption) (f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
U-235 (all lung absorption types) (a),(d),(e),(f)	Unlimited	Unlimited	1×10^{1} (b)	1×10^{4} (b)
U-236 (fast lung absorption) (d)	Unlimited	Unlimited	1×10^{1}	1×10^{4}
U-236 (medium lung absorption) (e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-236 (slow lung absorption) (f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
U-238 (all lung absorption types) (d),(e),(f)	Unlimited	Unlimited	1×10^{1} (b)	1×10^{4} (b)

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
U (nat)	Unlimited	Unlimited	1×10^{0} (b)	1×10^{3} (b)
U (enriched to 20% or less) (g)	Unlimited	Unlimited	1×10^{0}	1×10^{3}
U (dep)	Unlimited	Unlimited	1×10^{0}	1×10^{3}
Vanadium (23)				
V-48	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
V-49	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
Tungsten (74)				
W-178 (a)	9×10^{0}	5×10^{0}	1×10^{1}	1×10^{6}
W-181	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
W-185	4×10^{1}	8×10^{-1}	1×10^{4}	1×10^{7}
W-187	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
W-188 (a)	4×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Xenon (54)				
Xe-122 (a)	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{9}
Xe-123	2×10^{0}	7×10^{-1}	1×10^{2}	1×10^{9}
Xe-127	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{5}
Xe-131m	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{4}
Xe-133	2×10^{1}	1×10^{1}	1×10^{3}	1×10^{4}
Xe-135	3×10^{0}	2×10^{0}	1×10^{3}	1×10^{10}
Yttrium (39)				
Y-87 (a)	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
Y-88	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
Y-90	3×10^{-1}	3×10^{-1}	1×10^{3}	1×10^{5}
Y-91	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
Y-91m	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
Y-92	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{5}
Y-93	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
Ytterbium (70)				
Yb-169	4×10^{0}	1×10^{0}	1×10^{2}	1×10^{7}
Yb-175	3×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
Zinc (30)				
Zn-65	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
Zn-69	3×10^{0}	6×10^{-1}	1×10^{4}	1×10^{6}
Zn-69m (a)	3×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
Zirconium (40)				
Zr-88	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
Zr-93	Unlimited	Unlimited	1×10^{3} (b)	1×10^{7} (b)

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Zr-95 (a)	2×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
Zr-97 (a)	4×10^{-1}	4×10^{-1}	1×10^{1} (b)	1×10^{5} (b)

(a) A_1 and/or A_2 values for these parent radionuclides include contributions from their progeny with half-lives less than 10 days, as listed in the following:

Mg-28	Al-28
Ar-42	K-42
Ca-47	Sc-47
Ti-44	Sc-44
Fe-52	Mn-52m
Fe-60	Co-60m
Zn-69m	Zn-69
Ge-68	Ga-68
Rb-83	Kr-83m
Sr-82	Rb-82
Sr-90	Y-90
Sr-91	Y-91m
Sr-92	Y-92
Y-87	Sr-87m
Zr-95	Nb-95m
Zr-97	Nb-97m, Nb-97
Mo-99	Tc-99m
Tc-95m	Tc-95
Tc-96m	Tc-96
Ru-103	Rh-103m
Ru-106	Rh-106
Pd-103	Rh-103m
Ag-108m	Ag-108
Ag-110m	Ag-110
Cd-115	In-115m
In-114m	In-114
Sn-113	In-113m
Sn-121m	Sn-121
Sn-126	Sb-126m
Te-118	Sb-118
Te-127m	Te-127
Te-129m	Te-129
Te-131m	Te-131
Te-132	I-132
I-135	Xe-135m
Xe-122	I-122
Cs-137	Ba-137
Ba-131	Cs-131
Ba-140	La-140
Ce-144	Pr-144m, Pr-144
Pm-148m	Pm-148
Gd-146	Eu-146
Dy-166	Ho-166
Hf-172	Lu-172
W-178	Ta-178
W-188	Re-188
Re-189	Os-189m
Os-194	Ir-194
Ir-189	Os-189m
Pt-188	Ir-188
Hg-194	Au-194
Hg-195m	Hg-195
Pb-210	Bi-210
Pb-212	Bi-212, Tl-208, Po-212
Bi-210m	Tl-206
Bi-212	Tl-208, Po-212
At-211	Po-211
Rn-222	Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212

Radionuclide (atomic number)	*Special form A_1 (TBq)*	*Other form A_2 (TBq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*

Ra-225	Ac-225, Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ra-226	Rn-222, Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-228	Ac-228
Ac-225	Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ac-227	Fr-223
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m, Pa-234
Pa-230	Ac-226, Th-226, Fr-222, Ra-222, Rn-218, Po-214
U-230	Th-226, Ra-222, Rn-218, Po-214
U-235	Th-231
Pu-241	U-237
Pu-244	U-240, Np-240m
Am-242m	Am-242, Np-238
Am-243	Np-239
Cm-247	Pu-243
Bk-249	Am-245
Cf-253	Cm-249

(b) Parent nuclides and their progeny included in secular equilibrium are listed in the following (the activity to be taken into account is that of the parent nuclide only):

Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Ag-108m	Ag-108
Cs-137	Ba-137m
Ce-144	Pr-144
Ba-140	La-140
Bi-212	Tl-208 (0.36), Po-212 (0.64)
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0.36), Po-212 (0.64)
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb212, Bi-212, Tl208 (0.36), Po-212 (0.64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-nat[1]	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Th-234	Pa-234m
U-230	Th-226, Ra-222, Rn-218, Po-214
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
U-235	Th-231
U-238	Th-234, Pa-234m
U-nat[1]	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Np-237	Pa-233
Am-242m	Am-242
Am-243	Np-239

(c) The quantity may be determined from a measurement of the rate of decay or a measurement of the dose rate at a prescribed distance from the source.

(d) These values apply only to compounds of uranium that take the chemical form of UF_6, UO_2F_2 and $UO_2(NO_3)_2$ in both normal and accident conditions of transport.

(e) These values apply only to compounds of uranium that take the chemical form of UO_3, UF_4, UCl_4 and hexavalent compounds in both normal and accident conditions of transport.

(f) These values apply to all compounds of uranium other than those specified in (d) and (e) above.

(g) These values apply to unirradiated uranium only.

NOTE:

1. In the case of Th-natural, the parent nuclide is Th-232, in the case of U-natural the parent nuclide is U-238.

Table 2-13. Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	*A_1 (Tbq)*	*A_2 (Tbq)*	*Activity concentration limit for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Only beta- or gamma-emitting nuclides are known to be present	0.1	0.02	1×10^{1}	1×10^{4}
Alpha-emitting nuclides but no neutron emitters are known to be present	0.2	9×10^{-5}	1×10^{-1}	1×10^{3}
Neutron-emitting nuclides are known to be present or no relevant data are available	0.001	9×10^{-5}	1×10^{-1}	1×10^{3}

7.2.3 Determination of other material characteristics

7.2.3.1 *Low specific activity (LSA) material*

7.2.3.1.1 (Reserved)

7.2.3.1.2 LSA material must be in one of three groups:

a) LSA-I

i) uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides;

ii) natural uranium, depleted uranium, natural thorium, or their compounds or mixtures, that are unirradiated and in solid or liquid form;

iii) radioactive material for which the A_2 value is unlimited. Fissile material may be included only if excepted under 7.2.3.5; or

iv) other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in 7.2.2.1 to 7.2.2.6. Fissile material may be included only if excepted under 7.2.3.5.

b) LSA-II

i) water with tritium concentration up to 0.8 TBq/L;

ii) other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A_2/g for solids and gases, and 10^{-5} A_2/g for liquids.

c) LSA-III — solids (e.g. consolidated wastes, activated materials), excluding powders, in which:

i) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen and ceramic); and

ii) the estimated average specific activity of the solid, excluding any shielding material, does not exceed 2×10^{-3} A_2/g.

7.2.3.1.3 *Deleted.*

≠ 7.2.3.1.4 *Deleted.*

≠ 7.2.3.1.5 *Deleted.*

7.2.3.2 S*urface contaminated object (SCO)*

7.2.3.2.1 SCO is classified in one of three groups:

a) SCO-I: A solid object on which:

i) the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.4 Bq/cm^2 for all other alpha emitters;

ii) the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4×10^4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 4×10^3 Bq/cm^2 for all other alpha emitters; or

iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4×10^4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 4×10^3 Bq/cm^2 for all other alpha emitters;

b) SCO-II: A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I in a) above and on which:

i) the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 40 Bq/cm^2 for all other alpha emitters;

ii) the fixed contamination on the accessible surface, averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 8×10^5 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 8×10^4 Bq/cm^2 for all other alpha emitters; or

iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 8×10^5 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 8×10^4 Bq/cm^2 for all other alpha emitters;

c) SCO-III: A large solid object which, because of its size, cannot be transported in a type of package described in these Instructions.

Note.— SCO-III material is forbidden for transport by air.

7.2.3.3 *Special form radioactive material*

7.2.3.3.1 Special form radioactive material must have at least one dimension not less than 5 mm. When a sealed capsule constitutes part of the special form radioactive material, the capsule must be so manufactured that it can be opened only by destroying it. The design for special form radioactive material requires unilateral approval.

7.2.3.3.2 Special form radioactive material must be of such a nature or must be so designed that if it is subjected to the tests specified in 7.2.3.3.4 to 7.2.3.3.8, it must meet the following requirements:

a) it would not break or shatter under the impact, percussion and bending tests specified in 7.2.3.3.5 a), b), c) or 7.2.3.3.6 a), as applicable; and

b) it would not melt or disperse in the applicable heat test specified in 7.2.3.3.5 d) or 7.2.3.3.6 b), as applicable; and

c) the activity in the water from the leaching tests specified in 7.2.3.3.7 and 7.2.3.3.8 would not exceed 2 kBq; or alternatively for sealed sources, the leakage rate for the volumetric leakage assessment test specified in ISO 9978:1992 “Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods”, would not exceed the applicable acceptance threshold acceptable to the competent authority.

7.2.3.3.3 Demonstration of compliance with the performance standards in 7.2.3.3.2 must be in accordance with 6;7.11.1 and 6;7.11.2.

7.2.3.3.4 Specimens that comprise or simulate special form radioactive material must be subjected to the impact test, the percussion test, the bending test, and the heat test specified in 7.2.3.3.5 or alternative tests as authorized in 7.2.3.3.6. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test must be performed on the specimen by a method no less sensitive than the methods given in 7.2.3.3.7 for indispersible solid material or 7.2.3.3.8 for encapsulated material.

7.2.3.3.5 The relevant test methods are:

a) Impact test: The specimen must drop onto the target from a height of 9 m. The target must be as defined in 6;7.13;

b) Percussion test: The specimen must be placed on a sheet of lead which is supported by a smooth, solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg from a height of 1 m. The lower part of the bar must be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm. The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm thick, must cover an area greater than that covered by the specimen. A fresh surface of lead must be used for each impact. The bar must strike the specimen so as to cause maximum damage.

c) Bending test: The test must apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen must be rigidly clamped in a horizontal position so that one-half of its length protrudes from the face of the clamp. The orientation of the specimen must be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar must strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg from a height of 1 m. The lower part of the bar must be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm.

d) Heat test: The specimen must be heated in air to a temperature of 800°C and held at that temperature for a period of 10 minutes and must then be allowed to cool.

7.2.3.3.6 Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

a) the tests prescribed in 7.2.3.3.5 a) and b) provided that the specimens are alternatively subjected to the impact test prescribed in ISO 2919:2012: “Radiation Protection — Sealed Radioactive Sources — General requirements and classification”:

i) the Class 4 impact test if the mass of the special form radioactive material is less than 200 g; or

ii) the Class 5 impact test if the mass of the special form radioactive material is 200 g or more but less than 500 g; and

≠ b) the test prescribed in 7.2.3.3.5 d) provided the specimens are alternatively subjected to the Class 6 temperature test specified in ISO 2919:2012 “Radiation protection — Sealed radioactive sources — General requirements and classification”.

7.2.3.3.7 For specimens which comprise or simulate indispersible solid material, a leaching assessment must be performed as follows:

a) The specimen must be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test must be sufficient to ensure that at the end of the 7-day test period, the free volume of the unabsorbed and unreacted water remaining must be at least 10 per cent of the volume of the solid test sample itself. The water must have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20°C;

b) The water and the specimen must then be heated to a temperature of (50 ± 5)°C and maintained at this temperature for 4 hours;

c) The activity of the water must then be determined;

d) The specimen must then be kept for at least 7 days in still air at not less than 30°C and relative humidity not less than 90 per cent;

e) The specimen must then be immersed in water of the same specification as in a) above and the water and the specimen heated to (50 ± 5)°C and maintained at this temperature for 4 hours;

f) The activity of the water must then be determined.

7.2.3.3.8 For specimens which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment must be performed as follows:

a) The leaching assessment must consist of the following steps:

i) the specimen must be immersed in water at ambient temperature. The water must have an initial pH of 6-8 with a maximum conductivity of 1 mS/m at 20°C;

ii) the water and specimen must then be heated to a temperature of (50 ± 5)°C and maintained at this temperature for 4 hours;

iii) the activity of the water must then be determined;

iv) the specimen must then be kept for at least 7 days in still air at not less than 30°C and relative humidity of not less than 90 per cent;

v) the process in i), ii) and iii) must be repeated;

b) The alternative volumetric leakage assessment must comprise any of the tests prescribed in ISO 9978:1992 “Radiation protection — Sealed radioactive sources — Leakage test methods”, provided that they are acceptable to the competent authority.

7.2.3.4 *Low dispersible radioactive material*

7.2.3.4.1 The design for low dispersible radioactive material requires multilateral approval. Low dispersible radioactive material must be such that the total amount of this radioactive material in a package, taking into account the provisions of 6;7.7.14, must meet the following requirements:

a) The dose rate at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;

b) If subjected to the tests specified in 6;7.19.3 and 6;7.19.4, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100 A_2. A separate specimen may be used for each test; and

≠ c) If subjected to the test specified in 7.2.3.4.3, the activity in the water would not exceed 100 A_2. In the application of this test, the damaging effects of the tests specified in b) above must be taken into account.

7.2.3.4.2 Low dispersible material must be tested as follows:

A specimen that comprises or simulates low dispersible radioactive material must be subjected to the enhanced thermal test specified in 6;7.19.3 and the impact test specified in 6;7.19.4. A different specimen may be used for each of the tests. Following each test, the specimen must be subjected to the leach test specified in 7.2.3.4.3. After each test, it must be determined if the applicable requirements of 7.2.3.4.1 have been met.

+ 7.2.3.4.3 A solid material sample representing the entire contents of the package must be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test must be sufficient to ensure that at the end of the 7-day test period, the free volume of the unabsorbed and unreacted water remaining must be at least 10 per cent of the volume of the solid test sample itself. The water must have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20°C. The total activity of the free volume of water must be measured following the 7-day immersion of the test sample.

≠ 7.2.3.4.4 Demonstration of compliance with the performance standards in 7.2.3.4.1, 7.2.3.4.2 and 7.2.3.4.3 must be in accordance with 6;7.11.1 and 6;7.11.2.

7.2.3.5 *Fissile material*

7.2.3.5.1 Fissile material and packages containing fissile material must be classified under the relevant entry as fissile in accordance with Table 2-11 unless excepted by one of the provisions of sub-paragraphs a) to f) below and transported subject to the requirements of 7;2.9.4.3. All provisions apply only to material in packages that meets the requirements of 6;7.6.2.

a) Uranium enriched in uranium-235 to a maximum of 1 per cent by mass, and with a total plutonium and uranium-233 content not exceeding 1 per cent of the mass of uranium-235, provided that the fissile nuclides are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it must not form a lattice arrangement;

b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2 per cent by mass, with a total plutonium and uranium-233 content not exceeding 0.002 per cent of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;

c) Uranium with a maximum uranium enrichment of 5 per cent by mass uranium-235 provided:

i) there is no more than 3.5 g of uranium-235 per package;

ii) the total plutonium and uranium-233 content does not exceed 1 per cent of the mass of uranium-235 per package;

iii) transport of the package is subject to the consignment limit provided in 7;2.9.4.3 c);

d) Fissile nuclides with a total mass not greater than 2 g per package provided the package is transported subject to the consignment limit provided in 7;2.9.4.3 d);

e) Fissile nuclides with a total mass not greater than 45 g subject to the requirements of 7;2.9.4.3 e);

f) A fissile material that meets the requirements of 7;2.9.4.3 b), 7.2.3.6 and 5;1.2.2.1.

7.2.3.6 Fissile material excepted from classification as fissile under 7.2.3.5.1 f) must be subcritical without the need for accumulation control under the following conditions:

a) the conditions of 6;7.10.1 a);

b) the conditions consistent with the assessment provisions stated in 6;7.10.12 b) and 6;7.10.13 b) for packages; and

c) the conditions specified in 6;7.10.11 a).

7.2.4 Classification of packages

7.2.4.1 The quantity of radioactive material in a package must not exceed the relevant limits for the package type as specified below.

7.2.4.1.1 Classification as excepted packages

7.2.4.1.1.1 A package may be classified as excepted packages if it meets one of the following conditions:

a) it is an empty packaging having contained radioactive material;

b) it contains instruments or articles not exceeding the activity limits specified in columns 2 and 3 of Table 2-14;

≠ c) it contains articles manufactured of natural uranium, depleted uranium or natural thorium;

d) it contains radioactive material not exceeding the activity limits specified in column 4 of Table 2-14; or

e) it contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column 4 of Table 2-14.

≠ 7.2.4.1.1.2 The dose rate at any point on the external surface of an excepted package must not exceed 5 μSv/h.

7.2.4.1.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN 2911 — **Radioactive material, excepted package — instruments** or **articles** provided that:

a) the dose rate at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h; and

b) each instrument or article bears the mark “RADIOACTIVE” on its external surface except for the following:

i) radioluminescent time-pieces or devices;

ii) consumer products that either have received regulatory approval in accordance with 1;6.1.4 c) or do not individually exceed the activity limit for an exempt consignment in Table 2-12 (column 5), provided such products are transported in a package that bears the mark “RADIOACTIVE” on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; and

iii) other instruments or articles too small to bear the mark “RADIOACTIVE”, provided that they are transported in a package that bears the mark “RADIOACTIVE” on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package;

c) the active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material must not be considered to be an instrument or manufactured article);

d) the limits specified in columns 2 and 3 of Table 2-14 are met for each individual item and each package, respectively;

e) *reserved*; and

≠ f) if the package contains fissile material, one of the provisions of 7.2.3.5.1 a) to f) applies.

7.2.4.1.1.4 Radioactive material in forms other than as specified in 7.2.4.1.1.3 and with an activity not exceeding the limits specified in column 4 of Table 2-14 may be classified under UN 2910 — **Radioactive material, excepted package — limited quantity of material**, provided that:

a) the package retains its radioactive contents under routine conditions of transport;

b) the package bears the mark “RADIOACTIVE” on either:

i) an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; or

ii) the outside of the package, where it is impractical to mark an internal surface; and

≠ c) if the package contains fissile material, one of the provisions of 7.2.3.5.1 a) to f) applies.

7.2.4.1.1.5 Uranium hexafluoride not exceeding the limits specified in column 4 of Table 2-14 may be classified under UN 3507 — **Uranium hexafluoride, radioactive material, excepted package**, less than 0.1 kg per package, non-fissile or fissile-excepted provided that:

a) the mass of uranium hexafluoride in the package is less than 0.1 kg; and

b) the conditions of 7.2.4.5.2 and 7.2.4.1.1.4 a) and b) are met.

7.2.4.1.1.6 Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN 2909, **Radioactive material, excepted package — articles manufactured from natural uranium** or **depleted uranium** or **natural thorium** provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

7.2.4.1.1.7 An empty packaging which had previously contained radioactive material may be classified under UN 2908 — **Radioactive material, excepted package — empty packaging** provided that:

a) it is in a well-maintained condition and securely closed;

b) the outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;

c) the level of internal non-fixed contamination, when averaged over any 300 cm^2, does not exceed:

i) 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters; and

ii) 40 Bq/cm^2 for all other alpha emitters;

d) any labels which may have been displayed on it in conformity with 5;3.2.6 are no longer visible; and

≠ e) if the packaging has contained fissile material, one of the provisions of 7.2.3.5.1 a) to f) or one of the provisions for exclusion for fissile nuclides, as described in the definition for fissile nuclides in 7.1.3, applies.

*Note.— The external dose rates at the surface of empty Type B(U) or Type B(M) packages may exceed 5 μSv/h due to the presence of depleted uranium in the shielding material. Such empty packages cannot be transported as UN 2908 — **Radioactive material, excepted package — empty packaging** as they do not meet the conditions specified in 7.2.4.1.1.2. These packages remain subject to all applicable parts of these Instructions and may be classified as:*

≠ *a) LSA-I as specified in 7.2.3.1.2 a) ii); or*

b) Type B(U) package as specified in 7.2.4.6.2; or

c) Type B(M) package as specified in 7.2.4.6.3.

Table 2-14. Activity limits for excepted packages

	Instruments or article		*Materials*
Physical state of contents	*Item limits**	*Package limits**	*Package limits**
Solids			
Special form	10^{-2} A_1	A_1	10^{-3} A_1
Other form	10^{-2} A_2	A_2	10^{-3} A_2
Liquids	10^{-3} A_2	10^{-1} A_2	10^{-4} A_2
Gases			
Tritium	2×10^{-2} A_2	2×10^{-1} A_2	2×10^{-2} A_2
Special form	10^{-3} A_1	10^{-2} A_1	10^{-3} A_1
Other forms	10^{-3} A_2	10^{-2} A_2	10^{-3} A_2

* For mixtures of radionuclides, see 7.2.2.4 to 7.2.2.6.

7.2.4.2 *Classification as low specific activity (LSA) material*

7.2.4.2.1 Radioactive material may only be classified as LSA material if the definition of LSA in 7.1.3 and the conditions of 7.2.3.1, 4;9.2.1 and 7;2.9.2 are met.

7.2.4.3 *Classification as surface contaminated object (SCO)*

7.2.4.3.1 Radioactive material may be classified as SCO if the definition of SCO in 7.1.3 and the conditions of 7.2.3.2, 4;9.2.1 and 7;2.9.2 are met.

7.2.4.4 *Classification of Type A packages*

7.2.4.4.1 Packages containing radioactive material may be classified as Type A packages provided that the following conditions are met:

7.2.4.4.1.1 Type A packages must not contain activities greater than either of the following:

a) for special form radioactive material — A_1;

b) for all other radioactive material — A_2.

7.2.4.4.1.2 For mixtures of radionuclides whose identities and respective activities are known, the following condition must apply to the radioactive contents of a Type A package:

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$$

where

B(i) is the activity of radionuclide i as special form radioactive material;

$A_1(i)$ is the A_1 value for radionuclide i;

C(j) is the activity of radionuclide j as other than special form radioactive material;

$A_2(j)$ is the A_2 value for radionuclide j.

7.2.4.5 *Classification of uranium hexafluoride*

7.2.4.5.1 Uranium hexafluoride must only be assigned to:

a) UN 2977 — **Radioactive material, uranium hexafluoride, fissile**; or

b) UN 2978 — **Radioactive material, uranium hexafluoride**, non-fissile or fissile excepted; or

c) UN 3507 — **Uranium hexafluoride, radioactive material, excepted package**, less than 0.1 kg per package, non-fissile or fissile-excepted.

7.2.4.5.2 The contents of a package containing uranium hexafluoride must comply with the following requirements:

a) for UN Nos. 2977 and 2978, the mass of uranium hexafluoride must not be different from that allowed for the package design, and for UN 3507, the mass of uranium hexafluoride must be less than 0.1 kg;

b) the mass of uranium hexafluoride must not be greater than a value that would lead to an ullage smaller than 5 per cent at the maximum temperature of the package as specified for the plant systems where the package will be used; and

c) the uranium hexafluoride must be in solid form and the internal pressure must not be above atmospheric pressure when presented for transport.

7.2.4.6 *Classification as Type B(U), Type B(M) or Type C packages*

7.2.4.6.1 Packages not otherwise classified in 7.2.4 (7.2.4.1.1 to 7.2.4.5) must be classified in accordance with the competent authority certificate of approval for the package issued by the country of origin of design.

7.2.4.6.2 The contents of a Type B(U), Type B(M) or Type C package must be as specified in the certificate of approval.

7.2.5 Special arrangements

Radioactive material must be classified as transported under special arrangement when it is intended to be transported in accordance with 1;6.4.

Chapter 8

CLASS 8 — CORROSIVE SUBSTANCES

8.1 DEFINITION AND GENERAL PROVISIONS

8.1.1 Corrosive substances are substances which, by chemical action, will cause irreversible damage to the skin or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport.

8.1.2 For substances and mixtures that are corrosive to skin, general classification provisions are provided in 8.2. Skin corrosion refers to the production of irreversible damage to the skin, namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.

8.1.3 Liquids and solids which may become liquid during transport, which are judged not to be skin corrosive, must still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 8.3.3 c) ii).

8.2 GENERAL CLASSIFICATION PROVISIONS

8.2.1 Substances and mixtures of Class 8 are divided among the three packing groups according to their degree of danger in transport as follows:

a) Packing Group I: Very dangerous substances and mixtures;

b) Packing Group II: Substances and mixtures presenting medium danger;

c) Packing Group III: Substances and mixtures presenting minor danger.

8.2.2 Allocation of substances listed in Table 3-1 to the packing groups in Class 8 has been made on the basis of experience, taking into account such additional factors as inhalation risk (see 8.2.4) and reactivity with water, including the formation of hazardous decomposition products.

8.2.3 New substances and mixtures can be assigned to packing groups on the basis of the length of time of contact necessary to produce irreversible damage of intact skin tissue in accordance with the criteria in 8.3. Alternatively, for mixtures, the criteria in 8.4 can be used.

8.2.4 A substance or mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC_{50}) in the range of Packing Group I, but toxicity through oral ingestion or dermal contact only in the range of Packing Group III or less, must be allocated to Class 8 (see Note under 6.2.2.4.1).

8.3 PACKING GROUP ASSIGNMENT FOR SUBSTANCES AND MIXTURES

8.3.1 Existing human and animal data, including information from single or repeated exposure, must be the first line of evaluation, as they give information directly relevant to effects on the skin.

8.3.2 In assigning the packing group in accordance with 8.2.3, account must be taken of human experience in instances of accidental exposure. In the absence of human experience, classification must be based on data obtained from experiments in accordance with OECD Guideline for the Testing of Chemicals No. 404, *Acute Dermal Irritation/Corrosion*, 2015, No. 435, *In Vitro Membrane Barrier Test Method for Skin Corrosion*, 2015, No. 431, *In Vitro Skin Corrosion: Reconstructed Human Epidermis (RHE) Test Method,* 2016 or No. 430, *In Vitro Skin Corrosion: Transcutaneous Electrical Resistance (TER) Test Method,* 2015.

≠ 8.3.2.1 A substance or mixture which is determined not to be corrosive in accordance with OECD Guideline for the Testing of Chemicals No. 404, No. 435, No. 431 or No. 430 or non-classified in accordance with No. 439, *In Vitro Skin Irritation: Reconstructed Human Epidermis Test Method,* 2015 may be considered not to be corrosive to skin for the purposes of these Instructions without further testing. If the test results indicate that the substance or mixture is corrosive and not assigned to Packing Group I, but the test method does not allow discrimination between Packing Groups II and III, it must be considered to be Packing Group II. If the test results indicate that the substance or mixture is corrosive, but the test method does not allow discrimination between packing groups, it must be assigned to Packing Group I if no other test results indicate a different packing group.

8.3.3 Packing groups are assigned to corrosive substances in accordance with the following criteria (see Table 2-15):

a) *Packing Group I* is assigned to substances that cause irreversible damage of intact skin tissue within an observation period of up to 60 minutes starting after the exposure time of 3 minutes or less.

b) *Packing Group II* is assigned to substances that cause irreversible damage of intact skin tissue within an observation period of up to 14 days starting after the exposure time of more than 3 minutes but not more than 60 minutes.

c) *Packing Group III* is assigned to substances that:

i) cause irreversible damage of intact skin tissue within an observation period of up to 14 days starting after the exposure time of more than 60 minutes but not more than 4 hours; or

≠ ii) are judged not to cause irreversible damage of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55°C when tested on both materials. For the purposes of testing steel, type S235JR+CR (1.0037 resp. St 37-2), S275J2G3+CR (1.0144 resp. St 44-3), ISO 3574, Unified Numbering System (UNS) G10200 or SAE 1020, and for testing aluminium, non-clad types 7075-T6 or AZ5GU-T6, must be used. An acceptable test is prescribed in the UN *Manual of Tests and Criteria*, Part III, Section 37.

Note.— Where an initial test on either steel or aluminium indicates the substance being tested is corrosive, the follow up test on the other metal is not required.

Table 2-15. Summary of criteria for assigning packing groups to corrosive substances

Packing group	*Exposure time*	*Observation period*	*Effect*
I	≤ 3 min	≤ 60 min	Irreversible damage of intact skin
II	> 3 min ≤ 1 h	≤ 14 d	Irreversible damage of intact skin
III	> 1 h ≤ 4 h	≤ 14 d	Irreversible damage of intact skin
III	—	—	Corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55ºC when tested on both materials

8.4 ALTERNATIVE PACKING GROUP ASSIGNMENT METHODS FOR MIXTURES: STEP-WISE APPROACH

8.4.1 General provisions

For mixtures, it is necessary to obtain or derive information that allows the criteria to be applied to the mixture for the purpose of classification and assignment of packing groups. The approach to classification and assignment of packing groups is tiered, and is dependent upon the amount of information available for the mixture itself, for similar mixtures and/or for its ingredients. The flow chart of Figure 2-2 outlines the process to be followed.

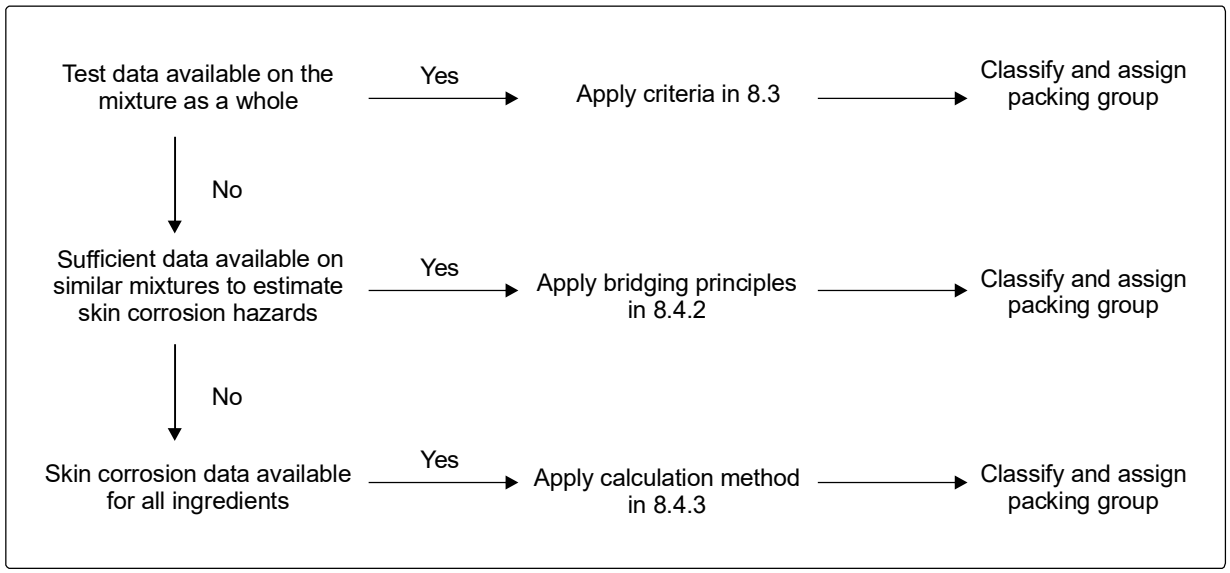


Figure 2-2. Step-wise approach to classify and assign packing group of corrosive mixtures

8.4.2 Bridging principles

Where a mixture has not been tested to determine its skin corrosion potential, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately classify and assign a packing group for the mixture, these data will be used in accordance with the following bridging principles. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture.

a) *Dilution.* If a tested mixture is diluted with a diluent which does not meet the criteria for Class 8 and does not affect the packing group of other ingredients, then the new diluted mixture may be assigned to the same packing group as the original tested mixture.

Note.— In certain cases, diluting a mixture or substance may lead to an increase in the corrosive properties. If this is the case, this bridging principle cannot be used.

b) *Batching.* The skin corrosion potential of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the skin corrosion potential of the untested batch has changed. If the latter occurs, a new classification is necessary.

c) *Concentration of mixtures of Packing Group I.* If a tested mixture meeting the criteria for inclusion in Packing Group I is concentrated, the more concentrated untested mixture may be assigned to Packing Group I without additional testing.

d) *Interpolation within one packing group.* For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same skin corrosion packing group, and where untested mixture C has the same Class 8 ingredients as mixtures A and B but has concentrations of Class 8 ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same skin corrosion packing group as A and B.

e) *Substantially similar mixtures.* Given the following:

i) two mixtures: (A+B) and (C+B);

ii) the concentration of ingredient B is the same in both mixtures;

iii) the concentration of ingredient A in mixture (A+B) equals the concentration of ingredient C in mixture (C+B);

iv) data on skin corrosion for ingredients A and C are available and substantially equivalent, i.e. they are in the same skin corrosion packing group and do not affect the skin corrosion potential of B;

if mixture (A+B) or (C+B) is already classified based on test data, then the other mixture may be assigned to the same packing group.

8.4.3 Calculation method based on the classification of the substances

8.4.3.1 Where a mixture has not been tested to determine its skin corrosion potential, nor is sufficient data available on similar mixtures, the corrosive properties of the substances in the mixture must be considered to classify and assign a packing group. Applying the calculation method is only allowed if there are no synergistic effects that make the mixture more corrosive than the sum of its substances. This restriction applies only if Packing Group II or III would be assigned to the mixture.

8.4.3.2 When using the calculation method, all Class 8 ingredients present at a concentration of ≥1 per cent must be taken into account, or <1 per cent if these ingredients are still relevant for classifying the mixture to be corrosive to skin.

8.4.3.3 To determine whether a mixture containing corrosive substances must be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 2-3 must be applied.

8.4.3.4 When a specific concentration limit (SCL) is assigned to a substance following its entry in Table 3-1 or in a special provision, this limit must be used instead of the generic concentration limits (GCL). This appears where 1 per cent is used in the first step for the assessment of the Packing Group I substances, and where 5 per cent is used for the other steps respectively in Figure 2-3.

8.4.3.5 For this purpose, the summation formula for each step of the calculation method must be adapted. This means that, where applicable, the generic concentration limit must be substituted by the specific concentration limit assigned to the substance(s) (SCL_i), and the adapted formula is a weighted average of the different concentration limits assigned to the different substances in the mixture:

$$\frac{PGx_1}{GCL} + \frac{PGx_2}{SCL_2} + \cdots + \frac{PGx_i}{SCL_i} \geq 1$$

Where:

PGx_i = concentration of substance 1, 2 … i in the mixture, assigned to Packing Group x (I, II or III)

GCL = generic concentration limit

SCL_i = specific concentration limit assigned to substance i

The criterion for a packing group is fulfilled when the result of the calculation is ≥1. The generic concentration limits to be used for the evaluation in each step of the calculation method are those found in Figure 2-3.

Note.— Examples for the application of the above formula:

Example 1

A mixture contains one corrosive substance in a concentration of 5 per cent assigned to Packing Group I without a specific concentration limit:

Calculation for Packing Group I:

$\frac{5}{5\ (\mathrm{GCL})} = 1$ ➔ assign to Class 8, Packing Group I:

Example 2

A mixture contains three substances corrosive to skin; two of them (A and B) have specific concentration limits; for the third one (C) the generic concentration limits apply. The rest of the mixture need not be taken into consideration:

Substance X in the mixture and its packing group assignment within Class 8	Concentration (conc) in the mixture	Specific concentration limit (SCL) for Packing Group I	Specific concentration limit (SCL) for Packing Group II	Specific concentration limit (SCL) for Packing Group III
A — assigned to Packing Group I	3%	30%	none	none
B — assigned to Packing Group I	2%	20%	10%	none
C — assigned to Packing Group III	10%	none	none	none

Calculation for Packing Group I:

$$\frac{3\ (conc\ A)}{30\ (SCL\ PGI)} + \frac{2\ (conc\ B)}{20\ (SCL\ PGI)} = 0.2 < 1$$

The criterion for Packing Group I is not fulfilled.

Calculation for Packing Group II:

$$\frac{3\ (conc\ A)}{5\ (GCL\ PG\ II)} + \frac{2\ (conc\ B)}{10\ (SCL\ PG\ II)} = 0.8 < 1$$

The criterion for Packing Group II is not fulfilled.

Calculation for Packing Group III:

$$\frac{3\ (conc\ A)}{5\ (GCL\ PGIII)} + \frac{2\ (conc\ B)}{5\ (GCL\ PG\ III)} + \frac{10\ (conc\ C)}{5\ (GCL\ PG\ III)} = 3 \geq 1$$

The criterion for Packing Group III is fulfilled, the mixture must be assigned to Class 8, Packing Group III.

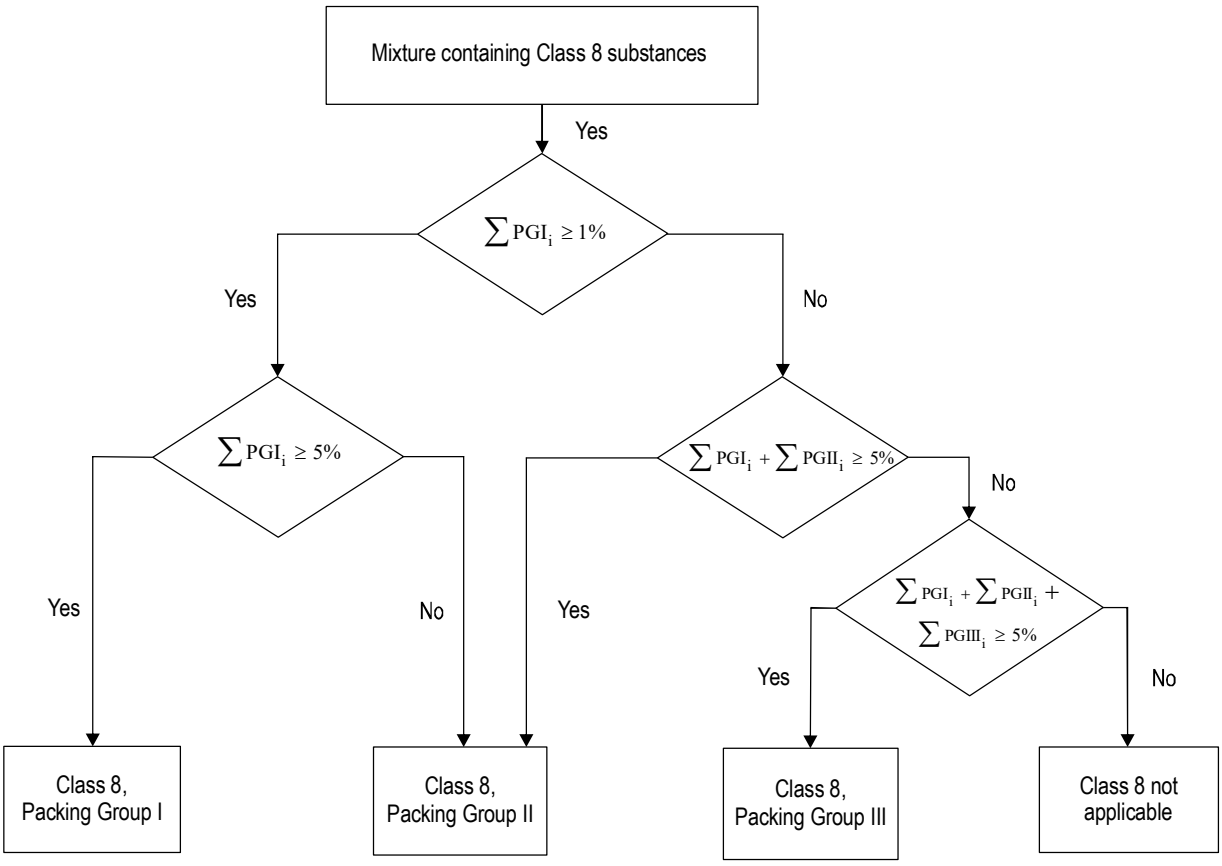


Figure 2-3. Calculation method

8.5 SUBSTANCES FORBIDDEN FOR TRANSPORT

Chemically unstable substances of Class 8 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end, particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

Chapter 9

CLASS 9 — MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES, INCLUDING ENVIRONMENTALLY HAZARDOUS SUBSTANCES

Parts of this Chapter are affected by State Variations DE 5, NL 4; see Table A-1

9.1 DEFINITION

9.1.1 *Class 9 substances and articles (miscellaneous dangerous substances and articles)* are substances and articles which, during air transport, present a danger not covered by other classes.

9.1.2 *Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)* are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally.

9.2 ASSIGNMENT TO CLASS 9

The substances and articles of Class 9 are subdivided as shown in Table 2-16.

Table 2-16. Substances and articles of Class 9

UN number	*Name*	*Notes*
Substances which, on inhalation as fine dust, may endanger health		
2212	**Asbestos, amphibole** (amosite, tremolite, actinolite, anthophyllite, crocidolite)	
2590	**Asbestos, chrysotile**	
Substances evolving flammable vapour		
2211	**Polymeric beads, expandable**, evolving flammable vapour	
3314	**Plastics moulding compound** in dough, sheet or extruded rope form evolving flammable vapour	
Lithium batteries		
3090	**Lithium metal batteries** (including lithium alloy batteries)	See 2;9.3
3091	**Lithium metal batteries contained in equipment** (including lithium alloy batteries)	
3091	**Lithium metal batteries packed with equipment** (including lithium alloy batteries)	
3480	**Lithium ion batteries** (including lithium ion polymer batteries)	
3481	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)	
3481	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)	
3536	**Lithium batteries installed in cargo transport unit**	
Capacitors		
3499	**Capacitor, electric double layer** (with an energy storage capacity greater than 0.3 Wh)	

	UN number	Name	Notes
	3508	**Capacitor, asymmetric** (with an energy storage capacity greater than 0.3 Wh)	
≠	*Life-saving appliances*		
	2990	**Life-saving appliances, self-inflating**	
	3072	**Life-saving appliances, not self-inflating** containing dangerous goods as equipment	
	3268	**Safety devices**, electrically initiated	
	Substances and articles which, in the event of fire, may form dioxins		
	2315	**Polychlorinated biphenyls, liquid**	Examples of articles are transformers, condensers and apparatus containing those substances.
	3432	**Polychlorinated biphenyls, solid**	
	3151	**Polyhalogenated biphenyls, liquid**	
	3151	**Halogenated monomethyldiphenylmethanes, liquid**	
	3151	**Polyhalogenated terphenyls, liquid**	
	3152	**Polyhalogenated biphenyls, solid**	
	3152	**Halogenated monomethyldiphenylmethanes, solid**	
	3152	**Polyhalogenated terphenyls, solid**	
	Substances transported or offered for transport at elevated temperatures		
	3257	**Elevated temperature liquid, n.o.s.**, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	Elevated temperature substances (i.e. substances that are transported or offered for transport at temperatures equal to or exceeding 100°C in a liquid state or at temperatures equal to or exceeding 240°C in a solid state (these substances may only be carried under 1;1.1)).
	3258	**Elevated temperature solid, n.o.s.**, at or above 240°C	
	Environmentally hazardous substances		
≠	3077	**Environmentally hazardous substance, solid, n.o.s.**	Environmentally hazardous substances (aquatic environment) are those that meet the criteria in 2.9.3 of the UN Model Regulations or that meet criteria in international regulations or national regulations established by the appropriate national authority in the State of Origin, Transit or Destination of the consignment. Substances or mixtures dangerous to the aquatic environment not otherwise classified under these Instructions must be assigned to Packing Group III and assigned to UN 3077 or UN 3082.
≠	3082	**Environmentally hazardous substance, liquid, n.o.s.**	
	Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)		
≠	3245	**Genetically modified micro-organisms**	GMMOs or GMOs which do not meet the definition of toxic substances (see 6.2) or infectious substances (see 6.3) must be assigned to UN 3245. GMMOs or GMOs are not subject to these Instructions when authorized for use by the appropriate national authorities of the States of Origin, Transit and Destination. Genetically modified live animals must be transported under terms and conditions of the appropriate national authorities of the States of Origin and Destination. COVID-19 vaccines containing GMOs or GMMOs, including those in clinical trials, are not subject to these Instructions.
≠	3245	**Genetically modified organisms**	
+			

UN number	*Name*	*Notes*
Ammonium nitrate based fertilizers		
2071	**Ammonium nitrate based fertilizer**	Solid ammonium nitrate based fertilizers must be classified in accordance with the procedure as set out in the UN *Manual of Tests and Criteria*, Part III, Section 39.
Other substances or articles presenting a danger during transport, but not meeting the definitions of another class		
1841	**Acetaldehyde ammonia**	
1845	**Dry ice**	
1845	**Carbon dioxide, solid**	
1931	**Zinc dithionite**	
1931	**Zinc hydrosulphite**	
1941	**Dibromodifluoromethane**	
1990	**Benzaldehyde**	
2216	**Fish meal, stabilized**	
2216	**Fish scrap, stabilized**	
2807	**Magnetized material**	Magnetized material is any material which, when packed for air transport, has a maximum magnetic field strength sufficient to cause a compass deflection of more than 2 degrees at a distance of 2.1 m from any point on the surface of the assembled package. The magnetic field strength at the compass producing a 2 degree deflection is taken to be 0.418 A/m (0.00525 Gauss). The magnetic field strength must be measured with a magnetic compass sensitive enough to read a 2 degree variation, preferably in 1 degree increments or finer, or using a Gauss meter having a sensitivity sufficient to measure magnetic fields greater than 0.0005 Gauss within a tolerance of plus or minus 5 per cent, or by an equivalent means. Compass measurements must be taken in an area free from magnetic interference other than the Earth's magnetic field. When using a compass, the material and the compass must be aligned in an east-west direction. Gauss meter measurements must be in accordance with the manufacturer's instructions. Measurements are taken while the packaged material is rotated through 360 degrees in its horizontal plane while maintaining a constant distance (2.1 m or 4.6 m as referred to in Packing Instruction 953) between the measuring device and any point on the outside surface of the package. Shielding may be used to reduce the package's magnetic strength. *Note.— Masses of ferro-magnetic metals such as automobiles, automobile parts, metal fencing, piping and metal construction material, even if not meeting the definition of magnetized material may affect aircraft compasses, as may packages or items which individually do not meet the definition of magnetized material but cumulatively may have a magnetic field strength of a magnetized material.*
2969	**Castor beans**	
2969	**Castor meal**	
2969	**Castor pomace**	
2969	**Castor flake**	

UN number	*Name*	*Notes*
3166	**Vehicle, flammable gas powered**	
3166	**Vehicle, flammable liquid powered**	
3166	**Vehicle, fuel cell, flammable gas powered**	
3166	**Vehicle, fuel cell, flammable liquid powered**	
3171	**Battery-powered vehicle**	
3171	**Battery-powered equipment**	
3316	**Chemical kit**	
3316	**First aid kit**	
3334	**Aviation regulated liquid, n.o.s.**	Aviation regulated liquid is any material which has narcotic, noxious or other properties such that, in the event of spillage or leakage on an aircraft, extreme annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.
3335	**Aviation regulated solid, n.o.s.**	Aviation regulated solid is any material which has narcotic, noxious or other properties such that, in the event of spillage or leakage on an aircraft, extreme annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.
3359	**Fumigated cargo transport unit**	
3363	**Dangerous goods in machinery**	
3363	**Dangerous goods in apparatus**	
3363	**Dangerous goods in articles**	
3509	**Packagings, discarded, empty, uncleaned**	
3530	**Engine, internal combustion**	
3530	**Machinery, internal combustion**	
3548	**Articles containing miscellaneous dangerous goods, n.o.s.**	

9.3 LITHIUM BATTERIES

Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form must be assigned to UN Nos. 3090, 3091, 3480 or 3481, as appropriate. They may be transported under these entries if they meet the following provisions:

a) each cell or battery is of the type proved to meet the requirements of each test of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3;

Cells and batteries manufactured according to a type meeting the requirements of subsection 38.3 of the UN *Manual of Tests and Criteria*, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be transported, unless otherwise provided in these Instructions.

Cell and battery types only meeting the requirements of the UN Manual of Tests and Criteria, Revision 3, are no longer valid. However, cells and batteries manufactured in conformity with such types before 1 July 2003 may continue to be transported if all other applicable requirements are fulfilled.

Note.— Batteries must be of a type proved to meet the testing requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3, irrespective of whether the cells of which they are composed are of a tested type.

b) each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally incident to transport;

c) each cell and battery is equipped with an effective means of preventing external short circuits;

d) each battery containing cells or a series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g. diodes, fuses, etc.);

e) cells and batteries must be manufactured under a quality management programme that includes:

1) a description of the organizational structure and responsibilities of personnel with regard to design and product quality;

2) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;

3) process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;

4) quality records, such as inspection reports, test data, calibration data and certificates. Test data must be kept and made available to the appropriate national authority upon request;

5) management reviews to ensure the effective operation of the quality management programme;

6) a process for control of documents and their revision;

7) a means for control of cells or batteries that are not conforming to the type tested in accordance with Part III, subsection 38.3 of the UN *Manual of Tests and Criteria*;

8) training programmes and qualification procedures for relevant personnel;

9) procedures to ensure that there is no damage to the final product;

Note.— In-house quality management programmes may be accepted. Third-party certification is not required, but the procedures listed in 1) to 9) above must be properly recorded and traceable. A copy of the quality management programme must be made available to the appropriate national authority upon request.

f) lithium batteries, containing both primary lithium metal cells and rechargeable lithium ion cells, that are not designed to be externally charged (see Special Provision A213) must meet the following conditions:

i) the rechargeable lithium ion cells can only be charged from the primary lithium metal cells;

ii) overcharge of the rechargeable lithium ion cells is precluded by design;

iii) the battery has been tested as a lithium primary battery;

iv) component cells of the battery must be of a type proved to meet the respective testing requirements of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.; and

≠ g) except for button cells installed in equipment (including circuit boards), manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 must make available the test summary as specified in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3, paragraph 38.3.5.

———————————

Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

Chapter 1

GENERAL

Parts of this Chapter are affected by State Variations RS 1, US 3, ZA 1; see Table A-1

1.1 GENERAL

1.1.1 The Dangerous Goods List (Table 3-1) in this Chapter lists the dangerous goods most commonly carried but is not exhaustive. It is intended that the list cover, as far as practicable, all dangerous substances of commercial importance.

≠ 1.1.2 Where an article or substance is specifically listed by name in the Dangerous Goods List, it must be transported in accordance with the provisions in the List which are appropriate for that article or substance. A "generic" or "not otherwise specified" entry may be used to permit the transport of substances or articles which do not appear specifically by name in the Dangerous Goods List. Such a substance or article may be transported only after its dangerous properties have been determined. The substance or article must then be classified according to the class definitions and test criteria and the name in the Dangerous Goods List which most appropriately describes the substance must be used. The classification must be made by the appropriate national authority when so required or may otherwise be made by the shipper. Once the class of the substance or article has been so established, all conditions for dispatch and transport, as provided in these Instructions, must be met. Any substance or article having or suspected of having explosive characteristics must first be considered for inclusion in Class 1.

1.1.3 The List also includes a number of specific articles and substances whose transport by air is forbidden (see Part 1, Chapter 2).

1.1.4 Where precautionary measures are laid down in the Dangerous Goods List in respect of a given substance or article (e.g. that it must be "stabilized" or "with x% water or phlegmatizer") such substance or article may not normally be carried when these measures have not been taken, unless the item in question is listed elsewhere (e.g. Class 1) without any indication of, or with different, precautionary measures.

1.1.5 Where there is any doubt as to whether a non-listed article or substance is permitted for transport by air, or under what conditions, the shipper and/or operator must consult an appropriate specialized agency.

1.2 PROPER SHIPPING NAME

Note.— For proper shipping names used for the transport of samples, see Part 2, Introductory Chapter, paragraph 5.

1.2.1 The proper shipping name is that portion of the entry most accurately describing the goods in the Dangerous Goods List, which is shown in boldface characters (plus any numbers, Greek letters, "sec", "tert", and the letters m, n, o, p, which form an integral part of the name). Portions of an entry appearing in lightface type need not be considered as part of the proper shipping name but may be used.

≠ 1.2.2 Proper shipping names may be used in the singular or plural as appropriate. In addition, when qualifying words are used as part of the proper shipping name, their sequence on documentation or package marks is optional. For instance, **"Dimethylamine aqueous solution"** may alternatively be shown as **"Aqueous solution of Dimethylamine"**. However, the entry in column 1 reflects the preferred sequence. Alternative spelling reflecting common usage around the world is acceptable for words such as **"caesium"** for **"cesium"**, **"sulfur"** for **"sulphur"**, **"aluminum"** for **"aluminium"**, etc. However, the spelling appearing in Table 3-1 is preferred.

1.2.3 Many substances have an entry for both the liquid and solid state (see definitions for liquid and solid in 1;3.1.1) or for the solid and solution. These are allocated separate UN numbers.

1.2.4 Unless it is already included in bold letters in the name indicated in the Dangerous Goods List, the qualifying word **"molten"** must be added as part of the proper shipping name when a substance, which is a solid in accordance with the definition in 1;3.1, is offered for transport in the molten state (e.g. **Alkylphenol, solid, n.o.s., molten**).

1.2.5 Except for self-reactive substances and organic peroxides and unless it is already included in boldface characters in the name indicated in column 1 of the Dangerous Goods List, the word "**stabilized**" must be added as part of the proper shipping name of a substance which without stabilization would be forbidden from transport in accordance with 1;2.1 due to it being liable to react dangerously under conditions normally encountered in transport (e.g. **"Toxic liquid, organic, n.o.s., stabilized"**).

1.2.6 Hydrates may be transported under the proper shipping name for the anhydrous substance.

1.2.7 Generic or "not otherwise specified" (n.o.s.) names

1.2.7.1 Generic and "not otherwise specified" proper shipping names, indicated by the inclusion of an asterisk in column 1 of the Dangerous Goods List, must be supplemented with the technical or chemical group names unless a national law or international convention prohibits their disclosure if it is a controlled substance. For explosives of Class 1, the dangerous goods description may be supplemented by additional descriptive text to indicate commercial or military names. Technical and chemical group names must be entered in brackets immediately following the proper shipping name. An appropriate modifier, such as "contains" or "containing" or other qualifying words such as "mixture", "solution", etc. and the percentage of the technical constituent may be used. For example: "UN 1993 **Flammable liquid, n.o.s.** (contains xylene and benzene), 3, PG II".

1.2.7.1.1 The technical name must be a recognized chemical or biological name or other name currently used in scientific and technical handbooks, journals and texts. Trade names must not be used for this purpose. In the case of pesticides, only ISO common name(s), other name(s) in the World Health Organization (WHO) *Recommended Classification of Pesticides by Hazard and Guidelines to Classification,* or the name(s) of the active substance(s) may be used.

1.2.7.1.2 When a mixture of dangerous goods or articles containing dangerous goods are described by one of the "n.o.s." or "generic" entries where an asterisk is indicated in column 1 of the Dangerous Goods List, not more than the two constituents which most predominantly contribute to the hazard or hazards of the mixture or of the articles need to be shown, excluding controlled substances when their disclosure is prohibited by national law or international convention. If a package containing a mixture is labelled with any subsidiary hazard label, one of the two technical names as shown in parentheses must be the name of the constituent which compels the use of the subsidiary hazard label.

1.2.7.1.3 Examples illustrating the selection of the proper shipping name supplemented with the technical name of the dangerous goods for such n.o.s. entries are:

UN 3540 **Articles containing flammable liquids n.o.s.** (pyrrolidine)
UN 3394 **Organometallic substance, liquid, pyrophoric, water-reactive** (Trimethylgallium)
UN 2902 **Pesticide, liquid, toxic, n.o.s.** (Drazoxolon)**.**

Note. — As an aid to choosing the most appropriate n.o.s. or generic name, all the n.o.s. entries and the main generic entries of Table 3-1 are listed in Attachment 1, Chapter 2.

1.3 MIXTURES OR SOLUTIONS

Note.— Where a substance is specifically listed by name in Table 3-1, it must be identified in transport by the proper shipping name in Table 3-1. Such substances may contain technical impurities (for example, those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification must be considered a mixture or solution (see Part 2, Introductory Chapter, paragraphs 3.2 and 3.5).

1.3.1 A mixture or solution is not subject to these Instructions if the characteristics, properties, form or physical state of the mixture or solution are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.

1.3.2 A mixture or solution meeting the classification criteria of these Instructions composed of a single predominant substance identified by name in Table 3-1 and one or more substances not subject to these Instructions and/or traces of one or more substances identified by name in Table 3-1 must be assigned the UN number and proper shipping name of the predominant substance named in Table 3-1, unless:

a) the mixture or solution is specifically identified by name in Table 3-1 in which case this name must be applied; or

b) the name and description of the substance named in Table 3-1 specifically indicates that it applies only to the pure substance; or

c) the hazard class or division, subsidiary hazard(s), physical state or packing group of the solution or mixture is different from that of the substance named in Table 3-1; or

d) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Table 3-1.

If b), c) or d) is applicable, the mixture or solution must be treated as a substance not specifically listed by name in Table 3-1.

Note.— Although traces of substances may not need to be taken into account for classification purposes, those traces may affect the properties of the substance and do need to be taken into account when considering the compatibility requirements of 4;1.1.3.

1.3.3 Qualifying words such as **"solution"** or **"mixture"**, as appropriate, must be added as part of the proper shipping name, e.g. **"Acetone solution"**. In addition, the concentration of the solution or mixture may also be indicated after the basic description of the mixture or solution, e.g. **"Acetone 75% solution"**.

1.3.4 A mixture or solution meeting the classification criteria of these Instructions that is not identified by name in Table 3-1 and that is composed of two or more dangerous goods must be assigned to an entry that has the proper shipping name, description, hazard class or division, subsidiary hazard(s) and packing group that most precisely describe the solution or mixture.

———————————

Chapter 2

ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

Parts of this Chapter are affected by State Variations AU 1, AU 2, AU 3, BE 3, CA 7, HR 3, IR 3, KP 2, KW 3, MO 2, NL 1, RO 3, RS 1, US 2, US 3, US 6, US 15, ZA 1; see Table A-1

2.1 ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

2.1.1 The Dangerous Goods List (Table 3-1) is divided into 13 columns as follows:

Column 1 "Name" — this column contains the alphabetically arranged list of dangerous goods, identified by their proper shipping names in boldface characters (see 1.2). Also included, in lightface type, are:

a) other names by which certain articles and substances may be known; in such cases a cross reference to the proper shipping name is given;

b) names of articles and substances which are forbidden for carriage by air under any circumstances; and

c) names of articles and substances which are subject to additional considerations under special provisions.

An explanation of some of the terms used appears in Attachment 2.

Entries in this column have been arranged in alphabetical order; where names comprise more than one word, they have been alphabetized as if they were a single word. In deciding the correct order, numbers and the terms n.o.s., alpha-, beta-, meta-, omega-, sec-, tert-, a-, b-, m-, N-, n-, O-, o- and p- have been ignored. Similarly, the word "see" and any words following it have been ignored.

Unless otherwise indicated, for an entry in the dangerous goods list, the word "solution" in a proper shipping name means one or more named dangerous goods dissolved in a liquid that is not otherwise subject to these Instructions.

Column 2 "UN No." — this column contains the serial number assigned to the article or substance under the United Nations classification system. Some entries in the list have not been assigned such a number and for these, a temporary identification number (ID) in the 8000 series has been allocated and is indicated where appropriate. Numbers in the 8000 series must be identified with the "ID" prefix instead of the "UN" prefix used when identifying all other numbers for marking and documentation in these Instructions. When the word "Forbidden" appears across this column and column 3, it means that the dangerous goods covered by that particular entry meet the description of dangerous goods forbidden on aircraft under any circumstances, as provided in 1;2.1. It must be noted, however, that all dangerous goods meeting this description have not been included in the Dangerous Goods List.

Column 3 "Class or division" — this column contains the class or division and, in the case of Class 1, the compatibility group assigned to the article or substance according to the classification system described in Part 2; Introductory Chapter.

Column 4 "Subsidiary hazard" — this column contains the class or division number of any important subsidiary hazards which have been identified by applying the classification found in Part 2; Chapters 1 to 9. Requirements for the labelling of dangerous goods which have subsidiary hazards are given in 5;3.2.

Column 5 "Labels" — this column specifies the class hazard label followed by the subsidiary hazard label(s) (after the symbol "&") to be applied to each outside packaging and overpack. Subsidiary hazard labels are not shown for all n.o.s. or generic articles and substances which possess more than one hazard. When such an article or substance has more than one hazard and no subsidiary hazard label is indicated in column 5 of Table 3-1, subsidiary hazard labels must be applied in accordance with 5;3.2.2 and 5;3.2.3. For magnetized material the required handling label is also shown. In the instances where no label is required the word "None" will appear.

Column 6 "State variations" — this column contains references to entries in Attachment 3, which shows State variations from these Instructions (these appear under the designator and name of the State).

Column 7 “Special provisions” — this column contains a number referring to the appropriate entries in Table 3-2. Special provisions apply to all the packing groups permitted for a particular substance or article unless the wording makes it otherwise apparent.

Column 8 “UN packing group” — this column contains the UN packing group number (i.e. I, II or III) assigned to the article or substance. If more than one packing group is indicated for the entry, the packing group of the substance or formulation to be transported should be determined, based on its properties, through application of the hazard grouping criteria as provided in Part 2.

Column 9 “Excepted quantities” — this column provides an alphanumeric code described in 5.1.2 which indicates the maximum quantity per inner and outer packaging for transporting dangerous goods as excepted quantities in accordance with Part 3, Chapter 5.

Column 10 “Passenger and cargo aircraft — Packing instruction” — this column refers to the relevant packing instructions listed in Part 4 for transport of the article or substance on a passenger aircraft. For some entries an alternative packing instruction is shown prefixed with the letter “Y”. Such packing instructions are for limited quantities of dangerous goods.

Column 11 “Passenger and cargo aircraft — Maximum net quantity per package” — this column shows the maximum net quantity (mass or volume) of the article or substance allowed in each package for transport on a passenger aircraft. Where a maximum net quantity appears beside a packing instruction prefixed by the letter “Y”, this indicates it is the maximum net quantity permitted in a packaging containing limited quantities of dangerous goods unless indicated by a letter “G” where the mass quoted is the total mass of the package. The maximum quantity per package may be further limited by the type of packaging used. The maximum net quantities indicated may be exceeded only if specified in these Instructions or as permitted in the Supplement to these Instructions in S-3;2 with the approval of the appropriate national authority of the State of Origin and the State of the Operator.

Column 12 “Cargo aircraft only — Packing instruction” — this column provides information similar to that in column 10, but for articles or substances which may be transported on a cargo aircraft only.

Column 13 “Cargo aircraft only — Maximum net quantity per package” — this column provides information similar to that in column 11, but for articles or substances which may be transported on a cargo aircraft only. The maximum quantity per package may be further limited by the type of packaging used. The maximum net quantities indicated do not apply to transport in portable tanks, as permitted in the Supplement to these Instructions, Part S-4, Chapter 12, with the approval of the appropriate authority of the State of Origin and the State of the Operator. The maximum net quantities indicated may be exceeded only if specified in these Instructions or as permitted in the Supplement to these Instructions in S-3;2 with the approval of the appropriate national authority of the State of Origin and the State of the Operator.

Note 1.— Where an article or substance may not be carried on a passenger aircraft, the word “FORBIDDEN” is written across columns 10 and 11. Where an article or substance may not be carried on any aircraft, the word “FORBIDDEN” is written across columns 12 and 13 as well as across columns 10 and 11.

Note 2.— Where an article or substance is packed according to the packing instruction and maximum net quantity per package given in columns 10 and 11, it may also be carried on a cargo aircraft. In such circumstances, the package must not bear the “Cargo aircraft only” label referred to in 5;3.2.12 a).

2.1.2 The following abbreviations or symbols are used in Table 3-1 and have the meanings shown:

Abbreviation	*Column*	*Meaning*
n.o.s.	1	Not otherwise specified
g	11 and 13	gram(s)
ml	11 and 13	millilitre(s)
L	11 and 13	Litre(s)
kg	11 and 13	Kilogram(s)
G	11	Gross mass of package as prepared for transport
*	1	Entry which requires the addition of a technical name according to 1.2.7
†	1	Entry for which there is an explanation in Attachment 2
≠		this symbol indicates changed text
+		this symbol indicates new or relocated text
>		this symbol indicates deleted text

Table 3-1. Dangerous Goods List

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	A												
	Accumulators, electric, see **Batteries**, etc. (UN Nos. 2794, 2795, 2800, 3028, 3292)												
	Acetal	1088	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Acetaldehyde	1089	3		Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		361	30 L
	Acetaldehyde ammonia	1841	9		Miscellaneous			III	E1	956	200 kg	956	200 kg
	Acetaldehyde oxime	2332	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Acetic acid, glacial	2789	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Acetic acid solution, more than 80% acid, by mass	2789	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Acetic acid solution, more than 10% but less than 50% acid, by mass	2790	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Acetic acid solution, not less than 50% but not more than 80% acid, by mass	2790	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Acetic anhydride	1715	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Acetoin, see **Acetyl methyl carbinol**												
	Acetone	1090	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠	**Acetone cyanohydrin, stabilized**	1541	6.1			AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2	I		FORBIDDEN		FORBIDDEN	
	Acetone oils	1091	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Acetonitrile	1648	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Acetyl bromide	1716	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Acetyl chloride	1717	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Acetyl cyclohexanesulphonyl peroxide, more than 82%, wetted with less than 12% water	FORBIDDEN											
Acetylene, dissolved	1001	2.1		Gas flammable	AU 1 CA 7 NL 1 US 3	A1		E0	FORBIDDEN		200	15 kg
Acetylene (liquefied)	FORBIDDEN											
Acetylene silver nitrate	FORBIDDEN											
Acetylene, solvent free	3374	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	15 kg
Acetylene tetrabromide, see **Tetrabromoethane**												
Acetylene tetrachloride, see **1,1,2,2-Tetrachloroethane**												
Acetyl iodide	1898	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Acetyl methyl carbinol	2621	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Acid butyl phosphate, see **Butyl acid phosphate**												
Acid mixture, hydrofluoric and sulphuric, see **Hydrofluoric acid and sulphuric acid mixture**												
Acid mixture, nitrating acid, see **Nitrating acid mixture**												
Acid mixture, spent, nitrating acid, see **Nitrating acid mixture, spent**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Acraldehyde, inhibited, see **Acrolein, stabilized**												
	Acridine	2713	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Acrolein dimer, stabilized	2607	3		Liquid flammable		A209	III	E1	FORBIDDEN		366	220 L
								III	E1	FORBIDDEN			
≠	**Acrolein, stabilized**	1092	6.1	3			A209	I		FORBIDDEN		FORBIDDEN	
	Acrylamide, solid	2074	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Acrylamide solution	3426	6.1		Toxic		A3	III	E1	655 Y642	60 L 2 L	663	220 L
	Acrylic acid, stabilized	2218	8	3	Corrosive & Liquid flammable		A209	II	E2	FORBIDDEN		855	30 L
								II	E2	FORBIDDEN			
	Acrylonitrile, stabilized	1093	3	6.1	Liquid flammable & Toxic		A209	I	E0	FORBIDDEN		361	30 L
	Actinolite, see **Asbestos, amphibole** (UN No. 2212)												
	Activated carbon, see **Carbon, activated**												
	Activated charcoal, see **Carbon, activated**												
	Actuating cartridge, explosive, see **Cartridges, power device** (UN Nos. 0275, 0276, 0323, 0381)												
	Adhesives containing flammable liquid	1133	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
								II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Adiponitrile	2205	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Adsorbed gas, n.o.s.*	3511	2.2		Gas non-flammable				E0	219	75 kg	219	150 kg
	Adsorbed gas, flammable, n.o.s.*	3510	2.1		Gas flammable				E0	FORBIDDEN		219	150 kg
	Adsorbed gas, oxidizing, n.o.s.*	3513	2.2	5.1	Gas non-flammable & Oxidizer				E0	219	75 kg	219	150 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Adsorbed gas, toxic, n.o.s.***	3512	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Adsorbed gas, toxic, corrosive, n.o.s.***	3516	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Adsorbed gas, toxic, flammable, n.o.s.***	3514	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Adsorbed gas, toxic, flammable, corrosive, n.o.s.***	3517	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Adsorbed gas, toxic, oxidizing, n.o.s.***	3515	2.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Adsorbed gas, toxic, oxidizing, corrosive, n.o.s.***	3518	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Aeroplane flares, see **Flares, aerial**												
	Aerosols, flammable	1950	2.1		Gas flammable		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
	Aerosols, flammable, containing substances in Division 6.1, Packing Group II	1950	2.1	6.1						FORBIDDEN		FORBIDDEN	
	Aerosols, flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.1	6.1 8	Gas flammable & Toxic & Corrosive		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
	Aerosols, flammable, containing toxic gas	1950	2.3	2.1						FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Aerosols, flammable, corrosive, containing substances in Class 8, Packing Group II	1950	2.1	8						FORBIDDEN		FORBIDDEN	
Aerosols, flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.1	8	Gas flammable & Corrosive		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
Aerosols, flammable (engine starting fluid)	1950	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		203	150 kg
Aerosols, flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.1	6.1	Gas flammable & Toxic		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
Aerosols, non-flammable	1950	2.2		Gas non-flammable		A98 A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
Aerosols, non-flammable, containing substances in Class 8, Packing Group II	1950	2.2	8						FORBIDDEN		FORBIDDEN	
Aerosols, non-flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.2	6.1 8	Gas non-flammable & Toxic & Corrosive		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
Aerosols, non-flammable, containing substances in Division 6.1, Packing Group II (other than tear gas devices)	1950	2.2	6.1						FORBIDDEN		FORBIDDEN	
Aerosols, non-flammable, containing toxic gas	1950	2.3							FORBIDDEN		FORBIDDEN	
Aerosols, non-flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.2	8	Gas non-flammable & Corrosive		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
Aerosols, non-flammable (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		203	50 kg
Aerosols, non-flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.2	6.1	Gas non-flammable & Toxic		A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
Aerosols, oxidizing	1950	2.2	5.1	Gas non-flammable & Oxidizer		A145 A167		E0	203	75 kg	203	150 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Agent, blasting, type B †	0331	1.5D							FORBIDDEN		FORBIDDEN	
	Agent, blasting, type E †	0332	1.5D							FORBIDDEN		FORBIDDEN	
	Air bag inflators, see **Safety devices** (UN No. 3268) or **Safety devices, pyrotechnic** (UN No. 0503)												
	Air bag modules, see **Safety devices** (UN No. 3268) or **Safety devices, pyrotechnic** (UN No. 0503)												
≠	**Air, compressed**	1002	2.2		Gas non-flammable		A221		E1	200	75 kg	200	150 kg
	Aircraft, see **Vehicle (flammable gas powered)** or **Vehicle (flammable liquid powered)**												
	Aircraft engines (including turbines) †, see **Engine, internal combustion, flammable liquid powered** (UN No. 3528)												
	Aircraft evacuation slides, see **Life-saving appliances, self-inflating** (UN No. 2990)												
	Aircraft hydraulic power unit fuel tank (containing a mixture of anhydrous hydrazine and methyl hydrazine) (M86 fuel)	3165	3	6.1 8	Liquid flammable & Toxic & Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1 A48	I	E0	FORBIDDEN		372	42 L
	Aircraft survival kits, see **Life-saving appliances, self-inflating** (UN No. 2990)												
	Air, refrigerated liquid	1003	2.2	5.1	Gas non-flammable & Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		202	150 kg
	Alcoholates solution, n.o.s.*, in alcohol	3274	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Alcohol, denatured, see **Alcohols, n.o.s.** or **Alcohols, flammable, toxic, n.o.s.**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Alcoholic beverages containing more than 70% alcohol by volume	3065	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Alcoholic beverages containing more than 24% but not more than 70% alcohol by volume	3065	3		Liquid flammable		A9 A58	III	E1	355 Y344	60 L 10 L	366	220 L
Alcohol, industrial, see **Alcohols, n.o.s.** or **Alcohols, toxic, flammable, n.o.s.**												
Alcohols, n.o.s.*	1987	3		Liquid flammable		A3 A180	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Alcohols, flammable, toxic, n.o.s.*	1986	3	6.1	Liquid flammable & Toxic		A3	I	E0	FORBIDDEN		361	30 L
							II	E2	352 Y341	1 L 1 L	364	60 L
							III	E1	355 Y343	60 L 2 L	366	220 L
Aldehyde, see **Aldehydes, n.o.s.** (UN No. 1989)												
Aldehydes, n.o.s.*	1989	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
							II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Aldehydes, flammable, toxic, n.o.s.*	1988	3	6.1	Liquid flammable & Toxic		A3	I	E0	FORBIDDEN		361	30 L
							II	E2	352 Y341	1 L 1 L	364	60 L
							III	E1	355 Y343	60 L 2 L	366	220 L
Aldol	2839	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Alkali metal alcoholates, self-heating, corrosive, n.o.s.*	3206	4.2	8	Spontaneous combustion & Corrosive		A3	II	E2	466	15 kg	470	50 kg
						A84	III	E1	468	25 kg	471	100 kg
Alkali metal alloy, liquid, n.o.s.	1421	4.3		Danger if wet		A84	I	E0	FORBIDDEN		480	1 L
Alkali metal amalgam, liquid	1389	4.3		Danger if wet		A84	I	E0	FORBIDDEN		480	1 L
Alkali metal amalgam, solid	3401	4.3		Danger if wet		A84	I	E0	FORBIDDEN		487	15 kg
Alkali metal amides	1390	4.3		Danger if wet		A84	II	E2	483 Y475	15 kg 5 kg	489	50 kg
Alkali metal dispersion	1391	4.3		Danger if wet		A84	I	E0	FORBIDDEN		480	1 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Alkali metal dispersion, flammable	3482	4.3	3	Danger if wet & Liquid flammable		A84	I	E0	FORBIDDEN		480	1 L
Alkaline corrosive battery fluid, see **Battery fluid, alkali**												
Alkaline earth metal alcoholates, n.o.s.*	3205	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
						A85	III	E1	469	25 kg	471	100 kg
Alkaline earth metal alloy, n.o.s.	1393	4.3		Danger if wet		A85	II	E2	484	15 kg	490	50 kg
									Y475	5 kg		
Alkaline earth metal amalgam, liquid	1392	4.3		Danger if wet		A85	I	E0	FORBIDDEN		480	1 L
Alkaline earth metal amalgam, solid	3402	4.3		Danger if wet		A85	I	E0	FORBIDDEN		487	15 kg
Alkaline earth metal dispersion	1391	4.3		Danger if wet		A85	I	E0	FORBIDDEN		480	1 L
Alkaline earth metal dispersion, flammable	3482	4.3	3	Danger if wet & Liquid flammable		A85	I	E0	FORBIDDEN		480	1 L
Alkaloid salts, liquid, n.o.s.*	3140	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
						A6			Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Alkaloid salts, solid, n.o.s.*	1544	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
						A6			Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Alkaloids, liquid, n.o.s.*	3140	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
						A6			Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Alkaloids, solid, n.o.s.*	1544	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
						A6			Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Alkyl aluminium halides, see **Organometallic substance, solid, pyrophoric, water-reactive** (UN No. 3393) or **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Alkylphenols, liquid, n.o.s. (including C_2-C_{12} homologues)	3145	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
								II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Alkylphenols, solid, n.o.s. (including C_2-C_{12} homologues)	2430	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
								II	E2	859 Y843	15 kg 1 kg	863	50 kg
								III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Alkylsulphonic acids, liquid with more than 5% free sulphuric acid	2584	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Alkylsulphonic acids, liquid with not more than 5% free sulphuric acid	2586	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Alkylsulphonic acids, solid with more than 5% free sulphuric acid	2583	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Alkylsulphonic acids, solid with not more than 5% free sulphuric acid	2585	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Alkylsulphuric acids	2571	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Allene, see **Propadiene, stabilized**												
	Allyl acetate	2333	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
≠	**Allyl alcohol**	1098	6.1	3				I		FORBIDDEN		FORBIDDEN	
≠	**Allylamine**	2334	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Allyl bromide	1099	3	6.1	Liquid flammable & Toxic			I	E0	FORBIDDEN		361	30 L
	Allyl chloride	1100	3	6.1	Liquid flammable & Toxic			I	E0	FORBIDDEN		361	30 L
	Allyl chlorocarbonate, see **Allyl chloroformate**												
≠	**Allyl chloroformate**	1722	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
	Allyl ethyl ether	2335	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
	Allyl formate	2336	3	6.1	Liquid flammable & Toxic			I	E0	FORBIDDEN		361	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Allyl glycidyl ether	2219	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Allyl iodide	1723	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	362	5 L
	Allyl isothiocyanate, stabilized	1545	6.1	3	Toxic & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209	II	E0	FORBIDDEN		661	60 L
	Allyltrichlorosilane, stabilized	1724	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209	II	E0	FORBIDDEN		876	30 L
	Aluminium alkyl halides, liquid, see **Organometallic substance, liquid, pyrophoric, water reactive** (UN No. 3394)												
	Aluminium alkyl halides, solid, see **Organometallic substance, solid, pyrophoric, water reactive** (UN No. 3393)												
	Aluminium alkyl hydrides, see **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												
	Aluminium alkyls, see **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												
≠	**Aluminium borohydride**	2870	4.2	4.3				I		FORBIDDEN		FORBIDDEN	
≠	**Aluminium borohydride in devices**	2870	4.2	4.3				I		FORBIDDEN		FORBIDDEN	
	Aluminium bromide, anhydrous	1725	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Aluminium bromide solution	2580	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
	Aluminium carbide	1394	4.3		Danger if wet			II	E2	484 Y475	15 kg 5 kg	489	50 kg
	Aluminium chloride, anhydrous	1726	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Aluminium chloride solution	2581	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Aluminium dross, see **Aluminium remelting by-products** or **Aluminium smelting by-products**												
Aluminium dross, wet or hot	FORBIDDEN											
Aluminium ferrosilicon powder	1395	4.3	6.1	Danger if wet & Toxic			II	E2	483 Y474	15 kg 1 kg	490	50 kg
Aluminium hydride	2463	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Aluminium nitrate	1438	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Aluminium phosphide	1397	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
≠ **Aluminium phosphide pesticide**	3048	6.1				A128	I		FORBIDDEN		FORBIDDEN	
Aluminium powder, coated †	1309	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
							III	E1	446 Y443	25 kg 10 kg	449	100 kg
Aluminium powder, uncoated †	1396	4.3		Danger if wet		A3	II	E2	484 Y475	15 kg 5 kg	490	50 kg
							III	E1	486 Y477	25 kg 10 kg	491	100 kg
Aluminium remelting by-products	3170	4.3		Danger if wet		A3 A102	II	E2	484 Y475	15 kg 5 kg	490	50 kg
							III	E1	486 Y477	25 kg 10 kg	491	100 kg
Aluminium resinate	2715	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Aluminium silicon powder, uncoated	1398	4.3		Danger if wet		A3 A53	III	E1	486 Y477	25 kg 10 kg	491	100 kg
Aluminium smelting by-products	3170	4.3		Danger if wet		A3 A102	II	E2	484 Y475	15 kg 5 kg	490	50 kg
							III	E1	486 Y477	25 kg 10 kg	491	100 kg
Amatols, see **Explosive, blasting, type B**												
Amines, flammable, corrosive, n.o.s.*	2733	3	8	Liquid flammable & Corrosive		A3	I	E0	350	0.5 L	360	2.5 L
							II	E2	352 Y340	1 L 0.5 L	363	5 L
							III	E1	354 Y342	5 L 1 L	365	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Amines, liquid, corrosive, n.o.s.*	2735	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		
Amines, liquid, corrosive, flammable, n.o.s.*	2734	8	3	Corrosive & Liquid flammable			I	E0	850	0.5 L	854	2.5 L
							II	E2	851	1 L	855	30 L
									Y840	0.5 L		
Amines, solid, corrosive, n.o.s.*	3259	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
							II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
							III	E1	860	25 kg	864	100 kg
									Y845	5 kg		
Aminobenzene, see **Aniline**												
2-Aminobenzotrifluoruride, see **2-Trifluoromethylaniline**												
3-Aminobenzotrifluoruride, see **3-Trifluoromethylaniline**												
Aminobutane, see **n-Butylamine**												
2-Amino-4-chlorophenol	2673	6.1		Toxic			II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
2-Amino-5-diethylaminopentane	2946	6.1		Toxic			III	E1	655	60 L	663	220 L
									Y642	2 L		
2-Amino-4,6-dinitrophenol, wetted with not less than 20% water by mass	3317	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
2-(2-Aminoethoxy)ethanol	3055	8		Corrosive			III	E1	852	5 L	856	60 L
									Y841	1 L		
N-Aminoethylpiperazine	2815	8	6.1	Corrosive & Toxic			III	E1	852	5 L	856	60 L
									Y841	1 L		
1-Amino-2-nitrobenzene, see **Nitroanilines**												
1-Amino-3-nitrobenzene, see **Nitroanilines**												
1-Amino-4-nitrobenzene, see **Nitroanilines**												
Aminophenols (o-,m-,p-)	2512	6.1		Toxic		A113	III	E1	670	100 kg	677	200 kg
									Y645	10 kg		

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Aminopyridines (o-,m-,p-)	2671	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Ammonia, anhydrous	1005	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Ammonia solution, relative density between 0.880 and 0.957 at 15ºC in water, with more than 10% but not more than 35% ammonia	2672	8		Corrosive		A64	III	E1	852 Y841	5 L 1 L	856	60 L
Ammonia solution, relative density less than 0.880 at 15ºC in water, with more than 50% ammonia	3318	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Ammonia solution, relative density less than 0.880 at 15ºC in water, with more than 35% but not more than 50% ammonia	2073	2.2		Gas non-flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Ammonium arsenate	1546	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Ammonium azide	FORBIDDEN											
Ammonium bichromate, see **Ammonium dichromate**												
Ammonium bifluoride, solid, see **Ammonium hydrogendifluoride, solid**												
Ammonium bifluoride solution, see **Ammonium hydrogendifluoride, solution**												
Ammonium bisulphate, see **Ammonium hydrogen sulphate**												
Ammonium bisulphite solution, see **Bisulphites, aqueous solution, n.o.s.**												
Ammonium bromate	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Ammonium chlorate	FORBIDDEN											
Ammonium dichromate	1439	5.1		Oxidizer	US 4		II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Ammonium dinitro-o-cresolate, solid	1843	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Ammonium dinitro-o-cresolate solution	3424	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Ammonium fluoride	2505	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
Ammonium fluorosilicate	2854	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Ammonium fulminate	FORBIDDEN											
Ammonium hexafluorosilicate, see **Ammonium fluorosilicate**												
Ammonium hydrogendifluoride, solid	1727	8		Corrosive	US 4		II	E2	859 Y844	15 kg 5 kg	863	50 kg
Ammonium hydrogendifluoride solution	2817	8	6.1	Corrosive & Toxic		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Ammonium hydrogen sulphate	2506	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Ammonium hydrosulphide solution, see **Ammonium sulphide solution**												
Ammonium metavanadate	2859	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Ammonium nitrate	0222	1.1D							FORBIDDEN		FORBIDDEN	
Ammonium nitrate with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	1942	5.1		Oxidizer		A64	III	E1	559 Y546	25 kg 10 kg	563	100 kg
Ammonium nitrate based fertilizer	2067	5.1		Oxidizer		A64 A79	III	E1	559 Y546	25 kg 10 kg	563	100 kg
Ammonium nitrate based fertilizer	2071	9		Miscellaneous		A90	III	E1	958 Y958	200 kg 30 kg G	958	200 kg
≠ **Ammonium nitrate emulsion** intermediate for blasting explosives	3375	5.1					II		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Ammonium nitrate explosives, see **Explosive, blasting, type B**												
≠	**Ammonium nitrate gel** intermediate for blasting explosives	3375	5.1					II		FORBIDDEN		FORBIDDEN	
≠	**Ammonium nitrate, liquid** (hot concentrated solution)	2426	5.1				A129			FORBIDDEN		FORBIDDEN	
≠	**Ammonium nitrate suspension** intermediate for blasting explosives	3375	5.1					II		FORBIDDEN		FORBIDDEN	
	Ammonium nitrite	FORBIDDEN											
	Ammonium perchlorate	0402	1.1D				A22			FORBIDDEN		FORBIDDEN	
	Ammonium perchlorate	1442	5.1		Oxidizer		A22	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Ammonium permanganate	FORBIDDEN											
	Ammonium persulphate	1444	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Ammonium picrate dry or wetted with less than 10% water, by mass	0004	1.1D							FORBIDDEN		FORBIDDEN	
	Ammonium picrate, wetted with not less than 10% water, by mass	1310	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
	Ammonium polysulphide solution	2818	8	6.1	Corrosive & Toxic		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Ammonium polyvanadate	2861	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Ammonium silicofluoride, see **Ammonium fluorosilicate**												
	Ammonium sulphide solution	2683	8	3 6.1	Corrosive & Liquid flammable & Toxic			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Ammunition, blank, see **Cartridges for weapons, blank**												
	Ammunition, fixed, semi-fixed or separate loading, see **Cartridges for weapons**, etc.												
	Ammunition, illuminating with or without burster, expelling charge or propelling charge †	0171	1.2G							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Ammunition, illuminating with or without burster, expelling charge or propelling charge †	0254	1.3G							FORBIDDEN		FORBIDDEN	
Ammunition, illuminating with or without burster, expelling charge or propelling charge †	0297	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Ammunition, incendiary, liquid or gel, with burster, expelling charge or propelling charge †	0247	1.3J							FORBIDDEN		FORBIDDEN	
Ammunition, incendiary with or without burster, expelling charge or propelling charge †	0009	1.2G							FORBIDDEN		FORBIDDEN	
Ammunition, incendiary with or without burster, expelling charge or propelling charge †	0010	1.3G							FORBIDDEN		FORBIDDEN	
Ammunition, incendiary with or without burster, expelling charge or propelling charge †	0300	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Ammunition, incendiary (water-activated contrivances), see **Contrivances, water-activated**, etc. (UN Nos. 0248, 0249)												
Ammunition, incendiary, white phosphorus with burster, expelling charge or propelling charge †	0243	1.2H							FORBIDDEN		FORBIDDEN	
Ammunition, incendiary, white phosphorus with burster, expelling charge or propelling charge †	0244	1.3H							FORBIDDEN		FORBIDDEN	
Ammunition, industrial, see **Cartridges, oil well** or **Cartridges, power device**												
Ammunition, lachrymatory, see **Ammunition, tear-producing**, etc.												
Ammunition, practice †	0362	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Ammunition, practice †	0488	1.3G							FORBIDDEN		FORBIDDEN	
Ammunition, proof †	0363	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Ammunition, smoke with or without burster, expelling charge or propelling charge †	0015	1.2G				A132			FORBIDDEN		FORBIDDEN	
Ammunition, smoke with or without burster, expelling charge or propelling charge †	0016	1.3G				A132			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Ammunition, smoke with or without burster, expelling charge or propelling charge †	0303	1.4G		Explosive 1.4		A132		E0	FORBIDDEN		130	75 kg
Ammunition, smoke (water-activated contrivances), white phosphorus, with burster, expelling charge or propelling charge, see **Contrivances, water-activated**, etc. (UN No. 0248)												
Ammunition, smoke (water-activated contrivances), without white phosphorus or phosphides, with burster, expelling charge or propelling charge, see **Contrivances, water-activated**, etc. (UN No. 0249)												
Ammunition, smoke, white phosphorus with burster, expelling charge or propelling charge †	0245	1.2H							FORBIDDEN		FORBIDDEN	
Ammunition, smoke, white phosphorus with burster, expelling charge or propelling charge †	0246	1.3H							FORBIDDEN		FORBIDDEN	
Ammunition, sporting, see **Cartridges for weapons, inert projectile or cartridges, small arms** (UN Nos. 0012, 0328, 0339, 0417)												
Ammunition, tear-producing with burster, expelling charge or propelling charge †	0018	1.2G	6.1 8						FORBIDDEN		FORBIDDEN	
Ammunition, tear-producing with burster, expelling charge or propelling charge †	0019	1.3G	6.1 8						FORBIDDEN		FORBIDDEN	
Ammunition, tear-producing with burster, expelling charge or propelling charge †	0301	1.4G	6.1 8	Explosive 1.4 & Toxic & Corrosive				E0	FORBIDDEN		130	75 kg
Ammunition, tear-producing, non-explosive without burster or expelling charge, non-fuzed	2017	6.1	8	Toxic & Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		679	50 kg
Ammunition, toxic* with burster, expelling charge or propelling charge †	0020	1.2K	6.1						FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Ammunition, toxic* with burster, expelling charge or propelling charge †	0021	1.3K	6.1						FORBIDDEN		FORBIDDEN	
Ammunition, toxic, non-explosive without burster or expelling charge, non-fuzed	2016	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		679	75 kg
Ammunition, toxic (water-activated contrivances), see **Contrivances, water-activated**, etc. (UN Nos. 0248, 0249)												
Amorces, (caps, toy), see **Fireworks** (UN Nos. 0333, 0336, 0337)												
Amosite, see **Asbestos, amphibole** (UN No. 2212)												
Amphibole asbestos, see **Asbestos, amphibole** (UN No. 2212)												
Amyl acetates	1104	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Amyl acid phosphate	2819	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Amyl aldehyde, see **Valeraldehyde**												
Amylamine	1106	3	8	Liquid flammable & Corrosive		A3	II	E2	352 Y340	1 L 0.5 L	363	5 L
							III	E1	354 Y342	5 L 1 L	365	60 L
Amyl butyrates	2620	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Amyl chloride	1107	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
n-Amylene	1108	3		Liquid flammable			I	E3	351	1 L	361	30 L
Amyl formates	1109	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Amyl mercaptan	1111	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
n-Amyl methyl ketone	1110	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Amyl nitrate	1112	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Amyl nitrite	1113	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
tert-Amylperoxy-3,5,5-trimethylhexanoate	FORBIDDEN											
Amyltrichlorosilane	1728	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Anaesthetic ether, see **Diethyl ether**												
Aniline	1547	6.1		Toxic		A113	II	E4	654 Y641	5 L 1 L	662	60 L
Aniline chloride, see **Aniline hydrochloride**												
Aniline hydrochloride	1548	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Aniline oil, see **Aniline**												
Aniline salt, see **Aniline hydrochloride**												
Anisidines	2431	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Anisole	2222	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Anisoyl chloride	1729	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Anthophyllite, see **Asbestos, amphibole** (UN No. 2212)												
Antimonious chloride, see **Antimony trichloride**												
Antimony compound, inorganic, liquid, n.o.s.*	3141	6.1		Toxic		A12	III	E1	655 Y642	60 L 2 L	663	220 L
Antimony compound, inorganic, solid, n.o.s.*	1549	6.1		Toxic		A12	III	E1	670 Y645	100 kg 10 kg	677	200 kg
Antimony hydride, see **Stibine**												
Antimony lactate	1550	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Antimony (III) lactate, see **Antimony lactate**												
Antimony pentachloride, liquid	1730	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Antimony pentachloride solution	1731	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Antimony pentafluoride	1732	8	6.1	Corrosive & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
Antimony perchloride, liquid, see **Antimony pentachloride, liquid**												
Antimony potassium tartrate	1551	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
Antimony powder	2871	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Antimony sulphide and a chlorate, mixture of	FORBIDDEN											
Antimony trichloride	1733	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Antu, see **Naphthylthiourea**												
Argon, compressed	1006	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
Argon, refrigerated liquid	1951	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
Arsenates, n.o.s., see **Arsenic compound, liquid, n.o.s.** or **Arsenic compound, solid, n.o.s.**												
Arsenic	1558	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Arsenic acid, liquid	1553	6.1		Toxic	US 4		I	E5	652	1 L	658	30 L
Arsenic acid, solid	1554	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Arsenical dust †	1562	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Arsenical flue dust, see **Arsenical dust**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Arsenical pesticide, liquid, flammable, toxic*, flash point less than 23ºC	2760	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352	1 L	364	60 L
									Y341	1 L		
Arsenical pesticide, liquid, toxic*	2994	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Arsenical pesticide, liquid, toxic, flammable*, flash point not less than 23ºC	2993	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Arsenical pesticide, solid, toxic*	2759	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Arsenic bromide	1555	6.1		Toxic			II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
Arsenic (III) bromide, see **Arsenic bromide**												
Arsenic chloride, see **Arsenic trichloride**												
Arsenic compound, liquid, n.o.s.*, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1556	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
						A6			Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Arsenic compound, solid, n.o.s.*, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1557	6.1		Toxic	US 4	A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
						A6			Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Arsenic (III) oxide, see **Arsenic trioxide**												
Arsenic (V) oxide, see **Arsenic pentoxide**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Arsenic pentoxide	1559	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Arsenic sulphide and a chlorate, mixture of	FORBIDDEN											
	Arsenic sulphides, see **Arsenic compound, liquid, n.o.s.** or **Arsenic compound, solid, n.o.s.**												
≠	**Arsenic trichloride**	1560	6.1			US 4		I		FORBIDDEN		FORBIDDEN	
	Arsenic trioxide	1561	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Arsenious chloride, see **Arsenic trichloride**												
	Arsenites, n.o.s., see **Arsenic compound, liquid, n.o.s.** or **Arsenic compound, solid, n.o.s.**												
	Arsenous chloride, see **Arsenic trichloride**												
	Arsine	2188	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Arsine, adsorbed**	3522	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Articles containing a substance liable to spontaneous combustion, n.o.s.***	3542	4.2	See 2;0.6						FORBIDDEN		FORBIDDEN	
≠	**Articles containing a substance which emits flammable gas in contact with water, n.o.s.***	3543	4.3	See 2;0.6						FORBIDDEN		FORBIDDEN	
≠	**Articles containing corrosive substance, n.o.s.***	3547	8	See 2;0.6			A2			FORBIDDEN		FORBIDDEN	
	Articles containing flammable gas, n.o.s.*	3537	2.1	See 2;0.6			A2			FORBIDDEN		FORBIDDEN	
≠	**Articles containing flammable liquid, n.o.s.***	3540	3	See 2;0.6			A2			FORBIDDEN		FORBIDDEN	
≠	**Articles containing flammable solid, n.o.s.***	3541	4.1	See 2;0.6			A2			FORBIDDEN		FORBIDDEN	
≠	**Articles containing miscellaneous dangerous goods, n.o.s.***	3548	9	See 2;0.6	Miscellaneous		A2 A224			FORBIDDEN		FORBIDDEN	
≠	**Articles containing non-flammable, non toxic gas, n.o.s.***	3538	2.2	See 2;0.6	Gas non-flammable		A2 A225			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Articles containing organic peroxide, n.o.s.*	3545	5.2	See 2;0.6						FORBIDDEN		FORBIDDEN	
≠	**Articles containing oxidizing substance, n.o.s.***	3544	5.1	See 2;0.6						FORBIDDEN		FORBIDDEN	
	Articles containing toxic gas, n.o.s.*	3539	2.3	See 2;0.6						FORBIDDEN		FORBIDDEN	
≠	**Articles containing toxic substance, n.o.s.***	3546	6.1	See 2;0.6			A2			FORBIDDEN		FORBIDDEN	
	Articles, EEI †	0486	1.6N				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0349	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
	Articles, explosive, n.o.s.*	0350	1.4B				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0351	1.4C		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
	Articles, explosive, n.o.s.*	0352	1.4D		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
	Articles, explosive, n.o.s.*	0353	1.4G		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
	Articles, explosive, n.o.s.*	0354	1.1L				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0355	1.2L				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0356	1.3L				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0462	1.1C				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0463	1.1D				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0464	1.1E				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0465	1.1F				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0466	1.2C				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0467	1.2D				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0468	1.2E				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0469	1.2F				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0470	1.3C				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, n.o.s.*	0471	1.4E		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
	Articles, explosive, n.o.s.*	0472	1.4F				A62			FORBIDDEN		FORBIDDEN	
	Articles, explosive, extremely insensitive †	0486	1.6N				A62			FORBIDDEN		FORBIDDEN	
	Articles, pressurized, hydraulic containing non-flammable gas	3164	2.2		Gas non-flammable		A48 A114 A195		E0	208	No limit	208	No limit

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Articles, pressurized, pneumatic containing non-flammable gas	3164	2.2		Gas non-flammable		A48 A114 A195		E0	208	No limit	208	No limit
Articles, pyrophoric †	0380	1.2L							FORBIDDEN		FORBIDDEN	
Articles, pyrotechnic for technical purposes †	0428	1.1G							FORBIDDEN		FORBIDDEN	
Articles, pyrotechnic for technical purposes †	0429	1.2G							FORBIDDEN		FORBIDDEN	
Articles, pyrotechnic for technical purposes †	0430	1.3G							FORBIDDEN		FORBIDDEN	
Articles, pyrotechnic for technical purposes †	0431	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
Articles, pyrotechnic for technical purposes †	0432	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
Arylsulphonic acids, liquid with more than 5% free sulphuric acid	2584	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Arylsulphonic acids, liquid with not more than 5% free sulphuric acid	2586	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Arylsulphonic acids, solid with more than 5% free sulphuric acid	2583	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Arylsulphonic acids, solid with not more than 5% free sulphuric acid	2585	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Asbestos †, see **Asbestos, amphibole** (UN No. 2212) or **Asbestos, chrysotile** (UN No. 2590)												
≠ **Asbestos, amphibole*** (amosite, tremolite, actinolite, anthophyllite, crocidolite) †	2212	9				A2 A61	II		FORBIDDEN		FORBIDDEN	
Asbestos, chrysotile †	2590	9		Miscellaneous	US 4	A61	III	E1	958	200 kg	958	200 kg
Ascaridole	FORBIDDEN											
Aviation regulated liquid, n.o.s.*	3334	9		Miscellaneous		A27	III	E1	964 Y964	450 L 30 kg G	964	450 L
Aviation regulated solid, n.o.s.*	3335	9		Miscellaneous		A27	III	E1	956 Y956	400 kg 30 kg G	956	400 kg
Azaurolic acid (salt of) (dry)	FORBIDDEN											
Azidodithiocarbonic acid	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Azidoethyl nitrate	FORBIDDEN											
	Azido guanidine picrate (dry)	FORBIDDEN											
	5-Azido-1-hydroxy tetrazole	FORBIDDEN											
	Azido hydroxy tetrazole (mercury and silver salts)	FORBIDDEN											
	3-Azido-1,2-propylene glycol dinitrate	FORBIDDEN											
≠	**Azodicarbonamide**	3242	4.1				A60	II		FORBIDDEN		FORBIDDEN	
	Azodicarbonamide formulation type B, temperature controlled	FORBIDDEN											
	Azotetrazole (dry)	FORBIDDEN											
	B												
	Bag charges, see **Charges, propelling, for cannon**												
	Ballistite, see **Powder, smokeless**												
	Bangalore torpedoes, see **Mines** with bursting charge (UN Nos. 0136, 0137, 0138, 0294)												
	Barium	1400	4.3		Danger if wet			II	E2	484 Y475	15 kg 5 kg	490	50 kg
≠	**Barium alloys, pyrophoric**	1854	4.2					I		FORBIDDEN		FORBIDDEN	
	Barium azide, dry or wetted with less than 50% water, by mass	0224	1.1A	6.1						FORBIDDEN		FORBIDDEN	
	Barium azide, wetted with not less than 50% water, by mass	1571	4.1	6.1	Solid flammable & Toxic	BE 3	A40	I	E0	FORBIDDEN		451	0.5 kg
	Barium binoxide, see **Barium peroxide**												
	Barium bromate	2719	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
	Barium chlorate, solid	1445	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Barium chlorate solution	3405	5.1	6.1	Oxidizer & Toxic		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Barium compound, n.o.s.*	1564	6.1		Toxic		A3 A82	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Barium cyanide	1565	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg
Barium dioxide, see **Barium peroxide**												
Barium hypochlorite with more than 22% available chlorine	2741	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Barium nitrate	1446	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Barium oxide	1884	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Barium perchlorate, solid	1447	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Barium perchlorate solution	3406	5.1	6.1	Oxidizer & Toxic		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Barium permanganate	1448	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Barium peroxide	1449	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Barium selenate, see **Selenates**												
Barium selenite, see **Selenites**												
Barium superoxide, see **Barium peroxide**												
Batteries, containing sodium †	3292	4.3		Danger if wet		A94 A183		E0	FORBIDDEN		492	No limit
Batteries, dry, containing potassium hydroxide solid, electric storage †	3028	8		Corrosive		A183 A184		E0	871	25 kg	871	230 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Batteries, electric storage, see Special Provision A123												
	Batteries, nickel-metal hydride	3496	9		Miscellaneous		A199				See Part 3;3, A199		
≠	**Batteries, wet, filled with acid**, electric storage †	2794	8		Corrosive		A51 A164 A183		E0	870	30 kg	870	400 kg
≠	**Batteries, wet, filled with alkali**, electric storage †	2795	8		Corrosive		A51 A164 A183		E0	870	30 kg	870	400 kg
	Batteries, wet, non-spillable, electric storage	2800	8		Corrosive		A48 A67 A164 A183		E0	872	No limit	872	No limit
	Battery fluid, acid	2796	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Battery fluid, alkali	2797	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Battery, lithium ion, see **Lithium ion batteries, etc.** (UN Nos. 3480, 3481)												
	Battery, lithium metal, see **Lithium metal batteries, etc.** (UN Nos. 3090, 3091)												
≠	**Battery-powered equipment**	3171	9		Miscellaneous		A67 A87 A94 A154 A164 A182 A214		E0	952	No limit	952	No limit
≠	**Battery-powered vehicle**	3171	9		Miscellaneous		A67 A87 A94 A154 A164 A214		E0	952	No limit	952	No limit
	Benzaldehyde	1990	9		Miscellaneous			III	E1	964 Y964	100 L 30 kg G	964	220 L
	Benzene	1114	3		Liquid flammable	US 4		II	E2	353 Y341	5 L 1 L	364	60 L
	Benzene diazonium chloride (dry)	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Benzene diazonium nitrate (dry)	FORBIDDEN											
Benzenesulphonyl chloride	2225	8		Corrosive	US 4		III	E1	852 Y841	5 L 1 L	856	60 L
Benzenethiol, see **Phenyl mercaptan**												
Benzene triozonide	FORBIDDEN											
Benzidine	1885	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
1,3,2-Benzodioxaborole						A210						
Benzol, see **Benzene**												
Benzolene, see **Petroleum distillates, n.o.s.**												
Benzonitrile	2224	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Benzoquinone	2587	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Benzosulphochloride, see **Benzenesulphonyl chloride**												
Benzotrichloride	2226	8		Corrosive	US 4		II	E2	851 Y840	1 L 0.5 L	855	30 L
Benzotrifluoride	2338	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Benzoxidiazoles (dry)	FORBIDDEN											
Benzoyl azide	FORBIDDEN											
Benzoyl chloride	1736	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Benzyl bromide	1737	6.1	8	Toxic & Corrosive			II	E4	653	1 L	660	30 L
Benzyl chloride	1738	6.1	8	Toxic & Corrosive			II	E4	653	1 L	660	30 L
Benzyl chlorocarbonate, see **Benzyl chloroformate**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Benzyl chloroformate	1739	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		854	2.5 L
	Benzyl cyanide, see **Phenylacetonitrile, liquid**												
	Benzyldimethylamine	2619	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Benzylidene chloride	1886	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Benzyl iodide	2653	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Beryllium compound, n.o.s.*	1566	6.1		Toxic	US 4	A3	II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Beryllium nitrate	2464	5.1	6.1	Oxidizer & Toxic	US 4		II	E2	558 Y543	5 kg 1 kg	562	25 kg
	Beryllium powder	1567	6.1	4.1	Toxic & Solid flammable	US 4		II	E4	668 Y644	15 kg 1 kg	675	50 kg
	Beverage extract (concentrate), see **Corrosive liquid, acidic, inorganic, n.o.s.**												
≠	**Bhusa**	1327	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2 A198			FORBIDDEN		FORBIDDEN	
	Bicyclo [2.2.1]-hepta-2, 5-diene, stabilized	2251	3		Liquid flammable		A209	II	E2	FORBIDDEN		364	60 L
								II	E2	FORBIDDEN			
	Bifluorides, n.o.s., see **Hydrogendifluorides, solid, n.o.s.** (UN No. 1740)												
	Biological substance, Category B	3373	6.2		None	GB 5			E0	See 650		See 650	
	Biomedical waste, n.o.s.	3291	6.2		Infectious		A117		E0	621	No limit	621	No limit
	Biphenyl triozonide	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Bipyridilium pesticide, liquid, flammable, toxic*, flash point less than 23ºC	2782	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352	1 L	364	60 L
									Y341	1 L		
Bipyridilium pesticide, liquid, toxic*	3016	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Bipyridilium pesticide, liquid, toxic, flammable*, flash point not less than 23ºC	3015	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Bipyridilium pesticide, solid, toxic*	2781	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Bisulphates, aqueous solution	2837	8		Corrosive		A3	II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		
Bisulphites, aqueous solution, n.o.s.*	2693	8		Corrosive			III	E1	852	5 L	856	60 L
									Y841	1 L		
Black powder, granular or as a meal †	0027	1.1D							FORBIDDEN		FORBIDDEN	
Black powder, compressed †	0028	1.1D							FORBIDDEN		FORBIDDEN	
Black powder in pellets †	0028	1.1D							FORBIDDEN		FORBIDDEN	
Blasting cap assemblies, see **Detonator assemblies, non-electric,** for blasting												
Blasting caps, electric, see **Detonators, electric,** for blasting												
Blasting caps, non-electric, see **Detonators, non-electric,** for blasting												
Bleaching powder, see **Calcium hypochlorite mixture, dry,** etc.												
Bombs with bursting charge †	0033	1.1F							FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Bombs with bursting charge †	0034	1.1D							FORBIDDEN		FORBIDDEN	
	Bombs with bursting charge †	0035	1.2D							FORBIDDEN		FORBIDDEN	
	Bombs with bursting charge †	0291	1.2F							FORBIDDEN		FORBIDDEN	
	Bombs, illuminating, see **Ammunition, illuminating,** etc. (UN No. 0254)												
	Bombs, photo-flash †	0037	1.1F							FORBIDDEN		FORBIDDEN	
	Bombs, photo-flash †	0038	1.1D							FORBIDDEN		FORBIDDEN	
	Bombs, photo-flash †	0039	1.2G							FORBIDDEN		FORBIDDEN	
	Bombs, photo-flash †	0299	1.3G							FORBIDDEN		FORBIDDEN	
	Bombs, smoke, non-explosive with corrosive liquid, without initiating device	2028	8		Corrosive			II	E0	FORBIDDEN		866	50 kg
	Bombs, target identification, see **Ammunition, illuminating,** etc.												
	Bombs with flammable liquid with bursting charge †	0399	1.1J							FORBIDDEN		FORBIDDEN	
	Bombs with flammable liquid with bursting charge †	0400	1.2J							FORBIDDEN		FORBIDDEN	
	Boosters without detonator †	0042	1.1D							FORBIDDEN		FORBIDDEN	
	Boosters without detonator †	0283	1.2D							FORBIDDEN		FORBIDDEN	
	Boosters with detonator †	0225	1.1B							FORBIDDEN		FORBIDDEN	
	Boosters with detonator †	0268	1.2B							FORBIDDEN		FORBIDDEN	
	Borate and chlorate mixture, see **Chlorate and borate mixture**												
	Borneol	1312	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
≠	**Boron tribromide**	2692	8			AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Boron trichloride	1741	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Boron trifluoride	1008	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A190			FORBIDDEN		FORBIDDEN	
	Boron trifluoride acetic acid complex, liquid	1742	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Boron trifluoride acetic acid complex, solid	3419	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
≠	**Boron trifluoride, adsorbed**	3519	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Boron trifluoride diethyl etherate	2604	8	3	Corrosive & Liquid flammable			I	E0	850	0.5 L	854	2.5 L
	Boron trifluoride dihydrate	2851	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Boron trifluoride dimethyl etherate	2965	4.3	3 8	Danger if wet & Liquid flammable & Corrosive			I	E0	FORBIDDEN		480	1 L
	Boron trifluoride propionic acid complex, liquid	1743	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Boron trifluoride propionic acid complex, solid	3420	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Bromates, inorganic, n.o.s.*	1450	5.1		Oxidizer		A170	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Bromates, inorganic, aqueous solution, n.o.s.*	3213	5.1		Oxidizer		A3 A170	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
≠	**Bromine**	1744	8	6.1		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Bromine azide	FORBIDDEN											
	Bromine chloride	2901	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Bromine pentafluoride**	1745	5.1	6.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
≠	**Bromine solution**	1744	8	6.1		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
≠	**Bromine trifluoride**	1746	5.1	6.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Bromoacetic acid, solid	3425	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Bromoacetic acid solution	1938	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
≠	**Bromoacetone**	1569	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	
	omega-Bromoacetone, see **Phenacyl bromide**												
	Bromoacetyl bromide	2513	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Bromobenzene	2514	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Bromobenzyl cyanides, liquid	1694	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A29	I	E0	FORBIDDEN		658	30 L
	Bromobenzyl cyanides, solid	3449	6.1		Toxic		A29	I	E5	666	5 kg	673	50 kg
	1-Bromobutane	1126	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	2-Bromobutane	2339	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Bromochloromethane	1887	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
1-Bromo-3-chloropropane	2688	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
4-Bromo-1,2-dinitrobenzene	FORBIDDEN											
1-Bromo-2,3-epoxypropane, see **Epibromohydrin**												
Bromoethane, see **Ethyl bromide**												
2-Bromoethyl ethyl ether	2340	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Bromoform	2515	6.1		Toxic	US 4		III	E1	655 Y642	60 L 2 L	663	220 L
Bromomethane, see **Methyl bromide**												
1-Bromo-3-methylbutane	2341	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Bromomethylpropanes	2342	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
2-Bromo-2-nitropropane-1,3-diol	3241	4.1		Solid flammable		A20	III	E1	457 Y457	25 kg 10 kg	457	50 kg
2-Bromopentane	2343	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Bromopropanes	2344	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
3-Bromopropyne	2345	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Bromosilane	FORBIDDEN											
Bromotrifluoroethylene	2419	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Bromotrifluoromethane	1009	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Brucine	1570	6.1		Toxic	US 4	A6	I	E5	666	5 kg	673	50 kg
Bursters, explosive †	0043	1.1D							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Butadienes and hydrocarbon mixture, stabilized, containing more than 40% butadienes	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
Butadienes, stabilized	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
Butane	1011	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Butane, butane mixtures and mixtures having similar properties in cartridges each not exceeding 500 grams, see **Receptacles**, etc.												
Butanedione	2346	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Butane-1-thiol, see **Butyl mercaptan**												
1,2,4-Butanetriol trinitrate	FORBIDDEN											
1-Butanol, see **Butanols**												
Butan-2-ol, see **Butanols**												
Butanols	1120	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Butanol, secondary, see **Butanols**												
Butanol, tertiary, see **Butanols**												
Butanone, see **Ethyl methyl ketone**												
2-Butenal, see **Crotonaldehyde, stabilized**												
Butene, see **Butylene**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	But-1-ene-3-one, see **Methyl vinyl ketone, stabilized**												
	1,2-Buteneoxide, see **1,2-Butylene oxide, stabilized**												
	2-Buten-1-ol, see **Methallyl alcohol**												
	tert-Butoxycarbonyl azide	FORBIDDEN											
	Butyl acetates	1123	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Butyl acetate, secondary, see **Butyl acetates**												
	Butyl acid phosphate	1718	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Butyl acrylates, stabilized	2348	3		Liquid flammable		A209	III	E1	FORBIDDEN		366	220 L
								III	E1	FORBIDDEN			
	Butyl alcohols, see **Butanols**												
	n-Butylamine	1125	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	N-Butylaniline	2738	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	sec-Butyl benzene, see **Butylbenzenes**												
	Butylbenzenes	2709	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	n-Butyl bromide, see **1-Bromobutane**												
	n-Butyl chloride, see **Chlorobutanes**												
≠	**n-Butyl chloroformate**	2743	6.1	3 8				II		FORBIDDEN		FORBIDDEN	
	tert-Butylcyclohexyl chloroformate	2747	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Butylene**	1012	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A222		E0	FORBIDDEN		200	150 kg
	1,2-Butylene oxide, stabilized	3022	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
	Butyl ethers, see **Dibutyl ethers**												
	Butyl ethyl ether, see **Ethyl butyl ether**												
	n-Butyl formate	1128	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	tert-Butyl hydroperoxide, more than 90% with water	FORBIDDEN											
≠	**tert-Butyl hypochlorite**	3255	4.2	8				I		FORBIDDEN		FORBIDDEN	
	N,n-Butylimidazole	2690	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	N-n-Butyliminazole, see **N,n-Butylimidazole**												
≠	**n-Butyl isocyanate**	2485	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
≠	**tert-Butyl isocyanate**	2484	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Butyl lithium, see **Organometallic substance, liquid, pyrophoric, water reactive** (UN No. 3394)												
	Butyl mercaptan	2347	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	n-Butyl methacrylate, stabilized	2227	3		Liquid flammable		A209	III III	E1 E1	FORBIDDEN FORBIDDEN		366	220 L
	Butyl methyl ether	2350	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	tert-Butyl monoperoxymaleate, more than 52%	FORBIDDEN											
	tert-Butyl monoperoxyphthalate	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Butyl nitrites	2351	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
tert-Butyl peroxyacetate, more than 52% and not more than 77%, when with not less than 23% diluent type A	FORBIDDEN											
tert-Butyl peroxyisobutyrate, more than 52% and not more than 77%, when with not less than 23% diluent Type A	FORBIDDEN											
Butylphenols, liquid, see **Alkylphenols, liquid, n.o.s.**												
Butylphenols, solid, see **Alkylphenols, solid, n.o.s.**												
Butyl propionates	1914	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
p-tert-Butyltoluene, see **Butyltoluenes**												
Butyltoluenes	2667	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Butyltrichlorosilane	1747	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
≠ **5-tert-Butyl-2,4,6-trinitro-m-xylene**	2956	4.1					III		FORBIDDEN		FORBIDDEN	
Butyl vinyl ether, stabilized	2352	3		Liquid flammable		A209	II	E2	FORBIDDEN		364	60 L
							II	E2	FORBIDDEN			
But-1-yne, see **Ethylacetylene, stabilized** (UN No. 2452)												
1,4-Butynediol	2716	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
2-Butyne-1,4-diol, see **1,4-Butynediol**												
Butyraldehyde	1129	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Butyraldoxime	2840	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Butyric acid	2820	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Butyric anhydride	2739	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Butyrone, see **Dipropyl ketone**												
Butyronitrile	2411	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
Butyroyl chloride, see **Butyryl chloride**												
Butyryl chloride	2353	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
C												
Cable cutters, explosive, see **Cutters, cable, explosive**												
Cacodylic acid	1572	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Cadmium compound*	2570	6.1		Toxic	US 4	A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Caesium	1407	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Caesium hydroxide	2682	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Caesium hydroxide solution	2681	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Caesium nitrate	1451	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Caffeine, see **Alkaloids**, etc.												
Cajeputene, see **Dipentene**												
Calcium	1401	4.3		Danger if wet			II	E2	484 Y475	15 kg 5 kg	490	50 kg
≠ **Calcium alloys, pyrophoric**	1855	4.2					I		FORBIDDEN		FORBIDDEN	
Calcium arsenate	1573	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Calcium arsenate and calcium arsenite mixture, solid	1574	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Calcium bisulphite solution, see **Bisulphites, aqueous solution, n.o.s.**												
Calcium carbide	1402	4.3		Danger if wet	US 4		I	E0	FORBIDDEN		487	15 kg
							II	E2	484 Y475	15 kg 5 kg	489	50 kg
Calcium chlorate	1452	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium chlorate, aqueous solution	2429	5.1		Oxidizer		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Calcium chlorite	1453	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium cyanamide with more than 0.1% of calcium carbide	1403	4.3		Danger if wet		A71	III	E1	486 Y477	25 kg 10 kg	491	100 kg
Calcium cyanide	1575	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg
Calcium dithionite	1923	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Calcium hydride	1404	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Calcium hydrosulphite	1923	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Calcium hypochlorite, dry	1748	5.1		Oxidizer	US 4	A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Calcium hypochlorite, dry, corrosive with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	8	Oxidizer & Corrosive		A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium hypochlorite, hydrated with not less than 5.5% but not more than 16% water	2880	5.1		Oxidizer	US 4	A3 A8 A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Calcium hypochlorite, hydrated, corrosive with not less than 5.5% but not more than 16% water	3487	5.1	8	Oxidizer & Corrosive		A8 A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y545	25 kg 5 kg	563	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Calcium hypochlorite, hydrated mixture with not less than 5.5% but not more than 16% water	2880	5.1		Oxidizer	US 4	A3 A8 A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
Calcium hypochlorite, hydrated mixture, corrosive with not less than 5.5% but not more than 16% water	3487	5.1	8	Oxidizer & Corrosive		A8 A136	II III	E2 E1	558 Y544 559 Y545	5 kg 2.5 kg 25 kg 5 kg	562 563	25 kg 100 kg
Calcium hypochlorite mixture, dry with more than 39% available chlorine (8.8% available oxygen)	1748	5.1		Oxidizer	US 4	A138	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
Calcium hypochlorite mixture, dry with more than 10% but not more than 39% available chlorine	2208	5.1		Oxidizer	US 4	A136	III	E1	559 Y546	25 kg 10 kg	563	100 kg
Calcium hypochlorite mixture, dry, corrosive with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	8	Oxidizer & Corrosive		A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium hypochlorite mixture, dry, corrosive with more than 10% but not more than 39% available chlorine	3486	5.1	8	Oxidizer & Corrosive		A136	III	E1	559 Y545	25 kg 5 kg	563	100 kg
Calcium manganese silicon	2844	4.3		Danger if wet			III	E1	486 Y477	25 kg 10 kg	491	100 kg
Calcium nitrate	1454	5.1		Oxidizer		A83	III	E1	559 Y546	25 kg 10 kg	563	100 kg
Calcium oxide	1910	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Calcium perchlorate	1455	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium permanganate	1456	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium peroxide	1457	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Calcium phosphide	1360	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
≠ **Calcium, pyrophoric**	1855	4.2					I		FORBIDDEN		FORBIDDEN	
Calcium resinate	1313	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Calcium resinate, fused	1314	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Calcium selenate, see **Selenates**												
Calcium silicide	1405	4.3		Danger if wet		A3	II	E2	484 Y475	15 kg 5 kg	490	50 kg
							III	E1	486 Y477	25 kg 10 kg	491	100 kg
Calcium silicon, see **Calcium silicide**												
Calcium superoxide, see **Calcium peroxide**												
Camphanone, see **Camphor**, synthetic												
Camphor, synthetic	2717	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Camphor oil	1130	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Camping gas, see **Receptacles, small**, **containing gas, or gas cartridges,** etc.												
Capacitor, asymmetric (with an energy storage capacity greater than 0.3Wh)	3508	9		Miscellaneous		A196		E0	971	No limit	971	No limit
Capacitor, electric double layer (with an energy storage capacity greater than 0.3 Wh)	3499	9		Miscellaneous		A186		E0	971	No limit	971	No limit
Caproic acid	2829	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Caps, toy †, see **Fireworks** (UN Nos. 0333, 0336, 0337)												
Carbamate pesticide, liquid, flammable, toxic*, flash point less than 23ºC	2758	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352 Y341	1 L 1 L	364	60 L
Carbamate pesticide, liquid, toxic*	2992	6.1		Toxic		A3 A4	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
							III	E1	655 Y642	60 L 2 L	663	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Carbamate pesticide, liquid, toxic, flammable*, flash point not less than 23ºC	2991	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654	5 L	662	60 L
										Y641	1 L		
								III	E1	655	60 L	663	220 L
										Y642	2 L		
	Carbamate pesticide, solid, toxic*	2757	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669	25 kg	676	100 kg
										Y644	1 kg		
								III	E1	670	100 kg	677	200 kg
										Y645	10 kg		
	Carbolic acid, see **Phenol, solid** or **Phenol, molten**												
	Carbolic acid solution, see **Phenol solution**												
≠	**Carbon**, animal or vegetable origin	1361	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	II III		FORBIDDEN FORBIDDEN		FORBIDDEN FORBIDDEN	
	Carbon, activated	1362	4.2		Spontaneous combustion		A3	III	E1	472	0.5 kg	472	0.5 kg
	Carbon bisulphide, see **Carbon disulphide**												
	Carbon black (animal or vegetable origin), see **Carbon**												
	Carbon dioxide	1013	2.2		Gas non-flammable		A202		E1	200	75 kg	200	150 kg
	Carbon dioxide and ethylene oxide mixture, see **Ethylene oxide and carbon dioxide mixture**, etc.												
	Carbon dioxide, refrigerated liquid	2187	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
	Carbon dioxide, solid	1845	9		Miscellaneous		A48 A151		E0	954	200 kg	954	200 kg
≠	**Carbon disulphide**	1131	3	6.1				I		FORBIDDEN		FORBIDDEN	
	Carbonic anhydride, see **Carbon dioxide**, etc.												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Carbon monoxide, compressed	1016	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Carbon oxysulphide, see **Carbonyl sulphide**												
Carbon tetrabromide	2516	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Carbon tetrachloride	1846	6.1		Toxic	US 4		II	E4	654 Y641	5 L 1 L	661	60 L
Carbonyl chloride, see **Phosgene**												
Carbonyl fluoride	2417	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Carbonyl sulphide	2204	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Cartridge cases, empty, primed, see **Cases, cartridge, empty, with primer**												
Cartridges, actuating, for fire extinguisher or apparatus valve, † see **Cartridges, power device** (UN Nos. 0275, 0276, 0323, 0381)												
Cartridges, explosive, see **Charges, demolition**												
Cartridges, flash †	0049	1.1G							FORBIDDEN		FORBIDDEN	
Cartridges, flash †	0050	1.3G		Explosive				E0	FORBIDDEN		135	75 kg
Cartridges for tools, blank †	0014	1.4S		Explosive 1.4				E0	130	25 kg	130	100 kg
Cartridges for weapons with bursting charge †	0005	1.1F							FORBIDDEN		FORBIDDEN	
Cartridges for weapons with bursting charge †	0006	1.1E							FORBIDDEN		FORBIDDEN	
Cartridges for weapons with bursting charge †	0007	1.2F							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Cartridges for weapons with bursting charge †	0321	1.2E							FORBIDDEN		FORBIDDEN	
Cartridges for weapons with bursting charge †	0348	1.4F							FORBIDDEN		FORBIDDEN	
Cartridges for weapons with bursting charge †	0412	1.4E		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Cartridges for weapons, blank †	0014	1.4S		Explosive 1.4				E0	130	25 kg	130	100 kg
Cartridges for weapons, blank †	0326	1.1C							FORBIDDEN		FORBIDDEN	
Cartridges for weapons, blank †	0327	1.3C							FORBIDDEN		FORBIDDEN	
Cartridges for weapons, blank †	0338	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Cartridges for weapons, blank †	0413	1.2C							FORBIDDEN		FORBIDDEN	
Cartridges for weapons, inert projectile †	0012	1.4S		Explosive 1.4				E0	130	25 kg	130	100 kg
Cartridges for weapons, inert projectile †	0328	1.2C							FORBIDDEN		FORBIDDEN	
Cartridges for weapons, inert projectile †	0339	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Cartridges for weapons, inert projectile †	0417	1.3C							FORBIDDEN		FORBIDDEN	
Cartridges, illuminating, see **Ammunition, illuminating**, etc.												
Cartridges, oil well †	0277	1.3C							FORBIDDEN		FORBIDDEN	
Cartridges, oil well †	0278	1.4C		Explosive 1.4				E0	FORBIDDEN		134	75 kg
Cartridges, power device †	0275	1.3C		Explosive				E0	FORBIDDEN		134	75 kg
Cartridges, power device †	0276	1.4C		Explosive 1.4				E0	FORBIDDEN		134	75 kg
Cartridges, power device †	0323	1.4S		Explosive 1.4		A165		E0	134	25 kg	134	100 kg
Cartridges, power device †	0381	1.2C							FORBIDDEN		FORBIDDEN	
Cartridges, signal †	0054	1.3G		Explosive				E0	FORBIDDEN		135	75 kg
Cartridges, signal †	0312	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
Cartridges, signal †	0405	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
Cartridges, small arms †	0012	1.4S		Explosive 1.4				E0	130	25 kg	130	100 kg
Cartridges, small arms †	0339	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Cartridges, small arms †	0417	1.3C							FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Cartridges, small arms, blank †	0014	1.4S		Explosive 1.4				E0	130	25 kg	130	100 kg
	Cartridges, small arms, blank †	0327	1.3C							FORBIDDEN		FORBIDDEN	
	Cartridges, small arms, blank †	0338	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
	Cartridges, starter, jet engine, see **Cartridges, power device**												
	Cases, cartridge, empty, with primer †	0055	1.4S		Explosive 1.4				E0	136	25 kg	136	100 kg
	Cases, cartridge, empty, with primer †	0379	1.4C		Explosive 1.4				E0	FORBIDDEN		136	75 kg
	Cases, combustible, empty, without primer †	0446	1.4C		Explosive 1.4				E0	FORBIDDEN		136	75 kg
	Cases, combustible, empty, without primer †	0447	1.3C							FORBIDDEN		FORBIDDEN	
	Casinghead gasoline, see **Gasoline** or **Petrol** or **Motor spirit** (UN No. 1203)												
	Castor beans	2969	9		Miscellaneous		A31	II	E2	956	No limit	956	No limit
	Castor flake	2969	9		Miscellaneous		A31	II	E2	956	No limit	956	No limit
	Castor meal	2969	9		Miscellaneous		A31	II	E2	956	No limit	956	No limit
	Castor pomace	2969	9		Miscellaneous		A31	II	E2	956	No limit	956	No limit
	Catecholborane						A210						
	Caustic alkali liquid, n.o.s.*	1719	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Caustic potash, see **Potassium hydroxide solution**												
	Caustic soda, see **Sodium hydroxide solution**												
	Caustic soda liquor, see **Sodium hydroxide solution**												
≠	**Cells, containing sodium** †	3292	4.3		Danger if wet		A94		E0	492	25 kg	492	400 kg
	Celluloid, in blocks, rods, rolls, sheets, tubes, etc. (except scrap)	2000	4.1		Solid flammable		A3 A48 A205	III	E1	456	25 kg	456	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Celluloid, scrap**	2002	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	III		FORBIDDEN		FORBIDDEN	
	Cement, see **Adhesives** containing flammable liquid												
	Cerium, slabs, ingots or rods	1333	4.1		Solid flammable			II	E2	445 Y441	15 kg 5 kg	448	50 kg
	Cerium, turnings or gritty powder	3078	4.3		Danger if wet			II	E2	484 Y475	15 kg 5 kg	490	50 kg
	Cer mischmetall, see **Ferrocerium**												
	Charcoal, activated, see **Carbon, activated**												
	Charcoal, non-activated, see **Carbon**												
	Charcoal screenings, wet	FORBIDDEN											
	Charcoal, wet	FORBIDDEN											
	Charges, bursting, plastics bonded	0457	1.1D							FORBIDDEN		FORBIDDEN	
	Charges, bursting, plastics bonded	0458	1.2D							FORBIDDEN		FORBIDDEN	
	Charges, bursting, plastics bonded	0459	1.4D		Explosive 1.4				E0	FORBIDDEN		130	75 kg
	Charges, bursting, plastics bonded	0460	1.4S		Explosive 1.4		A165		E0	130	25 kg	130	100 kg
	Charges, demolition †	0048	1.1D							FORBIDDEN		FORBIDDEN	
	Charges, depth †	0056	1.1D							FORBIDDEN		FORBIDDEN	
	Charges, expelling, explosive, for fire extinguishers, see **Cartridges, power device**												
	Charges, explosive, commercial without detonator †	0442	1.1D							FORBIDDEN		FORBIDDEN	
	Charges, explosive, commercial without detonator †	0443	1.2D							FORBIDDEN		FORBIDDEN	
	Charges, explosive, commercial without detonator †	0444	1.4D		Explosive 1.4				E0	FORBIDDEN		137	75 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Charges, explosive, commercial without detonator †	0445	1.4S		Explosive 1.4		A165		E0	137	25 kg	137	100 kg
	Charges, propelling †	0271	1.1C							FORBIDDEN		FORBIDDEN	
	Charges, propelling †	0272	1.3C							FORBIDDEN		FORBIDDEN	
	Charges, propelling †	0415	1.2C							FORBIDDEN		FORBIDDEN	
	Charges, propelling †	0491	1.4C		Explosive 1.4				E0	FORBIDDEN		143	75 kg
	Charges, propelling, for cannon †	0242	1.3C							FORBIDDEN		FORBIDDEN	
	Charges, propelling, for cannon †	0279	1.1C							FORBIDDEN		FORBIDDEN	
	Charges, propelling, for cannon †	0414	1.2C							FORBIDDEN		FORBIDDEN	
	Charges, shaped without detonator †	0059	1.1D			AU 2 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Charges, shaped without detonator †	0439	1.2D							FORBIDDEN		FORBIDDEN	
	Charges, shaped without detonator †	0440	1.4D		Explosive 1.4	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		137	75 kg
	Charges, shaped without detonator †	0441	1.4S		Explosive 1.4		A165		E0	137	25 kg	137	100 kg
	Charges, shaped, flexible, linear †	0237	1.4D		Explosive 1.4				E0	FORBIDDEN		138	75 kg
	Charges, shaped, flexible, linear †	0288	1.1D							FORBIDDEN		FORBIDDEN	
	Charges, supplementary, explosive †	0060	1.1D							FORBIDDEN		FORBIDDEN	
	Chemical kit	3316	9		Miscellaneous		A44 A163		E0	960 Y960	10 kg 1 kg	960	10 kg
≠	**Chemical sample, toxic**	3315	6.1				A106	I		FORBIDDEN		FORBIDDEN	
	Chemical under pressure, n.o.s.*	3500	2.2		Gas non-flammable		A187		E0	218	75 kg	218	150 kg
	Chemical under pressure, corrosive, n.o.s.*	3503	2.2	8	Gas non-flammable & Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1 A187		E0	FORBIDDEN		218	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Chemical under pressure, flammable, n.o.s.*	3501	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A187		E0	FORBIDDEN		218	75 kg
Chemical under pressure, flammable, corrosive, n.o.s.*	3505	2.1	8	Gas flammable & Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1 A187		E0	FORBIDDEN		218	75 kg
Chemical under pressure, flammable, toxic, n.o.s.*	3504	2.1	6.1	Gas flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A187		E0	FORBIDDEN		218	75 kg
Chemical under pressure, toxic, n.o.s.*	3502	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A187		E0	FORBIDDEN		218	100 kg
Chile saltpetre, see **Sodium nitrate**												
Chloral, anhydrous, stabilized	2075	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Chlorate and borate mixture	1458	5.1		Oxidizer		A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Chlorate and magnesium chloride mixture, solid	1459	5.1		Oxidizer		A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Chlorate and magnesium chloride mixture solution	3407	5.1		Oxidizer		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Chlorates, inorganic, n.o.s.*	1461	5.1		Oxidizer		A171	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Chlorates, inorganic, aqueous solution, n.o.s.*	3210	5.1		Oxidizer		A3 A171	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Chloric acid, aqueous solution** with not more than 10% chloric acid	2626	5.1			AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	
	Chlorine	1017	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Chlorine, adsorbed**	3520	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Chlorine azide	FORBIDDEN											
	Chlorine dioxide	FORBIDDEN											
	Chlorine pentafluoride	2548	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Chlorine trifluoride	1749	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Chlorites, inorganic, n.o.s.*	1462	5.1		Oxidizer		A172	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Chlorite solution	1908	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Chloroacetaldehyde, see **2-Chloroethanal**												
≠	**Chloroacetic acid, molten**	3250	6.1	8				II		FORBIDDEN		FORBIDDEN	
	Chloroacetic acid, solid	1751	6.1	8	Toxic & Corrosive			II	E4	668 Y644	15 kg 1 kg	675	50 kg
	Chloroacetic acid solution	1750	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Chloroacetone, stabilized**	1695	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
	Chloroacetone (unstabilized)	FORBIDDEN											
≠	**Chloroacetonitrile**	2668	6.1	3		AU 1 CA 7 NL 1 US 3		I		FORBIDDEN		FORBIDDEN	
	Chloroacetophenone, liquid	3416	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		661	60 L
	Chloroacetophenone, solid	1697	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		676	100 kg
≠	**Chloroacetyl chloride**	1752	6.1	8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Chloroanilines, liquid	2019	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Chloroanilines, solid	2018	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Chloroanisidines	2233	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Chlorobenzene	1134	3		Liquid flammable	US 4		III	E1	355 Y344	60 L 10 L	366	220 L
	Chlorobenzotrifluorides	2234	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Chlorobenzyl chlorides, liquid	2235	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Chlorobenzyl chlorides, solid	3427	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	1-Chloro-3-bromopropane, see **1-Bromo-3-chloropropane**												
	1-Chlorobutane, see **Chlorobutanes**												
	2-Chlorobutane, see **Chlorobutanes**												
	Chlorobutanes	1127	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Chlorocresols, solid	3437	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Chlorocresols solution	2669	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Chlorodifluorobromomethane	1974	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
1-Chloro-1,1-difluoroethane	2517	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Chlorodifluoromethane	1018	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Chlorodifluoromethane and chloropentafluoroethane mixture with fixed boiling point, with approximately 49% chlorodifluoromethane	1973	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
3-Chloro-1,2-dihydroxypropane, see **Glycerol alpha-monochlorohydrin**												
Chlorodimethyl ether, see **Methyl chloromethyl ether**												
Chlorodinitrobenzenes, liquid	1577	6.1		Toxic		A113	II	E4	654 Y641	5 L 1 L	662	60 L
Chlorodinitrobenzenes, solid	3441	6.1		Toxic		A113	II	E4	669 Y644	25 kg 1 kg	676	100 kg
≠ **2-Chloroethanal**	2232	6.1					I		FORBIDDEN		FORBIDDEN	
Chloroethane, see **Ethyl chloride**												
Chloroethane nitrile, see **Chloroacetonitrile**												
2-Chloroethanol, see **Ethylene chlorohydrin**												
Chloroform	1888	6.1		Toxic	US 4		III	E1	680 Y680	60 L 2 L	680	220 L
Chloroformates, toxic, corrosive, n.o.s.*	3277	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
Chloroformates, toxic, corrosive, flammable, n.o.s.*	2742	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Chloromethane, see **Methyl chloride**												
1-Chloro-3-methylbutane, see **Amyl chloride**												
2-Chloro-2-methylbutane, see **Amyl chloride**												
Chloromethyl chloroformate	2745	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
Chloromethyl cyanide, see **Chloroacetonitrile**												
Chloromethyl ethyl ether	2354	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
Chloromethyl methyl ether, see **Methyl chloromethyl ether**												
3-Chloro-4-methylphenyl isocyanate, liquid	2236	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
3-Chloro-4-methylphenyl isocyanate, solid	3428	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
3-Chloro-2-methylprop-1-ene, see **Methylallyl chloride**												
Chloronitroanilines	2237	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Chloronitrobenzenes, liquid	3409	6.1		Toxic		A113	II	E4	654 Y641	5 L 1 L	662	60 L
Chloronitrobenzenes, solid	1578	6.1		Toxic		A113	II	E4	669 Y644	25 kg 1 kg	676	100 kg
Chloronitrotoluenes, liquid	2433	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Chloronitrotoluenes, solid	3457	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Chloropentafluoroethane	1020	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
3-Chloroperoxybenzoic acid, more than 57% and not more than 86%, when with 14% or more inert solid	FORBIDDEN											
Chlorophenolates, liquid	2904	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Chlorophenolates, solid	2905	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Chlorophenols, liquid	2021	6.1		Toxic	US 4		III	E1	655 Y642	60 L 2 L	663	220 L
	Chlorophenols, solid	2020	6.1		Toxic	US 4	A25	III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Chlorophenyltrichlorosilane	1753	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
≠	**Chloropicrin**	1580	6.1					I		FORBIDDEN		FORBIDDEN	
	Chloropicrin and methyl bromide mixture with more than 2% chloropicrin	1581	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Chloropicrin and methyl chloride mixture	1582	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Chloropicrin mixture, n.o.s.***	1583	6.1			AU 1 CA 7 IR 3 NL 1 US 3	A2 A3 A137	I II III		FORBIDDEN FORBIDDEN FORBIDDEN		FORBIDDEN FORBIDDEN FORBIDDEN	
	Chloroplatinic acid, solid	2507	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Chloroprene, stabilized	1991	3	6.1	Liquid flammable & Toxic		A209	I	E0	FORBIDDEN		361	30 L
	Chloroprene, uninhibited	FORBIDDEN											
	1-Chloropropane	1278	3		Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		364	60 L
	2-Chloropropane	2356	3		Liquid flammable			I	E3	351	1 L	361	30 L
	3-Chloro-propanediol-1,2, see **Glycerol alpha-monochlorohydrin**												
	3-Chloropropanol-1	2849	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	2-Chloropropene	2456	3		Liquid flammable			I	E3	351	1 L	361	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	3-Chloropropene, see **Allyl chloride**												
	3-Chloroprop-1-ene, see **Allyl chloride**												
	2-Chloropropionic acid	2511	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
	2-Chloropyridine	2822	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Chlorosilanes, corrosive, n.o.s.	2987	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	Chlorosilanes, corrosive, flammable, n.o.s.	2986	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	Chlorosilanes, flammable, corrosive, n.o.s.	2985	3	8	Liquid flammable & Corrosive			II	E0	FORBIDDEN		377	5 L
	Chlorosilanes, toxic, corrosive, n.o.s. *	3361	6.1	8	Toxic & Corrosive			II	E0	FORBIDDEN		681	30 L
	Chlorosilanes, toxic, corrosive, flammable, n.o.s.*	3362	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	E0	FORBIDDEN		681	30 L
	Chlorosilanes, water-reactive, flammable, corrosive, n.o.s.	2988	4.3	3 8	Danger if wet & Liquid flammable & Corrosive			I	E0	FORBIDDEN		480	1 L
≠	**Chlorosulphonic acid** (with or without sulphur trioxide)	1754	8					I		FORBIDDEN		FORBIDDEN	
	1-Chloro-1,2,2,2-tetrafluoroethane	1021	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Chlorotoluenes	2238	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	4-Chloro-o-toluidine hydrochloride, solid	1579	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
	4-Chloro-o-toluidine hydrochloride solution	3410	6.1		Toxic		A3	III	E1	655 Y642	60 L 2 L	663	220 L
	Chlorotoluidines, liquid	3429	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Chlorotoluidines, solid	2239	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	1-Chloro-2,2,2-trifluoroethane	1983	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Chlorotrifluoroethylene, see **Trifluorochloroethylene, stabilized** (UN No. 1082)												
Chlorotrifluoromethane	1022	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Chlorotrifluoromethane and trifluoromethane azeotropic mixture with approximately 60% chlorotrifluoromethane	2599	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Chromic acid, solid, see **Chromium trioxide, anhydrous**												
Chromic acid solution	1755	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Chromic anhydride, solid, see **Chromium trioxide, anhydrous**												
Chromic fluoride, solid	1756	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Chromic fluoride solution	1757	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Chromic nitrate, see **Chromium nitrate**												
Chromic trioxide, see **Chromium trioxide, anhydrous**												
Chromium (VI) dichloride dioxide, see **Chromium oxychloride**												
Chromium (III) fluoride, solid, see **Chromic fluoride, solid**												
Chromium nitrate	2720	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Chromium (III) nitrate, see **Chromium nitrate**												
Chromium oxychloride	1758	8		Corrosive			I	E0	850	0.5 L	854	2.5 L
Chromium trioxide, anhydrous	1463	5.1	6.1 8	Oxidizer & Toxic & Corrosive	US 4		II	E2	558 Y544	5 kg 2.5 kg	562	25 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Chromosulphuric acid	2240	8		Corrosive			I	E0	850	0.5 L	854	2.5 L
Chrysotile, see **Asbestos, chrysotile** (UN 2590), etc.												
Cigar and cigarette lighter fluid, see **Flammable liquid, n.o.s.**												
Cigar and cigarette lighters, charged with fuel, see **Lighters** (cigarettes), etc.												
Cinene, see **Dipentene**												
Cinnamene, see **Styrene monomer, stabilized**												
Cinnamol, see **Styrene monomer, stabilized**												
Clinical waste, unspecified, n.o.s.	3291	6.2		Infectious		A117		E0	621	No limit	621	No limit
Coal briquettes, hot	FORBIDDEN											
Coal gas, compressed †	1023	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Coal tar distillates, flammable	1136	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Coal tar naphtha, see **Petroleum distillates, n.o.s.** or **Petroleum products, n.o.s.**												
Coal tar oil, see **Coal tar distillates, flammable**												
Coating solution (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining) †	1139	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
							II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
+	**Cobalt dihydroxide powder**, containing not less than 10% respirable particles	3550	6.1		Toxic			I	E5	666	5 kg	673	50 kg
	Cobalt naphthenates, powder	2001	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Cobalt resinate, precipitated	1318	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Cocculus, see **Toxins, extracted from living sources, n.o.s.**												
	Coke, hot	FORBIDDEN											
	Collodion cottons, see **Nitrocellulose,** etc. (UN Nos. 0340, 0341, 0342, 2059, 2555, 2556, 2557)												
	Cologne spirits, see **Perfumery products** etc.												
	Components, explosive train, n.o.s.* †	0382	1.2B							FORBIDDEN		FORBIDDEN	
	Components, explosive train, n.o.s.* †	0383	1.4B		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
	Components, explosive train, n.o.s.* †	0384	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
	Components, explosive train, n.o.s.* †	0461	1.1B							FORBIDDEN		FORBIDDEN	
	Composition B, see **Hexolite**, etc.												
	Compressed gas, n.o.s.*	1956	2.2		Gas non-flammable		A202		E1	200	75 kg	200	150 kg
	Compressed gas, flammable, n.o.s.*	1954	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Compressed gas, oxidizing, n.o.s.*	3156	2.2	5.1	Gas non-flammable & Oxidizer	US 18			E0	200	75 kg	200	150 kg
	Compressed gas, toxic, n.o.s.*	1955	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Compressed gas, toxic, corrosive, n.o.s.*	3304	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Compressed gas, toxic, flammable, n.o.s.*	1953	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Compressed gas, toxic, flammable, corrosive, n.o.s.*	3305	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Compressed gas, toxic, oxidizing, n.o.s.*	3303	2.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Compressed gas, toxic, oxidizing, corrosive, n.o.s.*	3306	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Consumer commodity †	8000	9		Miscellaneous		A112			Y963	30 kg G	Y963	30 kg G
Contrivances, water-activated* with burster, expelling charge or propelling charge †	0248	1.2L							FORBIDDEN		FORBIDDEN	
Contrivances, water-activated* with burster, expelling charge or propelling charge †	0249	1.3L							FORBIDDEN		FORBIDDEN	
Copper acetoarsenite	1585	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Copper acetylide	FORBIDDEN											
Copper amine azide	FORBIDDEN											
Copper arsenite	1586	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Copper (II) arsenite, see **Copper arsenite**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Copper based pesticide, liquid, flammable, toxic*, flash point less than 23ºC	2776	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
								II	E2	352	1 L	364	60 L
										Y341	1 L		
	Copper based pesticide, liquid, toxic*	3010	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654	5 L	662	60 L
										Y641	1 L		
								III	E1	655	60 L	663	220 L
										Y642	2 L		
	Copper based pesticide, liquid, toxic, flammable*, flash point not less than 23ºC	3009	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654	5 L	662	60 L
										Y641	1 L		
								III	E1	655	60 L	663	220 L
										Y642	2 L		
	Copper based pesticide, solid, toxic*	2775	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669	25 kg	676	100 kg
										Y644	1 kg		
								III	E1	670	100 kg	677	200 kg
										Y645	10 kg		
	Copper chlorate	2721	5.1		Oxidizer			II	E2	558	5 kg	562	25 kg
										Y544	2.5 kg		
	Copper (II) chlorate, see **Copper chlorate**												
	Copper chloride	2802	8		Corrosive	US 4		III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Copper cyanide	1587	6.1		Toxic	US 4		II	E4	669	25 kg	676	100 kg
										Y644	1 kg		
	Copper selenate, see **Selenates**												
	Copper selenite, see **Selenites**												
	Copper tetramine nitrate	FORBIDDEN											
≠	**Copra** †	1363	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
	Cord, detonating, flexible †	0065	1.1D			AU 2 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Cord, detonating, flexible †	0289	1.4D		Explosive 1.4	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		139	75 kg
Cord, detonating, metal clad †	0102	1.2D							FORBIDDEN		FORBIDDEN	
Cord, detonating, metal clad †	0290	1.1D							FORBIDDEN		FORBIDDEN	
Cord, detonating, mild effect, metal clad	0104	1.4D		Explosive 1.4				E0	FORBIDDEN		139	75 kg
Cord, igniter †	0066	1.4G		Explosive 1.4	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		140	75 kg
Cordite, see **Powder, smokeless**												
Corrosive liquid, n.o.s.*	1760	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Corrosive liquid, acidic, inorganic, n.o.s.*	3264	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Corrosive liquid, acidic, organic, n.o.s.*	3265	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Corrosive liquid, basic, inorganic, n.o.s.*	3266	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Corrosive liquid, basic, organic, n.o.s.*	3267	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Corrosive liquid, flammable, n.o.s.*	2920	8	3	Corrosive & Liquid flammable			I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Corrosive liquid, oxidizing, n.o.s.*	3093	8	5.1	Corrosive & Oxidizer			I	E0	FORBIDDEN		854	2.5 L
								II	E2	851	1 L	855	30 L
										Y840	0.5 L		
	Corrosive liquid, self-heating, n.o.s.*	3301	8	4.2	Corrosive & Spontaneous combustion			I	E0	850	0.5 L	854	2.5 L
								II	E2	851	1 L	855	30 L
≠	**Corrosive liquid, toxic, n.o.s.***	2922	8	6.1	Corrosive & Toxic		A3	I	E0	850	0.5 L	854	2.5 L
							A4	II	E2	851	1 L	855	30 L
										Y840	0.5 L		
								III	E1	852	5 L	856	60 L
										Y841	1 L		
≠	**Corrosive liquid, water-reactive, n.o.s.***	3094	8	4.3	Corrosive & Danger if wet			I		FORBIDDEN		FORBIDDEN	
								II	E2	851	1 L	855	30 L
	Corrosive solid, n.o.s.*	1759	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
								III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Corrosive solid, acidic, inorganic, n.o.s.*	3260	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
								III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Corrosive solid, acidic, organic, n.o.s.*	3261	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
								III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Corrosive solid, basic, inorganic, n.o.s.*	3262	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
								III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Corrosive solid, basic, organic, n.o.s.*	3263	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
								III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Corrosive solid, flammable, n.o.s.*	2921	8	4.1	Corrosive & Solid flammable			I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
	Corrosive solid, oxidizing, n.o.s.*	3084	8	5.1	Corrosive & Oxidizer			I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Corrosive solid, self-heating, n.o.s.*	3095	8	4.2	Corrosive & Spontaneous combustion			I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
≠	**Corrosive solid, toxic, n.o.s.***	2923	8	6.1	Corrosive & Toxic		A3	I	E0	858	1 kg	862	25 kg
							A5	II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
								III	E1	860	25 kg	864	100 kg
										Y845	5 kg		
	Corrosive solid, water-reactive, n.o.s.*	3096	8	4.3	Corrosive & Danger if wet			I	E0	858	1 kg	862	25 kg
								II	E2	859	15 kg	863	50 kg
										Y844	5 kg		
	Cosmetics, n.o.s., see **Consumer commodity**												
	Cosmetics, corrosive, liquid, n.o.s., see **Corrosive liquid, n.o.s.**												
	Cosmetics, corrosive, solid, n.o.s., see **Corrosive solid, n.o.s.**												
	Cosmetics, flammable, liquid, n.o.s., see **Flammable liquid, n.o.s.** or **Perfumery products**												
	Cosmetics, flammable, solid, n.o.s., see **Flammable solid, inorganic, n.o.s.** or **organic, n.o.s.**												
	Cosmetics, oxidizing material, n.o.s., see **Oxidizing liquid** or **solid, n.o.s.**												
≠	**Cotton waste, oily**	1364	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Cotton, wet**	1365	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
	Coumarin derivative pesticide, liquid, flammable, toxic*, flash point less than 23ºC	3024	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
								II	E2	352	1 L	364	60 L
										Y341	1 L		

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Coumarin derivative pesticide, liquid, toxic*	3026	6.1		Toxic		A3 A4	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Coumarin derivative pesticide, liquid, toxic, flammable*, flash point not less than 23ºC	3025	6.1	3	Toxic & Liquid flammable		A3 A4	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Coumarin derivative pesticide, solid, toxic*	3027	6.1		Toxic		A3 A5	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Creosote, see **Toxic liquid, organic, n.o.s.**												
	Creosote salts, see **Naphthalene**, etc.												
	Cresols, liquid	2076	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
	Cresols, solid	3455	6.1	8	Toxic & Corrosive			II	E4	668 Y644	15 kg 1 kg	675	50 kg
	Cresylic acid	2022	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
	Crocidolite, see **Asbestos, amphibole** (UN No. 2212)												
≠	**Crotonaldehyde**	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A209	I		FORBIDDEN		FORBIDDEN	
≠	**Crotonaldehyde, stabilized**	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A209	I		FORBIDDEN		FORBIDDEN	
	Crotonic acid, liquid	3472	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Crotonic acid, solid	2823	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Crotonic aldehyde, stabilized, see **Crotonaldehyde, stabilized**												
Crotonylene	1144	3		Liquid flammable			I	E3	351	1 L	361	30 L
Crude naphtha, see **Petroleum distillates, n.o.s.**												
Cumene, see **Isopropylbenzene**												
Cupric chlorate, see **Copper chlorate** (UN No. 2721)												
Cupric cyanide, see **Copper cyanide**												
Cupriethylenediamine solution	1761	8	6.1	Corrosive & Toxic		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Cutters, cable, explosive †	0070	1.4S		Explosive 1.4				E0	134	25 kg	134	100 kg
Cyanides, inorganic, solid, n.o.s.*	1588	6.1		Toxic	US 4	A3	I	E5	666	5 kg	673	50 kg
						A13	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Cyanide solution, n.o.s.*	1935	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							II	E4	654 Y641	5 L 1 L	661	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Cyanides, organic, flammable, toxic, n.o.s., see **Nitriles, flammable, toxic, n.o.s.**												
Cyanides, organic, toxic, n.o.s., see **Nitriles, liquid, toxic, n.o.s.** (UN No. 3276) or **Nitriles, solid, toxic, n.o.s.** (UN No. 3439)												
Cyanides, organic, toxic, flammable, n.o.s., see **Nitriles, toxic, flammable, n.o.s.**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Cyanoacetonitrile, see **Malononitrile**												
Cyanogen	1026	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠ **Cyanogen bromide**	1889	6.1	8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
Cyanogen chloride, stabilized	1589	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
Cyanuric chloride	2670	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Cyanuric triazide	FORBIDDEN											
Cyclobutane	2601	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Cyclobutyl chloroformate	2744	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
1,5,9-Cyclododecatriene	2518	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Cycloheptane	2241	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Cycloheptatriene	2603	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
1,3,5-Cycloheptatriene, see **Cycloheptatriene**												
Cycloheptene	2242	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
1,4-Cyclohexadienedione, see **Benzoquinone**												
Cyclohexane	1145	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Cyclohexanethiol, see **Cyclohexyl mercaptan**												
Cyclohexanone	1915	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Cyclohexene	2256	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Cyclohexenyltrichlorosilane	1762	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Cyclohexyl acetate	2243	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Cyclohexylamine	2357	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
≠ **Cyclohexyl isocyanate**	2488	6.1	3				I		FORBIDDEN		FORBIDDEN	
Cyclohexyl mercaptan	3054	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Cyclohexyltrichlorosilane	1763	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Cyclonite and cyclotetramethylene-tetranitramine mixture, desensitized with not less than 10% phlegmatizer, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
Cyclonite and cyclotetramethylene-tetranitramine mixture, wetted with not less than 15% water, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
Cyclonite, desensitized	0483	1.1D							FORBIDDEN		FORBIDDEN	
Cyclonite, wetted with not less than 15% water, by mass	0072	1.1D							FORBIDDEN		FORBIDDEN	
Cyclooctadiene phosphines	2940	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Cyclooctadienes	2520	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Cyclooctatetraene	2358	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Cyclopentane	1146	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Cyclopentanol	2244	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Cyclopentanone	2245	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Cyclopentene	2246	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Cyclopropane	1027	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Cyclotetramethylene-tetranitramine, desensitized	0484	1.1D							FORBIDDEN		FORBIDDEN	
Cyclotetramethylenetetranitramine (dry or unphlegmatized) (HMX)	FORBIDDEN											
Cyclotetramethylene-tetranitramine, wetted with not less than 15% water, by mass	0226	1.1D							FORBIDDEN		FORBIDDEN	
Cyclotrimethylenetrinitramine and cyclotetramethylene-tetranitramine mixture, desensitized with not less than 10% phlegmatizer, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
Cyclotrimethylenetrinitramine and cyclotetramethylene-tetranitramine mixture, wetted with not less than 15% water, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
Cyclotrimethylenetrinitramine, desensitized	0483	1.1D							FORBIDDEN		FORBIDDEN	
Cyclotrimethylenetrinitramine, wetted with not less than 15% water, by mass	0072	1.1D							FORBIDDEN		FORBIDDEN	
Cymenes	2046	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Cymol, see **Cymenes**												
D												
Dangerous goods in apparatus	3363	9		Miscellaneous		A48 A107		E0	FORBIDDEN		see 962	
Dangerous goods in articles	3363	9		Miscellaneous		A48 A107		E0	see 962		see 962	
Dangerous goods in machinery	3363	9		Miscellaneous		A48 A107		E0	FORBIDDEN		see 962	
Deanol, see **2-Dimethylaminoethanol** (UN No. 2051)												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Decaborane	1868	4.1	6.1	Solid flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		448	50 kg
	Decahydronaphthalene	1147	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Decalin, see **Decahydronaphthalene**												
	n-Decane	2247	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Deflagrating metal salts of aromatic nitro-derivatives, n.o.s.	0132	1.3C							FORBIDDEN		FORBIDDEN	
	Depth charges, see **Charges, depth**												
≠	**Desensitized explosive, liquid, n.o.s.***	3379	3			BE 3	A133	I		FORBIDDEN		FORBIDDEN	
≠	**Desensitized explosive, solid, n.o.s.***	3380	4.1			BE 3	A133 A217	I		FORBIDDEN		FORBIDDEN	
	Detonating relays, see **Detonators, non-electric** or **Detonator assemblies, non-electric**												
	Detonator assemblies, non-electric for blasting †	0360	1.1B							FORBIDDEN		FORBIDDEN	
	Detonator assemblies, non-electric for blasting †	0361	1.4B		Explosive 1.4				E0	FORBIDDEN		131	75 kg
	Detonator assemblies, non-electric for blasting †	0500	1.4S		Explosive 1.4		A165		E0	131	25 kg	131	100 kg
	Detonators, electric for blasting †	0030	1.1B							FORBIDDEN		FORBIDDEN	
	Detonators, electric for blasting †	0255	1.4B		Explosive 1.4				E0	FORBIDDEN		131	75 kg
	Detonators, electric for blasting †	0456	1.4S		Explosive 1.4		A165		E0	131	25 kg	131	100 kg
	Detonators, electronic programmable for blasting †	0511	1.1B						E0	FORBIDDEN		FORBIDDEN	
	Detonators, electronic programmable for blasting †	0512	1.4B		Explosive 1.4				E0	FORBIDDEN		131	75 kg
	Detonators, electronic programmable for blasting †	0513	1.4S		Explosive 1.4		A165		E0	131	25 kg	131	100 kg
	Detonators for ammunition †	0073	1.1B							FORBIDDEN		FORBIDDEN	
	Detonators for ammunition †	0364	1.2B							FORBIDDEN		FORBIDDEN	
	Detonators for ammunition †	0365	1.4B		Explosive 1.4				E0	FORBIDDEN		133	75 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Detonators for ammunition †	0366	1.4S		Explosive 1.4		A165		E0	133	25 kg	133	100 kg
Detonators, non-electric for blasting †	0029	1.1B							FORBIDDEN		FORBIDDEN	
Detonators, non-electric for blasting †	0267	1.4B		Explosive 1.4				E0	FORBIDDEN		131	75 kg
Detonators, non-electric for blasting †	0455	1.4S		Explosive 1.4		A165		E0	131	25 kg	131	100 kg
Deuterium, compressed	1957	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Devices, small, hydrocarbon gas powered with release device	3150	2.1		Gas flammable				E0	201	1 kg	201	15 kg
Diacetone alcohol	1148	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Diacetone alcohol peroxides, more than 57% in solution with more than 9% hydrogen peroxide, less than 26% diacetone alcohol and less than 9% water; total active oxygen content more than 10% by mass	FORBIDDEN											
Diallylamine	2359	3	6.1 8	Liquid flammable & Toxic & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Diallyl ether	2360	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
4,4'-Diaminodiphenylmethane	2651	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
1,2-Diaminoethane, see **Ethylenediamine**												
Diaminopropylamine, see **3,3'-Iminodipropylamine**												
Di-n-amylamine	2841	3	6.1	Liquid flammable & Toxic			III	E1	355 Y343	60 L 2 L	366	220 L
p-Diazidobenzene	FORBIDDEN											
1,2-Diazidoethane	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
1,1'-Diazoaminonaphthalene	FORBIDDEN											
Diazoaminotetrazole (dry)	FORBIDDEN											
Diazodinitrophenol (dry)	FORBIDDEN											
Diazodinitrophenol, wetted with not less than 40% water, or mixture of alcohol and water, by mass	0074	1.1A							FORBIDDEN		FORBIDDEN	
Diazodiphenylmethane	FORBIDDEN											
2-Diazo-1-naphthol-4-sulphonylchloride	FORBIDDEN											
2-Diazo-1-naphthol-5-sulphonylchloride	FORBIDDEN											
Diazonium nitrates (dry)	FORBIDDEN											
Diazonium perchlorates (dry)	FORBIDDEN											
1,3-Diazopropane	FORBIDDEN											
Dibenzopyridine, see **Acridine**												
Dibenzoyl peroxide, more than 77% and not more than 94%, when with 6% or more water	FORBIDDEN											
Dibenzoyl peroxide, more than 51%, when with not more than 48% inert solid	FORBIDDEN											
Dibenzyldichlorosilane	2434	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Dibenzyl peroxydicarbonate, more than 87% with water	FORBIDDEN											
Dibenzyl peroxydicarbonate, not more than 87% when with 13% or more water	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Diborane	1911	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Dibromoacetylene	FORBIDDEN											
1,2-Dibromobutan-3-one	2648	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
1,2-Dibromo-3-chloropropane, see **Dibromochloropropanes**												
Dibromochloropropanes	2872	6.1		Toxic	US 4	A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Dibromodifluoromethane	1941	9		Miscellaneous			III	E1	964 Y964	100 L 30 kg G	964	220 L
Dibromomethane	2664	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Di-n-butylamine	2248	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
Dibutylaminoethanol	2873	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
2-Dibutylaminoethanol, see **Dibutylaminoethanol**												
N,N-Di-n-butylaminoethanol, see **Dibutylaminoethanol**												
Dibutyl ethers	1149	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane, more than 90%	FORBIDDEN											
2,2-Di-(tert-butylperoxy) butane, more than 55% in solution	FORBIDDEN											
1,1-Di-(tert-butylperoxy) cyclohexane, more than 80%	FORBIDDEN											
Di-n-butyl peroxydicarbonate, more than 52% in solution	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Di-(tert-butylperoxy) phthalate, more than 55% in solution	FORBIDDEN											
	N,N'-Dichlorazodicarbonamidine (salts of) (dry)	FORBIDDEN											
	Dichloroacetic acid	1764	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	1,3-Dichloroacetone	2649	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Dichloroacetyl chloride	1765	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Dichloroacetylene	FORBIDDEN											
	Dichloroanilines, liquid	1590	6.1		Toxic		A113	II	E4	654 Y641	5 L 1 L	662	60 L
	Dichloroanilines, solid	3442	6.1		Toxic		A113	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	o-Dichlorobenzene	1591	6.1		Toxic	US 4	A113	III	E1	655 Y642	60 L 2 L	663	220 L
	Di-4-chlorobenzoyl peroxide, not more than 77%, when with 23% or more water	FORBIDDEN											
	2,2'-Dichlorodiethyl ether	1916	6.1	3	Toxic & Liquid flammable	US 4		II	E4	654 Y641	5 L 1 L	661	60 L
	Dichlorodifluoromethane	1028	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Dichlorodifluoromethane and difluoroethane azeotropic mixture with approximately 74% dichlorodifluoromethane	2602	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Dichlorodifluoromethane and ethylene oxide mixture, see **Ethylene oxide and dichlorodifluoromethane mixture**, etc.												
≠	**Dichlorodimethyl ether, symmetrical**	2249	6.1	3				I		FORBIDDEN		FORBIDDEN	
	1,1-Dichloroethane	2362	3		Liquid flammable	US 4		II	E2	353 Y341	5 L 1 L	364	60 L
	1,2-Dichloroethane, see **Ethylene dichloride**												
	1,2-Dichloroethylene	1150	3		Liquid flammable	US 4		II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Di(2-chloroethyl) ether, see **2,2'-Dichlorodiethyl ether**												
Dichloroethyl sulphide	FORBIDDEN											
Dichlorofluoromethane	1029	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
alpha-Dichlorohydrin, see **1,3-Dichloropropanol-2**												
Dichloroisocyanuric acid, dry	2465	5.1		Oxidizer		A28	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Dichloroisocyanuric acid salts	2465	5.1		Oxidizer		A28	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Dichloroisopropyl ether	2490	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Dichloromethane	1593	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
1,1-Dichloro-1-nitroethane	2650	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Dichloropentanes	1152	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Dichlorophenol, see **Chlorophenols**, liquid or solid, etc.												
Dichlorophenyl isocyanates	2250	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Dichlorophenyltrichlorosilane	1766	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
1,2-Dichloropropane	1279	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
1,3-Dichloropropanol-2	2750	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
1,3-Dichloro-2-propanone, see **1,3-Dichloroacetone**												
Dichloropropenes	2047	3		Liquid flammable	US 4	A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Dichlorosilane	2189	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Dichloro-s-triazine -2,4,6-trione, see **Dichloroisocyanuric acid, dry** or **Dichloroisocyanuric acid, salts**												
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1958	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Dichlorovinylchloroarsine	FORBIDDEN											
1,4-Dicyanobutane, see **Adiponitrile**												
Dicycloheptadiene, see **Bicyclo [2.2.1] hepta-2,5-diene, stabilized** or **2.5-Nonbornadiene, stabilized**												
Dicyclohexylamine	2565	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Dicyclohexylamine nitrite, see **Dicyclohexylammonium nitrite**												
Dicyclohexylammonium nitrite	2687	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Dicyclohexyl peroxydicarbonate, more than 91%	FORBIDDEN											
Dicyclopentadiene	2048	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
2,2-Di-(4,4-di-tert-butylperoxy-cyclohexyl) propane, more than 42% with inert solid	FORBIDDEN											
Di-2,4-dichlorobenzoyl peroxide, not more than 77% when with 23% or more water	FORBIDDEN											
1,2-Di-(dimethylamino) ethane	2372	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Didymium nitrate	1465	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Diesel fuel	1202	3		Liquid flammable		A3	III	E1	355 Y344	60 L 10 L	366	220 L
Diethanol nitrosamine dinitrate (dry)	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
1,1-Diethoxyethane, see **Acetal**												
1,2-Diethoxyethane, see **Ethylene glycol diethyl ether**												
Diethoxymethane	2373	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
3,3-Diethoxypropene	2374	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Diethylamine	1154	3	8	Liquid flammable & Corrosive	US 4		II	E2	352 Y340	1 L 0.5 L	363	5 L
Diethylaminoethanol, see **2-Diethylaminoethanol** (UN. 2686)												
2-Diethylaminoethanol	2686	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
3-Diethylaminopropylamine	2684	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
N,N-Diethylaniline	2432	6.1		Toxic		A113	III	E1	655 Y642	60 L 2 L	663	220 L
Diethylbenzene	2049	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Diethylcarbinol, see **Pentanols** (UN No. 1105)												
Diethyl carbonate	2366	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Diethyldichlorosilane	1767	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Diethylenediamine, see **Piperazine**												
Diethyleneglycol dinitrate, desensitized with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass	0075	1.1D							FORBIDDEN		FORBIDDEN	
Diethyleneglycol dinitrate (dry)	FORBIDDEN											
Diethylenetriamine	2079	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
N,N-Diethylethanolamine, see **2-Diethylaminoethanol**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Diethyl ether	1155	3		Liquid flammable			I	E3	351	1 L	361	30 L
N,N-Diethylethylenediamine	2685	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
Diethylgold bromide	FORBIDDEN											
Di-(2-ethylhexyl) phosphoric acid, see **Diisooctyl acid phosphate**												
Diethyl ketone	1156	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Diethyl peroxydicarbonate, more than 27% in solution	FORBIDDEN											
Diethyl sulphate	1594	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Diethyl sulphide	2375	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Diethylthiophosphoryl chloride	2751	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Diethylzinc, see **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												
2,4-Difluoroaniline, see **Fluoroanilines**												
Difluorochloroethane, see **1-Chloro-1,1-difluoroethane**												
1,1-Difluoroethane	1030	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
1,1-Difluoroethylene	1959	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Difluoromethane	3252	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane azeotropic mixture with approximately 23% difluoromethane and 25% pentafluoroethane, see **Refrigerant gas R 407C**												
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane azeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane, see **Refrigerant gas R 407A**												
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane azeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane, see **Refrigerant gas R 407B**												
Difluorophosphoric acid, anhydrous	1768	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
2,2-Dihydroperoxypropane, not more than 27% when with 73% or more inert solid	FORBIDDEN											
2,3-Dihydropyran	2376	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
1,8-Dihydroxy-2,4,5,7-tetranitro-anthraquinone (chrysamminic acid)	FORBIDDEN											
Di-(1-hydroxytetrazole) (dry)	FORBIDDEN											
Diiodoacetylene	FORBIDDEN											
Diisobutylamine	2361	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
alpha-Diisobutylene, see **Diisobutylene, isomeric compounds**												
beta-Diisobutylene, see **Diisobutylene, isomeric compounds**												
Diisobutylene, isomeric compounds	2050	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Diisobutyl ketone	1157	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Diisobutyryl peroxide, more than 32% and not more than 52%, when with 48% or more diluent Type A or B	FORBIDDEN											
Diisooctyl acid phosphate	1902	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Diisopropylamine	1158	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Diisopropyl ether	1159	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Diisopropyl peroxydicarbonate, more than 52%	FORBIDDEN											
≠ **Diketene, stabilized**	2521	6.1	3			A209	I		FORBIDDEN		FORBIDDEN	
1,2-Dimethoxyethane	2252	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
1,1-Dimethoxyethane	2377	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Dimethoxystrychnine, see **Brucine**												
Dimethylamine, anhydrous	1032	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Dimethylamine aqueous solution	1160	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
2-Dimethylaminoacetonitrile	2378	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
2-Dimethylaminoethanol	2051	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
2-Dimethylaminoethyl acrylate, stabilized	3302	6.1		Toxic		A209	II	E4	654 Y641	5 L 1 L	662	60 L
2-Dimethylaminoethyl methacrylate, stabilized	2522	6.1		Toxic		A209	II II	E4 E4	FORBIDDEN FORBIDDEN		662	60 L
N,N-Dimethylaniline	2253	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Dimethylarsenic acid, see **Cacodylic acid**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Di-(2-methylbenzoyl) peroxide, not more than 87% when with 13% or more water	FORBIDDEN											
	N,N-Dimethylbenzylamine, see **Benzyldimethylamine**												
	2,3-Dimethylbutane	2457	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	1,3-Dimethylbutylamine	2379	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Dimethylcarbamoyl chloride	2262	8		Corrosive	US 4		II	E2	851 Y840	1 L 0.5 L	855	30 L
	Dimethyl carbonate	1161	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Dimethylcyclohexanes	2263	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	N,N-Dimethylcyclohexylamine	2264	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, more than 82%	FORBIDDEN											
	2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3, more than 86%	FORBIDDEN											
	Dimethyldichlorosilane	1162	3	8	Liquid flammable & Corrosive			II	E0	FORBIDDEN		377	5 L
	Dimethyldiethoxysilane	2380	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	2,5-Dimethyl-2,5-dihydroperoxy hexane, more than 82% with water	FORBIDDEN											
	Dimethyldioxanes	2707	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
≠	**Dimethyl disulphide**	2381	3	6.1				II		FORBIDDEN		FORBIDDEN	
	Dimethylethanolamine, see **2-Dimethylaminoethanol**												
	Dimethyl ether	1033	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	N,N-Dimethylformamide	2265	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	1,1-Dimethylhydrazine, see **Dimethylhydrazine, unsymmetrical**												
≠	**Dimethylhydrazine, symmetrical**	2382	6.1	3		US 4		I		FORBIDDEN		FORBIDDEN	
≠	**Dimethylhydrazine, unsymmetrical**	1163	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
	N,N-Dimethyl-4-nitrosoaniline, see **p-Nitrosodimethylaniline**												
	2,2-Dimethylpropane	2044	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Dimethyl-N-propylamine	2266	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
≠	**Dimethyl sulphate**	1595	6.1	8				I		FORBIDDEN		FORBIDDEN	
	Dimethyl sulphide	1164	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Dimethyl thiophosphoryl chloride	2267	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
	Dimethylzinc, see **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												
	Di-(1-naphthoyl) peroxide	FORBIDDEN											
	DINGU	0489	1.1D							FORBIDDEN		FORBIDDEN	
	Dinitroanilines	1596	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Dinitrobenzenes, liquid	1597	6.1		Toxic	US 4	A3	II	E4	654 Y641	5 L 1L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Dinitrobenzenes, solid	3443	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Dinitrochlorobenzenes, see **Chlorodinitrobenzenes, liquid** (UN No. 1577) or **Chlorodinitrobenzenes, solid** (UN No. 3441)												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Dinitro-o-cresol	1598	6.1		Toxic	US 4	A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
Dinitro-7,8-dimethylglycoluril (dry)	FORBIDDEN											
1,3-Dinitro-5,5-dimethyl hydantoin	FORBIDDEN											
1,3-Dinitro-4,5-dinitrosobenzene	FORBIDDEN											
1,2-Dinitroethane	FORBIDDEN											
1,1-Dinitroethane (dry)	FORBIDDEN											
Dinitrogen tetroxide	1067	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Dinitroglycoluril	0489	1.1D							FORBIDDEN		FORBIDDEN	
Dinitromethane	FORBIDDEN											
Dinitrophenol, dry or wetted with less than 15% water, by mass	0076	1.1D	6.1						FORBIDDEN		FORBIDDEN	
Dinitrophenolates, alkali metals, dry or wetted with less than 15% water, by mass	0077	1.3C	6.1						FORBIDDEN		FORBIDDEN	
Dinitrophenolates, wetted with not less than 15% water, by mass	1321	4.1	6.1	Solid flammable & Toxic	BE 3	A40	I	E0	451	1 kg	451	15 kg
Dinitrophenol solution	1599	6.1		Toxic	US 4	A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Dinitrophenol, wetted with not less than 15% water, by mass	1320	4.1	6.1	Solid flammable & Toxic	BE 3 US 4	A40	I	E0	451	1 kg	451	15 kg
Dinitropropylene glycol	FORBIDDEN											
Dinitroresorcinol, dry or wetted with less than 15% water, by mass	0078	1.1D							FORBIDDEN		FORBIDDEN	
2,4-Dinitroresorcinol (heavy metal salts of) (dry)	FORBIDDEN											
4,6-Dinitroresorcinol (heavy metal salts of) (dry)	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Dinitroresorcinol, wetted with not less than 15% water, by mass	1322	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
	3,5-Dinitrosalicylic acid (lead salt) (dry)	FORBIDDEN											
	Dinitrosobenzene	0406	1.3C							FORBIDDEN		FORBIDDEN	
	Dinitrosobenzylamidine and salts of (dry)	FORBIDDEN											
	2,2-Dinitrostilbene	FORBIDDEN											
	1,4-Dinitro-1,1,4,4-tetramethylol-butane tetranitrate (dry)	FORBIDDEN											
	Dinitrotoluene mixed with sodium chlorate, see **Explosive, blasting, type C**												
	Dinitrotoluenes, liquid	2038	6.1		Toxic	US 4		II	E4	654 Y641	5 L 1 L	662	60 L
≠	**Dinitrotoluenes, molten**	1600	6.1					II		FORBIDDEN		FORBIDDEN	
	Dinitrotoluenes, solid	3454	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	2,4-Dinitro-1,3,5-trimethylbenzene	FORBIDDEN											
	Di-(beta-nitroxyethyl) ammonium nitrate	FORBIDDEN											
	a,a'-Di-(nitroxy) methylether	FORBIDDEN											
	1,9-Dinitroxy pentamethylene-2,4,6,8-tetramine (dry)	FORBIDDEN											
	Dioxane	1165	3		Liquid flammable	US 4		II	E2	353 Y341	5 L 1 L	364	60 L
	Dioxolane	1166	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Dipentene	2052	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Di-(2-phenoxyethyl) peroxydicarbonate, more than 85%	FORBIDDEN											
≠	**Diphenylamine chloroarsine**	1698	6.1					I		FORBIDDEN		FORBIDDEN	
≠	**Diphenylchloroarsine, liquid**	1699	6.1					I		FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Diphenylchloroarsine, solid	3450	6.1		Toxic			I	E0	FORBIDDEN		673	50 kg
Diphenyldichlorosilane	1769	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Diphenylmethyl bromide	1770	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Dipicrylamine	0079	1.1D							FORBIDDEN		FORBIDDEN	
Dipicryl sulphide, dry or wetted with less than 10% water, by mass	0401	1.1D							FORBIDDEN		FORBIDDEN	
Dipicryl sulphide, wetted with not less than 10% water, by mass	2852	4.1		Solid flammable	BE 3	A40	I	E0	FORBIDDEN		451	0.5 kg
Dipropionyl peroxide, more than 28% in solution	FORBIDDEN											
Dipropylamine	2383	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Dipropylene triamine, see **3,3'-Iminodipropylamine**												
Di-n-propyl ether	2384	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Dipropyl ketone	2710	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Disinfectant, liquid, corrosive, n.o.s.*	1903	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Disinfectant, liquid, toxic, n.o.s.*	3142	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Disinfectant, solid, toxic, n.o.s.*	1601	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Disodium trioxosilicate	3253	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Disuccinic acid peroxide 72% or more	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Divinyl ether, stabilized	1167	3		Liquid flammable		A209	I	E3	FORBIDDEN		361	30 L
Dodecyltrichlorosilane	1771	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Drugs, n.o.s., see **Consumer commodity**												
Drugs, corrosive, liquid, n.o.s., see **Corrosive liquid, n.o.s.**												
Drugs, corrosive, solid, n.o.s., see **Corrosive solid, n.o.s.**												
Drugs, flammable, liquid, n.o.s., see **Flammable liquid, n.o.s.**												
Drugs, flammable, solid, n.o.s., see **Flammable solid, inorganic, n.o.s.** or **organic, n.o.s.**												
Drugs, oxidizing substance, n.o.s., see **Oxidizing liquid** or **solid, n.o.s.**												
Drugs, toxic, liquid, n.o.s., see **Toxic liquid, organic, n.o.s.**												
Drugs, toxic, solid, n.o.s., see **Toxic solid, organic, n.o.s.**												
Dry ice	1845	9		Miscellaneous		A48 A151		E0	954	200 kg	954	200 kg
Dye and dye intermediate, n.o.s., flammable liquid, see **Flammable liquid, n.o.s.**												
Dye intermediate, liquid, corrosive, n.o.s.* †	2801	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		
Dye intermediate, liquid, toxic, n.o.s.* †	1602	6.1		Toxic		A3 A4	I	E5	652	1 L	658	30 L
							II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Dye intermediate, solid, corrosive, n.o.s.* †	3147	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
							II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
							III	E1	860	25 kg	864	100 kg
									Y845	5 kg		
Dye intermediate, solid, toxic, n.o.s.* †	3143	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Dye, liquid, corrosive, n.o.s.*	2801	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		
Dye, liquid, toxic, n.o.s.*	1602	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Dye, solid, corrosive, n.o.s.*	3147	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
							II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
							III	E1	860	25 kg	864	100 kg
									Y845	5 kg		
Dye, solid, toxic, n.o.s.*	3143	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Dynamite, see **Explosive, blasting, type A**												
E												
Electric storage batteries, see **Batteries**, etc. (UN Nos. 2794, 2795, 2800, 3028)												
Electrolyte (acid or alkaline) for batteries †, see **Battery fluid, acid** or **Battery fluid, alkali**												
Electron tubes containing mercury, see **Mercury** contained in manufactured articles												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Elevated temperature liquid, n.o.s.***, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	3257	9					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature liquid, flammable, n.o.s.***, with flash point above 60°C, at or above its flash point	3256	3					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature solid, n.o.s.***, at or above 240°C	3258	9					III		FORBIDDEN		FORBIDDEN	
≠	**Engine, fuel cell, flammable gas powered** †	3529	2.1		Gas flammable		A70 A87 A154 A176 A208		E0	FORBIDDEN		220	No limit
≠	**Engine, fuel cell, flammable liquid powered** †	3528	3		Liquid flammable		A70 A87 A154 A176 A208		E0	378	No limit	378	No limit
≠	**Engine, internal combustion**	3530	9		Miscellaneous		A87 A154 A208		E0	972	No limit	972	No limit
≠	**Engine, internal combustion, flammable gas powered**	3529	2.1		Gas flammable		A70 A87 A154 A208		E0	FORBIDDEN		220	No limit
≠	**Engine, internal combustion, flammable liquid powered**	3528	3		Liquid flammable		A70 A87 A154 A208		E0	378	No limit	378	No limit
	Engines, rocket, see **Rocket motors**, etc.												
	Environmentally hazardous substance, liquid, n.o.s.*	3082	9		Miscellaneous	DE 5 US 4	A97 A158 A197 A215	III	E1	964 Y964	450 L 30 kg G	964	450 L
	Environmentally hazardous substance, solid, n.o.s.*	3077	9		Miscellaneous	DE 5 US 4	A97 A158 A179 A197 A215	III	E1	956 Y956	400 kg 30 kg G	956	400 kg
≠	**Epibromohydrin**	2558	6.1	3				I		FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Epichlorohydrin	2023	6.1	3	Toxic & Liquid flammable	US 4	A113	II	E4	654 Y641	5 L 1 L	662	60 L
1,2-Epoxybutane, stabilized, see **1,2-Butylene oxide, stabilized**												
Epoxyethane, see **Ethylene oxide**												
1,2-Epoxy-3-ethoxypropane	2752	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
2,3-Epoxy-1-propanal, see **Glycidaldehyde**												
2,3-Epoxypropyl ethyl ether, see **1,2-Epoxy-3-ethoxypropane**												
Esters, n.o.s.*	3272	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Ethane	1035	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Ethane, refrigerated liquid	1961	2.1							FORBIDDEN		FORBIDDEN	
Ethanethiol, see **Ethyl mercaptan**												
Ethanol	1170	3		Liquid flammable		A3 A58	II	E2	353 Y341	5 L 1 L	364	60 L
						A180	III	E1	355 Y344	60 L 10 L	366	220 L
Ethanolamine	2491	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
Ethanol amine dinitrate	FORBIDDEN											
Ethanolamine solution	2491	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
Ethanol and gasoline mixture, with more than 10% ethanol	3475	3		Liquid flammable		A156	II	E2	353 Y341	5 L 1 L	364	60 L
Ethanol and motor spirit mixture, with more than 10% ethanol	3475	3		Liquid flammable		A156	II	E2	353 Y341	5 L 1 L	364	60 L
Ethanol and petrol mixture, with more than 10% ethanol	3475	3		Liquid flammable		A156	II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Ethanol solution	1170	3		Liquid flammable		A3 A58	II	E2	353 Y341	5 L 1 L	364	60 L
						A180	III	E1	355 Y344	60 L 10 L	366	220 L
Ether, see **Diethyl ether**												
Ethers, n.o.s.*	3271	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
2-Ethoxyethanol, see **Ethylene glycol monoethyl ether**												
2-Ethoxyethyl acetate, see **Ethylene glycol monoethyl ether acetate**												
Ethoxy propane-1, see **Ethyl propyl ether**												
Ethyl acetate	1173	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Ethylacetylene, stabilized	2452	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
Ethyl acrylate, stabilized	1917	3		Liquid flammable		A209	II	E2	FORBIDDEN		364	60 L
							II	E2	FORBIDDEN			
Ethyl alcohol	1170	3		Liquid flammable		A3 A58	II	E2	353 Y341	5 L 1 L	364	60 L
						A180	III	E1	355 Y344	60 L 10 L	366	220 L
Ethyl alcohol solution	1170	3		Liquid flammable		A3 A58	II	E2	353 Y341	5 L 1 L	364	60 L
						A180	III	E1	355 Y344	60 L 10 L	366	220 L
Ethylamine	1036	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Ethylamine, aqueous solution with not less than 50% but not more than 70% ethylamine	2270	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Ethyl amyl ketone	2271	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	N-Ethylaniline	2272	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	2-Ethylaniline	2273	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Ethylbenzene	1175	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	N-Ethyl-N-benzylaniline	2274	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	N-Ethylbenzyltoluidines, liquid	2753	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	N-Ethylbenzyltoluidines, solid	3460	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Ethyl borate	1176	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠	**Ethyl bromide**	1891	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
≠	**Ethyl bromoacetate**	1603	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	
	2-Ethylbutanol	2275	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	2-Ethylbutyl acetate	1177	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethyl butyl ether	1179	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	2-Ethylbutyraldehyde	1178	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Ethyl butyrate	1180	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethyl chloride	1037	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1		E0	FORBIDDEN		200	150 kg
	Ethyl chloroacetate	1181	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
	Ethyl chlorocarbonate, see **Ethyl chloroformate**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Ethyl chloroformate**	1182	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
	Ethyl 2-chloropropionate	2935	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethyl-alpha-chloropropionate, see **Ethyl-2-chloropropionate**												
≠	**Ethyl chlorothioformate**	2826	8	3				II		FORBIDDEN		FORBIDDEN	
	Ethyl crotonate	1862	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠	**Ethyldichloroarsine**	1892	6.1					I		FORBIDDEN		FORBIDDEN	
	Ethyldichlorosilane	1183	4.3	3 8	Danger if wet & Liquid flammable & Corrosive			I	E0	FORBIDDEN		480	1 L
	Ethylene	1962	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Ethylene, acetylene and propylene mixture, refrigerated liquid containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene	3138	2.1							FORBIDDEN		FORBIDDEN	
≠	**Ethylene chlorohydrin**	1135	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Ethylenediamine	1604	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Ethylene diamine diperchlorate	FORBIDDEN											
≠	**Ethylene dibromide**	1605	6.1			US 4		I		FORBIDDEN		FORBIDDEN	
	Ethylene dibromide and methyl bromide, liquid mixture, see **Methyl bromide and ethylene dibromide mixture, liquid**												
	Ethylene dichloride	1184	3	6.1	Liquid flammable & Toxic	US 4		II	E2	352 Y341	1 L 1 L	364	60 L
	Ethylene glycol diethyl ether	1153	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Ethylene glycol dinitrate	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Ethylene glycol monoethyl ether	1171	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethylene glycol monoethyl ether acetate	1172	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethylene glycol monomethyl ether	1188	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethylene glycol monomethyl ether acetate	1189	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠	**Ethyleneimine, stabilized**	1185	6.1	3			A209	I		FORBIDDEN		FORBIDDEN	
	Ethylene oxide	1040	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A131			FORBIDDEN		FORBIDDEN	
	Ethylene oxide and carbon dioxide mixture with more than 9% but not more than 87% ethylene oxide	1041	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	25 kg
	Ethylene oxide and carbon dioxide mixture, with more than 87% ethylene oxide	3300	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2			FORBIDDEN		FORBIDDEN	
	Ethylene oxide and carbon dioxide mixture, with not more than 9% ethylene oxide	1952	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Ethylene oxide and chlorotetrafluoroethane mixture, with not more than 8.8% ethylene oxide	3297	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Ethylene oxide and dichlorodifluoromethane mixture, with not more than 12.5% ethylene oxide	3070	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Ethylene oxide and pentafluoroethane mixture, with not more than 7.9% ethylene oxide	3298	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Ethylene oxide and propylene oxide mixture, not more than 30% ethylene oxide	2983	3	6.1	Liquid flammable & Toxic			I	E0	FORBIDDEN		361	30 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Ethylene oxide and tetrafluoroethane mixture, with not more than 5.6% ethylene oxide	3299	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Ethylene oxide with nitrogen up to a total pressure of 1 MPa at 50°C	1040	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2			FORBIDDEN		FORBIDDEN	
Ethylene, refrigerated liquid	1038	2.1							FORBIDDEN		FORBIDDEN	
Ethyl ether	1155	3		Liquid flammable			I	E3	351	1 L	361	30 L
Ethyl fluoride	2453	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Ethyl formate	1190	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
2-Ethylhexylamine	2276	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
2-Ethylhexyl chloroformate	2748	6.1	8	Toxic & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
Ethyl hydroperoxide	FORBIDDEN											
Ethylidene chloride, see **1,1-Dichloroethane**												
Ethyl isobutyrate	2385	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ **Ethyl isocyanate**	2481	6.1	3		US 2		I		FORBIDDEN		FORBIDDEN	
Ethyl lactate	1192	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Ethyl mercaptan	2363	3		Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		361	30 L
Ethyl methacrylate, stabilized	2277	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Ethyl methyl ether	1039	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Ethyl methyl ketone	1193	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Ethyl nitrate	FORBIDDEN											
	Ethyl nitrite	FORBIDDEN											
≠	**Ethyl nitrite solution**	1194	3	6.1		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Ethyl orthoformate	2524	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Ethyl oxalate	2525	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Ethyl perchlorate	FORBIDDEN											
	Ethylphenyldichlorosilane	2435	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	1-Ethylpiperidine	2386	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Ethyl propionate	1195	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Ethyl propyl ether	2615	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Ethyl silicate, see **Tetraethyl silicate**												
	Ethyl sulphate, see **Diethyl sulphate**												
	N-Ethyltoluidines	2754	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Ethyltrichlorosilane	1196	3	8	Liquid flammable & Corrosive			II	E0	FORBIDDEN		377	5 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Etiologic agent, see **Infectious substance**, etc.												
	Explosive articles, see **Articles, explosive**, etc.												
	Explosive, blasting, type A †	0081	1.1D							FORBIDDEN		FORBIDDEN	
	Explosive, blasting, type B †	0082	1.1D							FORBIDDEN		FORBIDDEN	
	Explosive, blasting, type B †	0331	1.5D							FORBIDDEN		FORBIDDEN	
	Explosive, blasting, type C †	0083	1.1D							FORBIDDEN		FORBIDDEN	
	Explosive, blasting, type D †	0084	1.1D							FORBIDDEN		FORBIDDEN	
	Explosive, blasting, type E †	0241	1.1D							FORBIDDEN		FORBIDDEN	
	Explosive, blasting, type E †	0332	1.5D							FORBIDDEN		FORBIDDEN	
	Explosive, emulsion, see **Explosive, blasting, type E**												
	Explosive, seismic, see **Explosive, blasting, type A, B and C**												
	Explosive, slurry, see **Explosive blasting, type E**												
	Explosive substances, see **Substances, explosive**												
	Explosive, water gel, see **Explosive, blasting, type E**												
>													
≠	**Extracts, liquid**, for flavour or aroma †	1197	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	F												
≠	**Fabrics, animal, n.o.s.**, with oil	1373	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
	Fabrics impregnated with weakly nitrated nitrocellulose, n.o.s.	1353	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Fabrics, synthetic, n.o.s**, with oil	1373	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Fabrics, vegetable, n.o.s.**, with oil	1373	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
	Ferric arsenate	1606	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Ferric arsenite	1607	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Ferric chloride, anhydrous	1773	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Ferric chloride solution	2582	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
	Ferric nitrate	1466	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Ferrocerium	1323	4.1		Solid flammable		A42	II	E2	445 Y441	15 kg 5 kg	448	50 kg
	Ferrosilicon with 30% or more but less than 90% silicon	1408	4.3	6.1	Danger if wet & Toxic		A3 A10	III	E1	485 Y477	25 kg 10 kg	491	100 kg
	Ferrous arsenate	1608	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Ferrous metal borings in a form liable to self-heating	2793	4.2		Spontaneous combustion		A3	III	E1	469	25 kg	471	100 kg
	Ferrous metal cuttings in a form liable to self-heating	2793	4.2		Spontaneous combustion		A3	III	E1	469	25 kg	471	100 kg
	Ferrous metal shavings in a form liable to self-heating	2793	4.2		Spontaneous combustion		A3	III	E1	469	25 kg	471	100 kg
	Ferrous metal turnings in a form liable to self-heating	2793	4.2		Spontaneous combustion		A3	III	E1	469	25 kg	471	100 kg
	Fertilizer ammoniating solution with free ammonia	1043	2.2		Gas non-flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Fertilizer with ammonium nitrate, n.o.s., see **Ammonium nitrate based fertilizer** (UN No. 2067) or **Ammonium nitrate based fertilizer** (UN No. 2071)												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Fibreglass repair kit, see **Polyester resin kit**												
≠	**Fibres, animal** burnt, wet or damp	1372	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Fibres, animal, n.o.s.**, with oil	1373	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
	Fibres impregnated with weakly nitrated nitrocellulose, n.o.s.	1353	4.1		Solid flammable	BE 3		III	E1	446 Y443	25 kg 10 kg	449	100 kg
≠	**Fibres, synthetic, n.o.s.**, with oil	1373	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Fibres, vegetable** burnt, wet or damp	1372	4.2				A2	III		FORBIDDEN		FORBIDDEN	
≠	**Fibres, vegetable, n.o.s.**, with oil	1373	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Fibres, vegetable, dry**	3360	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Films, nitrocellulose base, gelatin coated, except scrap †	1324	4.1		Solid flammable			III	E1	454 Y454	25 kg 10 kg	454	100 kg
	Films, nitrocellulose base, from which gelatin has been removed; film scrap, see **Celluloid scrap**												
	Fire extinguisher charges, corrosive liquid †	1774	8		Corrosive			II	E0	851 Y840	1 L 0.5 L	855	30 L
	Fire extinguisher charges, expelling, explosive, see **Cartridges, power device**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Fire extinguishers with compressed or liquefied gas	1044	2.2		Gas non-flammable		A19		E0	213	75 kg	213	150 kg
	Firelighters, solid with flammable liquid †	2623	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Fireworks †	0333	1.1G							FORBIDDEN		FORBIDDEN	
	Fireworks †	0334	1.2G							FORBIDDEN		FORBIDDEN	
	Fireworks †	0335	1.3G							FORBIDDEN		FORBIDDEN	
	Fireworks †	0336	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
	Fireworks †	0337	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
	First aid kit	3316	9		Miscellaneous		A44 A163		E0	960 Y960	10 kg 1 kg	960	10 kg
	Fish meal, stabilized	2216	9		Miscellaneous		A219	III	E1	956	100 kg	956	200 kg
≠	**Fish meal, unstabilized**	1374	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	
≠	**Fish scrap, stabilized**	2216	9			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Fish scrap, unstabilized**	1374	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	
	Flammable gas, see **Compressed** or **Liquefied gas, flammable**, etc.												
	Flammable gas in lighters, see **Lighters** (cigarettes), containing flammable gas												
	Flammable gas (small receptacles not fitted with a dispersion device, not refillable), see **Receptacles**, etc.												
	Flammable liquid, n.o.s.*	1993	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
								II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Flammable liquid, corrosive, n.o.s.*	2924	3	8	Liquid flammable & Corrosive		A3	I	E0	350	0.5 L	360	2.5 L
								II	E2	352	1 L	363	5 L
										Y340	0.5 L		
								III	E1	354	5 L	365	60 L
										Y342	1 L		
	Flammable liquid, toxic, n.o.s.*	1992	3	6.1	Liquid flammable & Toxic		A3	I	E0	FORBIDDEN		361	30 L
								II	E2	352	1 L	364	60 L
										Y341	1 L		
								III	E1	355	60 L	366	220 L
										Y343	2 L		
	Flammable liquid, toxic, corrosive, n.o.s.*	3286	3	6.1 8	Liquid flammable & Toxic & Corrosive			I	E0	FORBIDDEN		360	2.5 L
								II	E2	352	1 L	363	5 L
										Y340	0.5 L		
	Flammable solid, corrosive, inorganic, n.o.s.*	3180	4.1	8	Solid flammable & Corrosive		A3	II	E2	445	15 kg	448	50 kg
										Y441	5 kg		
								III	E1	446	25 kg	449	100 kg
										Y442	5 kg		
	Flammable solid, corrosive, organic, n.o.s.*	2925	4.1	8	Solid flammable & Corrosive		A3	II	E2	445	15 kg	448	50 kg
										Y441	5 kg		
								III	E1	446	25 kg	449	100 kg
										Y442	5 kg		
	Flammable solid, inorganic, n.o.s.*	3178	4.1		Solid flammable		A3	II	E2	445	15 kg	448	50 kg
										Y441	5 kg		
								III	E1	446	25 kg	449	100 kg
										Y443	10 kg		
	Flammable solid, organic, n.o.s.*	1325	4.1		Solid flammable		A3	II	E2	445	15 kg	448	50 kg
										Y441	5 kg		
								III	E1	446	25 kg	449	100 kg
										Y443	10 kg		
≠	**Flammable solid, organic, molten, n.o.s.***	3176	4.1				A3	II		FORBIDDEN		FORBIDDEN	
								III		FORBIDDEN		FORBIDDEN	
≠	**Flammable solid, oxidizing, n.o.s.***	3097	4.1	5.1			A3	II		FORBIDDEN		FORBIDDEN	
								III		FORBIDDEN		FORBIDDEN	
	Flammable solid, toxic, inorganic, n.o.s.*	3179	4.1	6.1	Solid flammable & Toxic		A3	II	E2	445	15 kg	448	50 kg
										Y440	1 kg		
								III	E1	446	25 kg	449	100 kg
										Y443	10 kg		
	Flammable solid, toxic, organic, n.o.s.*	2926	4.1	6.1	Solid flammable & Toxic		A3	II	E2	445	15 kg	448	50 kg
										Y440	1 kg		
								III	E1	446	25 kg	449	100 kg
										Y443	10 kg		
	Flares, aerial †	0093	1.3G		Explosive				E0	FORBIDDEN		135	75 kg
	Flares, aerial †	0403	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Flares, aerial †	0404	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
Flares, aerial †	0420	1.1G							FORBIDDEN		FORBIDDEN	
Flares, aerial †	0421	1.2G							FORBIDDEN		FORBIDDEN	
Flares, aeroplane, see **Flares, aerial**												
Flares, distress, small, see **Signal devices, hand**												
Flares, railway or highway, see **Signal devices, hand**												
Flares, surface †	0092	1.3G		Explosive				E0	FORBIDDEN		135	75 kg
Flares, surface †	0418	1.1G							FORBIDDEN		FORBIDDEN	
Flares, surface †	0419	1.2G							FORBIDDEN		FORBIDDEN	
Flares, water-activated, see **Contrivances, water-activated**, etc.												
Flash powder †	0094	1.1G							FORBIDDEN		FORBIDDEN	
Flash powder †	0305	1.3G							FORBIDDEN		FORBIDDEN	
Flue dusts, toxic, see **Arsenical dust**												
Fluoric acid, see **Hydrofluoric acid** (UN No. 1790)												
Fluorine, compressed	1045	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Fluoroacetic acid	2642	6.1		Toxic			I	E5	665	1 kg	672	15 kg
2-Fluoroaniline, see **Fluoroanilines**												
4-Fluoroaniline, see **Fluoroanilines**												
o-Fluoroaniline, see **Fluoroanilines**												
p-Fluoroaniline, see **Fluoroanilines**												
Fluoroanilines	2941	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Fluorobenzene	2387	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Fluoroboric acid	1775	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Fluoroethane, see **Ethyl fluoride**												
Fluoroform, see **Trifluoromethane**												
Fluoromethane, see **Methyl fluoride**												
Fluorophosphoric acid, anhydrous	1776	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Fluorosilicates, n.o.s.*	2856	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Fluorosilicic acid	1778	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Fluorosulphonic acid	1777	8		Corrosive			I	E0	850	0.5 L	854	2.5 L
Fluorotoluenes	2388	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Formaldehyde solution with less than 25 per cent formaldehyde						A189						
Formaldehyde solution with not less than 25% formaldehyde	2209	8		Corrosive	US 4		III	E1	852 Y841	5 L 1 L	856	60 L
Formaldehyde solution, flammable	1198	3	8	Liquid flammable & Corrosive		A180	III	E1	354 Y342	5 L 1 L	365	60 L
Formalin, see **Formaldehyde solution**												
Formamidine sulphinic acid, see **Thiourea dioxide**												
Formic acid with more than 85% acid by mass	1779	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
Formic acid with not less than 5% but less than 10% acid by mass	3412	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Formic acid with not less than 10% but not more than 85% acid by mass	3412	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Formic aldehyde, see **Formaldehyde solution**												
2-Formyl-3,4-dihydro-2H-pyran, see **Acrolein dimer, stabilized**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Fracturing devices, explosive, without detonator for oil wells †	0099	1.1D			AU 2 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Fuel, aviation, turbine engine	1863	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
							II	E2	353	5 L	364	60 L
									Y341	1 L		
							III	E1	355	60 L	366	220 L
									Y344	10 L		
Fuel cell cartridges, containing corrosive substances †	3477	8		Corrosive		A146 A157		E0	873 Y873	5 kg 2.5 kg	873	50 kg
Fuel cell cartridges, containing flammable liquids †	3473	3		Liquid flammable		A146		E0	374 Y374	5 kg 2.5 kg	374	50 kg
Fuel cell cartridges, containing hydrogen in metal hydride †	3479	2.1		Gas flammable		A146 A162		E0	215 Y215	1 kg 0.5 kg	215	15 kg
Fuel cell cartridges, containing liquefied flammable gas †	3478	2.1		Gas flammable		A146 A161		E0	215 Y215	1 kg 0.5 kg	215	15 kg
Fuel cell cartridges, containing water-reactive substances †	3476	4.3		Danger if wet		A146 A157		E0	495 Y495	5 kg 2.5 kg	495	50 kg
Fuel cell cartridges contained in equipment, containing corrosive substances	3477	8		Corrosive		A146 A157		E0	874	5 kg	874	50 kg
Fuel cell cartridges contained in equipment, containing flammable liquids	3473	3		Liquid flammable		A146		E0	375	5 kg	375	50 kg
Fuel cell cartridges contained in equipment, containing hydrogen in metal hydride	3479	2.1		Gas flammable		A146 A162		E0	216	1 kg	216	15 kg
Fuel cell cartridges contained in equipment, containing liquefied flammable gas	3478	2.1		Gas flammable		A146 A161		E0	216	1 kg	216	15 kg
Fuel cell cartridges contained in equipment, containing water-reactive substances	3476	4.3		Danger if wet		A146 A157		E0	496	5 kg	496	50 kg
Fuel cell cartridges packed with equipment, containing corrosive substances	3477	8		Corrosive		A146 A157		E0	875	5 kg	875	50 kg
Fuel cell cartridges packed with equipment, containing flammable liquids	3473	3		Liquid flammable		A146		E0	376	5 kg	376	50 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Fuel cell cartridges packed with equipment, containing hydrogen in metal hydride	3479	2.1		Gas flammable		A146 A162		E0	217	1 kg	217	15 kg
Fuel cell cartridges packed with equipment, containing liquefied flammable gas	3478	2.1		Gas flammable		A146 A161		E0	217	1 kg	217	15 kg
Fuel cell cartridges packed with equipment, containing water-reactive substances	3476	4.3		Danger if wet		A146 A157		E0	497	5 kg	497	50 kg
Fuel system components (including fuel control units (FCU), carburettors, fuel lines, fuel pumps), see **Dangerous goods in apparatus** or **Dangerous Goods in machinery** (UN No. 3363)												
Fulminate of mercury (dry)	FORBIDDEN											
Fulminate of mercury, wet, see **Mercury fulminate**, etc.												
Fulminating gold	FORBIDDEN											
Fulminating mercury	FORBIDDEN											
Fulminating platinum	FORBIDDEN											
Fulminating silver	FORBIDDEN											
Fulminic acid	FORBIDDEN											
Fumaroyl dichloride, see **Fumaryl chloride**												
Fumaryl chloride	1780	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Fumigant, see appropriate pesticide												
≠ **Fumigated cargo transport unit**	3359	9							FORBIDDEN		FORBIDDEN	
Fungicide, see appropriate pesticide												
Furaldehydes	1199	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
Furan	2389	3		Liquid flammable			I	E3	351	1 L	361	30 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Furfuryl alcohol	2874	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Furfurylamine	2526	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
Furyl carbinol, see **Furfuryl alcohol**												
Fuse, detonating, metal clad	0102	1.2D							FORBIDDEN		FORBIDDEN	
Fuse, detonating, metal clad	0290	1.1D							FORBIDDEN		FORBIDDEN	
Fuse, detonating, mild effect, metal clad	0104	1.4D		Explosive 1.4				E0	FORBIDDEN		139	75 kg
Fuse, igniter, tubular, metal clad †	0103	1.4G		Explosive 1.4				E0	FORBIDDEN		140	75 kg
Fusel oil	1201	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Fuse, non-detonating †	0101	1.3G							FORBIDDEN		FORBIDDEN	
Fuse, safety †	0105	1.4S		Explosive 1.4				E0	140	25 kg	140	100 kg
Fuzes, combination, percussion or time, see **Fuzes, detonating** (UN Nos. 0257, 0367)**; Fuzes, igniting** (UN Nos. 0317, 0368)												
Fuzes, detonating †	0106	1.1B							FORBIDDEN		FORBIDDEN	
Fuzes, detonating †	0107	1.2B							FORBIDDEN		FORBIDDEN	
Fuzes, detonating †	0257	1.4B		Explosive 1.4				E0	FORBIDDEN		141	75 kg
Fuzes, detonating †	0367	1.4S		Explosive 1.4		A165		E0	141	25 kg	141	100 kg
Fuzes, detonating with protective features †	0408	1.1D							FORBIDDEN		FORBIDDEN	
Fuzes, detonating with protective features †	0409	1.2D							FORBIDDEN		FORBIDDEN	
Fuzes, detonating with protective features †	0410	1.4D		Explosive 1.4				E0	FORBIDDEN		141	75 kg
Fuzes, igniting †	0316	1.3G							FORBIDDEN		FORBIDDEN	
Fuzes, igniting †	0317	1.4G		Explosive 1.4				E0	FORBIDDEN		141	75 kg
Fuzes, igniting †	0368	1.4S		Explosive 1.4				E0	141	25 kg	141	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
G												
Galactan trinitrate	FORBIDDEN											
Gallium †	2803	8		Corrosive		A69	III	E0	867	20 kg	867	20 kg
Gas cartridges, (flammable) without a release device, non-refillable	2037	2.1		Gas flammable		A145 A167		E0	203 Y203	1 kg 1 kg	203	15 kg
Gas cartridges (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		A98 A145 A167		E0	203 Y203	1 kg 1 kg	203	15 kg
Gas cartridges (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer		A145 A167		E0	203	1 kg	203	15 kg
Gas cartridges (toxic & corrosive) without a release device, non-refillable	2037	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Gas cartridges (toxic, flammable & corrosive) without a release device, non-refillable	2037	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Gas cartridges (toxic & flammable) without a release device, non-refillable	2037	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Gas cartridges (toxic, oxidizing & corrosive) without a release device, non-refillable	2037	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A211			FORBIDDEN		FORBIDDEN	
Gas cartridges (toxic & oxidizing) without a release device, non-refillable	2037	2.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Gas cartridges (toxic) without a release device, non-refillable	2037	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Gas, compressed, see **Compressed gas**, etc.												
Gas drips, hydrocarbon †, see **Hydrocarbons, liquid, n.o.s.**												
Gas liquefied, see **Liquefied gas**, etc.												
Gas oil	1202	3		Liquid flammable		A3	III	E1	355 Y344	60 L 10 L	366	220 L
Gasoline	1203	3		Liquid flammable		A100	II	E2	353 Y341	5 L 1 L	364	60 L
Gasoline, casinghead, see **Gasoline**												
Gas, refrigerated liquid, n.o.s.*	3158	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
Gas, refrigerated liquid, flammable, n.o.s.*	3312	2.1							FORBIDDEN		FORBIDDEN	
Gas, refrigerated liquid, oxidizing, n.o.s.*	3311	2.2	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Gas sample, non-pressurized, flammable, n.o.s., not refrigerated liquid	3167	2.1		Gas flammable				E0	206	1 L	206	5 L
Gas sample, non-pressurized, toxic, n.o.s., not refrigerated liquid	3169	2.3		Gas toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		206	1 L
Gas sample, non-pressurized, toxic, flammable, n.o.s., not refrigerated liquid	3168	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		206	1 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	Gas turbine engines †, see **Engine, internal combustion, flammable liquid powered** (UN No. 3528) or **Engine internal combustion, flammable gas powered** (UN No. 3529)												
	Gelatin, blasting, see **Explosive, blasting, type A**												
	Gelatin dynamites, see **Explosive, blasting, type A**												
	Genetically modified micro-organisms	3245	9		None		A47		E0	959	No limit	959	No limit
	Genetically modified organisms	3245	9		None		A47		E0	959	No limit	959	No limit
	Germane	2192	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Germane, adsorbed**	3523	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Germanium hydride, see **Germane**												
	Glycer-1,3-dichlorohydrin, see **1,3-Dichloropropanol-2**												
	Glycerol-1,3-dinitrate	FORBIDDEN											
	Glycerol gluconate trinitrate	FORBIDDEN											
	Glycerol lactate trinitrate	FORBIDDEN											
	Glycerol alpha-monochlorohydrin	2689	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Glyceryl trinitrate, see **Nitroglycerin**, etc.												
	Glycidaldehyde	2622	3	6.1	Liquid flammable & Toxic	US 4		II	E2	352 Y341	1 L 1 L	364	60 L
	Grenades, hand or rifle, with bursting charge †	0284	1.1D							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Grenades, hand or rifle, with bursting charge †	0285	1.2D							FORBIDDEN		FORBIDDEN	
Grenades, hand or rifle, with bursting charge †	0292	1.1F							FORBIDDEN		FORBIDDEN	
Grenades, hand or rifle, with bursting charge †	0293	1.2F							FORBIDDEN		FORBIDDEN	
Grenades, illuminating †, see **Ammunition, illuminating**, etc. (UN Nos. 0171, 0254, 0297)												
Grenades, practice, hand or rifle †	0110	1.4S		Explosive 1.4				E0	141	25 kg	141	100 kg
Grenades, practice, hand or rifle †	0318	1.3G							FORBIDDEN		FORBIDDEN	
Grenades, practice, hand or rifle †	0372	1.2G							FORBIDDEN		FORBIDDEN	
Grenades, practice, hand or rifle †	0452	1.4G		Explosive 1.4				E0	FORBIDDEN		141	75 kg
Grenades, smoke, see **Ammunition, smoke**, etc. (UN Nos. 0015; 0016; 0245; 0246; 0303)												
Guanidine nitrate	1467	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Guanyl nitrosaminoguanylidene hydrazine (dry)	FORBIDDEN											
Guanyl nitrosaminoguanylidene hydrazine, wetted with not less than 30% water, by mass	0113	1.1A							FORBIDDEN		FORBIDDEN	
Guanyl nitrosaminoguanyltetrazene (dry)	FORBIDDEN											
Guanyl nitrosaminoguanyltetrazene, wetted with not less than 30% water, or mixture of alcohol and water, by mass	0114	1.1A							FORBIDDEN		FORBIDDEN	
Gunpowder, granular or as a meal	0027	1.1D							FORBIDDEN		FORBIDDEN	
Gunpowder, compressed	0028	1.1D							FORBIDDEN		FORBIDDEN	
Gunpowder in pellets	0028	1.1D							FORBIDDEN		FORBIDDEN	
Gutta percha solution, see **Rubber solution**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
H												
≠ **Hafnium powder, dry**	2545	4.2		Spontaneous combustion		A3	I		FORBIDDEN		FORBIDDEN	
							II	E2	467	15 kg	470	50 kg
							III	E1	469	25 kg	471	100 kg
Hafnium powder, wetted with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns	1326	4.1		Solid flammable		A35	II	E2	445 Y441	15 kg 5 kg	448	50 kg
Halogenated monomethyldiphenylmethanes, liquid	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
Halogenated monomethyldiphenylmethanes, solid	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
Hay	1327	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2 A198			FORBIDDEN		FORBIDDEN	
Heating oil, light	1202	3		Liquid flammable		A3	III	E1	355 Y344	60 L 10 L	366	220 L
Heat producing articles, battery operated equipment, such as underwater torches or soldering equipment, which, if accidentally activated, will generate extreme heat and can cause fire	—	9				A93			FORBIDDEN		FORBIDDEN	
Heavy hydrogen, see **Deuterium, compressed** (UN No. 1957)												
Helium, compressed	1046	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
Helium, refrigerated liquid	1963	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
Heptafluoropropane	3296	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
n-Heptaldehyde	3056	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
n-Heptanal, see **n-Heptaldehyde**												
Heptanes	1206	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
4-Heptanone, see **Dipropyl ketone**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
n-Heptene	2278	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Hexachloroacetone	2661	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Hexachlorobenzene	2729	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
Hexachlorobutadiene	2279	6.1		Toxic	US 4		III	E1	655 Y642	60 L 2 L	663	220 L
Hexachloro-1,3-butadiene, see **Hexachlorobutadiene**												
≠ **Hexachlorocyclopentadiene**	2646	6.1			US 4		I		FORBIDDEN		FORBIDDEN	
Hexachlorophene	2875	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
Hexachloro-2-propanone, see **Hexachloroacetone**												
Hexadecyltrichlorosilane	1781	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Hexadiene	2458	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Hexaethyl tetraphosphate	1611	6.1		Toxic	US 4		II	E4	654 Y641	5 L 1 L	662	60 L
Hexaethyl tetraphosphate and compressed gas mixture	1612	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Hexafluoroacetone	2420	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Hexafluoroacetone hydrate, liquid	2552	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Hexafluoroacetone hydrate, solid	3436	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Hexafluoroethane	2193	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Hexafluorophosphoric acid	1782	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Hexafluoropropylene	1858	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Hexahydrocresol, see **Methylcyclohexanols**, etc.												
Hexahydromethyl phenol, see **Methylcyclohexanols**, etc.												
Hexaldehyde	1207	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
3,3,6,6,9,9-Hexamethyl-1,2,4,5 tetra-oxacyclononane, more than 52%	FORBIDDEN											
Hexamethylenediamine, solid	2280	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Hexamethylenediamine solution	1783	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Hexamethylene diisocyanate	2281	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Hexamethyleneimine	2493	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Hexamethylenetetramine	1328	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Hexamethylene triperoxide diamine (dry)	FORBIDDEN											
Hexamethylol benzene hexanitrate	FORBIDDEN											
Hexamine, see **Hexamethylenetetramine**												
Hexanes	1208	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Hexanitroazoxy benzene	FORBIDDEN											
2,2',4,4',6,6'-Hexanitro-3,3'-dihydroxyazobenzene (dry)	FORBIDDEN											
Hexanitrodiphenylamine	0079	1.1D							FORBIDDEN		FORBIDDEN	
2,3',4,4',6,6'-Hexanitrodiphenylether	FORBIDDEN											
N,N' (Hexanitrodiphenyl) ethylene dinitramine (dry)	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Hexanitrodiphenyl urea	FORBIDDEN											
Hexanitroethane	FORBIDDEN											
Hexanitrooxanilide	FORBIDDEN											
Hexanitrostilbene	0392	1.1D							FORBIDDEN		FORBIDDEN	
Hexanoic acid, see **Caproic acid**												
Hexanols	2282	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
1-Hexene	2370	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Hexogen and cyclotetramethylene-tetranitramine mixture, desensitized with not less than 10% phlegmatizer, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
Hexogen and cyclotetramethylene-tetranitramine mixture, wetted with not less than 15% water, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
Hexogen, desensitized	0483	1.1D							FORBIDDEN		FORBIDDEN	
Hexogen, wetted with not less than 15% water, by mass	0072	1.1D							FORBIDDEN		FORBIDDEN	
Hexolite, dry or wetted with less than 15% water, by mass	0118	1.1D							FORBIDDEN		FORBIDDEN	
Hexotol, dry or wetted with less than 15% water, by mass	0118	1.1D							FORBIDDEN		FORBIDDEN	
Hexotonal	0393	1.1D							FORBIDDEN		FORBIDDEN	
Hexyl	0079	1.1D							FORBIDDEN		FORBIDDEN	
Hexyltrichlorosilane	1784	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
High explosives, see individual explosives' entries												
HMX, desensitized	0484	1.1D							FORBIDDEN		FORBIDDEN	
HMX (dry or unphlegmatized)	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
HMX, wetted with not less than 15% water, by mass	0226	1.1D							FORBIDDEN		FORBIDDEN	
Hydrazine, anhydrous	2029	8	3 6.1	Corrosive & Liquid flammable & Toxic	US 4		I	E0	FORBIDDEN		854	2.5 L
Hydrazine, aqueous solution with more than 37% hydrazine by mass	2030	8	6.1	Corrosive & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A36	I	E0	FORBIDDEN		854	2.5 L
							II	E0	FORBIDDEN		855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Hydrazine, aqueous solution with not more than 37% hydrazine, by mass	3293	6.1		Toxic		A3	III	E1	655 Y642	60 L 2 L	663	220 L
Hydrazine aqueous solution, flammable with more than 37% hydrazine, by mass	3484	8	3 6.1	Corrosive & Liquid flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		854	2.5 L
Hydrazine azide	FORBIDDEN											
Hydrazine chlorate	FORBIDDEN											
Hydrazine dicarbonic acid diazide	FORBIDDEN											
Hydrazine perchlorate	FORBIDDEN											
Hydrazine selenate	FORBIDDEN											
Hydrides, metal, water-reactive, n.o.s., see **Metal hydrides, water-reactive, n.o.s.**												
Hydriodic acid	1787	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Hydriodic acid, anhydrous, see **Hydrogen iodide, anhydrous**												
≠ **Hydrobromic acid**, more than 49% strength	1788	8			AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Hydrobromic acid, not more than 49% strength	1788	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Hydrocarbon gas mixture, compressed, n.o.s.*	1964	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Hydrocarbon gas mixture, liquefied, n.o.s.*	1965	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Hydrocarbon gas powered small devices, see **Devices, small, hydrocarbon gas powered** with release device												
	Hydrocarbon gas refills for small devices with release device	3150	2.1		Gas flammable				E0	201	1 kg	201	15 kg
	Hydrocarbons, liquid, n.o.s.	3295	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
								II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Hydrochloric acid	1789	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
≠	**Hydrocyanic acid, aqueous solution** with not more than 20% hydrogen cyanide	1613	6.1					I		FORBIDDEN		FORBIDDEN	
	Hydrofluoric acid, with more than 60% hydrogen fluoride	1790	8	6.1	Corrosive & Toxic			I	E0	850	0.5 L	854	2.5 L
	Hydrofluoric acid, with not more than 60% hydrogen fluoride	1790	8	6.1	Corrosive & Toxic			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Hydrofluoric acid and sulphuric acid mixture	1786	8	6.1	Corrosive & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		854	2.5 L
	Hydrofluoroboric acid, see **Fluoroboric acid**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Hydrofluosilicic acid, see **Fluorosilicic acid**												
	Hydrogen and methane mixture, compressed	2034	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Hydrogen arsenide, see **Arsine**												
	Hydrogen bromide, anhydrous	1048	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Hydrogen bromide solution, see **Hydrobromic acid** (UN No. 1788)												
	Hydrogen chloride, anhydrous	1050	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Hydrogen chloride, refrigerated liquid	2186	2.3	8						FORBIDDEN		FORBIDDEN	
	Hydrogen, compressed	1049	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
≠	**Hydrogen cyanide, aqueous solution** with not more than 20% hydrogen cyanide	1613	6.1					I		FORBIDDEN		FORBIDDEN	
≠	**Hydrogen cyanide, solution in alcohol** with not more than 45% hydrogen cyanide	3294	6.1	3				I		FORBIDDEN		FORBIDDEN	
≠	**Hydrogen cyanide, stabilized** containing less than 3% water	1051	6.1	3			A209	I		FORBIDDEN		FORBIDDEN	
≠	**Hydrogen cyanide, stabilized** containing less than 3% water and absorbed in a porous inert material	1614	6.1				A209	I		FORBIDDEN		FORBIDDEN	
	Hydrogen cyanide, unstabilized	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Hydrogendifluorides, solid, n.o.s.	1740	8		Corrosive		A3	II	E2	859 Y844	15 kg 5 kg	863	50 kg
								III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Hydrogendifluorides, solution, n.o.s.	3471	8	6.1	Corrosive & Toxic		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
≠	**Hydrogen fluoride, anhydrous**	1052	8	6.1		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Hydrogen fluoride solution, see **Hydrofluoric acid**, etc.												
	Hydrogen in a metal hydride storage system	3468	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A143 A176		E0	FORBIDDEN		214	100 kg
	Hydrogen in a metal hydride storage system contained in equipment	3468	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A143 A176		E0	FORBIDDEN		214	100 kg
	Hydrogen in a metal hydride storage system packed with equipment	3468	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A143 A176		E0	FORBIDDEN		214	100 kg
	Hydrogen iodide, anhydrous	2197	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Hydrogen iodide solution, see **Hydriodic acid**												
	Hydrogen peroxide and peroxyacetic acid mixture with acid(s), water and not more than 5% peroxyacetic acid, **stabilized**	3149	5.1	8	Oxidizer & Corrosive		A96	II	E2	550 Y540	1 L 0.5 L	554	5 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Hydrogen peroxide, aqueous solution** with more than 40% but not more than 60% hydrogen peroxide (stabilized as necessary)	2014	5.1	8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A75	II		FORBIDDEN		FORBIDDEN	
	Hydrogen peroxide, aqueous solution with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	2984	5.1		Oxidizer			III	E1	551 Y541	2.5 L 1 L	555	30 L
	Hydrogen peroxide, aqueous solution with not less than 20% but not more than 40% hydrogen peroxide (stabilized as necessary)	2014	5.1	8	Oxidizer & Corrosive			II	E2	550 Y540	1 L 0.5 L	554	5 L
≠	**Hydrogen peroxide, aqueous solution, stabilized** with more than 60% hydrogen peroxide	2015	5.1	8				I		FORBIDDEN		FORBIDDEN	
≠	**Hydrogen peroxide, stabilized**	2015	5.1	8				I		FORBIDDEN		FORBIDDEN	
	Hydrogen, refrigerated liquid	1966	2.1							FORBIDDEN		FORBIDDEN	
≠	**Hydrogen selenide, adsorbed**	3526	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Hydrogen selenide, anhydrous	2202	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Hydrogen silicide, see **Silane**												
	Hydrogen sulphide	1053	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Hydroselenic acid, see **Hydrogen selenide, anhydrous**												
	Hydrosilicofluoric acid, see **Fluorosilicic acid**												
	1-Hydroxybenzotriazole, anhydrous, dry or wetted with less than 20% water, by mass	0508	1.3C							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
1-Hydroxybenzotriazole monohydrate	3474	4.1		Solid flammable	BE 3		I	E0	451	0.5 kg	451	0.5 kg
3-Hydroxybutan-2-one, see **Acetyl methyl carbinol**												
Hydroxyl amine iodide	FORBIDDEN											
Hydroxylamine sulphate	2865	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
1-Hydroxy-3-methyl-2-penten-4-yne, see **1-Pentol**												
3-Hydroxyphenol, see **Resorcinol**												
Hypochlorites, inorganic, n.o.s.*	3212	5.1		Oxidizer		A169	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Hypochlorite solution †	1791	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Hyponitrous acid	FORBIDDEN											
I												
Igniters †	0121	1.1G							FORBIDDEN		FORBIDDEN	
Igniters †	0314	1.2G							FORBIDDEN		FORBIDDEN	
Igniters †	0315	1.3G							FORBIDDEN		FORBIDDEN	
Igniters †	0325	1.4G		Explosive 1.4				E0	FORBIDDEN		142	75 kg
Igniters †	0454	1.4S		Explosive 1.4				E0	142	25 kg	142	100 kg
Ignition element for lighter, containing pyrophoric liquid	FORBIDDEN											
3,3'-Iminodipropylamine	2269	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Indiarubber, see **Rubber solution**												
Infectious substance, affecting animals only	2900	6.2		Infectious	AU 3 CA 8 GB 5 VU 2	A81 A140		E0	620	50 mL or 50 g	620	4 L or 4 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Infectious substance, affecting humans	2814	6.2		Infectious	AU 3 CA 8 GB 5 VU 2	A81 A140		E0	620	50 mL or 50 g	620	4 L or 4 kg
	Inflammable, see Flammable												
	Ink, printer's, flammable, see **Printing ink**												
	Inositol hexanitrate (dry)	FORBIDDEN											
	Insecticide, see appropriate pesticide												
	Insecticide gas, n.o.s.*	1968	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Insecticide gas, flammable, n.o.s.*	3354	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Insecticide gas, toxic, n.o.s.*	1967	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Insecticide gas, toxic, flammable, n.o.s.*	3355	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Inulin trinitrate (dry)	FORBIDDEN											
	Iodine	3495	8	6.1	Corrosive & Toxic		A113	III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Iodine azide (dry)	FORBIDDEN											
	Iodine monochloride, liquid	3498	8		Corrosive			II	E0	FORBIDDEN		855	30 L
	Iodine monochloride, solid	1792	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		863	50 kg
≠	**Iodine pentafluoride**	2495	5.1	6.1 8				I		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	2-Iodobutane	2390	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Iodomethane, see **Methyl iodide**												
	Iodomethylpropanes	2391	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Iodopropanes	2392	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	alpha-Iodotoluene, see **Benzyl iodide**												
	Iodoxy compounds (dry)	FORBIDDEN											
	IPDI, see **Isophorone diisocyanate**												
	Iridium nitratopentamine iridium nitrate	FORBIDDEN											
	Iron chloride, anhydrous, see **Ferric chloride, anhydrous**												
	Iron (III) chloride, anhydrous, see **Ferric chloride, anhydrous**												
	Iron chloride solution, see **Ferric chloride solution**												
≠	**Iron oxide, spent** † (obtained from coal gas purification)	1376	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	III		FORBIDDEN		FORBIDDEN	
≠	**Iron pentacarbonyl**	1994	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Iron perchloride, anhydrous, see **Ferric chloride, anhydrous**												
	Iron powder, pyrophoric, see **Pyrophoric metal, n.o.s.** or **Pyrophoric alloy, n.o.s.**												
	Iron sesquichloride, anhydrous, see **Ferric chloride, anhydrous**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Iron sponge, spent** † (obtained from coal gas purification)	1376	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	III		FORBIDDEN		FORBIDDEN	
	Iron swarf, see **Ferrous metal, borings, cuttings, shavings or turnings,** etc.												
	Irritating agents, see **Tear gas substance**, etc.												
	Isobutane	1969	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Isobutanol	1212	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Isobutene, see **Isobutylene**												
	Isobutyl acetate	1213	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Isobutyl acrylate, stabilized	2527	3		Liquid flammable		A209	III III	E1 E1	FORBIDDEN FORBIDDEN		366	220 L
	Isobutyl alcohol	1212	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Isobutyl aldehyde	2045	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Isobutylamine	1214	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Isobutylene	1055	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Isobutyl formate	2393	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Isobutyl isobutyrate	2528	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠	**Isobutyl isocyanate**	2486	6.1	3		US 2		I		FORBIDDEN		FORBIDDEN	
	Isobutyl methacrylate, stabilized	2283	3		Liquid flammable		A209	III III	E1 E1	FORBIDDEN FORBIDDEN		366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Isobutyl propionate	2394	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Isobutyraldehyde	2045	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Isobutyric acid	2529	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
Isobutyronitrile	2284	3	6.1	Liquid flammable & Toxic			II	E2	352 Y341	1 L 1 L	364	60 L
Isobutyryl chloride	2395	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Isocyanates, flammable, toxic, n.o.s.* †	2478	3	6.1	Liquid flammable & Toxic		A3	II	E2	352 Y341	1 L 1 L	364	60 L
							III	E1	355 Y343	60 L 2 L	366	220 L
Isocyanate solution, flammable, toxic, n.o.s.* †	2478	3	6.1	Liquid flammable & Toxic		A3	II	E2	352 Y341	1 L 1 L	364	60 L
							III	E1	355 Y343	60 L 2 L	366	220 L
Isocyanate solution, toxic, n.o.s.* †	2206	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Isocyanate solution, toxic, flammable, n.o.s.* †	3080	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
Isocyanates, toxic, n.o.s.* †	2206	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Isocyanates, toxic, flammable, n.o.s.* †	3080	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
Isocyanatobenzotrifluorides	2285	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
3-Isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate, see **Isophorone diisocyanate**												
Isododecane, see **Pentamethylheptane**												
Isoheptene	2287	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Isohexene	2288	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Isooctane, see **Octanes**												
Isooctene	1216	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Isopentane, see **Pentanes,** liquid												
Isopentenes	2371	3		Liquid flammable			I	E3	351	1 L	361	30 L
Isopentylamine, see **Amylamine**												
Isopentyl nitrite, see **Amyl nitrite**												
Isophoronediamine	2289	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Isophorone diisocyanate	2290	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Isoprene, stabilized	1218	3		Liquid flammable		A209	I	E3	FORBIDDEN		361	30 L
Isopropanol	1219	3		Liquid flammable		A180	II	E2	353 Y341	5 L 1 L	364	60 L
Isopropenyl acetate	2403	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Isopropenylbenzene	2303	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Isopropyl acetate	1220	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Isopropyl acid phosphate	1793	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
Isopropyl alcohol	1219	3		Liquid flammable		A180	II	E2	353 Y341	5 L 1 L	364	60 L
Isopropylamine	1221	3	8	Liquid flammable & Corrosive			I	E0	350	0.5 L	360	2.5 L
Isopropylbenzene	1918	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Isopropyl sec-butyl peroxydicarbonate, not more than 52%, with di-sec-butyl peroxydicarbonate, not more than 28%, with di-isopropyl peroxydicarbonate, not more than 22%	FORBIDDEN											
Isopropyl butyrate	2405	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Isopropyl chloride, see **2-Chloropropane**												
	Isopropyl chloroacetate	2947	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠	**Isopropyl chloroformate**	2407	6.1	3 8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Isopropyl 2-chloropropionate	2934	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Isopropyl-alpha-chloropropionate, see **Isopropyl 2-chloropropionate**												
	Isopropylcumyl hydroperoxide, more than 72% in solution	FORBIDDEN											
	Isopropyl ether, see **Diisopropyl ether**												
	Isopropylethylene, see **3-Methyl-1-butene**												
	Isopropyl formate, see **Propyl formates**												
	Isopropyl isobutyrate	2406	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠	**Isopropyl isocyanate**	2483	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Isopropyl mercaptan, see **Propanethiols**												
	Isopropyl nitrate	1222	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Isopropyl propionate	2409	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Isopropyltoluene, see **Cymenes**												
	Isopropyltoluol, see **Cymenes**												
	Isosorbide dinitrate mixture with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	4.1		Solid flammable	BE 3	A49	II	E0	445	15 kg	448	50 kg
≠	**Isosorbide-5-mononitrate**	3251	4.1				A110	III		FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Isothiocyanic acid	FORBIDDEN											
Isovaleraldehyde, see **Valeraldehyde**												
J												
Jet fuel, see **Fuel, aviation, turbine engine**												
Jet perforating guns, charged, oil well, without detonator †	0124	1.1D							FORBIDDEN		FORBIDDEN	
Jet perforating guns, charged, oil well, without detonator †	0494	1.4D		Explosive 1.4		A24		E0	FORBIDDEN		101	300 kg
Jet tappers, without detonator, see **Charges, shaped** (UN Nos. 0059, 0439, 0440, 0441)												
K												
Kerosene	1223	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Ketones, liquid, n.o.s.*	1224	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Krill meal	3497	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
							III	E1	469	25 kg	471	100 kg
Krypton, compressed	1056	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
Krypton, refrigerated liquid	1970	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
L												
Lacquer base or lacquer chips, nitrocellulose, dry †, see **Nitrocellulose**, etc. (UN No. 2557)												
Lacquer base or lacquer chips, plastic, wet with alcohol or solvent, see **Nitrocellulose** (UN Nos. 2059, 2555, 2556) or **Paint**, etc. (UN No. 1263)												
Lead acetate	1616	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Lead (II) acetate, see **Lead acetate**												
Lead arsenates	1617	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Lead arsenites	1618	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Lead azide (dry)	FORBIDDEN											
Lead azide, wetted with not less than 20% water, or mixture of alcohol and water, by mass	0129	1.1A							FORBIDDEN		FORBIDDEN	
Lead chloride, solid, see **Lead compound, soluble, n.o.s.**												
Lead compound, soluble, n.o.s.*	2291	6.1		Toxic		A92	III	E1	670 Y645	100 kg 10 kg	677	200 kg
Lead cyanide	1620	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Lead (II) cyanide, see **Lead cyanide**												
Lead dioxide	1872	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Lead nitrate	1469	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Lead (II) nitrate, see **Lead nitrate**												
Lead nitroresorcinate (dry)	FORBIDDEN											
Lead (II) perchlorate, see **Lead perchlorate, solid** (UN No. 1470) or **Lead perchlorate solution** (UN No. 3408)												
Lead perchlorate, solid	1470	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
Lead perchlorate solution	3408	5.1	6.1	Oxidizer & Toxic		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Lead peroxide, see **Lead dioxide**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Lead phosphite, dibasic	2989	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
								III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Lead picrate (dry)	FORBIDDEN											
	Lead styphnate (dry)	FORBIDDEN											
	Lead styphnate, wetted with not less than 20% water, or mixture of alcohol and water, by mass	0130	1.1A							FORBIDDEN		FORBIDDEN	
	Lead sulphate with more than 3% free acid	1794	8		Corrosive	US 4		II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Lead tetraethyl, see **Motor fuel anti-knock mixture**												
	Lead tetramethyl, see **Motor fuel anti-knock mixture**												
	Lead trinitroresorcinate (dry)	FORBIDDEN											
	Lead trinitroresorcinate, wetted with not less than 20% water, or mixture of alcohol and water, by mass	0130	1.1A							FORBIDDEN		FORBIDDEN	
≠	**Life-saving appliances, not self-inflating** containing dangerous goods as equipment	3072	9		Miscellaneous		A48 A87 A154 A182 A223		E0	955	No limit	955	No limit
≠	**Life-saving appliances, self-inflating**	2990	9		Miscellaneous		A48 A87 A154 A223		E0	955	No limit	955	No limit
	Lighter flints, see **Ferrocerium**												
	Lighter fluid, see **Flammable liquid, n.o.s.**												
	Lighter refills containing flammable gas	1057	2.1		Gas flammable				E0	201	1 kg	201	15 kg
	Lighters containing flammable gas	1057	2.1		Gas flammable	US 7			E0	201	1 kg	201	15 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Lighters (cigarettes) containing pyrophoric liquid	FORBIDDEN											
Lighters, fuse †	0131	1.4S		Explosive 1.4				E0	142	25 kg	142	100 kg
Lighters (cigarettes) with **lighter fluids**	FORBIDDEN											
Limonene, inactive, see **Dipentene**												
Liquefied gas, n.o.s.*	3163	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Liquefied gases, non-flammable, charged with nitrogen, carbon dioxide or air	1058	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Liquefied gas, flammable, n.o.s.*	3161	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Liquefied gas, oxidizing, n.o.s.*	3157	2.2	5.1	Gas non-flammable & Oxidizer	US 18			E0	200	75 kg	200	150 kg
Liquefied gas, toxic, n.o.s.*	3162	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Liquefied gas, toxic, corrosive, n.o.s.*	3308	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Liquefied gas, toxic, flammable, n.o.s.*	3160	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Liquefied gas, toxic, flammable, corrosive, n.o.s.*	3309	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Liquefied gas, toxic, oxidizing, n.o.s.*	3307	2.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Liquefied gas, toxic, oxidizing, corrosive, n.o.s.*	3310	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Liquefied petroleum gas, see **Petroleum gases, liquefied**												
	Liquor, see **Alcoholic beverages**, etc.												
	Lithium	1415	4.3		Danger if wet	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		487	15 kg
	Lithium alkyls, liquid, see **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												
	Lithium alkyls, solid, see **Organometallic substance, solid, pyrophoric, water-reactive** (UN No. 3393)												
	Lithium alloy batteries, see **Lithium metal batteries,** etc. (UN Nos. 3090, 3091)												
	Lithium aluminium hydride	1410	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
	Lithium aluminium hydride, ethereal	1411	4.3	3	Danger if wet & Liquid flammable			I	E0	FORBIDDEN		480	1 L
≠	**Lithium batteries installed in cargo transport unit** lithium ion batteries or lithium metal batteries	3536	9							FORBIDDEN		FORBIDDEN	
	Lithium borohydride	1413	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
	Lithium ferrosilicon	2830	4.3		Danger if wet			II	E2	484 Y475	15 kg 5 kg	490	50 kg
	Lithium hydride	1414	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
	Lithium hydride, fused solid	2805	4.3		Danger if wet			II	E2	483 Y475	15 kg 5 kg	489	50 kg
	Lithium hydroxide	2680	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Lithium hydroxide solution	2679	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Lithium hypochlorite, dry	1471	5.1		Oxidizer		A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
								III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Lithium hypochlorite mixture	1471	5.1		Oxidizer		A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
								III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Lithium in cartouches, see **Lithium**												
≠	**Lithium ion batteries** (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A183 A201 A213		E0	FORBIDDEN		See 965	
≠	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	A48 A88 A99 A154 A164 A181 A185 A213 A220		E0	967	5 kg	967	35 kg
≠	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A181 A185 A213		E0	966	5 kg	966	35 kg
	Lithium ion polymer batteries, see **Lithium ion batteries**, etc. (UN Nos. 3480, 3481)												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Lithium metal batteries** (including lithium alloy batteries) †	3090	9		Miscellaneous — Lithium batteries	US 2 US 3	A88 A99 A154 A164 A183 A201 A213		E0	FORBIDDEN		See 968	
≠	**Lithium metal batteries contained in equipment** (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	A48 A88 A99 A154 A164 A181 A185 A213 A220		E0	970	5 kg	970	35 kg
≠	**Lithium metal batteries packed with equipment** (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	A88 A99 A154 A164 A181 A185 A213		E0	969	5 kg	969	35 kg
	Lithium nitrate	2722	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Lithium nitride	2806	4.3		Danger if wet			I	E0	FORBIDDEN		488	15 kg
	Lithium peroxide	1472	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Lithium silicide, see **Lithium silicon**												
	Lithium silicon †	1417	4.3		Danger if wet			II	E2	483 Y475	15 kg 5 kg	489	50 kg
	LNG, see **Methane, refrigerated liquid** or **natural gas, refrigerated liquid,** etc.												
	London Purple	1621	6.1		Toxic		A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	LPG, see **Petroleum gases, liquefied**												
	Lye, see **Sodium hydroxide, solid**												
	Lythene, see **Petroleum distillates, n.o.s.**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	M												
≠	**Machinery, fuel cell, flammable gas powered**	3529	2.1		Gas flammable		A70 A87 A154 A176 A208		E0	FORBIDDEN		220	No limit
≠	**Machinery, fuel cell, flammable liquid powered**	3528	3		Liquid flammable		A70 A87 A154 A176 A208		E0	378	No limit	378	No limit
≠	**Machinery, internal combustion**	3530	9		Miscellaneous		A87 A154 A208		E0	972	No limit	972	No limit
≠	**Machinery, internal combustion, flammable gas powered**	3529	2.1		Gas flammable		A70 A87 A154 A208		E0	FORBIDDEN		220	No limit
≠	**Machinery, internal combustion, flammable liquid powered**	3528	3		Liquid flammable		A70 A87 A154 A208		E0	378	No limit	378	No limit
	Magnesium in pellets, turnings or ribbons	1869	4.1		Solid flammable		A15	III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Magnesium alkyls, see **Organometallic substance, liquid, pyrophoric, water-reactive** (UN No. 3394)												
	Magnesium alloys with more than 50% magnesium in pellets, turnings or ribbons	1869	4.1		Solid flammable		A15	III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Magnesium alloys powder	1418	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I II III	E0 E2 E1	FORBIDDEN 483 486	 15 kg 25 kg	488 490 491	15 kg 50 kg 100 kg
	Magnesium aluminium phosphide	1419	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
	Magnesium arsenate	1622	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Magnesium bisulphite solution, see **Bisulphites, aqueous solution, n.o.s.**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Magnesium bromate	1473	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Magnesium chlorate	2723	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Magnesium chloride and chlorate mixture, see **Chlorate and magnesium chloride mixture**, solid (UN No. 1459) or **Chlorate and magnesium chloride mixture solution** (UN No. 3407)												
Magnesium diamide	2004	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Magnesium diphenyl, see **Organometallic substance, solid, pyrophoric, water-reactive** (UN No. 3393)												
Magnesium dross, wet or hot	FORBIDDEN											
Magnesium fluorosilicate	2853	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Magnesium granules, coated, particle size not less than 149 microns	2950	4.3		Danger if wet			III	E1	486 Y477	25 kg 10 kg	491	100 kg
Magnesium hydride	2010	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Magnesium nitrate	1474	5.1		Oxidizer		A155	III	E1	559 Y546	25 kg 10 kg	563	100 kg
Magnesium perchlorate	1475	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Magnesium peroxide	1476	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Magnesium phosphide	2011	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
Magnesium powder	1418	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	483	15 kg	490	50 kg
							III	E1	486	25 kg	491	100 kg
Magnesium scrap †, see **Magnesium** or **Magnesium alloys** (UN No. 1869)												
Magnesium silicide	2624	4.3		Danger if wet			II	E2	483 Y475	15 kg 5 kg	489	50 kg
Magnesium silicofluoride, see **Magnesium fluorosilicate**												
Magnetized material	2807	9		Magnetic				E0	953	No limit	953	No limit

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Maleic anhydride	2215	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
≠ **Maleic anhydride, molten**	2215	8					III		FORBIDDEN		FORBIDDEN	
Malonic dinitrile, see **Malononitrile**												
Malonodinitrile, see **Malononitrile**												
Malononitrile	2647	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Maneb	2210	4.2	4.3	Spontaneous combustion & Danger if wet		A30	III	E1	468	25 kg	471	100 kg
Maneb preparation with not less than 60% maneb	2210	4.2	4.3	Spontaneous combustion & Danger if wet		A30	III	E1	468	25 kg	471	100 kg
Maneb preparation, stabilized against self-heating	2968	4.3		Danger if wet		A3	III	E1	486 Y477	25 kg 10 kg	491	100 kg
Maneb stabilized against self-heating	2968	4.3		Danger if wet		A3	III	E1	486 Y477	25 kg 10 kg	491	100 kg
Manganese ethylene-di-dithiocarbamate, see **Maneb**												
Manganese ethylene-1,2-di-dithiocarbamate, see **Maneb**												
Manganese nitrate	2724	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Manganese (II) nitrate, see **Manganese nitrate**												
Manganese resinate	1330	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Manganous nitrate, see **Manganese nitrate**												
Mannitan tetranitrate	FORBIDDEN											
Mannitol hexanitrate (dry)	FORBIDDEN											
Mannitol hexanitrate, wetted with not less than 40% water, or mixture of alcohol and water, by mass	0133	1.1D							FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Matches, fusee** †	2254	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2 A125	III		FORBIDDEN		FORBIDDEN	
	Matches, safety (book, card or strike on box) †	1944	4.1		Solid flammable		A125	III	E1	455 Y455	25 kg 10 kg	455	100 kg
≠	**Matches, 'strike anywhere'** †	1331	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2 A125	III		FORBIDDEN		FORBIDDEN	
	Matches, trick, see **Fireworks**, etc.												
	Matches, wax 'vesta'	1945	4.1		Solid flammable		A125	III	E1	455 Y455	25 kg 10 kg	455	100 kg
	Medical waste, n.o.s.	3291	6.2		Infectious		A117		E0	621	No limit	621	No limit
	Medical waste, Category A, affecting animals only, solid	3549	6.2				A2 A218		E0	FORBIDDEN		FORBIDDEN	
	Medical waste, Category A, affecting humans, solid	3549	6.2				A2 A218		E0	FORBIDDEN		FORBIDDEN	
	Medicine, n.o.s., see **Consumer commodity**												
	Medicine, liquid, flammable, toxic, n.o.s.	3248	3	6.1	Liquid flammable & Toxic		A3 A80	II	E2	352 Y341	1 L 1 L	364	60 L
								III	E1	355 Y343	60 L 2 L	366	220 L
	Medicine, liquid, toxic, n.o.s.	1851	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Medicine, solid, toxic, n.o.s.	3249	6.1		Toxic		A3	II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	p-Mentha-1,8-diene, see **Dipentene**												
	Mercaptan mixture, liquid, flammable, n.o.s.*	3336	3		Liquid flammable		A3	I	E0	FORBIDDEN		361	30 L
								II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Mercaptan mixture, liquid, flammable, toxic, n.o.s.***	1228	3	6.1	Liquid flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A3	II III	E0 E1	FORBIDDEN 373 Y373	 5 L 1 L	373 373	60 L 220 L
	Mercaptan mixture, liquid, toxic, flammable, n.o.s.*	3071	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	661	60 L
	Mercaptans, liquid, flammable, n.o.s.*	3336	3		Liquid flammable		A3	I II III	E0 E2 E1	FORBIDDEN 353 Y341 355 Y344	 5 L 1 L 60 L 10 L	361 364 366	30 L 60 L 220 L
≠	**Mercaptans, liquid, flammable, toxic, n.o.s.***	1228	3	6.1	Liquid flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A3	II III	E0 E1	FORBIDDEN 373 Y373	 5 L 1 L	373 373	60 L 220 L
	Mercaptans, liquid, toxic, flammable, n.o.s.*	3071	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	661	60 L
	2-Mercaptoethanol, see **Thioglycol**												
	2-Mercaptopropionic acid, see **Thiolactic acid**												
	5-Mercaptotetrazol-1-acetic acid	0448	1.4C		Explosive 1.4				E0	FORBIDDEN		114 b)	75 kg
	Mercuric arsenate	1623	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Mercuric chloride	1624	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Mercuric nitrate	1625	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Mercuric potassium cyanide	1626	6.1		Toxic			I	E5	666	5 kg	673	50 kg
	Mercuric sulphate, see **Mercury sulphate**												
	Mercurol, see **Mercury nucleate**												
	Mercurous azide	FORBIDDEN											
	Mercurous bisulphate, see **Mercury sulphate**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Mercurous chloride, see **Mercury compound, solid, n.o.s.** (UN No. 2025)												
Mercurous nitrate	1627	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercurous sulphate, see **Mercury sulphate**												
Mercury	2809	8	6.1	Corrosive & Toxic	US 4		III	E0	868	35 kg	868	35 kg
Mercury acetate	1629	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury acetylide	FORBIDDEN											
Mercury ammonium chloride	1630	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury based pesticide, liquid, flammable, toxic*, flash point less than 23°C	2778	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352 Y341	1 L 1 L	364	60 L
Mercury based pesticide, liquid, toxic*	3012	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Mercury based pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3011	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Mercury based pesticide, solid, toxic*	2777	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Mercury benzoate	1631	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury bichloride, see **Mercuric chloride**												
Mercury bromides	1634	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Mercury compound, liquid, n.o.s.*	2024	6.1		Toxic		A3 A4 A6 A18	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 661 663	30 L 60 L 220 L
Mercury compound, solid, n.o.s.*	2025	6.1		Toxic		A3 A5 A6 A18	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
Mercury contained in manufactured articles	3506	8	6.1	Corrosive & Toxic		A48 A69 A191		E0	869	No limit	869	No limit
Mercury cyanide	1636	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water, by mass	0135	1.1A							FORBIDDEN		FORBIDDEN	
Mercury gluconate	1637	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury iodide	1638	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury iodide aquabasic ammonobasic (Iodide of Millon's base)	FORBIDDEN											
Mercury nitride	FORBIDDEN											
Mercury nucleate	1639	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury oleate	1640	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury oxide	1641	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury oxycyanide, desensitized	1642	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury potassium iodide	1643	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury salicylate	1644	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury sulphate	1645	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Mercury thiocyanate	1646	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Mercury vapour tubes, see **Mercury contained in manufactured articles** (UN No. 3506)												
	Mesitylene, see **1,3,5-Trimethylbenzene**												
	Mesityl oxide	1229	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Metal carbonyls, liquid, n.o.s.*	3281	6.1		Toxic		A3 A4 A137	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Metal carbonyls, solid, n.o.s.*	3466	6.1		Toxic		A3 A5	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
≠	**Metal catalyst, dry***	2881	4.2		Spontaneous combustion		A1 A3 A36	I		FORBIDDEN		FORBIDDEN	
								II	E0	FORBIDDEN		473	50 kg
								III	E1	473	25 kg	473	100 kg
	Metal catalyst, wetted* with a visible excess of liquid	1378	4.2		Spontaneous combustion	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		473	50 kg
	Metaldehyde	1332	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Metal hydrides, flammable, n.o.s.*	3182	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
								III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Metal hydrides, water-reactive, n.o.s.*	1409	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
								II	E2	484 Y475	15 kg 5 kg	490	50 kg
	Metallic substance, water-reactive, n.o.s.*	3208	4.3		Danger if wet		A3	I	E0	FORBIDDEN		487	15 kg
								II	E2	483 Y475	15 kg 5 kg	489	50 kg
								III	E1	485 Y477	25 kg 10 kg	491	100 kg
	Metallic substance, water-reactive, self-heating, n.o.s.*	3209	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I	E0	FORBIDDEN		487	15 kg
								II	E0	FORBIDDEN		489	50 kg
								III	E1	485	25 kg	491	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Metal powder, flammable, n.o.s.	3089	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
								III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Metal powder, self-heating, n.o.s.*	3189	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
								III	E1	469	25 kg	471	100 kg
	Metal salts of organic compounds, flammable, n.o.s.*	3181	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
								III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Methacrylaldehyde, stabilized	2396	3	6.1	Liquid flammable & Toxic		A209	II	E2	FORBIDDEN		364	60 L
								II	E2	FORBIDDEN			
	Methacrylic acid, stabilized	2531	8		Corrosive		A209	II	E2	FORBIDDEN		855	30 L
								II	E2	FORBIDDEN			
≠	**Methacrylonitrile, stabilized**	3079	6.1	3			A209	I		FORBIDDEN		FORBIDDEN	
	Methallyl alcohol	2614	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Methanal, see **Formaldehyde solution**												
	Methane and hydrogen, mixture, compressed, see **Hydrogen and methane, mixture, compressed**												
	Methane, compressed	1971	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Methane, refrigerated liquid with high methane content	1972	2.1							FORBIDDEN		FORBIDDEN	
≠	**Methanesulphonyl chloride**	3246	6.1	8				I		FORBIDDEN		FORBIDDEN	
	Methanol	1230	3	6.1	Liquid flammable & Toxic		A113	II	E2	352 Y341	1 L 1 L	364	60 L
	Methazoic acid	FORBIDDEN											
	2-Methoxyethyl acetate, see **Ethylene glycol monomethyl ether acetate**												
≠	**Methoxymethyl isocyanate**	2605	6.1	3				I		FORBIDDEN		FORBIDDEN	
	4-Methoxy-4-methylpentan-2-one	2293	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
1-Methoxy-2-nitrobenzene, see **Nitroanisoles**, **liquid** (UN No. 2730) or **Nitroanisoles**, **solid** (UN No. 3458)												
1-Methoxy-3-nitrobenzene, see **Nitroanisoles, liquid** (UN No. 2730) or **Nitroanisoles, solid** (UN No. 3458)												
1-Methoxy-4-nitrobenzene, see **Nitroanisoles, liquid** (UN No. 2730) or **Nitroanisoles, solid** (UN No. 3458)												
1-Methoxy-2-propanol	3092	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Methyl acetate	1231	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methylacetylene and propadiene mixture, stabilized †	1060	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
beta-Methyl acrolein, see **Crotonaldehyde** or **Crotonaldehyde, stabilized** (UN No. 1143)												
Methyl acrylate, stabilized	1919	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
Methylal	1234	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl alcohol, see **Methanol**												
Methyl allyl alcohol, see **Methallyl alcohol**												
Methylallyl chloride	2554	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methylamine, anhydrous	1061	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1		E0	FORBIDDEN		200	150 kg
Methylamine, aqueous solution	1235	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Methylamine dinitramine and dry salts thereof	FORBIDDEN											
	Methylamine nitroform	FORBIDDEN											
	Methylamine perchlorate (dry)	FORBIDDEN											
	Methylamyl acetate	1233	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Methyl amyl alcohol, see **Methyl isobutyl carbinol**												
	Methyl amyl ketone, see **n-Amyl methyl ketone** (UN No. 1110)												
	N-Methylaniline	2294	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Methylated spirit, see **Alcohols, n.o.s.** or **Alcohols, flammable, toxic, n.o.s.**												
	alpha-Methylbenzyl alcohol, liquid	2937	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	alpha-Methylbenzyl alcohol, solid	3438	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Methyl bromide with not more than 2% chloropicrin	1062	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Methyl bromide and chloropicrin mixture, see **Chloropicrin and methyl bromide mixture**												
≠	**Methyl bromide and ethylene dibromide mixture, liquid**	1647	6.1			AU 1 CA 7 NL 1 US 3		I		FORBIDDEN		FORBIDDEN	
	Methyl bromoacetate	2643	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	2-Methylbutanal	3371	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	3-Methylbutan-2-one	2397	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	2-Methyl-1-butene	2459	3		Liquid flammable			I	E3	351	1 L	361	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	2-Methyl-2-butene	2460	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	3-Methyl-1-butene	2561	3		Liquid flammable			I	E3	351	1 L	361	30 L
	N-Methylbutylamine	2945	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Methyl tert-butyl ether	2398	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Methyl butyrate	1237	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Methyl chloride	1063	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	100 kg
	Methyl chloride and chloropicrin mixture, see **Chloropicrin and methyl chloride mixture**												
	Methyl chloride and methylene chloride mixture	1912	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A52		E0	FORBIDDEN		200	150 kg
≠	**Methyl chloroacetate**	2295	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Methyl chlorocarbonate, see **Methyl chloroformate**												
	Methyl chloroform, see **1,1,1-Trichloroethane**												
≠	**Methyl chloroformate**	1238	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
≠	**Methyl chloromethyl ether**	1239	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Methyl 2-chloropropionate	2933	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Methyl-alpha-chloropropionate, see **Methyl 2-chloropropionate**												
	Methylchlorosilane	2534	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Methyl cyanide, see **Acetonitrile**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Methylcyclohexane	2296	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methylcyclohexanols, flammable	2617	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Methylcyclohexanone	2297	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Methylcyclopentane	2298	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl dichloroacetate	2299	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Methyldichlorosilane	1242	4.3	3 8	Danger if wet & Liquid flammable & Corrosive			I	E0	FORBIDDEN		480	1 L
Methylene bromide, see **Dibromomethane**												
Methylene chloride, see **Dichloromethane**												
Methylene chloride and methyl chloride mixture, see **Methyl chloride and methylene chloride mixture**												
Methylene cyanide, see **Malononitrile**												
2,2'-Methylene-di- (3,4,6-trichlorophenol), see **Hexachlorophene**												
p,p'-Methylene dianiline, see **4,4'-Diaminodiphenylmethane**												
Methylene dibromide, see **Dibromomethane**												
Methylene glycol dinitrate	FORBIDDEN											
Methyl ethyl ether, see **Ethyl methyl ether**												
Methyl ethyl ketone	1193	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl ethyl ketone peroxide(s), 48% or more if available oxygen above 10% and not more than 10.7%, with or without water	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Methyl ethyl ketone peroxide(s), not more than 52% when with 48% or more diluent type A	FORBIDDEN											
	2-Methyl-5-ethylpyridine	2300	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Methyl fluoride	2454	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Methyl formate	1243	3		Liquid flammable			I	E3	351	1 L	361	30 L
	2-Methylfuran	2301	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	a-Methylglucoside tetranitrate	FORBIDDEN											
	a-Methylglycerol trinitrate	FORBIDDEN											
	Methyl glycol, see **Ethylene glycol monomethyl ether**												
	Methyl glycol acetate, see **Ethylene glycol monomethyl ether acetate**												
≠	**2-Methyl-2-heptanethiol**	3023	6.1	3				I		FORBIDDEN		FORBIDDEN	
	5-Methylhexan-2-one	2302	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠	**Methylhydrazine**	1244	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
≠	**Methyl iodide**	2644	6.1			US 4		I		FORBIDDEN		FORBIDDEN	
	Methyl isobutyl carbinol	2053	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Methyl isobutyl ketone	1245	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠	**Methyl isocyanate**	2480	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Methyl isopropenyl ketone, stabilized	1246	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
≠	**Methyl isothiocyanate**	2477	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Methyl isovalerate	2400	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Methyl magnesium bromide in ethyl ether	1928	4.3	3	Danger if wet & Liquid flammable			I	E0	FORBIDDEN		480	1 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Methyl mercaptan	1064	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Methyl mercaptopropionaldehyde, see **4-Thiapentanal** (UN No. 2785)												
	Methyl methacrylate monomer, stabilized	1247	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
	4-Methylmorpholine	2535	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	N-Methylmorpholine	2535	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Methyl nitramine (dry), metal salts of	FORBIDDEN											
	Methyl nitrate	FORBIDDEN											
	Methyl nitrite	FORBIDDEN											
≠	**Methyl orthosilicate**	2606	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Methylpentadiene	2461	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Methylpentanes, see **Hexanes**												
	2-Methylpentan-2-ol	2560	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	4-Methylpentan-2-ol, see **Methyl isobutyl carbinol**												
	3-Methyl-2-penten-4-ynol, see **1-Pentol**												
	Methylphenyldichlorosilane	2437	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	2-Methyl-2-phenylpropane, see **Butylbenzenes**												
	Methyl picric acid (heavy metal salts of)	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
1-Methylpiperidine	2399	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
Methyl propionate	1248	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methylpropylbenzene, see **Cymenes**												
Methyl propyl ether	2612	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl propyl ketone	1249	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl pyridines, see **Picolines**												
alpha-Methylstyrene, see **Isopropenylbenzene**												
Methylstyrene, stabilized, see **Vinyltoluenes, stabilized** (UN No. 2618)												
Methyl sulphate, see **Dimethyl sulphate**												
Methyl sulphide, see **Dimethyl sulphide**												
Methyltetrahydrofuran	2536	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl trichloroacetate	2533	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
Methyltrichlorosilane	1250	3	8	Liquid flammable & Corrosive	AU 1 CA 7 IR 3 NL 1 US 3		II	E0	FORBIDDEN		377	5 L
Methyl trimethylol methane trinitrate	FORBIDDEN											
alpha-Methylvaleraldehyde	2367	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Methyl vinyl benzene, stabilized, see **Vinyltoluenes, stabilized** (UN No. 2618)												
≠ **Methyl vinyl ketone, stabilized**	1251	6.1	3 8			A209	I		FORBIDDEN		FORBIDDEN	
MIBC, see **Methyl isobutyl carbinol**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Mine rescue equipment containing carbon dioxide, see **Carbon dioxide**												
Mines with bursting charge †	0136	1.1F							FORBIDDEN		FORBIDDEN	
Mines with bursting charge †	0137	1.1D							FORBIDDEN		FORBIDDEN	
Mines with bursting charge †	0138	1.2D							FORBIDDEN		FORBIDDEN	
Mines with bursting charge †	0294	1.2F							FORBIDDEN		FORBIDDEN	
Mirbane oil, see **Nitrobenzene**												
Missiles, guided, see **Rockets,** (UN No. 0398) **liquid fuelled**, etc. or **Rockets**, etc.												
Mobility aids, see **Battery-powered equipment** or **Battery-powered vehicle**												
Molybdenum pentachloride	2508	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Monochloroacetic acid, see **Chloroacetic acid**, etc.												
Monochlorobenzene, see **Chlorobenzene**												
Monochlorodifluoromethane, see **Chlorodifluoromethane**												
Monochlorodifluoromethane and monochloropentafluoroethane mixture, see **Chlorodifluoromethane and chloropentafluoroethane mixture**, etc.												
Monochlorodifluoromono-bromomethane, see **Chlorodifluorobromomethane**												
Monoethylamine, see **Ethylamine**												
Monopropylamine, see **Propylamine**												
Morpholine	2054	8	3	Corrosive & Liquid flammable			I	E0	850	0.5 L	854	2.5 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Motorcycles, see **Vehicle (flammable gas powered)** or **Vehicle (flammable liquid powered)**												
	Motor fuel anti-knock mixture	1649	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		658	30 L
≠	**Motor fuel anti-knock mixture, flammable**	3483	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Motor spirit	1203	3		Liquid flammable		A100	II	E2	353 Y341	5 L 1 L	364	60 L
	Muriatic acid, see **Hydrochloric acid**												
≠	**Musk xylene**	2956	4.1					III		FORBIDDEN		FORBIDDEN	
	Mysorite, see **Asbestos, amphibole** (UN No. 2212)												
	N												
	Naphtha, see **Petroleum distillates, n.o.s.**												
	Naphthalene, crude	1334	4.1		Solid flammable	US 4		III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Naphthalene diozonide	FORBIDDEN											
≠	**Naphthalene, molten**	2304	4.1					III		FORBIDDEN		FORBIDDEN	
	Naphthalene, refined	1334	4.1		Solid flammable	US 4		III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Naphtha, petroleum, see **Petroleum distillates, n.o.s.**												
	Naphtha, solvent, see **Petroleum products, n.o.s.**												
	alpha-Naphthylamine	2077	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Naphthyl amineperchlorate	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	beta-Naphthylamine, solid	1650	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	beta-Naphthylamine solution	3411	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Naphthylthiourea	1651	6.1		Toxic	US 4	A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	1-Naphthylthiourea, see **Naphthylthiourea**												
	Naphthylurea	1652	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Natural gas, compressed with high methane content	1971	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Natural gasoline, see **Gasoline** or **Motor spirit** or **Petrol**												
	Natural gas, refrigerated liquid with high methane content	1972	2.1							FORBIDDEN		FORBIDDEN	
	Neohexane, see **Hexanes**												
	Neon, compressed	1065	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
	Neon, refrigerated liquid	1913	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
	Neothyl, see **Methyl propyl ether**												
≠	**Nickel carbonyl**	1259	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Nickel cyanide	1653	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Nickel (II) cyanide, see **Nickel cyanide**												
	Nickel nitrate	2725	5.1		Oxidizer	US 4		III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Nickel (II) nitrate, see **Nickel nitrate**												
	Nickel nitrite	2726	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Nickel (II) nitrite, see **Nickel nitrite**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Nickelous nitrate, see **Nickel nitrate**												
Nickelous nitrite, see **Nickel nitrite**												
Nickel picrate	FORBIDDEN											
Nickel tetracarbonyl, see **Nickel carbonyl**												
Nicotine	1654	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Nicotine compound, liquid, n.o.s.*	3144	6.1		Toxic	US 4	A3 A4 A6	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Nicotine compound, solid, n.o.s.*	1655	6.1		Toxic	US 4	A3 A5 A6	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Nicotine hydrochloride, liquid	1656	6.1		Toxic	US 4	A3 A6	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Nicotine hydrochloride, solid	3444	6.1		Toxic		A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
Nicotine hydrochloride solution	1656	6.1		Toxic	US 4	A3 A6	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Nicotine preparation, liquid, n.o.s.*	3144	6.1		Toxic	US 4	A3 A4 A6	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Nicotine preparation, solid, n.o.s.*	1655	6.1		Toxic	US 4	A3 A5 A6	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Nicotine salicylate	1657	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Nicotine sulphate, solid	3445	6.1		Toxic	US 4	A3	II	E4	669 Y644	25 kg 1 kg	676	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Nicotine sulphate solution	1658	6.1		Toxic	US 4	A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Nicotine tartrate	1659	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Nitrates, inorganic, n.o.s.	1477	5.1		Oxidizer		A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Nitrates, inorganic, aqueous solution, n.o.s.	3218	5.1		Oxidizer		A3 A65	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Nitrates of diazonium compounds	FORBIDDEN											
Nitrating acid mixture with more than 50% nitric acid †	1796	8	5.1	Corrosive & Oxidizer			I	E0	FORBIDDEN		854	2.5 L
Nitrating acid mixture with not more than 50% nitric acid †	1796	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
Nitrating acid mixture, spent with more than 50% nitric acid †	1826	8	5.1	Corrosive & Oxidizer		A34	I	E0	FORBIDDEN		854	2.5 L
Nitrating acid mixture, spent with not more than 50% nitric acid †	1826	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1 A34	II	E0	FORBIDDEN		855	30 L
Nitric acid, other than red fuming, with at least 65% but not more than 70% nitric acid	2031	8	5.1	Corrosive & Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
Nitric acid, other than red fuming, with more than 20% and less than 65% nitric acid	2031	8		Corrosive		A212	II	E0	FORBIDDEN		855	30 L
Nitric acid, other than red fuming, with more than 70% nitric acid	2031	8	5.1	Corrosive & Oxidizer			I	E0	FORBIDDEN		854	2.5 L
Nitric acid, other than red fuming, with not more than 20% nitric acid	2031	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Nitric acid, red fuming**	2032	8	5.1 6.1				I		FORBIDDEN		FORBIDDEN	
	Nitric oxide and dinitrogen tetroxide mixture	1975	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Nitric oxide and nitrogen dioxide mixture	1975	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Nitric oxide, compressed	1660	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Nitric oxide, compressed contained in gas cartridges for use in sterilization devices, see **Gas cartridges** (toxic, oxidizing & corrosive) without a release device, non-refillable (UN No. 2037) or **Receptacles, small, containing gas** (toxic, oxidizing & corrosive) without a release device, non-refillable (UN No. 2037)												
	Nitriles, flammable, toxic, n.o.s.*	3273	3	6.1	Liquid flammable & Toxic			I	E0	FORBIDDEN		361	30 L
								II	E2	352 Y341	1 L 1 L	364	60 L
	Nitriles, liquid, toxic, n.o.s.*	3276	6.1		Toxic		A3 A4 A137	I	E5	652	1 L	658	30 L
								II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Nitriles, solid, toxic, n.o.s.*	3439	6.1		Toxic		A3 A5	I	E5	666	5 kg	673	50 kg
								II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Nitriles, toxic, flammable, n.o.s.*	3275	6.1	3	Toxic & Liquid flammable		A4 A137	I	E5	652	1 L	658	30 L
								II	E4	654 Y641	5 L 1 L	662	60 L
	Nitrites, inorganic, n.o.s.*	2627	5.1		Oxidizer		A33	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Nitrites, inorganic, aqueous solution, n.o.s.*	3219	5.1		Oxidizer		A3 A33	II	E2	550 Y540	1 L 0.5 L	554	5 L
								III	E1	551 Y541	2.5 L 1 L	555	30 L
	N-Nitroaniline	FORBIDDEN											
	Nitroanilines (o-,m-,p-)	1661	6.1		Toxic		A113	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Nitroanisoles, liquid	2730	6.1		Toxic		A113	III	E1	655 Y642	60 L 2 L	663	220 L
	Nitroanisoles, solid	3458	6.1		Toxic		A113	III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Nitrobenzene	1662	6.1		Toxic		A113	II	E4	654 Y641	5 L 1 L	662	60 L
	Nitrobenzene bromide, see **Nitrobromobenzenes**, etc.												
	m-Nitrobenzene diazonium perchlorate	FORBIDDEN											
	Nitrobenzenesulphonic acid	2305	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Nitrobenzol, see **Nitrobenzene**												
	5-Nitrobenzotriazol	0385	1.1D							FORBIDDEN		FORBIDDEN	
	Nitrobenzotrifluorides, liquid	2306	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Nitrobenzotrifluorides, solid	3431	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Nitrobromobenzene, liquid	2732	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Nitrobromobenzene, solid	3459	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Nitrocellulose, dry or wetted with less than 25% water (or alcohol), by mass	0340	1.1D				A216			FORBIDDEN		FORBIDDEN	
	Nitrocellulose, unmodified or plasticized with less than 18% plasticizing substance, by mass	0341	1.1D				A216			FORBIDDEN		FORBIDDEN	
≠	**Nitrocellulose membrane filters** with not more than 12.6% nitrogen, by dry mass	3270	4.1		Solid flammable		A73 A122	II	E2	458 Y458	1 kg 1 kg	458	15 kg
≠	**Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture without plasticizer, without pigment**	2557	4.1		Solid flammable	BE 3	A86 A217	II	E0	452	1 kg	453	15 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture without plasticizer, with pigment**	2557	4.1		Solid flammable	BE 3	A86 A217	II	E0	452	1 kg	453	15 kg
≠	**Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture with plasticizer, without pigment**	2557	4.1		Solid flammable	BE 3	A86 A217	II	E0	452	1 kg	453	15 kg
≠	**Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture with plasticizer, with pigment**	2557	4.1		Solid flammable	BE 3	A86 A217	II	E0	452	1 kg	453	15 kg
	Nitrocellulose, plasticized with not less than 18% plasticizing substance, by mass	0343	1.3C				A216			FORBIDDEN		FORBIDDEN	
	Nitrocellulose solution, flammable with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	2059	3		Liquid flammable	BE 3	A3 A91	I II III	E0 E0 E0	351 353 Y341 355 Y344	1 L 5 L 1 L 60 L 10 L	361 364 366	30 L 60 L 220 L
	Nitrocellulose, wetted with not less than 25% alcohol, by mass	0342	1.3C				A216			FORBIDDEN		FORBIDDEN	
≠	**Nitrocellulose with alcohol**, not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass	2556	4.1		Solid flammable	BE 3	A217	II	E0	452	1 kg	453	15 kg
≠	**Nitrocellulose with water**, not less than 25% water by mass	2555	4.1		Solid flammable	BE 3	A217	II	E0	452	15 kg	453	50 kg
	Nitrochlorobenzenes, see **Chloronitrobenzenes**												
	3-Nitro-4-chlorobenzotrifluoride	2307	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Nitrocresols, liquid	3434	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Nitrocresols, solid	2446	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	6-Nitro-4-diazotoluene-3-sulphonic acid (dry)	FORBIDDEN											
	Nitroethane	2842	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Nitroethylene polymer	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Nitroethyl nitrate	FORBIDDEN											
Nitrogen, compressed	1066	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
Nitrogen dioxide	1067	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Nitrogen dioxide contained in gas cartridges for use in sterilization devices, see **Gas cartridges** (toxic, oxidizing & corrosive) without a release device, non-refillable (UN No. 2037) or **Receptacles, small, containing gas** (toxic, oxidizing & corrosive) without a release device, non-refillable (UN No. 2037)												
Nitrogen, refrigerated liquid	1977	2.2		Gas non-flammable		A152		E1	202	50 kg	202	500 kg
Nitrogen trichloride	FORBIDDEN											
Nitrogen trifluoride	2451	2.2	5.1	Gas non-flammable & Oxidizer	US 18			E0	200	75 kg	200	150 kg
Nitrogen triiodide	FORBIDDEN											
Nitrogen triiodide monoamine	FORBIDDEN											
Nitrogen trioxide	2421	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Nitroglycerin, desensitized with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	0143	1.1D	6.1						FORBIDDEN		FORBIDDEN	
Nitroglycerin, liquid, not desensitized	FORBIDDEN											
≠ **Nitroglycerin mixture, desensitized, liquid, n.o.s.*** with not more than 30% nitroglycerin, by mass	3357	3			BE 3	A17	II		FORBIDDEN		FORBIDDEN	
≠ **Nitroglycerin mixture, desensitized, liquid flammable, n.o.s.*** with not more than 30% nitroglycerin, by mass	3343	3			BE 3				FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Nitroglycerin mixture, desensitized, solid, n.o.s.* with more than 2% but not more than 10% nitroglycerin, by mass	3319	4.1		Solid flammable	AU 1 BE 3 CA 7 IR 3 NL 1 US 3	A1 A68	II	E0	FORBIDDEN		499	0.5 kg
Nitroglycerin solution in alcohol with more than 1% but not more than 10% nitroglycerin	0144	1.1D							FORBIDDEN		FORBIDDEN	
Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin	3064	3		Liquid flammable	BE 3	A188	II	E0	FORBIDDEN		371	5 L
Nitroglycerin solution in alcohol with not more than 1% nitroglycerin	1204	3		Liquid flammable	BE 3		II	E0	371 Y341	5 L 1 L	371	60 L
Nitroguanidine, dry or wetted with less than 20% water, by mass	0282	1.1D							FORBIDDEN		FORBIDDEN	
Nitroguanidine nitrate	FORBIDDEN											
Nitroguanidine, wetted with not less than 20% water, by mass	1336	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
1-Nitro hydantoin	FORBIDDEN											
Nitrohydrochloric acid	1798	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		854	2.5 L
Nitro isobutane triol trinitrate	FORBIDDEN											
Nitromannite (dry)	FORBIDDEN											
Nitromannite, wetted with not less than 40% water, or mixture of alcohol and water, by mass	0133	1.1D							FORBIDDEN		FORBIDDEN	
Nitromethane	1261	3		Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A39	II	E0	FORBIDDEN		364	60 L
N-Nitro-N-methylglycolamide nitrate	FORBIDDEN											
2-Nitro-2-methylpropanol nitrate	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Nitromuriatic acid, see **Nitrohydrochloric acid**												
Nitronaphthalene	2538	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
Nitrophenols (o-,m-,p-)	1663	6.1		Toxic	US 4	A113	III	E1	670 Y645	100 kg 10 kg	677	200 kg
m-Nitrophenyldinitro methane	FORBIDDEN											
≠ **4-Nitrophenylhydrazine** with not less than 30% water, by mass	3376	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
Nitropropanes	2608	3		Liquid flammable	US 4		III	E1	355 Y344	60 L 10 L	366	220 L
p-Nitrosodimethylaniline	1369	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Nitrostarch, dry or wetted with less than 20% water, by mass	0146	1.1D							FORBIDDEN		FORBIDDEN	
Nitrostarch, wetted with not less than 20% water, by mass	1337	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
Nitrosugars (dry)	FORBIDDEN											
Nitrosyl chloride	1069	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Nitrosylsulphuric acid, liquid	2308	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Nitrosylsulphuric acid, solid	3456	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Nitrotoluenes, liquid	1664	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Nitrotoluenes, solid	3446	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Nitrotoluidines (mono)	2660	6.1		Toxic	US 4		III	E1	670 Y645	100 kg 10 kg	677	200 kg
Nitrotriazolone	0490	1.1D							FORBIDDEN		FORBIDDEN	
Nitro urea	0147	1.1D							FORBIDDEN		FORBIDDEN	
Nitrous oxide	1070	2.2	5.1	Gas non-flammable & Oxidizer	US 18			E0	200	75 kg	200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Nitrous oxide, refrigerated liquid	2201	2.2	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Nitroxylenes, liquid	1665	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Nitroxylenes, solid	3447	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Non-activated carbon, see **Carbon** (UN No. 1361)												
Non-activated charcoal, see **Carbon** (UN No. 1361)												
Nonanes	1920	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Non-flammable gas, n.o.s., see **Compressed** or **Liquefied gas**, etc.												
Non-liquefied gas, see **Compressed gas**, etc.												
Non-liquefied hydrocarbon gas, see **Hydrocarbon gas, compressed, n.o.s.**												
Nonyltrichlorosilane	1799	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
2,5-Norbornadiene, stabilized	2251	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
Normal propyl alcohol, see **Propyl alcohol, normal**												
NTO	0490	1.1D							FORBIDDEN		FORBIDDEN	
O												
Octadecyltrichlorosilane	1800	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Octadiene	2309	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
1,7-Octadiene-3,5-diyne-1,8-dimethoxy-9-octadecynoic acid	FORBIDDEN											
Octafluorobut-2-ene	2422	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Octafluorocyclobutane	1976	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Octafluoropropane	2424	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Octanes	1262	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Octogen, desensitized	0484	1.1D							FORBIDDEN		FORBIDDEN	
Octogen (dry or unphlegmatized)	FORBIDDEN											
Octogen, wetted with not less than 15% water, by mass	0226	1.1D							FORBIDDEN		FORBIDDEN	
Octol, dry or wetted with less than 15% water, by mass	0266	1.1D							FORBIDDEN		FORBIDDEN	
Octolite, dry or wetted with less than 15% water, by mass	0266	1.1D							FORBIDDEN		FORBIDDEN	
Octonal	0496	1.1D							FORBIDDEN		FORBIDDEN	
Octyl aldehydes	1191	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
tert-Octyl mercaptan, see **2-Methyl-2-heptanethiol**												
Octyltrichlorosilane	1801	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Oenanthol, see **n-Heptaldehyde**												
Oil gas, compressed †	1071	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	25 kg
Oil well sampling device, charged, see **Compressed** or **Liquefied gas, flammable, n.o.s.**												
Oleum, see **Sulphuric acid, fuming**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Organic peroxide type B, liquid	FORBIDDEN											
Organic peroxide type B, liquid, temperature controlled	FORBIDDEN											
Organic peroxide type B, solid	FORBIDDEN											
Organic peroxide type B, solid, temperature controlled	FORBIDDEN											
Organic peroxide type C, liquid*	3103	5.2		Organic peroxide		A20 A150		E0	570	5 L	570	10 L
Organic peroxide type C, liquid, temperature controlled*	3113	5.2							FORBIDDEN		FORBIDDEN	
Organic peroxide type C, solid*	3104	5.2		Organic peroxide		A20 A150		E0	570	5 kg	570	10 kg
Organic peroxide type C, solid, temperature controlled*	3114	5.2							FORBIDDEN		FORBIDDEN	
Organic peroxide type D, liquid*	3105	5.2		Organic peroxide		A20 A150		E0	570	5 L	570	10 L
Organic peroxide type D, liquid, temperature controlled*	3115	5.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A150			FORBIDDEN		FORBIDDEN	
Organic peroxide type D, solid*	3106	5.2		Organic peroxide		A20		E0	570	5 kg	570	10 kg
Organic peroxide type D, solid, temperature controlled*	3116	5.2			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Organic peroxide type E, liquid*	3107	5.2		Organic peroxide		A20 A150		E0	570	10 L	570	25 L
Organic peroxide type E, liquid, temperature controlled*	3117	5.2			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Organic peroxide type E, solid*	3108	5.2		Organic peroxide		A20		E0	570	10 kg	570	25 kg
Organic peroxide type E, solid, temperature controlled*	3118	5.2			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Organic peroxide type F, liquid*	3109	5.2		Organic peroxide		A20 A150		E0	570	10 L	570	25 L
Organic peroxide type F, liquid, temperature controlled*	3119	5.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A150			FORBIDDEN		FORBIDDEN	
Organic peroxide type F, solid*	3110	5.2		Organic peroxide		A20		E0	570	10 kg	570	25 kg
Organic peroxide type F, solid, temperature controlled*	3120	5.2			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Organic pigments, self-heating	3313	4.2		Spontaneous combustion		A3	II III	E2 E1	467 469	15 kg 25 kg	470 471	50 kg 100 kg
Organoarsenic compound, liquid, n.o.s.*	3280	6.1		Toxic		A3 A4 A137	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
Organoarsenic compound, solid, n.o.s.*	3465	6.1		Toxic		A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
Organochlorine pesticide, liquid, flammable, toxic*, flash point less than 23°C	2762	3	6.1	Liquid flammable & Toxic		A4	I II	E0 E2	FORBIDDEN 352 Y341	 1 L 1 L	361 364	30 L 60 L
Organochlorine pesticide, liquid, toxic*	2996	6.1		Toxic		A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
Organochlorine pesticide, liquid, toxic, flammable*, flash point not less than 23°C	2995	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
Organochlorine pesticide, solid, toxic*	2761	6.1		Toxic		A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Organometallic compound, liquid, toxic, n.o.s.*	3282	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654	5 L	662	60 L
										Y641	1 L		
								III	E1	655	60 L	663	220 L
										Y642	2 L		
	Organometallic compound, solid, toxic, n.o.s.*	3467	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669	25 kg	676	100 kg
										Y644	1 kg		
								III	E1	670	100 kg	677	200 kg
										Y645	10 kg		
≠	**Organometallic substance, liquid, pyrophoric***	3392	4.2					I		FORBIDDEN		FORBIDDEN	
≠	**Organometallic substance, liquid, pyrophoric, water reactive***	3394	4.2	4.3				I		FORBIDDEN		FORBIDDEN	
	Organometallic substance, liquid, water reactive*	3398	4.3		Danger if wet		A3	I	E0	FORBIDDEN		480	1 L
								II	E2	478	1 L	481	5 L
								III	E1	479	5 L	482	60 L
	Organometallic substance, liquid, water reactive, flammable*	3399	4.3	3	Danger if wet & Liquid flammable		A3	I	E0	FORBIDDEN		494	1 L
								II	E2	493	1 L	494	5 L
								III	E1	493	5 L	494	60 L
≠	**Organometallic substance, solid, pyrophoric***	3391	4.2					I		FORBIDDEN		FORBIDDEN	
≠	**Organometallic substance, solid, pyrophoric, water reactive***	3393	4.2	4.3				I		FORBIDDEN		FORBIDDEN	
	Organometallic substance, solid, self-heating*	3400	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
								III	E1	469	25 kg	471	100 kg
	Organometallic substance, solid, water reactive*	3395	4.3		Danger if wet		A3	I	E0	FORBIDDEN		487	15 kg
								II	E2	483	15 kg	489	50 kg
								III	E1	486	25 kg	491	100 kg
	Organometallic substance, solid, water reactive, flammable*	3396	4.3	4.1	Danger if wet & Solid flammable		A3	I	E0	FORBIDDEN		488	15 kg
								II	E2	483	15 kg	489	50 kg
								III	E1	486	25 kg	491	100 kg
	Organometallic substance, solid, water reactive, self-heating*	3397	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I	E0	FORBIDDEN		488	15 kg
								II	E2	483	15 kg	489	50 kg
								III	E1	486	25 kg	491	100 kg
	Organophosphorus compound, liquid, toxic, n.o.s.*	3278	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654	5 L	662	60 L
							A6			Y641	1 L		
							A137	III	E1	655	60 L	663	220 L
										Y642	2 L		
	Organophosphorus compound, solid, toxic, n.o.s.*	3464	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669	25 kg	676	100 kg
							A6			Y644	1 kg		
								III	E1	670	100 kg	677	200 kg
										Y645	10 kg		

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Organophosphorus compound, toxic, flammable, n.o.s.*	3279	6.1	3	Toxic & Liquid flammable		A4 A6 A137	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
Organophosphorus pesticide, liquid, flammable, toxic*, flash point less than 23°C	2784	3	6.1	Liquid flammable & Toxic		A4	I II	E0 E2	FORBIDDEN 352 Y341	 1 L 1 L	361 364	30 L 60 L
Organophosphorus pesticide, liquid, toxic*	3018	6.1		Toxic		A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
Organophosphorus pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3017	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
Organophosphorus pesticide, solid, toxic*	2783	6.1		Toxic		A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
Organotin compound, liquid, n.o.s.*	2788	6.1		Toxic		A3 A4 A6	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 661 663	30 L 60 L 220 L
Organotin compound, solid, n.o.s.*	3146	6.1		Toxic		A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
Organotin pesticide, liquid, flammable, toxic*, flash point less than 23°C	2787	3	6.1	Liquid flammable & Toxic		A4	I II	E0 E2	FORBIDDEN 352 Y341	 1 L 1 L	361 364	30 L 60 L
Organotin pesticide, liquid, toxic*	3020	6.1		Toxic		A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Organotin pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3019	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654	5 L	662	60 L
										Y641	1 L		
								III	E1	655	60 L	663	220 L
										Y642	2 L		
	Organotin pesticide, solid, toxic*	2786	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669	25 kg	676	100 kg
										Y644	1 kg		
								III	E1	670	100 kg	677	200 kg
										Y645	10 kg		
	Orthophosphoric acid, see **Phosphoric acid, solution** (UN No. 1805) or **Phosphoric acid**, **solid** (UN No. 3453)												
	Osmium tetroxide	2471	6.1		Toxic			I	E5	666	5 kg	673	50 kg
	Oxidizing liquid, n.o.s.*	3139	5.1		Oxidizer		A3	I	E0	FORBIDDEN		553	2.5 L
								II	E2	550	1 L	554	5 L
										Y540	0.5 L		
								III	E1	551	2.5 L	555	30 L
										Y541	1 L		
≠	**Oxidizing liquid, corrosive, n.o.s.***	3098	5.1	8	Oxidizer & Corrosive		A3	I		FORBIDDEN		FORBIDDEN	
								II	E2	550	1 L	554	5 L
										Y540	0.5 L		
								III	E1	551	2.5 L	555	30 L
										Y541	1 L		
	Oxidizing liquid, toxic, n.o.s.*	3099	5.1	6.1	Oxidizer & Toxic		A3	I	E0	FORBIDDEN		553	2.5 L
								II	E2	550	1 L	554	5 L
										Y540	0.5 L		
								III	E1	551	2.5 L	555	30 L
										Y541	1 L		
	Oxidizing solid, n.o.s.*	1479	5.1		Oxidizer		A3	I	E0	557	1 kg	561	15 kg
								II	E2	558	5 kg	562	25 kg
										Y544	2.5 kg		
								III	E1	559	25 kg	563	100 kg
										Y546	10 kg		
	Oxidizing solid, corrosive, n.o.s.*	3085	5.1	8	Oxidizer & Corrosive		A3	I	E0	557	1 kg	561	15 kg
								II	E2	558	5 kg	562	25 kg
										Y544	2.5 kg		
								III	E1	559	25 kg	563	100 kg
										Y545	5 kg		
≠	**Oxidizing solid, flammable, n.o.s.***	3137	5.1	4.1				I		FORBIDDEN		FORBIDDEN	
≠	**Oxidizing solid, self-heating, n.o.s.***	3100	5.1	4.2				I		FORBIDDEN		FORBIDDEN	
								II		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Oxidizing solid, toxic, n.o.s.*	3087	5.1	6.1	Oxidizer & Toxic		A3	I	E0	557	1 kg	561	15 kg
								II	E2	558	5 kg	562	25 kg
										Y543	1 kg		
								III	E1	559	25 kg	563	100 kg
										Y546	10 kg		
≠	**Oxidizing solid, water-reactive, n.o.s.***	3121	5.1	4.3				I		FORBIDDEN		FORBIDDEN	
								II		FORBIDDEN		FORBIDDEN	
	Oxirane, see **Ethylene oxide**, etc.												
	Oxygen, compressed	1072	2.2	5.1	Gas non-flammable & Oxidizer	US 18	A175		E0	200	75 kg	200	150 kg
	Oxygen difluoride, compressed	2190	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Oxygen generator, chemical † (including when contained in associated equipment, e.g. passenger service units (PSUs), protective breathing equipment (PBE), etc.)	3356	5.1		Oxidizer	AU 1 CA 7 FR 7 IR 3 NL 1 US 3 US 18	A1 A111 A116 A144		E0	FORBIDDEN		565	25 kg
	Oxygen, refrigerated liquid	1073	2.2	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	1-Oxy-4-nitrobenzene, see **Nitrophenols**												
	P												
≠	**Packagings, discarded, empty, uncleaned**	3509	9				A200			FORBIDDEN		FORBIDDEN	
	Paint (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	3		Liquid flammable		A3 A72 A192	I	E3	351	1 L	361	30 L
								II	E2	353	5 L	364	60 L
										Y341	1 L		
								III	E1	355	60 L	366	220 L
										Y344	10 L		

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Paint (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	8		Corrosive		A3 A72 A192	II III	E2 E1	851 Y840 852 Y841	1 L 0.5 L 5 L 1 L	855 856	30 L 60 L
Paint, corrosive, flammable (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	8	3	Corrosive & Liquid flammable		A72 A192	II	E2	851 Y840	1 L 0.5 L	855	30 L
Paint, flammable, corrosive (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	3	8	Liquid flammable & Corrosive		A3 A72 A192	I II III	E0 E2 E1	350 352 Y340 354 Y342	0.5 L 1 L 0.5 L 5 L 1 L	360 363 365	2.5 L 5 L 60 L
Paint related material (including paint thinning or reducing compound)	1263	3		Liquid flammable		A3 A72 A192	I II III	E3 E2 E1	351 353 Y341 355 Y344	1 L 5 L 1 L 60 L 10 L	361 364 366	30 L 60 L 220 L
Paint related material (including paint thinning or reducing compound)	3066	8		Corrosive		A3 A72 A192	II III	E2 E1	851 Y840 852 Y841	1 L 0.5 L 5 L 1 L	855 856	30 L 60 L
Paint related material corrosive, flammable (including paint thinning or reducing compound)	3470	8	3	Corrosive & Liquid flammable		A72 A192	II	E2	851 Y840	1 L 0.5 L	855	30 L
Paint related material, flammable, corrosive (including paint thinning or reducing compound)	3469	3	8	Liquid flammable & Corrosive		A3 A72 A192	I II III	E0 E2 E1	350 352 Y340 354 Y342	0.5 L 1 L 0.5 L 5 L 1 L	360 363 365	2.5 L 5 L 60 L
≠ **Paper, unsaturated oil treated**, incompletely dried (including carbon paper)	1379	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
Paraffin, see **Kerosene**												
Paraformaldehyde	2213	4.1		Solid flammable		A3	III	E1	446 Y443	25 kg 10 kg	449	100 kg
Paraldehyde	1264	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	PCBs, see **Polychlorinated biphenyls**												
≠	**Pentaborane**	1380	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
	Pentachloroethane	1669	6.1		Toxic	US 4		II	E4	654 Y641	5 L 1 L	662	60 L
	Pentachlorophenol	3155	6.1		Toxic		A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Pentaerythrite tetranitrate with not less than 7% wax, by mass	0411	1.1D							FORBIDDEN		FORBIDDEN	
	Pentaerythrite tetranitrate, desensitized with not less than 15% phlegmatizer by mass	0150	1.1D							FORBIDDEN		FORBIDDEN	
	Pentaerythrite tetranitrate (dry)	FORBIDDEN											
≠	**Pentaerythrite tetranitrate mixture desensitized, solid, n.o.s.*** with more than 10% but not more than 20% PETN, by mass	3344	4.1			BE 3		II		FORBIDDEN		FORBIDDEN	
	Pentaerythrite tetranitrate, wetted with not less than 25% water, by mass	0150	1.1D							FORBIDDEN		FORBIDDEN	
	Pentaerythritol tetranitrate with not less than 7% wax, by mass	0411	1.1D							FORBIDDEN		FORBIDDEN	
	Pentaerythritol tetranitrate, desensitized with not less than 15% phlegmatizer, by mass	0150	1.1D							FORBIDDEN		FORBIDDEN	
	Pentaerythritol tetranitrate (dry)	FORBIDDEN											
≠	**Pentaerythritol tetranitrate mixture desensitized, solid, n.o.s.*** with more than 10% but not more than 20% PETN, by mass	3344	4.1			BE 3		II		FORBIDDEN		FORBIDDEN	
	Pentaerythritol tetranitrate, wetted with not less than 25% water, by mass	0150	1.1D							FORBIDDEN		FORBIDDEN	
	Pentafluoroethane	3220	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane, see **Refrigerant gas R 404A**												
	Pentamethylheptane	2286	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Pentanal, see **Valeraldehyde**												
n-Pentane, see **Pentanes, liquid**												
Pentane-2,4-dione	2310	3	6.1	Liquid flammable & Toxic			III	E1	355 Y343	60 L 2 L	366	220 L
Pentanes, liquid	1265	3		Liquid flammable			I II	E3 E2	351 353 Y341	1 L 5 L 1 L	361 364	30 L 60 L
Pentanitroaniline (dry)	FORBIDDEN											
3-Pentanol, see **Pentanols** (UN No. 1105)												
Pentanols	1105	3		Liquid flammable		A3	II III	E2 E1	353 Y341 355 Y344	5 L 1 L 60 L 10 L	364 366	60 L 220 L
1-Pentene	1108	3		Liquid flammable			I	E3	351	1 L	361	30 L
1-Pentol	2705	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Pentolite, dry or wetted with less than 15% water, by mass	0151	1.1D							FORBIDDEN		FORBIDDEN	
Pentyl nitrite, see **Amyl nitrite**												
Perchlorates, inorganic, n.o.s.	1481	5.1		Oxidizer		A3	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
Perchlorates, inorganic, aqueous solution, n.o.s.	3211	5.1		Oxidizer		A3	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
Perchloric acid with more than 50% but not more than 72% acid, by mass	1873	5.1	8	Oxidizer & Corrosive			I	E0	FORBIDDEN		553	2.5 L
Perchloric acid with not more than 50% acid, by mass	1802	8	5.1	Corrosive & Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Perchloric acid with more than 72% acid, by mass	FORBIDDEN											
	Perchlorobenzene, see **Hexachlorobenzene**												
	Perchlorocyclopentadiene, see **Hexachlorocyclopentadiene**												
	Perchloroethylene, see **Tetrachloroethylene**												
≠	**Perchloromethyl mercaptan**	1670	6.1			US 4		I		FORBIDDEN		FORBIDDEN	
	Perchloryl fluoride	3083	2.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Perfluoroacetylchloride, see **Trifluoroacetyl chloride**												
	Perfluoro (ethyl vinyl ether)	3154	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Perfluoro (methyl vinyl ether)	3153	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Perfluoropropane, see **Octafluoropropane**												
	Perfumery products with flammable solvents	1266	3		Liquid flammable		A3 A72	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Permanganates, inorganic, n.o.s.*	1482	5.1		Oxidizer		A3 A37	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							A173	III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Permanganates, inorganic, aqueous solution, n.o.s.*	3214	5.1		Oxidizer		A37 A173	II	E2	550 Y540	1 L 0.5 L	554	5 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Permeation devices for calibrating air quality monitoring equipment, see Special Provision A41												
Peroxide, organic, see **Organic peroxide**, etc.												
Peroxides, inorganic, n.o.s.	1483	5.1		Oxidizer		A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Peroxyacetic acid, more than 43% and with more than 6% hydrogen peroxide	FORBIDDEN											
Persulphates, inorganic, n.o.s.	3215	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Persulphates, inorganic, aqueous solution, n.o.s.	3216	5.1		Oxidizer			III	E1	551 Y541	2.5 L 1 L	555	30 L
Pesticide, liquid, flammable, toxic, n.o.s.*, flash point less than 23°C	3021	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352 Y341	1 L 1 L	364	60 L
Pesticide, liquid, toxic, n.o.s.*	2902	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Pesticide, liquid, toxic, flammable, n.o.s.*, flash point not less than 23°C	2903	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Pesticide, solid, toxic, n.o.s.*	2588	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Pesticide, toxic, under compressed gas, n.o.s., see **Aerosols**												
PETN/TNT, see **Pentolite**, etc.												
PETN with not less than 7% wax, by mass	0411	1.1D							FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	PETN, desensitized with not less than 15% phlegmatizer, by mass	0150	1.1D							FORBIDDEN		FORBIDDEN	
	PETN (dry)	FORBIDDEN											
≠	**PETN mixture desensitized, solid, n.o.s.*** with more than 10% but not more than 20% PETN, by mass	3344	4.1			BE 3		II		FORBIDDEN		FORBIDDEN	
	PETN, wetted with not less than 25% water, by mass	0150	1.1D							FORBIDDEN		FORBIDDEN	
	Petrol	1203	3		Liquid flammable		A100	II	E2	353 Y341	5 L 1 L	364	60 L
	Petroleum crude oil	1267	3		Liquid flammable		A3 A177	I II	E3 E2	351 353 Y341	1 L 5 L 1 L	361 364	30 L 60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Petroleum distillates, n.o.s.	1268	3		Liquid flammable		A3	I II	E3 E2	351 353 Y341	1 L 5 L 1 L	361 364	30 L 60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Petroleum ether, see **Petroleum distillates, n.o.s.**												
	Petroleum gases, liquefied	1075	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Petroleum naphtha, see **Petroleum distillates, n.o.s.**												
	Petroleum oil, see **Petroleum products, n.o.s.**												
	Petroleum products, n.o.s.	1268	3		Liquid flammable		A3	I II	E3 E2	351 353 Y341	1 L 5 L 1 L	361 364	30 L 60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Petroleum raffinate, see **Petroleum distillates, n.o.s.**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Petroleum sour crude oil, flammable, toxic	3494	3	6.1	Liquid flammable & Toxic		A166	I	E0	FORBIDDEN		361	30 L
							II	E2	352	1 L	364	60 L
									Y341	1 L		
							III	E1	355	60 L	366	220 L
									Y343	2 L		
Petroleum spirit, see **Petroleum distillates, n.o.s.**												
Phenacyl bromide	2645	6.1		Toxic			II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
Phenetidines	2311	6.1		Toxic		A113	III	E1	655	60 L	663	220 L
									Y642	2 L		
Phenolates, liquid	2904	8		Corrosive			III	E1	852	5 L	856	60 L
									Y841	1 L		
Phenolates, solid	2905	8		Corrosive			III	E1	860	25 kg	864	100 kg
									Y845	5 kg		
≠ **Phenol, molten**	2312	6.1					II		FORBIDDEN		FORBIDDEN	
Phenol, solid	1671	6.1		Toxic		A113	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
Phenol solution	2821	6.1		Toxic		A3	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Phenolsulphonic acid, liquid	1803	8		Corrosive			II	E2	851	1 L	855	30 L
									Y840	0.5 L		
Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic*, flash point less than 23°C	3346	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352	1 L	364	60 L
									Y341	1 L		
Phenoxyacetic acid derivative pesticide, liquid, toxic*	3348	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3347	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Phenoxyacetic acid derivative pesticide, solid, toxic*	3345	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Phenylacetonitrile, liquid	2470	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Phenylacetyl chloride	2577	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Phenylamine, see **Aniline**												
	1-Phenylbutane, see **Butylbenzenes**												
	2-Phenylbutane, see **Butylbenzenes**												
≠	**Phenylcarbylamine chloride**	1672	6.1					I		FORBIDDEN		FORBIDDEN	
	Phenyl chloroformate	2746	6.1	8	Toxic & Corrosive			II	E4	653 Y641	1 L 1 L	660	30 L
	Phenyl cyanide, see **Benzonitrile**												
	m-Phenylene diaminediperchlorate (dry)	FORBIDDEN											
	Phenylenediamines (o-,m-,p-)	1673	6.1		Toxic		A113	III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Phenylethylene, see **Styrene monomer, stabilized** (UN No. 2055)												
	Phenylhydrazine	2572	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
≠	**Phenyl isocyanate**	2487	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Phenylisocyanodichloride, see **Phenylcarbylamine chloride**												
≠	**Phenyl mercaptan**	2337	6.1	3		US 4		I		FORBIDDEN		FORBIDDEN	
	Phenylmercuric acetate	1674	6.1		Toxic	US 4	A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Phenylmercuric compound, n.o.s.*	2026	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							A6	III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Phenylmercuric hydroxide	1894	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Phenylmercuric nitrate	1895	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Phenylphosphorus dichloride	2798	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
Phenylphosphorus thiodichloride	2799	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
2-Phenylpropene, see **Isopropenylbenzene**												
Phenyltrichlorosilane	1804	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
Phosgene	1076	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
9-Phosphabicyclononanes	2940	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Phosphine	2199	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠ **Phosphine, adsorbed**	3525	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Phosphoretted hydrogen, see **Phosphine**												
Phosphoric acid, anhydrous, see **Phosphorus pentoxide**												
Phosphoric acid, solid	3453	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Phosphoric acid, solution	1805	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
Phosphorous acid	2834	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Phosphorous (V) sulphide, free from yellow and white phosphorous, see **Phosphorous pentasulphide**												
	Phosphorus, amorphous	1338	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Phosphorus bromide, see **Phosphorus tribromide**												
	Phosphorus chloride, see **Phosphorus trichloride**												
	Phosphorus heptasulphide, free from yellow and white phosphorus	1339	4.1		Solid flammable			II	E2	445 Y441	15 kg 5 kg	448	50 kg
	Phosphorus oxybromide	1939	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		863	50 kg
≠	**Phosphorus oxybromide, molten**	2576	8					II		FORBIDDEN		FORBIDDEN	
≠	**Phosphorus oxychloride**	1810	6.1	8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Phosphorus pentabromide	2691	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		863	50 kg
	Phosphorus pentachloride	1806	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		863	50 kg
	Phosphorus pentafluoride	2198	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Phosphorus pentafluoride, adsorbed**	3524	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Phosphorus pentasulphide, free from yellow and white phosphorus	1340	4.3	4.1	Danger if wet & Solid flammable	US 4		II	E2	483 Y475	15 kg 5 kg	490	50 kg
	Phosphorus pentoxide	1807	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Phosphorus sesquisulphide, free from yellow and white phosphorus	1341	4.1		Solid flammable			II	E2	445 Y441	15 kg 5 kg	448	50 kg
	Phosphorus sulphochloride, see **Thiophosphoryl chloride**												
	Phosphorus tribromide	1808	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
≠	**Phosphorus trichloride**	1809	6.1	8				I		FORBIDDEN		FORBIDDEN	
	Phosphorus trioxide	2578	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Phosphorus trisulphide, free from yellow and white phosphorus	1343	4.1		Solid flammable			II	E2	445 Y441	15 kg 5 kg	448	50 kg
≠	**Phosphorus, white, dry**	1381	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Phosphorus, white, in solution**	1381	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Phosphorus, white, molten**	2447	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
	Phosphorus (white or red) and a chlorate, mixture of	FORBIDDEN											
≠	**Phosphorus, white, under water**	1381	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Phosphorus, yellow, dry**	1381	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Phosphorus, yellow, in solution**	1381	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Phosphorus, yellow, under water**	1381	4.2	6.1				I		FORBIDDEN		FORBIDDEN	
	Phosphoryl chloride, see **Phosphorus oxychloride**												
	Phthalic anhydride with more than 0.05% of maleic anhydride	2214	8		Corrosive		A74	III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Picolines	2313	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Picramide	0153	1.1D							FORBIDDEN		FORBIDDEN	
	Picric acid, dry or wetted with less than 30% water, by mass	0154	1.1D							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Picric acid, wetted with not less than 30% water, by mass	1344	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
Picric acid, wetted with not less than 10% water, by mass	3364	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Picrite, dry or wetted with less than 20% water, by mass	0282	1.1D							FORBIDDEN		FORBIDDEN	
Picrite, wetted with not less than 20% water by mass	1336	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
Picrotoxin, see **Toxins, extracted from living sources, liquid, n.o.s.** (UN No. 3172) or **Toxins, extracted from living sources, solid, n.o.s.** (UN No. 3462)												
Picryl chloride	0155	1.1D							FORBIDDEN		FORBIDDEN	
Picryl chloride, wetted with not less than 10% water, by mass	3365	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
alpha-Pinene	2368	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Pine oil	1272	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Piperazine	2579	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Piperidine	2401	8	3	Corrosive & Liquid flammable			I	E0	850	0.5 L	854	2.5 L
Pivaloyl chloride, see **Trimethylacetyl chloride**												
Plastic explosives, see **Explosive, blasting, type D**												
Plastics moulding compound in dough, sheet or extruded rope form evolving flammable vapour	3314	9		Miscellaneous		A38	III	E1	957	100 kg	957	200 kg
≠ **Plastics, nitrocellulose-based, self-heating, n.o.s.***	2006	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
Plastic solvent, n.o.s. †, see **Flammable liquid, n.o.s.**												
Plutonium nitrate solution, see Part 2, Chapter 7												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Poisonous, see Toxic												
Polyamines, flammable, corrosive, n.o.s.*	2733	3	8	Liquid flammable & Corrosive		A3	I	E0	350	0.5 L	360	2.5 L
							II	E2	352	1 L	363	5 L
									Y340	0.5 L		
							III	E1	354	5 L	365	60 L
									Y342	1 L		
Polyamines, liquid, corrosive, n.o.s.*	2735	8		Corrosive		A3	I	E0	850	0.5 L	854	2.5 L
							II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		
Polyamines, liquid, corrosive, flammable, n.o.s.*	2734	8	3	Corrosive & Liquid flammable			I	E0	850	0.5 L	854	2.5 L
							II	E2	851	1 L	855	30 L
									Y840	0.5 L		
Polyamines, solid, corrosive, n.o.s.*	3259	8		Corrosive		A3	I	E0	858	1 kg	862	25 kg
							II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
							III	E1	860	25 kg	864	100 kg
									Y845	5 kg		
Polychlorinated biphenyls, liquid	2315	9		Miscellaneous	US 4	A11	II	E2	964	100 L	964	220 L
Polychlorinated biphenyls, solid	3432	9		Miscellaneous	US 4	A11	II	E2	956	100 kg	956	200 kg
Polyester resin kit, liquid base material †	3269	3		Liquid flammable		A66	II	E0	370	5 kg	370	5 kg
						A163			Y370	1 kg		
							III	E0	370	10 kg	370	10 kg
									Y370	5 kg		
Polyester resin kit, solid base material†	3527	4.1		Solid flammable		A66	II	E0	450	5 kg	450	5 kg
						A163			Y450	1 kg		
							III	E0	450	10 kg	450	10 kg
									Y450	5 kg		
Polyhalogenated biphenyls, liquid	3151	9		Miscellaneous		A11	II	E2	964	100 L	964	220 L
						A95						
Polyhalogenated biphenyls, solid	3152	9		Miscellaneous		A11	II	E2	956	100 kg	956	200 kg
						A95						
Polyhalogenated terphenyls, liquid	3151	9		Miscellaneous		A11	II	E2	964	100 L	964	220 L
						A95						
Polyhalogenated terphenyls, solid	3152	9		Miscellaneous		A11	II	E2	956	100 kg	956	200 kg
						A95						
Polymeric beads, expandable, evolving flammable vapour †	2211	9		Miscellaneous		A204	III	E1	957	100 kg	957	200 kg
Polymerizing substance, liquid, stabilized, n.o.s.*	3532	4.1		Solid flammable		A209	III	E0	FORBIDDEN		459	25 L
≠ **Polymerizing substance, liquid, temperature controlled, n.o.s.***	3534	4.1				A209	III		FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Polymerizing substance, solid, stabilized, n.o.s.*	3531	4.1		Solid flammable		A209	III	E0	FORBIDDEN		459	25 kg
≠ **Polymerizing substance, solid, temperature controlled, n.o.s.***	3533	4.1				A209	III		FORBIDDEN		FORBIDDEN	
Polystyrene beads, expandable, etc., see **Polymeric beads, expandable**, evolving flammable vapour												
Potassium	2257	4.3		Danger if wet	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		487	15 kg
Potassium arsenate	1677	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Potassium arsenite	1678	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
Potassium bifluoride, see **Potassium hydrogendifluoride, solid** (UN No. 1811)												
Potassium bisulphate, see **Potassium hydrogen sulphate**												
Potassium bisulphite solution, see **Bisulphites, aqueous solution, n.o.s.**												
Potassium borohydride	1870	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Potassium bromate	1484	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Potassium carbonyl	FORBIDDEN											
Potassium chlorate	1485	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Potassium chlorate, aqueous solution	2427	5.1		Oxidizer		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Potassium chlorate mixed with mineral oil, see **Explosive, blasting, type C**												
Potassium cuprocyanide	1679	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Potassium cyanide, solid	1680	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Potassium cyanide solution	3413	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Potassium dicyanocuprate, (I), see **Potassium cuprocyanide**												
Potassium dithionite	1929	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Potassium fluoride, solid	1812	6.1		Toxic			III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Potassium fluoride solution	3422	6.1		Toxic		A3	III	E1	655	60 L	663	220 L
									Y642	2 L		
Potassium fluoroacetate	2628	6.1		Toxic			I	E5	666	5 kg	673	50 kg
Potassium fluorosilicate	2655	6.1		Toxic			III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Potassium hexafluorosilicate, see **Potassium fluorosilicate**												
Potassium hydrate, see **Potassium hydroxide, solid**												
Potassium hydrogendifluoride, solid	1811	8	6.1	Corrosive & Toxic			II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
Potassium hydrogendifluoride solution	3421	8	6.1	Corrosive & Toxic		A3	II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		
Potassium hydrogen sulphate	2509	8		Corrosive			II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
Potassium hydrosulphite	1929	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Potassium hydroxide, liquid, see **Potassium hydroxide solution**												
Potassium hydroxide, solid	1813	8		Corrosive			II	E2	859	15 kg	863	50 kg
									Y844	5 kg		
Potassium hydroxide solution	1814	8		Corrosive		A3	II	E2	851	1 L	855	30 L
									Y840	0.5 L		
							III	E1	852	5 L	856	60 L
									Y841	1 L		

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Potassium metal alloys, liquid	1420	4.3		Danger if wet	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		480	1 L
Potassium metal alloys, solid	3403	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Potassium metavanadate	2864	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Potassium monoxide	2033	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Potassium nitrate	1486	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Potassium nitrate and sodium nitrate mixture, see **Sodium nitrate and potassium nitrate mixture**												
Potassium nitrate and sodium nitrite mixture	1487	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Potassium nitrite	1488	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Potassium perchlorate	1489	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Potassium permanganate	1490	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Potassium peroxide	1491	5.1		Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		561	15 kg
Potassium persulphate	1492	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Potassium phosphide	2012	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
Potassium selenate, see **Selenates**												
Potassium selenite, see **Selenites**												
Potassium silicofluoride, see **Potassium fluorosilicate**												
Potassium sodium alloys, liquid †	1422	4.3		Danger if wet	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		480	1 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Potassium sodium alloys, solid	3404	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
	Potassium sulphide with less than 30% water of crystallization	1382	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
	Potassium sulphide, anhydrous †	1382	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
	Potassium sulphide, hydrated with not less than 30% water of crystallization	1847	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
	Potassium superoxide	2466	5.1		Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		561	15 kg
	Potassium tetracyanomercurate, (II), see **Mercuric potassium cyanide**												
	Powder cake, wetted with not less than 17% alcohol, by mass †	0433	1.1C							FORBIDDEN		FORBIDDEN	
	Powder cake, wetted with not less than 25% water, by mass †	0159	1.3C							FORBIDDEN		FORBIDDEN	
	Powder paste, wetted with not less than 17% alcohol, by mass †	0433	1.1C							FORBIDDEN		FORBIDDEN	
	Powder paste, wetted with not less than 25% water, by mass	0159	1.3C							FORBIDDEN		FORBIDDEN	
	Powder, smokeless †	0160	1.1C							FORBIDDEN		FORBIDDEN	
	Powder, smokeless †	0161	1.3C							FORBIDDEN		FORBIDDEN	
≠	**Powder, smokeless** †	0509	1.4C		Explosive 1.4				E0	FORBIDDEN		114	75 kg
	Power devices, explosive, see **Cartridges, power device**												
	Pressurized products, see **Aerosols** etc.												
	Primers, cap type †	0044	1.4S		Explosive 1.4				E0	133	25 kg	133	100 kg
	Primers, cap type †	0377	1.1B							FORBIDDEN		FORBIDDEN	
	Primers, cap type †	0378	1.4B		Explosive 1.4				E0	FORBIDDEN		133	75 kg
	Primers, small arms, see **Primers, cap type**												
	Primers, tubular †	0319	1.3G							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Primers, tubular †	0320	1.4G		Explosive 1.4				E0	FORBIDDEN		133	75 kg
Primers, tubular †	0376	1.4S		Explosive 1.4				E0	133	25 kg	133	100 kg
Printing ink, flammable	1210	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
						A72	II	E2	353	5 L	364	60 L
						A192			Y341	1 L		
							III	E1	355	60 L	366	220 L
									Y344	10 L		
Printing ink related material (including printing ink thinning or reducing compound), flammable	1210	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
						A72	II	E2	353	5 L	364	60 L
						A192			Y341	1 L		
							III	E1	355	60 L	366	220 L
									Y344	10 L		
Projectiles, inert with tracer †	0345	1.4S		Explosive 1.4				E0	130	25 kg	130	100 kg
Projectiles, inert with tracer †	0424	1.3G							FORBIDDEN		FORBIDDEN	
Projectiles, inert with tracer †	0425	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Projectiles with burster or expelling charge †	0346	1.2D							FORBIDDEN		FORBIDDEN	
Projectiles with burster or expelling charge †	0347	1.4D		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Projectiles with burster or expelling charge †	0426	1.2F							FORBIDDEN		FORBIDDEN	
Projectiles with burster or expelling charge †	0427	1.4F							FORBIDDEN		FORBIDDEN	
Projectiles with burster or expelling charge †	0434	1.2G							FORBIDDEN		FORBIDDEN	
Projectiles with burster or expelling charge †	0435	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Projectiles with bursting charge †	0167	1.1F							FORBIDDEN		FORBIDDEN	
Projectiles with bursting charge †	0168	1.1D							FORBIDDEN		FORBIDDEN	
Projectiles with bursting charge †	0169	1.2D							FORBIDDEN		FORBIDDEN	
Projectiles with bursting charge †	0324	1.2F							FORBIDDEN		FORBIDDEN	
Projectiles with bursting charge †	0344	1.4D		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Projectiles, illuminating, see **Ammunition, illuminating**, etc.												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Propadiene and methyl acetylene mixture, stabilized, see **Methyl acetylene and propadiene mixture, stabilized**												
	Propadiene, stabilized	2200	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
	Propane	1978	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Propanethiols	2402	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	n-Propanol	1274	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Propellant, liquid †	0495	1.3C							FORBIDDEN		FORBIDDEN	
	Propellant, liquid †	0497	1.1C							FORBIDDEN		FORBIDDEN	
	Propellant, single, double or triple base, see **Powder, smokeless**												
	Propellant, solid †	0498	1.1C							FORBIDDEN		FORBIDDEN	
	Propellant, solid †	0499	1.3C							FORBIDDEN		FORBIDDEN	
≠	**Propellant, solid**	0501	1.4C		Explosive 1.4				E0	FORBIDDEN		114	75 kg
	Propene, see **Propylene**												
	Propionaldehyde	1275	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Propionic acid with not less than 90% acid by mass	3463	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Propionic acid with not less than 10% and less than 90% acid by mass	1848	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Propionic anhydride	2496	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Propionitrile	2404	3	6.1	Liquid flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		364	60 L
	Propionyl chloride	1815	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	n-Propyl acetate	1276	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Propyl alcohol, normal	1274	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Propylamine	1277	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	n-Propylbenzene	2364	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Propyl chloride, see **1-Chloropropane**												
≠	**n-Propyl chloroformate**	2740	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
	Propylene	1077	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
	Propylene chlorohydrin	2611	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
	1,2-Propylenediamine	2258	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Propylene dichloride, see **1,2-Dichloropropane**												
	Propyleneimine, stabilized	1921	3	6.1	Liquid flammable & Toxic	US 4	A209	I	E0	FORBIDDEN		361	30 L
	Propylene or liquefied petroleum gas, see **Petroleum gases, liquefied**												
	Propylene oxide	1280	3		Liquid flammable			I	E3	351	1 L	361	30 L
	Propylene tetramer	2850	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Propylene trimer, see **Tripropylene**												
	Propyl formates	1281	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠	**n-Propyl isocyanate**	2482	6.1	3				I		FORBIDDEN		FORBIDDEN	
	Propyl mercaptan, see **Propanethiols**												
	n-Propyl nitrate	1865	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Propyltrichlorosilane	1816	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	Pyrazine hexahydride, see **Piperazine**												
	Pyrethroid pesticide, liquid flammable, toxic*, flash point less than 23°C	3350	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
								II	E2	352 Y341	1 L 1 L	364	60 L
	Pyrethroid pesticide, liquid, toxic*	3352	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Pyrethroid pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3351	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Pyrethroid pesticide, solid, toxic*	3349	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Pyridine	1282	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Pyridine perchlorate	FORBIDDEN											
≠	**Pyrophoric alloy, n.o.s.***	1383	4.2					I		FORBIDDEN		FORBIDDEN	
≠	**Pyrophoric liquid, inorganic, n.o.s.*** †	3194	4.2					I		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Pyrophoric liquid, organic, n.o.s.*** †	2845	4.2					I		FORBIDDEN		FORBIDDEN	
≠	**Pyrophoric metal, n.o.s.***	1383	4.2					I		FORBIDDEN		FORBIDDEN	
≠	**Pyrophoric solid, inorganic, n.o.s.*** †	3200	4.2					I		FORBIDDEN		FORBIDDEN	
≠	**Pyrophoric solid, organic, n.o.s.*** †	2846	4.2					I		FORBIDDEN		FORBIDDEN	
	Pyrosulphuryl chloride	1817	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Pyroxylin solution †, see **Nitrocellulose solution, flammable**												
	Pyrrolidine	1922	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Q												
	Quebrachitol pentanitrate	FORBIDDEN											
	Quinoline	2656	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Quinone, see **Benzoquinone**												
	R												
	Radioactive material, excepted package — articles manufactured from natural uranium or **depleted uranium** or **natural thorium**	2909	7		None		A130			See Part 1;6			
	Radioactive material, excepted package — empty packaging	2908	7		None		A130			See Part 1;6			
	Radioactive material, excepted package — instruments or **articles**	2911	7		None		A130			See Part 1;6			
	Radioactive material, excepted package — limited quantity of material	2910	7		None		A130 A193			See Part 1;6			
	Radioactive material, low specific activity (LSA-I), non-fissile or fissile excepted	2912	7		Radioactive	CA 1	A23 A78 A139			See Part 2;7		and Part 4;9	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Radioactive material, low specific activity (LSA-II), non-fissile or fissile excepted	3321	7		Radioactive	CA 1	A23 A78 A139 A159			See Part 2;7 and Part 4;9			
	Radioactive material, low specific activity (LSA-II), fissile	3324	7		Radioactive	CA 1	A76 A78 A159			See Part 2;7 and Part 4;9			
	Radioactive material, low specific activity (LSA-III), non-fissile or fissile excepted	3322	7		Radioactive	CA 1	A23 A78 A139 A159			See Part 2;7 and Part 4;9			
	Radioactive material, low specific activity (LSA-III), fissile	3325	7		Radioactive	CA 1	A76 A78 A159			See Part 2;7 and Part 4;9			
	Radioactive material, surface contaminated objects (SCO-I or **SCO-II), fissile**	3326	7		Radioactive	CA 1	A78 A159			See Part 2;7 and Part 4;9			
≠	**Radioactive material, surface contaminated objects (SCO-I, SCO-II or SCO-III)**, non-fissile or fissile excepted	2913	7		Radioactive	CA 1	A78 A139 A159			See Part 2;7 and Part 4;9			
	Radioactive material, transported under special arrangement, non-fissile or fissile excepted	2919	7		Radioactive	CA 1	A23 A78 A139			See Part 2;7 and Part 4;9			
	Radioactive material, transported under special arrangement, fissile	3331	7		Radioactive	CA 1	A76 A78			See Part 2;7 and Part 4;9			
	Radioactive material, Type A package, non-special form, non-fissile or fissile excepted	2915	7		Radioactive	CA 1	A23 A78 A139			See Part 2;7 and Part 4;9			
	Radioactive material, Type A package, fissile, non-special form	3327	7		Radioactive	CA 1	A76 A78			See Part 2;7 and Part 4;9			
	Radioactive material, Type A package, special form, non-fissile or fissile excepted	3332	7		Radioactive	CA 1	A78 A139			See Part 2;7 and Part 4;9			
	Radioactive material, Type A package, special form, fissile	3333	7		Radioactive	CA 1	A78			See Part 2;7 and Part 4;9			

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Radioactive material, Type B(M) package, non-fissile or fissile excepted	2917	7		Radioactive	CA 1	A23 A78 A139 A160			See Part 2;7 and Part 4;9			
	Radioactive material, Type B(M) package, fissile	3329	7		Radioactive	CA 1	A76 A78 A160			See Part 2;7 and Part 4;9			
	Radioactive material, Type B(U) package, non-fissile or fissile excepted	2916	7		Radioactive	CA 1	A23 A78 A139 A160			See Part 2;7 and Part 4;9			
	Radioactive material, Type B(U) package, fissile	3328	7		Radioactive	CA 1	A76 A78 A160			See Part 2;7 and Part 4;9			
	Radioactive material, Type C package, non-fissile or fissile excepted	3323	7		Radioactive	CA 1	A23 A78 A139			See Part 2;7 and Part 4;9			
	Radioactive material, Type C package, fissile	3330	7		Radioactive	CA 1	A76 A78			See Part 2;7 and Part 4;9			
	Radioactive material, uranium hexafluoride, non-fissile or fissile excepted	2978	7	6.1 8	Radioactive & Toxic & Corrosive	CA 1	A139			See Part 2;7 and Part 4;9			
	Radioactive material, uranium hexafluoride, fissile	2977	7	6.1 8	Radioactive & Toxic & Corrosive					See Part 2;7 and Part 4;9			
≠	**Rags, oily**	1856	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	RDX and cyclotetramethylene-tetranitramine mixture, desensitized with not less than 10% phlegmatizer, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
	RDX and cyclotetramethylene-tetranitramine mixture, wetted with not less than 15% water, by mass	0391	1.1D							FORBIDDEN		FORBIDDEN	
	RDX, desensitized	0483	1.1D							FORBIDDEN		FORBIDDEN	
	RDX, wetted with not less than 15% water, by mass	0072	1.1D							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Receptacles, small, containing gas (flammable) without a release device, non-refillable	2037	2.1		Gas flammable		A145 A167		E0	203 Y203	1 kg 1 kg	203	15 kg
Receptacles, small, containing gas (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		A98 A145 A167		E0	203 Y203	1 kg 1 kg	203	15 kg
Receptacles, small, containing gas (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer		A145 A167		E0	203	1 kg	203	15 kg
Receptacles, small, containing gas (toxic & corrosive) without a release device, non-refillable	2037	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Receptacles, small, containing gas (toxic, flammable & corrosive) without a release device, non-refillable	2037	2.3	2.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Receptacles, small, containing gas (toxic & flammable) without a release device, non-refillable	2037	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Receptacles, small, containing gas (toxic, oxidizing & corrosive) without a release device, non-refillable	2037	2.3	5.1 8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A211			FORBIDDEN		FORBIDDEN	
Receptacles, small, containing gas (toxic & oxidizing) without a release device, non-refillable	2037	2.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Receptacles, small, containing gas (toxic) without a release device, non-refillable	2037	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Red phosphorus, see **Phosphorus, amorphous**												
Refrigerant gas, n.o.s.*	1078	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 12	1028	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 12B1	1974	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 13	1022	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 13B1	1009	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 14	1982	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 21	1029	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 22	1018	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 23	1984	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 32	3252	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 40	1063	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	100 kg
Refrigerant gas R 41	2454	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 114	1958	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 115	1020	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 116	2193	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 124	1021	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 125	3220	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 133a	1983	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 134a	3159	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Refrigerant gas R 142b	2517	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 143a	2035	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 152a	1030	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 161	2453	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 218	2424	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 227	3296	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 404A	3337	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 407A	3338	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 407B	3339	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 407C	3340	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 500	2602	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 502	1973	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 503	2599	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R 1113	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
Refrigerant gas R 1132a	1959	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Refrigerant gas R 1216	1858	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Refrigerant gas R 1318	2422	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerant gas R C318	1976	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Refrigerating machines containing flammable, non-toxic, liquefied gas	3358	2.1				A103			FORBIDDEN		FORBIDDEN	
Refrigerating machines containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)	2857	2.2		Gas non-flammable		A26		E0	See 211		See 211	
Refrigerating machines containing toxic, liquefied gas or ammonia solution with more than 50% ammonia	FORBIDDEN											
Regulated medical waste, n.o.s.	3291	6.2		Infectious		A117		E0	621	No limit	621	No limit
Release devices, explosive †	0173	1.4S		Explosive 1.4				E0	134	25 kg	134	100 kg
Resin solution, flammable	1866	3		Liquid flammable		A3	I	E3	351	1 L	361	30 L
							II	E2	353	5 L	364	60 L
									Y341	1 L		
							III	E1	355	60 L	366	220 L
									Y344	10 L		
Resorcin, see **Resorcinol**												
Resorcinol	2876	6.1		Toxic			III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Rivets, explosive	0174	1.4S		Explosive 1.4				E0	134	25 kg	134	100 kg
Rocket motors †	0186	1.3C		Explosive				E0	FORBIDDEN		130	220 kg
Rocket motors †	0280	1.1C							FORBIDDEN		FORBIDDEN	
Rocket motors †	0281	1.2C							FORBIDDEN		FORBIDDEN	
Rocket motors †	0510	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Rocket motors, liquid fuelled †	0395	1.2J							FORBIDDEN		FORBIDDEN	
Rocket motors, liquid fuelled †	0396	1.3J							FORBIDDEN		FORBIDDEN	
Rocket motors with hypergolic liquids with or without expelling charge †	0250	1.3L							FORBIDDEN		FORBIDDEN	
Rocket motors with hypergolic liquids with or without expelling charge †	0322	1.2L							FORBIDDEN		FORBIDDEN	
Rockets with bursting charge †	0180	1.1F							FORBIDDEN		FORBIDDEN	
Rockets with bursting charge †	0181	1.1E							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Rockets with bursting charge †	0182	1.2E							FORBIDDEN		FORBIDDEN	
Rockets with bursting charge †	0295	1.2F							FORBIDDEN		FORBIDDEN	
Rockets with expelling charge †	0436	1.2C							FORBIDDEN		FORBIDDEN	
Rockets with expelling charge †	0437	1.3C							FORBIDDEN		FORBIDDEN	
Rockets with expelling charge †	0438	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Rockets with inert head †	0183	1.3C							FORBIDDEN		FORBIDDEN	
Rockets with inert head †	0502	1.2C							FORBIDDEN		FORBIDDEN	
Rockets, line-throwing †	0238	1.2G							FORBIDDEN		FORBIDDEN	
Rockets, line-throwing †	0240	1.3G		Explosive				E0	FORBIDDEN		130	75 kg
Rockets, line-throwing †	0453	1.4G		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Rockets, liquid fuelled with bursting charge †	0397	1.1J							FORBIDDEN		FORBIDDEN	
Rockets, liquid fuelled with bursting charge †	0398	1.2J							FORBIDDEN		FORBIDDEN	
Rosin oil	1286	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Rubber scrap, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	1345	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
Rubber shoddy, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	1345	4.1		Solid flammable		A3	II	E2	445 Y441	15 kg 5 kg	448	50 kg
Rubber solution	1287	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Rubidium	1423	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Rubidium hydroxide	2678	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Rubidium hydroxide solution	2677	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	S												
	Safety devices, electrically initiated†	3268	9		Miscellaneous	BE 3 US 16	A32 A115 A119		E0	961	25 kg	961	100 kg
	Safety devices, pyrotechnic †	0503	1.4G		Explosive 1.4		A32 A56		E0	FORBIDDEN		135	75 kg
	Saltpetre, see **Potassium nitrate**												
	Samples, explosive*, other than initiating explosives	0190	1							FORBIDDEN		FORBIDDEN	
	Sand acid, see **Fluorosilicic acid**												
	Seat-belt pretensioners, see **Safety devices** (UN No. 3268) or **Safety devices, pyrotechnic** (UN No. 0503)												
	Security type equipment †	FORBIDDEN					A178						
≠	**Seed cake** with more than 1.5% oil and not more than 11% moisture	1386	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
≠	**Seed cake** with not more than 1.5% oil and not more than 11% moisture	2217	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A55	III		FORBIDDEN		FORBIDDEN	
	Seed expellers, see **Seed cake**, etc.												
	Selenates*	2630	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg
	Selenic acid	1905	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		862	25 kg
	Selenites*	2630	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg
	Selenium compound, liquid, n.o.s.*	3440	6.1		Toxic		A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Selenium compound, solid, n.o.s.*	3283	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Selenium disulphide	2657	6.1		Toxic	US 4		II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
Selenium hexafluoride	2194	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Selenium nitride	FORBIDDEN											
Selenium oxychloride	2879	8	6.1	Corrosive & Toxic			I	E0	850	0.5 L	854	2.5 L
Self-heating liquid, corrosive, inorganic, n.o.s.*	3188	4.2	8	Spontaneous combustion & Corrosive		A3	II	E2	462	1 L	464	5 L
							III	E1	463	5 L	465	60 L
Self-heating liquid, corrosive, organic, n.o.s.*	3185	4.2	8	Spontaneous combustion & Corrosive		A3	II	E2	462	1 L	464	5 L
							III	E1	463	5 L	465	60 L
Self-heating liquid, inorganic, n.o.s.*	3186	4.2		Spontaneous combustion		A3	II	E2	462	1 L	464	5 L
							III	E1	463	5 L	465	60 L
Self-heating liquid, organic, n.o.s.*	3183	4.2		Spontaneous combustion		A3	II	E2	462	1 L	464	5 L
							III	E1	463	5 L	465	60 L
Self-heating liquid, toxic, inorganic, n.o.s.*	3187	4.2	6.1	Spontaneous combustion & Toxic		A3	II	E2	462	1 L	464	5 L
							III	E1	463	5 L	465	60 L
Self-heating liquid, toxic, organic, n.o.s.*	3184	4.2	6.1	Spontaneous combustion & Toxic		A3	II	E2	462	1 L	464	5 L
							III	E1	463	5 L	465	60 L
Self-heating solid, corrosive, inorganic, n.o.s.*	3192	4.2	8	Spontaneous combustion & Corrosive		A3	II	E2	466	15 kg	470	50 kg
							III	E1	468	25 kg	471	100 kg
Self-heating solid, corrosive, organic, n.o.s.*	3126	4.2	8	Spontaneous combustion & Corrosive		A3	II	E2	466	15 kg	470	50 kg
							III	E1	468	25 kg	471	100 kg
Self-heating solid, inorganic, n.o.s.*	3190	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
							III	E1	469	25 kg	471	100 kg
Self-heating solid, organic, n.o.s.*	3088	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
							III	E1	469	25 kg	471	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Self-heating solid, oxidizing, n.o.s.***	3127	4.2	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	II III		FORBIDDEN FORBIDDEN		FORBIDDEN FORBIDDEN	
	Self-heating solid, toxic, inorganic, n.o.s.*	3191	4.2	6.1	Spontaneous combustion & Toxic		A3	II III	E2 E1	466 468	15 kg 25 kg	470 471	50 kg 100 kg
	Self-heating solid, toxic, organic, n.o.s.*	3128	4.2	6.1	Spontaneous combustion & Toxic		A3	II III	E2 E1	466 468	15 kg 25 kg	470 471	50 kg 100 kg
	Self-propelled vehicle, see **Battery-powered equipment** or **Battery-powered vehicle** or **Vehicle, (flammable gas powered)** or **Vehicle, (flammable liquid powered)**												
≠	Self-reactive liquid type B*	FORBIDDEN											
≠	Self-reactive liquid type B, temperature controlled*	FORBIDDEN											
	Self-reactive liquid type C*	3223	4.1		Solid flammable		A20		E0	459	5 L	459	10 L
	Self-reactive liquid type C, temperature controlled*	3233	4.1							FORBIDDEN		FORBIDDEN	
	Self-reactive liquid type D*	3225	4.1		Solid flammable		A20		E0	459	5 L	459	10 L
	Self-reactive liquid type D, temperature controlled*	3235	4.1							FORBIDDEN		FORBIDDEN	
	Self-reactive liquid type E*	3227	4.1		Solid flammable		A20		E0	459	10 L	459	25 L
	Self-reactive liquid type E, temperature controlled*	3237	4.1							FORBIDDEN		FORBIDDEN	
	Self-reactive liquid type F*	3229	4.1		Solid flammable		A20		E0	459	10 L	459	25 L
	Self-reactive liquid type F, temperature controlled*	3239	4.1							FORBIDDEN		FORBIDDEN	
	Self-reactive solid type B	FORBIDDEN											
	Self-reactive solid type B, temperature controlled	FORBIDDEN											
	Self-reactive solid type C*	3224	4.1		Solid flammable		A20		E0	459	5 kg	459	10 kg
	Self-reactive solid type C, temperature controlled*	3234	4.1							FORBIDDEN		FORBIDDEN	
	Self-reactive solid type D*	3226	4.1		Solid flammable		A20		E0	459	5 kg	459	10 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Self-reactive solid type D, temperature controlled*	3236	4.1							FORBIDDEN		FORBIDDEN	
Self-reactive solid type E*	3228	4.1		Solid flammable		A20		E0	459	10 kg	459	25 kg
Self-reactive solid type E, temperature controlled*	3238	4.1							FORBIDDEN		FORBIDDEN	
Self-reactive solid type F*	3230	4.1		Solid flammable		A20		E0	459	10 kg	459	25 kg
Self-reactive solid type F, temperature controlled*	3240	4.1							FORBIDDEN		FORBIDDEN	
Shale oil	1288	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Shaped charges, see **Charges, shaped** (UN Nos. 0059, 0439, 0440, 0441)												
Signal devices, hand †	0191	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
Signal devices, hand †	0373	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
Signals, distress, ship †	0194	1.1G							FORBIDDEN		FORBIDDEN	
Signals, distress, ship †	0195	1.3G		Explosive				E0	FORBIDDEN		135	75 kg
Signals, distress, ship†	0505	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
Signals, distress, ship†	0506	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
Signals, distress, ship, water-activated, see **Contrivances, water-activated**, etc.												
Signals, railway track, explosive †	0192	1.1G							FORBIDDEN		FORBIDDEN	
Signals, railway track, explosive †	0193	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg
Signals, railway track, explosive †	0492	1.3G							FORBIDDEN		FORBIDDEN	
Signals, railway track, explosive †	0493	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
Signals, smoke †	0196	1.1G							FORBIDDEN		FORBIDDEN	
Signals, smoke †	0197	1.4G		Explosive 1.4				E0	FORBIDDEN		135	75 kg
Signals, smoke †	0313	1.2G							FORBIDDEN		FORBIDDEN	
Signals, smoke †	0487	1.3G							FORBIDDEN		FORBIDDEN	
Signals, smoke †	0507	1.4S		Explosive 1.4				E0	135	25 kg	135	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Silane	2203	2.1			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Silicofluoric acid, see **Fluorosilicic acid**												
	Silicofluorides, n.o.s., see **Fluorosilicates, n.o.s.**												
	Silicon chloride, see **Silicon tetrachloride**												
	Silicon powder, amorphous	1346	4.1		Solid flammable		A54	III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Silicon tetrachloride	1818	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	Silicon tetrafluoride	1859	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Silicon tetrafluoride, adsorbed**	3521	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Silver acetylide (dry)	FORBIDDEN											
	Silver arsenite	1683	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Silver azide (dry)	FORBIDDEN											
	Silver chlorite (dry)	FORBIDDEN											
	Silver cyanide	1684	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Silver fulminate (dry)	FORBIDDEN											
	Silver nitrate	1493	5.1		Oxidizer	US 4		II	E2	558 Y544	5 kg 2.5 kg	562	25 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Silver oxalate (dry)	FORBIDDEN											
	Silver picrate (dry)	FORBIDDEN											
≠	**Silver picrate, wetted** with not less than 30% water, by mass	1347	4.1			BE 3	A40	I		FORBIDDEN		FORBIDDEN	
	Sludge acid †	1906	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
	Soda lime with more than 4% sodium hydroxide †	1907	8		Corrosive		A16	III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Sodium	1428	4.3		Danger if wet	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1	I	E0	FORBIDDEN		487	15 kg
	Sodium aluminate, solid	2812	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
	Sodium aluminate solution	1819	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
	Sodium aluminium hydride	2835	4.3		Danger if wet	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		489	50 kg
	Sodium ammonium vanadate	2863	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Sodium arsanilate	2473	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Sodium arsenate	1685	6.1		Toxic	US 4		II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Sodium arsenite, aqueous solution	1686	6.1		Toxic	US 4	A3 A6	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Sodium arsenite, solid	2027	6.1		Toxic	US 4	A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Sodium azide	1687	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Sodium bifluoride, see **Sodium hydrogendifluoride**												
Sodium binoxide, see **Sodium peroxide**												
Sodium bisulphite solution, see **Bisulphites, aqueous solution, n.o.s.**												
Sodium borohydride	1426	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Sodium borohydride and sodium hydroxide solution, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide, by mass	3320	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Sodium bromate	1494	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Sodium cacodylate	1688	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Sodium carbonate peroxyhydrate	3378	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
							III	E1	559 Y546	25 kg 10 kg	563	100 kg
Sodium chlorate	1495	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Sodium chlorate, aqueous solution	2428	5.1		Oxidizer		A3	II	E2	550 Y540	1 L 0.5 L	554	5 L
							III	E1	551 Y541	2.5 L 1 L	555	30 L
Sodium chlorate mixed with dinitrotoluene, see **Explosive, blasting, type C**												
Sodium chlorite	1496	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Sodium chloroacetate	2659	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Sodium cuprocyanide, solid	2316	6.1		Toxic			I	E5	666	5 kg	673	50 kg
Sodium cuprocyanide solution	2317	6.1		Toxic			I	E5	652	1 L	658	30 L
Sodium cyanide, solid	1689	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Sodium cyanide solution	3414	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Sodium dicyanocuprate, (I), solid, see **Sodium cuprocyanide, solid**												
Sodium dicyanocuprate, (I), solution, see **Sodium cuprocyanide solution**												
Sodium dimethylarsenate, see **Sodium cacodylate**												
Sodium dinitro-o-cresolate, dry or wetted with less than 15% water, by mass	0234	1.3C							FORBIDDEN		FORBIDDEN	
Sodium dinitro-o-cresolate, wetted with not less than 15% water, by mass	1348	4.1	6.1	Solid flammable & Toxic	BE 3	A40	I	E0	451	1 kg	451	15 kg
Sodium dinitro-o-cresolate, wetted with not less than 10% water, by mass	3369	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Sodium dioxide, see **Sodium peroxide**												
Sodium dithionite	1384	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Sodium fluoride, solid	1690	6.1		Toxic			III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Sodium fluoride solution	3415	6.1		Toxic		A3	III	E1	655	60 L	663	220 L
									Y642	2 L		
Sodium fluoroacetate	2629	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg
Sodium fluorosilicate	2674	6.1		Toxic			III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Sodium hexafluorosilicate, see **Sodium fluorosilicate**												
Sodium hydrate, see **Sodium hydroxide solution**												
Sodium hydride	1427	4.3		Danger if wet			I	E0	FORBIDDEN		487	15 kg
Sodium hydrogen 4-amino-phenylarsenate, see **Sodium arsanilate**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Sodium hydrogendifluoride	2439	8		Corrosive	US 4		II	E2	859 Y844	15 kg 5 kg	863	50 kg
Sodium hydrosulphide with less than 25% water of crystallization	2318	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Sodium hydrosulphide, hydrated with not less than 25% water of crystallization	2949	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Sodium hydrosulphite	1384	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Sodium hydroxide, solid	1823	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Sodium hydroxide solution	1824	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Sodium metasilicate pentahydrate, see **Disodium trioxosilicate**												
Sodium methylate	1431	4.2	8	Spontaneous combustion & Corrosive			II	E2	466	15 kg	470	50 kg
Sodium methylate solution in alcohol	1289	3	8	Liquid flammable & Corrosive		A3	II	E2	352 Y340	1 L 0.5 L	363	5 L
							III	E1	354 Y342	5 L 1 L	365	60 L
Sodium monoxide	1825	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Sodium nitrate	1498	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Sodium nitrate and potassium nitrate mixture	1499	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Sodium nitrite	1500	5.1	6.1	Oxidizer & Toxic	US 4		III	E1	559 Y546	25 kg 10 kg	563	100 kg
Sodium nitrite and potassium nitrate mixture, see **Potassium nitrate and sodium nitrite mixture**												
Sodium pentachlorophenate	2567	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Sodium perborate monohydrate	3377	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Sodium perchlorate	1502	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Sodium permanganate	1503	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Sodium peroxide	1504	5.1		Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		561	15 kg
Sodium peroxoborate, anhydrous	3247	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Sodium persulphate	1505	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Sodium phosphide	1432	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
Sodium picramate, dry or wetted with less than 20% water, by mass	0235	1.3C							FORBIDDEN		FORBIDDEN	
Sodium picramate, wetted with not less than 20% water, by mass	1349	4.1		Solid flammable	AU 1 BE 3 CA 7 IR 3 NL 1 US 3	A1 A40	I	E0	FORBIDDEN		451	15 kg
Sodium picryl peroxide	FORBIDDEN											
Sodium potassium alloys, see **Potassium sodium alloys, liquid** (UN No. 1422) or **Potassium sodium alloys, solid** (UN No. 3404)												
Sodium selenate, see **Selenates**												
Sodium selenite, see **Selenites**												
Sodium silicofluoride, see **Sodium fluorosilicate**												
Sodium sulphide with less than 30% water of crystallization	1385	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Sodium sulphide, anhydrous †	1385	4.2		Spontaneous combustion			II	E2	467	15 kg	470	50 kg
Sodium sulphide, hydrated with not less than 30% water	1849	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Sodium superoxide	2547	5.1		Oxidizer	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		561	15 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Sodium tetranitride	FORBIDDEN											
Solids containing corrosive liquid, n.o.s.*	3244	8		Corrosive		A77	II	E2	859 Y844	15 kg 5 kg	863	50 kg
Solids containing flammable liquid, n.o.s.*	3175	4.1		Solid flammable		A46	II	E2	445 Y441	15 kg 5 kg	448	50 kg
Solids containing toxic liquid, n.o.s.*	3243	6.1		Toxic		A50	II	E4	669 Y644	25 kg 1 kg	676	100 kg
Solvents, flammable †, n.o.s., see **Flammable liquid, n.o.s.**												
Solvents, flammable, toxic †, n.o.s., see **Flammable liquid, toxic, n.o.s.**												
Sounding devices, explosive †	0204	1.2F							FORBIDDEN		FORBIDDEN	
Sounding devices, explosive †	0296	1.1F							FORBIDDEN		FORBIDDEN	
Sounding devices, explosive †	0374	1.1D							FORBIDDEN		FORBIDDEN	
Sounding devices, explosive †	0375	1.2D							FORBIDDEN		FORBIDDEN	
Squibs, see **Igniters** (UN Nos. 0325, 0454)												
Stannic chloride, anhydrous	1827	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
Stannic chloride pentahydrate	2440	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Stannic phosphides	1433	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
Steel swarf, see **Ferrous metal, borings, shavings, turnings or cuttings**, etc.												
Stibine	2676	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Storage batteries, wet, see **Batteries, wet**, etc.												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Straw**	1327	4.1			AU 1 CA 7 IR 3 NL 1 US 3	A2 A198			FORBIDDEN		FORBIDDEN	
	Strontium alloys, pyrophoric, see **Pyrophoric metal, n.o.s.**, etc.												
	Strontium arsenite	1691	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Strontium chlorate	1506	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Strontium dioxide, see **Strontium peroxide**												
	Strontium nitrate	1507	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Strontium perchlorate	1508	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Strontium peroxide	1509	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Strontium phosphide	2013	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
	Strychnine	1692	6.1		Toxic	US 4	A5	I	E5	666	5 kg	673	50 kg
	Strychnine salts	1692	6.1		Toxic	US 4	A5	I	E5	666	5 kg	673	50 kg
	Styphnic acid, dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	0219	1.1D							FORBIDDEN		FORBIDDEN	
	Styphnic acid, wetted with not less than 20% water, or mixture of alcohol and water, by mass	0394	1.1D							FORBIDDEN		FORBIDDEN	
	Styrene monomer, stabilized	2055	3		Liquid flammable		A209	III III	E1 E1	FORBIDDEN FORBIDDEN		366	220 L
	Substances, EVI, n.o.s.* †	0482	1.5D							FORBIDDEN		FORBIDDEN	
	Substances, explosive, n.o.s.*	0357	1.1L							FORBIDDEN		FORBIDDEN	
	Substances, explosive, n.o.s.*	0358	1.2L							FORBIDDEN		FORBIDDEN	
	Substances, explosive, n.o.s.*	0359	1.3L							FORBIDDEN		FORBIDDEN	
	Substances, explosive, n.o.s.*	0473	1.1A							FORBIDDEN		FORBIDDEN	
	Substances, explosive, n.o.s.*	0474	1.1C							FORBIDDEN		FORBIDDEN	
	Substances, explosive, n.o.s.*	0475	1.1D							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Substances, explosive, n.o.s.*	0476	1.1G							FORBIDDEN		FORBIDDEN	
Substances, explosive, n.o.s.*	0477	1.3C							FORBIDDEN		FORBIDDEN	
Substances, explosive, n.o.s.*	0478	1.3G							FORBIDDEN		FORBIDDEN	
Substances, explosive, n.o.s.*	0479	1.4C		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
Substances, explosive, n.o.s.*	0480	1.4D		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
Substances, explosive, n.o.s.*	0481	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
Substances, explosive, n.o.s.*	0485	1.4G		Explosive 1.4		A62		E0	FORBIDDEN		101	75 kg
Substances, explosive, very insensitive, n.o.s.* †	0482	1.5D							FORBIDDEN		FORBIDDEN	
Substances liable to spontaneous combustion, n.o.s., see **Pyrophoric liquid/solid, inorganic/organic, n.o.s.** or **Self-heating liquid/solid, inorganic/organic, n.o.s.**												
Substituted nitrophenol pesticide, liquid, flammable, toxic*, flash point less than 23°C	2780	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
							II	E2	352 Y341	1 L 1 L	364	60 L
Substituted nitrophenol pesticide, liquid, toxic*	3014	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Substituted nitrophenol pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3013	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
						A4	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Substituted nitrophenol pesticide, solid, toxic*	2779	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
							III	E1	670 Y645	100 kg 10 kg	677	200 kg
Sucrose octanitrate (dry)	FORBIDDEN											
Sulphamic acid	2967	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Sulphur	1350	4.1		Solid flammable		A105	III	E1	446 Y443	25 kg 10 kg	449	100 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Sulphur chlorides	1828	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		854	2.5 L
	Sulphur dichloride, see **Sulphur chlorides**												
	Sulphur dioxide	1079	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Sulphuretted hydrogen, see **Hydrogen sulphide** (UN No. 1053)												
	Sulphur hexafluoride	1080	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
	Sulphuric acid with more than 51% acid	1830	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Sulphuric acid with not more than 51% acid	2796	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
≠	**Sulphuric acid, fuming** †	1831	8	6.1		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Sulphuric acid, spent †	1832	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1 A34	II	E0	FORBIDDEN		855	30 L
	Sulphuric and hydrofluoric acid mixture, see **Hydrofluoric acid and sulphuric acid mixture**												
≠	**Sulphur, molten**	2448	4.1					III		FORBIDDEN		FORBIDDEN	
	Sulphur monochloride, see **Sulphur chlorides**												
	Sulphurous acid	1833	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Sulphur tetrafluoride	2418	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Sulphur trioxide, stabilized**	1829	8			AU 1 CA 7 IR 3 NL 1 US 3	A2 A209	I		FORBIDDEN		FORBIDDEN	
≠	**Sulphuryl chloride**	1834	6.1	8				I		FORBIDDEN		FORBIDDEN	
	Sulphuryl fluoride	2191	2.3			AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	T												
	Talcum with tremolite and/or actinolite, see **Asbestos, amphibole** (UN No. 2212)												
	Tars, liquid, including road oils, and cutback bitumens	1999	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	Tartar emetic, see **Antimony potassium tartrate**												
	Tear gas candles	1700	6.1	4.1	Toxic & Solid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		679	50 kg
	Tear gas cartridges, see **Ammunition, tear-producing,** etc.												
	Tear gas devices, containing tear gas substances, see **Aerosols** etc.												
	Tear gas grenades, see **Tear gas candles**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Tear gas substance, liquid, n.o.s.***	1693	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
								II	E0	FORBIDDEN		659	5 L
	Tear gas substance, solid, n.o.s.*	3448	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A36	I	E0	FORBIDDEN		672	15 kg
								II	E0	FORBIDDEN		674	25 kg
	Tellurium compound, n.o.s.*	3284	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Tellurium hexafluoride	2195	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
	Terpene hydrocarbons, n.o.s.	2319	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Terpinolene	2541	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Tetraazido benzene quinone	FORBIDDEN											
	Tetrabromoethane	2504	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	1,1,2,2-Tetrachloroethane	1702	6.1		Toxic	US 4		II	E4	654 Y641	5 L 1 L	661	60 L
	Tetrachloroethylene	1897	6.1		Toxic	US 4		III	E1	655 Y642	60 L 2 L	663	220 L
	Tetraethylammonium perchlorate (dry)	FORBIDDEN											
	Tetraethyl dithiopyrophosphate	1704	6.1		Toxic	US 4	A6	II	E4	654 Y641	5 L 1 L	662	60 L
	Tetraethylenepentamine	2320	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Tetraethyl lead, see **Motor fuel anti-knock mixture**												
	Tetraethyloxysilane, see **Tetraethyl silicate**												
	Tetraethyl silicate	1292	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Tetrafluorodichloroethane, see **1,2-Dichloro-1,1,2,2-tetrafluoroethane** or **Refrigerant gas R 114** (UN No. 1958)												
1,1,1,2-Tetrafluoroethane	3159	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Tetrafluoroethylene, stabilized	1081	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
Tetrafluoromethane	1982	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
1,2,3,6-Tetrahydrobenzaldehyde	2498	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Tetrahydrofuran	2056	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Tetrahydrofurfurylamine	2943	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Tetrahydro-1,4-oxazine, see **Morpholine**												
Tetrahydrophthalic anhydrides with more than 0.05% of maleic anhydride	2698	8		Corrosive		A74	III	E1	860 Y845	25 kg 5 kg	864	100 kg
1,2,3,6-Tetrahydropyridine	2410	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Tetrahydrothiophene	2412	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Tetramethoxysilane, see **Methyl orthosilicate**												
Tetramethylammonium hydroxide, solid	3423	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg
Tetramethylammonium hydroxide solution	1835	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
							III	E1	852 Y841	5 L 1 L	856	60 L
Tetramethylene, see **Cyclobutane**												
Tetramethylene cyanide, see **Adiponitrile**												
Tetramethylene diperoxide dicarbamide	FORBIDDEN											

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Tetramethyl lead, see **Motor fuel anti-knock mixture**												
	Tetramethylsilane	2749	3		Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		361	30 L
	Tetranitroaniline	0207	1.1D							FORBIDDEN		FORBIDDEN	
	Tetranitro diglycerin	FORBIDDEN											
≠	**Tetranitromethane**	1510	6.1	5.1				I		FORBIDDEN		FORBIDDEN	
	2,3,4,6-Tetranitrophenol	FORBIDDEN											
	2,3,4,6-Tetranitrophenyl methyl nitramine	FORBIDDEN											
	2,3,4,6-Tetranitrophenylnitramine	FORBIDDEN											
	Tetranitroresorcinol (dry)	FORBIDDEN											
	2,3,5,6-Tetranitroso- 1,4-dinitrobenzene	FORBIDDEN											
	2,3,5,6-Tetranitroso nitrobenzene (dry)	FORBIDDEN											
	Tetrapropyl orthotitanate	2413	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Tetrazene (dry)	FORBIDDEN											
	Tetrazene, wetted with not less than 30% water, or mixture of alcohol and water, by mass	0114	1.1A							FORBIDDEN		FORBIDDEN	
	Tetrazine	FORBIDDEN											
	Tetrazol-1-acetic acid	0407	1.4C		Explosive 1.4				E0	FORBIDDEN		114 b)	75 kg
	1H-Tetrazole	0504	1.1D							FORBIDDEN		FORBIDDEN	
	Tetrazolyl azide (dry)	FORBIDDEN											
	Tetryl	0208	1.1D							FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Textile waste, wet**	1857	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
	Thallium chlorate	2573	5.1	6.1	Oxidizer & Toxic			II	E2	558 Y543	5 kg 1 kg	562	25 kg
	Thallium (I) chlorate, see **Thallium chlorate**												
	Thallium compound, n.o.s.*	1707	6.1		Toxic	US 4	A6	II	E4	669 Y644	25 kg 1 kg	676	100 kg
	Thallium nitrate	2727	6.1	5.1	Toxic & Oxidizer			II	E4	667 Y644	5 kg 1 kg	674	25 kg
	Thallium (I) nitrate, see **Thallium nitrate**												
	Thallous chlorate, see **Thallium chlorate**												
	4-Thiapentanal	2785	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Thia-4-pentanal, see **4-Thiapentanal**												
	Thioacetic acid	2436	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Thiocarbamate pesticide, liquid, flammable, toxic*, flash point less than 23°C	2772	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
								II	E2	352 Y341	1 L 1 L	364	60 L
	Thiocarbamate pesticide, liquid, toxic*	3006	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Thiocarbamate pesticide, liquid, toxic, flammable*, flash point not less than 23°C	3005	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Thiocarbamate pesticide, solid, toxic*	2771	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Thioglycol	2966	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	Thioglycolic acid	1940	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L
	Thiolactic acid	2936	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
≠	**Thionyl chloride**	1836	8			AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Thiophene	2414	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Thiophenol, see **Phenyl mercaptan**												
≠	**Thiophosgene**	2474	6.1			AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Thiophosphoryl chloride	1837	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
	Thiourea dioxide	3341	4.2		Spontaneous combustion		A3	II III	E2 E1	467 469	15 kg 25 kg	470 471	50 kg 100 kg
	Tin chloride anhydrous, see **Stannic chloride, anhydrous**												
	Tin (IV) chloride, anhydrous, see **Stannic chloride, anhydrous**												
	Tin chloride pentahydrate, see **Stannic chloride pentahydrate**												
	Tin (IV) chloride pentahydrate, see **Stannic chloride pentahydrate**												
	Tinctures, medicinal	1293	3		Liquid flammable		A3	II III	E2 E1	353 Y341 355 Y344	5 L 1 L 60 L 10 L	364 366	60 L 220 L
	Tin tetrachloride, see **Stannic chloride, anhydrous**												

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Tire assemblies inflated, unserviceable, damaged or above maximum rated pressure	—	2.2				A59			FORBIDDEN		FORBIDDEN	
	Titanium disulphide	3174	4.2		Spontaneous combustion			III	E1	469	25 kg	471	100 kg
	Titanium hydride	1871	4.1		Solid flammable			II	E2	445 Y441	15 kg 5 kg	448	50 kg
≠	**Titanium powder, dry**	2546	4.2		Spontaneous combustion		A3	I		FORBIDDEN		FORBIDDEN	
								II	E2	467	15 kg	470	50 kg
								III	E1	469	25 kg	471	100 kg
	Titanium powder, wetted with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns	1352	4.1		Solid flammable		A35	II	E2	445 Y441	15 kg 5 kg	448	50 kg
	Titanium sponge granules	2878	4.1		Solid flammable		A3	III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Titanium sponge powders	2878	4.1		Solid flammable		A3	III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Titanium sulphate solution with not more than 45% sulphuric acid, see **Corrosive liquid, acidic, inorganic, n.o.s.**												
≠	**Titanium tetrachloride**	1838	6.1	8		AU 1 CA 7 IR 3 NL 1 US 3	A2	I		FORBIDDEN		FORBIDDEN	
	Titanium trichloride mixture	2869	8		Corrosive		A3	II	E2	859 Y844	15 kg 5 kg	863	50 kg
								III	E1	860 Y845	25 kg 5 kg	864	100 kg
≠	**Titanium trichloride mixture, pyrophoric**	2441	4.2	8				I		FORBIDDEN		FORBIDDEN	
≠	**Titanium trichloride, pyrophoric**	2441	4.2	8				I		FORBIDDEN		FORBIDDEN	
	TNT, dry or wetted with less than 30% water, by mass	0209	1.1D							FORBIDDEN		FORBIDDEN	
	TNT and hexanitrostilbene mixture	0388	1.1D							FORBIDDEN		FORBIDDEN	
	TNT and trinitrobenzene mixture	0388	1.1D							FORBIDDEN		FORBIDDEN	
	TNT mixed with aluminium, see **Tritonal**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
TNT mixture containing trinitrobenzene and hexanitrostilbene	0389	1.1D							FORBIDDEN		FORBIDDEN	
TNT, wetted with not less than 30% water, by mass	1356	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
TNT, wetted with not less than 10% water, by mass	3366	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Toe puffs, nitrocellulose base, see **Fibres impregnated with weakly nitrated nitrocellulose, n.o.s.** or **Fabrics impregnated with weakly nitrated nitrocellulose, n.o.s.**												
Toluene	1294	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
Toluene diisocyanate	2078	6.1		Toxic	US 4	A113	II	E4	654 Y641	5 L 1 L	662	60 L
Toluidines, liquid	1708	6.1		Toxic	US 4	A113	II	E4	654 Y641	5 L 1 L	662	60 L
Toluidines, solid	3451	6.1		Toxic	US 4	A113	II	E4	669 Y644	25 kg 1 kg	676	100 kg
Toluol, see **Toluene**												
2,4-Toluylenediamine, solid	1709	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
2,4-Toluylenediamine solution	3418	6.1		Toxic		A3	III	E1	655 Y642	60 L 2 L	663	220 L
Toluylene diisocyanate, see **Toluene diisocyanate**												
Tolylethylene, inhibited, see **Vinyltoluenes, stabilized**												
Torpedoes with bursting charge †	0329	1.1E							FORBIDDEN		FORBIDDEN	
Torpedoes with bursting charge †	0330	1.1F							FORBIDDEN		FORBIDDEN	
Torpedoes with bursting charge †	0451	1.1D							FORBIDDEN		FORBIDDEN	
Torpedoes, liquid fuelled with inert head †	0450	1.3J							FORBIDDEN		FORBIDDEN	
Torpedoes, liquid fuelled with or without bursting charge †	0449	1.1J							FORBIDDEN		FORBIDDEN	
≠ **Toxic by inhalation liquid, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}	3381	6.1					I		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Toxic by inhalation liquid, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3382	6.1					I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3389	6.1	8				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3390	6.1	8				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, flammable, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3383	6.1	3				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, flammable, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3384	6.1	3				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3488	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3489	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, oxidizing, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3387	6.1	5.1				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, oxidizing, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3388	6.1	5.1				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, water-reactive, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3385	6.1	4.3				I		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Toxic by inhalation liquid, water-reactive, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3386	6.1	4.3				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3490	6.1	3 4.3				I		FORBIDDEN		FORBIDDEN	
≠	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3491	6.1	3 4.3				I		FORBIDDEN		FORBIDDEN	
	Toxic gas, n.o.s., see **Compressed** or **Liquefied gas, toxic,** etc.												
	Toxic liquid, corrosive, inorganic, n.o.s.*	3289	6.1	8	Toxic & Corrosive		A4 A137	I II	E5 E4	651 653 Y640	0.5 L 1 L 0.5 L	657 660	2.5 L 30 L
	Toxic liquid, corrosive, organic, n.o.s.*	2927	6.1	8	Toxic & Corrosive		A4 A137	I II	E5 E4	651 653 Y640	0.5 L 1 L 0.5 L	657 660	2.5 L 30 L
	Toxic liquid, flammable, organic, n.o.s.*	2929	6.1	3	Toxic & Liquid flammable		A4 A137	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
	Toxic liquid, inorganic, n.o.s.*	3287	6.1		Toxic		A3 A4 A137	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Toxic liquid, organic, n.o.s.*	2810	6.1		Toxic		A3 A4 A137	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Toxic liquid, oxidizing, n.o.s.*	3122	6.1	5.1	Toxic & Oxidizer		A4 A137	I II	E0 E4	FORBIDDEN 653 Y641	 1 L 1 L	657 659	2.5 L 5 L
	Toxic liquid, water-reactive, n.o.s.*	3123	6.1	4.3	Toxic & Danger if wet		A4 A137	I II	E0 E4	FORBIDDEN 653	 1 L	699 659	1 L 5 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Toxic solid, corrosive, inorganic, n.o.s.*	3290	6.1	8	Toxic & Corrosive		A5	I	E5	665	1 kg	672	15 kg
							II	E4	668	15 kg	675	50 kg
									Y644	1 kg		
Toxic solid, corrosive, organic, n.o.s.*	2928	6.1	8	Toxic & Corrosive		A5	I	E5	665	1 kg	672	15 kg
							II	E4	668	15 kg	675	50 kg
									Y644	1 kg		
Toxic solid, flammable, inorganic, n.o.s.*	3535	6.1	4.1	Toxic & Solid flammable		A5	I	E5	665	1 kg	672	15 kg
							II	E4	668	15 kg	675	50 kg
									Y644	1 kg		
Toxic solid, flammable, organic, n.o.s.*	2930	6.1	4.1	Toxic & Solid flammable		A5	I	E5	665	1 kg	672	15 kg
							II	E4	668	15 kg	675	50 kg
									Y644	1 kg		
Toxic solid, inorganic, n.o.s.*	3288	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Toxic solid, organic, n.o.s.*	2811	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A5	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Toxic solid, oxidizing, n.o.s.*	3086	6.1	5.1	Toxic & Oxidizer		A5	I	E5	665	1 kg	672	15 kg
							II	E4	667	5 kg	674	25 kg
									Y644	1 kg		
Toxic solid, self-heating, n.o.s.*	3124	6.1	4.2	Toxic & Spontaneous combustion		A5	I	E5	665	1 kg	672	15 kg
							II	E4	668	15 kg	675	50 kg
Toxic solid, water-reactive, n.o.s.*	3125	6.1	4.3	Toxic & Danger if wet		A5	I	E5	699	5 kg	699	15 kg
							II	E4	668	15 kg	675	50 kg
									Y644	1 kg		
Toxins, extracted from living sources, liquid, n.o.s.*	3172	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
						A43	II	E4	654	5 L	662	60 L
									Y641	1 L		
							III	E1	655	60 L	663	220 L
									Y642	2 L		
Toxins, extracted from living sources, solid, n.o.s.*	3462	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
						A43	II	E4	669	25 kg	676	100 kg
									Y644	1 kg		
							III	E1	670	100 kg	677	200 kg
									Y645	10 kg		
Tracers for ammunition †	0212	1.3G							FORBIDDEN		FORBIDDEN	
Tracers for ammunition †	0306	1.4G		Explosive 1.4				E0	FORBIDDEN		133	75 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Tractors, see **Vehicle (flammable gas powered)** or **Vehicle (flammable liquid powered)**												
	Tremolite, see **Asbestos, amphibole** (UN No. 2212)												
	Triallylamine	2610	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
	Triallyl borate	2609	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Triazine pesticide, liquid, flammable, toxic*, flash point less than 23°C	2764	3	6.1	Liquid flammable & Toxic		A4	I	E0	FORBIDDEN		361	30 L
								II	E2	352 Y341	1 L 1 L	364	60 L
	Triazine pesticide, liquid, toxic*	2998	6.1		Toxic		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Triazine pesticide, liquid, toxic, flammable*, flash point not less than 23°C	2997	6.1	3	Toxic & Liquid flammable		A3	I	E5	652	1 L	658	30 L
							A4	II	E4	654 Y641	5 L 1 L	662	60 L
								III	E1	655 Y642	60 L 2 L	663	220 L
	Triazine pesticide, solid, toxic*	2763	6.1		Toxic		A3	I	E5	666	5 kg	673	50 kg
							A5	II	E4	669 Y644	25 kg 1 kg	676	100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	Tri-(b-nitroxyethyl) ammonium nitrate	FORBIDDEN											
	Tribromoborane, see **Boron tribromide**												
	Tributylamine	2542	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
≠	**Tributylphosphane**	3254	4.2					I		FORBIDDEN		FORBIDDEN	
	Trichloroacetaldehyde, see **Chloral, anhydrous, stabilized** (UN No. 2075)												
	Trichloroacetic acid	1839	8		Corrosive			II	E2	859 Y844	15 kg 5 kg	863	50 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Trichloroacetic acid solution	2564	8		Corrosive		A3	II	E2	851 Y840	1 L 0.5 L	855	30 L
								III	E1	852 Y841	5 L 1 L	856	60 L
≠	**Trichloroacetyl chloride**	2442	8			AU 1 CA 7 IR 3 NL 1 US 3	A2	II		FORBIDDEN		FORBIDDEN	
	Trichlorobenzenes, liquid	2321	6.1		Toxic	US 4		III	E1	655 Y642	60 L 2 L	663	220 L
	Trichlorobutene	2322	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
	1,1,1-Trichloroethane	2831	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Trichloroethylene	1710	6.1		Toxic	US 4		III	E1	655 Y642	60 L 2 L	663	220 L
	Trichloroisocyanuric acid, dry	2468	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	Trichloromethyl perchlorate	FORBIDDEN											
	Trichloronitromethane, see **Chloropicrin**												
	Trichlororaceticaldehyde, see **Chloral, anhydrous, stabilized** (UN No. 2075)												
≠	**Trichlorosilane**	1295	4.3	3 8				I		FORBIDDEN		FORBIDDEN	
	1,3,5-Trichloro-s-triazine-2,4,6-trione, see **Trichloroisocyanuric acid, dry**												
	2,4,6-Trichloro-1,3,5-triazine, see **Cyanuric chloride**												
	Tricresyl phosphate with more than 3% ortho isomer	2574	6.1		Toxic			II	E4	654 Y641	5 L 1 L	661	60 L
	Triethylamine	1296	3	8	Liquid flammable & Corrosive			II	E2	352 Y340	1 L 0.5 L	363	5 L
	Triethyl borate, see **Ethyl borate**												
	Triethylenetetramine	2259	8		Corrosive			II	E2	851 Y840	1 L 0.5 L	855	30 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Triethyl orthoformate, see **Ethyl orthoformate**												
Triethyl phosphite	2323	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Trifluoroacetic acid	2699	8		Corrosive			I	E0	850	0.5 L	854	2.5 L
Trifluoroacetyl chloride	3057	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Trifluorobromomethane, see **Bromotrifluoromethane**												
Trifluorochloroethane, see **1-Chloro-2,2,2-trifluoroethane**												
Trifluorochloroethylene, stabilized	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
Trifluorochloromethane, see **Chlorotrifluoromethane**												
1,1,1-Trifluoroethane	2035	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
Trifluoromethane	1984	2.2		Gas non-flammable				E1	200	75 kg	200	150 kg
Trifluoromethane, refrigerated liquid	3136	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
2-Trifluoromethylaniline	2942	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
3-Trifluoromethylaniline	2948	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Triformoxime trinitrate	FORBIDDEN											
Triisobutylene	2324	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Triisopropyl borate	2616	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Trimethylacetyl chloride**	2438	6.1	3 8				I		FORBIDDEN		FORBIDDEN	
	Trimethylamine, anhydrous	1083	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1		E0	FORBIDDEN		200	150 kg
	Trimethylamine, aqueous solution, not more than 50% trimethylamine, by mass	1297	3	8	Liquid flammable & Corrosive		A3	I	E0	350	0.5 L	360	2.5 L
								II	E2	352 Y340	1 L 0.5 L	363	5 L
								III	E1	354 Y342	5 L 1 L	365	60 L
	1,3,5-Trimethylbenzene	2325	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	Trimethyl borate	2416	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
	Trimethylchlorosilane	1298	3	8	Liquid flammable & Corrosive			II	E0	FORBIDDEN		377	5 L
	Trimethylcyclohexylamine	2326	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Trimethylene chlorobromide, see **1-Bromo-3-chloropropane**												
	Trimethylene glycol diperchlorate	FORBIDDEN											
	Trimethylhexamethylenediamines	2327	8		Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
	Trimethylhexamethylene diisocyanate	2328	6.1		Toxic			III	E1	655 Y642	60 L 2 L	663	220 L
	Trimethylol nitromethane trinitrate	FORBIDDEN											
	2,4,4-Trimethylpentene-1, see **Diisobutylene, isomeric compounds** (UN No. 2050)												
	2,4,4-Trimethylpentene-2, see **Diisobutylene, isomeric compounds** (UN No. 2050)												
	Trimethyl phosphite	2329	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
	1,3,5-Trimethyl-2,4,6-trinitrobenzene	FORBIDDEN											
	Trinitroacetic acid	FORBIDDEN											

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Trinitroacetonitrile	FORBIDDEN											
Trinitroamine cobalt	FORBIDDEN											
Trinitroaniline	0153	1.1D							FORBIDDEN		FORBIDDEN	
Trinitroanisole	0213	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrobenzene, dry or wetted with less than 30% water, by mass	0214	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrobenzenesulphonic acid	0386	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrobenzene, wetted with not less than 30% water, by mass	1354	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Trinitrobenzene, wetted with not less than 10% water, by mass	3367	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Trinitrobenzoic acid, dry or wetted with less than 30% water, by mass	0215	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrobenzoic acid, wetted with not less than 30% water, by mass	1355	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Trinitrobenzoic acid, wetted with not less than 10% water, by mass	3368	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Trinitrochlorobenzene	0155	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrochlorobenzene, wetted with not less than 10% water, by mass	3365	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Trinitro-m-cresol	0216	1.1D							FORBIDDEN		FORBIDDEN	
2,4,6-Trinitro-1,3-diazobenzene	FORBIDDEN											
Trinitroethanol	FORBIDDEN											
Trinitroethylnitrate	FORBIDDEN											
Trinitrofluorenone	0387	1.1D							FORBIDDEN		FORBIDDEN	
Trinitromethane	FORBIDDEN											
Trinitronaphthalene	0217	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrophenetole	0218	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrophenol, dry or wetted with less than 30% water, by mass	0154	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrophenol, wetted with not less than 30% water, by mass	1344	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Trinitrophenol, wetted with not less than 10% water, by mass	3364	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
2,4,6-Trinitrophenyl guanidine (dry)	FORBIDDEN											
Trinitrophenylmethylnitramine	0208	1.1D							FORBIDDEN		FORBIDDEN	
2,4,6-Trinitrophenyl nitramine	FORBIDDEN											
2,4,6-Trinitrophenyl trimethylol methyl nitramine trinitrate (dry)	FORBIDDEN											
Trinitroresorcinol, dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	0219	1.1D							FORBIDDEN		FORBIDDEN	
Trinitroresorcinol, wetted with not less than 20% water, or mixture of alcohol and water, by mass	0394	1.1D							FORBIDDEN		FORBIDDEN	
2,4,6-Trinitroso-3-methyl nitraminoanisole	FORBIDDEN											
Trinitrotetramine cobalt nitrate	FORBIDDEN											
Trinitrotoluene, dry or wetted with less than 30% water, by mass	0209	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrotoluene and hexanitrostilbene mixture	0388	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrotoluene and trinitrobenzene mixture	0388	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrotoluene mixture containing trinitrobenzene and hexanitrostilbene	0389	1.1D							FORBIDDEN		FORBIDDEN	
Trinitrotoluene, wetted with not less than 30% water, by mass	1356	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
Trinitrotoluene, wetted with not less than 10% water, by mass	3366	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
2,4,6-Trinitro-1,3,5-triazido benzene (dry)	FORBIDDEN											
Tripropylamine	2260	3	8	Liquid flammable & Corrosive			III	E1	354 Y342	5 L 1 L	365	60 L
Tripropylene	2057	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Tris-(1-aziridinyl) phosphine oxide solution	2501	6.1		Toxic		A3	II	E4	654 Y641	5 L 1 L	662	60 L
							III	E1	655 Y642	60 L 2 L	663	220 L
Tris, bis-bifluoroamino diethoxy propane (TVOPA)	FORBIDDEN											
Tritonal	0390	1.1D							FORBIDDEN		FORBIDDEN	
Tropilidene, see **Cycloheptatriene**												
Tungsten hexafluoride	2196	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
Turpentine	1299	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Turpentine substitute †	1300	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Tyre assemblies inflated, unserviceable, damaged or above maximum rated pressure	—	2.2				A59			FORBIDDEN		FORBIDDEN	
U												
Undecane	2330	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	6.1	7 8	Toxic & Corrosive		A139 A194	I	E0	See 603		See 603	
Urea hydrogen peroxide	1511	5.1	8	Oxidizer & Corrosive			III	E1	559 Y545	25 kg 5 kg	563	100 kg
Urea nitrate, dry or wetted with less than 20% water, by mass	0220	1.1D							FORBIDDEN		FORBIDDEN	
Urea nitrate, wetted with not less than 20% water, by mass	1357	4.1		Solid flammable	BE 3	A40 A101	I	E0	451	1 kg	451	15 kg
Urea nitrate, wetted with not less than 10% water, by mass	3370	4.1		Solid flammable	BE 3	A40	I	E0	451	0.5 kg	451	0.5 kg
V												
Valeral, see **Valeraldehyde**												

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Valeraldehyde	2058	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
n-Valeraldehyde, see **Valeraldehyde**												
Valeric aldehyde, see **Valeraldehyde**												
Valeryl chloride	2502	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
Vanadium compound, n.o.s.*	3285	6.1		Toxic		A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
Vanadium (IV) oxide sulphate, see **Vanadyl sulphate**												
Vanadium oxysulphate, see **Vanadyl sulphate**												
Vanadium oxytrichloride	2443	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		855	30 L
Vanadium pentoxide, non-fused form	2862	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Vanadium tetrachloride	2444	8		Corrosive	AU 1 CA 7 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		854	2.5 L
Vanadium trichloride	2475	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Vanadyl sulphate	2931	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
≠ **Vehicle, flammable gas powered**	3166	9		Miscellaneous		A70 A87 A118 A120 A154 A214		E0	FORBIDDEN		951	No limit

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
≠	**Vehicle, flammable liquid powered**	3166	9		Miscellaneous		A70 A87 A118 A120 A154 A214		E0	950	No limit	950	No limit
≠	**Vehicle, fuel cell, flammable gas powered** †	3166	9		Miscellaneous		A70 A87 A118 A120 A154 A176 A214		E0	FORBIDDEN		951	No limit
≠	**Vehicle, fuel cell, flammable liquid powered** †	3166	9		Miscellaneous		A70 A87 A118 A120 A154 A176 A214		E0	950	No limit	950	No limit
	Vehicles, self-propelled, see **Battery-powered equipment** or **Battery-powered vehicle** or **Vehicle (flammable gas powered)** or **Vehicle (flammable liquid powered)**												
	Villiaumite, see **Sodium fluoride, solid** (UN No. 1690)												
	Vinyl acetate, stabilized	1301	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
	Vinylbenzene, see **Styrene monomer, stabilized**												
	Vinyl bromide, stabilized	1085	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
	Vinyl butyrate, stabilized	2838	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
	Vinyl chloride, stabilized	1086	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1 A209		E0	FORBIDDEN		200	150 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Vinyl chloroacetate	2589	6.1	3	Toxic & Liquid flammable			II	E4	654 Y641	5 L 1 L	662	60 L
Vinyl ethyl ether, stabilized	1302	3		Liquid flammable		A209	I	E3	FORBIDDEN		361	30 L
Vinyl fluoride, stabilized	1860	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
Vinylidene chloride, stabilized	1303	3		Liquid flammable		A209	I	E3	FORBIDDEN		361	30 L
Vinyl isobutyl ether, stabilized	1304	3		Liquid flammable		A209	II II	E2 E2	FORBIDDEN FORBIDDEN		364	60 L
Vinyl methyl ether, stabilized	1087	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
Vinyl nitrate polymer	FORBIDDEN											
Vinylpyridines, stabilized	3073	6.1	3 8	Toxic & Liquid flammable & Corrosive		A209	II II	E4 E4	FORBIDDEN FORBIDDEN		660	30 L
Vinyltoluenes, stabilized	2618	3		Liquid flammable		A209	III III	E1 E1	FORBIDDEN FORBIDDEN		366	220 L
Vinyltrichlorosilane	1305	3	8	Liquid flammable & Corrosive	AU 1 CA 7 IR 3 NL 1 US 3		II	E0	FORBIDDEN		377	5 L
W												
Warheads for guided missiles, see **Warheads, rocket**												
Warheads, rocket with burster or expelling charge †	0370	1.4D		Explosive 1.4				E0	FORBIDDEN		130	75 kg
Warheads, rocket with burster or expelling charge †	0371	1.4F							FORBIDDEN		FORBIDDEN	
Warheads, rocket with bursting charge †	0286	1.1D							FORBIDDEN		FORBIDDEN	
Warheads, rocket with bursting charge †	0287	1.2D							FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Warheads, rocket with bursting charge †	0369	1.1F							FORBIDDEN		FORBIDDEN	
Warheads, torpedo with bursting charge †	0221	1.1D							FORBIDDEN		FORBIDDEN	
Water-reactive liquid, n.o.s.*	3148	4.3		Danger if wet		A3	I	E0	FORBIDDEN		480	1 L
							II	E2	478	1 L	481	5 L
							III	E1	479	5 L	482	60 L
Water-reactive liquid, corrosive, n.o.s.*	3129	4.3	8	Danger if wet & Corrosive		A3	I	E0	FORBIDDEN		480	1 L
							II	E0	FORBIDDEN		481	5 L
							III	E1	479	5 L	482	60 L
Water-reactive liquid, toxic, n.o.s.*	3130	4.3	6.1	Danger if wet & Toxic		A3	I	E0	FORBIDDEN		480	1 L
							II	E0	FORBIDDEN		481	5 L
							III	E1	479	5 L	482	60 L
Water-reactive solid, n.o.s.*	2813	4.3		Danger if wet		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	484	15 kg	490	50 kg
									Y475	5 kg		
							III	E1	486	25 kg	491	100 kg
									Y477	10 kg		
Water-reactive solid, corrosive, n.o.s.*	3131	4.3	8	Danger if wet & Corrosive		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	483	15 kg	490	50 kg
									Y475	5 kg		
							III	E1	486	25 kg	491	100 kg
									Y476	5 kg		
Water-reactive solid, flammable, n.o.s.*	3132	4.3	4.1	Danger if wet & Solid flammable		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	483	15 kg	490	50 kg
									Y475	5 kg		
							III	E1	486	25 kg	491	100 kg
									Y476	5 kg		
≠ **Water-reactive solid, oxidizing, n.o.s.***	3133	4.3	5.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	II III		FORBIDDEN FORBIDDEN		FORBIDDEN FORBIDDEN	
Water-reactive solid, self-heating, n.o.s.*	3135	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	483	15 kg	490	50 kg
							III	E1	486	25 kg	491	100 kg
Water-reactive solid, toxic, n.o.s.*	3134	4.3	6.1	Danger if wet & Toxic		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	483	15 kg	490	50 kg
									Y474	1 kg		
							III	E1	486	25 kg	491	100 kg
									Y477	10 kg		

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Wheelchair, electric with batteries, see **Battery-powered equipment** or **Battery-powered vehicle**												
White arsenic, see **Arsenic trioxide**												
White spirit, see **Turpentine substitute**												
Wood preservatives, liquid	1306	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
≠ **Wool waste, wet**	1387	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2	III		FORBIDDEN		FORBIDDEN	
X												
Xanthates	3342	4.2		Spontaneous combustion		A3	II	E2	467	15 kg	470	50 kg
							III	E1	469	25 kg	471	100 kg
Xenon	2036	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
Xenon, refrigerated liquid	2591	2.2		Gas non-flammable				E1	202	50 kg	202	500 kg
Xylenes	1307	3		Liquid flammable		A3	II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Xylenols, liquid	3430	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Xylenols, solid	2261	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Xylidines, liquid	1711	6.1		Toxic			II	E4	654 Y641	5 L 1 L	662	60 L
Xylidines, solid	3452	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Xylols, see **Xylenes**												
Xylyl bromide, liquid	1701	6.1		Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		661	60 L
Xylyl bromide, solid	3417	6.1		Toxic			II	E4	669	25 kg	676	100 kg

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
p-Xylyl diazide	FORBIDDEN											
Z												
Zinc ammonium nitrite	1512	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Zinc arsenate	1712	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Zinc arsenate and zinc arsenite mixture	1712	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Zinc arsenite	1712	6.1		Toxic			II	E4	669 Y644	25 kg 1 kg	676	100 kg
Zinc ashes	1435	4.3		Danger if wet		A3	III	E1	486 Y477	25 kg 10 kg	491	100 kg
Zinc bisulphite solution, see **Bisulphites, aqueous solution, n.o.s.**												
Zinc bromate	2469	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
Zinc chlorate	1513	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Zinc chloride, anhydrous	2331	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg
Zinc chloride solution	1840	8		Corrosive		A3	III	E1	852 Y841	5 L 1 L	856	60 L
Zinc cyanide	1713	6.1		Toxic	US 4		I	E5	666	5 kg	673	50 kg
Zinc dithionite	1931	9		Miscellaneous			III	E1	956	100 kg	956	200 kg
Zinc dust	1436	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I	E0	FORBIDDEN		488	15 kg
							II	E2	483	15 kg	490	50 kg
							III	E1	486	25 kg	491	100 kg
Zinc fluorosilicate	2855	6.1		Toxic			III	E1	670 Y645	100 kg 10 kg	677	200 kg
Zinc hexafluorosilicate, see **Zinc fluorosilicate**												
Zinc hydrosulphite	1931	9		Miscellaneous			III	E1	956	100 kg	956	200 kg
Zinc nitrate	1514	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Zinc permanganate	1515	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
Zinc peroxide	1516	5.1		Oxidizer			II	E2	558 Y544	5 kg 2.5 kg	562	25 kg

	Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft: Packing instruction	Passenger and cargo aircraft: Max. net quantity per package	Cargo aircraft only: Packing instruction	Cargo aircraft only: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Zinc phosphide	1714	4.3	6.1	Danger if wet & Toxic			I	E0	FORBIDDEN		487	15 kg
	Zinc powder	1436	4.3	4.2	Danger if wet & Spontaneous combustion		A3	I	E0	FORBIDDEN		488	15 kg
								II	E2	483	15 kg	490	50 kg
								III	E1	486	25 kg	491	100 kg
	Zinc resinate	2714	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Zinc selenate, see **Selenates**												
	Zinc selenite, see **Selenites**												
	Zinc silicofluoride, see **Zinc fluorosilicate**												
	Zirconium, dry, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	2858	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
	Zirconium, dry, finished sheets, strip or coiled wire (thinner than 18 microns)	2009	4.2		Spontaneous combustion		A3	III	E1	469	25 kg	471	100 kg
	Zirconium hydride	1437	4.1		Solid flammable			II	E2	445 Y441	15 kg 5 kg	448	50 kg
	Zirconium nitrate	2728	5.1		Oxidizer			III	E1	559 Y546	25 kg 10 kg	563	100 kg
	Zirconium picramate, dry or wetted with less than 20% water, by mass	0236	1.3C							FORBIDDEN		FORBIDDEN	
	Zirconium picramate, wetted with not less than 20% water, by mass	1517	4.1		Solid flammable	BE 3	A40	I	E0	451	1 kg	451	15 kg
≠	**Zirconium powder, dry**	2008	4.2		Spontaneous combustion		A3	I		FORBIDDEN		FORBIDDEN	
								II	E2	467	15 kg	470	50 kg
								III	E1	469	25 kg	471	100 kg
	Zirconium powder, wetted with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns	1358	4.1		Solid flammable		A35	II	E2	445 Y441	15 kg 5 kg	448	50 kg
≠	**Zirconium scrap**	1932	4.2			AU 1 CA 7 IR 3 NL 1 US 3	A2 A3	III		FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
Zirconium suspended in a flammable liquid †	1308	3		Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 2	A1 A3 A108	I	E0	FORBIDDEN		361	30 L
							II	E2	353 Y341	5 L 1 L	364	60 L
							III	E1	355 Y344	60 L 10 L	366	220 L
Zirconium tetrachloride	2503	8		Corrosive			III	E1	860 Y845	25 kg 5 kg	864	100 kg

Chapter 3

SPECIAL PROVISIONS

Parts of this Chapter are affected by State Variations AE 3, AU 1, AU 2, CA 7, HR 3, IR 3, JM 1, KP 2, MO 2, OM 3, NL 1, RS 1, US 11, ZA 1; see Table A-1

3.1 Table 3-2 lists the special provisions referred to in column 7 of Table 3-1 and the information contained in them is additional to that shown for the relevant entry. Where the wording of the special provision is equivalent to that in the UN Model Regulations, the UN special provision number is shown in parentheses. Where the wording of the special provision is related to but not equivalent to that in the UN Model Regulations, the UN special provision number preceded by "≈" is shown in parentheses.

3.2 Where a special provision includes a requirement for package marking, the provisions of Part 5;2.2 must be met. If the required mark is in the form of specific wording indicated in quotation marks, the size of the mark must be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in these Instructions.

Table 3-2. Special provisions

	TIs	*UN*	
≠	A1		This article or substance may be transported on passenger aircraft only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by those authorities. The conditions must include the quantity limitations and packing requirements and these must comply with S-3;1.2.2 of the Supplement. A copy of the document(s) of approval, showing the quantity limitations and packing requirements, must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document. The article or substance may be carried on cargo aircraft in accordance with columns 12 and 13 of Table 3-1. When States, other than the State of Origin and the State of the Operator, have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from these States, as appropriate.
≠	A2		This article or substance may be transported on cargo aircraft only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by those authorities. When States, other than the State of Origin and the State of the Operator, have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from the States of Transit, Overflight and Destination, as appropriate.
≠			In each case, the conditions must include the quantity limitations and packing requirements and these must comply with S-3;1.2.3 of the Supplement. A copy of the document(s) of approval, showing the quantity limitations and the packing and labelling requirements, must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document.
	A3	(223)	If the chemical or physical properties of a substance covered by this description are such that, when tested, it does not meet the established defining criteria for the class or division listed in column 3, or any other class or division, it is not subject to these Instructions.
	A4		Liquids having a vapour inhalation toxicity of Packing Group I are forbidden on both passenger and cargo aircraft.
≠			Liquids having a mist inhalation toxicity of Packing Group I are forbidden on a passenger aircraft. They may be carried on cargo aircraft providing they are packed in accordance with the packing instructions for the Packing Group I substance and the maximum net quantity per package does not exceed 5 L, except where the limit specified in column 13 of Table 3-1 is less than 5 L, in which case the limit specified in column 13 applies. Transport in accordance with this special provision must be noted on the dangerous goods transport document.

TIs	*UN*	
A5		Solids having an inhalation toxicity of Packing Group I are forbidden on passenger aircraft. They may be carried on cargo aircraft providing they are packed in accordance with the packing instructions for the Packing Group I substance and the maximum net quantity per package does not exceed 15 kg. Transport in accordance with this special provision must be noted on the dangerous goods transport document.
A6	(43)	When offered for carriage as pesticides, these substances must be carried under the relevant pesticide entry and in accordance with the relevant pesticide provisions (see 2;6.2.3 and 2;6.2.4).
A7		Not used.
A8	(322)	When transported in non-friable tablet form, these goods are assigned to Packing Group III.
A9	(≈145)	Alcoholic beverages containing not more than 70 per cent alcohol by volume, when packed in receptacles of 5 litres or less, are not subject to these Instructions when carried as cargo.
A10	(39)	This substance is not subject to these Instructions when it contains less than 30 per cent or not less than 90 per cent silicon.
A11	(305)	These substances are not subject to these Instructions when in concentrations of not more than 50 mg/kg.
A12	(45)	Antimony sulphides and oxides which contain not more than 0.5 per cent of arsenic calculated on the total mass are not subject to these Instructions.
A13	(47)	Ferricyanides and ferrocyanides are not subject to these Instructions.
A14		Not used.
A15	(59)	These substances are not subject to these Instructions when they contain not more than 50 per cent magnesium.
A16	(62)	This substance is not subject to these Instructions when it does not contain more than 4 per cent sodium hydroxide.
A17	(≈288)	These substances must not be classified and transported unless authorized by the appropriate authority of the State in which the dangerous goods were manufactured on the basis of results from Series 2 tests and a Series 6(c) test of the UN *Manual of Tests and Criteria* on packages as prepared for transport.
A18	(66)	Cinnabar is not subject to these Instructions.
A19	(225)	Fire extinguishers under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4C or 1.4S), without changing the classification of Division 2.2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per extinguishing unit. Fire extinguishers must be manufactured, tested, approved and labelled according to the provisions applied in the State of Manufacture. Fire extinguishers under this entry include: *Note.— Provisions applied in the State of Manufacture means the provisions applicable in the State of Manufacture or those applicable in the State of use.* a) portable fire extinguishers for manual handling and operation; + *Note.— Fire extinguishers may be considered portable even if some components that are necessary for their proper functioning (e.g. hoses and nozzles) are temporarily detached, as long as the safety of the pressurized extinguishing agent containers is not compromised and the fire extinguishers continue to be identified as portable fire extinguishers.* b) fire extinguishers for installation in aircraft; c) fire extinguishers mounted on wheels for manual handling; d) fire extinguishing equipment or machinery mounted on wheels or wheeled platforms or units transported similar to (small) trailers; and e) fire extinguishers composed of a non-rollable pressure drum and equipment, and handled, for example, by fork lift or crane when loaded or unloaded. Cylinders which contain gases for use in the above-mentioned extinguishers or for use in stationary firefighting installations must meet the requirements in Part 6;5 and all requirements applicable to the relevant dangerous goods when these cylinders are transported separately.

	TIs	*UN*	
	A20		During the course of transport this substance must be protected from direct sunlight and all sources of heat and be placed in an adequately ventilated area. A statement to this effect must be included in the dangerous goods transport document.
	A21		Not used.
	A22	(152)	The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. The appropriate classification must be made using the procedure for the classification of explosives.
	A23	(325)	In the case of non-fissile or fissile excepted uranium hexafluoride, the material must be classified under UN 2978.
	A24		The total quantity of explosive substance contained in the shaped charges and the detonating cord must not exceed 10 kg per assembled perforating gun.
	A25	(205)	This entry must not be used for Pentachlorophenol (UN 3155).
	A26	(119)	Refrigerating machines include air conditioning units and machines or other appliances which have been designed for the specific purpose of keeping food or other items at low temperature in an internal compartment. Refrigerating machines and refrigerating machine components are considered not subject to these Instructions if containing less than 12 kg of a gas in Division 2.2 or if containing less than 12 L ammonia solution (UN 2672).
	A27	(276)	This includes any substance which is not covered by any of the other classes but which has narcotic, noxious or other properties such that, in the event of spillage or leakage on an aircraft, extreme annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.
	A28	(135)	The dihydrated sodium salt of dichloroisocyanuric acid does not meet the criteria for inclusion in Division 5.1 and is not subject to these Instructions unless meeting the criteria for inclusion in another class or division.
	A29	(138)	p-Bromobenzyl cyanide is not subject to these Instructions.
	A30	(273)	Maneb and maneb preparations stabilized against self-heating need not be classified in Division 4.2 when it can be demonstrated by testing that a cubic metre of the substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200°C, when the sample is maintained at a temperature of not less than 75°C ± 2°C for a period of 24 hours.
	A31	(141)	Products which have undergone sufficient heat treatment so they present no hazard during transport are not subject to these Instructions.
	A32	(≈289)	Safety devices, electrically initiated and safety devices, pyrotechnic installed in vehicles, vessels or aircraft or in completed components such as steering columns, door panels, seats, etc., which are not capable of inadvertent activation are not subject to these Instructions when carried as cargo. The words “not restricted” and the special provision number A32 must be provided on the air waybill when an air waybill is issued.
	A33	(103)	Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are forbidden.
	A34	(113)	The transport of chemically unstable mixtures is forbidden.
≠	A35		This substance is not subject to these Instructions when: — mechanically produced, particle size of 53 microns or more; or — chemically produced, particle size of 840 microns or more.
≠	A36		The provisions of Special Provision A1 apply to this entry for Packing Group II only.
	A37	(≈206)	This entry is not intended to include Ammonium permanganate, the transport of which is forbidden under any circumstances.
	A38	(207)	Moulding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.
	A39	(≈26)	This substance possesses some dangerous explosive properties when transported in large volumes.
	A40	(28)	This substance may be transported under provisions of Division 4.1 only if it is so packed that the percentage of diluent will not fall below that stated at any time during transport.

	TIs	*UN*	
	A41		Permeation devices that contain dangerous goods and that are used for calibrating air quality monitoring devices are not subject to these Instructions when carried as cargo provided the following requirements are met: a) Each device must be constructed of a material compatible with the dangerous goods it contains; b) The total contents of dangerous goods in each device is limited to 2 millilitres and the device must not be liquid full at 55°C; c) Each permeation device must be placed in a sealed, high impact-resistant, tubular inner packaging of plastic or equivalent material. Sufficient absorbent material must be contained in the inner packaging to completely absorb the contents of the device. The closure of the inner packaging must be securely held in place with wire, tape or other positive means; d) Each inner packaging must be contained in a secondary packaging constructed of metal, or plastic having a minimum thickness of 1.5 mm. The secondary packaging must be hermetically sealed; e) The secondary packaging must be securely packed in strong outer packaging. The completed package must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction in effectiveness: i) the following free drops onto a rigid, non-resilient, flat and horizontal surface from a height of 1.8 m: — one drop flat on the bottom; — one drop flat on the top; — one drop flat on the long side; — one drop flat on the short side; — one drop on a corner at the junction of three intersecting edges; and ii) a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample). *Note.— Each of the above tests may be performed on different but identical packages.* f) The gross mass of the completed package must not exceed 30 kg.
	A42	(249)	Ferrocerium (lighter flints), stabilized against corrosion, with a minimum iron content of 10 per cent are not subject to these Instructions.
	A43	(210)	Toxins from plant, animal or bacterial sources which contain infectious substances, or toxins that are contained in infectious substances, must be classified as Division 6.2.
	A44	(≈251)	The entry chemical kit or first-aid kit is intended to apply to boxes, cases, etc., containing small quantities of various dangerous goods which are used, for example, for medical, analytical or testing or repair purposes. Components must not react dangerously (see 4;1.1.8). The packing group assigned to the kit as a whole must be the most stringent packing group assigned to any individual substance in the kit. The assigned packing group must be shown on the dangerous goods transport document. Where the kit contains only dangerous goods to which no packing group is assigned, a packing group must not be indicated on the dangerous goods transport document. Such kits must only contain dangerous goods that are permitted as: a) excepted quantities not exceeding the quantity indicated by the code in column 9 of Table 3-1, provided that the quantity per inner packaging and quantity per package are as prescribed in 5.1.2 and 5.1.3 and the inner packagings are as prescribed in 5.2 a); or b) limited quantities as prescribed under 3;4.1.2.
	A45		Not used. *Note.— See Packing Instructions 965-970.*
≠	A46	(≈216)	Mixtures of solids which are not subject to these Instructions and flammable liquids may be transported under this entry without first applying the classification criteria of Division 4.1, providing there is no free liquid visible at the time the substance is packaged and, for single packagings, the packaging must pass a leakproofness test at the Packing Group II level. Sealed packets and articles containing less than 10 mL of a Packing Group II or III flammable liquid absorbed into a solid material are not subject to these Instructions provided there is no free liquid in the packet or articles.

	TIs	*UN*	
	A47	(219)	Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs) packed and marked in accordance with Packing Instruction 959 are not subject to any other requirements in these Instructions when carried as cargo. If GMMOs or GMOs meet the definition in 2;6 of a toxic substance or an infectious substance and meet the criteria for inclusion in Division 6.1 or 6.2, the requirements in these Instructions for transporting toxic substances or infectious substances apply.
	A48		Packaging tests are not considered necessary.
	A49	(≈127)	Other inert material or inert material mixture may be used at the discretion of the appropriate authority of the State in which the dangerous goods were manufactured, provided this inert material has identical phlegmatizing properties.
	A50	(≈217)	Mixtures of solids which are not subject to these Instructions and toxic liquids may be transported under this entry without first applying the classification criteria of Division 6.1, providing there is no free liquid visible at the time the substance is packaged and, for single packagings, the packaging must pass a leakproofness test at the Packing Group II level. This entry must not be used for solids containing a Packing Group I liquid.
	A51		Irrespective of the limit specified in column 11 of Table 3-1, aircraft batteries up to a limit of 100 kg net mass per package may be transported. Transport in accordance with this special provision must be noted on the dangerous goods transport document. *Note.— This special provision applies to* UN 2794 **Batteries, wet, filled with acid** *and* UN 2795 **Batteries, wet, filled with alkali** *only.*
	A52	(228)	Mixtures not meeting the criteria for flammable gases (Division 2.1) must be transported under UN 3163.
	A53	(37)	This substance is not subject to these Instructions when coated.
	A54	(32)	This substance is not subject to these Instructions when in any other form.
	A55	(142)	Solvent extracted soya bean meal containing not more than 1.5 per cent oil and not more than 11 per cent moisture, which is substantially free of flammable solvent, is not subject to these Instructions.
	A56	(235)	This entry applies to articles which contain Class 1 explosive substances and which may also contain dangerous goods of other classes. These articles are used to enhance safety in vehicles, vessels or aircraft (e.g. air bag inflators, air bag modules, seat belt pretensioners and pyromechanical devices). *Note.— For the carriage of a vehicle, see Packing Instruction 950, 951 and 952.*
≠	A57		Not used.
	A58	(144)	An aqueous solution containing not more than 24 per cent alcohol by volume is not subject to these Instructions.
	A59		A tire assembly unserviceable or damaged is not subject to these Instructions if the tire is deflated to a gauge pressure of less than 200 kPa at 20ºC. A tire assembly with a serviceable tire is not subject to these Instructions provided the tire is not inflated to a gauge pressure exceeding the maximum rated pressure for that tire. However, such tires (including valve assemblies) must be protected from damage during transport, which may require the use of a protective cover.
	A60	(215)	This entry only applies to the technically pure substance or to formulations derived from it having an SADT higher than 75°C and therefore does not apply to formulations which are self-reactive substances. (For self-reactive substances, see 2;4.2.3. Table 2-6). Homogeneous mixtures containing not more than 35 per cent by mass of azodicarbonamide and at least 65 per cent of inert substance are not subject to these Instructions unless criteria of other classes or divisions are met.
	A61	(168)	Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, asphalt, resins or mineral ore) in such a way that no escape of hazardous quantities of respirable asbestos fibres can occur during transport is not subject to these Instructions. Manufactured articles, containing asbestos and not meeting this requirement, are nevertheless not subject to these Instructions, when packed so that no escape of hazardous quantities of respirable asbestos fibres can occur during transport.
+			The words “not restricted” and the special provision number A61 must be provided on the air waybill when an air waybill is issued.
	A62	(178)	This designation may only be used when no other appropriate designation exists in the list and then only with the approval of the appropriate authority of the State in which the dangerous goods were manufactured.

TIs	*UN*	
A63		Not used.
A64	(306)	This entry may only be used for substances that are too insensitive for acceptance into Class 1 when tested in accordance with test series 2 (see UN *Manual of Tests and Criteria*, Part I).
A65	(270)	Aqueous solutions of Division 5.1 inorganic solid nitrate substances are considered as not meeting the criteria of Division 5.1 if the concentration of the substances in solution at the minimum temperature encountered in transport is not greater than 80 per cent of the saturation limit.
A66	(236)	Polyester resin kits consist of two components: a base material (either Class 3 or Division 4.1, Packing Group II or III) and an activator (organic peroxide). The organic peroxide must be type D, E or F, not requiring temperature control. The packing group must be Packing Group II or III, according to the criteria for either Class 3 or Division 4.1, as appropriate, applied to the base material.
A67	(≈238)	Batteries can be considered as non-spillable provided that they are capable of withstanding the vibration and pressure differential tests given below, without leakage of battery fluid. *Vibration test*: The battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) is applied. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz to 55 Hz. The entire range of frequencies and return is traversed in 95 ± 5 minutes for each mounting position (direction of vibration) of the battery. The battery must be tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods. *Pressure differential test*: Following the vibration test, the battery is stored for six hours at 24°C ±4°C while subjected to a pressure differential of at least 88 kPa. The battery must be tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position. *Note.— Non-spillable type batteries which are an integral part of, and necessary for the operation of, mechanical or electronic equipment must be securely fastened in the battery holder on the equipment and protected in such a manner so as to prevent damage and short circuits.* Non-spillable batteries are not subject to these Instructions when carried as cargo if, at a temperature of 55°C, the electrolyte will not flow from a ruptured or cracked case. The battery must not contain any free or unabsorbed liquid. Any electrical battery or battery powered device, equipment or vehicle having the potential of dangerous evolution of heat must be prepared for transport so as to prevent: a) a short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or, in the case of equipment, by disconnection of the battery and protection of exposed terminals); and b) unintentional activation. The words “not restricted” and the special provision number A67 must be provided on the air waybill when an air waybill is issued.
A68	(272)	This substance must not be transported under the provisions of Division 4.1 unless specifically authorized by the appropriate national authority. (See UN 0143 or UN 0150 as appropriate.)
A69		The following are not subject to these Instructions when carried as cargo: a) articles other than lamps, such as thermometers, switches and relays, each containing a total quantity of not more than 15 g of mercury, if they are installed as an integral part of a machine or apparatus and so fitted that shock or impact damage, leading to leakage of mercury, is unlikely to occur under normal conditions of transport. b) articles other than lamps, each containing not more than 100 mg of mercury, gallium or inert gas and packaged so that the quantity of mercury, gallium or inert gas per package is 1 g or less. The words “not restricted” and the special provision number A69 must be provided on the air waybill when an air waybill is issued. *Note.— For lamps containing dangerous goods, see Part 1;2.6.*

TIs	*UN*	
A70		Internal combustion or fuel cell engines or machinery being shipped either separately or incorporated into a vehicle, machine or other apparatus, without batteries or other dangerous goods, are not subject to these Instructions when carried as cargo provided that: a) for flammable liquid powered engines: 1) the engine is powered by a fuel that does not meet the classification criteria for any class or division; or 2) the fuel tank of the vehicle, machine or other apparatus has never contained any fuel or the fuel tank has been flushed and purged of vapours and adequate measures taken to nullify the hazard; and 3) the entire fuel system of the engine has no free liquid and all fuel lines are sealed or capped or securely connected to the engine and vehicle, machinery or apparatus. b) for flammable gas powered internal combustion or fuel cell engines: 1) the entire fuel system must have been flushed, purged and filled with a non-flammable gas or fluid to nullify the hazard; 2) the final pressure of the non-flammable gas used to fill the system does not exceed 200 kPa at 20°C; 3) the shipper has made prior arrangements with the operator; and 4) the shipper has provided the operator with written or electronic documentation stating that the flushing, purging and filling procedure has been followed and that the final contents of the engine(s) have been tested and verified to be non-flammable. Multiple engines may be shipped in a unit load device provided that the shipper has made prior arrangements with the operator(s) for each shipment. When this special provision is used, the words “not restricted” and the special provision number A70 must be provided on the air waybill when an air waybill is issued.
A71	(38)	This substance is not subject to these Instructions when it contains not more than 0.1 per cent calcium carbide.
A72	(163)	A substance specifically listed by name in Table 3-1 must not be transported under this entry. Substances transported under this entry may contain 20 per cent or less nitrocellulose provided the nitrocellulose contains not more than 12.6 per cent nitrogen.
A73	(237)	The membrane filters, including paper separators, coating, or backing materials, etc., that are present in transport, must not be liable to propagate a detonation as tested by one of the tests described in the UN *Manual of Tests and Criteria*, Part I, Test Series 1(a). In addition, the appropriate authority may determine, on the basis of the results of suitable burning rate tests taking account of the standard tests in the UN *Manual of Tests and Criteria,* Part III, subsection 33.2.1, that nitrocellulose membrane filters in the form in which they are to be transported are not subject to the provisions of these Instructions applicable to flammable solids in Division 4.1.
A74	(169)	Phthalic anhydride in the solid state and tetrahydrophthalic anhydrides, with not more than 0.05 per cent maleic anhydride, are not subject to these Instructions. Phthalic anhydride molten at a temperature above its flash point, with not more than 0.05 per cent maleic anhydride, must be classified under UN 3256.
A75		Articles such as sterilization devices, when containing less than 30 mL per inner packaging with not more than 150 mL per outer packaging, may be transported on passenger and cargo aircraft in accordance with the provisions in 3;5, irrespective of the indication of “forbidden” in columns 10 to 13 of Table 3-1, provided such packagings were first subjected to comparative fire testing. Comparative fire testing between a package as prepared for transport (including the substance to be transported) and an identical package filled with water must show that the maximum temperature measured inside the packages during testing does not differ by more than 200°C. Packagings may include a vent to permit the slow escape of gas (i.e. not more than 0.1 mL/hour per 30 mL inner packaging at 20°C) produced from gradual decomposition. The requirements of 4;1.1.6, 4;1.1.12 and 4;7.1.2 do not apply.
A76	(326)	In the case of fissile uranium hexafluoride, the material must be classified under UN 2977.

TIs	*UN*	
A77	(≈218)	Mixtures of solids which are not subject to these Instructions and corrosive liquids may be transported under this entry without first applying the classification criteria of Class 8, providing there is no free liquid visible at the time the substance is packaged and, for single packagings, the packaging must pass a leakproofness test at the Packing Group II level.
A78	(≈172)	Where a radioactive material has a subsidiary hazard(s): a) The substance must be allocated to Packing Group I, II or III, if appropriate, by application of the packing group criteria provided in Part 2 corresponding to the nature of the predominant subsidiary hazard. b) Packages must be labelled with subsidiary hazard labels corresponding to each subsidiary hazard exhibited by the material in accordance with the relevant provisions of 5;3.2; corresponding placards must be affixed to cargo transport units in accordance with the relevant provisions of 5;3.6. c) For the purposes of documentation and package marking, the proper shipping name must be supplemented with the name of the constituents which most predominantly contribute to this subsidiary hazard(s) and which must be enclosed in parenthesis. However, where the constituent is listed by name in Table 3-1 and: i) "forbidden" is shown in columns 10 and 11, the dangerous goods transport document must indicate Cargo Aircraft Only and the package must bear cargo aircraft only labels, except that the substance may be shipped on a passenger aircraft with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the conditions established by those authorities. A copy of the document of approval, showing the quantity limitations and the packaging requirements, must accompany the consignment; and ii) "forbidden" is shown in columns 12 and 13, the substance is forbidden for transport by air except that the substance may be shipped on a cargo aircraft with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the conditions established by those authorities. A copy of the document of approval, showing the quantity limitations and the packaging requirements, must accompany the consignment. Radioactive material with a subsidiary hazard of Division 4.2 in Packing Group I must be transported in Type B packages. These may be transported on passenger or cargo aircraft. d) The dangerous goods transport document must indicate the class or division of the subsidiary hazard and, where assigned, the packing group as required by 5;4.1.4.1 d) and e). For packing, see also 4;9.1.5.
A79	(307)	This entry may only be used for ammonium nitrate fertilizers. They must be classified in accordance with the procedure as set out in the *Manual of Tests and Criteria*, Part III, Section 39.
A80	(220)	The technical name of the flammable liquid component only of this solution or mixture must be shown in parenthesis immediately following the proper shipping name.
A81		The quantity limits shown in columns 11 and 13 do not apply to body parts, organs or whole bodies.
A82	(177)	Barium sulphate is not subject to these Instructions.
A83	(208)	The commercial grade of calcium nitrate fertilizer, when consisting mainly of a double salt (calcium nitrate and ammonium nitrate) containing not more than 10 per cent ammonium nitrate and at least 12 per cent water of crystallization, is not subject to these Instructions.
A84	(182)	The group of alkali metals includes lithium, sodium, potassium, rubidium and caesium.
A85	(183)	The group of alkaline earth metals includes magnesium, calcium, strontium and barium.
A86	(241)	The formulation must be prepared so that it remains homogeneous and does not separate during transport. Formulations with low nitrocellulose contents are not subject to these Instructions provided that 1) they do not exhibit dangerous properties when tested for their liability to detonate, deflagrate or explode when heated under defined confinement by tests of test series 1(a), 2(b) and 2(c) respectively in the UN *Manual of Tests and Criteria* and 2) they are not flammable solids when tested in accordance with test N1 in the UN *Manual of Tests and Criteria*, Part III, subsection 3.3.2.1.4 (chips, if necessary, crushed and sieved to a particle size of less than 1.25 mm).
A87		Articles which are not fully enclosed by packaging, crates or other means that prevent ready identification are not subject to the marking requirements of 5;2 or the labelling requirements of 5;3.

TIs	*UN*	
A88		Pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs (i.e. annual production runs consisting of not more than 100 lithium batteries or cells) of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator and the requirements in Packing Instruction 910 of the Supplement are met. A copy of the document of approval including the quantity limitations must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document.
≠		Irrespective of the limit specified in column 13 of Table 3-1, the cell or battery as prepared for transport may have a mass exceeding 35 kg.
A89	(186)	Not used.
A90	(193)	This entry may only be used for ammonium nitrate based compound fertilizers. They must be classified in accordance with the procedure as set out in the UN *Manual of Tests and Criteria*, Part III, Section 39.
A91	(198)	A nitrocellulose solution containing not more than 20 per cent nitrocellulose may be transported under the requirements for “Paint”, “Perfumery products” or “Printing ink” as applicable; see UN 1210, UN 1263, UN 1266, UN 3066, UN 3469 and UN 3470.
A92	(199)	Lead compounds which, when mixed in a ratio of 1:1000 with 0.07 M hydrochloric acid and stirred for 1 hour at a temperature of 23°C ±2°C, exhibit a solubility of 5 per cent or less (see ISO 3711:1990 “*Lead chromate pigments and lead chromate-molybdate pigments — Specifications and methods of test*”) are considered insoluble and are not subject to these Instructions unless they meet the criteria for inclusion in another hazard class or division.
A93		A heat-producing article is not subject to these Instructions when the heat-producing component or the energy source is removed to prevent unintentional functioning during transport. The words “not restricted” and the special provision number A93 must be provided on the air waybill when an air waybill is issued.
A94	(≈239)	Batteries or cells containing sodium must not contain dangerous goods other than sodium, sulphur or sodium compounds (e.g. sodium polysulphides and sodium tetrachloroaluminate). Batteries or cells must not be offered for transport at a temperature such that liquid elemental sodium is present in the battery or cell unless approved and under the conditions established by the appropriate national authority. Cells must consist of hermetically sealed metal casings which fully enclose the dangerous goods and which are so constructed and closed as to prevent the release of the dangerous goods under normal conditions of transport. Batteries must consist of cells secured within and fully enclosed by a metal casing so constructed and closed as to prevent the release of the dangerous goods under normal conditions of transport.
A95	(203)	This entry is not to be used for Polychlorinated biphenyls (UN 2315).
A96	(196)	Only formulations which in laboratory testing neither detonate in the cavitated state nor deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be transported under this entry. The formulation must also be thermally stable (i.e. the SADT is 60°C or higher for a 50 kg package). Formulations not meeting these criteria must be transported under the appropriate provisions of Division 5.2.
A97		These entries must be used for substances which are hazardous to the environment but do not meet the classification criteria of any other class or other substance within Class 9. This must be based on the criteria as indicated in 2;9.2 a). This designation may also be used for wastes not otherwise subject to these Instructions but which are covered under the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*.
A98		Aerosols, gas cartridges and receptacles, small, containing gas with a capacity not exceeding 50 ml, containing no constituents subject to these Instructions other than a Division 2.2 gas, are not subject to these Instructions when carried as cargo unless their release could cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties. The words “not restricted” and the special provision number A98 must be provided on the air waybill when an air waybill is issued.

	TIs	*UN*	
≠	A99		Irrespective of the quantity limits for cargo aircraft specified in column 13 of Table 3-1, and in Section I of Packing Instructions 965, 966, 967, 968, 969 and 970, a lithium cell or battery (i.e. UN 3090 or UN 3480), including when packed with equipment or contained in equipment (i.e. UN 3091 or UN 3481) that meets the other requirements of Section I of the applicable packing instruction, may have a mass exceeding 35 kg, if approved by the appropriate authority of the State of Origin and the State of the Operator and the requirements in Packing Instruction 974 of the Supplement are met. A copy of the document of approval must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document.
	A100	(243)	Gasoline, motor spirit and petrol for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) must be assigned to this entry regardless of variations in volatility.
	A101	(227)	When phlegmatized with water and inorganic inert material, the content of urea nitrate may not exceed 75 per cent by mass, and the mixture must not be capable of being detonated by the series 1 type (a) test in the UN *Manual of Tests and Criteria*, Part I.
	A102	(244)	This entry includes aluminium dross, aluminium skimmings, spent cathodes, spent potliner and aluminium salt slags.
	A103	(≈291)	Flammable liquefied gases must be contained within refrigerating machine components. These components must be designed and tested to at least three times the working pressure of the machinery. The refrigerating machines must be designed and constructed to contain the liquefied gas and preclude the risk of bursting or cracking of the pressure-retaining components during normal conditions of transport. Refrigerating machines and refrigerating machine components are considered not subject to these Instructions if containing less than 100 g flammable, non-toxic, liquefied gas.
	A104		Not used.
	A105	(242)	Sulphur is not subject to these Instructions when it has been formed to a specific shape (e.g. prills, granules, pellets, pastilles or flakes).
	A106		This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Chemical Weapons Convention. They may be transported on a passenger or cargo aircraft providing prior approval has been granted by the appropriate authority of the State of Origin or the Director General of the Organization for the Prohibition of Chemical Weapons and providing the samples comply with the requirements shown against the entry for chemical samples in Table S-3-1 of the Supplement. The substance is assumed to meet the criteria of Packing Group I for Division 6.1. Subsidiary hazard labelling is not required. A copy of the document of approval showing the quantity limitations and the packing requirements must accompany the consignment. *Note.— The transport of substances under this description must be in accordance with chain of custody and security procedures specified by the Organization for the Prohibition of Chemical Weapons.*
	A107	(≈301)	This entry only applies to articles such as machinery, apparatus or devices containing dangerous goods as a residue or as an integral element of the articles. It must not be used for articles for which a proper shipping name already exists in Table 3-1. Where the quantity of dangerous goods contained as an integral element in articles exceeds the limits permitted by Packing Instruction 962, and the dangerous goods meet the provisions of Special Provision 301 of the UN Model Regulations, the articles may be transported only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by those authorities. *Note.— This special provision is assigned to UN 3363 —* ***Dangerous goods in articles****,* ***Dangerous goods in machinery*** *and* ***Dangerous goods in apparatus****. The same requirements of these Instructions apply to each of these items.*
	A108		The provisions of Special Provision A1 apply to this entry for Packing Group I only.
	A109		Not used.
	A110	(226)	Formulations of these substances containing not less than 30 per cent non-volatile, non-flammable phlegmatizer are not subject to these Instructions.

	TIs	*UN*	
	A111		Oxygen generators, chemical, that have passed their expiration date, are unserviceable or that have been used are forbidden for transport.
	A112		Consumer commodities may only include substances of Class 2 (non-toxic aerosols only), Class 3, Packing Group II or III, Division 6.1 (Packing Group III only), UN 3077, UN 3082, UN 3175, UN 3334 and UN 3335 provided such substances do not have a subsidiary hazard. Dangerous goods that are forbidden for transport aboard passenger aircraft must not be transported as consumer commodities.
	A113	(279)	The substance is assigned to this classification or Packing Group based on human experience rather than the strict application of classification criteria set out in the Instructions.
	A114	(283)	Articles, containing gas, intended to function as shock absorbers, including impact energy absorbing devices, or pneumatic springs are not subject to these Instructions provided: a) each article has a gas space capacity not exceeding 1.6 litres and a charge pressure not exceeding 280 bar where the product of the capacity (litres) and charge pressure (bars) does not exceed 80 (i.e. 0.5 litre gas space and 160 bar charge pressure, 1 litre gas space and 80 bar charge pressure, 1.6 litre gas space and 50 bar charge pressure, 0.28 litre gas space and 280 bar charge pressure); b) each article has a minimum burst pressure of 4 times the charge pressure at 20°C for products not exceeding 0.5 litre gas space capacity and 5 times charge pressure for products greater than 0.5 litre gas space capacity; c) each article is manufactured from material which will not fragment upon rupture; d) each article is manufactured in accordance with a quality assurance standard acceptable to the appropriate national authority; and e) the design type has been subjected to a fire test demonstrating that pressure in the article is relieved by means of a fire-degradable seal or other pressure-relief device such that the article will not fragment and the article does not rocket.
	A115	(280)	This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat belt pretensioners, and pyromechanical devices and which contain dangerous goods of Class 1 or dangerous goods of other classes and when transported as component parts and if these articles as presented for transport have been tested in accordance with test series 6 (c) of Part I of the UN *Manual of Tests and Criteria*, with no explosion of the device, no fragmentation of the device casing or pressure receptacle, and no projection hazard or thermal effect which would significantly hinder firefighting or other emergency response efforts in the immediate vicinity. This entry does not apply to life saving appliances described in Packing Instruction 955 (UN Nos. 2990 and 3072).
	A116	(≈284)	An oxygen generator, chemical, when containing an explosive actuating device must only be transported under this entry when excluded from Class 1 in accordance with 2;1.1 b).
≠	A117		Wastes containing Category A infectious substances must be assigned to UN 2814, UN 2900 or UN 3549, as applicable. Wastes transported under UN 3291 are wastes containing infectious substances in Category B or wastes that are reasonably believed to have a low probability of containing infectious substances. Decontaminated wastes which previously contained infectious substances may be considered as not subject to these Instructions unless the criteria of another class or division are met.
	A118		Items classified as explosive must be removed from vehicles and transported in accordance with the provisions of these Instructions unless authorized by the appropriate national authority under the written conditions established by that authority. In such circumstances, vehicles may be transported on cargo aircraft only. *Note.— This special provision does not apply where the explosives are a smoke candle installed as a permanent part of the vehicle or are part of an assembly classified as dangerous goods of other than Class 1, e.g. Air bag inflators, Air bag modules and Seat-belt pretensioners (UN 3268), Fire extinguishers (UN 1044). Additionally, this special provision does not apply in the case of Air bag modules and Air bag inflators and Seat-belt pretensioners (UN 0503) installed in the vehicle.*
	A119		Irrespective of the limit specified in column 13 of Table 3-1, a handling device meeting the requirements of Packing Instruction 961 as prepared for transport may have a gross mass not exceeding 1 000 kg.
	A120		This entry includes but is not limited to automobiles, motorcycles, aircraft, boats, snowmobiles, jet skis, etc.
	A121		Not used.

TIs	*UN*	
A122	(286)	Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to these Instructions when contained individually in an article or a sealed packet.
A123		This entry applies to Batteries, electric storage, not otherwise listed in Table 3-1. Examples of such batteries are: alkali-manganese, zinc-carbon and nickel-cadmium batteries. Any electrical battery or battery-powered device, equipment or vehicle having the potential of a dangerous evolution of heat must be prepared for transport so as to prevent: a) a short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or, in the case of equipment, by disconnection of the battery and protection of exposed terminals); and b) unintentional activation. The words “not restricted” and the special provision number A123 must be provided on the air waybill when an air waybill is issued.
A124	(292)	Not used.
A125	(293)	The following definitions apply to matches: a) Fusee matches are matches the heads of which are prepared with a friction-sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat; b) Safety matches are matches combined with or attached to the box, book or card which can be ignited by friction only on a prepared surface; c) Strike anywhere matches are matches that can be ignited by friction on a solid surface; d) Wax Vesta matches are matches that can be ignited by friction either on a prepared surface or on a solid surface.
A126		Not used.
A127		Not used.
A128	(153)	This entry only applies if it is demonstrated, on the basis of tests, that the substances, when in contact with water are not combustible nor show a tendency to auto-ignition and that the mixture of gases evolved is not flammable.
A129	(252)	Provided the ammonium nitrate remains in solution under all conditions of transport, aqueous solutions of ammonium nitrate, with not more than 0.2 per cent combustible material, in a concentration not exceeding 80 per cent are not subject to these Instructions when carried as cargo.
A130	(290)	When this radioactive material meets the definitions and criteria of other classes or divisions as defined in Part 2, it must be classified in accordance with the following: a) Where the substance meets the criteria for dangerous goods in excepted quantities as set out in 3;5, the packagings must be in accordance with 3;5.2 and meet the testing requirements of 3;5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1;6.1.5 apply without reference to the other class or division; b) Where the quantity exceeds the limits specified in 3;5.1.2, the substance must be classified in accordance with the predominant subsidiary hazard. The dangerous goods transport document must describe the substance with the proper shipping name and UN number applicable to the other class supplemented with the name applicable to the radioactive excepted package according to column 1 of the Dangerous Goods List, and must be transported in accordance with the provisions applicable to that UN number. An example of the information shown on the dangerous goods transport document is: UN 1993 Flammable liquid, n.o.s. (ethanol and toluene mixture), Radioactive material, excepted package — limited quantity of material, Class 3, PG II The radioactive material, excepted package label (Figure 5-33) is not required on packages meeting the conditions set out in this sub-paragraph. To aid acceptance, it is recommended that “A130” be indicated on the dangerous goods transport document. In addition, the requirements of 2;7.2.4.1.1 apply; c) The provisions of 3;4 for the transport of dangerous goods packed in limited quantities do not apply to substances classified in accordance with sub-paragraph b);

	TIs	*UN*	
			d) When the substance meets a special provision that excepts this substance from all dangerous goods provisions of the other classes, it must be classified in accordance with the applicable UN number of Class 7 and all requirements specified in 1;6.1.5 apply.
	A131	(342)	Glass inner receptacles (such as ampoules or capsules) intended only for use in sterilization devices, when containing less than 30 mL of ethylene oxide per inner packaging with not more than 300 mL per outer packaging, may be transported in accordance with the provisions in 3;5, irrespective of the indication of "forbidden" in columns 10 to 13 of Table 3-1, provided that: a) after filling, each glass inner receptacle has been determined to be leak-tight by placing the glass inner receptacle in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. Any glass inner receptacle showing evidence of leakage, distortion or other defect under this test must not be transported under the terms of this special provision; b) in addition to the packaging required by 3;5.2, each glass inner receptacle is placed in a sealed plastic bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner receptacle; and c) each glass inner receptacle is protected by a means of preventing puncture of the plastic bag (e.g. sleeves or cushioning) in the event of damage to the packaging (e.g. by crushing).
≠	A132	(204)	Articles containing smoke-producing substance(s) corrosive according to the criteria for Class 8 must be labelled with a "Corrosive" subsidiary hazard label. Articles containing smoke-producing substance(s) toxic by inhalation according to the criteria for Division 6.1 must be labelled with a "TOXIC" subsidiary hazard label (Figure 5-18).
	A133	(311)	Substances must not be transported under this entry unless approved by the appropriate national authority on the basis of the results of appropriate tests according to Part I of the UN *Manual of Tests and Criteria*. Packaging must ensure that the percentage of diluent does not fall below that stated in the appropriate authority approval at any time during transport.
	A134	(312)	Not used.
	A135	(313)	Not used.
	A136	(314)	a) These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds). b) During the course of transport, these substances must be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.
	A137	(315)	This entry must not be used for Division 6.1 substances that meet the inhalation toxicity criteria for Packing Group I described in 2;6.2.2.4.3.
	A138	(316)	This entry applies only to calcium hypochlorite, dry, when transported in non-friable tablet form.
	A139	(317)	"Fissile-excepted" applies only to those packages complying with 2;7.2.3.5.
	A140	(318)	For the purposes of documentation, the proper shipping name must be supplemented with the technical name (see 1.2.7). Technical names need not be shown on the package. When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in category A and assignment to UN 2814 or UN 2900, the words "suspected category A infectious substance" must be shown, in parentheses, following the proper shipping name on the transport document, but not on the outer packagings.
	A141		Not used.
	A142		Not used.
	A143	(321)	These storage systems must always be considered as containing hydrogen.
	A144		Protective breathing equipment (PBE) containing a small chemical oxygen generator for use by aircrew members may be transported on passenger aircraft in accordance with Packing Instruction 565 subject to the following conditions: a) the PBE must be serviceable and contained in the manufacturer's original unopened inner packaging (i.e. vacuum sealed bag and protective container);

TIs	*UN*	

b) the PBE may only be consigned by, or on behalf of, an operator in the event that a PBE(s) has been rendered unserviceable or has been used and there is a need to replace such items so as to restore the number of PBEs on an aircraft to that required by pertinent airworthiness requirements and operating regulations;

c) a maximum of two PBE may be contained in a package;

d) the statement “Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144” must be:

(i) included on the dangerous goods transport document;

(ii) marked adjacent to the proper shipping name on the package.

If the above conditions are met, the requirements of Special Provision A1 do not apply. All other requirements applicable to chemical oxygen generators must apply except that the “cargo aircraft only” handling label must not be displayed.

A145 Waste aerosols, waste gas cartridges and waste receptacles, small, containing gas are forbidden from air transport. Waste gas cartridges and waste receptacles, small, containing gas that were filled with gases of Division 2.2 and have been pierced are not subject to these Instructions.

A146 (328) This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, must be designed and constructed to prevent fuel leakage under normal conditions of transport.

Fuel cell cartridge design types using liquids as fuels must pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.

Except for fuel cell cartridges containing hydrogen in metal hydride which must be in compliance with A162, each fuel cell cartridge design type, including fuel cell cartridges installed in or integral to a fuel cell system, must be shown to pass a 1.2 metre drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.

When lithium metal batteries or lithium ion batteries are contained in the fuel cell system, the consignment must be consigned under this entry and under the appropriate entries for UN 3091 **Lithium metal batteries contained in equipment** or UN 3481 **Lithium ion batteries contained in equipment**.

A147 (329) Not used.

A148 (330) Not used.

A149 Not used.

A150 An additional subsidiary hazard label may be required by a Note found adjacent to the technical name entry in Table 2-7.

A151 When dry ice is used as a refrigerant for other than dangerous goods loaded in a unit load device, the quantity limits per package shown in columns 11 and 13 of Table 3-1 for dry ice do not apply. In such case, the unit load device must be identified to the operator and must allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure.

A152 Insulated packagings conforming to the requirements of Packing Instruction 202 containing refrigerated liquid nitrogen fully absorbed in a porous material are not subject to these Instructions provided the design of the insulated packaging would not allow the build-up of pressure within the container and would not permit the release of any refrigerated liquid nitrogen irrespective of the orientation of the insulated packaging and any outer packaging or overpack used is closed in a way that will not allow the build-up of pressure within that packaging or overpack. When used to contain substances not subject to these Instructions, the words “not restricted” and the special provision number A152 must be provided on the air waybill when an air waybill is issued.

A153 Not used.

TIs	*UN*	
A154	(≈376)	Lithium ion cells or batteries and lithium metal cells or batteries, identified as being defective for safety reasons, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons or cells or batteries that cannot be diagnosed as defective prior to transport). Lithium ion cells or batteries and lithium metal cells or batteries identified as being damaged such that they do not conform to the type tested according to the applicable provisions of the UN *Manual of Tests and Criteria* are forbidden for transport. For the purposes of this special provision, these may include, but are not limited to: a) cells or batteries that have leaked or vented; b) cells or batteries that cannot be diagnosed prior to transport; or c) cells or batteries that have sustained physical or mechanical damage. In assessing a cell or battery as defective or damaged, an assessment or evaluation must be performed based on safety criteria from the cell, battery or product manufacturer or by a technical expert with knowledge of the cell's or battery's safety features. An assessment or evaluation may include, but is not limited to, the following criteria: a) acute hazard, such as gas, fire, or electrolyte leaking; b) the use or misuse of the cell or battery; c) signs of physical damage, such as deformation to cell or battery casing, or colours on the casing; d) external and internal short circuit protection, such as voltage or isolation measures; e) the condition of the cell or battery safety features; or f) damage to any internal safety components, such as the battery management system.
A155	(332)	Magnesium nitrate hexahydrate is not subject to these Instructions.
A156	(333)	Ethanol and gasoline, motor spirit or petrol mixtures for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) must be assigned to this entry regardless of variations in volatility.
A157	(334)	A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during transport.
A158	(335)	Mixtures of solids which are not subject to these Instructions and liquids or solids classified by the shipper as environmentally hazardous substances (UN 3077 and 3082) (see Special Provision A97) may be transported under this entry, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging is closed. Sealed packets and articles containing less than 10 mL of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to these Instructions.
A159	(336)	A single package of non-combustible solid LSA-II or LSA-III material must not contain an activity greater than 3000 A_2.
A160	(337)	Type B(U) and Type B(M) packages, must not contain activities greater than the following: a) For low dispersible radioactive material: as authorized for the package design as specified in the certificate of approval; b) For special form radioactive material: 3000 A_1 or 100 000 A_2, whichever is the lower; or c) For all other radioactive material: 3000 A_2.`
A161	(338)	Each fuel cell cartridge transported under this entry and designed to contain a liquefied flammable gas must: a) be capable of withstanding, without leakage or bursting, a pressure of at least two (2) times the equilibrium pressure of the contents at 55°C; b) not contain more than 200 mL liquefied flammable gas, the vapour pressure of which must not exceed 1 000 kPa at 55°C; and c) pass the hot water bath test prescribed in 6;5.4.1.

TIs	*UN*	
A162	(339)	Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry must have a water capacity less than or equal to 120 mL. The pressure in the fuel cell cartridge must not exceed 5 MPa at 55°C. The design type must withstand, without leaking or bursting, a pressure of two (2) times the design pressure of the cartridge at 55°C or 200 kPa more than the design pressure of the cartridge at 55°C, whichever is greater. The pressure at which this test is conducted is referred to in the drop test and the hydrogen cycling test as the “minimum shell burst pressure”. Fuel cell cartridges must be filled in accordance with procedures provided by the manufacturer. The manufacturer must provide the following information with each fuel cell cartridge: a) inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge; b) safety precautions and potential hazards to be aware of; c) method for determining when the rated capacity has been achieved; d) minimum and maximum pressure range; e) minimum and maximum temperature range; and f) any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling. The fuel cell cartridges must be designed and constructed to prevent fuel leakage under normal conditions of transport. Each cartridge design type, including cartridges integral to a fuel cell, must be subjected to and must pass the following tests: **Drop test** A 1.8 metre drop test onto an unyielding surface in four different orientations: a) vertically, on the end containing the shut-off valve assembly; b) vertically, on the end opposite to the shut-off valve assembly; c) horizontally, onto a steel apex with a diameter of 38 mm, with the steel apex in the upward position; and d) at a 45° angle on the end containing the shut-off valve assembly. There must be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge must then be hydrostatically pressurized to destruction. The recorded burst pressure must exceed 85 per cent of the minimum shell burst pressure. **Fire test** A fuel cell cartridge filled to rated capacity with hydrogen must be subjected to a fire engulfment test. The cartridge design, which may include a vent feature integral to it, is deemed to have passed the fire test if: a) the internal pressure vents to zero gauge pressure without rupture of the cartridge; or b) the cartridge withstands the fire for a minimum of 20 minutes without rupture. **Hydrogen cycling test** This test is intended to ensure that a fuel cell cartridge design stress limits are not exceeded during use. The fuel cell cartridge must be cycled from not more than 5 per cent rated hydrogen capacity to not less than 95 per cent rated hydrogen capacity and back to not more than 5 per cent rated hydrogen capacity. The rated charging pressure must be used for charging and temperatures must be held within the operating temperature range. The cycling must be continued for at least 100 cycles.

TIs	*UN*	
		Following the cycling test, the fuel cell cartridge must be charged, and the water volume displaced by the cartridge must be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge charged to 95 per cent rated capacity and pressurized to 75 per cent of its minimum shell burst pressure. **Production leak test** Each fuel cell cartridge must be tested for leaks at 15°C ± 5°C, while pressurized to its rated charging pressure. There must be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations. Each fuel cell cartridge must be permanently marked with the following information: a) the rated charging pressure in megapascals (MPa); b) the manufacturer's serial number of the fuel cell cartridges or unique identification number; and c) the date of expiry based on the maximum service life (year in four digits; month in two digits).
A163	(340)	Chemical kits, first-aid kits and polyester resin kits containing dangerous goods in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in column 9 of Table 3-1 may be transported in accordance with 3;5. Division 5.2 substances, although not individually permitted as excepted quantities in Table 3-1, are permitted in such kits and are assigned Code E2 (see 5.1.2).
A164		Any electrical battery or battery-powered device, equipment or vehicle having the potential of a dangerous evolution of heat must be prepared for transport so as to prevent: a) a short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or, in the case of equipment, by disconnection of the battery and protection of exposed terminals); and b) unintentional activation.
A165	(347)	This entry may only be used if the results of Test Series 6 (d) of Part I of the UN *Manual of Tests and Criteria* have demonstrated that any hazardous effects arising from functioning are confined within the package (see 2;1.4.2.1).
A166	(343)	This entry applies to crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard. The packing group assigned must be determined by the flammability hazard and inhalation hazard, in accordance with the degree of danger presented.
A167	(344)	The provisions of 6;5.4 must be met.
A168	(348)	Not used. *Note.— See Packing Instructions 965 to 967.*
A169	(349)	Mixtures of a hypochlorite with an ammonium salt are not to be accepted for transport. UN 1791 **Hypochlorite solution** is a substance of Class 8.
A170	(350)	Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt are forbidden for transport.
A171	(351)	Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt are forbidden for transport.
A172	(352)	Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt are forbidden for transport.
A173	(353)	Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt are forbidden for transport.
A174	(354)	Not used.

	TIs	*UN*	
	A175	(355)	Oxygen cylinders for emergency use transported under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4, Compatibility Group C or S), without changing the classification of Division 2.2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per oxygen cylinder. The cylinders with the installed actuating cartridges as prepared for transport must have an effective means of preventing inadvertent activation.
≠	A176	(356)	Metal hydride storage systems installed in vehicles, vessels, machinery, engines or aircraft or in completed components or intended to be installed in vehicles, vessels, machinery, engines or aircraft must be approved by the appropriate national authority before acceptance for transport. Transport in accordance with this special provision must be noted on the dangerous goods transport document. The dangerous goods transport document must include an indication that the package was approved by the appropriate national authority or a copy of the appropriate national authority approval must accompany each consignment.
	A177	(357)	Petroleum crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard must be consigned under the entry UN 3494 **Petroleum sour crude oil, flammable, toxic**.
	A178		Security type equipment such as attaché cases, cash boxes, cash bags, etc., incorporating dangerous goods, for example lithium batteries, gas cartridges and/or pyrotechnic material, are not subject to these Instructions if the equipment complies with the following: a) The equipment must be equipped with an effective means of preventing accidental activation; b) If the equipment contains an explosive or pyrotechnic substance or an explosive article, this article or substance must be excluded from Class 1 by the appropriate national authority of the State of Manufacture in compliance with Part 2;1.5.2.1; c) If the equipment contains lithium cells or batteries, these cells or batteries must comply with the following restrictions: 1) for a lithium metal cell, the lithium content is not more than 1 g; 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g; 3) for lithium ion cells, the Watt-hour rating (see Attachment 2) is not more than 20 Wh; 4) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh; 5) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; d) If the equipment contains gases to expel dye or ink, only gas cartridges and receptacles, small, containing gas with a capacity not exceeding 50 mL, containing no constituents subject to these Instructions other than a Division 2.2 gas, are allowed. The release of gas must not cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties. In case of accidental activation, all hazardous effects must be confined within the equipment and must not produce extreme noise. e) Security type equipment that is defective or that has been damaged is forbidden for transport. The words “not restricted” and the special provision number A178 must be provided on the air waybill when an air waybill is issued.
	A179		For UN 3077, irrespective of the maximum net quantities specified in columns 11 and 13 of Table 3-1, intermediate bulk containers (IBCs) with a maximum net quantity not exceeding 1 000 kg are permitted in accordance with Packing Instruction 956.

	TIs	*UN*	
	A180		Non-infectious specimens, such as specimens of mammals, birds, amphibians, reptiles, fish, insects and other invertebrates containing small quantities of UN 1170, UN 1198, UN 1987 or UN 1219 are not subject to these Instructions provided the following packing and marking requirements are met: a) specimens are: ≠ 1) wrapped in paper towel and/or cheesecloth moistened with alcohol, an alcohol solution or a formaldehyde solution and then placed in a plastic bag that is heat-sealed. Any free liquid in the bag must not exceed 30 mL; or ≠ 2) placed in vials or other rigid containers with no more than 30 mL of alcohol, an alcohol solution or a formaldehyde solution; b) the prepared specimens are then placed in a plastic bag that is then heat-sealed; c) the bagged specimens are then placed inside another plastic bag with absorbent material then heat- sealed; d) the finished bag is then placed in a strong outer packaging with suitable cushioning material; e) the total quantity of flammable liquid per outer packaging must not exceed 1 L; and f) the completed package is marked “scientific research specimens, not restricted Special Provision A180 applies”. The words “not restricted” and the special provision number A180 must be provided on the air waybill when an air waybill is issued.
	A181		When a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment, the following requirements apply: a) the shipper must ensure that all applicable parts of both packing instructions are met. The total mass of lithium batteries contained in any package must not exceed the limits for passenger aircraft or cargo aircraft, as applicable; b) the package must be marked UN 3091 **Lithium metal batteries packed with equipment**, or UN 3481 **Lithium ion batteries packed with equipment**, as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, the package must be marked as required for both battery types. However, button cell batteries installed in equipment (including circuit boards) need not be considered; c) the dangerous goods transport document must include the wording “UN 3091 **Lithium metal batteries packed with equipment**” or “UN 3481 **Lithium ion batteries packed with equipment**”, as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, then the dangerous goods transport document must include the wording “UN 3091 **Lithium metal batteries packed with equipment**” and “UN 3481 **Lithium ion batteries packed with equipment**”.
	A182		Equipment containing only lithium batteries must be classified as either UN 3091 or UN 3481.
	A183		Waste batteries and batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.
	A184	(304)	This entry may only be used for the transport of non-activated batteries which contain dry potassium hydroxide and which are intended to be activated prior to use by the addition of an appropriate amount of water to the individual cells.
	A185	(360)	Vehicles only powered by lithium metal batteries or lithium ion batteries must be assigned to UN 3171 **Battery-powered vehicle**. Lithium batteries installed in cargo transport units, designed only to provide power external to the transport unit must be assigned to UN 3536 **Lithium batteries installed in cargo transport unit**.

TIs	*UN*	
A186	(361)	This entry applies to electric double layer capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to these Instructions. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. All capacitors to which this entry applies, including capacitors containing an electrolyte that does not meet the classification criteria of any class or division of dangerous goods, must meet the following conditions: a) capacitors not installed in equipment must be transported in an uncharged state. Capacitors installed in equipment must be transported either in an uncharged state or protected against a short circuit; b) each capacitor must be protected against a potential short circuit hazard in transport as follows: i) when a capacitor's energy storage capacity is less than or equal to 10 Wh or when the energy storage capacity of each capacitor in a module is less than or equal to 10 Wh, the capacitor or module must be protected against a short circuit or be fitted with a metal strap connecting the terminals; and ii) when the energy storage capacity of a capacitor or a capacitor in a module is more than 10 Wh, the capacitor or module must be fitted with a metal strap connecting the terminals; c) capacitors containing dangerous goods must be designed to withstand a 95 kPa pressure differential; d) capacitors must be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting must be contained by the packaging or by the equipment in which a capacitor is installed; and e) capacitors manufactured after 31 December 2013 must be marked with the energy storage capacity in Wh. Capacitors containing an electrolyte not meeting the classification criteria of any class or division of dangerous goods, including when installed in equipment, are not subject to other provisions of these Instructions. Capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods, with an energy storage capacity of 10 Wh or less are not subject to other provisions of these Instructions when they are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents. Capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 10 Wh are subject to these Instructions. Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class or division of dangerous goods are not subject to other provisions of these Instructions provided the equipment is packaged in a strong outer packaging constructed of suitable material and of adequate strength and design in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during transport. Large robust equipment containing capacitors may be offered for transport unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained. *Note.— Capacitors which by design maintain a terminal voltage (e.g. asymmetrical capacitors) do not belong to this entry.*
A187	(362)	This entry applies to liquids, pastes or powders, pressurized with a propellant which meets the definition of a gas in 2;2.1.1 and 2;2.1.2 a) or b). *Note.— A chemical under pressure in an aerosol dispenser must be transported under UN 1950.* The following provisions must apply: a) The chemical under pressure must be classified based on the hazard characteristics of the components in the different states: i) the propellant; ii) the liquid; or iii) the solid.

TIs *UN*

If one of these components, which can be a pure substance or a mixture, needs to be classified as flammable, the chemical under pressure must be classified as flammable in Division 2.1. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

i) a flammable liquid is a liquid having a flashpoint of not more than 93°C;

ii) a flammable solid is a solid which meets the criteria in 2;4.2.2 of these Instructions;

iii) a flammable gas is a gas which meets the criteria in 2;2.2.1 of these Instructions;

b) gases of Division 2.3 and gases with a subsidiary hazard of 5.1 must not be used as a propellant in a chemical under pressure;

c) where the liquid or solid components are classified as dangerous goods of Division 6.1, Packing Groups II or III, or Class 8, Packing Groups II or III, the chemical under pressure must be assigned a subsidiary hazard of Division 6.1 or Class 8 and the appropriate UN number must be assigned. Components classified in Division 6.1, Packing Group I, or Class 8, Packing Group I, must not be used for transport under this proper shipping name;

d) in addition, chemicals under pressure with components meeting the properties of: Class 1, explosives; Class 3, liquid desensitized explosives; Division 4.1, self-reactive substances and solid desensitized explosives; Division 4.2, substances liable to spontaneous combustion; Division 4.3, substances which, in contact with water, emit flammable gases; Division 5.1, oxidizing substances; Division 5.2, organic peroxides; Division 6.2, infectious substances; or Class 7, radioactive material, must not be used for transport under this proper shipping name;

e) Chemicals under pressure containing components forbidden for transport on both passenger and cargo aircraft (columns 10 to 13 of Table 3-1) must not be transported by air.

A188 (359) Nitroglycerin solution in alcohol with more than 1 per cent but not more than 5 per cent nitroglycerin must be classified in Class 1 and assigned to UN 0144 if not all the requirements of Packing Instruction 371 are complied with.

A189 Except where the defining criteria of another class or division are met, concentrations of formaldehyde solution:

— with less than 25 per cent but not less than 10 per cent formaldehyde must be classified as UN 3334 **Aviation regulated liquid, n.o.s.**; and

— with less than 10 per cent formaldehyde are not subject to these Instructions.

A190 (373) Neutron radiation detectors containing non-pressurized boron trifluoride gas in excess of 1 g and radiation detection systems containing neutron radiation detectors as components may be transported on cargo aircraft in accordance with all applicable requirements of these Instructions irrespective of the indication of “forbidden” in columns 12 and 13 of Table 3-1 and with “Toxic gas” and “Corrosive” labels displayed on each package irrespective of no labels being indicated in column 5, provided the following conditions are met:

a) each radiation detector must meet the following conditions:

i) the pressure in each neutron radiation detector must not exceed 105 kPa absolute at 20°C;

ii) the amount of gas must not exceed 13 grams per detector;

iii) each detector must be manufactured under a registered quality assurance programme;

Note.— The application of ISO 9001:2008 may be considered acceptable for this purpose.

iv) each neutron radiation detector must be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors must have a minimum burst pressure of 1 800 kPa as demonstrated by design type qualification testing; and

v) each detector must be tested to a 1×10^{-10} cm^3/s leaktightness standard before filling.

TIs	*UN*	

b) radiation detectors transported as individual components must be transported as follows:

i) they must be packed in a sealed intermediate plastic liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;

ii) they must be packed in strong outer packagings and the completed package must be capable of withstanding a 1.8 m drop test without leakage of gas contents from detectors; and

iii) the total amount of gas from all detectors per outer packaging must not exceed 52 grams.

c) completed neutron radiation detector systems containing detectors meeting the conditions of sub-paragraph a) must be transported as follows:

i) the detectors must be contained in a strong sealed outer casing;

ii) the casing must contain sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents; and

iii) the completed system must be packed in strong outer packagings capable of withstanding a 1.8 m drop test without leakage unless a system's outer casing affords equivalent protection.

Transport in accordance with this special provision must be noted on the dangerous goods transport document. A packing instruction must not be shown on the transport document.

When transported as cargo, neutron radiation detectors containing not more than 1 gram of boron trifluoride, including those with solder glass joints, are not subject to these Instructions provided they meet the requirements in sub-paragraph a) and are packed in accordance with sub-paragraph b) irrespective of the indication of "forbidden" in columns 10 to 13. Radiation detection systems containing such detectors are not subject to these Instructions provided they are packed in accordance with sub-paragraph c). The words "not restricted" and the special provision number A190 must be provided on the air waybill when an air waybill is used.

A191 Notwithstanding the Division 6.1 subsidiary hazard shown in column 4 of Table 3-1, the toxic subsidiary hazard label and an indication of this subsidiary hazard on the dangerous goods transport document are not required when the manufactured articles contain not more than 5 kg of mercury. Transport in accordance with this special provision must be noted on the dangerous goods transport document.

A192 (367) For the purposes of documentation and package marking:

— the proper shipping name **Paint related material** may be used for consignments of packages containing paint and paint related material in the same package;

— the proper shipping name **Paint related material, corrosive, flammable** may be used for consignments of packages containing paint, corrosive, flammable and paint related material, corrosive, flammable in the same package;

— the proper shipping name **Paint related material, flammable, corrosive** may be used for consignments of packages containing paint, flammable, corrosive and paint related material, flammable, corrosive in the same package; and

— the proper shipping name **Printing ink related material** may be used for consignments of packages containing printing ink and printing ink related material in the same package.

A193 (368) In the case of non-fissile or fissile-excepted uranium hexafluoride, the material must be classified under UN 3507 or UN 2978.

A194 (369) In accordance with Part 2, Introductory Chapter, paragraph 4, this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Division 6.1 with radioactive and corrosive subsidiary hazards.

Uranium hexafluoride may be classified under this entry only if the conditions of 2;7.2.4.1.1.2, 2;7.2.4.1.1.5, 2;7.2.4.5.2 and, for fissile-excepted material, of 2;7.2.3.6 are met.

In addition to the provisions applicable to the transport of Division 6.1 substances with a corrosive subsidiary hazard, the provisions of 5;1.2.2.2, 5;1.6.3, 7;1.6 and 7;3.2.1 to 7;3.2.4 apply.

No Class 7 label is required to be displayed.

TIs	*UN*	
A195	(371)	1) This entry also applies to articles containing a small pressure receptacle with a release device. Such articles must comply with the following requirements: a) the water capacity of the pressure receptacle must not exceed 0.5 litres and the working pressure must not exceed 25 bar at 15°C; b) the minimum burst pressure of the pressure receptacle must be at least four times the pressure of the gas at 15°C; c) each article must be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, transport and use. This may be achieved by an additional locking device linked to the activator; d) each article must be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle; e) each pressure receptacle must be manufactured from material which will not fragment upon rupture; f) the design type of the article must be subjected to a fire test. For this test, the provisions of paragraphs 16.6.1.2, except sub-paragraph g), 16.6.1.3.1 to 16.6.1.3.6, 16.6.1.3.7 b) and 16.6.1.3.8 of the UN *Manual of Tests and Criteria* must be applied. It must be demonstrated that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, in such a way that the pressure receptacle will not fragment and that the article or fragments of the article do not rocket more than 10 metres; and g) the design type of the article must be subjected to the following test. A stimulating mechanism must be used to initiate one article in the middle of the packaging. There must be no hazardous effects outside the package such as disruption of the package, metal fragments or a receptacle which passes through the packaging. 2) The manufacturer must produce technical documentation of the design type, manufacture as well as the tests and their results. The manufacturer must apply procedures to ensure that articles produced in a series are made of good quality, conform to the design type and are able to meet the requirements in 1). The manufacturer must provide such information to the appropriate national authority on request.
A196	(372)	This entry applies to asymmetric capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to these Instructions. Energy storage capacity means the energy stored in a capacitor, as calculated according to the following equation: $Wh = 1/2C_N(U_R^2-U_L^2) \times (1/3600)$, using the nominal capacitance (C_N), rated voltage (U_R) and rated lower limit voltage (U_L). All asymmetric capacitors to which this entry applies must meet the following conditions: a) capacitors or modules must be protected against short circuit; b) capacitors must be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting must be contained by packaging or by equipment in which a capacitor is installed; c) capacitors manufactured after 31 December 2015 must be marked with the energy storage capacity in Wh; and d) capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods must be designed to withstand a 95 kPa pressure differential. Capacitors containing an electrolyte not meeting the classification criteria of any class or division of dangerous goods, including when configured in a module or when installed in equipment, are not subject to other provisions of these Instructions.

TIs	*UN*	
		Capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods, with an energy storage capacity of 20 Wh or less, including when configured in a module, are not subject to other provisions of these Instructions when the capacitors are capable of withstanding a 1.2 m drop test unpackaged on an unyielding surface without loss of contents. Capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 20 Wh are subject to these Instructions. Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class or division of dangerous goods are not subject to other provisions of these Instructions provided that the equipment is packaged in a strong outer packaging constructed of suitable material, and of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during transport. Large robust equipment containing capacitors may be offered for transport unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained. *Note.— Notwithstanding the provisions of this special provision, nickel-carbon asymmetric capacitors containing Class 8 alkaline electrolytes must be transported as UN 2795,* ***Batteries, wet, filled with alkali****, electric storage.*
A197	(375)	These substances when transported in single or combination packagings containing a net quantity per single or inner packaging of 5 L or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids, are not subject to any other provisions of these Instructions provided the packagings meet the general provisions of 4;1.1.1, 4;1.1.3.1 and 4;1.1.5.
A198		Hay, straw and bhusa, when not wet, damp or contaminated with oil are not subject to these Instructions.
A199		Nickel-metal hydride batteries or nickel-metal hydride battery-powered devices, equipment or vehicles having the potential of a dangerous evolution of heat are not subject to these Instructions provided they are prepared for transport so as to prevent: a) a short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals, or, in the case of equipment, by disconnection of the battery and protection of exposed terminals); and b) unintentional activation. The words "not restricted" and the special provision number A199 must be provided on the air waybill when an air waybill is issued.
A200		This entry applies to packagings that contain residues of dangerous goods and which no longer meet the provisions of Part 6. These packagings are forbidden for transport by air. Such packagings or parts thereof must be transported in accordance with Part 4;1.1.15 of these Instructions.
A201		In instances where other forms of transport (including cargo aircraft) are impracticable, lithium cells or batteries may be transported as Class 9 (UN 3480 or UN 3090) on passenger aircraft with the prior approval of the authority of the State of Origin, the State of the Operator and the State of Destination under the written conditions established by those authorities, provided that the quantities per package do not exceed: a) for lithium metal cells or batteries: 1) up to 2 batteries with a lithium content more than 0.3 g but not more than 2 g per battery; or 2) up to 8 cells with a lithium content more than 0.3 g but not more than 1 g per cell; or 3) up to 2.5 kg of cells and/or batteries with a lithium content not more than 0.3 g per cell or battery; or b) for lithium ion cells or batteries: 1) up to 2 batteries with a Watt-hour (Wh) rating more than 2.7 Wh but not more than 100 Wh per battery; or 2) up to 8 cells with a Watt-hour rating more than 2.7 Wh but not more than 20 Wh per cell; or 3) up to 2.5 kg of cells and/or batteries with a Watt-hour rating not more than 2.7 Wh per cell or battery.

TIs *UN*

In instances where other forms of transport (including cargo aircraft) are impracticable and in the case of urgent medical need, one consignment of lithium batteries may be transported as Class 9 (UN 3480 or UN 3090) on a passenger aircraft with the prior approval of the authority of the State of Origin and with the approval of the operator under the following conditions:

a) the shipper must provide a copy of the test summary report as specified in Part 2;9.3 g);

b) the consignment must not contain more than 4 batteries;

c) for lithium ion batteries:

1) the Watt-hour rating of each battery must not exceed 100 Wh; and

2) the batteries must be prepared in accordance with Packing Instruction 965, Section IA;

d) for lithium metal batteries:

1) the lithium content of each battery must not exceed 2 g; and

2) the batteries must be prepared in accordance with Packing Instruction 968, Section IA.

When States, other than the State of Origin, the State of the Operator or State of Destination have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from these States, as appropriate.

The requirements of Part 5 for Class 9 (UN 3090 or UN 3480) lithium metal and lithium ion batteries apply. A copy of the document of approval including the quantity limitations must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document.

If transport in accordance with this special provision is not possible, States concerned may grant an exemption from the prohibition to transport lithium metal or lithium ion batteries on passenger aircraft in accordance with Part 1;1.1.3.

Authorities issuing exemptions or approvals in accordance with this special provision must provide a copy to the Chief of the Cargo Safety Section within three months via email at CSS@icao.int, via facsimile at +1 514-954-6077 or via post to the following address:

Chief, Cargo Safety Section
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec
CANADA H3C 5H7

Note.— Guidance for the processing of exemptions or approvals from the prohibition to transport lithium batteries may be found in Part S-1;4 and Table S-3-1, Special Provision A334 of the Supplement to the Technical Instructions.

A202 (≈378) Radiation detectors containing this gas in non-refillable cylinders not meeting the requirements of Part 6;5 and Packing Instruction 200 may be offered for transport under this entry provided:

a) the working pressure in each cylinder does not exceed 50 bar;

b) the cylinder capacity does not exceed 12 L;

c) each cylinder has a minimum burst pressure of at least three times the working pressure when a relief device is fitted and at least four times the working pressure when no relief device is fitted;

d) each cylinder is manufactured from material which will not fragment upon rupture;

e) each detector is manufactured under a registered quality assurance programme;

Note.— ISO 9001:2008 may be used for this purpose.

	TIs	*UN*	

f) detectors are transported in strong outer packagings. The complete package must be capable of withstanding a 1.2 m drop test without breakage of the detector or rupture of the outer packaging. Equipment that includes a detector must be packed in a strong outer packaging unless the detector is afforded equivalent protection by the equipment in which it is contained; and

g) transport in accordance with this special provision must be noted on the dangerous goods transport document.

Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of these Instructions if the detectors meet the requirements in a) to f) above and the capacity of detector cylinders does not exceed 50 mL.

A203 (380) Not used.

A204 (382) Polymeric beads may be made from polystyrene, poly (methyl methacrylate) or other polymeric material. When it can be demonstrated that no flammable vapour, resulting in a flammable atmosphere, is evolved according to test U1 (Test method for substances liable to evolve flammable vapours) of Part III, sub-section 38.4.4 of the UN *Manual of Tests and Criteria*, polymeric beads, expandable need not be classified under this UN number. This test should only be performed when de-classification of a substance is considered.

A205 (383) Table tennis balls manufactured from celluloid are not subject to these Instructions where the net mass of each table tennis ball does not exceed 3.0 g and the total net mass of table tennis balls does not exceed 500 g per package.

≠ A206 Not used.

A207 (≈385) Not used.

A208 (≈363) a) This entry applies to engines or machinery, powered by fuels classified as dangerous goods via internal combustion systems or fuel cells (e.g. combustion engines, generators, compressors, turbines, heating units).

b) Engines and machinery containing fuels meeting the classification criteria of Class 3 must be consigned under the entries UN 3528 — **Engine, internal combustion, flammable liquid powered** or UN 3528 — **Engine, fuel cell, flammable liquid powered** or UN 3528 — **Machinery, internal combustion, flammable liquid powered** or UN 3528 — **Machinery, fuel cell, flammable liquid powered**, as appropriate.

c) Engines and machinery containing fuels meeting the classification criteria of Division 2.1 must be consigned under the entries UN 3529 — **Engine, internal combustion, flammable gas powered** or UN 3529 — **Engine, fuel cell, flammable gas powered** or UN 3529 — **Machinery, internal combustion, flammable gas powered** or UN 3529 — **Machinery, fuel cell, flammable gas powered**, as appropriate.

Engines and machinery powered by both a flammable gas and a flammable liquid must be consigned under the appropriate UN 3529 entry.

d) Engines and machinery containing liquid fuels meeting the classification criteria for environmentally hazardous substances and not meeting the classification criteria of any other class or division, must be consigned under the entries UN 3530 — **Engine, internal combustion** or UN 3530 — **Machinery, internal combustion**, as appropriate.

A209 (≈386) When chemical stabilization is employed, the person offering the packaging for transport must ensure that the level of stabilization is sufficient to prevent the substance in the packaging from dangerous polymerization at a bulk mean temperature of 50°C. Where chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport, temperature control is required in which case the substances are forbidden for transport by air.

A210 This substance is forbidden for transport by air. It may be transported on cargo aircraft only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by those authorities.

	TIs	*UN*	
	A211		Receptacles, small containing gas (toxic, oxidizing and corrosive) or Gas cartridges (toxic, oxidizing and corrosive) which are intended for use in sterilization devices only, when containing: a) UN1067 — **Nitrogen dioxide**; or b) UN1660 — **Nitric oxide, compressed** may be transported on passenger and cargo aircraft irrespective of the indication of "forbidden" in columns 10 to 13 of Table 3-1, provided: a) the water capacity of receptacles or gas cartridges does not exceed 30 mL; b) receptacles or gas cartridges are designed such that the burst pressure is not less than four times the pressure in the cartridge at 55°C; c) receptacles or gas cartridges are packed in a compatible, sealed intermediate packaging with sufficient adsorbent material capable of containing the contents of the gas cartridge; d) intermediate packagings are securely packed in an outer packaging of a type permitted by Packing Instruction 203 meeting the Packing Group I performance requirements of Part 6; Chapter 1; e) the aggregate water capacity of all receptacles or gas cartridges in a package does not exceed 300 mL; f) packages bear hazard labels denoting the hazards of "toxic gas", "oxidizer" and "corrosive"; and g) reference to Special Provision A211 is made on the dangerous goods transport document as required by Part 5;4.1.5.8. If the above conditions are met, the requirements of Special Provision A2 do not apply.
	A212		UN 2031 — **Nitric acid**, other than red fuming, with more than 20% and less than 65% nitric acid intended for use in sterilization devices only, may be transported on passenger aircraft irrespective of the indication of "forbidden" in columns 10 and 11 of Table 3-1 provided: a) each inner packaging contains not more than 30 mL; b) each inner packaging is contained in a sealed leak-proof intermediate packaging with sufficient absorbent material capable of containing contents of the inner packaging; c) intermediate packagings are securely packed in an outer packaging of a type permitted by Packing Instruction 855 meeting the Packing Group I performance requirements of Part 6; Chapter 1; d) the maximum quantity of nitric acid in the package does not exceed 300 mL; and e) reference to Special Provision A212 is made on the dangerous goods transport document as required by Part 5;4.1.5.8.
≠	A213	(387)	Lithium batteries in conformity with 2;9.3 f) containing both primary lithium metal cells and rechargeable lithium ion cells must be assigned to UN Nos. 3090 or 3091 as appropriate. When such batteries are transported in accordance with Section IB of Packing Instruction 968 or in accordance with Section II of Packing Instruction 969 or 970, the total lithium content of all lithium metal cells contained in the battery must not exceed 1.5 g, and the total capacity of all lithium ion cells contained in the battery must not exceed 10 Wh.
	A214	(388)	UN No. 3166 entries apply to vehicles powered by flammable liquid or flammable gas internal combustion engines or fuel cells. Vehicles powered by a fuel cell engine must be assigned to UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed. Other vehicles which contain an internal combustion engine must be assigned to UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

	TIs	*UN*	
			If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be assigned to UN 3166 **Vehicle, flammable gas powered**. Entry UN 3171 only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries transported with these batteries installed. For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles transported in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging. Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be assigned to UN 3091 **Lithium metal batteries contained in equipment** or UN 3091 **Lithium metal batteries packed with equipment** or UN 3481 **Lithium ion batteries contained in equipment** or UN 3481 **Lithium ion batteries packed with equipment**, as appropriate. Lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit must be assigned to UN 3536 **Lithium batteries installed in cargo transport unit**.
	A215	(≈274)	For UN 3077 and UN 3082, the technical name may be a name shown in bold characters in column 1 of Table 3-1, provided that this name does not include “n.o.s.” or an “*”. The name which most appropriately describes the substance or mixture must be used, e.g.: UN 3082, **Environmentally hazardous substance, liquid, n.o.s. (Paint)** UN 3082, **Environmentally hazardous substance, liquid, n.o.s. (Perfumery products)**
	A216	(393)	The nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN *Manual of Tests and Criteria* Appendix 10. Tests of type 3 (c) need not be applied.
	A217	(394)	The nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN *Manual of Tests and Criteria* Appendix 10.
	A218	(395)	This entry must only be used for solid medical waste of Category A transported for disposal.
	A219	(308)	Stabilization of fish meal must be achieved to prevent spontaneous combustion by effective application of ethoxyquin, BHT (butylated hydroxytoluene) or tocopherols (also used in a blend with rosemary extract) at the time of production. The said application must occur within twelve months prior to shipment. Fish meal must contain at least 50 ppm (mg/kg) of ethoxyquin, 100 ppm (mg/kg) of BHT or 250 ppm (mg/kg) of tocopherol-based antioxidant at the time of consignment.
+	A220		Packages containing COVID-19 pharmaceuticals accompanied by data loggers and/or cargo tracking devices containing lithium batteries are not subject to the marking and documentation requirements of Section II of Packing Instruction 967 or 970, as applicable. This same package configuration, when consigned without the COVID-19 pharmaceutical for the purpose of use or reuse, is also not subject to the marking and documentation requirements of Section II of Packing Instruction 967 or 970, as applicable, provided prior arrangements have been made with the operator.
+	A221	(397)	Mixtures of nitrogen and oxygen containing not less than 19.5 per cent and not more than 23.5 per cent oxygen by volume may be transported under this entry when no other oxidizing gases are present. A Division 5.1 subsidiary hazard label is not required for any concentrations within this limit.
+	A222	(398)	This entry applies to mixtures of butylenes, 1-butylene, cis-2-butylene and trans-2-butylene. For isobutylene, see UN 1055.
+	A223	(≈296)	Life-saving appliances packed in strong rigid outer packagings with a total maximum gross mass not exceeding 40 kg, containing no dangerous goods other than Division 2.2 compressed or liquefied gases (with no subsidiary hazard) contained in receptacles with a capacity not exceeding 120 mL and installed solely for the purpose of the activation of the appliance, are not subject to these Instructions when carried as cargo.

	TIs	*UN*	
+	A224		UN 3548 — **Articles containing miscellaneous dangerous goods, n.o.s.** may be transported on passenger and cargo aircraft irrespective of the indication of "forbidden" in columns 10 to 13 of Table 3-1, provided that: a) with the exception of lithium cells or batteries that comply with Section II of Packing Instruction 967 or Section II of Packing Instruction 970, as applicable, the only dangerous goods contained in the article is an environmentally hazardous substance; b) the articles are packed in accordance with Packing Instruction 975; and c) reference to Special Provision A224 is made on the dangerous goods transport document as required by Part 5;4.1.5.8. All other provisions of these Instructions apply. If the above conditions are met, the requirements of Special Provision A2 do not apply.
+	A225		UN 3538 — **Articles containing non-flammable, non-toxic gas, n.o.s.** may be transported on passenger and cargo aircraft irrespective of the indication of "forbidden" in columns 10 to 13 of Table 3-1, provided that: a) with the exception of lithium cells or batteries that comply with Section II of Packing Instruction 967 or Section II of Packing Instruction 970, as applicable, the only dangerous goods contained in the article is a Division 2.2 gas without a subsidiary hazard, but excluding refrigerated liquefied gases and gases forbidden for transport on passenger aircraft; b) the articles are packed in accordance with Packing Instruction 222; and c) reference to Special Provision A225 is made on the dangerous goods transport document as required by Part 5;4.1.5.8. All other provisions of these Instructions apply. If the above conditions are met, the requirements of Special Provision A2 do not apply.

———————————

Chapter 4

DANGEROUS GOODS IN LIMITED QUANTITIES

Note.— The UN Recommendations contain provisions for limited quantities of dangerous goods. These recognize that many dangerous goods when in reasonably limited quantities present a reduced hazard during transport and can safely be carried in good quality packagings of the types specified in the Recommendations but which have not been tested and marked accordingly. The provisions contained in this paragraph are based on those in the UN Recommendations and allow limited quantities of dangerous goods to be transported in packagings which, although not tested and marked in accordance with Part 6 of these Instructions, do meet the construction requirements of that part. The UN Recommendations require packages containing limited quantities of dangerous goods to be marked with a diamond shaped mark as specified in Chapter 3.4 of the UN Model Regulations. The mark required by these Instructions includes all of the elements of this mark with the addition of a "Y" which indicates compliance with the provisions of these Instructions, some of which are more stringent than those of the UN Model Regulations and of other modes of transport. For example, packages transported in accordance with these Instructions require hazard labels, and inner packaging and per-package quantities are in some cases lower than those authorized by the UN Model Regulations. The UN Model Regulations recognize the mark required by these Instructions in order to ensure that packages containing limited quantities of dangerous goods prepared in accordance with these Instructions are acceptable for transport by other modes.

4.1 APPLICABILITY

4.1.1 Limited quantities of dangerous goods may only be carried in accordance with the limitations and provisions of this chapter and must meet all the applicable requirements of the Technical Instructions unless otherwise provided for below.

4.1.2 Only dangerous goods which are permitted on passenger aircraft and which meet the criteria of the following classes, divisions and packing groups (if appropriate) may be carried under these provisions for dangerous goods in limited quantities:

	Class 2	Only UN 1950 in Divisions 2.1 and 2.2, UN 2037 in Divisions 2.1 and 2.2 without a subsidiary hazard, UN 3478 (**Fuel cell cartridges**, containing liquefied flammable gas) and UN 3479 (**Fuel cell cartridges**, containing hydrogen in metal hydride)
	Class 3	Packing Groups II and III and UN 3473 (**Fuel cell cartridges**, containing flammable liquids)
≠	Division 4.1	Packing Groups II and III but excluding UN 2555, UN 2556, UN 2557, UN 2907, polymerizing substances and all self-reactive substances
	Division 4.3	Packing Groups II and III, solids only and UN 3476 (**Fuel cell cartridges**, containing water-reactive substances)
	Division 5.1	Packing Groups II and III
	Division 5.2	Only when contained in a chemical kit or a first-aid kit
	Division 6.1	Packing Groups II and III
	Class 8	Packing Groups II and III and UN 3477 (**Fuel cell cartridges**, containing corrosive substances) but excluding UN 2794, UN 2795, UN 2803, UN 2809, UN 3028 and UN 3506
	Class 9	Only UN 1941, UN 1990, UN 2071, UN 3077, UN 3082, UN 3316, UN 3334, UN 3335 and ID 8000

Note.— Many articles or substances, including the following, are NOT permitted under these limited quantity provisions:

a) those permitted only on cargo aircraft;

b) those in Packing Group I;

c) those in Class 1 or 7 or Divisions 2.1 (except as permitted above), 2.3 or 6.2;

d) those in Division 4.2 or with a subsidiary hazard of 4.2.

4.1.3 The limitations and provisions of this chapter for the transport of dangerous goods in limited quantities apply equally to both passenger and cargo aircraft.

4.2 PACKING AND PACKAGINGS

4.2.1 The general packing requirements of 4;1.1 applicable to passenger aircraft must be met except that the requirements of 4;1.1.2, 4;1.1.9 c), 4;1.1.9 e), 4;1.1.16, 4;1.1.18 and 4;1.1.20 do not apply.

4.2.2 Packagings, including closures, which have been used more than once (i.e. they have been refilled and are being reshipped after having previously been emptied) must be inspected thoroughly and must be in such condition that they will protect their contents and perform their containment functions as efficiently as new packagings. Cushioning and absorbent materials if used previously must remain capable of performing their primary functions.

4.2.3 Single packagings, including composite packagings, are not permitted.

4.2.4 Limited quantities of dangerous goods must be packed in accordance with the applicable limited quantity packing instruction identified by the prefix letter “Y” indicated in column 10 of Table 3-1.

4.2.5 Inner packagings must meet the requirements of 6;3.2. Outer packagings must be so designed that they meet the construction requirements in 6;3.1 which apply to the type of outer packaging to be used for the article or substance.

4.3 QUANTITY LIMITATIONS

4.3.1 The net quantity per package must not exceed the quantity specified in column 11 of Table 3-1 against the packing instruction number identified by the prefix letter “Y” in column 10.

4.3.2 The gross mass per package must not exceed 30 kg.

4.3.3 When different dangerous goods are contained in one outer packaging, the quantities of such dangerous goods must be so limited that:

a) for classes other than Classes 2 (except UN 2037, UN 3478 and UN 3479) and 9, the total net quantity in the package does not exceed the value of 1, where “Q” is calculated using the formula:

$$Q = \frac{n_1}{M_1} + \frac{n_2}{M_2} + \frac{n_3}{M_3} + \ldots$$

where n_1, n_2, etc., are the net quantities of the different dangerous goods and M_1, M_2 etc., are the maximum net quantities for these different dangerous goods shown in Table 3-1 against the relevant “Y” packing instructions; and

b) for Classes 2 (except UN 2037, UN 3478 and UN 3479) and 9:

1) when packed together without goods of other classes, the gross mass of the package does not exceed 30 kg; or

2) when packed together with goods of other classes, the gross mass of the package does not exceed 30 kg and the total net quantity in the package of goods other than in Classes 2 (except UN 2037, UN 3478 and UN 3479) or 9 does not exceed the value of 1 when calculated according to a) above.

c) carbon dioxide, solid (dry ice), UN 1845 may be packed together with goods of other classes, provided that the gross mass of the package does not exceed 30 kg. The quantity of dry ice does not need to be taken into account in the calculation of the “Q” value. However, the packaging containing the carbon dioxide, solid (dry ice) and the outer packaging must permit the release of carbon dioxide gas.

4.3.4 Where the different dangerous goods in the outer packaging consist only of those with the same UN number, packing group and physical state (i.e. solid or liquid), the calculation in 4.3.3 a) does not need to be made. However, the total net quantity in the package must not exceed the maximum net quantity according to Table 3-1.

4.4 PACKAGE TESTING

4.4.1 Each package offered for transport must be capable of withstanding a 1.2 m drop test on to a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause damage. The criteria for passing the test is that the outer packaging must not exhibit any damage liable to affect safety during transport and there must be no leakage from the inner packaging(s).

4.4.2 Each package offered for transport must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction of effectiveness, a force applied to the top surface for a duration of 24 hours equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample).

4.5 PACKAGE MARKING

4.5.1 Packages containing limited quantities of dangerous goods must be marked as required by the applicable paragraphs of 5;2, except that 5;2.4.4.1 does not apply.

4.5.2 Packages containing limited quantities of dangerous goods and prepared in accordance with this chapter must bear the mark shown in Figure 3-1 below. The mark must be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness. The mark must be in the form of a square set at an angle of 45°(diamond shaped). The top and bottom portions and the surrounding line must be black. The centre area must be white or a suitable contrasting background. The minimum dimension must be 100 mm × 100 mm and the minimum width of the line forming the diamond must be 2 mm. The symbol “Y” must be placed in the centre of the mark and must be clearly visible. Where dimensions are not specified, all features must be in approximate proportion to those shown.

4.5.2.1 If the size of the package so requires, the minimum outer dimensions shown in Figure 3-1 may be reduced to be not less than 50 mm × 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm. The symbol “Y” must remain in approximate proportion to that shown in Figure 3-1.

4.5.2.2 The entire mark must appear on one side of the package.

4.5.3 Use of overpacks

An overpack containing dangerous goods packed in limited quantities must be:

a) marked with the word “OVERPACK” in lettering of at least 12 mm high;

b) marked with the other marks required by this chapter; and

c) labelled as required by this chapter

unless the marks and labels representative of all dangerous goods in the overpack are visible.

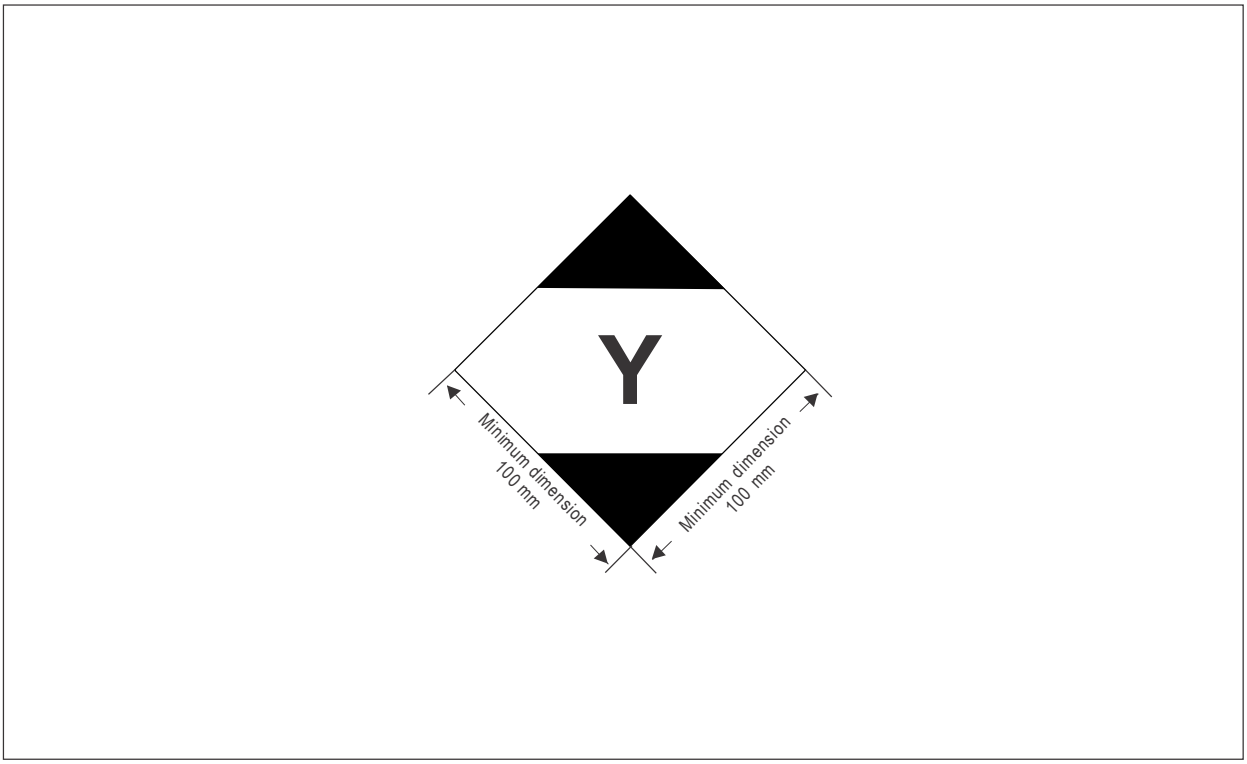


Figure 3-1. Limited quantities mark

4.6 PACKAGE LABELLING

Packages containing limited quantities must be labelled as required by the applicable paragraphs of 5;3.

4.7 DANGEROUS GOODS TRANSPORT DOCUMENT

The dangerous goods transport document must comply with all the requirements of 5;4.

Chapter 5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

Parts of this Chapter are affected by State Variation JP 23; see Table A-1

5.1 EXCEPTED QUANTITIES

5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this chapter are not subject to any other provisions of these Instructions except for:

a) the prohibition in post in 1;2.3;

b) the definitions in 1;3;

c) the training requirements in 1;4;

d) the classification procedures and packing group criteria in Part 2;

e) the packaging requirements of 4;1.1.1, 4;1.1.3.1, 4;1.1.3.3, 4;1.1.5, 4;1.1.6, 4;1.1.7 and 4;1.1.8 (4;1.1.6 does not apply to UN 3082);

f) the loading restriction in 7;2.1;

g) the reporting requirements of dangerous goods accidents, incidents and other occurrences in 7;4.4 and 7;4.5; and

h) the prohibition of dangerous goods in baggage in 8;1.1.

Note.— In the case of radioactive material, the requirements for radioactive material in excepted packages in 1;6.1.5 apply.

5.1.2 Dangerous goods which may be carried as excepted quantities in accordance with this chapter are shown in column 9 of the dangerous goods list by means of an alphanumeric code as indicated in Table 3-3 below:

Table 3-3. Excepted quantity codes for Table 3-1

Code	*Maximum quantity per inner packaging*	*Maximum quantity per outer packaging*
E0	Not permitted as Excepted Quantity	
E1	30 g/30 mL	1 kg/1 L
E2	30 g/30 mL	500 g/500 mL
E3	30 g/30 mL	300 g/300 mL
E4	1 g/1 mL	500 g/500 mL
E5	1 g/1 mL	300 g/300 mL

5.1.2.1 For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer packaging.

5.1.3 Where dangerous goods in excepted quantities for which different codes are assigned are packaged together, the total quantity per outer packaging must be limited to that corresponding to the most restrictive Code.

5.2 PACKAGINGS

Packagings used for the transport of dangerous goods in excepted quantities must be in compliance with the following:

a) there must be an inner packaging and each inner packaging must be constructed of plastic (when used for liquid dangerous goods it must have a thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4;1.1.3.1) and the closure of each inner packaging must be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads must have a leakproof threaded type cap. The closure must be resistant to the contents;

b) each inner packaging must be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. For liquid dangerous goods, the intermediate or outer packaging must contain sufficient absorbent material to absorb the entire contents of the inner packagings. When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods must not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package must completely contain the contents in case of breakage or leakage;

c) the intermediate packaging must be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);

d) each package type must be in compliance with the provisions in 5.3;

e) each package must be of such a size that there is adequate space to apply all necessary marks; and

f) overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Instructions provided that the packages are secured within the overpack.

5.3 TESTS FOR PACKAGES

5.3.1 The complete package as prepared for transport, with inner packagings filled to not less than 95 per cent of their capacity for solids or 98 per cent for liquids, must be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

a) drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:

1) where the sample is in the shape of a box, it must be dropped in each of the following orientations:

— flat on the base;
— flat on the top;
— flat on the longest side;
— flat on the shortest side;
— on a corner;

2) where the sample is in the shape of a drum, it must be dropped in each of the following orientations:

— diagonally on the top chime, with the centre of gravity directly above the point of impact;
— diagonally on the base chime;
— flat on the side.

Note.— Each of the above drops may be performed on different but identical packages.

b) a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the sample).

5.3.2 For the purposes of testing, the substances to be transported in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity must be similar to those of the substance to be transported.

5.4 MARKING OF PACKAGES

5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this chapter must be durably and legibly marked with the mark shown in Figure 3-2. The primary hazard class or, when assigned, the division of each of the dangerous goods contained in the package must be shown in the mark. Where the name of the shipper or consignee is not shown elsewhere on the package, this information must be included within the mark.

5.4.2 The mark must be in the form of a square. The hatching and symbol must be of the same colour, black or red, on white or suitable contrasting background. The dimensions of the mark must be a minimum of 100 mm × 100 mm. Where dimensions are not specified, all features must be in approximate proportion to those shown.

5.4.3 The entire mark must appear on one side of the package.

5.4.4 Use of overpacks

An overpack containing dangerous goods packed in excepted quantities must be:

a) marked with the word “OVERPACK” in lettering of at least 12 mm high; and

b) marked with the other marks required by this chapter

unless the marks representative of all dangerous goods on packages in the overpack are clearly visible. The other provisions of 5;2.4.10 apply only if other dangerous goods which are not packed in excepted quantities are contained in the overpack and only in relation to these other dangerous goods.

5.5 DOCUMENTATION

If a document such as an air waybill accompanies dangerous goods in excepted quantities, it must include the statement “Dangerous Goods in Excepted Quantities” and indicate the number of packages.

5.6 DE MINIMIS QUANTITIES

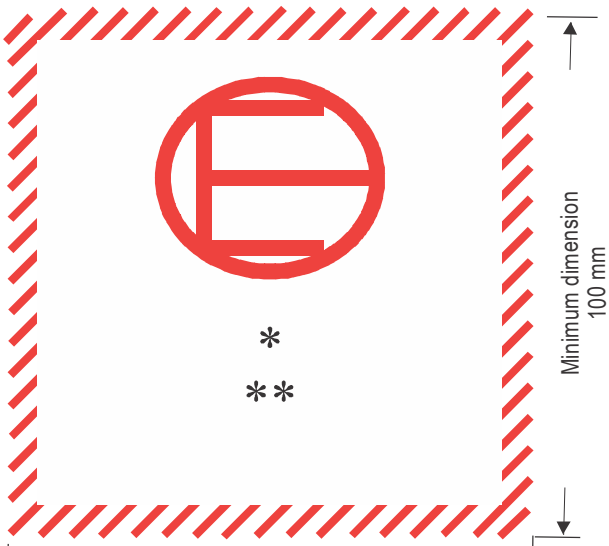
Dangerous goods assigned to codes E1, E2, E4 or E5 are not subject to these Instructions when carried as cargo provided that:

a) the maximum net quantity per inner packaging is limited to 1 mL for liquids and gases and 1 g for solids;

b) the provisions of 5.2 are met, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents; and for liquid dangerous goods, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings;

c) the provisions of 5.3 are complied with; and

d) the maximum net quantity of dangerous goods per outer packaging does not exceed 100 g for solids or 100 mL for liquids and gases.



* Place for class or, when assigned, the division number(s)
** Place for name of shipper or consignee, if not shown elsewhere on the package

Figure 3-2. Excepted quantities mark

Part 4

PACKING INSTRUCTIONS

INTRODUCTORY NOTES

Note 1.— Packing groups

For packing purposes, dangerous goods other than those of Classes 1, 2 and 7, Divisions 5.2 and 6.2 and self-reactive substances of Division 4.1 are assigned to three packing groups in accordance with the degree of danger they present:

Packing Group I — Substances presenting high danger
Packing Group II — Substances presenting medium danger
Packing Group III — Substances presenting low danger

Some substances in Class 9 and liquids in Division 5.1 have been assigned to packing groups by experience rather than through application of technical criteria. The packing group to which a substance is assigned is listed in Table 3-1. The criteria for the packing groups are given in Part 2, Chapters 3, 4, 5, 6 and 8.

Note 2.— Temperature variations

For the information of users of these Instructions, the extremes of temperature which may be encountered in international transportation are in the order of –40°C and 55°C. Since receptacles or packagings may be filled at low temperatures and then exposed in transit in tropical areas, the increase in temperature may tend to cause discharge of liquid contents or bursting of the receptacles or packagings during transit, unless a suitable ullage (outage) has been provided and the receptacles or packagings meet the pressure requirement specified in 1.1.6 of this Part.

Note 3.— Pressure variations

Due to altitude, the ambient pressure experienced by a package in flight will be lower than standard atmospheric pressure at sea level. Since receptacles or packagings will generally be filled at a standard atmospheric pressure of approximately 100 kPa, this lower ambient pressure will result in a pressure differential between the contents of the receptacle or package and the cargo compartment. For pressurized cargo compartments, the pressure differential may be approximately 25 kPa, while for non-pressurized or partially pressurized cargo compartments, the pressure differential may be as much as 75 kPa. This pressure differential will tend to cause discharge of liquid contents or bursting of the receptacles or packagings during flight unless each receptacle or packaging and its closures meet the packaging test requirements.

Note 4.— Vibrations

Vibrations in commercial aircraft to which packagings may be exposed range from 5 mm amplitude at 7 Hz (corresponding to 1 g acceleration), to 0.05 mm amplitude at 200 Hz (corresponding to 8 g acceleration).

Note 5.— Nomenclature

A nomenclature of some packaging terms used in the Instructions is given in 1;3.1. Explanations of the codes used in this Part to designate types of inner and outer packagings may be found in Tables 6-2 and 6-3.

Note 6.— Portable tanks

With the approval of the appropriate authority of the State of Origin and the State of the Operator, certain dangerous goods may also be carried on cargo aircraft in portable tanks in accordance with the provisions of Part S-4, Chapter 12 of the Supplement.

Note 7.— Carriage of oxygen and air with aquatic animals

With the approval of the appropriate authority of the State of Origin and the State of the Operator, for the purpose of providing life support to aquatic animals during transport, cylinders containing Oxygen compressed (UN 1072) or Air, compressed (UN 1002) may be carried to oxygenate the water in accordance with the provisions of Table S-3-1 and Special Provision A302 (which appear in the Supplement).

Note 8.— Packagings for explosives, self-reactive substances and organic peroxides

Unless specific provision to the contrary is made in these Instructions, the packagings used for goods of Class 1, self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 should comply with the provisions for the medium danger (Packing Group II) category.

Note 9.— Additional requirements for the air mode

The transport of dangerous goods by air is subject to requirements additional to those of other modes of transport (e.g. quantity limitations, requirements for absorbent material, pressure differential requirements, appropriate closure procedures, specific packing instruction requirements).

Note 10.— Carriage of flames

With the approval of the appropriate authority of the State of Origin and the State of the Operator, lamps fuelled by UN 1223 — **Kerosene** or UN 3295 — **Hydrocarbons, liquid, n.o.s.**, carried by a passenger to transport a symbolic flame (e.g. Olympic flame, Peace flame) may be carried in accordance with the provisions of Special Provision A324 (which appears in the Supplement to this document).

Note 11.— Open external carriage

When dangerous goods are prepared for open external carriage (e.g. suspended from a helicopter or in open external carrying devices), consideration should be given to the type of packaging used and protection of those packagings where necessary from the effects of airflow and weather (e.g. by damage from rain or snow).

Note 12.— Large packagings

With the approval of the appropriate authority of the State of Origin and the State of the Operator, an article with a total net mass exceeding 400 kg may be packed in large packagings and carried on cargo aircraft in accordance with the provisions of Part S-4;13 of the Supplement.

Chapter 1

GENERAL PACKING REQUIREMENTS

Parts of this Chapter are affected by State Variations JP 24; see Table A-1

1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES EXCEPT CLASS 7

1.1.1 Dangerous goods must be packed in good quality packagings, which must be strong enough to withstand the shocks and loadings normally encountered during transport, including removal from a pallet, unit load device or overpack for subsequent manual or mechanical handling. Packagings must be constructed and closed so as to prevent any loss of contents when prepared for transport, which may be caused under normal conditions of transport, by vibration, or by changes in temperature, humidity or pressure (resulting from altitude, for example). Packagings (including inner packagings and receptacles) must be closed in accordance with the information provided by the manufacturer. No dangerous residue must adhere to the outside of packages during transport. These provisions apply, as appropriate, to new, reused, reconditioned or re-manufactured packagings.

Note.— The nature of transport dictates that many packages are likely to be moved between different modes of transport with the attendant increase in handling, e.g. from vehicles into warehouses and then onto aircraft. Additionally, packages consigned on a pallet may be removed from that pallet to assist handling and loading which may be carried out manually. To avoid damage and leakage from packages during transport, shippers should take this into account in selecting an appropriate packaging or in making the decision about the suitability of an already packaged item. In this respect, it is recommended that single steel or aluminium packagings (1A1, 1A2, 1B1, 1B2, 3A1, 3A2, 3B1, 3B2), when transported in narrow-bodied aircraft and not otherwise protected by, for example, placement in a unit load device, be provided additional protection against the abrasive effects experienced in loading the aircraft through overpacking, palletization or other means of protecting the bottom head and chime. Also, small single packagings, with a capacity of 2 L or less, should be overpacked to facilitate handling and to permit adequate securing of the dangerous goods aboard the aircraft.

1.1.2 New, remanufactured, reused or reconditioned packagings which are listed in Tables 6-2 and 6-3, must meet the applicable requirements of Part 6 of these Instructions. Such packagings must be manufactured and tested under a quality assurance programme which satisfies the appropriate national authority, in order to ensure that such packagings meet those applicable requirements. Packagings may conform to one or more than one successfully tested design type and may bear more than one mark required by 6;2. Where packagings are required to be tested in accordance with 6;4, their subsequent use must be as specified in the applicable test report and conform in all respects with the design type which was tested, including the method of packing and size and type of any inner packagings, except as provided for in 1.1.10.1 or 6;4.1.7. Before being filled and handed over for transport, every packaging must be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging which shows signs of reduced strength as compared with the approved design type must no longer be used or must be so reconditioned that it is able to withstand the design type tests.

>

1.1.3 Compatibility requirements

1.1.3.1 Parts of packagings which are in direct contact with dangerous goods:

a) must not be affected or significantly weakened by those dangerous goods;

b) must not cause a dangerous effect, e.g. catalyzing a reaction or reacting with the dangerous goods; and

c) must not allow permeation of the dangerous goods that could constitute a danger under normal conditions of transport.

Where necessary, they must be provided with a suitable inner coating or treatment.

1.1.3.2 Shippers must also ensure that any absorbent materials and the materials of intermediate packagings for liquids do not react dangerously with the liquid.

1.1.3.3 Materials, such as some plastics, which can be significantly softened or rendered brittle or permeable by the temperatures likely to be experienced during transport or because of the chemical action of the contents or the use of a refrigerant, must not be used. Even though certain packagings are specified in individual packing instructions, it is, nevertheless, the responsibility of the shipper to ensure that such packagings are, in every way, compatible with the articles or substances to be contained within such packagings. This particularly applies to corrosivity, permeability, softening, premature aging and embrittlement.

Particular attention should be paid to the following:

a) the effect of fluorine on glass;

b) the effects of corrosion on metals such as steel and aluminium; and

c) consideration of the interaction (such as swelling, permeation, chemical degradation and environmental stress cracking) of substances with polymer materials such as polyethylene and polypropylene.

1.1.3.4 Shippers must ensure that all appropriate measures have been taken to ensure that the packagings used are compatible with the dangerous goods to be transported. Evidence of such measures or assessments must be made available to the competent authority upon request.

1.1.4 The body and the closure of any packaging must be so constructed as to be able to adequately resist the effects of temperature and vibration occurring in normal conditions of transport. The closure device must be so designed that it:

a) is unlikely that it can be incorrectly or incompletely closed, and must be such that it may be checked easily to determine that it is completely closed; and

b) remains securely closed during transport.

1.1.4.1 In addition, for inner packagings containing liquids, closures must be held securely, tightly and effectively in place by secondary means. Examples of such methods include: adhesive tape, friction sleeves, welding or soldering, positive locking wires, locking rings, induction heat seals and child-resistant closures. When secondary means of closure cannot be applied, the inner packaging must be securely closed and placed in a leakproof liner and then placed in an outer packaging.

1.1.5 When filling packagings for liquids sufficient ullage (outage) must be left to ensure that neither leakage nor permanent distortion of the packaging will occur as a result of an expansion of the liquid caused by temperatures likely to prevail during transport. Liquids must not completely fill a packaging at a temperature of 55°C.

1.1.6 Packagings for which retention of liquid is a basic function must be capable of withstanding without leakage an internal pressure which produces a pressure differential of not less than 95 kPa (not less than 75 kPa for liquids in Packing Group III of Class 3 or Division 6.1), or a pressure related to the vapour pressure of the liquid to be conveyed, whichever is the greater. The pressure related to the vapour pressure must be determined as either:

a) the total gauge pressure measured in the packaging (i.e. the vapour pressure of the filling substance and the partial pressure of the air or other inert gases, less 100 kPa) at 55°C, multiplied by a safety factor of 1.5; this total gauge pressure should be determined on the basis of a degree of filling in accordance with 1.1.5 and a filling temperature of 15°C; or

b) 1.75 times the vapour pressure at 50°C less 100 kPa, but with a minimum of 95 kPa.

This is expressed as:

$P = (V_{p50} \times 1.75) - 100$ kPa with a minimum of 95 kPa

where

P = Pressure requirement in kPa (gauge)

V_{p50} = Vapour pressure at 50°C; or

c) 1.5 times the vapour pressure at 55°C less 100 kPa, but with a minimum of 95 kPa.

This is expressed as:

$P = (V_{p55} \times 1.5) - 100$ kPa with a minimum of 95 kPa

where

P = Pressure requirement in kPa (gauge)

V_{p55} = Vapour pressure at 55°C.

Note.— The capability of a packaging to withstand an internal pressure without leakage that produces the specified pressure differential should be determined by testing samples of inner packagings of combination packagings and single packagings. Pressure differential is the difference between the pressure exerted on the inside of the packaging and the pressure on the outside. The appropriate test method should be selected based on packaging type. Acceptable test methods include any method that produces the required pressure differential between the inside and outside of a single packaging or an inner packaging of a combination packaging. The test may be conducted using internal hydraulic or pneumatic pressure (gauge) or external vacuum test methods. Internal hydraulic or pneumatic pressure can be applied in most cases as the required pressure differential can be achieved under most circumstances. An external vacuum test is not acceptable if the specified pressure differential is not achieved and maintained. The external vacuum test is a generally acceptable method for rigid packagings but is not normally acceptable for:

— *flexible packagings;*

— *packagings filled and closed under an absolute atmospheric pressure lower than 95 kPa or for liquids in Packing Group III of Class 3 or Division 6.1 with an absolute pressure of 75 kPa;*

— *packagings intended for the transport of high vapour pressure liquids (i.e. vapour pressure greater than 111 kPa at 50°C or 130 kPa at 55°C and accordingly greater than 100 kPa at 50°C or 117 kPa at 55°C for liquids) in Packing Group III of Class 3 or Division 6.1.*

1.1.7 Notwithstanding the foregoing, dangerous goods may be contained in an inner packaging which does not itself meet the pressure requirement provided that the inner packaging is packed within a supplementary packaging which does meet the pressure requirement and all the other requirements of this Chapter and the applicable packing instruction.

1.1.8 Dangerous goods must not be packed together in the same outer packaging with dangerous or other goods if they react dangerously with each other and cause:

a) combustion and/or evolution of considerable heat;

b) evolution of flammable, toxic or asphyxiant gases;

c) the formation of corrosive substances; or

d) the formation of unstable substances.

1.1.9 Subject to 1.1.8 an outer packaging may contain more than one item of dangerous goods provided that:

a) the inner packaging used for each item of dangerous goods and the quantity contained therein complies with the relevant part of the packing instruction applicable to that item;

b) the outer packagings used are permitted by all the packing instructions applicable to each item of dangerous goods;

c) the package as prepared for shipment meets the specification performance tests for the most restrictive packing group of a substance or article contained in the package;

d) the dangerous goods do not require segregation according to Table 7-1, unless otherwise provided for in these Instructions; and

e) the quantities of different dangerous goods contained in one outer packaging must be such that “Q” does not exceed the value of 1, where “Q” is calculated using the formula:

$$Q = \frac{n_1}{M_1} + \frac{n_2}{M_2} + \frac{n_3}{M_3} + \ldots$$

where n_1, n_2, etc. are the net quantities of the different dangerous goods and M_1, M_2, etc. are the maximum net quantities for these different dangerous goods according to Table 3-1 for passenger or cargo aircraft, as applicable. However, the following dangerous goods do not need to be taken into account in the calculation of the “Q” value:

1) carbon dioxide, solid (dry ice), UN 1845;

2) those where columns 11 and 13 of Table 3-1 indicate “No limit”;

3) those with the same UN number, packing group, and physical state (i.e. solid or liquid) and the same maximum net quantity according to column 11 or 13 of Table 3-1, providing they are the only dangerous goods in the package and the total net quantity does not exceed the maximum net quantity according to Table 3-1.

An outer packaging containing Division 6.2 (Infectious Substances) may contain material for refrigeration, or freezing or packaging material such as absorbent material.

Note.— For packages containing radioactive material, see 9.1.3.

1.1.10 Inner packagings must be so packed, secured or cushioned in an outer packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings containing liquids must be packaged with their closures upward and placed within outer packagings consistent with the orientation mark prescribed in 5;3.2.12 b) of these Instructions. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastic material, must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not substantially impair the protective properties of the cushioning material or of the outer packaging.

1.1.10.1 Where an outer packaging of a combination packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:

a) inner packagings of equivalent or smaller size may be used provided:

1) the inner packagings are of similar design to the tested inner packagings (e.g. shape — round, rectangular);

2) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;

3) the inner packagings have the same or smaller openings and the closure is of similar design (screw cap, friction lid, etc.);

4) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and

5) inner packagings are oriented within the outer packaging in the same manner as in the tested package; and

b) a lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.

1.1.10.2 Use of supplementary packagings within an outer packaging (e.g. an intermediate packaging or a receptacle inside a required inner packaging) additional to what is required by the packing instructions is permitted provided all relevant requirements are met, including those of 4;1.1.2, and, if appropriate, suitable cushioning is used to prevent movement within the packaging.

1.1.11 The nature and the thickness of the outer packaging must be such that friction during transport does not generate any heat likely to alter dangerously the chemical stability of the contents.

1.1.12 Venting of packagings to reduce internal pressure, which may develop by the evolution of gas from the contents, is not permitted for air transport, except as otherwise specified in these Instructions.

1.1.13 Except as provided in 1.1.13.1, combination packagings having inner packagings containing liquid dangerous goods must be packed so that the closures on the inner packagings are upward and the upright position of the package must be indicated on it by the “Package orientation” label described in 5;3.2.12 b). The words “This side up” or “This end up” may also be displayed on the top cover of the package.

1.1.13.1 Orientation arrows are not required on outer packagings containing:

a) dangerous goods in inner packagings each containing not more than 120 mL with sufficient absorbent material between the inner and outer packagings to completely absorb the liquid contents;

b) Division 6.2 infectious substances in primary receptacles each containing not more than 50 mL; or

c) dangerous goods in gas tight inner packagings such as tubes, bags or vials which are opened by breaking or puncturing. Each inner packaging must not contain more than 500 mL.

1.1.14 Except as provided in 5;3.5.1.1 a), a package must be of such size that there is adequate space to affix all necessary labels and marks.

1.1.15 An empty packaging that has contained a dangerous substance must be treated in the same manner as is required by these Instructions for a package filled with that substance unless adequate measures have been taken to nullify any hazard.

Note.— Purging and thorough flushing of the packaging with a neutralizing agent is an acceptable method of nullifying the hazard.

1.1.16 Packagings tested as prescribed in 6;4.5 and marked with the hydraulic test pressure prescribed in 6;2.1.1 d) 1) must be filled only with a liquid having a vapour pressure:

a) such that the total gauge pressure in the packaging (i.e. the vapour pressure of the filling substance plus the partial pressure of air or other inert gases, less 100 kPa) at 55°C, determined on the basis of a maximum degree of filling in accordance with 1.1.5 and a filling temperature of 15°C, will not exceed two-thirds of the marked test pressure; or

b) at 50°C less than four-sevenths of the sum of the marked test pressure plus 100 kPa; or

c) at 55°C less than two-thirds of the sum of the marked test pressure plus 100 kPa (see Table 4-1).

However, where the packaging is selected on the basis of 1.1.16 a) the hydraulic test pressure marked in accordance with 6;2.1.1 d) 1) must be not less than 100 kPa (not less than 80 kPa for liquids in Packing Group III of Class 3 or Division 6.1).

1.1.17 Packagings used for solids which may become liquid at temperatures encountered during air transport must also be capable of containing that substance in the liquid state.

Note.— Packagings for solids (both inner and single) which may be permitted by the applicable packing instruction should not be used if they are unsuitable for containing liquids (e.g. paper or plastic bags as inner packagings, unlined fibre drums as single packagings, should not be used).

Table 4-1. Examples of required marked test pressures calculated as in 1.1.16 c)

UN No.	*Name*	*Class*	*Packing Group*	*V_{p55} (kPa)*	*V_{p55} × 1.5 (kPa)*	*(V_{p55} × 1.5) minus 100 (kPa)*	*Required minimum test pressure (gauge) under 6;4.5.3 c) (kPa)*	*Minimum test pressure (gauge) to be marked on the packaging (kPa)*
2056	Tetrahydrofuran	3	II	70	105	5	100	100
2247	n-Decane	3	III	1.4	2.1	–97.9	100	100
1593	Dichloromethane	6.1	III	164	246	146	146	150
1155	Diethyl ether	3	I	199	299	199	199	250

Note 1.— For pure liquids the vapour pressure at 55°C (V_{p55}) can often be obtained from scientific tables.

Note 2.— The maximum vapour pressures in 1.1.16 b) and c) refer to the basis of the formula while the minimum hydraulic test pressure in the last sentence of 1.1.16 refers to the aircraft altitude.

Note 3.— This table refers to the use of 1.1.16 c) only, which means that the marked test pressure must exceed 1.5 times the vapour pressure at 55°C less 100 kPa. When, for example, the test pressure for n-Decane is determined according to 6;4.5.3 a) the minimum marked test pressure of 80 kPa applies.

Note 4.— For Diethyl ether the required minimum test pressure under 6;4.5.4 is 250 kPa.

1.1.18 Every packaging intended to contain liquids must successfully undergo a suitable leakproofness test. This test is part of a quality assurance programme as required by 4;1.1.2 which shows the capability of meeting the appropriate test level indicated in 6;4.4.2:

a) before it is first used for transport;

b) after remanufacturing or reconditioning, before it is reused for transport.

For this test, packagings need not have their own closures fixed.

The inner receptacle of composite packagings may be tested without the outer packaging provided the test results are not affected. This test is not necessary for inner packagings of combination packagings.

1.1.19 The closures of packagings containing wetted or diluted substances must be such that the percentage of liquid (water, solvent or phlegmatizer) does not fall below the prescribed limits during transport.

1.1.20 For plastic drums and jerricans, rigid plastic IBCs and composite IBCs with plastic inner receptacles, unless otherwise approved by the appropriate national authority, the period of use permitted for the transport of dangerous goods must be not more than five years from the date of manufacture of the receptacles, except where a shorter period of use is prescribed because of the nature of the substance to be transported.

+ *Note.— For composite IBCs the period of use refers to the date of manufacture of the inner receptacle.*

1.1.21 Where ice is used as a coolant it must not affect the integrity of the packaging.

1.2 PACKING GROUP

Unless otherwise provided for, the specification packagings (i.e. those listed in Table 6-2) detailed in the packing instructions must meet the performance test requirements of the relevant packing group shown in column 8 of Table 3-1 for the particular substance or article.

1.3 TRANSITIONAL PACKAGING ARRANGEMENTS FOR RADIOACTIVE MATERIAL

For the arrangements for the use of packagings for radioactive material manufactured under earlier requirements, see 6;7.24.

1.4 SALVAGE PACKAGINGS

1.4.1 Damaged, defective, leaking or non-conforming packages, or dangerous goods that have spilled or leaked may be transported in salvage packagings (see 1;3.1.1) meeting the requirements of 1.4.2 and 6;4.8. These salvage packagings may be used provided that appropriate measures are taken to prevent excessive movement of the damaged or leaking packages within the salvage packaging and that when the salvage packaging contains liquids, sufficient absorbent material is added to eliminate the presence of free liquid. Prior approval from the appropriate national authority must be obtained to ship salvage packagings.

1.4.2 Salvage packagings must be single packagings of a material resistant to any chemical or other action of the leaking or spilled dangerous goods. Not more than one damaged, defective or leaking package of dangerous goods may be packed in any one of such single packagings.

1.4.3 Damaged, defective or leaking packages of dangerous goods of Classes 1, 2 and 7 and Division 6.2 (other than Clinical waste and Medical waste falling under UN 3291) must not be transported in salvage packagings.

1.4.4 Damaged, defective or leaking packages of self-reactive substances of Division 4.1 or substances of Division 5.2 must not be transported in metal salvage packagings meeting Packing Group I requirements.

Chapter 2

GENERAL

2.1 Each of the succeeding Chapters of this Part is devoted to the specific packing instructions applicable to an individual class of dangerous goods. In some cases the Chapters start with general requirements which apply to all goods in that class.

2.2 The Dangerous Goods List (Table 3-1) shows for each article or substance, in columns 10 and 12, the number of the packing instruction that must be used.

≠ 2.3 Each instruction shows, where applicable, the acceptable single and combination packagings. For combination packagings, tables show the acceptable outer packagings and associated inner packagings with the maximum net quantity permitted in each inner packaging. Where provisions for particular articles or substances apply, a table shows the inner packagings with associated quantity limitations, the permitted quantity per package and, where applicable, an indication if single packagings are permitted. Where appropriate, additional packing requirements are also indicated at the end of a packing instruction. These additional packing requirements may impose a higher standard of packaging than would normally apply to the packing group, or may require specific packaging considerations. Where packagings which need not meet the requirements of 1.1.2 (e.g. crates, pallets, etc.) are authorized in a packing instruction or the special provisions named in the dangerous goods list, these packages are not subject to the mass or volume limits generally applicable to packagings conforming to the requirements of Part 6, unless otherwise indicated in the relevant packing instruction or special provision.

2.4 Unless otherwise specified, each packaging must conform to the applicable requirements of Part 6. Generally packing instructions do not provide guidance on compatibility and the user must not select a packaging without checking that the substance is compatible with the packaging material selected (e.g. most fluorides are unsuitable for glass receptacles). Where glass receptacles are permitted in the packing instructions porcelain, earthenware and stoneware packagings are also allowed.

2.5 The following packagings must not be used when the substances being transported are liable to become liquid during transport:

Drums:	1D and 1G
Boxes:	4C1, 4C2, 4D, 4F, 4G and 4H1
Bags:	5L1, 5L2, 5L3, 5H1, 5H2, 5H3, 5H4, 5M1 and 5M2
Composite packagings:	6HC, 6HD2, 6HG1, 6HG2, 6HD1, 6PC, 6PD1, 6PD2, 6PG1, 6PG2 and 6PH1.

2.6 Where the packing instructions in this Part authorize the use of a particular type of outer packaging (e.g. 4G, 1A2), packagings bearing the same packaging identification code followed by the letters “V”, “U” or “W” marked in accordance with the requirements of 6;4.1.7 h) (e.g. 4GV, 4GU or 4GW; 1A2V, 1A2U or 1A2W) may also be used under the same conditions and limitations applicable to the use of that type of packaging according to the relevant packing instruction. For example, a combination packaging marked with the packaging code “4GV” may be used whenever a combination packaging marked “4G” is authorized, provided the requirements in the relevant packing instruction regarding types of inner packagings and quantity limitations are respected.

2.7 Cylinders may be used for liquids and solids when indicated in a packing instruction. The cylinder must meet the standards set out below.

2.7.1 Unless otherwise indicated in these Instructions, cylinders must conform to:

a) the applicable requirements of 6;5; or

b) the national or international standards on the design, construction, testing, manufacturing and inspection, as applied by the country in which the cylinders are manufactured, provided that the provisions of 2.7 and 6;5.3.3 are met.

2.7.2 Every design type of cylinder must be approved by the competent authority of the country of manufacture or as indicated in 6;5.

2.7.3 Unless otherwise indicated, cylinders having a minimum test pressure of 0.6 MPa must be used.

2.7.4 Unless otherwise indicated, cylinders may be provided with an emergency pressure relief device designed to avoid bursting in case of overfill or fire accidents.

2.7.5 Cylinder valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage which could cause inadvertent release of the contents of the cylinder, by one of the methods as given in 4.1.1.9 a) to e).

2.7.6 The level of filling must not exceed 95 per cent of the capacity of the cylinder at 50°C. Sufficient ullage (outage) must be left to ensure that the cylinder will not be liquid full at a temperature of 55°C.

2.7.7 Unless otherwise indicated cylinders must be subjected to a periodic inspection and test every 5 years. The periodic inspection must include an external examination, an internal examination or alternative method as approved by the competent authority, a pressure test or equivalent effective non-destructive testing with the agreement of the competent authority including an inspection of all accessories (e.g. tightness of valves, emergency relief valves of fusible elements). Cylinders must not be filled after they become due for periodic inspection and test but may be transported after the expiry of the time limit. Cylinder repairs must meet the requirements of 4.1.1.11.

2.7.8 Prior to filling, the filler must perform an inspection of the cylinder and ensure that the cylinder is authorized for the substances to be transported and that the provisions of these Instructions have been met. Shut-off valves must be closed after filling and remain closed during transport. The shipper must verify that the closures and equipment are not leaking.

2.7.9 Refillable cylinders must not be filled with a substance different from that previously contained unless the necessary operations for change of service have been performed.

2.7.10 Marking of cylinders for liquids and solids according to 2.7 (not conforming to the requirements of 6;5) must be in accordance with the requirements of the competent authority of the country of manufacturing.

2.8 The appropriate authority of the State of Origin may approve the use of a packaging alternative to those provided in a particular packing instruction indicated in Table 3-1 for listed dangerous goods provided:

a) the alternative packaging complies with the general requirements of 4;1;

b) when the particular packing instruction indicated in Table 3-1 specifies packagings which are listed in Tables 6-2 and 6-3, the alternative packaging must meet the applicable requirements of Part 6;

c) for the type of alternative packaging, the expressions “Not used in these Instructions” or “Specialized use only” do not appear in Table 6-2 under the “Paragraph” column heading;

d) the appropriate authority of the State of Origin determines that the alternative packaging achieves at least the same level of safety as if the substance were packed in accordance with a method specified in the particular packing instruction indicated in Table 3-1;

e) the maximum net quantity of dangerous goods in the packaging does not exceed the quantity specified in the appropriate column of Table 3-1; and

f) a copy of the document of approval accompanies each consignment.

2.9 UNPACKAGED ARTICLES OTHER THAN CLASS 1 ARTICLES

The appropriate authority of the State of Origin and the State of the Operator may approve the transport of large and robust articles which cannot be packaged in accordance with the requirements of 6;1 to 6;4, where they have to be transported empty, uncleaned and unpackaged, providing they comply with the requirements in Part S-4, Chapter 3 of the Supplement.

Chapter 3

CLASS 1 — EXPLOSIVES

Parts of this Chapter are affected by State Variation BE 2, DK 2, HR 5; see Table A-1

3.1 PACKING GROUP

Unless otherwise specified in these Instructions, packagings must conform to the requirements of 6;1, 6;2, 6;3 and 6;4 and must meet the test requirements of 6;4 for Packing Group II.

3.2 GENERAL REQUIREMENTS

3.2.1 The general packing requirements of 4;1 must be met.

3.2.2 All packagings for Class 1 explosives must be so designed and constructed that:

a) they will protect the explosives, prevent them from escaping and cause no increase in the risk of unintended ignition or initiation when subjected to normal conditions of transport including foreseeable changes in temperature, humidity and pressure;

b) the complete package can be handled safely in normal conditions of transport; and

c) the packages will withstand any loading imposed on them by foreseeable stacking to which they will be subject during transport so that they do not add to the risk presented by the explosives, the containment function of the packagings is not harmed, and they are not distorted in a way or to an extent which will reduce their strength or cause instability of a stack.

3.2.3 All explosive substances and articles, as prepared for transport, must have been classified in accordance with the procedures detailed in 2;1.5.

3.3 GENERAL PACKING PROVISIONS

3.3.1 The general provisions detailed below are in addition to those in Part 4, Chapter 1.

3.3.1.1 The closure device of packagings containing liquid explosives must ensure a double protection against leakage.

3.3.1.2 The closure device of metal drums must include a suitable gasket; if a closure device includes a screw-thread, the ingress of explosive substances into the screw-thread must be prevented.

3.3.1.3 Packagings for water soluble substances must be water-resistant.

3.3.1.4 When the packaging includes a double envelope filled with water which may freeze during transport, a sufficient quantity of an anti-freeze agent must be added to the water to prevent freezing. Anti-freeze that could create a fire hazard because of its inherent flammability must not be used.

3.3.1.5 Nails, staples and other closure devices made of metal without protective covering must not penetrate to the inside of the outer packaging unless the inner packaging adequately protects the explosives against contact with the metal.

3.3.1.6 Inner packagings, fittings and cushioning materials and the placing of explosive substances or articles in packages must be accomplished in a manner which prevents the explosive substances or articles from becoming loose in the outer packaging under normal conditions of transport. Metallic components of articles must be prevented from making contact with metal packagings. Articles containing explosive substances not enclosed in an outer casing must be separated from each other in order to prevent friction and impact. Padding, trays, partitioning in the inner or outer packaging, mouldings or receptacles may be used for this purpose.

3.3.1.7 Packagings must be made of materials compatible with, and impermeable to, the explosives contained in the package, so that neither interaction between the explosives and the packaging materials, nor leakage, causes the explosive to become unsafe to transport, or the hazard division or compatibility group to change.

3.3.1.8 The ingress of explosive substances into the recesses of seamed metal packagings must be prevented.

3.3.1.9 Plastic packagings must not be liable to generate or accumulate sufficient static electricity so that a discharge could cause the packaged explosive substances or articles to initiate, ignite or function.

3.3.1.10 Explosive substances must not be packed in inner or outer packagings where the differences in internal and external pressures, due to thermal or other effects, could cause an explosion or rupture of the package.

3.3.1.11 Whenever loose explosive substances or the explosive substance of an uncased or partly cased article may come into contact with the inner surface of metal packagings (1A2, 1B2, 4A, 4B and metal receptacles), the metal packaging must be provided with an inner liner or coating (see 1.1.3).

3.3.1.12 Packing Instruction 101 may be used for any explosive provided the package has been approved by an appropriate national authority regardless of whether the packaging complies with the packing instruction assignment in the Dangerous Goods List.

3.3.1.13 Electro-explosive devices must be adequately protected against electro-magnetic radiation and stray currents.

3.3.1.14 Large and robust explosive articles, normally intended for military use, without their means of initiation or without their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems must be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling, storage or launching devices in such a way that they will not become loose during normal conditions of transport.

3.3.1.14.1 Where such large explosive articles are, as part of their operational safety and suitability tests, subjected to test regimes that meet the intentions of these Instructions and such tests have been successfully undertaken, the appropriate national authority may approve such articles to be transported under these Instructions.

Note 1.— The term receptacle used in the Inner and Intermediate packaging columns of this table includes boxes, bottles, cans, drums, jars and tubes, including any means of closure.

Note 2.— Reels are devices made of plastics, wood, fibreboard, metal or other suitable material comprising a central spindle with, or without, side walls at each end of the spindle. Articles and substances can be wound onto the spindle and may be retained by side walls.

Note 3.— Trays are sheets of metal, plastics, wood, fibreboard or other suitable material which are placed in the inner, intermediate or outer packaging and achieve a close-fit in such packaging. The surface of the tray may be shaped so that packagings or articles can be inserted, held secure and separated from each other.

3.4 PACKING INSTRUCTIONS

Packing Instruction 101

Inner packagings	*Intermediate packagings*	*Outer packagings*

As specified by the appropriate national authority.

The distinguishing sign used on vehicles in international road traffic of the country for which the authority acts must be marked on the dangerous goods transport document as follows: “Packaging approved by the competent authority of ...”

Note 1.— In this instance the term “competent authority” is used for intermodal compatibility; it refers to the appropriate national authority.

Note 2.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

Packing Instruction 114

a) solid wetted

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags plastics textile woven plastics Receptacles metal plastics wood	Bags plastics textile, plastic coated or lined Receptacles metal plastics Dividing partitions wood	Boxes fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0077, 0234, 0235 and 0236, packagings must be lead-free.
— For UN 0342, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastic (1H1 or 1H2) drums are used as outer packagings.
— Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging.

b) solid dry

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags paper, kraft plastics textile, siftproof woven plastics, siftproof Receptacles fibreboard metal paper plastics wood woven plastics, siftproof	Not necessary	Boxes fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) plywood (4D) reconstituted wood (4F) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0077, 0132, 0234, 0235 and 0236, packagings must be lead-free.
— For UN 0508 and 0509, metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6;3, are not considered metal packagings.
— For UN 0160 and 0161, when metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) are used as the outer packaging, metal packagings must be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes, is prevented.
— For UN 0160 and 0161, inner packagings are not required if drums are used as the outer packaging.

Packing Instruction 130

Inner packagings	*Intermediate packagings*	*Outer packagings*
Not necessary	Not necessary	Boxes aluminium (4B) expanded plastics (4H1) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— The following applies to UN 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0238, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0459, 0488, 0502 and 0510. Large and robust explosive articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems must be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling, storage or launching devices in such a way that they will not become loose during normal conditions of transport. Where such large explosive articles are as part of their operational safety and suitability tests subjected to test regimes that meet the intentions of these Instructions and such tests have been successfully undertaken, the appropriate national authority may approve such articles to be transported under these Instructions.

— For UN 0457, 0458, 0459 and 0460, whenever loose explosive substances or the explosive substance of an uncased or partly cased article may come into contact with the inner surface of metal packagings (1A2, 1B2, 4A, 4B and metal receptacles), the metal packaging must be provided with an inner liner or coating.

Packing Instruction 131

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags paper plastics Receptacles fibreboard metal plastics wood Reels	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plastics, solid (4H2) plywood (4D) reconstituted wood (4F) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) plastics (1H1, 1H2) other metal (1N1, 1N2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0029, 0267 and 0455, bags and reels must not be used as inner packagings.

Packing Instruction 133

Inner packagings	*Intermediate packagings*	*Outer packagings*
Receptacles fibreboard metal plastics wood Trays, fitted with dividing partitions fibreboard plastics wood	Receptacles fibreboard metal plastics wood	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— Receptacles are only required as intermediate packagings when the inner packagings are trays.
— For UN 0043, 0212, 0225, 0268 and 0306, trays must not be used as inner packagings.

Packing Instruction 134

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags water-resistant Receptacles fibreboard metal plastics wood Sheets fibreboard, corrugated Tubes fibreboard	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) plastics (1H1, 1H2) other metal (1N1, 1N2) plywood (1D) steel (1A1, 1A2)

Packing Instruction 135

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags paper plastics Receptacles fibreboard metal plastics wood Sheets paper plastics	Not necessary	Boxes aluminium (4B) expanded plastics (4H1) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

Packing Instruction 136

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags plastics textile Boxes fibreboard plastics wood Dividing partitions in the outer packagings	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

Packing Instruction 137

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags plastics Boxes fibreboard wood Tubes fibreboard metal plastics Dividing partitions in the outer packagings	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plastics, solid (4H2) plywood (4D) reconstituted wood (4F) steel (4A)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

≠ — For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package must be marked as illustrated in Figure 5-29. When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.

Packing Instruction 138

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags plastics	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— If the ends of the articles are sealed, inner packagings are not necessary.

Packing Instruction 139

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags plastics Receptacles fibreboard metal plastics wood Reels Sheets paper plastics	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord must be sealed, for example by a plug firmly fixed so that the explosive cannot escape. The ends of "**Cord, detonating,** flexible", must be fastened securely.
— For UN 0065 and 0289, inner packagings are not required when they are in coils.

Packing Instruction 140

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags plastics Reels Sheets paper, kraft plastics Receptacles wood	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— If the ends of UN 0105 are sealed, no inner packagings are required.
— For UN 0101, the packaging must be siftproof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps.
— For UN 0101, steel, aluminium or other metal boxes or drums must not be used.

Packing Instruction 141

Inner packagings	*Intermediate packagings*	*Outer packagings*
Receptacles fibreboard metal plastics wood Trays, fitted with dividing partitions plastics wood Dividing partitions in the outer packagings	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

Packing Instruction 142

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags paper plastics Receptacles fibreboard metal plastics wood Sheets paper Trays, fitted with dividing partitions plastics	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

Packing Instruction 143

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags paper, kraft plastics textile textile, rubberized Receptacles fibreboard metal plastics wood Trays, fitted with dividing partitions plastics	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0271, 0272, 0415 and 0491, when metal packagings are used, metal packagings must be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes, is prevented.
— Instead of the above inner and outer packagings, composite packagings (6HH2) (plastic receptacle with outer solid box) may be used.

Chapter 4

CLASS 2 — GASES

Parts of this Chapter are affected by State Variations CA 10, US 6, US 15; see Table A-1

4.1 SPECIAL PACKING PROVISIONS FOR DANGEROUS GOODS OF CLASS 2

4.1.1 General requirements

4.1.1.1 This section provides general requirements applicable to the use of cylinders and closed cryogenic receptacles for the transport of Class 2 gases (e.g. UN 1072 **Oxygen, compressed**). Cylinders and closed cryogenic receptacles must be constructed and closed so as to prevent any loss of contents which might be caused under normal conditions of transport, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

4.1.1.2 Parts of cylinders and closed cryogenic receptacles that are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). In addition to the requirements specified in the relevant packing instruction, which take precedence, the applicable provisions of ISO 11114-1:2012 + A1:2017 and ISO 11114-2:2013 must be met.

4.1.1.3 Cylinders and closed cryogenic receptacles, including their closures, must be selected that are able to contain a gas or a mixture of gases according to the requirements of 6;5.1.2 and the requirements of the specific packing instructions of this Part.

4.1.1.4 Refillable cylinders must not be filled with a gas or gas mixture different from that previously contained unless the necessary operations for change of gas service have been performed. The change of service for compressed and liquefied gases must be in accordance with ISO 11621:1997, as applicable. In addition, a cylinder that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary hazard must not be authorized for the transport of a Class 2 substance unless the necessary inspection and testing as specified in 6;5.1.6 have been performed.

4.1.1.5 Prior to filling, the filler must perform an inspection of the cylinder or closed cryogenic receptacle and ensure that the cylinder or closed cryogenic receptacle is authorized for the gas to be transported and that the provisions of these Instructions have been met. Shut-off valves must be closed after filling and remain closed during transport. The shipper must verify that the closures and equipment are not leaking.

≠ 4.1.1.6 Cylinders and closed cryogenic receptacles must be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance and taking into account the lowest pressure rating of any component. Service equipment having a pressure rating lower than other components must nevertheless comply with 6;5.1.3.1. Reactive gases and gas mixtures must be filled to a pressure such that if complete decomposition of the gas occurs, the working pressure of the cylinder must not be exceeded.

4.1.1.7 Cylinders and closed cryogenic receptacles, including their closures, must conform to the design, construction, inspection and testing requirements detailed in 6;5. When outer packagings are prescribed, the cylinders must be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in an outer packaging.

4.1.1.8 Valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage, which could cause inadvertent release of the contents of the cylinder and closed cryogenic receptacle, by one of the following methods:

a) Valves are placed inside the neck of the cylinder and closed cryogenic receptacle and protected by a threaded plug or cap;

b) Valves are protected by caps. Caps must possess vent holes of a sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;

c) Valves are protected by shrouds or guards;

d) Not used; or

e) Cylinders and closed cryogenic receptacles are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6;4.3 at the Packing Group I performance level.

≠ For cylinders and closed cryogenic receptacles with valves as described in b) and c), the requirements of ISO 11117:1998, ISO 11117:2008 + Cor 1:2009 or ISO 11117:2019 must be met; for valves with inherent protection, the requirements of Annex A of ISO 10297:2006, Annex A of ISO 10297:2014 or Annex A of ISO 10297 + A1:2017 must be met. For cylinders and closed cryogenic receptacles with self-closing valves with inherent protection, the requirements of Annex A of ISO 17879:2017 must be met. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 or ISO 16111:2018 must be met.

4.1.1.9 Non-refillable cylinders and closed cryogenic receptacles must:

a) be transported in an outer packaging, such as a box, or crate, or in shrink-wrapped trays or stretch-wrapped trays;

b) not be repaired after being put into service.

≠ 4.1.1.10 Refillable cylinders, other than closed cryogenic receptacles, must be periodically inspected according to the provisions of 6;5.1.6 and Packing Instruction 200, 214, 218 or 219. Cylinders and closed cryogenic receptacles must not be filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

4.1.1.11 Repairs must be consistent with the fabrication and testing requirements of the applicable design and construction standards and are only permitted as indicated in the relevant periodic inspection standards specified in 6;5.2.4. Cylinders, other than the jacket of closed cryogenic receptacles, must not be subjected to repairs of any of the following:

a) weld cracks or other weld defects;

b) cracks in walls;

c) leaks or defects in the material of the wall, head or bottom.

4.1.1.12 Cylinders and closed cryogenic receptacles must not be offered for filling:

a) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;

b) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or

c) unless the required certification, retest, and filling marks are legible.

4.1.1.13 Filled cylinders and closed cryogenic receptacles must not be offered for transport:

a) when leaking;

b) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;

c) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or

d) unless the required certification, retest, and filling marks are legible.

4.2 PACKING INSTRUCTIONS

Packing Instruction 200

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

Cylinders, constructed as specified in 6;5 are authorized for the transport of a specific substance when specified in the following tables (Table 1 and Table 2). Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and marks conform to the requirements of the appropriate national authority in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed. Valves must be suitably protected or must be designed and constructed in such a manner that they are able to withstand damage without leakage as specified in Annex B of ISO 10297:1999. Cylinders with capacities of one litre or less must be packaged in outer packaging constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use, and secured or cushioned so as to prevent significant movement within the outer packaging during normal conditions of transport. For some substances, the special packing provisions may prohibit a particular type of cylinder. The following requirements must be met:

1) Pressure relief devices must be fitted on cylinders used for the transport of UN 1013 **Carbon dioxide** and UN 1070 **Nitrous oxide**. Other cylinders must be fitted with a pressure relief device if specified by the appropriate national authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, must be specified by the appropriate national authority of the country of use. Manifolding of cylinders is not permitted.

2) The following two tables cover compressed gases (Table 1) and liquefied and dissolved gases (Table 2). They provide:

   a) the UN number, name and description, and classification of the substance;
   b) the LC_{50} for toxic substances;
   c) the types of cylinders authorized for the substance, shown by the letter "X";
   d) the maximum test period for periodic inspection of the cylinders;
      Note.— For cylinders which make use of composite materials, the maximum test period must be five years. The test period may be extended to that specified in Tables 1 and 2 (i.e. up to ten years), if approved by the appropriate national authority of the country of use.
   e) the minimum test pressure of the cylinders;
   f) the maximum working pressure of the cylinders for compressed gases (where no value is given, the working pressure must not exceed two-thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
   g) special packing provisions that are specific to a substance.

3) In no case must cylinders be filled in excess of the limit permitted in the following requirements:

   a) For compressed gases, the working pressure must be not more than two-thirds of the test pressure of the cylinders. Restrictions to this upper limit on working pressure are imposed by special packing provision "o". In no case must the internal pressure at 65°C exceed the test pressure.

   b) For high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not exceed the test pressure of the cylinders.

      The use of test pressures and filling ratios other than those in the table is permitted provided that the above criterion is met, except where special packing provision "o" applies.

      For high pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio (FR) must be determined as follows:

      $$FR = 8.5 \times 10^{-4} \times d_g \times P_h$$

      where FR = maximum filling ratio
      d_g = gas density (at 15°C, 1 bar)(in g/l)
      P_h = minimum test pressure (in bar).

      If the density of the gas is unknown, the maximum filling ratio must be determined as follows:

      $$FR = \frac{P_h \times MM \times 10^{-3}}{R \times 338}$$

      where FR = maximum filling ratio
      P_h = minimum test pressure (in bar)
      MM = molecular mass (in g/mol)
      R = 8.31451×10^{-2} bar.l/mol.K (gas constant).

      For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components.

   c) For low pressure liquefied gases, the maximum mass of contents per litre of water capacity must equal 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not fill the cylinder at any temperature up to 60°C. The test pressure of the cylinder must be at least equal to the vapour pressure (absolute) of the liquid at 65°C, minus 100 kPa (1 bar).

      For low pressure liquefied gases for which filling data is not provided in the table, the maximum filling ratio must be determined as follows:

      $$FR = (0.0032 \times BP - 0.24) \times d_1$$

      where FR = maximum filling ratio
      BP = boiling point (in Kelvin)
      d_1 = density of the liquid at boiling point (in kg/l).

d) For UN 1001, **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, see p).

e) For liquefied gases charged with compressed gases, both components — the liquefied gas and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder.

The maximum mass of contents per litre of water capacity must not exceed 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not completely fill the cylinder at any temperature up to 60°C.

When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansions of all substances in the cylinders must be considered. When experimental data is not available, the following steps must be carried out:

i) Calculation of the vapour pressure of the liquefied gas and of the partial pressure of the compressed gas at 15°C (filling temperature);

ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;

iii) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.

iv) Calculation of the vapour pressure of the liquefied gas at 65°C;

v) Calculation of the total pressure, which is the sum of the vapour pressure of the liquefied gas and the partial pressure of the compressed gas at 65°C;

vi) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

The test pressure of the cylinder must not be less than the calculated total pressure minus 100 kPa (1bar).

If the solubility of the compressed gas in the liquefied phase is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (vi)) into account.

4) Gas mixtures containing any of the following gases must not be offered for transport in aluminium alloy cylinders unless approved by the appropriate national authority of the State of Origin and the State of the Operator:

UN 1037 **Ethyl chloride**
UN 1063 **Methyl chloride**
UN 1063 **Refrigerant gas R 40**
UN 1085 **Vinyl bromide, stabilized**
UN 1086 **Vinyl chloride, stabilized**
UN 1860 **Vinyl fluoride, stabilized**
UN 1912 **Methyl chloride and methylene chloride mixture**

5) The filling of cylinders must be carried out by qualified staff using appropriate equipment and procedures. The procedures should include checks of:

— the conformity of cylinders and accessories with these Instructions;
— their compatibility with the product to be transported;
— the absence of damage which might affect safety;
— compliance with the degree or pressure of filling, as appropriate;
— marks and identification.

These requirements are deemed to be met if the following standards are applied:

ISO 10691: 2004	Gas cylinders — Refillable welded steel cylinders for liquefied petroleum gas (LPG) — Procedures for checking before, during and after filling.
ISO 11372: 2011	Gas cylinders — Acetylene cylinders — Filling conditions and filling inspection
ISO 11755: 2005	Gas cylinders — Cylinder bundles for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling
ISO 13088: 2011	Gas cylinders — Acetylene cylinder bundles — Filling conditions and filling inspection
ISO 24431:2016	Gas cylinders — Seamless, welded and composite cylinders for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

6) "Special packing provisions":

Material compatibility

a) Aluminium alloy cylinders are forbidden.
b) Copper valves are forbidden.
c) Metal parts in contact with the contents must not contain more than 65 per cent copper.
≠ d) When steel cylinders or composite cylinders with steel liners are used, only those bearing the "H" mark in accordance with 6;5.2.7.4 p) are permitted.

Gas specific provisions:

l) UN 1040 **Ethylene oxide** may also be packed in hermetically sealed glass ampoules or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the Packing Group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging must be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. The maximum net mass in any outer packaging must not exceed 2.5 kg. When cylinders are used, they must be of the seamless or welded steel types that are equipped with suitable pressure relief devices. Each cylinder must be tested for leakage with an inert gas before each refilling and must be insulated with three coats of heat retardant paint or in any equally efficient manner. The maximum net quantity per cylinder must not exceed 25 kg.

m) Cylinders must be filled to a working pressure not exceeding 5 bar.

o) In no case must the working pressure or filling ratio shown in the table be exceeded.

p) For UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**: cylinders must be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene must not exceed the values prescribed in the approval or in ISO 3807-1:2000, ISO 3807-2:2000 or ISO 3807:2013, as applicable.

For UN 1001 **Acetylene, dissolved**, cylinders must contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000, ISO 3807-2:2000 or ISO 3807:2013, as applicable); cylinders fitted with pressure relief devices must be transported vertically.

The test pressure of 52 bar applies only to cylinders fitted with a fusible plug.

ra) Ethyl chloride may be carried in securely sealed glass ampoules (IP.8) containing not more than 5 g of ethyl chloride with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons with not more than 12 ampoules per carton. The cartons must be tightly packed to prevent movement in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) that meet the performance testing requirements of 6;4 at the Packing Group II performance level. Not more than 300 g of ethyl chloride is permitted per package.

s) Aluminium alloy cylinders must be:

— Equipped only with brass or stainless steel valves; and
— Cleaned in accordance with ISO 11621:1997 and not contaminated with oil.

Periodic inspection:

u) The interval between periodic tests may be extended to 10 years for aluminium alloy cylinders when the alloy of the cylinder has been subjected to stress corrosion testing as specified in ISO 7866:2012 + Cor 1:2014.

v) The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the appropriate national authority of the country of use.

Requirements for N.O.S. descriptions and for mixtures:

z) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio must be calculated in accordance with the relevant requirements of PI 200.

The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

Note.— For the carriage of oxygen to provide life support to aquatic animals, see Note 7 of the Introductory Notes to this Part.

Table 1. COMPRESSED GASES

UN No.	Name and description	Class or Division	Subsidiary hazard	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar*	Maximum working pressure, bar*	Special packing provisions*
1002	**Air, compressed**	2.2			X	10			
1006	**Argon, compressed**	2.2			X	10			
1046	**Helium, compressed**	2.2			X	10			
1049	**Hydrogen, compressed**	2.1			X	10			d
1056	**Krypton, compressed**	2.2			X	10			
1065	**Neon, compressed**	2.2			X	10			
1066	**Nitrogen, compressed**	2.2			X	10			
1071	**Oil gas, compressed**	2.3	2.1		X	5			
1072	**Oxygen, compressed**	2.2	5.1		X	10			s
1954	**Compressed gas, flammable, n.o.s.**	2.1			X	10			z
1956	**Compressed gas, n.o.s.**	2.2			X	10			z
1957	**Deuterium, compressed**	2.1			X	10			d
1964	**Hydrocarbon gas mixture, compressed, n.o.s.**	2.1			X	10			z
1971	**Methane, compressed or natural gas, compressed** with high methane content	2.1			X	10			
2034	**Hydrogen and methane mixture, compressed**	2.1			X	10			
3156	**Compressed gas, oxidizing, n.o.s.**	2.2	5.1		X	10			z

* Where the entries are blank, the working pressure must not exceed two-thirds of the test pressure.

Table 2. LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary hazard	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1001	**Acetylene, dissolved**	2.1			X	10	60 52		c, p
1009	**Bromotrifluoromethane (refrigerant gas R 13b1)**	2.2			X	10	42 120 250	1.13 1.44 1.60	
1010	**Butadienes, stabilized** (1,2-butadiene)	2.1			X	10	10	0.59	
1010	**Butadienes, stabilized** (1,3-butadiene)	2.1			X	10	10	0.55	z
1010	**Butadienes and hydrocarbon mixture, stabilized** containing more than 40% butadienes	2.1			X	10			v z
1011	**Butane**	2.1			X	10	10	0.52	v
1012	**Butylene** (butylenes mixture)	2.1			X	10	10	0.50	z
1012	**Butylene** (1-butylene)	2.1			X	10	10	0.53	
1012	**Butylene** (cis-2-butylene)	2.1			X	10	10	0.55	
1012	**Butylene** (trans-2 butylene)	2.1			X	10	10	0.54	
1013	**Carbon dioxide**	2.2			X	10	190 250	0.68 0.76	

UN No.	Name and description	Class or Division	Subsidiary hazard	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1018	**Chlorodifluoromethane (refrigerant gas R 22)**	2.2			X	10	27	1.03	
1020	**Chloropentafluoroethane (refrigerant gas R 115)**	2.2			X	10	25	1.05	
1021	**1-Chloro-1,2,2,2-tetrafluoroethane (refrigerant gas R 124)**	2.2			X	10	11	1.20	
1022	**Chlorotrifluoromethane (refrigerant gas R 13)**	2.2			X	10	100 120 190 250	0.83 0.90 1.04 1.11	
1027	**Cyclopropane**	2.1			X	10	18	0.55	
1028	**Dichlorodifluoromethane (refrigerant gas R 12)**	2.2			X	10	16	1.15	
1029	**Dichlorofluoromethane (refrigerant gas R 21)**	2.2			X	10	10	1.23	
1030	**1,1-Difluoroethane (Refrigerant gas R 152 a)**	2.1			X	10	16	0.79	
1032	**Dimethylamine, anhydrous**	2.1			X	10	10	0.59	b
1033	**Dimethyl ether**	2.1			X	10	18	0.58	
1035	**Ethane**	2.1			X	10	95 120 300	0.25 0.30 0.40	
1036	**Ethylamine**	2.1			X	10	10	0.61	b
1037	**Ethyl chloride**	2.1			X	10	10	0.80	a, ra
1039	**Ethyl methyl ether**	2.1			X	10	10	0.64	
1041	**Ethylene oxide and carbon dioxide mixture** with more than 9% ethylene oxide but not more than 87%	2.1			X	10	190 250	0.66 .75	
1043	**Fertilizer ammoniating solution** with free ammonia	2.2			X	5			b, z
1055	**Isobutylene**	2.1			X	10	10	0.52	
1058	**Liquefied gases,** non-flammable, charged with nitrogen, carbon dioxide or air	2.2			X	10			
1060	**Methylacetylene and propadiene mixture, stabilized**	2.1			X	10			c, z
1060	**Methylacetylene and propadiene mixture, stabilized** (propadiene with 1% to 4% methylacetylene)	2.1			X	10	22	0.52	c
1061	**Methylamine, anhydrous**	2.1			X	10	13	0.58	b
1063	**Methyl chloride (refrigerant gas R 40)**	2.1			X	10	17	0.81	a
1070	**Nitrous oxide**	2.2	5.1		X	10	180 225 250	0.68 0.74 0.75	
1075	**Petroleum gases, liquefied**	2.1			X	10			v, z
1077	**Propylene**	2.1			X	10	27	0.43	

UN No.	Name and description	Class or Division	Subsidiary hazard	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1078	**Refrigerant gas, n.o.s.**	2.2			X	10			z
1080	**Sulphur hexafluoride**	2.2			X	10	70 140 160	1.06 1.34 1.38	
1081	**Tetrafluoroethylene, stabilized**	2.1			X	10	200		m, o
1083	**Trimethylamine, anhydrous**	2.1			X	10	10	0.56	b
1085	**Vinyl bromide, stabilized**	2.1			X	10	10	1.37	a
1086	**Vinyl chloride, stabilized**	2.1			X	10	12	0.81	a
1087	**Vinyl methyl ether, stabilized**	2.1			X	10	10	0.67	
1858	**Hexafluoropropylene (refrigerant gas R 1216)**	2.2			X	10	22	1.11	
1860	**Vinyl fluoride, stabilized**	2.1			X	10	250	0.64	a
1912	**Methyl chloride and methylene chloride mixture**	2.1			X	10	17	0.81	a
1952	**Ethylene oxide and carbon dioxide mixture** with not more than 9% ethylene oxide	2.2			X	10	190 250	0.66 0.75	
1958	**1,2-dichloro-1,1,2,2-tetrafluoroethane (refrigerant gas R 114)**	2.2			X	10	10	1.30	
1959	**1,1-difluoroethylene (refrigerant gas R 1132a)**	2.1			X	10	250	0.77	
1962	**Ethylene**	2.1			X	10	225 300	0.34 0.38	
1965	**Hydrocarbon gas mixture, liquefied, n.o.s.**	2.1			X	10			v, z
1968	**Insecticide gas, n.o.s.**	2.2			X	10			z
1969	**Isobutane**	2.1			X	10	10	0.49	v
1973	**Chlorodifluoromethane and chloropentafluoroethane mixture** with fixed boiling point, with approximately 49% chlorodifluoromethane **(refrigerant gas R 502)**	2.2			X	10	31	1.01	
1974	**Chlorodifluorobromo-methane (refrigerant gas R 12b1)**	2.2			X	10	10	1.61	
1976	**Octafluorocyclobutane (refrigerant gas R C318)**	2.2			X	10	11	1.32	
1978	**Propane**	2.1			X	10	23	0.43	v
1982	**Tetrafluoromethane (refrigerant gas R 14)**	2.2			X	10	200 300	0.71 0.90	
1983	**1-chloro-2,2,2-trifluoroethane (refrigerant gas R 133a)**	2.2			X	10	10	1.18	
1984	**Trifluoromethane (refrigerant gas R 23)**	2.2			X	10	190 250	0.88 0.96	
2035	**1,1,1-trifluoroethane (refrigerant gas R 143a)**	2.1			X	10	35	0.73	
2036	**Xenon**	2.2			X	10	130	1.28	

UN No.	Name and description	Class or Division	Subsidiary hazard	LC_{50} ml/m³	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
2044	**2,2-dimethylpropane**	2.1			X	10	10	0.53	
2073	**Ammonia solution,** relative density less than 0.880 at 15°C in water,	2.2							
	with more than 35% but not more than 40% ammonia				X	5	10	0.80	b
	with more than 40% but not more than 50% ammonia				X	5	12	0.77	b
2193	**Hexafluoroethane (refrigerant gas R 116)**	2.2			X	10	200	1.13	
2200	**Propadiene, stabilized**	2.1			X	10	22	0.50	
2419	**Bromotrifluoroethylene**	2.1			X	10	10	1.19	
2422	**Octafluorobut-2-ene (refrigerant gas R 1318)**	2.2			X	10	12	1.34	
2424	**Octafluoropropane (refrigerant gas R 218)**	2.2			X	10	25	1.04	
2451	**Nitrogen trifluoride**	2.2	5.1		X	10	200	0.50	
2452	**Ethylacetylene, stabilized**	2.1			X	10	10	0.57	c
2453	**Ethyl fluoride (refrigerant gas R 161)**	2.1			X	10	30	0.57	
2454	**Methyl fluoride (refrigerant gas R 41)**	2.1			X	10	300	0.63	
2517	**1-chloro-1,1-difluoroethane (refrigerant gas R 142b)**	2.1			X	10	10	0.99	
2599	**Chlorotrifluoromethane and trifluoromethane azeotropic mixture** with approximately 60% chlorotrifluoromethane (refrigerant gas R 503)	2.2			X	10	31 42 100	0.12 0.17 0.64	
2601	**Cyclobutane**	2.1			X	10	10	0.63	
2602	**Dichlorodifluoro-methane and difluoroethane azeotropic mixture** with approximately 74% dichlorodifluoromethane (refrigerant gas R 500)	2.2			X	10	22	1.01	
3070	**Ethylene oxide and dichlorodifluoro-methane mixture** with not more than 12.5% ethylene oxide	2.2			X	10	18	1.09	
3153	**Perfluoro(methyl vinyl ether)**	2.1			X	10	20	0.75	
3154	**Perfluoro(ethyl vinyl ether)**	2.1			X	10	10	0.98	
3157	**Liquefied gas, oxidizing, n.o.s.**	2.2	5.1		X	10			z
3159	**1,1,1,2-tetrafluoroethane (refrigerant gas R 134a)**	2.2			X	10	18	1.05	
3161	**Liquefied gas, flammable, n.o.s.**	2.1			X	10			z
3163	**Liquefied gas, n.o.s.**	2.2			X	10			z
3220	**Pentafluoroethane (refrigerant gas R 125)**	2.2			X	10	49 35	0.95 0.87	

UN No.	Name and description	Class or Division	Subsidiary hazard	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
3252	**Difluoromethane (refrigerant gas R 32)**	2.1			X	10	48	0.78	
3296	**Heptafluoropropane (refrigerant gas R 227)**	2.2			X	10	13	1.21	
3297	**Ethylene oxide and chlorotetrafluoroethane mixture** with not more than 8.8% ethylene oxide	2.2			X	10	10	1.16	
3298	**Ethylene oxide and pentafluoroethane mixture** with not more than 7.9% ethylene oxide	2.2			X	10	26	1.02	
3299	**Ethylene oxide and tetrafluoroethane mixture** with not more than 5.6% ethylene oxide	2.2			X	10	17	1.03	
3337	**Refrigerant gas R 404a**	2.2			X	10	36	0.82	
3338	**Refrigerant gas R 407a**	2.2			X	10	32	0.94	
3339	**Refrigerant gas R 407b**	2.2			X	10	33	0.93	
3340	**Refrigerant gas R 407c**	2.2			X	10	30	0.95	
3354	**Insecticide gas, flammable, n.o.s.**	2.1			X	10			z
3374	**Acetylene, solvent free**	2.1			X	5	60 52		c, p

Packing Instruction 201

The general packing requirements of 4;1 must be met.

Hydrocarbon gas-powered small devices, including replacement cartridges, and lighters for cigarettes and lighter refills must comply with the requirements of the country in which they are filled. They must be provided with protection against inadvertent discharge. Lighters must not contain more than 10 g of liquefied petroleum gas. Hydrocarbon gas-powered small devices and lighter refills must not contain more than 65 g of liquefied petroleum gas. The liquid portion of the gas must not exceed 85 per cent of the capacity of the fuel vessel at 15°C. The articles, including closures, must be capable of withstanding an internal pressure of twice the pressure in the fuel vessel at 55°C. Where refill cartridges are in the form of aerosol dispensers, the pressure in the aerosol must not exceed 1 500 kPa at 55°C and the requirements of subparagraphs b) to e) of Packing Instruction 203 must be met. The articles must be tightly packed to prevent inadvertent operation in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II. The net quantity of liquefied petroleum gas in each package must not exceed 1 kg on passenger aircraft and 15 kg on cargo aircraft. Articles which meet the above requirements are permitted only when the valve and ignition mechanisms are designed or securely sealed, taped or otherwise fastened to prevent operation or leakage of contents during transport.

Articles permitted under this packing instruction may also include, within the same outer packaging, replacement cartridges exceeding 65 g each, containing liquefied petroleum gas, provided such cartridges comply with all the requirements of Packing Instruction 200, they are not manifolded or connected to the article and they cannot cause the failure or functioning of the article during transport. Such consignments must be carried on cargo aircraft.

Packing Instruction 202

This instruction applies to Class 2 refrigerated liquefied gases in open and closed cryogenic receptacles.

Requirements for closed cryogenic receptacles

1) The general requirements of 4;1 and 4;4.1 must be met.

2) The requirements of 6;5 must be met.

3) The closed cryogenic receptacles must be so insulated that they do not become coated with frost.

4) Test pressure

   Refrigerated liquids must be filled in closed cryogenic receptacles with the following minimum test pressures:

   a) For closed cryogenic receptacles with vacuum insulation, the test pressure must not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar);

   b) For other closed cryogenic receptacles, the test pressure must be not less than 1.3 times the maximum internal pressure of the filled receptacle, taking into account the pressure developed during filling and discharge.

5) Degree of filling

   For non-flammable, non-toxic refrigerated liquefied gases, the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) must not exceed 98 per cent of the water capacity of the pressure receptacle.

6) Pressure-relief devices

   Every closed cryogenic receptacle, having a nominal capacity in excess of 550 L, must be provided with at least 2 pressure-relief devices. The pressure-relief device must be of the type that will resist dynamic forces including surge.

   Closed cryogenic receptacles, having a nominal capacity of 550 L or less, must be provided with at least 1 pressure-relief device, and may in addition have a frangible disc in parallel with the spring loaded device in order to meet the requirements of 6;5.1.3.6.5. The pressure-relief device must be of the type that will resist dynamic forces including surge.

   Note.— The pressure-relief devices must meet the requirements of 6;5.1.3.6.4 and 6;5.1.3.6.5.

Packing Instruction 202

7) Compatibility

Materials used to ensure the leakproofness of the joints or for the maintenance of the closures must be compatible with the contents. In the case of receptacles intended for the transport of oxidizing gases (i.e. with a subsidiary hazard of 5.1), these materials must not react with these gases in a dangerous manner.

8) Periodic inspection

The periodic inspection and test frequencies of pressure relief valves must not exceed five years.

Note.— Insulated packagings containing refrigerated liquid nitrogen fully absorbed in a porous material are not subject to these Instructions when carried as cargo provided they meet the requirements of Special Provision A152.

Requirements for open cryogenic receptacles

Open cryogenic receptacles must be constructed to meet the following requirements:

1. The receptacles must be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during their normal use and during normal conditions of transport.

2. The maximum water capacity for metal receptacles is 50 litres and for glass receptacles it is 5 litres.

3. The receptacle must have a double wall construction with the space between the inner and outer wall being evacuated (vacuum insulation). The insulation must prevent the formation of hoar frost on the exterior of the receptacle.

4. The materials of construction must have suitable mechanical properties at the service temperature.

5. Materials which are in direct contact with the dangerous goods must not be affected or weakened by the dangerous goods intended to be transported and must not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods.

6. Receptacles of glass double wall construction must have an outer packaging with suitable cushioning or absorbent materials which can withstand the pressures and impacts liable to occur under normal conditions of transport.

7. The receptacle must be designed to remain in an upright position during transport (e.g. have a base whose smaller horizontal dimension is greater than the height of the centre of gravity when filled to capacity or be mounted on gimbals).

8. Receptacles must be metal or glass vacuum insulated vessels or flasks vented to the atmosphere to prevent any increase in pressure within the package and the openings must be fitted with devices allowing gases to escape, preventing any splashing out of liquid and so configured that they remain in place during transport.

9. Open cryogenic receptacles must bear the following marks permanently affixed, e.g. by stamping, engraving or etching:

   — the manufacturer's name and address;
   — the model number or name;
   — the serial or batch number;
   — the UN number and proper shipping name of gases for which the receptacle is intended;
   — the capacity of the receptacle in litres.

Note.— The size of the mark must be as set out for cylinders in Part 6;5.2.7.1. Open cryogenic receptacles manufactured prior to 1 January 2012 are not required to be so marked.

10. Open cryogenic receptacles are permitted for nitrogen, argon, krypton, neon and xenon refrigerated liquids.

Packing Instruction 203

Passenger and cargo aircraft for UN 1950 and 2037 only

The general packing requirements of 4;1 must be met.

For the purposes of this packing instruction, a receptacle is considered to be an inner packaging.

Note.— "Receptacle" has the same meaning as set out in 1;3. Any reference in this packing instruction to receptacle will include "aerosols" of UN 1950 and "receptacles, small, containing gas" and "gas cartridges" of UN 2037.

≠ Aerosols and receptacles, small, containing gas (gas cartridges) must meet the requirements of Part 6;5.4.

The capacity of metal receptacles must not exceed 1 000 mL; plastics receptacles must not exceed 500 mL.

>

UN number and name		*Net quantity per package*	
		Passenger	*Cargo*
UN 1950	**Aerosols**, flammable	75 kg	150 kg
UN 1950	**Aerosols**, flammable (engine starting fluid)	Forbidden	150 kg
UN 1950	**Aerosols**, non-flammable	75 kg	150 kg
UN 1950	**Aerosols**, non-flammable (tear gas devices)	Forbidden	50 kg
UN 2037	**Gas cartridges**	1 kg	15 kg
UN 2037	**Receptacles, small, containing gas**	1 kg	15 kg

ADDITIONAL PACKING REQUIREMENTS

— Packagings must meet Packing Group II performance requirements.
— Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents during normal conditions of air transport.
— Receptacles must be packed so as to prevent excessive movement and inadvertent discharge during normal conditions of transport.

>

OUTER PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Packing Instruction Y203

Passenger and cargo aircraft for UN 1950 and 2037 only

The requirements of 3;4 must be met.

For the purposes of this packing instruction, a receptacle is considered to be an inner packaging.

Note.— "Receptacle" has the same meaning as set out in 1;3. Any reference in this packing instruction to receptacle will include "aerosols" of UN 1950 and "receptacles, small, containing gas" and "gas cartridges" of UN 2037.

≠ Aerosols and receptacles, small, containing gas (gas cartridges) must meet the requirements of Part 6;5.4.

The capacity of metal receptacles must not exceed 1 000 mL; plastics receptacles must not exceed 500 mL.

Non-refillable aerosols and non-refillable receptacles containing gas (gas cartridges) containing toxic substances must not exceed 120 mL capacity.

> ≠

UN number and name		*Total gross mass per package*
UN 1950	***Aerosols**, flammable*	30 kg G
UN 1950	***Aerosols**, non-flammable*	30 kg G
UN 2037	***Gas cartridges***	1 kg
UN 2037	***Receptacles, small, containing gas***	1 kg

ADDITIONAL PACKING REQUIREMENTS

— Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents during normal conditions of air transport.
— Receptacles must be packed so as to prevent excessive movement and inadvertent discharge during normal conditions of transport.

OUTER PACKAGINGS (see 6;3.1)

Boxes	*Drums*
Aluminium	Aluminium
Fibreboard	Fibre
Natural wood	Other metal
Other metal	Plastics
Plastics	Plywood
Plywood	Steel
Reconstituted wood	
Steel	

Packing Instruction 206

Passenger and cargo aircraft for UN 3167, UN 3168 and UN 3169 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

A gas sample may only be accepted for transport as a non-pressurized gas providing it is at a pressure corresponding to ambient atmospheric pressure at the time the containment system is closed and this must not exceed 105 kPa absolute.

Cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the appropriate national authority are permitted.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS						**SINGLE PACKAGINGS**
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — passenger*	*Total quantity per package — passenger*	*Inner packaging quantity (per receptacle) — cargo*	*Total quantity per package — cargo*	
UN 3167 **Gas sample, non-pressurized, flammable, n.o.s.**	Glass	1.0 L	1.0 L	2.5 L	5.0 L	No
	Metal	1.0 L		2.5 L		
UN 3168 **Gas sample, non-pressurized, toxic, flammable, n.o.s.**	Glass	Forbidden	Forbidden	1.0 L	1.0 L	No
	Metal			1.0 L		
UN 3169 **Gas sample, non-pressurized, toxic, n.o.s.**	Glass	Forbidden	Forbidden	1.0 L	1.0 L	No
	Metal			1.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Inner packagings must be hermetically sealed.
— Packagings must meet the Packing Group II performance requirements.
— Inner packaging(s) must be packed so as to prevent movement in the outer packaging.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1 1H2)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

Packing Instruction 208

The general packing requirements of 4;1 must be met.

Articles, pressurized pneumatic or hydraulic containing a non-flammable, non-liquefied and non-toxic gas and constructed from materials which will not fragment under pressure, may be carried under the following conditions:

a) when installed in construction equipment and assembled machinery, articles must be designed and constructed with a burst pressure of not less than 5 times their charged pressure at 21°C when shipped;

Note.— Labelling, marking, dangerous goods transport document and information to pilot-in-command are not required.

b) when tightly packed to prevent movement in strong outer packagings and charged to not more than 1 380 kPa at 21°C, the following conditions also apply:

1) each article must have a fluid space not exceeding 41 L under stored pressure;

2) each article must be tested without failure or damage to at least 3 times its charged pressure at 21°C but not less than 830 kPa before initial shipment and before each refilling and re-shipment;

c) when tightly packed to prevent movement in strong outer packagings and charged with a pressure exceeding 1 380 kPa at 21°C the following conditions also apply:

1) each article must have a fluid space not exceeding 41 L under stored pressure;

2) each article must be tested without failure or damage to at least 3 times its charged pressure at 21°C, but not less than 830 kPa before initial shipment and before each refilling and re-shipment;

3) each article must be designed and constructed with a burst pressure of not less than 5 times its charged pressure at 21°C when shipped.

Packing Instruction 211

The general packing requirements of 4;1 must be met.

Refrigerating machines or components containing non-toxic liquefied gases or Ammonia solutions (UN 2672) must meet the following requirements:

a) each cylinder must not contain more than 450 kg of a Division 2.2 gas without subsidiary hazard or 25 kg of Ammonia solutions (UN 2672);

b) machines or components having two or more charged cylinders may not contain an aggregate of more than 910 kg of a Division 2.2 gas without subsidiary hazard or more than 45 kg of Ammonia solutions (UN 2672);

c) each cylinder must be equipped with a safety device meeting the requirements of a recognized national standard;

d) each cylinder must be equipped with a shut-off valve at each opening except openings used for safety devices and with no other connection. These valves must be closed prior to and during transport;

e) cylinders must be manufactured, inspected and tested in accordance with a recognized UN or national standard;

f) all parts subject to refrigerant pressure during shipment must be tested in accordance with a recognized UN or national standard;

g) the liquid portion of the refrigerant, if any, must not completely fill any pressure vessel at 55°C;

h) the amount of refrigerant, if liquefied, must not exceed the filling density prescribed by applicable State regulations.

Packing Instruction 213

The general packing requirements of 4;1 must be met.

Fire extinguishers with compressed or liquefied gas must be packed in strong outer packagings so that they cannot be accidentally activated.

Fire extinguishers may include installed actuating cartridges (cartridges, power device of Division 1.4C or 1.4S), without changing the classification of Division 2.2, provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per extinguishing unit.

Large fire extinguishers may also be transported unpackaged provided that the requirements of S-4;3.1.2 a) to e) are met, the valves are protected by one of the methods in accordance with 4;4.1.1.8 a) to c) and other equipment mounted on the fire extinguisher is protected to prevent accidental activation. For the purpose of this packing instruction, “large fire extinguishers” means fire extinguishers as described in sub-paragraphs c) to e) of Special Provision A19.

Packing Instruction 214

Cargo aircraft only for UN 3468 only

This Instruction applies to storage systems containing hydrogen absorbed in a metal hydride (UN 3468) individually or when contained in equipment and apparatus when transported on cargo aircraft.

1) For metal hydride storage systems, the general packing requirements of 4;4.1 must be met.

2) Only cylinders not exceeding 150 L in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.

3) Metal hydride storage systems meeting the applicable requirements of 6;5 for the construction and testing of cylinders containing gas may be used for the transport of hydrogen only.

4) When steel cylinders or composite cylinders with steel liners are used, only those bearing the “H” mark, in accordance with 6;5.2.9.2 j) are permitted.

≠ 5) Metal hydride storage systems must meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008 or ISO 16111:2018, and their conformity and approval must be assessed in accordance with 6;5.2.5.

≠ 6) Metal hydride storage systems must be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent mark on the system as specified in ISO 16111:2008 or ISO 16111:2018.

≠ 7) The periodic test requirements for a metal hydride storage system must be in accordance with ISO 16111:2008 or ISO 16111:2018 and carried out in accordance with 6;5.2.6, and the interval between periodic inspections must not exceed five years. See 6;5.2.4.2 to determine which standard is applicable at the time of periodic inspection and test.

8) Storage systems with a water capacity of less than 1 L must be packaged in rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use. They must be adequately secured or cushioned so as to prevent damage during normal conditions of transport.

9) Maximum net quantity per package for cargo aircraft is 100 kg of metal hydride storage systems, including when such storage systems are packed with equipment or contained in equipment.

Packing Instruction 215

Passenger and cargo aircraft for UN 3478 and 3479 only

General requirements

Part 4;1.1.1, 1.1.2 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3478 **Fuel cell cartridges** containing liquefied flammable gas UN 3479 **Fuel cell cartridges** containing hydrogen in metal hydride	1 kg of fuel cell cartridges	15 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B2) Fibre (1G) Plastics (1H2) Plywood (1D) Steel (1A2)	Aluminium (3B2) Plastics (3H2) Steel (3A2)

Packing Instruction Y215

Limited quantities for UN 3478 and 3479 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3478 **Fuel cell cartridges** containing liquefied flammable gas UN 3479 **Fuel cell cartridges** containing hydrogen in metal hydride	0.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges must not exceed 120 ml water capacity each.

Packing Instruction Y215

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Plastics	Steel
Other metal	Plywood	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 216

Passenger and cargo aircraft for UN 3478 and 3479 (contained in equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3478 **Fuel cell cartridges contained in equipment,** containing liquefied flammable gas UN 3479 **Fuel cell cartridges contained in equipment,** containing hydrogen in metal hydride	1 kg of fuel cell cartridges	15 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
— Equipment must be securely cushioned in the outer packagings.
— Fuel cell systems must not charge batteries during transport.
— On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, or a standard approved by the appropriate authority of the State of Origin.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 217

Passenger and cargo aircraft for UN 3478 and 3479 (packed with equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3478 **Fuel cell cartridges packed with equipment,** containing liquefied flammable gas UN 3479 **Fuel cell cartridges packed with equipment,** containing hydrogen in metal hydride	1 kg of fuel cell cartridges	15 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— When fuel cell cartridges are packed with equipment, they must be packed in intermediate packagings together with the equipment they are capable of powering.
— The maximum number of fuel cell cartridges in the intermediate packaging must be the minimum number required to power the equipment, plus 2 spares.
— The fuel cell cartridges and the equipment must be packed with cushioning material or divider(s) or inner packaging so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges within the packaging.

OUTER PACKAGINGS

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 218

General requirements

The general requirements of 4;4.1 applicable to cylinders must be met. Cylinders, constructed as specified in 6;5 are authorized for the transport of UN 3500, UN 3501, UN 3502, UN 3503, UN 3504 and UN 3505. Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and marks conform to the requirements of the appropriate national authority of the State in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed.

Compatibility requirements

— The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.
— The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

Periodic inspection

— The maximum test period for periodic inspection of the cylinders must be 5 years.

ADDITIONAL PACKING REQUIREMENTS

a) Cylinders must be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity, and they are not completely filled at 60°C. When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansion of all substances in the cylinders must be taken into account.
b) Spray application equipment (such as a hose and wand assembly) must not be connected during transport.
c) The minimum test pressure must be in accordance with Packing Instruction 200 for the propellant but must not be less than 20 bar.
d) Non-refillable cylinders used may have a water capacity in litres not exceeding 1 000 litres divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with ISO 11118:1999, which limits the maximum capacity to 50 litres.
e) For liquids charged with a compressed gas, both components — the liquid and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder. When experimental data is not available, the following steps must be carried out:

   i) Calculation of the vapour pressure of the liquid and of the partial pressure of the compressed gas at 15°C (filling temperature);

   ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;

   iii) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

   Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.

   iv) Calculation of the vapour pressure of the liquid at 65°C;

   v) Calculation of the total pressure, which is the sum of the vapour pressure of the liquid and the partial pressure of the compressed gas at 65°C;

   vi) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

   The test pressure of the cylinders must not be less than the calculated total pressure minus 100 kPa (1 bar).

   If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph vi)) into account.
f) For fire extinguishing agents assigned to UN 3500, the maximum test period for periodic inspection must be ten years.

Packing Instruction 218

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
	Strong outer packagings	

Packing Instruction 219

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

This Instruction applies to Class 2 adsorbed gases.

1) The following packagings are permitted provided the general packing requirements of 4.1.1 are met:

≠ a) Cylinders constructed as specified in 6;5.2 and in accordance with ISO 11513:2011, ISO 11513:2019, ISO 9809-1:2010 or ISO 9809-1:2019; and

b) Cylinders constructed before 1 January 2016 in accordance with 6;5.3 and a specification approved by the appropriate national authorities of the countries of transport and use.

2) The pressure of each filled cylinder must be less than 101.3 kPa at 20°C and less than 300 kPa at 50°C.

3) The minimum test pressure of the cylinder is 21 bar.

4) The minimum burst pressure of the cylinder is 94.5 bar.

5) The internal pressure at 65°C of the filled cylinder must not exceed the test pressure of the cylinder.

6) The adsorbent material must be compatible with the cylinder and must not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material must not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction).

7) The quality of the adsorbent material must be verified at the time of each fill to assure the pressure and chemical stability requirements of this packing instruction are met each time an adsorbed gas package is offered for transport.

8) The adsorbent material must not meet the criteria of any of the classes or divisions in these Instructions.

≠ 9) The filling procedure must be in accordance with Annex A of ISO 11513:2011 (applicable until 31 December 2024) or Annex A of ISO 11513:2019.

10) The maximum period for periodic inspections is five years.

11) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

Packing Instruction 220

Cargo aircraft only for UN 3529 only
(See Packing Instruction 378 for flammable liquid-powered engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name		*Quantity — passenger*	*Quantity — cargo*
UN 3529	**Engine, internal combustion, flammable gas powered** or **Machinery, internal combustion, flammable gas powered** or **Engine, fuel cell, flammable gas powered** or **Machinery, fuel cell, flammable gas powered**	Forbidden	No limit

>

General

1) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;

2) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged.

ADDITIONAL PACKING REQUIREMENTS

If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required. Dangerous goods in engines or machinery must otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4;1.1.1, or they must be fixed in such a way that they will not become loose during normal conditions of transport, e.g. in cradles or crates or other handling devices.

Flammable gas vessels

1) for flammable gas-powered machines or equipment, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the engine or machinery to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading aboard the aircraft;

or alternatively,

2) flammable gas-powered machines or equipment that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:

   i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;

   ii) after closing the tank shut-off valves, the equipment or machinery must be operated until it stops from lack of fuel before being loaded aboard the aircraft;

   iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

Packing Instruction 220

Batteries

All batteries must be installed and securely fastened in the battery holder of the machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

≠ 1) If spillable batteries are installed, and it is possible for the machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable.

≠ 2) If lithium batteries are installed:

i) lithium batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport; and

ii) lithium batteries must meet the provisions of Part 2;9.3, except that pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN Manual of Tests and Criteria may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.

≠ 3) If sodium batteries are installed they must conform to the requirements of Special Provision A94.

Other operational equipment

1) Dangerous goods required for the operation or safety of the machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the machine or equipment.

Internal combustion or fuel cell engine shipped separately (not installed)

1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.

2) This requirement also applies to machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

+

Packing Instruction 222

Passenger and cargo aircraft for UN 3538 only

Introduction

≠ This packing instruction is only permitted for articles which do not have an existing proper shipping name and which contain only gases of Division 2.2 without a subsidiary hazard, but excluding refrigerated liquefied gases and gases forbidden for transport on passenger aircraft, where the quantity of the Division 2.2 gas exceeds the quantity limits for UN 3363 as prescribed in Packing Instruction 962. In addition to the Division 2.2 gas, the article may also contain lithium cells or batteries that comply with Section II of Packing Instruction 967 or Section II of Packing Instruction 970, as applicable.

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

UN number and proper shipping name	*Maximum net quantity of gas — passenger*	*Maximum net quantity of gas — cargo*
UN 3538 **Articles containing non-flammable, non-toxic gas, n.o.s.***	75 kg	150 kg

ADDITIONAL PACKING REQUIREMENTS

— Packagings must meet the Packing Group II performance requirements.
— Receptacles within articles containing gases must meet the requirements of 4;4.1.1 and 6;5 as appropriate or meet a national or regionally recognized pressure receptacle standard such as the European Pressure Equipment Directive (2014/68/EU) or ASME Section VII,Div.1 R that is capable of providing an equivalent level of protection as Packing Instructions 200 or 219.
— Articles must be packed to prevent movement and inadvertent operation during normal conditions of transport.

ROBUST ARTICLES

Robust articles may alternatively be transported in strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging capacity and its intended use. The packagings must achieve a level of protection that is at least equivalent to that provided by 6;1. Articles may be transported unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained. In such cases the additional requirement related to Packing Group II performance requirements and the requirement for UN specification packagings do not apply.

OUTER PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Chapter 5

CLASS 3 — FLAMMABLE LIQUIDS

5.1 PACKING INSTRUCTIONS

Packing Instructions Y340 – Y344

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y340	II	Glass	0.5 L	0.5 L	30 kg	No
		Plastics	0.5 L			
		Metal	0.5 L			
Y341	II	Glass	0.5 L	1.0 L		No
		Plastics	0.5 L			
		Metal	0.5 L			
Y342	III	Glass	1.0 L	1.0 L		No
		Plastics	1.0 L			
		Metal	1.0 L			
Y343	III	Glass	1.0 L	2.0 L		No
		Plastics	1.0 L			
		Metal	1.0 L			
Y344	III	Glass	2.5 L	10.0 L		No
		Plastics	5.0 L			
		Metal	5.0 L			

Packing Instructions Y340 – Y344

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instructions 350 – 355

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
350	I	Glass	0.5 L	0.5 L	No
		Plastics	Forbidden		
		Metal	0.5 L		
351	I	Glass	0.5 L	1 L	No
		Plastics	Forbidden		
		Metal	1.0 L		
352	II	Glass	1.0 L	1 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
353	II	Glass	1.0 L	5 L	No
		Plastics	5.0 L		
		Metal	5.0 L		
354	III	Glass	2.5 L	5 L	5 L
		Plastics	5.0 L		
		Metal	5.0 L		
355	III	Glass	2.5 L	60 L	60 L
		Plastics	10.0 L		
		Metal	10.0 L		

Packing Instructions 350 – 355

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

— Packagings must meet the Packing Group II performance requirements if the substance has a Class 8 subsidiary hazard.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements if the substance has a Class 8 subsidiary hazard.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 354 OR PI 355)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 360 – 366

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
360	I	Glass	1.0 L	2.5 L	2.5 L
		Plastics	Forbidden		
		Metal	2.5 L		
361	I	Glass	1.0 L	30 L	30 L
		Plastics	Forbidden		
		Metal	5.0 L		
362	II	Glass	1.0 L	5 L	5 L
		Plastics	1.0 L		
		Metal	1.0 L		
363	II	Glass	2.5 L	5 L	5 L
		Plastics	2.5 L		
		Metal	5.0 L		
364	II	Glass	2.5 L	60 L	60 L
		Plastics	5.0 L		
		Metal	10.0 L		
365	III	Glass	5.0 L	60 L	60 L
		Plastics	10.0 L		
		Metal	25.0 L		
366	III	Glass	5.0 L	220 L	220 L
		Plastics	10.0 L		
		Metal	25.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

— Packagings must meet the Packing Group II performance requirements if the substance has a Class 8 subsidiary hazard.

Packing Instructions 360 – 366

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Other metal (3N2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Plastics (3H1, 3H2)
Other metal (4N)	Plywood (1D)	Steel (3A1, 3A2)
Plastics (4H1, 4H2)	Plastics (1H1, 1H2)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

For UN 1308

For Packing Groups I and II, only combination packagings are permitted. The completed package must not have a gross mass exceeding 75 kg.

Packing Group III

— Packagings must meet the Packing Group II performance requirements if the substance has a Class 8 subsidiary hazard.

SINGLE PACKAGINGS FOR PACKING GROUP I

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1) Other metal (1N1) Steel (1A1)	Aluminium (3B1) Steel (3A1)

SINGLE PACKAGINGS FOR PACKING GROUP II

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1) Other metal (1N1) Plastics (1H1) Steel (1A1)	Aluminium (3B1) Plastics (3H1) Steel (3A1)

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 370

Passenger and cargo aircraft for UN 3269 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

≠

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing conditions	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — for liquid base material*	*Inner packaging quantity (per receptacle) — for liquid activator*	*Inner packaging quantity (per receptacle) — for solid activator*	*Total quantity per package*	
Activator (Organic peroxide)	Plastics*	n/a	125 mL	500 g	5 kg	No
	Metal*	n/a	125 mL	500 g		
Base material Class 3 Packing Group II	Glass	1.0 L	n/a	n/a		
	Plastics	5.0 L	n/a	n/a		
	Metal	5.0 L	n/a	n/a		
Activator (Organic peroxide)	Plastics*	n/a	125 mL	500 g	10 kg	No
	Metal*	n/a	125 mL	500 g		
Base material Class 3 Packing Group III	Glass	2.5 L	n/a	n/a		
	Plastics	10.0 L	n/a	n/a		
	Metal	10.0 L	n/a	n/a		

*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4;1.1.7).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y370

Limited quantities
Passenger and cargo aircraft for UN 3269 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

COMBINATION PACKAGINGS							SINGLE PACKAGINGS
Packing conditions	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — for liquid base material*	*Inner packaging quantity (per receptacle) — for liquid activator*	*Inner packaging quantity (per receptacle) — for solid activator*	*Total quantity per package*	*Total gross mass per package*	
Activator (Organic peroxide)	Plastics*	n/a	30 mL	100 g	1 kg	30 kg	No
	Metal*	n/a	30 mL	100 g			
Base material Class 3 Packing Group II	Glass	1.0 L	n/a	n/a			
	Plastics	1.0 L	n/a	n/a			
	Metal	1.0 L	n/a	n/a			
Activator (Organic peroxide)	Plastics*	n/a	30 mL	100 g	5 kg		
	Metal*	n/a	30 mL	100 g			
Base material Class 3 Packing Group III	Glass	2.5 L	n/a	n/a			
	Plastics	5.0 L	n/a	n/a			
	Metal	5.0 L	n/a	n/a			

*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4;1.1.7).

Packing Instruction Y370

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 371

Passenger and cargo aircraft for UN 1204 and UN 3064 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 1204 **Nitroglycerin solution in alcohol** with not more than 1% nitroglycerin (Packing Group II)	Glass	1.0 L	5 L	60 L	No
	Plastics	1.0 L			
	Metal	1.0 L			
UN 3064 **Nitroglycerin solution in alcohol** with more than 1% but not more than 5% nitroglycerin (Packing Group II)	Metal	1.0 L	Forbidden	5 L	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

For UN 1204 and UN 3064

Inner packagings must be completely surrounded with absorbent cushioning material of sufficient quantity to absorb the entire liquid content.

For UN 3064

Wooden boxes (4C1, 4C2, 4D or 4F) must be used as the outer packaging and must be completely lined with a suitable material impervious to water, alcohol and nitroglycerin.

Packing Instruction 371

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 372

Cargo aircraft only for UN 3165 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

ADDITIONAL PACKING REQUIREMENTS

UN 3165 **Aircraft hydraulic power unit fuel tank** (containing a mixture of anhydrous hydrazine and methyl hydrazine) (M86 fuel) and designed for installation as complete units in aircraft are acceptable, subject to either of the following conditions:

a) the unit must consist of an aluminium pressure receptacle made from tubing and having welded heads. Primary containment of the fuel within this receptacle must consist of a welded aluminium bladder having a maximum internal volume of 46 L. The outer receptacle must have a minimum design gauge pressure of 1 275 kPa and a minimum burst gauge pressure of 2 755 kPa. Each receptacle must be leak-checked during manufacture and before shipment and must be found leakproof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per primary containment and package is 42 L; or

b) the unit must consist of an aluminium pressure receptacle. Primary containment of the fuel within this receptacle must consist of a welded hermetically sealed fuel compartment with an elastomeric bladder having a maximum internal volume of 46 L. The pressure receptacle must have a minimum design gauge pressure of 2 860 kPa and a minimum burst gauge pressure of 5 170 kPa. Each receptacle must be leak-checked during manufacture and before shipment and must be found leakproof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per primary containment and package is 42 L.

Note.— This packing instruction is the same as UN packing instruction P301.

Packing Instruction 373

Passenger and cargo aircraft for UN 1228 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS							SINGLE PACKAGINGS	
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — passenger*	*Inner packaging quantity (per receptacle) — cargo*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1228 **Mercaptans, liquid, flammable, toxic, n.o.s.***	II	Glass	Forbidden	5.0 L	Forbidden	60 L	No	60 L
		Plastics		5.0 L				
		Metal		5.0 L				
	III	Glass	1.0 L	5.0 L	5 L	220 L	No	220 L
		Plastics	1.0 L	5.0 L				
		Metal	1.0 L	5.0 L				

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Glass inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

SINGLE PACKAGINGS FOR CARGO AIRCRAFT ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
		Other metal (1N1, 1N2)	Plastics (3H1, 3H2)
		Plastics (1H1, 1H2)	Steel (3A1, 3A2)
		Steel (1A1, 1A2)	

Packing Instruction Y373

Limited quantities
Passenger and cargo aircraft for UN 1228 (Packing Group III) only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
UN 1228 **Mercaptans, liquid, flammable, toxic, n.o.s.***	III	Glass	0.5 L	1 L	30 kg	No
		Plastics	0.5 L			
		Metal	0.5 L			

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Glass inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Steel

Jerricans

Aluminium
Plastics
Steel

Packing Instruction 374

Passenger and cargo aircraft for UN 3473 only

General requirements

Part 4;1.1.1, 1.1.2 and 1.1.8 requirements must be met, including:

1) Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3473 **Fuel cell cartridges**	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Steel (3A2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Aluminium (3B2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y374

Limited quantities for UN 3473 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3473 **Fuel cell cartridges**, containing flammable liquids	2.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges must not exceed 0.5 L of flammable liquid fuel per cartridge.

Packing Instruction Y374

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instruction 375

Passenger and cargo aircraft for UN 3473 (contained in equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3473 **Fuel cell cartridges contained in equipment**	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
— Equipment must be securely cushioned in the outer packagings.
— Fuel cell systems must not charge batteries during transport.
— On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, or a standard approved by the appropriate authority of the State of Origin.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 376

Passenger and cargo aircraft for UN 3473 (packed with equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3473 **Fuel cell cartridges packed with equipment**	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— When fuel cell cartridges are packed with equipment, they must be packed in intermediate packagings together with the equipment they are capable of powering.
— The maximum number of fuel cell cartridges in the intermediate packaging must be the minimum number required to power the equipment, plus 2 spares.
— The fuel cell cartridges and the equipment must be packed with cushioning material or divider(s) or inner packaging so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges within the packaging.

OUTER PACKAGINGS

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 377

Cargo aircraft only for Chlorosilanes

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number	*Inner packaging (see 6;3.2)*	*Net quantity per inner packaging*	*Total quantity per package*	
UN 1162, UN 1196, UN 1250, UN 1298, UN 1305, UN 2985	Glass	1.0 L	5.0 L	5.0 L
	Plastics	Forbidden		
	Steel	5.0 L		

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A1, 1A2)
Reconstituted wood (4F)	
Steel (4A)	

SINGLE PACKAGINGS

Composites	*Cylinders*	*Drums*	*Jerricans*
Plastic receptacle in steel drum (6HA1)	Steel (as permitted by 4;2.7)	Steel (1A1)	Steel (3A1)

Packing Instruction 378

Passenger and cargo aircraft for UN 3528 only
(See Packing Instruction 220 for flammable gas-powered engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name		*Quantity — passenger*	*Quantity — cargo*
UN 3528	**Engine, internal combustion, flammable liquid powered** or **Machinery, internal combustion, flammable liquid powered** or **Engine, fuel cell, flammable liquid powered** or **Machinery, fuel cell, flammable liquid powered**	No limit	No limit

> *General*

1) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;

2) Any valves or openings (e.g. venting devices) must be closed during transport;

3) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged.

+ **ADDITIONAL PACKING REQUIREMENTS**

If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required. Dangerous goods in engines or machinery must otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4;1.1.1, or they must be fixed in such a way that they will not become loose during normal conditions of transport, e.g. in cradles or crates or other handling devices.

Flammable liquid fuel tanks

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, machinery must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.

Batteries

All batteries must be installed and securely fastened in the battery holder of the machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

≠ 1) If spillable batteries are installed, and it is possible for the machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable.

≠ 2) If lithium batteries are installed:

i) lithium batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport; and

ii) lithium batteries must meet the provisions of Part 2;9.3, except that pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.

≠ 3) If sodium batteries are installed they must conform to the requirements of Special Provision A94.

Packing Instruction 378

Other operational equipment

Dangerous goods required for the operation or safety of the machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the machine or equipment.

Internal combustion or fuel cell engine shipped separately (not installed)

1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.

2) This requirement also applies to vehicles containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

Chapter 6

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

6.1 GENERAL REQUIREMENTS FOR SELF-REACTIVE SUBSTANCES

Packagings for self-reactive substances must conform to the requirements of 6;1, 6;2, 6;3 and 6;4 and must meet the test requirements of 6;4 for Packing Group II.

6.2 PACKING INSTRUCTIONS

Packing Instructions Y440 – Y443

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

Packing Instructions Y440 – Y443

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y440	II	Glass	0.5 kg	1 kg	30 kg	No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Plastic bag	0.5 kg			
Y441	II	Glass	0.5 kg	5 kg		No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Plastic bag	0.5 kg			
Y442	III	Glass	1.0 kg	5 kg		No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Plastic bag	1.0 kg			
Y443	III	Glass	1.0 kg	10 kg		No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Plastic bag	1.0 kg			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Plastics	Steel
Other metal	Plywood	
Plastics	Other metal	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instructions 445 – 446

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden *(only permitted for wetted explosives, see Packing Instruction 451)*			
445	II	Glass	1.0 kg	15 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Plastic bag	1.0 kg		
446	III	Glass	5.0 kg	25 kg	No
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

Packing Instructions 448 – 449

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden *(only permitted for wetted explosives, see Packing Instruction 451)*			
448	II	Glass	2.5 kg	50 kg	50 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Plastic bag	2.5 kg		
449	III	Glass	5.0 kg	100 kg	100 kg
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

Packing Instructions 448 – 449

SINGLE PACKAGINGS

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plywood (4D) Plastics (4H2) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 450

Passenger and cargo aircraft for UN 3527 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

≠

COMBINATION PACKAGINGS						**SINGLE PACKAGINGS**
Packing conditions	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — for solid base material*	*Inner packaging quantity (per receptacle) — for liquid activator*	*Inner packaging quantity (per receptacle) — for solid activator*	*Total quantity per package*	
Activator (Organic peroxide)	Plastics*	n/a	125 mL	500 g	5 kg	No
	Metal*	n/a	125 mL	500 g		
Base material Division 4.1 Packing Group II	Glass	1.0 kg	n/a	n/a		
	Plastics	5.0 kg	n/a	n/a		
	Metal	5.0 kg	n/a	n/a		
Activator (Organic peroxide)	Plastics*	n/a	125 mL	500 g	10 kg	No
	Metal*	n/a	125 mL	500 g		
Base material Division 4.1 Packing Group III	Glass	2.5 kg	n/a	n/a		
	Plastics	10.0 kg	n/a	n/a		
	Metal	10.0 kg	n/a	n/a		

*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

Packing Instruction 450

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4;1.1.7).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4A, 4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y450

Limited quantities
Passenger and cargo aircraft for UN 3527 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

- Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

- Part 3, Chapter 4 requirements must be met, including:
  - the capability of the package to pass a 1.2 m drop test;
  - a 24-hour stacking test; and
  - inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

Packing Instruction Y450

COMBINATION PACKAGINGS							SINGLE PACKAGINGS
Packing conditions	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — for solid base material*	*Inner packaging quantity (per receptacle) — for liquid activator*	*Inner packaging quantity (per receptacle) — for solid activator*	*Total quantity per package*	*Total gross mass per package*	
Activator (Organic peroxide)	Plastics*	n/a	30 mL	100 g	1 kg	30 kg	No
	Metal*	n/a	30 mL	100 g			
Base material Division 4.1 Packing Group II	Glass	1.0 kg	n/a	n/a			
	Plastics	1.0 kg	n/a	n/a			
	Metal	1.0 kg	n/a	n/a			
Activator (Organic peroxide)	Plastics*	n/a	30 mL	100 g	5 kg		
	Metal*	n/a	30 mL	100 g			
Base material Division 4.1 Packing Group III	Glass	2.5 kg	n/a	n/a			
	Plastics	5.0 kg	n/a	n/a			
	Metal	5.0 kg	n/a	n/a			

*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4;1.1.7).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instruction 451

Passenger and cargo aircraft — wetted explosives (Packing Group I)

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

Packing Instruction 451

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 1354 **Trinitrobenzene, wetted** UN 1355 **Trinitrobenzoic acid, wetted** UN 1356 **Trinitrotoluene, wetted** or **TNT, wetted** UN 3364 **Picric acid, wetted** or **Trinitrophenol, wetted**, with not less than 10% water, by mass UN 3365 **Picryl chloride, wetted** or **Trinitrochlorobenzene, wetted** UN 3366 **Trinitrotoluene, wetted** or **TNT, wetted** UN 3367 **Trinitrobenzene, wetted** UN 3368 **Trinitrobenzoic acid, wetted** UN 3369 **Sodium dinitro-o-cresolate, wetted** UN 3370 **Urea nitrate, wetted**	Glass Plastics Metal Plastic bag	0.5 kg	0.5 kg	0.5 kg	No
UN 1336 **Nitroguanidine, wetted** or **Picrite, wetted** UN 1337 **Nitrostarch, wetted** UN 1357 **Urea nitrate, wetted**	Glass Plastics Metal Plastic bag	0.5 kg	1 kg	15 kg	No
UN 1310 **Ammonium picrate, wetted** *See Note 1 below.*	Glass Plastics Metal Plastic bag	0.5 kg	0.5 kg	0.5 kg	No
UN 1349 **Sodium picramate, wetted** *See Note 1 below.*	Glass Plastics Metal Plastic bag	0.5 kg	Forbidden	15 kg	No
UN 1320 **Dinitrophenol, wetted** UN 1321 **Dinitrophenolates, wetted** UN 1322 **Dinitroresorcinol, wetted** UN 1344 **Picric acid, wetted** or **Trinitrophenol, wetted**, with not less than 30% water, by mass UN 1348 **Sodium dinitro-o-cresolate, wetted** UN 1517 **Zirconium picramate, wetted** UN 3317 **2-Amino-4,6-dinitrophenol, wetted** *See Note 1 below.*	Glass Plastics Metal Plastic bag	0.5 kg	1 kg	15 kg	No
UN 1571 **Barium azide, wetted** UN 2852 **Dipicryl sulphide, wetted**	Glass Plastics	0.25 kg	Forbidden	0.5 kg	No
UN 3474 **1-Hydroxybenzotriazole, anhydrous, wetted**	Glass Plastics	0.5 kg	0.5 kg	0.5 kg	No

Note 1.— These substances must be in lead free packagings.

Packing Instruction 451

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.
— Packagings must be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar).
— The type of packaging and maximum permitted quantity per packaging are limited by the provisions of Part 2;1.5.2 and may be less than the limits shown above.
— Plastic or glass inner packagings must be packed in tightly closed metal or rigid plastic receptacles before packing in outer packagings. Inner packagings must be packed with absorbent material in sufficient quantity to absorb the contents in the event of leakage.

For UN 3474

Metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6;3, are not considered metal packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Other metal (3N2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Plastics (3H1, 3H2)
Other metal (4N)	Plastics (1H1, 1H2)	Steel (3A2)
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 452

Passenger aircraft for UN 2555, 2556 and 2557 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name		*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
UN 2555	**Nitrocellulose with water**	Glass	1.0 kg	15 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Plastic bag	1.0 kg		
UN 2556	**Nitrocellulose with alcohol**	Glass	1.0 kg	1 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Plastic bag	1.0 kg		
UN 2557	**Nitrocellulose, mixture without plasticizer, without pigment** or **Nitrocellulose, mixture without plasticizer, with pigment** or **Nitrocellulose, mixture with plasticizer, without pigment** or **Nitrocellulose, mixture with plasticizer, with pigment**	Glass	1.0 kg	1 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Plastic bag	1.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.
— Packagings must be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Other metal (3N2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Plastics (3H1, 3H2)
Other metal (4N)	Plastics (1H1, 1H2)	Steel (3A2)
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 453

Cargo aircraft only for UN 2555, 2556 and 2557 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name		*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
UN 2555	**Nitrocellulose with water**	Glass	1.0 kg	50 kg	50 kg
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Plastic bag	1.0 kg		
UN 2556	**Nitrocellulose with alcohol**	Glass	1.0 kg	15 kg	15 kg
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Plastic bag	1.0 kg		
UN 2557	**Nitrocellulose mixture without plasticizer, without pigment** or **Nitrocellulose mixture without plasticizer, with pigment** or **Nitrocellulose mixture with plasticizer, without pigment** or **Nitrocellulose mixture with plasticizer, with pigment**	Glass	1.0 kg	15 kg	15 kg
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Plastic bag	1.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.
— Packagings must be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Other metal (3N2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Plastics (3H1, 3H2)
Other metal (4N)	Plastics (1H1, 1H2)	Steel (3A2)
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 453

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Packagings must be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.
— Packagings must be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar).
— Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

SINGLE PACKAGINGS

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 454

Passenger and cargo aircraft for UN 1324 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS			
UN number and proper shipping name	*Total quantity per package — passenger*	*Total quantity per package — cargo*	**SINGLE PACKAGINGS**
UN 1324 **Films, nitrocellulose base**	25 kg	100 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.
— Each reel must be placed in a tightly closed metal can or strong cardboard or fibreboard inner packaging with cover held in place by adhesive tape or paper.

Packing Instruction 454

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)*	Fibre (1G)*	Plastics (3H1, 3H2)*
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)*	
Plastics (4H1, 4H2)*	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

*These packagings are permitted only for a maximum of 600 m of film.

Packing Instruction Y454

Limited quantities
Passenger and cargo aircraft for UN 1324 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS				
UN number and proper shipping name	*Total quantity of film per inner packaging*	*Total quantity per package*	*Total gross mass per package*	**SINGLE PACKAGINGS**
UN 1324 **Films, nitrocellulose base**	1 kg	10 kg	30 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Each reel must be placed in a tightly closed metal can or strong cardboard or fibreboard inner packaging with cover held in place by adhesive tape or paper.

Packing Instruction Y454

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard*	Fibre*	Plastics*
Natural wood	Other metal	Steel
Other metal	Plastics*	
Plywood	Steel	
Reconstituted wood		
Solid plastic*		
Steel		

*These packagings are permitted only for a maximum of 600 m or 1 kg (whichever is more restrictive) of film in one outer packaging.

Packing Instruction 455

Passenger and cargo aircraft for UN 1944 and 1945 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 1944 **Matches, safety** UN 1945 **Matches, wax 'vesta'**	Packaging as set out in the list of outer packagings below may be used. **For a maximum of 50 books** The following packaging is permitted: Strong fibreboard carton, which is made of straw board covered with kraft paper, having a securely glued inside lining consisting of aluminium foil, at least 0.01 mm thick, the carton to have a full depth lid with all joints secured with gummed paper tape.	25 kg	100 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Matches, safety (book card or strike on box) must be of a type that will not ignite spontaneously under normal conditions of air transport and can be readily ignited by friction only by striking on the manufacturer's box, book or card.
— Matches must be tightly packed to prevent movement within the package and ignition by rubbing against an adjoining box, book or card.
— Matches must be securely wrapped in paper or foil or packed in tightly closed inner packagings.
— No more than 50 books of matches may be packed in one inner packaging.
— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywod (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y455

Limited quantities
Passenger and cargo aircraft for UN 1944 and 1945 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name	*Packing conditions*	*Total quantity per package*	*Total gross mass per package*	
UN 1944 **Matches, safety** UN 1945 **Matches, wax 'vesta'**	Packaging as set out in the list of outer packagings below may be used. **For a maximum of 50 books** The following packaging is permitted: Strong fibreboard carton, which is made of straw board covered with kraft paper, having a securely glued inside lining consisting of aluminium foil, at least 0.01 mm thick, the carton to have a full depth lid with all joints secured with gummed paper tape.	10 kg	30 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Matches, safety (book card or strike on box) must be of a type that will not ignite spontaneously under normal conditions of air transport and can be readily ignited by friction only by striking on the manufacturer's box, book or card.
— Matches must be tightly packed to prevent movement within the package and ignition by rubbing against an adjoining box, book or card.
— Matches must be securely wrapped in paper or foil or packed in tightly closed inner packagings.
— No more than 50 books of matches may be packed in one inner packaging.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 456

Passenger and cargo aircraft for UN 2000 only

General requirements

Part 4, Chapter 1 requirements must be met.

UN number and proper shipping name	*Total quantity per package — passenger*	*Total quantity per package — cargo*
UN 2000 **Celluloid**	25 kg	100 kg

Packing Instruction 457

Passenger and cargo aircraft for UN 3241 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**	
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 3241 **2-Bromo-2-nitropropane-1,3-diol**	Glass	0.5 kg	25 kg	50 kg	25 kg	50 kg
	Plastics	1.0 kg				
	Plastic bag	1.0 kg				

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Fibreboard (4G) Natural wood (4C1, 4C2) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F)	Fibre (1G) Plastics (1H1, 1H2) Plywood (1D)	Plastics (3H1, 3H2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.

Packing Instruction 457

SINGLE PACKAGINGS

Composites	*Drums*	*Jerricans*
Plastic receptacle with outer wooden box (6HC) Plastic receptacle with outer plywood drum (6HD1) Plastic receptacle with outer plywood box (6HD2) Plastic receptacle with outer fibre drum (6HG1) Plastic receptacle with outer fibreboard box (6HG2) Plastic receptacle with outer plastic drum (6HH1) Plastic receptacle with outer solid plastic box (6HH2)	Plastics (1H1, 1H2)	Plastics (3H1, 3H2)

Packing Instruction Y457

Limited quantities
Passenger and cargo aircraft for UN 3241 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
UN 3241 **2-Bromo-2-nitropropane-1, 3-diol**	Glass	0.5 kg	10 kg	30 kg	No
	Plastics	0.5 kg			
	Plastic bag	0.5 kg			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Fibreboard	Fibre	Plastics
Natural wood	Plastics	
Plastics		
Plywood		
Reconstituted wood		

Packing Instruction 458

Passenger and cargo aircraft for UN 3270 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 3270 **Nitrocellulose membrane filters**	Any packaging from the list of outer packagings below provided that explosion is not possible by reason of increased internal pressure.	1 kg	15 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Steel (1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y458

Limited quantities
Passenger and cargo aircraft for UN 3270 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name	*Packing conditions*	*Total quantity per package*	*Total gross mass per package*	
UN 3270 **Nitrocellulose membrane filters**	Any packaging from the list of outer packagings below provided that explosion is not possible by reason of increased internal pressure.	1 kg	30 kg	No

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 459

Passenger and cargo aircraft — self-reactive substances and polymerizing substances

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) Closure requirements

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS							SINGLE PACKAGINGS
UN number and proper shipping name		*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — passenger*	*Total quantity per package — passenger*	*Inner packaging quantity (per receptacle) — cargo*	*Total quantity per package — cargo*	
Liquids							
UN 3223	**Self-reactive liquid type C**	Plastics	0.5 L	5 L	1.0 L	10 L	No
UN 3225	**Self-reactive liquid type D**	Plastics	0.5 L	5 L	1.0 L	10 L	
UN 3227	**Self-reactive liquid type E**	Plastics	1.0 L	10 L	2.5 L	25 L	
UN 3229	**Self-reactive liquid type F**	Plastics	1.0 L	10 L	2.5 L	25 L	
UN 3532	**Polymerizing substance, liquid, stabilized, n.o.s.***	Plastics	1.0 L	10 L	2.5 L	25 L	
Solids							
UN 3224	**Self-reactive solid type C**	Plastics	0.5 kg	5 kg	1.0 kg	10 kg	No
		Plastic bag	0.5 kg	5 kg	1.0 kg	10 kg	
UN 3226	**Self-reactive solid type D**	Plastics	0.5 kg	5 kg	1.0 kg	10 kg	
		Plastic bag	0.5 kg	5 kg	1.0 kg	10 kg	
UN 3228	**Self-reactive solid type E**	Plastics	1.0 kg	10 kg	2.5 kg	25 kg	
		Plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	
UN 3230	**Self-reactive solid type F**	Plastics	1.0 kg	10 kg	2.5 kg	25 kg	
		Plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	
UN 3531	**Polymerizing substance, solid, stabilized, n.o.s.***	Plastics	1.0 kg	10 kg	2.5 kg	25 kg	
		Plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Cushioning materials must not be readily combustible.
— Packagings must meet the Packing Group II performance requirements.

UN 3223 or UN3224

Energetic samples classified in accordance with Part 2, Introductory Chapter, paragraph 5.4 may be carried under UN 3223 or UN 3224, as appropriate, provided that:

1. The quantity per individual inner cavity does not exceed 0.01 g for solids or 0.01 mL for liquids and the maximum net quantity per outer packaging does not exceed 20 g for solids or 20 mL for liquids, or in the case of mixed packing the sum of grams and millilitres does not exceed 20:

Packing Instruction 459

a) the samples are carried in microtiter plates or multi-titer plates made of plastics, glass, porcelain or stoneware as an inner packaging;

b) only combination packaging with outer packaging comprising boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) are permitted; or

2. The maximum content of each inner packaging does not exceed 1 g for solids or 1 mL for liquids and the maximum net quantity per outer packaging does not exceed 56 g for solids or 56 mL for liquids, or in the case of mixed packing the sum of grams and millilitres does not exceed 56:

a) The individual substance is contained in an inner packaging of glass or plastics of maximum capacity of 30 mL placed in an expandable polyethylene foam matrix of at least 130 mm thickness having a density of 18 ±1 g/L;

b) Within the foam carrier, inner packagings are segregated from each other by a minimum distance of 40 mm and from the wall of the outer packaging by a minimum distance of 70 mm. The package may contain up to two layers of such foam matrices, each carrying up to twenty-eight inner packagings;

c) The outer packaging consists only of corrugated fibreboard boxes (4G) having minimum dimensions of 60 cm (length) by 40.5 cm (width) by 30 cm (height) and minimum wall thickness of 1.3 cm.

When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, all applicable requirements of these Instructions must be met. Interior supports must be provided to secure the inner packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met. The inner and outer packagings must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Fibreboard (4G) Natural wood (4C1, 4C2) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F)	Fibre (1G) Plastics (1H1, 1H2) Plywood (1D)	Plastics (3H1, 3H2)

Packing Instructions 462 – 463

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
462	II	Glass	1.0 L	1 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
463	III	Glass	2.5 L	5 L	5 L
		Plastics	2.5 L		
		Metal	5.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY (PI 463)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 464 – 465

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
464	II	Glass	2.5 L	5 L	No
		Plastics	2.5 L		
		Metal	5.0 L		
465	III	Glass	5.0 L	60 L	60 L
		Plastics	5.0 L		
		Metal	10.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY (PI 465)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 466 – 469

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
466	II	Glass	1.0 kg	15 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
467	II	Glass	1.0 kg	15 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Plastic bag	1.0 kg		
468	III	Glass	2.5 kg	25 kg	No
		Plastics	2.5 kg		
		Metal	5.0 kg		
469	III	Glass	5.0 kg	25 kg	No
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

Packing Instructions 470 – 471

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
470	II	Glass	2.5 kg	50 kg	50 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Plastic bag	2.5 kg		
471	III	Glass	5.0 kg	100 kg	100 kg
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— Fibreboard, fibre, wood and plywood single packagings must be fitted with a suitable liner.

Packing Instruction 470 – 471

SINGLE PACKAGINGS

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Fibre (1G) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 472

Passenger and cargo aircraft for UN 1362 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	**SINGLE PACKAGINGS**
UN 1362 **Carbon, activated**	Plastics	0.1 kg	0.5 kg	No

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Steel (4A)	Aluminium (1B1, 1B2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Steel (3A1, 3A2)

Packing Instruction 473

Passenger and cargo aircraft — for UN 1378 and UN 2881 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) Compatibility requirements
   — Substances must be compatible with their packagings as required by 4;1.1.3.
2) Closure requirements
   — Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS							SINGLE PACKAGINGS	
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — passenger*	*Total quantity per package — passenger*	*Inner packaging quantity (per receptacle) — cargo*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1378 **Metal catalyst, wetted**	II	Glass	Forbidden		1.0 kg	50 kg	No	No
		Metal			1.0 kg			
UN 2881 **Metal catalyst, dry**	I		Forbidden		Forbidden		No	No
	II	Glass	Forbidden		1.0 kg	50 kg	No	No
		Metal			1.0 kg			
	III	Glass	1.0 kg	25 kg	2.5 kg	100 kg	No	100 kg
		Metal	1.0 kg	25 kg	5.0 kg	100 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY

Cylinders	*Drums*	*Jerricans*
See 4;2.7	Steel (1A1, 1A2)	Steel (3A1, 3A2)

Packing Instructions Y474 – Y477

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y474	II	Glass	0.5 kg	1 kg	30 kg	No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Plastic bag	0.5 kg			
Y475	II	Glass	0.5 kg	5 kg		No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Plastic bag	0.5 kg			
Y476	III	Glass	1.0 kg	5 kg		No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Plastic bag	1.0 kg			
Y477	III	Glass	1.0 kg	10 kg		No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Plastic bag	1.0 kg			

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Groups II and III

— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

Packing Instructions Y474 – Y477

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instructions 478 – 479

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
478	II	Glass	1.0 L	1 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
479	III	Glass	2.5 L	5 L	5 L
		Plastics	2.5 L		
		Metal	5.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group II

— Inner packagings must have threaded enclosures and must be surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents and enclosed in a leakproof liner, plastic bag or other equally effective means of intermediate leakproof containment.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

Packing Instructions 478 – 479

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 479 only)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 480 – 482

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
480	I	Glass	1.0 L	1 L	No
		Plastics	Forbidden		
		Metal	1.0 L		
481	II	Glass	2.5 L	5 L	No
		Plastics	2.5 L		
		Metal	5.0 L		
482	III	Glass	5.0 L	60 L	60 L
		Plastics	5.0 L		
		Metal	10.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must have threaded enclosures and must be surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents and enclosed in a leakproof liner, plastic bag or other equally effective means of intermediate leakproof containment.

Packing Group II

— Inner packagings must have threaded enclosures and must be surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instructions 480 – 482

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUPS I AND II

Cylinders, provided that the general provisions of 4;2.7 are met. Cylinders must be made of steel and subjected to an initial test and period tests every ten years at a pressure of not less than 0.6 Mpa (6 bar) (gauge pressure). During transport, the liquid must be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar).

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY (PI 482)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1,1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 483 – 486

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
483	II	Glass	1.0 kg	15 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
484	II	Glass	1.0 kg	15 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Plastic bag	1.0 kg		
485	III	Glass	2.5 kg	25 kg	No
		Plastics	2.5 kg		
		Metal	5.0 kg		
486	III	Glass	5.0 kg	25 kg	No
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instructions 487 – 491

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
487	I	Glass	1.0 kg	15 kg	15 kg
		Plastics	1.0 kg		
		Metal	1.0 kg		
488	I	Glass	1.0 kg	15 kg	15 kg
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Plastic bag	2.5 kg		
489	II	Glass	2.5 kg	50 kg	50 kg
		Plastics	2.5 kg		
		Metal	5.0 kg		
490	II	Glass	2.5 kg	50 kg	50 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Plastic bag	2.5 kg		
491	III	Glass	5.0 kg	100 kg	100 kg
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be hermetically sealed, e.g. by taping or by threaded closures.

Packing Groups I and II

— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

Packing Instructions 487 – 491

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Fibreboard, fibre, wood and plywood single packagings must be fitted with a suitable liner.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP I

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

SINGLE PACKAGINGS FOR PACKING GROUPS II AND III ONLY

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 492

Passenger and cargo aircraft for UN 3292 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*
UN 3292 **Batteries, containing sodium**	Batteries may be offered for transport and transported unpacked or in protective enclosures such as fully enclosed or wooden slatted crates that are not subject to the requirements of Part 6 of these Instructions.	Forbidden	No limit
≠ UN 3292 **Cells, containing sodium**	There must be sufficient cushioning material to prevent contact between cells and between cells and the internal surfaces of the outer packaging and to ensure that no dangerous movement of the cells within the outer packaging occurs in transport.	25 kg	400 kg

ADDITIONAL PACKING REQUIREMENTS

— Packagings for cells must meet the Packing Group II performance requirements.
— Cells and batteries must be protected against short circuit and must be isolated in such a manner as to prevent short circuits.

PACKAGINGS

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

Packing Instruction 493

Passenger aircraft for UN 3399 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
UN 3399 **Organometallic substance, liquid, water reactive, flammable**	I	Forbidden			
	II	Glass (see 6;3.2)	1.0 L	1 L	No
		Appropriate cylinders or other pressure vessels (see 4;2.7)	1.0 L	1 L	No
	III	Glass (see 6;3.2)	5.0 L	5 L	No
		Appropriate cylinders or other pressure vessels (see 4;2.7)	5.0 L	5 L	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Glass containers must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.
— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 494

Cargo aircraft only for UN 3399

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	**SINGLE PACKAGINGS**
UN 3399 **Organometallic substance, liquid, water reactive, flammable**	I	Glass (see 6;3.2)	1.0 L	1.0 L	No
		Appropriate cylinders or other pressure vessels (see 4;2.7)	1.0 L	1.0 L	No
	II	Glass (see 6;3.2)	2.5 L	5 L	No
		Appropriate cylinders or other pressure vessels (see 4;2.7)	2.5 L	5 L	No
	III	Glass (see 6;3.2)	5.0 L	60 L	60 L
		Appropriate cylinders or other pressure vessels (see 4;2.7)	5.0 L	60 L	60 L

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must have threaded enclosures and must be surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents and enclosed in a leakproof liner, plastic bag or other equally effective means of intermediate leakproof containment.

Packing Group II

— Glass inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and enclosed in a leakproof liner, plastic bag or other equally effective means of intermediate leakproof containment.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

Packing Instruction 494

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY

Appropriate cylinders or pressure vessels as permitted by 4;2.7.

Packing Instruction 495

Passenger and cargo aircraft for UN 3476 only

General requirements

Part 4;1.1.1, 1.1.2 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3476 **Fuel cell cartridges**, containing water-reactive substances	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.

— The mass of each fuel cell cartridge must not exceed 1 kg.

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium(4B)	Aluminium(1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y495

Limited quantities for UN 3476 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

Fuel cell cartridges containing liquid water reactive fuels are not permitted in limited quantities.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3476 **Fuel cell cartridges**, containing water-reactive substances	2.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges containing solid water reactive fuels must not exceed 0.2 kg solid water reactive fuel per cartridge.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instruction 496

Passenger and cargo aircraft for UN 3476 (contained in equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3476 **Fuel cell cartridges contained in equipment**, containing water-reactive substances	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
— Equipment must be securely cushioned in the outer packagings.
— The mass of each fuel cell cartridge must not exceed 1 kg.
— Fuel cell systems must not charge batteries during transport.
— On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, or a standard approved by the appropriate authority of the State of Origin.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 497

Passenger and cargo aircraft for UN 3476 (packed with equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3476 **Fuel cell cartridges packed with equipment**, containing water-reactive substances	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— When fuel cell cartridges are packed with equipment, they must be packed in intermediate packagings together with the equipment they are capable of powering.
— The maximum number of fuel cell cartridges in the intermediate packaging must be the minimum number required to power the equipment, plus two spares.
— The fuel cell cartridges and the equipment must be packed with cushioning material or divider(s) or inner packaging so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges within the packaging.
— The mass of each fuel cell cartridge must not exceed 1 kg.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 499

Only packagings which are approved by the appropriate national authority for these substances may be used (see 4;2.8). A copy of this approval must accompany each consignment or an annotation that it has been granted must be included with the transport document.

Chapter 7

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

7.1 GENERAL REQUIREMENTS FOR ORGANIC PEROXIDES

7.1.1 Packagings for organic peroxides must conform to the requirements of 6;1, 6;2, 6;3 and 6;4 and must meet the test requirements of 6;4 for Packing Group II.

7.1.2 Venting of packages is not permitted for air transport.

7.1.3 The packaging of organic peroxides presenting an explosive subsidiary hazard must comply with the provisions of 4;3.2.2 and 4;3.2.3.

7.2 PACKING INSTRUCTIONS

Packing Instructions Y540 – Y541

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y540	II	Glass	0.1 L	0.5 L	30 kg	No
		Plastics	0.1 L			
		Metal	0.1 L			
Y541	III	Glass	0.5 L	1.0 L		No
		Plastics	0.5 L			
		Metal	0.5 L			

Packing Instructions Y540 – Y541

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instructions Y543 – Y546

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS						**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y543	II	Glass	0.5 kg	1.0 kg	30 kg	No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Paper bag	0.5 kg			
		Plastic bag	0.5 kg			
		Fibre	0.5 kg			
Y544	II	Glass	0.5 kg	2.5 kg	30 kg	No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Paper bag	0.5 kg			
		Plastic bag	0.5 kg			
		Fibre	0.5 kg			

Y545	III	Glass	1.0 kg	5 kg	30 kg	No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Paper bag	1.0 kg			
		Plastic bag	1.0 kg			
		Fibre	1.0 kg			
Y546	III	Glass	1.0 kg	10 kg	30 kg	No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Paper bag	1.0 kg			
		Plastic bag	1.0 kg			
		Fibre	1.0 kg			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instructions 550 – 551

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
—	I	Forbidden			
550	II	Glass	1.0 L	1 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
551	III	Glass	2.5 L	2.5 L	No
		Plastics	2.5 L		
		Metal	2.5 L		

Packing Instructions 550 – 551

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*
Aluminium (4B)	Aluminium (1B1, 1B2)
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)
Other metal (4N)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Steel (1A1, 1A2)
Plywood (4D)	
Reconstituted wood (4F)	
Steel (4A)	

Packing Instructions 553 – 555

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
553	I	Glass	1.0 L	2.5 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
554	II	Glass	2.5 L	5 L	No
		Plastics	2.5 L		
		Metal	2.5 L		
555	III	Glass	5.0 L	30 L	30 L
		Plastics	5.0 L		
		Metal	5.0 L		

Packing Instructions 553 – 555

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— UN 1873, parts of packagings which are in direct contact with perchloric acid must be constructed of glass or plastics.
— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*
Aluminium (4B)	Aluminium (1B1, 1B2)
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)
Other metal (4N)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Steel (1A1, 1A2)
Plywood (4D)	
Reconstituted wood (4F)	
Steel (4A)	

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 555)

Composites	*Drums*	*Jerricans*
All (see 6;3.1.18)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
	Other metal (1N1, 1N2)	Plastics (3H1, 3H2)
	Plastics (1H1, 1H2)	Steel (3A1, 3A2)
	Steel (1A1, 1A2)	

Packing Instructions 557 – 559

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

Packing Instructions 557 – 559

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
557	I	Glass	1.0 kg	1 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
558	II	Glass	1.0 kg	5 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
		Paper bag	1.0 kg		
		Plastic bag	1.0 kg		
		Fibre	1.0 kg		
559	III	Glass	2.5 kg	25 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Paper bag	2.5 kg		
		Plastic bag	2.5 kg		
		Fibre	2.5 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Groups I and II

— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS FOR PACKING GROUP I

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

OUTER PACKAGINGS OF COMBINATION PACKAGINGS FOR PACKING GROUPS II AND III

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

Packing Instructions 561 – 563

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
561	I	Glass	1.0 kg	15 kg	15 kg
		Plastics	1.0 kg		
		Metal	1.0 kg		
562	II	Glass	2.5 kg	25 kg	25 kg
		Plastics	2.5 kg		
		Metal	5.0 kg		
		Paper bag	2.5 kg		
		Plastic bag	2.5 kg		
		Fibre	2.5 kg		
563	III	Glass	5.0 kg	100 kg	100 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Paper bag	5.0 kg		
		Plastic bag	5.0 kg		
		Fibre	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Groups I and II

— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— For wetted substances where the outer packaging is not leakproof, a leakproof liner or equally effective means of intermediate containment must be provided.

Packing Instructions 561 – 563

OUTER PACKAGINGS OF COMBINATION PACKAGINGS FOR PACKING GROUP I

Boxes	*Drums*
Aluminium (4B)	Aluminium (1B1, 1B2)
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)
Other metal (4N)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A1, 1A2)
Reconstituted wood (4F)	
Steel (4A)	

OUTER PACKAGINGS OF COMBINATION PACKAGINGS FOR PACKING GROUPS II AND III ONLY

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP I

Drums
Aluminium (1B1, 1B2)
Other metal (1N1, 1N2)
Steel (1A1, 1A2)

SINGLE PACKAGINGS FOR PACKING GROUPS II AND III

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)			Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C2)			Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)			Plastics (1H1, 1H2)	
Plastics (4H2)			Plywood (1D)	
Plywood (4D)			Steel (1A1, 1A2)	
Reconstituted wood (4F)				
Steel (4A)				

Packing Instruction 565

Cargo aircraft for UN 3356 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 3356 **Oxygen generator, chemical**	The generators must be tightly packed in the outer packagings listed below.	Forbidden	25 kg	Unpackaged No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

a) The generator, without its packaging, must be capable of withstanding a 1.8 m drop test onto a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause actuation, without loss of its contents and without actuation. For portable breathing equipment (PBE), which are in a vacuum-sealed bag as part of their containment system, this test may be conducted on the PBE in the vacuum-sealed bag.

b) When a generator is equipped with an actuating device, it must have at least two positive means of preventing unintentional actuation as follows:

1) mechanically actuated devices:

i) two pins, installed so that each is independently capable of preventing the actuator from striking the primer;
ii) one pin and one retaining ring, each installed so that each is independently capable of preventing the actuator from striking the primer; or
iii) a cover securely installed over the primer and a pin installed so as to prevent the actuator from striking the primer and cover.

2) electrically actuated devices: The electrical leads must be mechanically shorted and the mechanical short must be shielded in metal foil;

3) for PBE:

i) a pin so as to prevent the actuator from striking the primer; and
ii) placed in protective packaging such as a vacuum-sealed bag;

c) The generator(s) must be transported in a package which will meet the following requirements when one generator in the package is actuated:

1) other generators in the package will not be actuated;

2) packaging material will not ignite; and

3) the outside surface temperature of the completed package will not exceed 100°C.

Note.— To enable tests 1), 2) and 3) to be conducted on PBE, it is acceptable to break the vacuum-sealed bag to actuate the generator before placing it in the package.

d) Packagings must meet the Packing Group II performance requirements.

Packing Instruction 565

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Plastics (4H1, 4H2)	Plastics (1H2)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 570

Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS							**SINGLE PACKAGINGS**
UN number and proper shipping name		*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)— passenger*	*Total quantity per package — passenger*	*Inner packaging quantity (per receptacle)— cargo*	*Total quantity per package — cargo*	
Liquids							
UN 3103	**Organic peroxide type C, liquid**	Plastics	0.5 L	5 L	1.0 L	10 L	No
UN 3105	**Organic peroxide type D, liquid**	Plastics	0.5 L	5 L	1.0 L	10 L	
UN 3107	**Organic peroxide type E, liquid**	Plastics	1.0 L	10 L	2.5 L	25 L	
UN 3109	**Organic peroxide type F, liquid**	Plastics	1.0 L	10 L	2.5 L	25 L	
Solids							
UN 3104	**Organic peroxide type C, solid**	Plastics and plastic bag	0.5 kg	5 kg	1.0 kg	10 kg	No
UN 3106	**Organic peroxide type D, solid**	Plastics and plastic bag	0.5 kg	5 kg	1.0 kg	10 kg	
UN 3108	**Organic peroxide type E, solid**	Plastics and plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	
UN 3110	**Organic peroxide type F, solid**	Plastics and plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	

Packing Instruction 570

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.

Cargo aircraft only

Inner packagings of peroxyacetic acid, stabilized (classified as UN 3107 **Organic peroxide type E, liquid** or UN 3109 **Organic peroxide type F, liquid)** may be fitted with a vent consisting of hydrophobic membrane when the substance is used for purposes such as sterilization, provided:

a) each inner packaging contains not more than 70 mL;

b) the inner packaging is designed so that the vent is not immersed in liquid in any orientation;

c) each inner packaging is enclosed in an intermediate rigid plastic packaging with a small opening to permit release of gas and contains a buffer that neutralizes the contents of the inner packaging in the event of leakage;

d) intermediate packagings are packed in a fibreboard box (4G) outer packaging;

e) each outer packaging contains not more than 1.4 L of liquid; and

f) the rate of oxygen release from the outer packaging does not exceed 15 mL per hour.

Such packages must be transported on cargo aircraft only. The requirements of 4;1.1.6, 4;1.1.12 and 4;7.1.2 do not apply.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Fibreboard (4G) Natural wood (4C1, 4C2) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F)	Fibre (1G) Plastics (1H1, 1H2) Plywood (1D)	Plastics (3H1, 3H2)

Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

8.1 PACKING INSTRUCTIONS

Packing Instruction 603

Passenger and cargo aircraft for UN 3507 only

General requirements

Part 4, Chapter 1 and Part 4;9.1.2, 9.1.4 and 9.1.7 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and name	*Quantity per package — passenger*	*Quantity per package — cargo*
UN 3507 **Uranium hexafluoride, radioactive material, excepted package**, non-fissile or fissile-excepted	Less than 0.1 kg	Less than 0.1 kg

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Substances must be packed in a metal or plastics primary receptacle in a leakproof rigid secondary packaging in a rigid outer packaging.
— Primary inner receptacles must be packed in secondary packagings in a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings must be secured in outer packagings with suitable cushioning material to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated so as to prevent contact between them.
— The contents must comply with the provisions of 2;7.2.4.5.2.
— The provisions of 6;7.3 must be met.
— In the case of fissile-excepted material, limits specified in 2;7.2.3.5 and 6;7.10.2.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Plastics (4H1, 4H2)	Plastics (1H2)	
Plywood (4D)	Plywood (1D)	
Reconstituted wood (4F)	Steel (1A2)	
Steel (4A)		

Packing Instruction 620

This packing instruction applies to UN 2814 and UN 2900.

The following packagings are authorized provided the special packing provisions are met.

Packagings meeting the requirements of 6;6 and approved accordingly consisting of:

a) inner packagings comprising:

1) leakproof primary receptacle(s);

2) a leakproof secondary packaging;

3) other than for solid infectious substances, an absorbent material in sufficient quantity to absorb the entire contents placed between the primary receptacle(s) and the secondary packaging; if multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated so as to prevent contact between them;

b) a rigid outer packaging. The smallest external dimension must be not less than 100 mm.

Additional requirements:

c) Inner packagings containing infectious substances must not be consolidated with inner packagings containing unrelated types of goods. Complete packages may be overpacked in accordance with the provisions of 1;3.1 and 5;2.4.10. Such an overpack may contain dry ice.

d) Other than for exceptional consignments, e.g. whole organs, which require special packaging, the following additional requirements must apply:

1) Substances consigned at ambient temperatures or at a higher temperature. Primary receptacles must be of glass, metal or plastics. Positive means of ensuring a leakproof seal must be provided, e.g. a heat seal, a skirted stopper or a metal crimp seal. If screw caps are used, they must be secured by positive means, e.g. tape, paraffin sealing tape or manufactured locking closure;

2) Substances consigned refrigerated or frozen. Ice, dry ice or other refrigerant must be placed around the secondary packaging(s) or, alternatively, in an overpack with one or more complete packages marked in accordance with 6;6.3. Interior supports must be provided to secure secondary packaging(s) or packages in position after the ice or dry ice has dissipated. If ice is used, the outer packaging or overpack must be leakproof. If dry ice is used, the outer packaging or overpack must permit the release of carbon dioxide gas. The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used;

3) Substances consigned in liquid nitrogen. Plastic primary receptacles capable of withstanding very low temperature must be used. The secondary packaging must also be capable of withstanding very low temperatures and, in most cases, will need to be fitted over the primary receptacle individually. Provisions for the consignment of liquid nitrogen must also be fulfilled. The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the liquid nitrogen;

4) Lyophilized substances may also be transported in primary receptacles that are flame-sealed glass ampoules or rubberstoppered glass vials fitted with metal seals.

e) Whatever the intended temperature of the consignment, the primary receptacle or the secondary packaging must be capable of withstanding, without leakage, an internal pressure producing a pressure differential of not less than 95 kPa. This primary receptacle or secondary packaging must also be capable of withstanding temperatures in the range –40°C to +55°C.

Packing Instruction 620

Note.— The capability of a packaging to withstand an internal pressure without leakage that produces the specified pressure differential should be determined by testing samples of primary receptacles or secondary packagings. Pressure differential is the difference between the pressure exerted on the inside of the receptacle or packaging and the pressure on the outside. The appropriate test method should be selected based on receptacle or packaging type. Acceptable test methods include any method that produces the required pressure differential between the inside and outside of a primary receptacle or a secondary packaging. The test may be conducted using internal hydraulic or pneumatic pressure (gauge) or external vacuum test methods. Internal hydraulic or pneumatic pressure can be applied in most cases as the required pressure differential can be achieved under most circumstances. An external vacuum test is not acceptable if the specified pressure differential is not achieved and maintained. The external vacuum test is a generally acceptable method for rigid receptacles and packagings but is not normally acceptable for:

— *flexible receptacles and flexible packagings;*

— *receptacles and packagings filled and closed under an absolute atmospheric pressure lower than 95 kPa.*

f) Other dangerous goods must not be packed in the same packaging as Division 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Class 3, 8 or 9 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3;5. These small quantities of dangerous goods of Class 3, 8 or 9 are not subject to any additional requirements of these Instructions when packed in accordance with this packing instruction.

g) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4;2.8.

Special packing provisions

a) Shippers of infectious substances must ensure that packages are prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during transport.

b) The definition in 1;3, and the general packing requirements of 4;1, apply to infectious substances packages.

c) An itemized list of contents must be enclosed between the secondary packaging and the outer packaging. When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in Category A, the words “suspected Category A infectious substance” must be shown in parentheses following the proper shipping name on the itemized list of contents inside the outer packaging.

d) Before an empty packaging is returned to the shipper, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard, and any label or mark indicating that it had contained an infectious substance must be removed or obliterated.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 621

≠ **General requirements**

Part 4, Chapter 1 requirements (except 1.1.20) must be met.

ADDITIONAL PACKING REQUIREMENTS

> — The packaging tests may be those appropriate for solids when there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids. In all other circumstances, the packaging tests must be those appropriate for liquids.

— Packagings intended to contain sharp objects such as broken glass and needles must be resistant to puncture and retain liquids under the performance test conditions for the packaging.

\+ — Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
≠ Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1,1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instructions Y640 – Y642

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

Packing Instructions Y640 – Y642

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y640	II	Glass	0.1 L	0.5 L	30 kg	No
		Plastics	0.1 L			
		Metal	0.1 L			
Y641	II	Glass	0.1 L	1.0 L		No
		Plastics	0.1 L			
		Metal	0.1 L			
Y642	III	Glass	0.5 L	2.0 L		No
		Plastics	0.5 L			
		Metal	0.5 L			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instructions Y644 – Y645

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS						**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y644	II	Glass	0.5 kg	1 kg	30 kg	No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Paper bag	0.5 kg			
		Plastic bag	0.5 kg			
		Fibre	0.5 kg			
Y645	III	Glass	1.0 kg	10 kg		No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Paper bag	1.0 kg			
		Plastic bag	1.0 kg			
		Fibre	1.0 kg			

Packing Instructions Y644 – Y645

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 650

This packing instruction applies to UN 3373.

1) The packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during transport, including transhipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings must be constructed and closed to prevent any loss of contents that might be caused under normal conditions of transport by vibration or by changes in temperature, humidity or pressure.

2) The packaging must consist of three components:

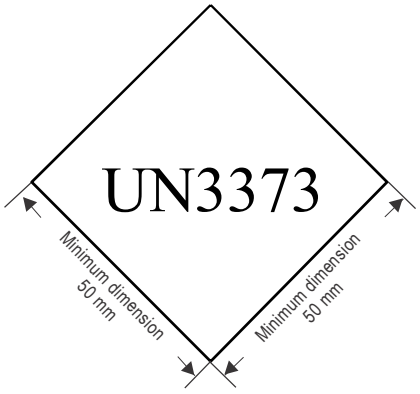
   a) a primary receptacle;

   b) a secondary packaging; and

   c) a rigid outer packaging.

3) Primary receptacles must be packed in secondary packagings in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not compromise the integrity of the cushioning material or of the outer packaging.

4) For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm, the width of the line must be at least 2 mm, and the letters and numbers must be at least 6 mm high. The entire mark must appear on one side of the package. The proper shipping name “Biological substance, Category B” in letters at least 6 mm high must be marked on the outer packaging adjacent to the diamond-shaped mark.



5) At least one surface of the outer packaging must have a minimum dimension of 100 mm × 100 mm.

Packing Instruction 650

6) The completed package must be capable of successfully passing the drop test in 6;6.5.3 as specified in 6;6.5.2 of the Instructions except that the height of the drop must not be less than 1.2 m. Following the appropriate drop sequence, there must be no leakage from the primary receptacle(s) which must remain protected by absorbent material, when required, in the secondary packaging.

7) For liquid substances:

   a) The primary receptacle(s) must be leakproof and must not contain more than 1 litre;

   b) The secondary packaging must be leakproof;

   c) If multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent contact between them;

   d) Absorbent material must be placed between the primary receptacle(s) and the secondary packaging. The absorbent material must be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;

   e) The primary receptacle or the secondary packaging must be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar);

   f) The outer packaging must not contain more than 4 litres. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold.

      Note.— The capability of a packaging to withstand an internal pressure without leakage that produces the specified pressure differential should be determined by testing samples of primary receptacles or secondary packagings. Pressure differential is the difference between the pressure exerted on the inside of the receptacle or packaging and the pressure on the outside. The appropriate test method should be selected based on receptacle or packaging type. Acceptable test methods include any method that produces the required pressure differential between the inside and outside of a primary receptacle or a secondary packaging. The test may be conducted using internal hydraulic or pneumatic pressure (gauge) or external vacuum test methods. Internal hydraulic or pneumatic pressure can be applied in most cases as the required pressure differential can be achieved under most circumstances. An external vacuum test is not acceptable if the specified pressure differential is not achieved and maintained. The external vacuum test is a generally acceptable method for rigid receptacles and packagings but is not normally acceptable for:

      — *flexible receptacles and flexible packagings;*

      — *receptacles and packagings filled and closed under an absolute atmospheric pressure lower than 95 kPa.*

8) For solid substances:

   a) The primary receptacle(s) must be siftproof and must not exceed the outer packaging mass limit;

   b) The secondary packaging must be siftproof;

   c) If multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent contact between them;

   d) Except for packages containing body parts, organs or whole bodies, the outer packaging must not contain more than 4 kg. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold;

   e) If there is any doubt as to whether or not residual liquid may be present in the primary receptacle during transport, then a packaging suitable for liquids, including absorbent materials, must be used.

9) Refrigerated or frozen specimens: ice, dry ice and liquid nitrogen:

   a) When dry ice or liquid nitrogen is used to keep specimens cold, all applicable requirements of these Instructions must be met. When used, ice or dry ice must be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports must be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If carbon dioxide, solid (dry ice) is used, the packaging must be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings;

   b) The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

Packing Instruction 650

10) When packages are placed in an overpack, the package marks required by this packing instruction must either be clearly visible or the marks must be reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

11) Infectious substances assigned to UN 3373 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:

a) the name and address of the shipper and of the consignee must be provided on each package;

b) the name and telephone number of a person responsible must be provided on a written document (such as an air waybill) or on the package;

c) classification must be in accordance with 2;6.3.2;

d) the incident reporting requirements in 7;4.4 and 7;4.5 must be met;

e) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4; and

f) passengers and crew members are prohibited from transporting infectious substances either as, or in, carry-on baggage or checked baggage or on their person.

Note.— When the shipper or consignee is also the “person responsible” as referred to in b), the name and address need be marked only once in order to satisfy the name and marking provisions in both a) and b).

12) Clear instructions on filling and closing such packages must be provided to the shipper or to the person who prepares the package (e.g. patient) by packaging manufacturers and subsequent distributors to enable the package to be correctly prepared for transport.

13) Other dangerous goods must not be packed in the same packaging as Division 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Class 3, 8 or 9 permitted as excepted quantities under 3;5 may be packed in each primary receptacle containing infectious substances. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction no other requirements in these Instructions need be met.

Additional requirements:

1) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4;2.8.

Packing Instructions 651 – 655

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

Packing Instructions 651 – 655

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
651	I	Glass	0.5 L	0.5 L	No
		Plastics	0.5 L		
		Metal	0.5 L		
652	I	Glass	0.5 L	1 L	No
		Plastics	0.5 L		
		Metal	1.0 L		
653	II	Glass	1.0 L	1 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
654	II	Glass	1.0 L	5 L	No
		Plastics	1.0 L		
		Metal	2.5 L		
655	III	Glass	2.5 L	60 L	60 L
		Plastics	2.5 L		
		Metal	5.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 655)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
		Other metal (1N1, 1N2)	Plastics (3H1, 3H2)
		Plastics (1H1, 1H2)	Steel (3A1, 3A2)
		Steel (1A1, 1A2)	

Packing Instructions 657 – 663

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
657	I	Glass	1.0 L	2.5 L	2.5 L
		Plastics	1.0 L		
		Metal	2.5 L		
658	I	Glass	1.0 L	30 L	30 L
		Plastics	1.0 L		
		Metal	2.5 L		
659	II	Glass	1.0 L	5 L	5 L
		Plastics	1.0 L		
		Metal	2.5 L		
660	II	Glass	1.0 L	30 L	30 L
		Plastics	1.0 L		
		Metal	2.5 L		
661	II	Glass	1.0 L	60 L	60 L
		Plastics	1.0 L		
		Metal	2.5 L		
662	II	Glass	2.5 L	60 L	60 L
		Plastics	2.5 L		
		Metal	5.0 L		
663	III	Glass	5.0 L	220 L	220 L
		Plastics	5.0 L		
		Metal	10.0 L		

Packing Instructions 657 – 663

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

SINGLE PACKAGINGS FOR PACKING GROUPS I AND II

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1) Other metal (1N1) Plastics (1H1) Steel (1A1)	Aluminium (3B1) Plastics (3H1) Steel (3A1)

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 665 – 670

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
665	I	Glass	0.5 kg	1 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
666	I	Glass	0.5 kg	5 kg	No
		Plastics	1.0 kg		
		Metal	1.0 kg		
667	II	Glass	1.0 kg	5 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Paper bag	1.0 kg		
		Plastic bag	1.0 kg		
		Fibre	1.0 kg		
668	II	Glass	1.0 kg	15 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Paper bag	1.0 kg		
		Plastic bag	1.0 kg		
		Fibre	1.0 kg		
669	II	Glass	1.0 kg	25 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Paper bag	1.0 kg		
		Plastic bag	1.0 kg		
		Fibre	1.0 kg		
670	III	Glass	5.0 kg	100 kg	100 kg
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Paper bag	5.0 kg		
		Plastic bag	5.0 kg		
		Fibre	5.0 kg		

Packing Instructions 665 – 670

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 670)

Bags	*Boxes*	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Paper (5M2) Plastic film (5H4) Textile (5L3) Woven plastics (5H3)	Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 672 – 677

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary hazard.

2) **Closure requirements**

- Closures must meet the requirements of 4;1.1.4.

Packing Instructions 672 – 677

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
672	I	Glass	1.0 kg	15 kg	15 kg
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Paper bag	1.0 kg		
		Plastic bag	1.0 kg		
		Fibre	1.0 kg		
673	I	Glass	1.0 kg	50 kg	50 kg
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Paper bag	1.0 kg		
		Plastic bag	1.0 kg		
		Fibre	1.0 kg		
674	II	Glass	2.5 kg	25 kg	25 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Paper bag	2.5 kg		
		Plastic bag	2.5 kg		
		Fibre	2.5 kg		
675	II	Glass	2.5 kg	50 kg	50 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Paper bag	2.5 kg		
		Plastic bag	2.5 kg		
		Fibre	2.5 kg		
676	II	Glass	2.5 kg	100 kg	100 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Paper bag	2.5 kg		
		Plastic bag	2.5 kg		
		Fibre	2.5 kg		
677	III	Glass	5.0 kg	200 kg	200 kg
		Plastics	10.0 kg		
		Metal	10.0 kg		
		Paper bag	5.0 kg		
		Plastic bag	5.0 kg		
		Fibre	5.0 kg		

Packing Instructions 672 – 677

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

SINGLE PACKAGINGS FOR PACKING GROUP I

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

SINGLE PACKAGINGS FOR PACKING GROUPS II AND III ONLY

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G)) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 677 only)

Bags	*Boxes*	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Paper (5M2) Plastic film (5H4) Textile (5L3) Woven plastics (5H3)	Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 679

Cargo aircraft only for UN 1700, 2016 and 2017 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name		*Packing conditions*	*Maximum net quantity per package*	
UN 1700	**Tear gas candles**	Elements must not be assembled in grenades or devices, but must be packed in a separate wooden (4C1, 4C2) box and so cushioned that they cannot come into contact with each other or with the walls of the packaging during transport. Not more than 24 grenades and 24 functioning devices per package are permitted.	50 kg	No
UN 2016	**Ammunition, toxic, non-explosive**	Without ignition elements, bursting charges, detonating fuses or other explosive components.	75 kg	No
UN 2017	**Ammunition, tear-producing, non-explosive**	Without ignition elements, bursting charges, detonating fuses or other explosive components.	50 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.
— The articles must be individually packaged and separated from each other using partitions, dividers, inner packagings or cushioning material to prevent inadvertent discharge during normal conditions of transport.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*
Aluminium (4B)	Aluminium (1B1, 1B2)
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)
Other metal (4N)	Plastics (1H1, 1H2)
Plastics (4H2)	Plywood (1D)
Plywood (4D)	Steel (1A1, 1A2)
Reconstituted wood (4F)	
Steel (4A)	

Packing Instruction 680

Passenger and cargo aircraft for UN 1888 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS						SINGLE PACKAGINGS	
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — passenger*	*Inner packaging quantity (per receptacle) — cargo*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1888 **Chloroform**	Glass	1.0 L	2.5 L	60 L	220 L	No	220 L
	Plastics	1.0 L	2.5 L				
	Metal	2.5 L	5.0 L				

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

SINGLE PACKAGINGS FOR CARGO AIRCRAFT ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
		Other metal (1N1, 1N2)	Plastics (3H1, 3H2)
		Plastics (1H1, 1H2)	Steel (3A1, 3A2)
		Steel (1A1, 1A2)	

Packing Instruction Y680

Limited quantities
Passenger and cargo aircraft for UN 1888 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

COMBINATION PACKAGINGS						
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	**SINGLE PACKAGINGS**
UN 1888 **Chloroform**	III	Glass	0.1 L	2 L	30 kg	No
		Plastics	0.1 L			
		Metal	0.1 L			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Instruction 681

Cargo aircraft only for Chlorosilanes

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number	*Inner packaging (see 6;3.2)*	*Net quantity per inner packaging*	*Total quantity per package*	
UN 3361, UN 3362	Glass	1.0 L	30.0 L	30.0 L
	Plastics	Forbidden		
	Steel	5.0 L		

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A1, 1A2)
Reconstituted wood (4F)	
Steel (4A)	

SINGLE PACKAGINGS

Composites	*Cylinders*	*Drums*	*Jerricans*
Plastic receptacle in steel drum (6HA1)	Steel (as permitted by 4;2.7)	Steel (1A1)	Steel (3A1)

Packing Instruction 699

Passenger and cargo aircraft for UN 3123 and UN 3125 only

Only packagings which are approved by the appropriate national authority for these substances may be used (see 4;2.8). A copy of this approval must accompany each consignment or an annotation that it has been granted must be included with the transport document.

Chapter 9

CLASS 7 — RADIOACTIVE MATERIAL

Parts of this Chapter are affected by State Variations CA 1, CA 2, CA 4, IR 4, JP 2, JP 17; see Table A-1

9.1 GENERAL

9.1.1 Radioactive material, packagings and packages must meet the requirements of 6;7. The quantity of radioactive material in a package must not exceed the limits specified in 2;7.2.4. The types of packages for radioactive materials covered by these Instructions are:

a) Excepted package (see 1;6.1.5);

b) Industrial package Type 1 (Type IP-1 package);

c) Industrial package Type 2 (Type IP-2 package);

d) Industrial package Type 3 (Type IP-3 package);

e) Type A package;

f) Type B(U) package;

g) Type B(M) package;

h) Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements.

9.1.2 The non-fixed contamination on the external surfaces of any package must be kept as low as practicable and, under routine conditions of transport, must not exceed the following limits:

a) 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters; and

b) 0.4 Bq/cm^2 for all other alpha emitters.

These limits are applicable when averaged over any area of 300 cm^2 of any part of the surface.

9.1.3 A package must not contain any other items except such articles and documents as are necessary for the use of the radioactive material. This requirement must not preclude the transport of low specific activity material or surface contaminated objects with other items. The transport of such articles and documents in a package, or of low specific activity material or surface contaminated objects with other items may be permitted provided that there is no interaction between them and the packaging or its radioactive contents that would reduce the safety of the package.

9.1.4 Except as provided in 7;3.2.5, the level of non-fixed contamination on the external and internal surfaces of overpacks and freight containers, must not exceed the limits specified in 9.1.2. This requirement does not apply to the internal surfaces of freight containers being used as packagings, either loaded or empty.

9.1.5 Radioactive material meeting the criteria of other Classes or Divisions as defined in Part 2 must be allocated to Packing Group I, II or III, as appropriate, by the application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary hazard. It must also be capable of meeting the appropriate packaging performance criteria for the subsidiary hazard.

9.1.6 Before a packaging is first used to transport radioactive material, it must be confirmed that it has been manufactured in conformity with the design specifications to ensure compliance with the relevant provisions of these Instructions and any applicable certificate of approval. The following requirements must also be fulfilled, if applicable:

a) If the design pressure of the containment system exceeds 35 kPa (gauge), it must be ensured that the containment system of each packaging conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;

b) For each packaging intended for use as a Type B(U), Type B(M) and Type C package and for each packaging intended to contain fissile material, it must be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;

c) For each packaging intended to contain fissile material, it must be ensured that the effectiveness of the criticality safety features is within the limits applicable to or specified for the design and in particular where, in order to comply with the requirements of 6;7.10.1 neutron poisons are specifically included, checks must be performed to confirm the presence and distribution of those neutron poisons.

9.1.7 Before each shipment of any package, it must be ensured that the package does not contain:

a) radionuclides different from those specified for the package design; or

b) contents in a form, or physical or chemical state different from those specified for the package design.

9.1.8 Before each shipment of any package, it must be ensured that all the requirements specified in the relevant provisions of these Instructions and in the applicable certificates of approval have been fulfilled. The following requirements must also be fulfilled, if applicable:

a) It must be ensured that lifting attachments which do not meet the requirements of 6;7.1.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6;7.1.3;

b) Each Type B(U), Type B(M) and Type C package must be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;

c) For each Type B(U), Type B(M) and Type C package, it must be ensured by inspection and/or appropriate tests that all closures, valves, and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6;7.7.8 and 6;7.9.3 were made;

d) For packages containing fissile material, the measurement specified in 6;7.10.5 b) and the tests to demonstrate closure of each package as specified in 6;7.10.8 must be performed;

e) For packages intended to be used for shipment after storage, it must be ensured that all packaging components and radioactive contents have been maintained during storage in a manner such that all the requirements specified in the relevant provisions of these Instructions and in the applicable certificates of approval have been fulfilled.

9.1.9 The shipper must also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.

9.1.10 Except for consignments under exclusive use, the transport index of any package or overpack must not exceed 10, nor must the criticality safety index of any package or overpack exceed 50.

9.1.11 Except for packages or overpacks transported under exclusive use and special arrangement under the conditions specified in 7;2.10.5.3, the maximum dose rate at any point on any external surface of a package or overpack must not exceed 2 mSv/h.

9.1.12 The maximum dose rate at any point on any external surface of a package or overpack under exclusive use must not exceed 10 mSv/h.

9.2 REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO

9.2.1 The quantity of LSA material or SCO in a single Industrial package Type 1 (Type IP-1), Industrial package Type 2 (Type IP-2), or Industrial package Type 3 (Type IP-3), must be so restricted that the external dose rate at 3 m from the unshielded material does not exceed 10 mSv/h.

9.2.2 LSA material and SCO which are or contain fissile material, which is not excepted under 2;7.2.3.5, must meet the applicable requirements in 7;2.9.4.1 and 7;2.9.4.2.

9.2.3 LSA material and SCO which are or contain fissile material must meet the applicable requirements of 6;7.10.1.

9.2.4 LSA-I material, SCO-I and fissile material must not be transported unpackaged.

9.2.5 LSA material and SCO must be packaged in accordance with Table 4-2.

9.3 PACKAGES CONTAINING FISSILE MATERIAL

The contents of packages containing fissile material must be as specified for the package design either directly in these Instructions or in the certificate of approval.

Table 4-2. Industrial package requirements for LSA material and SCO

	Industrial package type	
Radioactive contents	*Exclusive use*	*Not under exclusive use*
LSA-I Solid Liquid	 Type IP-1 Type IP-1	 Type IP-1 Type IP-2
LSA-II Solid Liquid and gas	 Type IP-2 Type IP-2	 Type IP-2 Type IP-3
LSA-III	Type IP-2	Type IP-3
SCO-I	Type IP-1	Type IP-1
SCO-II	Type IP-2	Type IP-2

Chapter 10

CLASS 8 — CORROSIVE SUBSTANCES

10.1 PACKING INSTRUCTIONS

Packing Instructions Y840 – Y841

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.
— Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y840	II	Glass	0.1L	0.5 L	30 kg	No
		Plastics	0.1L			
		Metal	0.1L			
Y841	III	Glass	0.5 L	1.0 L		No
		Plastics	0.5 L			
		Metal	0.5 L			

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group II

— Glass inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a compatible and rigid intermediate packaging before packing in outer packagings.

Packing Instructions Y840 – Y841

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instructions Y843 – Y845

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion.
- Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

2) **Closure requirements**

- Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

- Part 3, Chapter 4 requirements must be met including:
  - the capability of the package to pass a 1.2 m drop test; and
  - a 24-hour stacking test.

COMBINATION PACKAGINGS						**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	*Total gross mass per package*	
Y843	II	Glass	0.5 kg	1 kg	30 kg	No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Plastic bag	0.5 kg			
Y844	II	Glass	0.5 kg	5 kg		No
		Plastics	0.5 kg			
		Metal	0.5 kg			
		Plastic bag	0.5 kg			
Y845	III	Glass	1.0 kg	5 kg		No
		Plastics	1.0 kg			
		Metal	1.0 kg			
		Plastic bag	1.0 kg			

Packing Instructions Y843 – Y845

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instructions 850 – 852

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.
— Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
850	I	Glass	0.5 L	0.5 L	No
		Plastics	0.5 L		
		Metal	0.5 L		
851	II	Glass	1.0 L	1 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
852	III	Glass	2.5 L	5 L	No
		Plastics	2.5 L		
		Metal	5.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

Packing Instructions 850 – 852

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

Packing Instructions 854 – 856

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion.
- Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

2) **Closure requirements**

- Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
854	I	Glass	1.0 L	2.5 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
855	II	Glass	2.5 L	30 L	30 L
		Plastics	2.5 L		
		Metal	2.5 L		
856	III	Glass	5.0 L	60 L	60 L
		Plastics	5.0 L		
		Metal	10.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

- Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

- Packagings must meet the Packing Group II performance requirements.

Packing Instructions 854 – 856

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

SINGLE PACKAGINGS FOR PACKING GROUP II

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1) Other metal (1N1) Plastics (1H1) Steel (1A1)	Aluminium (3B1) Plastics (3H1) Steel (3A1)

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instructions 858 – 860

Passenger aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.
— Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
858	I	Glass	0.5 kg	1 kg	No
		Plastics	0.5 kg		
		Metal	0.5 kg		
859	II	Glass	1.0 kg	15 kg	No
		Plastics	2.5 kg		
		Metal	2.5 kg		
		Plastic bag	1.0 kg		
860	III	Glass	2.5 kg	25 kg	No
		Plastics	2.5 kg		
		Metal	5.0 kg		
		Plastic bag	2.5 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instructions 862 – 864

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.
— Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
862	I	Glass	1.0 kg	25 kg	25 kg
		Plastics	2.5 kg		
		Metal	2.5 kg		
863	II	Glass	2.5 kg	50 kg	50 kg
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Plastic bag	2.5 kg		
864	III	Glass	5.0 kg	100 kg	100 kg
		Plastics	5.0 kg		
		Metal	10.0 kg		
		Plastic bag	5.0 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

Packing Instructions 862 – 864

SINGLE PACKAGINGS FOR PACKING GROUP I

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

SINGLE PACKAGINGS FOR PACKING GROUPS II AND III ONLY

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 866

Cargo aircraft only for UN 2028 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				**SINGLE PACKAGINGS**
UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 2028 **Bombs, smoke, non-explosive** with corrosive liquid, without initiating device	Bombs, smoke may be carried provided they are without ignition elements, bursting charges, detonating fuses or other explosive components.	Forbidden	50 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— The articles must be individually packaged and separated from each other using partitions, dividers, inner packagings or cushioning material.

Packing Instruction 866

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*
Aluminium (4B)	Aluminium (1B2)
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N2)
Other metal (4N)	Plastics (1H2)
Plastics (4H1, 4H2)	Steel (1A2)
Plywood (4D)	
Reconstituted wood (4F)	
Steel (4A)	

Packing Instruction 867

Passenger and cargo aircraft for UN 2803 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					**SINGLE PACKAGINGS**
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 2803 **Gallium**	Plastics	3.5 kg	20 kg	20 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group I performance requirements.
— Plastic inner packagings must be enclosed in liners or bags of strong leakproof and puncture resistant material impervious to the contents and completely surrounding the contents to prevent it from escaping from a package irrespective of its position or orientation.
— Plastic inner packagings must be packed with sufficient cushioning material to prevent breakage.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)
Other metal (4N)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Steel (1A1, 1A2)
Plywood (4D)	
Reconstituted wood (4F)	
Steel (4A)	

Packing Instruction 867

CARRIAGE AT LOW TEMPERATURES

When it is necessary to transport Gallium at low temperatures in order to maintain it in a completely solid state, packagings may be overpacked in strong water-resistant outer packagings which contain dry ice or other means of refrigeration. If a refrigerant is used, all of the above materials used in the packaging of gallium must be chemically and physically resistant at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging must permit the release of carbon dioxide gas.

Packing Instruction 868

Passenger and cargo aircraft for UN 2809 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	
UN 2809 **Mercury**	Glass	2.5 kg	35 kg	35 kg	See below
	Plastics	2.5 kg			

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group I performance requirements.
— Inner packagings must be enclosed in liners or bags of strong leakproof and puncture resistant material impervious to the contents and completely surrounding the contents to prevent it from escaping from a package irrespective of its position or orientation.
— Inner packagings must be packed with sufficient cushioning material to prevent breakage.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Steel (1A1, 1A2)

SINGLE PACKAGINGS

Mercury may also be packed in a single packaging which may only be a welded steel bottle with an inner vaulted bottom, an opening not exceeding 20 mm and a closure which must be a bolt with a conical thread.

Packing Instruction 869

Passenger and cargo aircraft for UN 3506 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS			
UN number and proper shipping name	*Net quantity* per package — passenger*	*Net quantity* per package — cargo*	**SINGLE PACKAGINGS**
UN 3506 **Mercury contained in manufactured articles**	No limit	No limit	No

*For the purposes of Part 5;4.1.5.1 the “net quantity” shown on the dangerous goods transport document is the net mass of the manufactured articles in each package.

ADDITIONAL PACKING REQUIREMENTS

— Manufactured articles or apparatuses of which metallic mercury is a component part, such as manometers, pumps, thermometers, and switches must be packed in sealed inner liners or bags of strong leakproof and puncture-resistant material impervious to mercury which will prevent the escape of mercury from the package irrespective of its position before being packed in outer packagings.

Note.— Mercury switches and relays are excepted from the requirement for a sealed inner liner or bag providing they are of the totally enclosed leakproof type in sealed metal or plastic units.

— Electron tubes, mercury vapour tubes (tubes with less than a total net quantity of 450 g of mercury) must be packed in strong outer packagings with all seams and joints sealed with self-adhesive, pressure-sensitive tape which will prevent the escape of mercury from the package.

Note.— Tubes with 450 g of mercury or more must be packaged according to the requirements for manufactured articles or apparatuses (above).

— Electron tubes which are packed in sealed leakproof metal cases may be shipped in the manufacturer’s original packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 870

Passenger and cargo aircraft for UN 2794 and 2795 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*
UN 2794 **Batteries, wet, filled with acid** UN 2795 **Batteries, wet, filled with alkali**	Batteries must be placed in an acid/alkali-proof liner of sufficient strength and adequately sealed to positively preclude leakage in the event of spillage. The batteries must be packed so that the fill openings and vents, if any, are upward; they must be incapable of short-circuiting and be securely cushioned in the packagings. The upright position of the package must be indicated on it by "Package orientation" labels (Figure 5-29) as required by 5;3. The words "This side up" or "This end up" may also be displayed on the top of the package.	30 kg	400 kg

ADDITIONAL PACKING REQUIREMENTS

— Packagings must meet the Packing Group II performance requirements.
— For batteries, electric storage, packed with battery fluid in the same outer packaging, see UN 2796 and UN 2797.

PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Plastics (4H1, 4H2)	Plastics (1H2)	
Plywood (4D)	Plywood (1D)	
Reconstituted wood (4F)	Steel (1A2)	
Steel (4A)		

Packing Instruction 871

Passenger and cargo aircraft for UN 3028 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*
UN 3028 **Batteries, dry, containing potassium hydroxide solid**	The batteries must be securely cushioned in the packagings.	25 kg	230 kg

ADDITIONAL PACKING REQUIREMENTS

— Packagings must meet the Packing Group II performance requirements.

PACKAGINGS

Boxes

Aluminium (4B))
Fibreboard (4G)
Natural wood (4C1, 4C2)
Plastics (4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Packing Instruction 872

Passenger and cargo aircraft for UN 2800

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Packing conditions*	*Total quantity per package — passenger*	*Total quantity per package — cargo*
UN 2800 **Batteries, wet, non-spillable**	Batteries must be protected against short circuits and must be securely packed in strong outer packagings.	No limit	No limit

PACKAGINGS

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 873

Passenger and cargo aircraft for UN 3477

General requirements

Part 4;1.1.1, 1.1.2 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3477 **Fuel cell cartridges**	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— The mass of each fuel cell cartridge must not exceed 1 kg.
— Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium(4B)	Aluminium(1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction Y873

Limited quantities for UN 3477 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3477 **Fuel cell cartridges**, containing corrosive substances	2.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges must not exceed 0.2 L of liquid corrosive fuel or 0.2 kg of solid corrosive fuel per cartridge.

Packing Instruction Y873

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instruction 874

Passenger and cargo aircraft for UN 3477 (contained in equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3477 **Fuel cell cartridges contained in equipment**, containing corrosive substances	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
— Equipment must be securely cushioned in the outer packagings.
— The mass of each fuel cell cartridge must not exceed 1 kg.
— Fuel cell systems must not charge batteries during transport.
— On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, or a standard approved by the appropriate authority of the State of Origin.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 875

Passenger and cargo aircraft for UN 3477 (packed with equipment) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Quantity — passenger*	*Quantity — cargo*
UN 3477 **Fuel cell cartridges packed with equipment**, containing corrosive substances	5 kg of fuel cell cartridges	50 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— When fuel cell cartridges are packed with equipment, they must be packed in intermediate packagings together with the equipment they are capable of powering.
— The maximum number of fuel cell cartridges in the intermediate packaging must be the minimum number required to power the equipment, plus 2 spares.
— The fuel cell cartridges and the equipment must be packed with cushioning material or divider(s) or inner packaging so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges within the packaging.
— The mass of each fuel cell cartridge must not exceed 1 kg.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 876

Cargo aircraft only for Chlorosilanes

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS	
UN number	*Inner packaging (see 6;3.2)*	*Net quantity per inner packaging — cargo*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1724, UN 1728, UN 1747, UN 1753, UN 1762, UN 1763, UN 1766, UN 1767, UN 1769, UN 1771, UN 1781, UN 1784, UN 1799, UN 1800, UN 1801, UN 1804, UN 1816, UN 1818, UN 2434, UN 2435, UN 2437, UN 2986, UN 2987	Glass	1.0 L	30.0 L	No	30.0 L
	Plastics	Forbidden			
	Steel	5.0 L			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Plastics (1H1, 1H2)
Plastics (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A1, 1A2)
Reconstituted wood (4F)	
Steel (4A)	

SINGLE PACKAGINGS FOR CARGO AIRCRAFT ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
Plastic receptacle in steel drum (6HA1)	Steel (as permitted by 4;2.7)	Steel (1A1)	Steel (3A1)

Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

11.1 PACKING INSTRUCTIONS

Packing Instruction 950

Passenger and cargo aircraft for UN 3166 only
(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 951 for flammable gas-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3166 **Vehicle, flammable liquid powered** or **Vehicle, fuel cell, flammable liquid powered**	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS

Flammable liquid fuel tanks

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of vehicles incorporating internal combustion engines, such as lawn mowers, where such vehicles could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, vehicles, except those with diesel engines, must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.

Diesel engines

Vehicles equipped with diesel engines are excepted from the requirement to drain the fuel tanks, provided that a sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are tightly closed. A careful check must be made to ensure there are no fuel leakages.

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle and must be protected in such a manner so as to prevent damage and short circuits. In addition:

≠ 1) If spillable batteries are installed, and it is possible for the vehicle to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable.

≠ 2) If lithium batteries are installed:

i) lithium batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport; and

ii) lithium batteries must meet the provisions of Part 2;9.3, except that pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.

≠ 3) If sodium batteries are installed they must conform to the requirements of Special Provision A94.

Packing Instruction 950

Other operational equipment

1) Dangerous goods required for the operation or safety of the vehicle, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.

2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Packing Instruction 951

Cargo aircraft only for UN 3166 only
(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3166 **Vehicle, flammable gas powered** or **Vehicle, fuel cell, flammable gas powered**	Forbidden	No limit

ADDITIONAL PACKING REQUIREMENTS

Flammable gas vessels

1) for flammable gas-powered vehicles, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the vehicle to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading the vehicle aboard the aircraft;

or alternatively,

2) flammable gas-powered vehicles that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:

   i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;

   ii) after closing the tank shut-off valves, the vehicle must be operated until it stops from lack of fuel before being loaded aboard the aircraft;

   iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

Packing Instruction 951

Flammable liquid fuel tanks

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, the requirements set out in Packing Instruction 950 for flammable liquid fuel tanks must also be met.

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle and must be protected in such a manner so as to prevent damage and short circuits. In addition:

≠ 1) If spillable batteries are installed, and it is possible for the vehicle to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable.

≠ 2) If lithium batteries are installed:

i) lithium batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport; and

ii) lithium batteries must meet the provisions of Part 2;9.3, except that pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.

≠ 3) If sodium batteries are installed they must conform to the requirements of Special Provision A94.

Other operational equipment

1) Dangerous goods required for the operation or safety of the vehicle, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.

2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Packing Instruction 952

Passenger and cargo aircraft for UN 3171 only
(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3171 **Battery-powered equipment** or **Battery-powered vehicle**	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS

This entry applies to vehicles and equipment which are powered by wet batteries, sodium batteries or lithium batteries and which are transported with these batteries installed. Examples of such vehicles and equipment are electrically-powered cars, lawn mowers, wheelchairs and other mobility aids. Vehicles that also contain an internal combustion engine must be consigned under the entry UN 3166 Vehicle (flammable gas powered) (See Packing Instruction 951) or Vehicle (flammable liquid powered) (See Packing Instruction 950), as appropriate.

Where vehicles could possibly be handled in other than an upright position, the vehicle must be secured in a strong, rigid outer packaging of the type below. The vehicle must be secured by means capable of restraining the vehicle in the outer packaging to prevent any movement during transport which would change the orientation or cause the vehicle to be damaged.

Battery-powered vehicles, machines or equipment must meet the following requirements:

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

≠ 1) If spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable.

≠ 2) If lithium batteries are installed:

i) lithium batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport; and

ii) lithium batteries must meet the provisions of Part 2;9.3, unless otherwise approved by the appropriate authority of the State of Origin, except that pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.

iii) Where the lithium battery is removed from the vehicle and is packed separate from the vehicle in the same outer packaging, the package must be consigned as UN 3481— **Lithium ion batteries packed with equipment** or UN 3091 — **Lithium metal batteries packed with equipment** and packed according to Packing Instruction 966 or 969, as applicable.

≠ 3) If sodium batteries are installed they must conform to the requirements of Special Provision A94.

Packing Instruction 952

Other operational equipment

1) Dangerous goods required for the operation or safety of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.

2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Strong outer packagings — vehicles

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instruction 953

Passenger and cargo aircraft for UN 2807 only

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 2807 **Magnetized material**	No limit	No limit

Magnetized materials with field strengths causing a compass deflection of more than 2 degrees at a distance of 2.1 m but not more than 2 degrees at a distance of 4.6 m (equivalent to 0.418 A/m or 0.00525 Gauss measured at a distance of 4.6 m) are not subject to any other requirements in these Instructions when carried as cargo except for the following:

a) the shipper must make prior arrangements with the operator identifying the magnetized material. The dangerous goods transport document requirements of Part 5;4 are not applicable provided alternative written or electronic documentation includes the words “magnetized material” in association with the description of the goods;

b) the package must bear the magnetized material handling label;

c) the operator must stow the packaged magnetized material in accordance with 7;2.10; and

d) the incident reporting requirements of 7;4.4 must be met.

Magnetized material with a field strength sufficient to cause a compass deflection of more than 2 degrees at a distance of 4.6 m may only be transported with the prior approval of the appropriate authority of the State of Origin and the State of the Operator.

Packing Instruction 954

Passenger and cargo aircraft for UN 1845 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 1845 **Carbon dioxide, solid** or **Dry ice**	200 kg	200 kg

ADDITIONAL PACKING REQUIREMENTS

In packages:

a) must be packed in accordance with the general packing requirements of 4;1 and be in packaging designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packaging;

b) the shipper must make arrangements with the operator(s) for each shipment, to ensure that ventilation safety procedures are followed;

c) the dangerous goods transport document requirements of 5;4 are not applicable provided alternative written documentation is provided describing the contents. The information on the document must be shown in the location provided for the description of the goods. Where an agreement exists with the operator, the shipper may provide the information by electronic data processing (EDP) or electronic data interchange (EDI) techniques. The information required is as follows and should be shown in the following order:

1) UN 1845;

2) **Carbon dioxide, solid** or **Dry ice**;

3) the number of packages and the net quantity of dry ice in each package; and

d) the net mass of the **Carbon dioxide, solid** or **Dry ice** must be marked on the outside of the package.

Dry ice may be shipped in a unit load device prepared by a single shipper provided that:

a) the shipper has made prior arrangements with the operator;

b) the unit load device does not contain dangerous goods other than UN 3373, **Biological substance, Category B** or ID 8000, **Consumer commodity**. Where the unit load device contains UN 3373 or ID 8000, the provisions of these Instructions that apply to those substances must be met in addition to the provisions set out in this packing instruction;

c) the unit load device must allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure (the marking requirements of 5;2 and the labelling requirements of 5;3 do not apply to the unit load device); and

d) the shipper must provide the operator with written documentation or, where agreed with the operator, information by EDP or EDI techniques, stating the total quantity of the dry ice contained in the unit load device.

Packing Instruction 955

Passenger and cargo aircraft for UN 2990 and UN 3072 only

The term “life-saving appliances” applies to articles such as life rafts, life vests, aircraft survival kits or aircraft evacuation slides.

The description “Life-saving appliances, self-inflating” (UN 2990) is intended to apply to life-saving appliances that present a hazard if the self-inflating device is activated accidentally.

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 2990 **Life-saving appliances, self-inflating** UN 3072 **Life-saving appliances, not self-inflating** containing dangerous goods as equipment	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS

Life-saving appliances may only contain the dangerous goods listed below:

a) Division 2.2 gases, must be contained in cylinders which conform to the requirements of the appropriate national authority of the country in which they are approved and filled. Such cylinders may be connected to the life-saving appliance. These cylinders may include installed actuating cartridges (cartridges, power device of Division 1.4C and 1.4S) provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per unit. When the cylinders are shipped separately, they must be classified as appropriate for the Division 2.2 gas contained and need not be marked, labelled or described as explosive articles;

b) signal devices (Class 1), which may include smoke and illumination signal flares; signal devices must be packed in plastic or fibreboard inner packagings;

c) small quantities of flammable substances, corrosive solids and organic peroxides (Class 3, Class 8, Division 4.1 and 5.2), which may include a repair kit and not more than 30 strike-anywhere matches. The organic peroxide may only be a component of a repair kit and the kit must be packed in strong inner packaging. The strike-anywhere matches must be packed in a cylindrical metal or composition packaging with a screw-type closure and be cushioned to prevent movement;

d) electric storage batteries (Class 8), which must be disconnected or electrically isolated and protected against short circuits;

≠ e) lithium batteries:

1) identified as damaged or defective in accordance with Special Provision A154 are forbidden for transport;

2) must meet the applicable requirements of 2;9.3;

3) must be disconnected or electrically isolated and protected against short circuits; and

4) must be secured against movement within the appliance.

f) first aid kits which may include flammable, corrosive and toxic articles or substances.

The appliances must be packed, so that they cannot be accidentally activated, in strong outer packagings and, except for life vests, the dangerous goods must be in inner packagings packed so as to prevent movement. The dangerous goods must be an integral part of the appliance without which it would not be operational and in quantities which do not exceed those appropriate for the actual appliance when in use.

> Life-saving appliances may also include articles and substances not subject to these Instructions which are an integral part of the appliance.

Packing Instruction 956

Passenger and cargo aircraft for UN 1841, UN 1931, UN 2216, UN 3432, UN 2969, UN 3077, UN 3152 and UN 3335 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS	
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	Quantity — passenger	Quantity — cargo
UN 1841 **Acetaldehyde ammonia**	Glass	10.0 kg	200 kg	200 kg	200 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 1931 **Zinc dithionite** or **Zinc hydrosulphite**	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 2216 **Fish meal, stabilized**	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 2969 **Castor beans** or **Castor flake** or **Castor meal** or **Castor pomace**	Glass	10.0 kg	No limit	No limit	No Limit	No Limit
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3077 **Environmentally hazardous substance, solid, n.o.s.**	Glass	10.0 kg	400 kg	400 kg	400 kg	400 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3152 **Polyhalogenated biphenyls, solid** or **Polyhalogenated terphenyls, solid** or **Halogenated monomethyl-diphenylmethanes, solid**	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3335 **Aviation regulated solid, n.o.s.**	Glass	10.0 kg	400 kg	400 kg	400 kg	400 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				

Packing Instruction 956

COMBINATION PACKAGINGS					SINGLE PACKAGINGS	
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	Quantity — passenger	Quantity — cargo
UN 3432 **Polychlorinated biphenyls, solid**	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.

SINGLE PACKAGINGS

Bags	*Boxes*	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Paper (5M2) Plastic film (5H4) Textile (5L3) Woven plastics (5H3)	Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

Packing Instruction 956

INTERMEDIATE BULK CONTAINERS FOR UN 3077 ONLY

For UN 3077, irrespective of the maximum net quantities specified in the columns 11 and 13 of the Dangerous Goods List (Table 3-1) and as provided above for single packagings, intermediate bulk containers (IBCs) with a maximum net quantity not exceeding 1 000 kg are permitted as shown below. Each IBC must be in accordance with Chapter 6.5 of the United Nations Model Regulations and must bear the required UN mark.

Metal	*Rigid plastic*	*Composite with plastic inner receptacle*	*Fibreboard*	*Wooden*	*Flexible*
Steel (11A), (21A) Aluminium (11B), (21B) Other than steel or aluminium (11N), (21N)	For solids, filled or discharged by gravity, fitted with structural equipment (11H1) For solids, filled or discharged by gravity, free-standing (11H2) For solids, filled or discharged under pressure, fitted with structural equipment (21H1) For solids, filled or discharged under pressure, free-standing (21H2)	For solids, filled or discharged by gravity, with rigid plastic inner receptacle (11HZ1) For solids, filled or discharged by gravity, with flexible plastic inner receptacle (11HZ2) For solids, filled or discharged under pressure, with rigid plastic inner receptacle (21HZ1) For solids, filled or discharged under pressure, with flexible plastic inner receptacle (21HZ2) (The IBC Code must be completed by replacing the letter Z with a capital letter indicating the nature of the material used for the outer casing (A for steel; B for aluminium; C for natural wood; D for plywood; F for reconstituted wood; G for fibreboard; H for plastic material; L for textile; M for paper, multi-walled; and N for metal other than steel or aluminium).)	For solids, filled or discharged by gravity (11G)	Natural wood for solids, filled or discharged by gravity with inner liner (11C) Plywood for solids, filled or discharged by gravity, with inner liner (11D) Reconstituted wood for solids, filled or discharged by gravity, with inner liner (11F)	Woven plastic, coated (13H2) Woven plastic with liner (13H3) Woven plastic, coated and with liner (13H4) Plastic film (13H5) Textile coated (13L2) Textile with liner (13L3) Textile coated and with liner (13L4) Paper multi-wall (13M1) Paper multi-wall, water-resistant (13M2)

ADDITIONAL PACKING REQUIREMENTS FOR INTERMEDIATE BULK CONTAINERS

— Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.

Packing Instruction Y956

Limited quantities
Passenger and cargo aircraft for UN 3077 and UN 3335 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total gross mass per package*	
UN 3077 **Environmentally hazardous substance, solid, n.o.s.** UN 3335 **Aviation regulated solid, n.o.s.***	III	Glass	5.0 kg	30 kg	No
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Paper bag	5.0 kg		
		Plastic bag	5.0 kg		
		Fibre	5.0 kg		

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 957

Passenger and cargo aircraft for UN 2211 and UN 3314 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Quantity — passenger*	*Quantity — cargo*	**SINGLE PACKAGINGS**
UN 2211 **Polymeric beads, expandable**, evolving flammable vapour UN 3314 **Plastics moulding compound** in dough, sheet or extruded rope form evolving flammable vapour	Glass	10 kg	100 kg	200 kg	Yes
	Fibre	50 kg			
	Metal	50 kg			
	Paper bag	50 kg			
	Plastics	50 kg			
	Plastic bag	50 kg			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

For other than metal and plastics packagings, a sealed plastic liner must be used.

SINGLE PACKAGINGS

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural Wood (4C1, 4C2)
Other metal (4N)
Plastics (4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

Packing Instruction 958

Passenger and cargo aircraft for UN 2071 and UN 2590 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name		*Inner packaging (see 6.3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package*	
≠ UN 2071	**Ammonium nitrate based fertilizers**	Glass	10 kg	200 kg	200 kg
		Fibre	50 kg		
UN 2590	**Asbestos, chrysotile**	Metal	50 kg		
		Paper bag	50 kg		
		Plastics	50 kg		
		Plastic bag	50 kg		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Plastic, paper and fibre inner packagings must be siftproof.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics(4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A1, 1A2)	
Reconstituted wood (4F)		
Steel (4A)		

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Fibre, fibreboard, wood and plywood single packagings must be fitted with a suitable liner.
— For UN 2590, bags must be placed in closed rigid overpacks.

SINGLE PACKAGINGS

Bags	*Boxes*	*Drums*	*Jerricans*
Paper (5M2)	Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Plastics (5H4)	Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Textile(5L3)	Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Woven plastics (5H3)	Other metal (4N)	Plastics (1H1, 1H2)	
	Plastics (4H2)	Plywood (1D)	
	Plywood (4D)	Steel (1A2)	
	Reconstituted wood (4F)		
	Steel (4A)		

Packing Instruction Y958

Limited quantities
Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
UN number and proper shipping name	*Packing group*	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total gross mass per package*	
UN 2071 **Ammonium nitrate based fertilizer**	III	Glass	5.0 kg	30 kg	No
		Plastics	5.0 kg		
		Metal	5.0 kg		
		Paper bag	5.0 kg		
		Plastic bag	5.0 kg		
		Fibre	5.0 kg		

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 959

Passenger and cargo aircraft for UN 3245 only

General requirements

Part 4, Chapters 1 and 2 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

The following packagings are authorized:

1) Packagings meeting the provisions of 4;1.1.1, 4;1.1.3.1, 4;1.1.5 and 4;2 and so designed that they meet the construction requirements of 6;3. Outer packagings constructed of suitable material of adequate strength and designed in relation to the packaging capacity and its intended use must be used. Where this packing instruction is used for the transport of inner packagings of combination packagings, the packaging must be designed and constructed to prevent inadvertent discharge during normal conditions of transport.

2) Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:

   a) an inner packaging comprising:

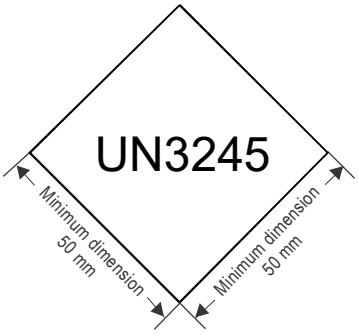
      1) primary receptacle(s) and a secondary packaging, the primary receptacle(s) or the secondary packaging must be leakproof for liquids or siftproof for solids;

      2) for liquids, absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material must be in a quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;

      3) if multiple fragile primary receptacles are placed in a single secondary packaging they must be individually wrapped or separated to prevent contact between them;

   b) an outer packaging must be strong enough for its capacity, mass and intended use, and with a smallest external dimension of at least 100 mm.

For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line must be at least 2 mm and the letters and numbers must be at least 6 mm high. The entire mark must appear on one side of the package.



When packages are placed in an overpack, the package marks required by this packing instruction must either clearly be visible or the marks must be reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Packing Instruction 959

GMOs or GMMOs assigned to UN 3245 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:

1) the name and address of the shipper and of the consignee must be provided on each package;
2) classification must be in accordance with 2;9.2 c);
3) the incident reporting requirements in 7;4.4 and 7;4.5 must be met;
4) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4;
5) passengers and crew members are prohibited from transporting UN 3245 either as, or in, carry-on baggage or checked baggage or on their person.

ADDITIONAL PACKING REQUIREMENTS

— When dry ice or liquid nitrogen is used, all applicable requirements of these Instructions must be met. When used, ice or dry ice must be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports must be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met.
— The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

Packing Instruction 960

Passenger and cargo aircraft for UN 3316 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*State*	*Inner packaging* (see 6;3.2)*	*Maximum quantity of dangerous goods per kit***	*Package quantity — passenger*	*Package quantity — cargo*	**SINGLE PACKAGINGS**
UN 3316 **Chemical kit** or **First aid kit**	Liquid	250 mL	1 L	10 kg	10 kg	No
	Solid	250 g	1 kg			

* Containing dangerous goods.
** The total quantity of dangerous goods in any one kit must not exceed 1 L or 1 kg.

ADDITIONAL PACKING REQUIREMENTS

— Kits may contain dangerous goods which require segregation according to Table 7-1.
— Packagings must meet the performance standards of the most stringent packing group assigned to any individual substance contained in the kit. Where the kit contains only dangerous goods to which no packing group is assigned, packagings must meet Packing Group II performance standards.
— Kits must not be packed with other dangerous goods in the same outer packaging, with the exception of dry ice. If dry ice is used, the requirements in Packing Instruction 954 must be met.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Packing Instruction Y960

Limited quantities
Passenger and cargo aircraft for UN 3316 only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met except 3;4.3.3, including:

— the capability of the package to pass a 1.2 m drop test; and
— a 24-hour stacking test.

≠

UN number and proper shipping name	*State*	*Inner packaging* (see 6;3.2)*	*Maximum quantity of dangerous goods per kit*	*Maximum quantity of dangerous goods per package*	*Total gross mass per package*	**SINGLE PACKAGINGS**
UN 3316 **Chemical kit** or **First aid kit**	Liquid	30 mL	1 kg	1 kg	30 kg	No
	Solid	100 g				
*Containing dangerous goods.						

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Kits may contain dangerous goods which require segregation according to Table 7-1. The packing group assigned to the kit as a whole must be the most stringent packing group assigned to any individual substance contained in the kit.
— Kits must not be packed with other dangerous goods in the same outer packaging, with the exception of dry ice. If dry ice is used, the requirements in Packing Instruction 954 must be met.
— The total quantity of dangerous goods in any one kit and in any one package must not exceed 1 kg.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

≠

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Packing Instruction 961

Passenger and cargo aircraft for UN 3268 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*	**SINGLE PACKAGINGS**
UN 3268 **Safety devices**, electrically initiated	25 kg	100 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Packagings must meet the Packing Group III performance requirements.
— The packagings must be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of transport.
— Any pressure receptacle must be in accordance with the requirements of the appropriate national authority for the substance(s) contained therein.

Cargo aircraft only

Air bag inflators, air bag modules and seat-belt pretensioners may also be transported unpackaged on cargo aircraft in dedicated handling devices when transported to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.When transported in handling devices, the following conditions must be met:

a) air bag inflators, air bag modules or seat-belt pretensioners as fitted in the handling device must be capable of meeting the test criteria prescribed in Special Provision A115;

b) the handling device must be completely enclosed;

c) each air bag inflator, air bag module or seat-belt pretensioner unit must be secured within the handling device to prevent movement in transport; and

d) irrespective of the limit specified in column 13 of Table 3-1, a handling device meeting these requirements may have a gross mass not exceeding 1 000 kg.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Packing Instruction 962

Passenger and cargo aircraft for UN 3363 only

General requirements

Part 4, Chapter 1 requirements must be met (except that the requirements of 4;1.1.2, 1.1.9, 1.1.13 and 1.1.16 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

This entry only applies to articles, such as machinery, apparatus or devices containing dangerous goods as a residue or as an integral element of the article. It must not be used for an article for which a proper shipping name exists in Table 3-1. For other than fuel system components, articles may only contain one or more of the following: dangerous goods permitted under 3;4.1.2 or UN 2807 or gases of Division 2.2 without subsidiary hazard but excluding refrigerated liquefied gases.

UN number and proper shipping name	*State*	*Total net quantity of dangerous goods in one package (excluding magnetic material)*
UN 3363 **Dangerous goods in apparatus** or **Dangerous goods in machinery** or **Dangerous goods in articles**	Liquid	0.5 L
	Solid	1 kg
	Gas (Division 2.2 only)	0.5 kg

ADDITIONAL PACKING REQUIREMENTS

— If the article contains more than one item of dangerous goods, the individual dangerous goods must be enclosed to prevent them reacting dangerously with one another during transport (see 4;1.1.3).
— Receptacles containing dangerous goods must be so secured or cushioned so as to prevent their breakage or leakage and so as to control their movement within the article during normal conditions of transport. Cushioning material must not react dangerously with the contents of the receptacles. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.
— "Package orientation" labels (Figure 5-29), or preprinted orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780-1997 must be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction only when required to ensure liquid dangerous goods remain in their intended orientation.
— Irrespective of 5;3.2.10, articles containing magnetized material meeting the requirements of Packing Instruction 953 must also bear the "Magnetized material" label (Figure 5-27).
— For Division 2.2 gases, cylinders for gases, their contents and filling ratios must conform to the requirements of Packing Instruction 200.
— Dangerous goods in articles must be packed in strong outer packagings unless the receptacles containing the dangerous goods are afforded adequate protection by the construction of the articles.

Fuel system components

— Fuel system components must be emptied of fuel as far as practicable and all openings must be sealed securely. They must be packed:

1) in sufficient absorbent material to absorb the maximum amount of liquid which may possibly remain after emptying. Where the outer packaging is not liquid tight, a means of containing the liquid in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally efficient means of containment; and

2) in strong outer packagings.

Packing Instruction Y963

Limited quantities
Passenger and cargo aircraft for ID 8000 only

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for the purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this packing instruction do not need to comply with 4;1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements. Other dangerous goods not classified as ID 8000 must not be packed in the same outer packaging with ID 8000.

a) Each packaging must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during air transport.

b) Inner packagings that are breakable (such as earthenware, glass or brittle plastic) must be packed to prevent breakage and leakage under conditions normally incident to transport. Each package offered for transport must be capable of withstanding a 1.2 m drop on solid concrete in the position most likely to cause damage. The criteria for passing the test is that the outer packaging must not exhibit any damage liable to affect safety during transport and there must be no leakage from the inner packaging(s). Each package offered for transport must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction of effectiveness, a force applied to the top surface for a duration of 24 hours equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample).

c) When filling receptacles for liquids, sufficient ullage (outage) must be left to ensure that neither leakage nor permanent distortion of the receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to prevail during transport. Unless specific requirements are prescribed in national rules or international agreements, liquids must not completely fill a receptacle at a temperature of 55°C. At this temperature a minimum ullage of 2 per cent should be left. The primary packaging (which may include composite packaging), for which retention of the liquid is a basic function, must be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than 75 kPa or a pressure related to the vapour pressure of the liquid to be conveyed, whichever is the greater. The pressure related to the vapour pressure must be determined by the method shown in 4;1.1.6. Tests on sample receptacles must be carried out to demonstrate the capability of the primary packaging to withstand the above pressure.

d) Stoppers, corks or other such friction-type closures must be held securely, tightly and effectively in place by positive means. The closure device must be so designed that it is extremely improbable that it can be incorrectly or incompletely closed and must be such that it may be easily checked to determine that it is completely closed.

e) Inner packagings must be tightly packed in strong outer packagings and must be so packed, secured or cushioned so as to prevent any breakage, puncture or leakage of contents into the outer packaging(s) during normal conditions of transport. Absorbent material must be provided for glass or earthenware inner packaging(s) containing consumer commodities in Class 3 or liquids of Division 6.1, in sufficient quantity to absorb the liquid contents of the largest of such inner packagings contained in the outer packaging. Absorbent and cushioning material must not react dangerously with the contents of the inner packagings. Notwithstanding the above, absorbent material may not be required if the inner packagings are so protected that breakage of the inner packagings and leakage of their contents from the outer packaging will not occur during normal conditions of transport.

f) Inner packagings containing liquids must be packed with their closures upward and the upright position of the package must be indicated by “Package orientation” labels (Figure 5-29). These labels, or pre-printed package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780-1997, must be affixed to, or printed on, at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The requirements of this sub-paragraph do not apply to:

   1) dangerous goods in inner packagings each containing not more than 120 mL with sufficient absorbent material between the inner and outer packagings to completely absorb the liquid contents; or

   2) dangerous goods in gas tight inner packagings such as tubes, bags or vials which are opened by breaking or puncturing.

g) Each completed package as prepared for shipment must not exceed a gross mass of 30 kg G.

Packing Instruction Y963

≠ h) Class 2 substances must be further limited to aerosol products containing non-toxic compressed or liquefied gas(es). Aerosols must meet the requirements of Part 6;5.4. The valves must be protected by a cap or other suitable means during transport.

> i) Except for aerosols, inner packagings must not exceed:

1) 500 mL for liquids; and

2) 500 g for solids.

j) Consumer commodities shipped according to these provisions may be shipped in a unit load device prepared by a single shipper provided they contain no other dangerous goods other than UN 1845 — **Carbon dioxide, solid** (dry ice) used as a refrigerant. When the unit load device contains dry ice, the provisions of these Instructions applicable to dry ice must be met in addition to the provisions set out in this packing instruction. The shipper must provide the operator with written documentation stating the number of packages of consumer commodities contained in each unit load device.

k) The gross mass on the dangerous goods transport document must be shown as:

1) for one package, the actual gross mass of the package;

2) for more than one package, either the actual gross mass of each package or as the average mass of the packages. (For example, if there are 10 packages and the total gross mass of them is 100 kg, the dangerous goods transport document may show this as “average gross mass per package 10 kg”.)

l) Packages prepared in accordance with these provisions must be durably and legibly marked with the mark shown in Figure 3-1.

Packing Instruction 964

Passenger and cargo aircraft for UN 1941, UN 1990, UN 2315, UN 3151, UN 3082 and UN 3334 only

General requirements

Part 4, Chapter 1 requirements must be met (with the exception that for UN 3082 the requirements of 4;1.1.6 do not apply). These requirements include:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS	
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1941 **Dibromodifluoromethane**	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 1990 **Benzaldehyde**	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 2315 **Polychlorinated biphenyls, liquid**	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 3082 **Environmentally hazardous substance, liquid, n.o.s.**	Glass	10.0 L	450 L	450 L	450 L	450 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 3151 **Polyhalogenated biphenyls, liquid** or **Polyhalogenated terphenyls, liquid** or **Halogenated monomethyldiphenyl-methanes, liquid**	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 3334 **Aviation regulated liquid, n.o.s.**	Glass	10.0 L	450 L	450 L	450 L	450 L
	Plastics	30.0 L				
	Metal	40.0 L				

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H1, 3H2)
Natural wood (4C1, 4C2)	Other metal (1N1, 1N2)	Steel (3A1, 3A2)
Other metal (4N)	Plastics (1H1, 1H2)	
Plastics (4H1, 4H2)	Steel (1A1, 1A2)	
Plywood (4D)		
Reconstituted wood (4F)		
Steel (4A)		

SINGLE PACKAGINGS

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2)	Aluminium (3B1, 3B2)
		Other metal (1N1, 1N2)	Plastics (3H1, 3H2)
		Plastics (1H1, 1H2)	Steel (3A1, 3A2)
		Steel (1A1, 1A2)	

Packing Instruction Y964

Limited quantities
Passenger and cargo aircraft for UN 1941, UN 1990, UN 3082 and UN 3334 only

General requirements

Part 4, Chapter 1 requirements must be met (with the exception that the requirements of 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18, 1.1.20 and in addition for UN 3082 the requirements of 4.1.1.6 do not apply). These requirements include:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

≠

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total gross mass per package*	
UN 1941 **Dibromodifluoromethane** UN 1990 **Benzaldehyde** UN 3082 **Environmentally hazardous substance, liquid, n.o.s.** UN 3334 **Aviation regulated liquid, n.o.s.***	Glass	5.0 L	30 kg	No
	Plastics	5.0 L		
	Metal	5.0 L		

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Steel	
Plywood		
Reconstituted wood		
Steel		

Packing Instruction 965

Cargo aircraft only for UN 3480

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries. This packing instruction is structured as follows:

— Section IA applies to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions; and
— Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

IA. **SECTION IA**

Each cell or battery must meet the provisions of 2;9.3.

IA.1 **General requirements**

— Part 4;1 requirements must be met.
— Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

Table 965-IA

UN number and proper shipping name	*Net quantity per package*	
	Passenger	*Cargo*
UN 3480 **Lithium ion batteries**	Forbidden	35 kg

Packing Instruction 965

IA.2 **Additional requirements**

- Lithium ion cells and batteries must be protected against short circuits.
- Lithium ion cells and batteries must be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
- Lithium ion cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
- ≠ A lithium ion cell or battery with a mass of 12 kg or greater and having a strong, impact-resistant outer casing may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

IA.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

IB. **SECTION IB**

≠ Lithium ion cells or batteries prepared in accordance with this section are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the provisions of Part 6.

Lithium ion cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number “965” required by 5;4.1.5.8.1 a) must be supplemented with “IB”. All other applicable provisions of Part 5;4 apply.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3 a), e) and g) and the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;

2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
   - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009;

IB.1 **General requirements**

- Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).
- Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

Table 965-IB

Contents	*Net quantity per package*	
	Passenger	*Cargo*
Lithium ion cells and batteries	Forbidden	10 kg

Packing Instruction 965

IB.2 **Additional requirements**

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong rigid outer packaging.
- Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Divìsion 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
+ - Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of 24 hours.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3) in addition to the appropriate Class 9 hazard label (Figure 5-26) and the cargo aircraft only label (Figure 5-28).

IB.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

>

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries packed with equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.

I. **SECTION I**

Each cell or battery must meet the provisions of 2;9.3.

I.1 **General requirements**

Part 4;1 requirements must be met.

	Package quantity (Section I)	
UN number and proper shipping name	*Passenger*	*Cargo*
UN 3481 **Lithium ion batteries packed with equipment**	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

Packing Instruction 966

≠ I.2 **Additional requirements**

— Lithium ion cells and batteries must be protected against short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
— Lithium ion cells and batteries must:
  — be placed in inner packagings that completely enclose the cell or battery, then placed in a packaging of a type shown below that meets the Packing Group II performance requirements, then placed with the equipment in a strong, rigid outer packaging; or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a packaging of a type shown below that meets the Packing Group II performance requirements.
— The equipment must be secured against movement within the outer packaging.
— The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

II. **SECTION II**

Lithium ion cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 7;4.5 (Operator's responsibilities — Reporting of undeclared and misdeclared dangerous goods);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3 a), e) and g) and the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;

2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
   — the Watt-hour rating must be marked on the outside case except for those batteries manufactured before 1 January 2009.

> II.1 **General requirements**

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

Packing Instruction 966

≠ II.2 **Additional requirements**

— Lithium ion cells and batteries must:
  — be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1); or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).
— Cells and batteries must be protected against short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit.
— The equipment must be secured against movement within the outer packaging.
— The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.
— Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  — damage to cells or batteries contained therein;
  — shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  — release of contents.
— Each package must be marked with the appropriate lithium battery mark (Figure 5-3).
  — the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
≠ — The words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used. Where packages of Section II lithium batteries from multiple packing instructions are included on one air waybill, the compliance statement for the different lithium battery types and/or packing instructions may be combined into a single statement provided that the statement identifies the applicable lithium battery type(s) and packing instruction numbers.
— Where a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment that meet the limits for lithium cells or batteries of Section II, the following additional requirements apply:
  — the shipper must ensure that all applicable parts of both packing instructions are met. The total mass of lithium batteries contained in any package must not exceed 5 kg;
  — the words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used.
— Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with the functions for which they are responsible.

II.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II.4 **Overpacks**

When packages are placed in an overpack:

\+ a) the packages must be secured within the overpack;

\+ b) the intended function of each package must not be impaired by the overpack; and

c) the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack" in lettering of at least 12 mm high.

Packing Instruction 967

Passenger and cargo aircraft for UN 3481 (contained in equipment) only

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries contained in equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.

I. **SECTION I**

Each cell or battery must meet the provisions of 2;9.3.

I.1 **General requirements**

≠ Equipment must be packed in strong rigid outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1). Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.

	Package quantity (Section I)	
UN number and proper shipping name	*Passenger*	*Cargo*
UN 3481 **Lithium ion batteries contained in equipment**	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

I.2 **Additional requirements**

≠
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Where multiple pieces of equipment are packed in the same outer packaging, each piece of equipment must be packed to prevent contact with other equipment.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Packing Instruction 967

II. **SECTION II**

Lithium ion cells and batteries contained in equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 7;4.5 (Operator's responsibilities — Reporting of undeclared and misdeclared dangerous goods);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3 a), e) and g) and the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;

2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
   — the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

II.1 **General requirements**

≠ Equipment must be packed in strong rigid outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1). Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

II.2 **Additional requirements**

— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
— Cells and batteries must be protected so as to prevent short circuits.
≠ — Where multiple pieces of equipment are packed in the same outer packaging, each piece of equipment must be packed to prevent contact with other equipment.
— Each package must be marked with the appropriate lithium battery mark (Figure 5-3). The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
   — This requirement does not apply to:
      — packages containing only button cell batteries installed in equipment (including circuit boards); and
      — packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.
≠ — Where a consignment includes packages bearing the lithium battery mark, the words "lithium ion batteries, in compliance with Section II of PI967" must be placed on the air waybill, when an air waybill is used. Where packages of Section II lithium batteries from multiple packing instructions are included on one air waybill, the compliance statement for the different lithium battery types and/or packing instructions may be combined into a single statement provided that the statement identifies the applicable lithium battery type(s) and packing instruction numbers.
— Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with the functions for which they are responsible.

Packing Instruction 967

II.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II.4 **Overpacks**

When packages are placed in an overpack:

+ a) the packages must be secured within the overpack;

+ b) the intended function of each package must not be impaired by the overpack; and

c) the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Packing Instruction 968

Cargo aircraft only for UN 3090

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries. This packing instruction is structured as follows:

— Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions; and
— Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g.

> A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a “cell” and must be transported according to the requirements for “cells” for the purpose of this packing instruction.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

IA. **SECTION IA**

Each cell or battery must meet the provisions of 2;9.3.

IA.1 **General requirements**

Part 4;1 requirements must be met.

Table 968-IA

UN number and proper shipping name	*Net quantity per package*	
	Passenger	*Cargo*
UN 3090 **Lithium metal batteries**	Forbidden	35 kg

IA.2 **Additional requirements**

— Lithium metal cells and batteries must be protected against short circuits.
— Lithium metal cells and batteries must be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
— Lithium metal cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
— A lithium metal cell or battery with a mass of 12 kg or greater and having a strong, impact-resistant outer casing may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.

Packing Instruction 968

IA.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

IB. **SECTION IB**

≠ Lithium metal cells or batteries prepared in accordance with this section are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the provisions of Part 6.

Lithium metal cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number “968” required by 5;4.1.5.8.1 a) must be supplemented with “IB”. All other applicable provisions of Part 5;4 apply.

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3 a), e), f) (if applicable) and g) and the following:

1) for lithium metal cells, the lithium content is not more than 1 g;
2) for lithium metal or lithium alloy batteries, the aggregate lithium content is not more than 2 g.

IB.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-IB

Contents	*Net quantity per package*	
	Passenger	*Cargo*
Lithium metal cells and batteries	Forbidden	2.5 kg

IB.2 **Additional requirements**

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong rigid outer packaging.
- Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Divìsion 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
- + Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of 24 hours.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3) in addition to the appropriate Class 9 hazard label (Figure 5-26) and the cargo aircraft only label (Figure 5-28).

Packing Instruction 968

IB.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

>

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries packed with equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.

I. **SECTION I**

Each cell or battery must meet the provisions of 2;9.3.

I.1 **General requirements**

Part 4;1 requirements must be met.

UN number and proper shipping name		*Package quantity (Section I)*	
		Passenger	*Cargo*
UN 3091	**Lithium metal batteries packed with equipment**	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

Packing Instruction 969

I.2 **Additional requirements**

≠ — Lithium metal cells and batteries must be protected against short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
≠ — Lithium metal cells and batteries must:
  — be placed in inner packagings that completely enclose the cell or battery, then placed in a packaging of a type shown below that meets the Packing Group II performance requirements, then placed with the equipment in a strong, rigid outer packaging; or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a packaging of a type shown below that meets the Packing Group II performance requirements.
≠ — The equipment must be secured against movement within the outer packaging.
— The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.
— For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
  — cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

II. **SECTION II**

Lithium metal or lithium alloy cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 7;4.5 (Operator's responsibilities — Reporting of undeclared and misdeclared dangerous goods);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3 a),e), f) (if applicable) and g) and the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

II.1 **General requirements**

>

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

Packing Instruction 969

II.2 **Additional requirements**

≠ — Lithium metal cells and batteries must:
  — be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1); or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

≠ — Cells and batteries must be protected against short circuits. This includes protection against contact with ≠ electrically conductive material within the same packaging that could lead to a short circuit.

— The equipment must be secured against movement within the outer packaging.

— The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.

— Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  — damage to cells or batteries contained therein;
  — shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  — release of contents.

— Each package must be marked with the appropriate lithium battery mark (Figure 5-3).
  — the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

≠ — The words "lithium metal batteries, in compliance with Section II of PI969" must be placed on the air waybill, when an air waybill is used. Where packages of Section II lithium batteries from multiple packing instructions are included on one air waybill, the compliance statement for the different lithium battery types and/or packing instructions may be combined into a single statement provided that the statement identifies the applicable lithium battery type(s) and packing instruction numbers.

— Where a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment that meet the limits for lithium cells or batteries of Section II, the following additional requirements apply:
  — the shipper must ensure that all applicable parts of both packing instructions are met. The total mass of lithium batteries contained in any package must not exceed 5 kg;
  — the words "lithium metal batteries, in compliance with Section II of PI969" must be placed on the air waybill, when an air waybill is used.

— Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with the functions for which they are responsible.

II.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II.4 **Overpacks**

When packages are placed in an overpack:

+ a) the packages must be secured within the overpack;

+ b) the intended function of each package must not be impaired by the overpack; and

c) the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack" in lettering of at least 12 mm high.

Packing Instruction 970

Passenger and cargo aircraft for UN 3091 (contained in equipment) only

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries contained in equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.

I. **SECTION I**

Each cell or battery must meet the provisions of 2;9.3.

I.1 **General requirements**

≠ Equipment must be packed in strong rigid outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1). Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.

UN number and proper shipping name	*Package quantity (Section I)*	
	Passenger	*Cargo*
UN 3091 **Lithium metal batteries contained in equipment**	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

I.2 **Additional requirements**

≠
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Where multiple pieces of equipment are packed in the same outer packaging, each piece of equipment must be packed to prevent contact with other equipment.
- The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

Packing Instruction 970

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II. **SECTION II**

Lithium metal or lithium alloy cells and batteries contained in equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 7;4.5 (Operator's responsibilities — Reporting of undeclared and misdeclared dangerous goods);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3 a), e), f) (if applicable) and g) and the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

II.1 **General requirements**

≠ Equipment must be packed in strong rigid outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1). Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

Packing Instruction 970

II.2 **Additional requirements**

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Cells and batteries must be protected so as to prevent short circuits.
≠ - Where multiple pieces of equipment are packed in the same outer packaging, each piece of equipment must be packed to prevent contact with other equipment.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3). The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
  - This requirement does not apply to:
    - packages containing only button cell batteries installed in equipment (including circuit boards); and
    - packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.
≠ - Where a consignment includes packages bearing the lithium battery mark, the words “lithium metal batteries, in compliance with Section II of PI970” must be placed on the air waybill, when an air waybill is used. Where packages of Section II lithium batteries from multiple packing instructions are included on one air waybill, the compliance statement for the different lithium battery types and/or packing instructions may be combined into a single statement provided that the statement identifies the applicable lithium battery type(s) and packing instruction numbers.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with the functions for which they are responsible.

II.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II.4 **Overpacks**

When packages are placed in an overpack:

+ a) the packages must be secured within the overpack;

+ b) the intended function of each package must not be impaired by the overpack; and

c) the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Packing Instruction 971

Passenger and cargo aircraft for UN 3499 only (see also Special Provision A186) and UN 3508 (Special Provision A196) only

General requirements

Part 4;1.1.1 and 1.1.8 requirements must be met.

For the purpose of this packing instruction, a capacitor is considered an inner packaging.

UN number and proper shipping name		*Quantity — passenger*	*Quantity — cargo*
UN 3499	**Capacitor**, electric double layer	No limit	No limit
UN 3508	**Capacitor, asymmetric** (with an energy storage capacity greater than 0.3 Wh)	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS

For UN 3499

— Each capacitor must be transported in an uncharged state. The capacitor or, when fitted in a module, the module must be fitted with a metal strap connecting the terminals.
— Capacitors must be securely cushioned in the outer packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 972

Passenger or cargo aircraft for UN 3530 only
(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles or Packing Instruction 952 for battery-powered equipment and vehicles)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3530 **Engine, internal combustion** or **Machinery, internal combustion**	No limit	No limit

General

1) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;

2) Any valves or openings (e.g. venting devices) must be closed during transport;

3) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged.

ADDITIONAL PACKING REQUIREMENTS

If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required. Dangerous goods in engines or machinery must otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4;1.1.1, or they must be fixed in such a way that they will not become loose during normal conditions of transport, e.g. in cradles or crates or other handling devices.

Liquid fuel tanks

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, machinery must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.

Batteries

All batteries must be installed and securely fastened in the battery holder of the machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

≠ 1) If spillable batteries are installed, and it is possible for the machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable.

≠ 2) If lithium batteries are installed:

i) lithium batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport; and

ii) they must meet the provisions of Part 2;9.3, except that pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.

≠ 3) If sodium batteries are installed they must conform to the requirements of Special Provision A94.

Packing Instruction 972

Other operational equipment

Dangerous goods required for the operation or safety of the machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the machine or equipment.

+

Packing Instruction 975

Passenger and cargo aircraft for UN 3548 only

Introduction

≠ This packing instruction is only permitted for articles which do not have an existing proper shipping name and which contain only environmentally hazardous substances where the quantity of the environmentally hazardous substance in the article exceeds 5 L or 5 kg. In addition to the environmentally hazardous substances, the article may also contain lithium cells or batteries that comply with Section II of Packing Instruction 967 or Section II of Packing Instruction 970, as applicable.

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3548 **Articles containing miscellaneous dangerous goods, n.o.s.***	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS

— Packagings must meet the Packing Group II performance requirements.
— Receptacles containing liquids or solids within articles must be constructed of suitable materials and secured in the article in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the article itself or the outer packaging.
— Receptacles containing liquids with closures must be packed with their closures correctly oriented. The receptacles must in addition conform to the internal pressure test provisions of 6;4.5.
— Receptacles that are liable to break or be punctured easily, such as those made of glass or of certain plastics materials must be properly secured, and any leakage of the contents must not substantially impair the protective properties of the article or of the outer packaging.
— Where there is no receptacle within the article, the article must fully enclose the dangerous goods and prevent their release under normal conditions of transport.
— Articles must be packed to prevent movement and inadvertent operation during normal conditions of transport.

ROBUST ARTICLES

Robust articles may alternatively be transported in strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging capacity and its intended use. The packagings must achieve a level of protection that is at least equivalent to that provided by 6;1. Articles may be transported unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained. In such cases, the additional requirement related to Packing Group II performance requirements and the requirement for UN specification packagings do not apply.

OUTER PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

Part 5

SHIPPER'S RESPONSIBILITIES

Chapter 1

GENERAL

Parts of this Chapter are affected by State Variations BE 4, BR 8, CA 1, CA 4, CH 3, DE 1, DE 2, FR 2, FR 3, GB 1, HK 3, HR 4, IN 2, IN 3, IR 1, IR 4, IT 1, IT 2, IT 3, IT 5, JP 8, JP 17, MY 2, MY 3, NL 3, RO 1, UA 1, US 10, VE 7; see Table A-1

Note.— It is the shipper's responsibility to ensure that all of the applicable air transport requirements are met. The items indicated below are provided as examples and do not include a complete list of all the applicable requirements for air transport.

1.1 GENERAL REQUIREMENTS

Before a person offers any package or overpack of dangerous goods for transport by air, that person must ensure that:

a) the articles or substances are not forbidden for transport by air (see Part 1, Chapter 2);

b) the goods are properly classified, marked and labelled and otherwise in a condition for transport as required by these Instructions;

c) the dangerous goods are packaged in compliance with all the applicable air transport requirements including:

— inner packaging and the maximum quantity per package limits;

— appropriate types of packaging according to the packing instructions;

— other applicable requirements indicated in the packing instructions including:

— single packagings may be forbidden;
— only inner and outer packagings indicated in the packing instructions are permitted;
— inner packaging may need to be packed in intermediate packagings; and
— certain dangerous goods must be transported in packagings meeting a higher performance level.

— appropriate closure procedures for inner and outer packagings (see 4;1.1.4);

— the compatibility requirements such as those in the particular packing requirements of the packing instructions and in Part 4, Chapter 1;

— the absorbent material requirements in the packing instructions when applicable; and

— the pressure differential requirement in 4;1.1.6.

d) the dangerous goods transport document has been properly executed and the declaration signed;

e) the overpack does not contain packages of dangerous goods which require segregation according to Table 7-1;

f) when an overpack is used, packages must be secured within the overpack;

g) the dangerous goods are not included in any freight container/unit load device except as specified in 7;1.4;

h) before a package or overpack is reused, all inappropriate dangerous goods labels and marks are removed or completely obliterated;

i) each package contained within an overpack is properly packed, marked, labelled and is free of any indication that its integrity has been compromised and in all respects is properly prepared as required in these Instructions. The "overpack" mark described in 2.4.10 is an indication of compliance with this requirement. The intended function of each package must not be impaired by the overpack; and

j) packages and overpacks containing dangerous goods are offered to the operator separately from cargo which is not subject to these Instructions, except as provided for in 7;1.4.1.

Note 1.— Packages and overpacks containing dangerous goods may be included on the same air waybill as cargo which is not subject to these Instructions.

Note 2.— The requirement in 1.1 j) also applies to consolidated shipments offered to the operator.

Note 3.— For cooling purposes, an overpack may contain dry ice, provided that the overpack meets the requirements of Packing Instruction 954.

Note 4.— In accordance with the GHS, a GHS pictogram not required by these Instructions should only appear in transport as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).

1.2 GENERAL PROVISIONS FOR CLASS 7

1.2.1 Approval of shipments and notification

1.2.1.1 *General*

In addition to the approval of package designs described in Part 6, Chapter 4, multilateral shipment approval is also required in certain circumstances (1.2.1.2 and 1.2.1.3). In some circumstances it is also necessary to notify competent authorities of a shipment (1.2.1.4).

1.2.1.2 *Shipment approvals*

Multilateral approval must be required for:

a) The shipment of Type B(M) packages not conforming with the requirements of 6;7.6.5;

b) The shipment of Type B(M) packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower; and

c) The shipment of packages containing fissile materials if the sum of the criticality safety indexes of the packages in a single freight container or in an aircraft exceeds 50;

except that a competent authority may authorize transport into or through its country without shipment approval, by a specific provision in its design approval (see 1.2.2.1).

≠ 1.2.1.3 *Shipment approval by special arrangement*

A competent authority may approve provisions under which consignments that do not satisfy all the applicable requirements of these Instructions may be transported under special arrangement (see 1;6.4).

1.2.1.4 *Notifications*

Notification to competent authorities is required as follows:

a) Before the first shipment of any package requiring competent authority approval, the shipper must ensure that copies of each applicable competent authority certificate applying to that package design have been submitted to the competent authority of the country of origin of the shipment and to the competent authority of each country through or into which the consignment is to be transported. The shipper is not required to await an acknowledgement from the competent authority, nor is the competent authority required to make such acknowledgement of receipt of the certificate;

b) For each of the following types of shipments:

   i) Type C packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

   ii) Type B(U) packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

   iii) Type B(M) packages;

   iv) Shipment under special arrangement;

   the shipper must notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be transported. This notification must be in the possession of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance;

c) The shipper is not required to send a separate notification if the required information has been included in the application for approval of shipment (see 6;7.22);

d) The consignment notification must include:

i) sufficient information to enable the identification of the package or packages including all applicable certificate numbers and identification marks;

ii) information on the date of shipment, the expected date of arrival and proposed routeing;

iii) the names of the radioactive material or nuclides;

iv) descriptions of the physical and chemical forms of the radioactive material, or whether it is special form radioactive material or low dispersible radioactive material; and

v) the maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with an appropriate SI prefix symbol (see 1;3.2). For fissile material, the mass of fissile material (or of each fissile nuclide for mixtures when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity.

1.2.2 Certificates issued by the competent authority

1.2.2.1 Certificates issued by the competent authority are required for the following:

a) Designs for:

i) special form radioactive material;

ii) low dispersible radioactive material;

iii) fissile material excepted under 2;7.2.3.5.1 f);

iv) packages containing 0.1 kg or more of uranium hexafluoride;

v) packages containing fissile material unless excepted by 2;7.2.3.5, 6;7.10.2 or 6;7.10.3;

vi) Type B(U) packages and Type B(M) packages;

vii) Type C packages;

b) Special arrangements;

c) Certain shipments (1.2.1.2).

d) Determination of the basic radionuclide values referred to in 2;7.2.2.1 for individual radionuclides which are not listed in Table 2-12 (see 2;7.2.2.2 a));

e) Alternative activity limits for an exempt consignment of instruments or articles (see 2;7.2.2.2 b));.

The certificates must confirm that the applicable requirements are met, and for design approvals, must attribute to the design an identification mark.

The certificates of approval for the package design and shipment may be combined into a single certificate.

Certificates and applications for these certificates must be in accordance with the requirements in 6;7.22.

1.2.2.2 The shipper must be in possession of a copy of each applicable certificate.

1.2.2.3 For package designs where it is not required that a competent authority issue a certificate of approval, the shipper must, on request, make available for inspection by the relevant competent authority, documentary evidence of the compliance of the package design with all the applicable requirements.

1.2.3 Determination of transport index (TI) and criticality safety index (CSI)

1.2.3.1 Determination of transport index

1.2.3.1.1 The transport index (TI) for a package, overpack or freight container, must be the number derived in accordance with the following procedure:

a) Determine the maximum dose rate in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, or freight container. The value determined must be multiplied by 100 and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum dose rate at any point 1 m from the external surface of the load may be taken as:

   0.4 mSv/h for ores and physical concentrates of uranium and thorium;

   0.3 mSv/h for chemical concentrates of thorium;

   0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride;

b) For freight containers, the value determined in step a) above must be multiplied by the appropriate factor from Table 5-1;

c) The value obtained in steps a) and b) above must be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero and the resulting number is the transport index value.

Note.— If the measured dose rate comprises more than one type of radiation, then the transport index should be based on the sum of all the dose rates from each type of radiation (see paragraph 523.1 of the IAEA Specific Safety Guide No. SSG-26 (2012 Edition)).

1.2.3.1.2 The transport index for each overpack or freight container must be determined as the sum of the transport indices of all the packages contained therein. However, for a rigid overpack, or a freight container from one single shipper, the shipper may determine the transport index by direct measurement of dose rate. The transport index for a non-rigid overpack must be determined only as the sum of the transport indices of all the packages within the overpack.

Table 5-1. Multiplication factors for freight containers

*Size of load**	*Multiplication factor*
size of load ≤ 1 m^2	1
1 m^2 < size of load ≤ 5 m^2	2
5 m^2 < size of load ≤ 20 m^2	3
20 m^2 < size of load	10
* Largest cross-sectional area of the load being measured.	

1.2.3.1.3 The criticality safety index for each overpack or freight container must be determined as the sum of the CSIs of all the packages contained. The same procedure must be followed for determining the total sum of CSIs in a consignment or aboard an aircraft.

1.2.3.1.4 Packages, overpacks and freight containers must be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 5-2 and with the following requirements:

a) for a package, overpack or freight container, both the transport index and the surface dose rate conditions must be taken into account in determining which is the appropriate category. Where the transport index satisfies the condition for one category but the surface dose rate satisfies the condition for a different category, the package, overpack or freight container must be assigned to the higher category. For this purpose, category I-WHITE must be regarded as the lowest category;

b) the transport index must be determined following the procedures specified in 1.2.3.1.1 and 1.2.3.1.2;

c) if the surface dose rate is greater than 2 mSv/h, the package or overpack must be transported under exclusive use and under the provisions of 7;2.10.5.3, as appropriate;

d) a package transported under a special arrangement must be assigned to category III-YELLOW except under the provisions of 1.2.3.1.5;

e) an overpack or freight container which contains packages transported under special arrangement must be assigned to category III-YELLOW except under the provisions of 1.2.3.1.5.

Table 5-2. Categories of packages, overpacks and freight containers

Conditions		
Transport index	*Maximum dose rate at any point on external surface*	*Category*
0*	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1*	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2 mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III-YELLOW**
* If the measured transport index is not greater than 0.05, the value quoted may be zero in accordance with 1.2.3.1.1 c). ** Must be transported under exclusive use and special arrangement except for freight containers (see Table 7-6).		

1.2.3.1.5 In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the categorization must be in accordance with the certificate of the country of origin of design.

1.2.4 Specific provisions for excepted packages of radioactive material of Class 7

1.2.4.1 Excepted packages of radioactive material of Class 7 must be legibly and durably marked on the outside of the packaging with:

a) the UN number preceded by the letters “UN”;

b) an identification of either the shipper or consignee, or both; and

c) the permissible gross mass if this exceeds 50 kg.

1.2.4.2 The documentation requirements of 5;4 do not apply to excepted packages of radioactive material of Class 7, except that:

a) the UN number preceded by the letters “UN” and the name and address of the shipper and the consignee and, if relevant, the identification mark for each competent authority certificate of approval (see 5;4.1.5.7.1 g)) must be shown on a transport document such as an air waybill or other similar document complying with the requirements of 5;4.1.2.1 to 5;4.1.2.4;

b) the requirements, if relevant, of 4.1.5.7.1 g), 4.1.5.7.3 and 4.1.5.7.4 apply; and

c) the requirements of 4.4 apply.

Where an agreement exists with the operator, the shipper may provide the information by EDP or EDI techniques.

1.2.4.3 The requirements of 2.4.5.2 and 3.5.1.1 k) apply if relevant.

1.3 INFORMATION TO EMPLOYEES

A shipper must provide such information to employees as will enable them to carry out the functions for which they are responsible with regard to the transport of dangerous goods by air.

1.4 TRAINING

Before a consignment of dangerous goods is offered for air transport, all relevant persons involved in its preparation must have received training to enable them to carry out the functions for which they are responsible, as detailed in Part 1. Where a shipper does not have trained staff, the “relevant persons” may be interpreted as applying to those employed to act on the shipper’s behalf and to undertake the shipper’s responsibilities in the preparation of the consignment. However, such persons must be trained as required by Part 1, Chapter 4.

1.5 SALVAGE PACKAGINGS

Before a person offers any salvage packaging for transport by air, that person must ensure that:

— it is marked with the proper shipping name and UN number of, and bear all the labels appropriate for, the dangerous goods contained therein;

— it is marked with the word “Salvage” and the lettering of the “Salvage” mark must be at least 12 mm high;

≠ — the words “Salvage packaging” are added after the description of the goods in the dangerous goods transport document required by 4.1; and

— where the package contains dangerous goods restricted to transport on cargo aircraft only, it bears a “Cargo aircraft only” label and the dangerous goods transport document contains the necessary statement according to 4.1.5.8.1 c).

In addition, that person must ensure that all other applicable requirements are met.

1.6 EMPTY PACKAGINGS

1.6.1 Other than for Class 7, a packaging which previously contained dangerous goods must be identified, marked, labelled and placarded as required for those dangerous goods unless steps such as cleaning, purging of vapours or refilling with a non-dangerous substance are taken to nullify any hazard.

1.6.2 Before an empty packaging which had previously contained an infectious substance is returned to the shipper, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard, and any label or mark indicating that it had contained an infectious substance must be removed or obliterated.

1.6.3 Freight containers as well as other packagings and overpacks used for the transport of radioactive material must not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm2 for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm2 for all other alpha emitters.

1.7 MIXED PACKING

When two or more dangerous goods are packed within the same outer packaging, the package must be labelled and marked as required for each substance. Labels need not be applied for a subsidiary hazard if the hazard is already represented by a primary hazard label.

Chapter 2

MARKING

Parts of this Chapter are affected by State Variations BR 6, CA 4, DQ 4, ES 1, HK 2, IR 4, MY 6, PK 1, RU 1, US 1, US 7, VC 6, VU 1; see Table A-1

2.1 THE REQUIREMENT TO MARK

Unless otherwise provided in these Instructions, packages of dangerous goods and overpacks containing dangerous goods offered for transport by air must be marked as required by this Chapter.

2.2 APPLICATION OF MARKS

2.2.1 All marks must be so placed on the packagings that they are not covered or obscured by any part of or attachment to the packaging or any other label or mark.

2.2.2 All package marks required by 2.1:

a) must be durable and printed or otherwise marked on, or affixed to, the external surface of the package;

b) must be readily visible and legible;

c) must be able to withstand open weather exposure without a substantial reduction in effectiveness;

d) must be displayed on a background of contrasting colour; and

e) must not be located with other package marks that could substantially reduce their effectiveness.

2.2.3 The marks required by 2.4.9 (Figure 5-2) and 2.4.16 (Figure 5-3) must be applied on one side of the package.

2.3 PROHIBITED MARKS

Arrows for purposes other than indicating proper package orientation must not be displayed on a package containing liquid dangerous goods.

2.4 MARKING SPECIFICATIONS AND REQUIREMENTS

2.4.1 Marking with proper shipping name and UN or ID number

2.4.1.1 Unless otherwise provided in these Instructions, the proper shipping name of the dangerous goods (supplemented with the technical name(s) if appropriate, see Part 3, Chapter 1) and, when assigned, the corresponding UN or ID number preceded by the letters “UN” or “ID”, as appropriate, must be displayed on each package. The UN or ID number and the letters “UN” or “ID” must be at least 12 mm high, except for packagings of 30 L capacity or less or of 30 kg maximum net mass and for cylinders of 60 L water capacity or less, when they must be at least 6 mm in height and except for packagings of 5 L capacity or less or of 5 kg maximum net mass when they must be of an appropriate size. In the case of unpackaged articles, the mark must be displayed on the article, on its cradle or on its handling, storage or launching device. A typical package mark would be:

“Corrosive liquid, acidic, organic, n.o.s. (caprylyl chloride) UN 3265”.

2.4.1.2 For solid substances, unless the word “molten” is already included in the proper shipping name, it must be added to the proper shipping name on the package when a substance is offered for air transport in the molten state (see Part 3, Chapter 1).

Note.— Additional descriptive text in the entries in column 1 of the Dangerous Goods List (Table 3-1) are not part of the proper shipping name but may be used in addition to the proper shipping name.

2.4.2 Shipper and consignee identification

The name and address of the person who offers the dangerous goods for transport by air and of the consignee must be provided on each package and should be located on the same surface of the package near the proper shipping name mark, if the package dimensions are adequate.

2.4.3 Special marking requirements for explosives

The proper shipping name required by 2.4.1 may be supplemented by additional descriptive text to indicate commercial or military names.

2.4.4 Packaging specification marks

2.4.4.1 Each outer or single packaging used for dangerous goods, for which specification packaging is required in Part 4, must bear the marks appropriate to the contents as specified in Part 6, Chapter 2.

2.4.4.2 Marks must be stamped, printed or otherwise marked on the package to provide adequate permanency.

2.4.5 Special marking requirements for radioactive material

2.4.5.1 The marking of excepted packages of radioactive material of Class 7 must be as required by 1.2.4.1.

2.4.5.2 Each package of gross mass exceeding 50 kg must have its permissible gross mass legibly and durably marked on the outside of the packaging.

2.4.5.3 Each package which conforms to:

a) a Type IP-1 package, a Type IP-2 package or a Type IP-3 package design must be legibly and durably marked on the outside of the packaging with “TYPE IP-1”, “TYPE IP-2” or “TYPE IP-3” as appropriate;

b) a Type A package design must be legibly and durably marked on the outside of the packaging with “TYPE A”;

c) a Type IP-2 package, a Type IP-3 package or a Type A package design must be legibly and durably marked on the outside of the packaging with the international vehicle registration code (VRI Code) of the country of origin of design and either the name of the manufacturer, or other identification of the packaging specified by the competent authority of the country of origin of design.

2.4.5.4 Each package which conforms to a design approved under one or more of 1.2.2.1, 6;7.21.1 to 6;7.21.4, 6;7.24.2.1 and 6.4.23.4 to 6.4.23.7 of the UN Model Regulations must be legibly and durably marked on the outside of the package with the following information:

a) the identification mark allocated to that design by the competent authority;

b) a serial number to uniquely identify each packaging which conforms to that design; and

c) “Type B(U)”, “Type B(M)” or “Type C” in the case of a Type B(U), Type B(M) or Type C package design.

Note.— Empty Type B(U) or Type B(M) packages, as specified in the Note to 2;7.2.4.1.1.7, shipped as industrial packages Type IP-1 must bear the appropriate specification marks for a Type IP-1 in which case the appropriate specification marks specified in 2.4.5.4 must be obliterated.

2.4.5.5 Each package which conforms to a Type B(U), Type B(M) or Type C package design must have the outside of the outermost receptacle which is resistant to the effects of fire and water plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol, as shown in Figure 5-1 below. Any mark on the package made in accordance with the requirements of 2.4.5.3 a) and b) and 2.4.5.4 c) relating to the package type that does not relate to the UN number and proper shipping name must be removed or covered.

2.4.5.6 In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the mark must be in accordance with the certificate of the country of origin of the design.

2.4.6 Special marking requirements for refrigerated liquefied gas

The upright position of each package must be indicated prominently by either the “Package orientation” label (Figure 5-29) or pre-printed package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780:1997. The label must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The wording “KEEP UPRIGHT” must be placed at 120° intervals around the package or on each side. Packages must also be clearly marked “DO NOT DROP — HANDLE WITH CARE”.

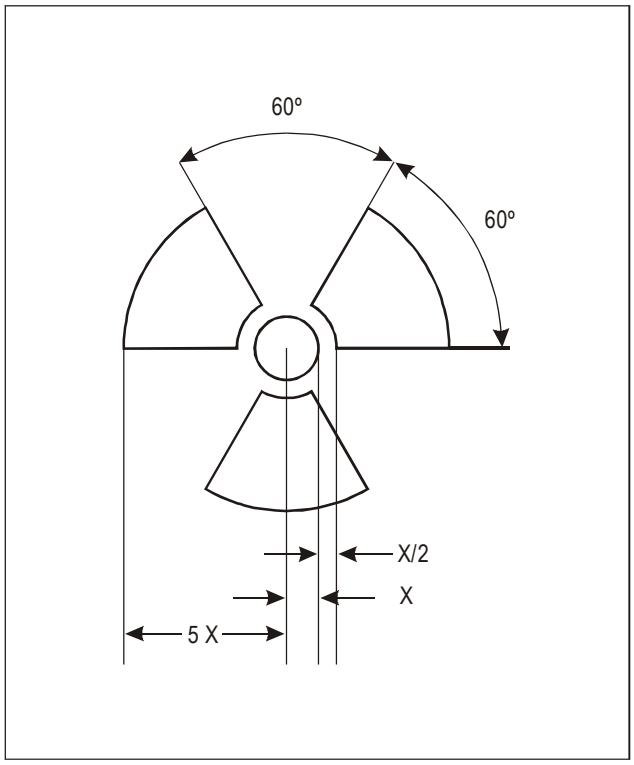


Figure 5-1. Basic trefoil symbol with proportions based on a central circle of radius X. The minimum allowable size of X must be 4 mm.

2.4.7 Special marking requirement for dry ice

The net mass of solid carbon dioxide (dry ice) must be marked on any package containing such substance.

2.4.8 Special marking requirement for biological substances, Category B

Packages containing biological substances, Category B packed in accordance with Packing Instruction 650 must be marked “Biological substance, Category B”.

2.4.9 Special marking provisions for environmentally hazardous substances

2.4.9.1 Unless otherwise specified in these Instructions, packages containing environmentally hazardous substances meeting the criteria of 2;9.2 a) (UN Nos. 3077 and 3082) must be durably marked with the environmentally hazardous substance mark and the packages must also bear a Class 9 hazard label.

2.4.9.2 The environmentally hazardous substance mark must be located adjacent to the marks required by 2.4.1.1. The requirements of 2.2.2 must be met.

2.4.9.3 The environmentally hazardous substance mark must be as shown in Figure 5-2. The mark must be in the form of a square set at an angle of 45° (diamond-shaped). The symbol (fish and tree) must be black on white or suitable contrasting background. The minimum dimensions must be 100 mm × 100 mm and the minimum width of line forming the diamond must be 2 mm. If the size of the package so requires, the dimensions/line thickness may be reduced, provided the mark remains clearly visible. Where dimensions are not specified, all features must be in approximate proportion to those shown.

Note.— The labelling provisions of 5;3 apply in addition to any requirement for packages to bear the environmentally hazardous substance mark.

Figure 5-2. Symbol (fish and tree): black on white or suitable contrasting background

2.4.10 Marking of overpacks

2.4.10.1 Unless marks and labels representative of all dangerous goods in the overpack are visible, the overpack must be:

a) marked with the word “OVERPACK”. The lettering of the “OVERPACK” mark must be at least 12 mm high; and

b) labelled and marked with the proper shipping name, UN number and other marks, as required for packages in accordance with this chapter and Chapter 3, for each item of dangerous goods contained in the overpack.

2.4.10.2 Labelling of overpacks containing radioactive material must be in accordance with 3.2.6 and 3.5.1.1 h) to i).

2.4.10.3 Packaging specification marks must not be reproduced on the overpack.

2.4.11 Additional marks of packages containing dangerous goods in limited quantities

Provisions for the marking of packages containing dangerous goods in limited quantities are contained in 3;4.

2.4.12 Specific provisions for dangerous goods packed in excepted quantities

Provisions for the marking of packages containing dangerous goods in excepted quantities are contained in 3;5.

2.4.13 Marks required by other modes of transport

Marks required by other international or national transport regulations are permitted in addition to marks required by these Instructions, provided that they cannot be confused with or conflict with any marks prescribed by these Instructions, because of their colour, design or shape.

2.4.14 Special marking requirement for chemical oxygen generators

When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the statement “Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144” shall be marked adjacent to the proper shipping name on the package.

2.4.15 Marking requirements for IBCs used to transport UN 3077

Intermediate bulk containers must comply with the marking requirements applicable to other packagings, except that intermediate bulk containers of more than 450 L capacity must be marked with the proper shipping name and UN number, as required in 2.4.1, and the environmentally hazardous substance mark, on two opposite sides.

2.4.16 Special marking requirements for lithium batteries

≠ 2.4.16.1 Packages containing lithium cells or batteries prepared in accordance with Section II of Packing Instructions 966, 967, 969 or 970 and Section IB of Packing Instructions 965 and 968 must be marked as shown in Figure 5-3.

≠ 2.4.16.2 The mark must indicate the appropriate UN number preceded by the letters “UN” as follows:

a) “UN 3090” for lithium metal cells or batteries;

b) “UN 3480” for lithium ion cells or batteries;

c) “UN 3091” for lithium metal cells or batteries contained in, or packed with, equipment; or

d) “UN 3481” for lithium ion cells or batteries contained in, or packed with, equipment.

Where a package contains lithium cells or batteries assigned to different UN numbers, all applicable UN numbers must be indicated on one or more marks.

>

2.4.16.3 The mark must be in the form of a rectangle or a square with hatched edging. The symbol (group of batteries, one damaged and emitting flame, above the UN number for lithium ion or lithium metal batteries or cells) must be black on white or suitable contrasting background. The hatching must be red. The mark must be a minimum dimension of 100 mm wide × 100 mm high and the minimum width of the hatching must be 5 mm. If the size of the package so requires, the dimensions may be reduced to not less than 100 mm wide × 70 mm high. Where dimensions are not specified, all features must be in approximate proportion to those shown on the full-size mark (Figure 5-3).

2.4.16.4 Packages containing lithium batteries that meet the requirements of Section IB of Packing Instructions 965 or 968 must bear both the lithium battery mark (Figure 5-3) and the lithium battery Class 9 hazard label (Figure 5-26).

2.5 LANGUAGES TO BE USED

In addition to the languages which may be required by the State of Origin, English should be used.

≠

Figure 5-3. Lithium battery mark

≠ *Note.— The mark shown in Figure 5-3 of the 2021-2022 Edition of the Technical Instructions may continue to be applied until 31 December 2026.*

Chapter 3

LABELLING

Parts of this Chapter are affected by State Variations AU 5, CA 1, CA 4 JP 9, PK 2, VU 5; see Table A-1

Note 1.— These provisions relate essentially to danger labels. However, additional marks or symbols indicating precautions to be taken in handling or storing a package (e.g. a symbol representing an umbrella indicating that a package should be kept dry) may be displayed on a package as appropriate. For such purposes, it is preferable to use the symbols recommended by the International Organization for Standardization (ISO).

Note 2.— In 3.6 of this Chapter there are provisions concerning the placarding of large freight containers for radioactive material.

Note 3.— The provisions concerning the placarding of portable tanks are shown in the Supplement, Part S-4;12.4.

3.1 THE REQUIREMENT TO LABEL

3.1.1 Where articles or substances are specifically listed in the Dangerous Goods List (Table 3-1), a danger class label must be affixed for the hazard shown in column 3 of Table 3-1. A subsidiary hazard label must also be affixed for any hazard indicated by a class or division number in column 4 of Table 3-1. However, special provisions indicated in column 7 may also require a subsidiary hazard label where no subsidiary hazard is indicated in column 4 or may exempt from the requirement for a subsidiary hazard label where such a hazard is indicated in the Dangerous Goods List.

3.1.2 Labels identifying the primary and subsidiary hazards of the dangerous goods must bear the class or division number as required in 3.5.1.

3.1.3 All labels must be able to withstand open weather exposure without a substantial reduction in effectiveness.

3.2 APPLICATION OF LABELS

3.2.1 The labels required to be displayed on packages of dangerous goods are identified in the Dangerous Goods List for articles and substances specifically listed by name and for articles and substances not specifically listed by name which are covered by generic or n.o.s. entries.

3.2.2 Packages containing substances of Class 8 need not show a subsidiary hazard label for Division 6.1 if the toxicity arises solely from the destructive effect on tissue. Substances of Division 4.2 need not show a subsidiary hazard label for Division 4.1 if the substance is also a flammable solid.

3.2.3 Packages containing organic peroxides which meet the criteria for Class 8, Packing Group I or II must be labelled with a corrosive subsidiary hazard label.

Note.— Many liquid organic peroxide formulations are flammable; however, no subsidiary hazard flammable label is required because the organic peroxide label itself is considered to imply that the product may be flammable.

3.2.4 In addition to the primary hazard label (Figure 5-19), infectious substances packages must bear any other label required by the nature of the contents. This is not required if a quantity of 30 ml or less of dangerous goods included in classes 3, 8 or 9 is packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3;5.1.2.

3.2.5 Packages containing radioactive material having additional hazardous characteristics must also be labelled to indicate those characteristics.

3.2.6 Except when enlarged labels are used in accordance with 3.6, each package, overpack and freight container containing radioactive material must bear the labels conforming to Figures 5-20, 5-21 and 5-22 according to the appropriate category. Labels must be affixed to two opposite sides on the outside of the package or overpack or on the outside of all four sides of a freight container. Each overpack containing radioactive material must bear at least two labels on opposite sides of the outside of the overpack. In addition, each package, overpack and freight container containing fissile material, other than fissile

material excepted under the provisions of 2;7.2.3.5 must bear labels conforming to the model shown in Figure 5-23; such labels, where applicable, must be affixed adjacent to the labels conforming to Figure 5-20, 5-21, or 5-22, as applicable. Labels must not cover the marks specified in Chapter 2. Any labels which do not relate to the contents must be removed or covered.

3.2.7 Intermediate bulk containers must comply with the labelling requirements applicable to other packagings, except that intermediate bulk containers of more than 450 L capacity must be labelled on two opposite sides.

3.2.8 Except as provided in 3.5.1.1 b), each class hazard label must:

a) be affixed to a background of contrasting colour or must have a dotted or solid line outer boundary;

b) be located on the same surface of the package near the proper shipping name mark, if the package dimensions are adequate;

c) be so placed on the packaging that they are not covered or obscured by any part of or attachment to the packaging or any other label or mark;

d) when primary and subsidiary hazard labels are required, be displayed next to each other; and

e) be affixed at an angle of 45° (diamond shaped), unless the package dimensions are inadequate.

3.2.9 Labels must not be folded. Cylindrical packages must be of such dimensions that a label will not overlap itself. In the case of cylindrical packages containing radioactive materials, which require two identical labels, these labels must be centred on opposite points of the circumference and must not overlap each other. If the dimensions of the package are such that two identical labels cannot be affixed without overlapping each other, one label is acceptable provided it does not overlap itself.

3.2.10 Labels must be firmly affixed to or printed on the package of dangerous goods. Where a package is of such an irregular shape that a label cannot be affixed to or printed on a surface, it is acceptable to attach the label to the package by an adequately strong tag.

3.2.11 Since packages or consignments of magnetized material (Class 9) must bear the “Magnetized material” label (Figure 5-27) as required by column 5 of Table 3-1, such packages or consignments do not need to bear the “Miscellaneous dangerous goods” label (Figure 5-25).

3.2.12 In addition to the class hazard labels specified in 3.1, handling labels must also be affixed to packages of dangerous goods as follows:

a) the “Cargo aircraft only” label (Figure 5-28) must be affixed:

   1) when the package containing the dangerous goods may only be transported on a cargo aircraft. However, where the packing instruction number and the permitted quantity per package are identical for passenger and cargo aircraft, the “Cargo aircraft only” label should not be used;

   2) to each Type B(M) package of radioactive material and any freight container containing such a Type B(M) package;

   3) on the same surface of the package near the hazard labels;

b) when required by the provisions of 4;1.1.13, either the “Package orientation” label (Figure 5-29), or preprinted package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780:1997, must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The words “Dangerous goods” may be inserted on the label below the line;

c) for packages containing refrigerated liquefied gases, the “Cryogenic liquid” label (Figure 5-31) must be affixed on all packages;

d) for packages containing self-reactive substances of Division 4.1 or Division 5.2 organic peroxides, the “Keep away from heat” label (Figure 5-32) must be affixed on all packages. This label should be affixed on the same surface of the package near the hazard label(s);

e) for excepted packages of radioactive material the “Radioactive material, excepted package” handling label (Figure 5-33) must be affixed;

f) be affixed to a background of contrasting colour or must have a dashed or solid line outer boundary;

g) be so placed on the packaging that they are not covered or obscured by any part of or attachment to the packaging or any other label or mark.

3.2.13 Where a text is indicated in Figures 5-1 to 5-33, an equivalent text in another language may be used.

3.2.14 Labels required by other international or national transport regulations are permitted in addition to labels required by these Instructions, provided that they cannot be confused with or conflict with any label prescribed by these Instructions, because of their colour, design or shape.

3.3 LABELLING OF OVERPACKS

3.3.1 An overpack must be labelled as required for packages by Chapter 3, for each item of dangerous goods contained in the overpack unless labels representative of all dangerous goods in the overpack are visible.

3.3.2 An overpack containing liquid dangerous goods in single packagings with end closures must be labelled with either the “Package Orientation” label (Figure 5-29), or pre-printed package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780:1997, unless such labels are affixed to the package and are visible from the outside of the overpack. Such labels must be affixed to or printed on at least two opposite vertical sides of the overpack with the arrows pointing in the direction required to indicate the orientation of the overpack required to ensure that end closures are upward, notwithstanding that such single packages may also have sideclosures.

3.4 PROHIBITED LABELLING

Arrows for purposes other than indicating proper package orientation must not be displayed on a package containing liquid dangerous goods.

3.5 LABEL SPECIFICATIONS

3.5.1 Class hazard label specifications

3.5.1.1 Labels must satisfy the provisions of this section and conform, in terms of colour, symbols and general format, to the specimen labels shown in Figures 5-4 to 5-26.

Note.— Where appropriate, labels in Figures 5-4 to 5-26 are shown with a dotted outer boundary as provided for in 3.5.1.1 a). This is not required when the label is applied on a background of contrasting colour.

Class hazard labels must conform to the following specifications:

a) Labels must be configured as described below (see Figure 5-4).

   i) Labels must be displayed on a background of contrasting colour, or must have either a dotted or solid outer boundary line.

   ii) The label must be in the form of a square set at an angle of 45° (diamond shaped). The minimum dimensions must be 100 mm × 100 mm. There must be a line inside the edge forming the diamond which must be parallel and approximately 5 mm from the outside of that line to the edge of the label. The line inside the edge on the upper half of the label must be the same colour as the symbol, and the line inside the edge on the lower half of the label must be the same colour as the class or division number in the bottom corner. Where dimensions are not specified, all features must be in approximate proportion to those shown.

   iii) Labels of 50 mm × 50 mm may be used on packages containing infectious substances where the packages are of dimensions such that they can only bear smaller labels. Dimensions for labels on cylinders must comply with 3.5.1.1 b).

b) Cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for transport, bear labels representative of those specified in this chapter, which have been reduced in size, according to ISO 7225:2005 “Gas cylinders — Precautionary labels”, for display on the non-cylindrical part (shoulder) of such cylinders. Labels may overlap to the extent provided for by ISO 7225:2005; however, in all cases the labels representing the primary hazard and the numbers appearing on any label must remain fully visible and the symbols recognizable.

   Note.— When the diameter of the cylinder is too small to permit the display of the reduced size labels on the non-cylindrical upper part of the cylinder, the reduced sized labels may be displayed on the cylindrical part.

c) With the exception of labels for Divisions 1.4, 1.5 and 1.6 of Class 1, the upper half of the label must contain the pictorial symbol and the lower half must contain the class or, in the case of labels for Class 5, the division number, as appropriate. However for the Class 9 label for lithium batteries (Figure 5-26), the upper half of the label must only contain the seven vertical stripes of the symbol and the lower half must contain the group of batteries of the symbol and the class number. Except for the Class 9 label for lithium batteries (Figure 5-26), the label may include such text as the UN number, or words describing the hazard class (e.g. “flammable”) in accordance with 3.5.1.1 e) provided that the text does not obscure or detract from the other required label elements.

d) In addition, except for Divisions 1.4, 1.5 and 1.6, labels for Class 1 must show in the lower half, above the class number, the division number and compatibility group letter for the substance or article. Labels for Divisions 1.4, 1.5 and 1.6 must show in the upper half the division number and in the lower half the class number and the compatibility group letter.

e) On labels other than those for material of Class 7, the insertion of any text (other than the class or division number or compatibility group) in the space below the symbol must be confined to particulars indicating the nature of the hazard and precautions to be taken in handling. In the case of the Class 9 label for lithium batteries (Figure 5-26), no text other than the class number must be included in the bottom part of the label.

f) The symbols, texts and numbers must be shown in black on all labels except:

1) the Class 8 label, where the text (if any) and class number must appear in white;

2) labels with entirely green, red or blue backgrounds, where they may be shown in white;

3) the Division 5.2 label, where the symbol may be shown in white; and

4) the Division 2.1 label displayed on cylinders and gas cartridges for liquefied petroleum gases, where they may be shown in the background colour of the receptacle if adequate contrast is provided.

g) A label may contain form identification information, including the name of its maker, provided that information is printed outside of the solid line border in no larger than 10-point type.

Labelling of radioactive material

h) Each label conforming to the applicable Figure 5-20, 5-21 or 5-22 must be completed with the following information:

1) Contents:

A) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2-12, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. The group of LSA or SCO must be shown following the name(s) of the radionuclide(s). The terms “LSA-II”,“LSA-III”, “SCO-I” and “SCO-II” must be used for this purpose;

B) for LSA-I material, the term “LSA-I” is all that is necessary; the name of the radionuclide is not necessary;

2) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol. For fissile material, the total mass of fissile nuclides in units of grams (g), or multiples thereof, may be used in place of activity;

3) For overpacks and freight containers the “contents” and “activity” entries on the label must bear the information required in 3.5.1.1 h) 1) A) and B), respectively, totalled together for the entire contents of the overpack or freight container except that on labels for overpacks or freight containers containing mixed loads of packages containing different radionuclides, such entries may read “See Transport Documents”;

4) Transport index: The number determined in accordance with 1.2.3.1.1 and 1.2.3.1.2 (except for category I-WHITE).

i) Each label conforming to Figure 5-23 must be completed with the criticality safety index (CSI) as stated in the certificate of approval applicable in the States through or into which the consignment is transported and issued by the competent authority.

j) For overpacks and freight containers, the label conforming to Figure 5-23 must bear the sum of the criticality safety indexes of all the packages contained therein.

k) In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the labelling must be in accordance with the certificate of the country of origin of design.

3.5.1.2 Illustrations of the class hazard labels, showing the approved symbols and colours, are given in Figures 5-5 to 5-26. The label descriptions used in column 5 of Table 3-1 are indicated in parentheses.

Note 1.— The asterisk appearing in the bottom corner of the label indicates the location of the class or division number when the label is used to show the primary hazard. See Figures 5-5 to 5-8 concerning the location of information on explosives labels.

Note 2.— Minor variations in the design of the symbol on labels or other differences such as the width of vertical lines on labels as shown in these Instructions or in regulations of other modes, which do not affect the obvious meaning of the label, are acceptable. For example the hand shown on the Class 8 label may be shown with or without shading, the extreme right and left vertical lines on the Division 4.1 and Class 9 labels may extend to the edge of the label or there may be some white space at the edge, etc.

3.5.2 Handling label specifications

An illustration of each of the handling labels showing the approved design and colour is given in Figures 5-27 to 5-29 and Figures 5-31 to 5-33. The minimum label dimensions are shown in the figures. Where dimensions or features are not specified, these must be in approximate proportion to those shown; however:

a) labels having dimensions not smaller than half of those indicated may be used on packages containing infectious substances when the packages are of dimensions such that they can only bear smaller labels; and

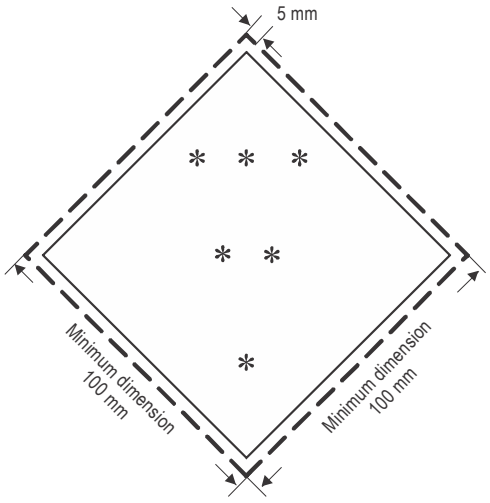
b) orientation labels may meet the specification of either Figure 5-29 or ISO Standard 780:1997.

3.6 PLACARDING OF LARGE FREIGHT CONTAINERS CONTAINING RADIOACTIVE MATERIAL

3.6.1 Special provisions for Class 7

3.6.1.1 Large freight containers carrying packages (other than excepted packages) and tanks must bear four placards which conform with Figure 5-30. The placards must be affixed in a vertical orientation to each side wall and each end wall of the large freight container. Any placards which do not relate to the contents must be removed. Instead of using both labels and placards, it is permitted as an alternative to use enlarged labels only, as shown in Figures 5-20, 5-21 and 5-22, and where appropriate Figure 5-23, with dimensions as required for the placard in Figure 5-30.

3.6.1.2 For Class 7, the placard must have minimum overall dimensions of 250 mm by 250 mm with a black line running 5 mm inside the edge and parallel with it, and must be otherwise as shown in Figure 5-30. The number 7 must not be less than 25 mm high. The background colour of the upper half of the placard must be yellow and of the lower half white, the colour of the trefoil and the printing must be black. The use of the word “Radioactive” in the bottom half is optional to allow the use of this placard to display the appropriate United Nations number for the consignment.



* The class or, for Divisions 5.1 and 5.2, the division number must be shown in the bottom corner
** Additional text/numbers/symbol/letters must (if mandatory) or may (if optional) be shown in this bottom half
*** The class or division symbol or, for Divisions 1.4, 1.5 and 1.6, the division number and for Figure 5-23 the word “FISSILE” must be shown in this top half”.

Figure 5-4. Class/division label

(Explosive)

Note.— Packages bearing this label marked Division 1.1 or 1.2 are not normally permitted for transport by air.

Symbol (exploding bomb): black
Background: orange

** Place for division and compatibility group

Figure 5-5. Explosive, Class 1, Divisions 1.1, 1.2 and 1.3

(Explosive 1.4)

Background: orange
Figures: black
Numerals must be about 30 mm in height and about 5 mm thick (for a label measuring 100 mm × 100 mm).

*** Place for compatibility group

Figure 5-6. Explosive, Class 1, Division 1.4

(Explosive 1.5)

Note.— Packages bearing this label are not normally permitted for transport by air.

Background: orange
Figures: black
Numerals must be about 30 mm in height and about 5 mm thick (for a label measuring 100 mm × 100 mm).

*** Place for compatibility group

Figure 5-7. Explosive, Class 1, Division 1.5

(Explosive 1.6)

Note.— Packages bearing this label are not normally permitted for transport by air.

Background: orange
Figures: black
Numerals must be about 30 mm in height and about 5 mm thick (for a label measuring 100 mm × 100 mm).

*** Place for compatibility group

Figure 5-8. Explosive, Class 1, Division 1.6

(Gas flammable)

Symbol (flame): black or white
Background: red

Figure 5-9. Flammable gas, Class 2, Division 2.1

(Gas non-flammable)

Symbol (gas cylinder): black or white
Background: green

Figure 5-10. Non-flammable, non-toxic gas, Class 2, Division 2.2

(Gas toxic)

Symbol (skull and crossbones): black
Background: white

Figure 5-11. Toxic gas, Class 2, Division 2.3

(Liquid flammable)

Symbol (flame): black or white
Background: red

Figure 5-12. Flammable liquid, Class 3

(Solid flammable)

Symbol (flame): black
Background: white with seven vertical red stripes

Figure 5-13. Flammable solid, Class 4, Division 4.1

(Spontaneous combustion)

Symbol (flame): black
Background: upper half white, lower half red

Figure 5-14. Substance liable to spontaneous combustion, Class 4, Division 4.2

(Danger if wet)

Symbol (flame): black or white
Background: blue

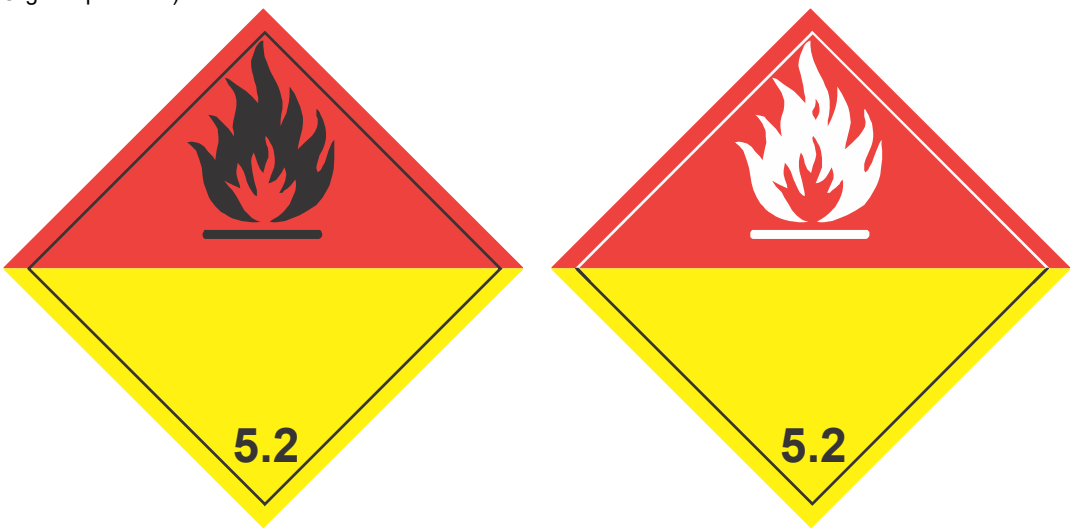
Figure 5-15. Substance which, in contact with water, emits flammable gas, Class 4, Division 4.3

(Oxidizer)

Symbol (flame over circle): black
Background: yellow
Figure “5.1” in bottom corner

Figure 5-16. Oxidizing substance, Class 5

(Organic peroxide)



Symbol (flame): black or white
Background: upper half red; lower half yellow
Figure “5.2” in bottom corner

Figure 5-17. Organic peroxide, Class 5, Division 5.2

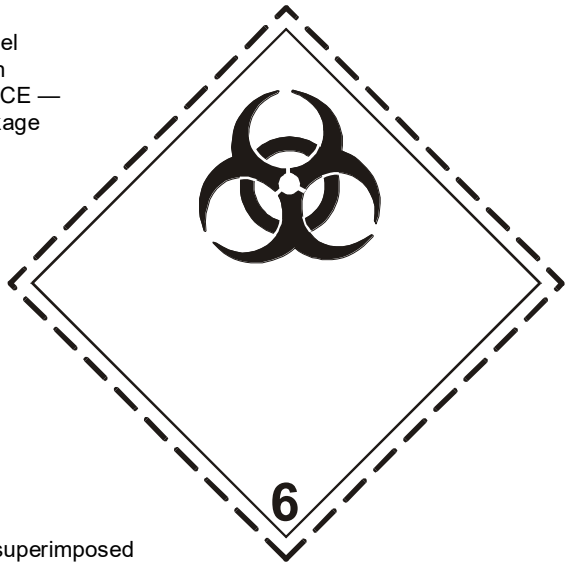
(Toxic)

Symbol (skull and crossbones): black
Background: white

Figure 5-18. Toxic substance, Class 6, Division 6.1

(Infectious)

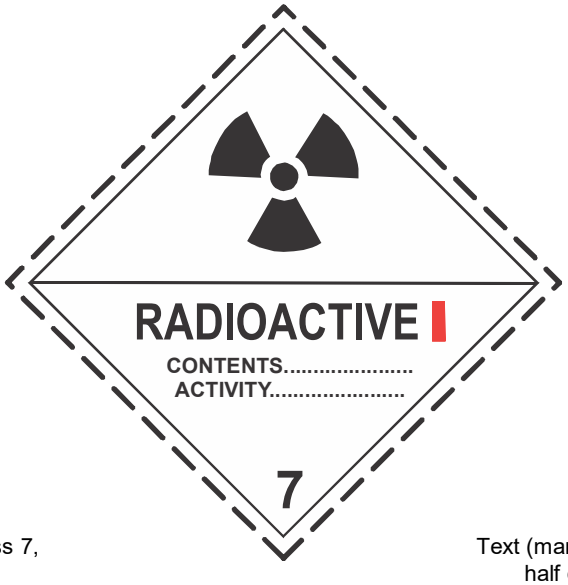
The bottom part of the label should bear the inscription "INFECTIOUS SUBSTANCE — In case of damage or leakage immediately notify public health authority"



Symbol (three crescents superimposed on a circle) and inscription: black
Background: white
Figure "6" in bottom corner

Figure 5-19. Infectious substance, Class 6, Division 6.2

(Radioactive)



Radioactive material, Class 7, Category I — White
Symbol (trefoil): black
Background: white
Figure "7" in bottom corner

Text (mandatory), black in bottom half of label: "Radioactive"; "Contents . . ."; "Activity . . ."
One (1) red vertical stripe must follow the word "Radioactive".

Figure 5-20. Radioactive material, Class 7, Category I

(Radioactive)

Radioactive material, Class 7, Category II — Yellow
Symbol (trefoil): black
Background: top half yellow with white border, bottom half white
Figure “7” in bottom corner

Text (mandatory), black in bottom half of label: ”Radioactive”; “Contents . . .”; “Activity . . .”; in a black outlined box — “Transport Index”.
Two (2) red vertical stripes must follow the word “Radioactive”.

Figure 5-21. Radioactive material, Class 7, Category II

(Radioactive)

Radioactive material, Class 7, Category III — Yellow
Symbol (trefoil): black
Background: top half yellow with white border, bottom half white
Figure “7” in bottom corner

Text (mandatory), black in bottom half of label: “Radioactive”; “Contents . . .”; “Activity . . .”; in a black outlined box — “Transport Index”.
Three (3) red vertical stripes must follow the word “Radioactive”.

Figure 5-22. Radioactive material, Class 7, Category III

Requirements and controls for transport

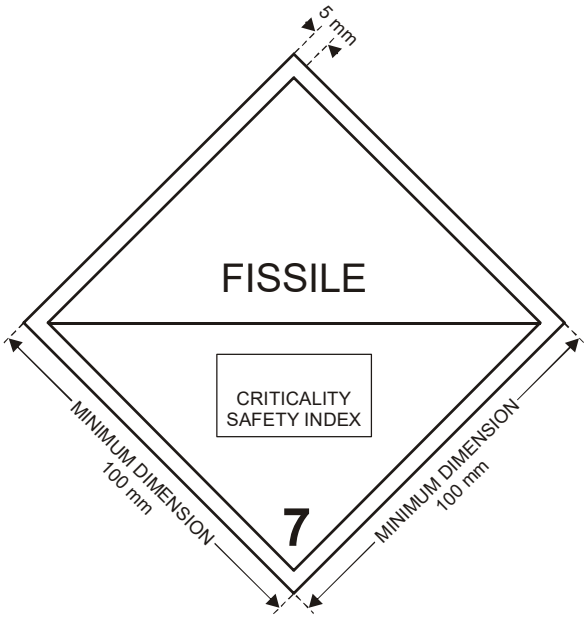
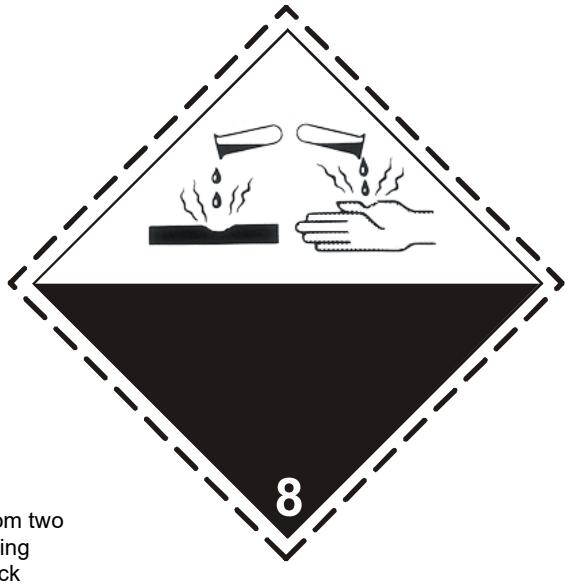


Figure 5-23. Criticality safety index label

(Corrosive)



Symbol (liquids spilling from two glass vessels and attacking a hand and a metal); black
Background: upper half white, lower half black with white border

Figure 5-24. Corrosive, Class 8

(Miscellaneous)

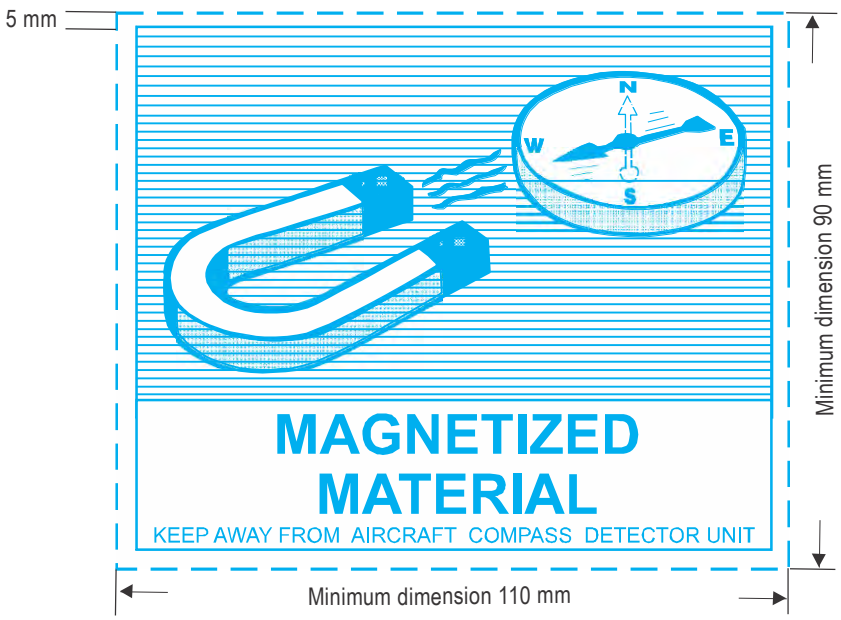
Symbol (seven vertical stripes in upper half): black
Background: white

Figure 5-25. Miscellaneous dangerous goods, Class 9

(Miscellaneous — Lithium cells and batteries)

Symbol (seven vertical stripes in upper half); battery group, one broken and emitting flame in lower half: black
Background: white
Figure “9” underlined in bottom corner

Figure 5-26. Miscellaneous dangerous goods — lithium batteries, Class 9

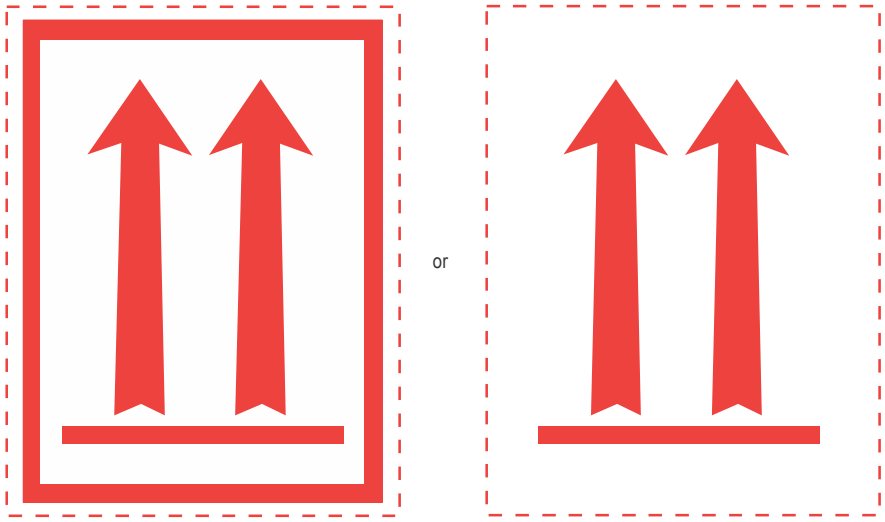


Colour: blue on white

Figure 5-27. Magnetized material

Colour: black on orange

Figure 5-28. Cargo aircraft only



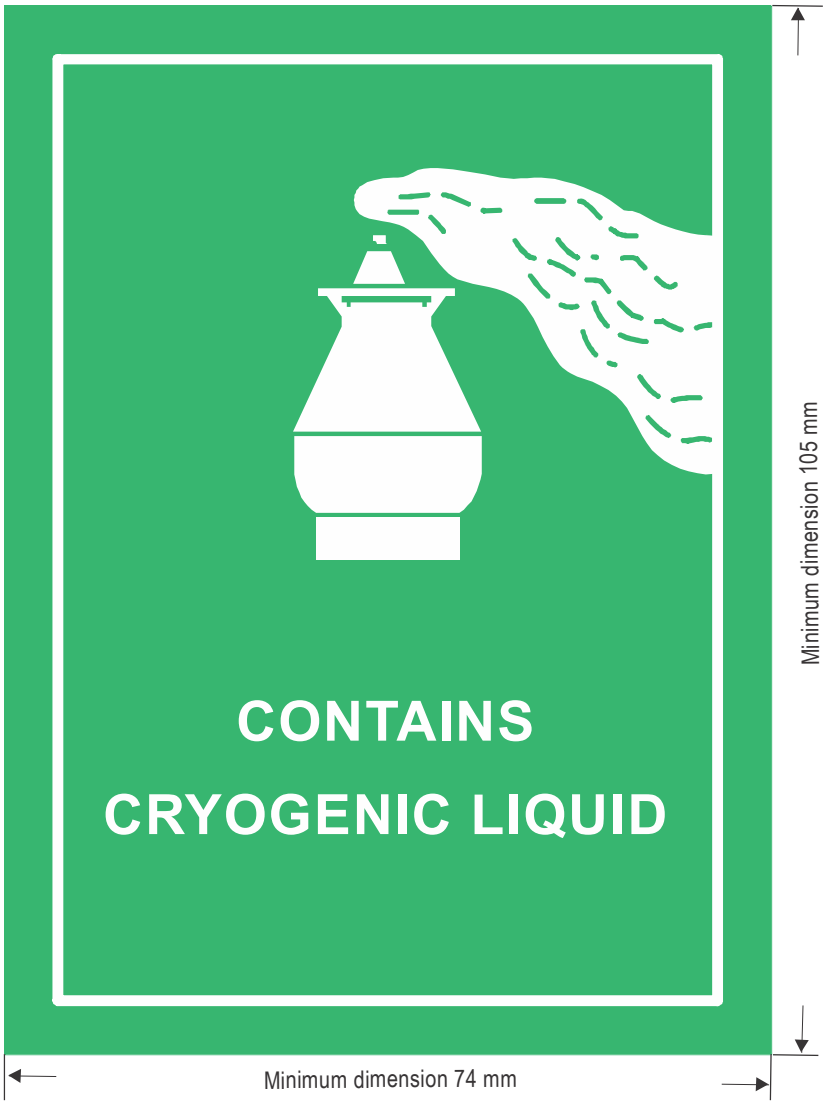
Two black or red arrows on white or suitable contrasting background
The rectangular border is optional
All features must be in approximate proportion to those shown
Dimensions: 74 mm × 105 mm

Figure 5-29. Package orientation

Radioactive material, Class 7
Placard
Symbol (trefoil): black
Background: top half yellow with white border, bottom half white
Dimensions: the minimum dimensions are shown. When larger dimensions are used, the relative proportions must be maintained. The figure "7" must be in the bottom corner and must be not less than 25 mm high.

Note.— The word "RADIOACTIVE" in the bottom half is optional to allow the alternative use of the appropriate UN number.

Figure 5-30. Radioactive material, Class 7, placard for large freight containers



Symbol: white
Background: green

Note.— The words "Caution — may cause cold burn injuries if spilled or leaked" are optional and may be included.

Figure 5-31. Cryogenic liquid label

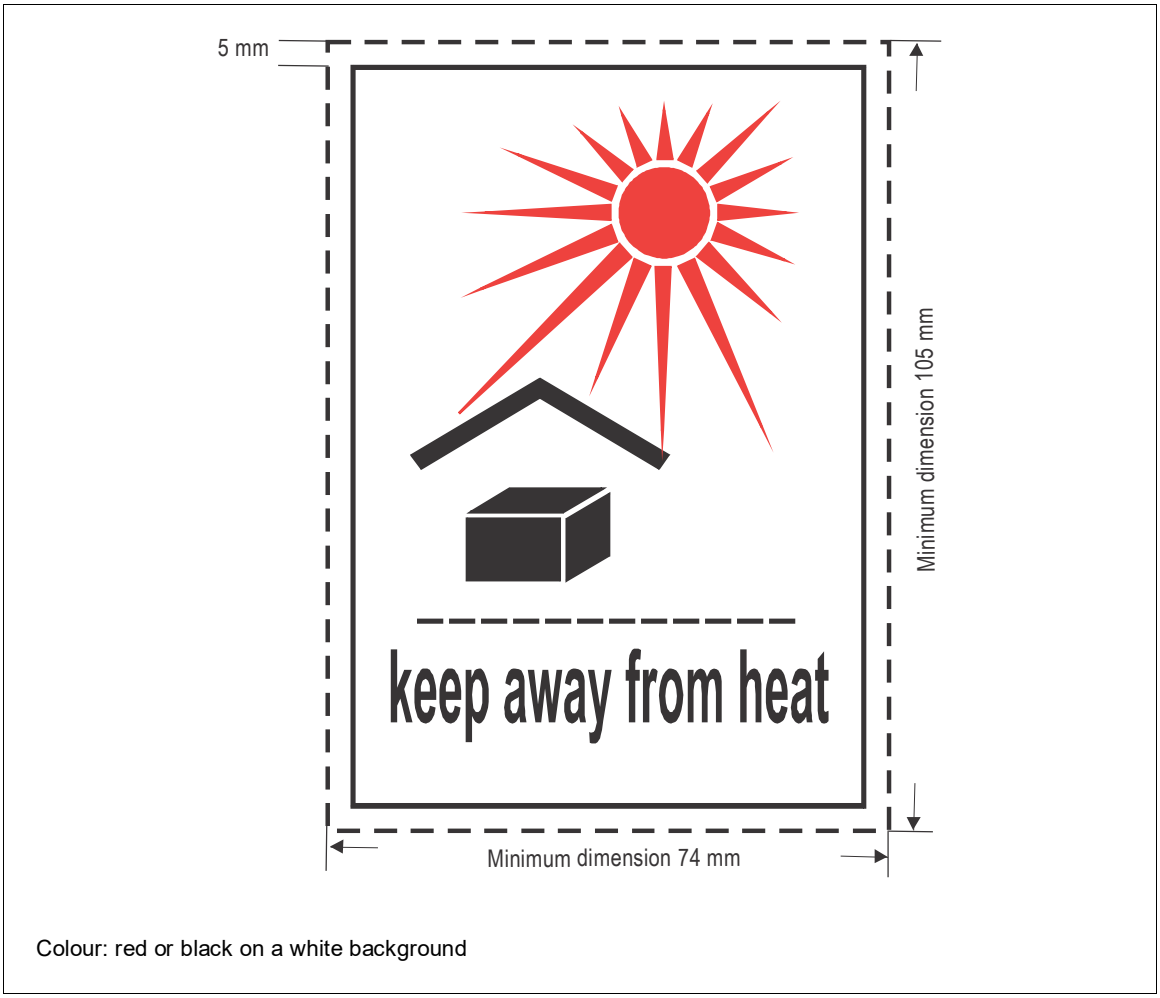


Figure 5-32. Keep away from heat

Colour: red or black on a contrasting background

Note.— The words "The information for this package need not appear on the Notification to Captain (NOTOC)" are optional and may be included.

Figure 5-33. Radioactive material, excepted package

Chapter 4

DOCUMENTATION

Parts of this Chapter are affected by State Variations AE 5, AE 6, AU 5, BN 2, BR 3, BR 5, BR 6, BR 8, CA 4, CA 9, DQ 4, ES 1, FR 7, HK 2, JM 2, JM 3, KW 5, MY 6, OM 5, OM 7, PE 3, PK 3, RU 1, US 1, US 7, US 12, VC 8, VE 7, VU 1, ZA 3; see Table A-1

Note.— These Instructions do not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an alternative to paper documentation. Unless otherwise indicated, all references to "dangerous goods transport document" in this chapter also include provision of the required information by use of EDP and EDI transmission techniques.

4.1 DANGEROUS GOODS TRANSPORT INFORMATION

4.1.1 General

4.1.1.1 The person who offers dangerous goods for transport by air must provide to the operator the information applicable to the consignment as set out in this paragraph. The information may be provided on a paper document or, where an agreement exists with the operator, by EDP or EDI techniques.

4.1.1.2 Where a paper document is used, the person who offers dangerous goods for transport by air must provide to the operator two copies of the dangerous goods transport document, completed and signed as provided for in this paragraph.

4.1.1.3 Where the dangerous goods transport information is provided by EDP or EDI techniques the data must be able to be produced as a paper document without delay, with the data in the sequence required by this chapter.

Note.— All references to "dangerous goods transport document" in this chapter also include provision of the required information by use of EDP and EDI transmission techniques.

4.1.2 Form of the transport document

4.1.2.1 A dangerous goods transport document may be in any form, provided it contains all of the information required by these Instructions.

4.1.2.2 If both dangerous and non-dangerous goods are listed in one document, the dangerous goods must be listed first, or otherwise be emphasized.

4.1.2.3 *Continuation page*

A dangerous goods transport document may consist of more than one page, provided pages are consecutively numbered.

4.1.2.4 The information on a dangerous goods transport document must be easy to identify, legible and durable.

4.1.3 Shipper and consignee

The name and address of the shipper and the consignee of the dangerous goods must be included on the dangerous goods transport document. For the transport of radioactive material, it is recommended that the telephone number of the consignee is included to facilitate a prompt release at the airport of destination.

4.1.4 Information required on the dangerous goods transport document

4.1.4.1 *Dangerous goods description*

The dangerous goods transport document must contain the following information for each dangerous substance, material or article offered for transport:

a) the UN or ID number preceded by the letters "UN" or "ID" as appropriate;

b) the proper shipping name, as determined according to 3;1.2, including the technical name enclosed in parenthesis, as applicable (see 3;1.2.7);

c) the primary hazard class or, when assigned, the division of the goods, including for Class 1 the compatibility group letter. The words “Class” or “Division” may be included preceding the primary hazard class or division numbers;

d) subsidiary hazard class or division number(s) corresponding to the subsidiary hazard label(s) required to be applied, when assigned, must be entered following the primary hazard class or division and must be enclosed in parenthesis. The words “Class” or “Division” may be included preceding the subsidiary hazard class or division numbers;

e) where assigned, the packing group for the substance or article which may be preceded by “PG” (e.g. “PG II”).

4.1.4.2 *Sequence of the dangerous goods description*

The five elements of dangerous goods description specified in 4.1.4.1 must be shown in the order listed above (i.e. a), b), c), d), e)), with no information interspersed, except as provided in these Instructions. Examples of a dangerous goods description are:

“UN 1717 Acetyl chloride 3 (8) II” or
“UN 1717 Acetyl chloride, Class 3 (Class 8), PG II”

Note 1.— In addition to the requirements of these Instructions, other elements of information may be required by the appropriate national authority or for certain modes of transport (e.g. flash point for sea transport). Unless permitted or required by these Instructions, additional information must be placed after the dangerous goods description.

Note 2.— Additional descriptive text in the entries in column 1 of the Dangerous Goods List (Table 3-1) are not part of the proper shipping name but may be used in addition to the proper shipping name.

Note 3.— For explosives of Class 1, the basic dangerous goods description may be supplemented by additional descriptive text to indicate commercial or military names.

4.1.4.3 *Information which supplements the proper shipping name in the dangerous goods description*

The proper shipping name in the dangerous goods description must be supplemented as follows:

a) *Technical names for “n.o.s.” and other generic descriptions*: Proper shipping names that are assigned an asterisk in column 1 of the Dangerous Goods List must be supplemented with their technical or chemical group names as described in 3;1.2.7;

b) *Empty uncleaned packagings*: Empty means of containment which contain the residue of dangerous goods of classes other than Class 7 must be described as such by, for example, placing the words “Empty uncleaned” or “Residue last contained” before or after the dangerous goods description specified in 4.1.4.1 a) to e);

c) *Wastes*: For waste dangerous goods (other than radioactive wastes) which are being transported for disposal, or for processing for disposal, the proper shipping name must be preceded by the word “Waste”, unless this is already a part of the proper shipping name;

+ d) *Molten substances:* When a substance, which is solid in accordance with the definition in 1;3.1, is offered for transport in the molten state, the qualifying word “Molten” must be added as part of the proper shipping name, unless it is already part of the proper shipping name (see 3;1.2.4);

+ e) *Stabilized substances:* Unless already part of the proper shipping name, the word “Stabilized” must be added to the proper shipping name if stabilization is used.

4.1.5 Information required in addition to the dangerous goods description

In addition to the dangerous goods description the following information must be included after the dangerous goods description on the dangerous goods transport document.

4.1.5.1 *Quantity of dangerous goods, number and type of packagings*

The number of packages, type of packaging (e.g. steel drum, fibreboard box, etc.) and net quantity of dangerous goods in each package (by volume or mass, as appropriate) must be indicated for each item of dangerous goods bearing a different proper shipping name, UN number or packing group. Abbreviations may be used to specify the unit of measurement for the quantity.

For packages containing the same dangerous goods and quantity per package a multiple of the quantity may be used. For example:

UN 1263, Paint, 3, PG II, 5 fibreboard boxes x 5 L

Consignment comprising packages of different quantities of the same dangerous good must be clearly identified. For example:

UN 1263, Paint, 3, PG II, 5 fibreboard boxes x 5 L, 10 fibreboard boxes x 10 L

UN packaging codes may only be used to supplement the description of the kind of package (e.g. one fibreboard box (4G)). For limited quantities, where the letter "G" follows the quantity in column 11 of Table 3-1, the gross mass of each package must be indicated, rather than the net quantity (except when there are different dangerous goods packed together in the same outer packaging which must be described as shown in paragraph e)) and:

a) for empty uncleaned packagings as described by 4.1.4.3 b) only the number and type of packagings need be shown;

b) for chemical kits and first aid kits, the total net mass of dangerous goods. Where the kits contain solids and/or liquids, the net mass of liquids within the kits is to be calculated on a 1 to 1 basis of their volume, i.e. 1 litre equal to 1 kilogram;

c) for dangerous goods in machinery or apparatus, the individual total quantities of dangerous goods in solid, liquid or gaseous state, contained in the article;

d) for dangerous goods transported in salvage packagings, an estimate of the quantity of dangerous goods must be given;

e) for dangerous goods in limited quantities with a 30 kg G limit in Table 3-1, where different dangerous goods are packed together in the same outer packaging, the net quantity of each dangerous goods followed by the gross mass of the completed package;

f) for explosive articles of Class 1, the net quantity indicated for each package must be supplemented with the net explosive mass (see Part 1;3.1.1 for the definition of net explosive mass) contained in the package followed by the unit of measurement. The abbreviations "NEQ", "NEM" or "NEW" may be indicated in association with the value provided.

Note.— The number, type and capacity of each inner packaging within the outer packaging of a combination packaging is not required to be indicated.

4.1.5.2 *Salvage packagings*

≠ For dangerous goods transported in salvage packagings in accordance with 4;1.4, the words "Salvage packaging" must be included.

4.1.5.3 *Chemical oxygen generators*

When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the statement "Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144" must be included on the dangerous goods transport document.

4.1.5.4 *Self-reactive substances and organic peroxides*

4.1.5.4.1 When organic peroxides and self-reactive substances are transported under conditions where approval is required (for organic peroxides, see 2;5.3.2.5 for self-reactive substances, see 2;4.2.3.2.5), a statement to this effect must be included in the dangerous goods transport document. A copy of the classification approval and conditions of transport for non-listed organic peroxides and self-reactive substances must be attached to the dangerous goods transport document.

4.1.5.4.2 When a sample of an organic peroxide (see 2;5.3.2.6) or a self-reactive substance (see 2;4.2.3.2.6) is transported, a statement to this effect must be included in the dangerous goods transport document.

4.1.5.5 *Infectious substances and controlled substances*

The dangerous goods transport document must also include the name and telephone number of a responsible person when a national law or international convention prohibits the disclosure of the technical name following an "n.o.s.*" entry or for infectious substances, UN 2814 and UN 2900.

4.1.5.6 *Firework classification reference*

4.1.5.6.1 When fireworks of UN 0336 or UN 0337 are transported, the dangerous goods transport document must include a classification reference(s) issued by the appropriate national authority.

4.1.5.6.2 The classification reference(s) must consist of the appropriate national authority's State, indicated by the distinguishing sign used on vehicles in international traffic, the appropriate national authority identification and a unique serial reference. Examples of such classification references are:

GB/HSE123456
D/BAM1234
USA EX20091234.

Note.— The distinguishing sign used on vehicles in international traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

4.1.5.7 *Radioactive material*

4.1.5.7.1 The following information must be included for each consignment of Class 7 material, as applicable, in the order given:

a) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;

+ *Note.— When Table 2-13 is used, refer to 5;4.1.5.8.1 g) for additional information required on the dangerous goods transport document.*

b) A description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form;

Note.— For empty Type B(U) or Type B(M) packages as specified in the Note to 2;7.2.4.1.1.7, the name or symbol of the radionuclide of the shielding material followed by the physical and chemical form must be included (e.g. U-dep., solid, metal oxide) in which case the indicated radionuclide may differ from the radionuclide(s) authorized in the package design certificate.

c) The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with an appropriate SI prefix symbol (see 1;3.2). For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity;

d) The category of the package and if applicable for the overpack and freight container, as assigned per 1.2.3.1.4, i.e. I-WHITE, II-YELLOW, III-YELLOW;

e) The transport index as determined per 1.2.3.1.1 and 1.2.3.1.2 (except for category I-WHITE);

f) For fissile material:

1) shipped under one exception of 2;7.2.3.5.1 a) to f), reference to that paragraph;

2) shipped under 2;7.2.3.5.1 c) to e), the total mass of fissile nuclides;

3) contained in a package for which one of 6;7.10.2 a) to c) or 6;7.10.3 is applied, reference to that paragraph; and

4) the criticality safety index, where applicable.

g) The identification mark for each competent authority certificate of approval (special form radioactive material, low dispersible radioactive material, fissile material excepted under 2;7.2.3.5.1 f), special arrangement, package design, or shipment) applicable to the consignment;

h) For consignments of more than one package, the information contained in 4.1.4.1 a) to c) and 4.1.5.7.1 a) to g) must be given for each package. For packages in an overpack or freight container, a detailed statement of the contents of each package within the overpack or freight container and, where appropriate, of each overpack or freight container must be included. If packages are to be removed from the overpack or freight container at a point of intermediate unloading, appropriate transport documents must be made available;

i) Where a consignment is required to be shipped under exclusive use, the statement "EXCLUSIVE USE SHIPMENT"; and

j) For LSA-II, LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of A_2. For radioactive material for which the A_2 value is unlimited, the multiple of A_2 must be zero.

4.1.5.7.2 The shipper must provide a statement regarding actions, if any, that are required to be taken by the carrier. The statement must be in the languages deemed necessary by the carrier or the authorities concerned, and must include at least the following points:

a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack or freight container including any special stowage provisions for the safe dissipation of heat (see 7;2.9.3.2), or a statement that no such requirements are necessary;

b) Restrictions on the type of aircraft and any necessary routeing instructions;

c) Emergency arrangements appropriate to the consignment.

4.1.5.7.3 In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the UN number and proper shipping name required in 4.1.4.1 must be in accordance with the certificate of the country of origin of design.

4.1.5.7.4 The applicable competent authority certificates need not necessarily accompany the consignment. The shipper must make them available.

4.1.5.8 *Additional requirements*

4.1.5.8.1 The dangerous goods transport document must also contain:

a) except for radioactive material, the packing instruction applied. For shipments of lithium batteries prepared in accordance with Section IB of Packing Instruction 965 or Packing Instruction 968, the letters "IB" must be added following the packing instruction number;

≠ > b) when applicable, reference to Special Provision A1, A2, A4, A5, A51, A88, A99, A176, A190, A191, A201, A202, A211, A212, A224 or A225;

c) a statement indicating that the shipment is within the limitations prescribed for either passenger and cargo aircraft or cargo-only aircraft, as appropriate;

Note.— To qualify as acceptable for transport aboard passenger aircraft, passenger aircraft packing instruction number(s) must be used, and the package must not bear the "Cargo aircraft only" label. To qualify as acceptable for transport aboard cargo-only aircraft, cargo aircraft packing instruction number(s) must be used, and the package must bear the "Cargo aircraft only" label; or passenger aircraft instruction number(s) must be shown and no "Cargo aircraft only" label applied. However, where the packing instruction number(s) and the permitted quantity per package are identical for passenger and cargo aircraft, the "Cargo aircraft only" label should not be used.

d) special handling information, when appropriate;

e) an indication that an overpack has been used, when appropriate;

f) the "Q" value rounded up to the first decimal place, if substances are packed in accordance with 3;4.3.3 or 4;1.1.9 e); and

+ g) for individual radionuclides or for mixtures of radionuclides for which relevant data are not available or which are not listed in Table 2-12 and where Table 2-13 was used to determine the maximum allowed activity, the use of Table 2-13 must be referenced as well as the radioactive contents as specified in the first column of Table 2-13. For example: "Table 2-13 used. Only beta- or gamma-emitting nuclides are known to be present".

4.1.5.8.2 For explosive substances, where Packing Instruction 101 has been adopted by an appropriate national authority, the State's distinguishing sign for motor vehicles in international traffic of the country for which the authority acts must be marked on the dangerous goods transport document as follows:

Packaging approved by the competent authority of ...

Note.— In this instance, the term "competent authority" is used for intermodal compatibility; it refers to the appropriate national authority.

4.1.5.8.3 When self-reactive substances of Division 4.1, or organic peroxides of Division 5.2 or other substances having similar properties, are offered for transport, the shipper must indicate on the dangerous goods transport document that the packages containing such substances must be protected from direct sunlight and all sources of heat and be placed in adequately-ventilated areas.

4.1.5.9 *Classification where new data is available (see Part 2; Introductory Chapter, paragraph 1)*

For transport in accordance with 2;0.1, a statement to this effect must be included on the dangerous goods transport document, as follows "Classified in accordance with 2;0.1 of the Technical Instructions".

+ 4.1.5.10 *Application of special provisions*

Where, in accordance with a special provision in Table 3-2, additional information is necessary, this additional information must be included on the dangerous goods transport document.

4.1.6 Certification

4.1.6.1 The dangerous goods transport document must include a certification or declaration that the consignment is acceptable for transport and that the goods are properly packaged, marked and labelled, and in proper condition for transport in accordance with the applicable regulations and including additional air transport requirements of these Instructions (examples of additional air transport requirements are indicated in 5;1.1).

The text for this certification is:

"I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations."

For air transport the following additional statement is required:

"I declare that all of the applicable air transport requirements have been met."

The certification must be signed and dated by the shipper. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.

Note.— The word "placarded" is not essential for shipments by air.

4.1.6.2 If the dangerous goods documentation is presented to the operator by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign. Where the original consignment details are provided to an operator, by EDP or EDI techniques, and subsequently the consignment is transhipped to an operator that requires a paper dangerous goods transport document, the operator must ensure the paper document indicates "Original Received Electronically" and the name of the signatory must be shown in capital letters.

4.1.6.3 In addition to the languages which may be required by the State of Origin, English should be used for the dangerous goods transport document.

4.2 AIR WAYBILL

When an air waybill is issued for a consignment for which a dangerous goods transport document is required, the air waybill must contain a statement to indicate that the dangerous goods are described on an accompanying dangerous goods transport document. An air waybill issued for a consignment must, when applicable, indicate that the consignment must be loaded on cargo aircraft only.

4.3 ADDITIONAL DOCUMENTATION FOR OTHER THAN RADIOACTIVE MATERIAL

4.3.1 When dangerous goods are shipped as authorized by Special Provision A1 or A2, they must be accompanied by a copy of the document(s) of approval, showing the quantity limitations, the packing requirements and, in the case of A2, the labelling requirements.

4.3.2 When dangerous goods are shipped in portable tanks as authorized by Part S-4, Chapter 12 of the Supplement, they must be accompanied by a copy of the document(s) of approval.

4.3.3 When dangerous goods are shipped in packagings as authorized by 4;2.8, they must be accompanied by a copy of the document(s) of approval.

4.3.4 When organic peroxides and self-reactive substances require an approval prior to transport under the provisions of 2;5.3.2.5 or 2;4.2.3.2.5, a copy of the approval must be attached to the dangerous goods transport document.

≠ 4.3.5 When dangerous goods are shipped under exemption (see 1;1.1), a copy of the exemption must accompany the consignment. Where more than one State has granted an exemption for a particular consignment, the documents that need to accompany it are the exemptions granted by the States of Origin, Transit (if relevant) and Destination.

4.4 RETENTION OF DANGEROUS GOODS TRANSPORT INFORMATION

4.4.1 The shipper must retain a copy of the dangerous goods transport document and additional information and documentation as specified in these Instructions, for a minimum period of three months.

4.4.2 When the documents are kept electronically or in a computer system, the shipper must be able to reproduce them in a printed form.

———————

Part 6

PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

Chapter 1

APPLICABILITY, NOMENCLATURE AND CODES

1.1 APPLICABILITY

1.1.1 The applicability of each Chapter of this Part to the packagings for the various Classes and Divisions of dangerous goods is as set out in Table 6-1.

Table 6-1. Applicability of Chapters

Class or Division	*Chapter*
Classes 1, 2, 3, 4, 5, 8 and 9 and Division 6.1, where the packing instructions for these Classes and Divisions require the use of a packaging marked in accordance with Chapter 2 of this Part	1 to 5
Division 6.2, infectious substances	2, 6
Class 7, radioactive material	7

≠ 1.1.2 The requirements for packagings in Chapter 3 are based on packagings currently used. In order to take into account progress in science and technology, there is no objection to the use of packagings having specifications different from those in Chapter 3, provided they are equally effective, acceptable to the appropriate authority and able to successfully fulfil the requirements described in 4;1.1.18 and Chapter 4. Methods of testing other than those described in these Instructions are acceptable, provided they are equivalent.

+ 1.1.3 Packagings must be manufactured and tested under a quality assurance programme that satisfies the appropriate national authority in order to ensure that each packaging meets the requirements of Chapters 1 to 4.

Note.— ISO 16106:2020 "Transport packages for dangerous goods — Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings — Guidelines for the application of ISO 9001" provides acceptable guidance on procedures that may be followed.

1.1.4 Manufacturers and subsequent distributors of packagings must provide information regarding procedures to be followed (including closure instructions for inner packagings and receptacles), a description of the types and dimensions of the closures (including required gaskets) and any other components needed to ensure that packages, as presented for transport, are capable of passing the applicable performance tests of Chapters 4 to 7 and the pressure differential requirements of 4;1.1.6 as applicable.

1.2 CODES FOR DESIGNATING TYPES OF PACKAGINGS

1.2.1 The code consists of:

— an Arabic numeral indicating the kind of packaging, e.g. drum, jerrican, etc., followed by

— a capital letter(s) in Latin characters indicating the nature of the material, e.g. steel, wood, etc., followed where necessary by

— an Arabic numeral indicating the category of packaging within the kind to which the packaging belongs.

1.2.2 In the case of composite packagings, two capital letters in Latin characters are used in sequence in the second position of the code. The first indicates the material of the inner receptacle and the second that of the outer packaging.

1.2.3 For combination packagings, only the code number for the outer packaging is used.

1.2.4 The following numerals must be used for the kinds of packaging:

1. Drum
2. Reserved
3. Jerrican
4. Box
5. Bag
6. Composite packaging.

1.2.5 The following capital letters must be used for the types of material:

A. Steel (all types and surface treatments)
B. Aluminium
C. Natural wood
D. Plywood
F. Reconstituted wood
G. Fibreboard
H. Plastic material
L. Textile
M. Paper, multiwall
N. Metal (other than steel or aluminium)
P. Glass, porcelain or stoneware (not used in these Instructions).

Note.— Plastics materials are taken to include other polymeric materials such as rubber.

1.2.6 The letters “T” or “U” or “V” or “W” may follow the packaging code. The letter “T” signifies a salvage packaging conforming to the requirements of 4.8. The letter “U” signifies a special packaging conforming to the requirements of 6.5.1.6. The letter “V” signifies a special packaging conforming to the requirements of 4.1.7. The letter “W” signifies that the packaging, although of the same type indicated by the code, is manufactured to a specification different to that in 3.1 and is considered equivalent under the requirements of 1.1.2.

1.3 INDEX OF PACKAGINGS

Table 6-2 contains an index of packagings, other than inner packagings, referred to in Chapters 1 to 4. It lists all the packagings, except inner packagings, specified in the United Nations *Recommendations for the Transport of Dangerous Goods*, and notes those not used in these Instructions for air transport. The index lists the number of the paragraph containing the requirements of those packagings used in these Instructions. The performance tests are specified in Chapter 4. Table 6-3 contains an index of inner packagings and lists the paragraph number containing the requirements together with, where applicable, individual performance tests (e.g. for aerosols). In addition to the listed packagings, intermediate bulk containers are permitted for UN 3077 as shown in Packing Instruction 956.

Table 6-2. Index of packagings other than inner packagings

Kind	*Code and, where applicable, category*		*Paragraph*	*Maximum capacity (L)*	*Maximum net mass (kg)*
Steel drums	1A1	non-removable head	3.1.1	450	400
	1A2	removable head	3.1.1	450	400
Aluminium drums	1B1	non-removable head	3.1.2	450	400
	1B2	removable head	3.1.2	450	400
Metal (other than steel or aluminium) drums	1N1	non-removable head	3.1.3	450	400
	1N2	removable head	3.1.3	450	400
Steel jerricans	3A1	non-removable head	3.1.4	60	120
	3A2	removable head	3.1.4	60	120
Aluminium jerricans	3B1	non-removable head	3.1.4	60	120
	3B2	removable head	3.1.4	60	120
Plywood drums	1D		3.1.5	250	400
Reserved					
Fibre drums	1G		3.1.6	450	400
Plastic drums and jerricans	1H1	drums, non-removable head	3.1.7	450	400
	1H2	drums, removable head	3.1.7	450	400
	3H1	jerricans, non-removable head	3.1.7	60	120
	3H2	jerricans, removable head	3.1.7	60	120

Kind	*Code and, where applicable, category*		*Paragraph*	*Maximum capacity (L)*	*Maximum net mass (kg)*
Boxes of natural wood	4C1	ordinary	3.1.8		400
	4C2	with siftproof walls	3.1.8		400
Plywood boxes	4D		3.1.9		400
Reconstituted wood boxes	4F		3.1.10		400
Fibreboard boxes	4G		3.1.11		400
Plastic boxes	4H1	expanded plastic boxes	3.1.12		60
	4H2	solid plastic boxes	3.1.12		400
Steel, aluminium or other metal boxes	4A	steel	3.1.13		400
	4B	aluminium	3.1.13		400
	4N	metal, other than steel or aluminium	3.1.13		400
Textile bags	5L1	without inner liner or coating	Not used in these Instructions		
	5L2	siftproof	3.1.14		50
	5L3	water-resistant	3.1.14		50
Woven plastic bags	5H1	without inner liner or coating	3.1.15	Specialized use only	50
	5H2	siftproof	3.1.15		50
	5H3	water-resistant	3.1.15		50
Plastic film bags	5H4		3.1.16		50
Paper bags	5M1	multiwall	3.1.17		50
	5M2	multiwall, water-resistant	3.1.17		50
Composite packaging (plastic material)	6HA1	plastic receptacle with outer steel drum	3.1.18	250	400
	6HA2	plastic receptacle with outer steel crate*/or box	3.1.18	60	75
	6HB1	plastic receptacle with outer aluminium drum	3.1.18	250	400
	6HB2	plastic receptacle with outer aluminium crate*/or box	3.1.18	60	75
	6HC	plastic receptacle with outer wooden box	3.1.18	60	75
	6HD1	plastic receptacle with outer plywood drum	3.1.18	250	400
	6HD2	plastic receptacle with outer plywood box	3.1.18	60	75
	6HG1	plastic receptacle with outer fibre drum	3.1.18	250	400
	6HG2	plastic receptacle with outer fibreboard box	3.1.18	60	75
	6HH1	plastic receptacle with outer plastic drum	3.1.18	250	400
	6HH2	plastic receptacle with outer solid plastic box	3.1.18	60	75
Composite packagings (glass, porcelain or stoneware)	6PA1	receptacle with outer steel drum			
	6PA2	receptacle with outer steel crate*/or box			
	6PB1	receptacle with outer aluminium drum			
	6PB2	receptacle with outer aluminium crate*/or box			
	6PC	receptacle with outer wooden box			
	6PD1	receptacle with outer plywood drum	Not used in these Instructions		
	6PD2	receptacle with outer wickerwork hamper			
	6PG1	receptacle with outer fibre drum			
	6PG2	receptacle with outer fibreboard box			
	6PH1	receptacle with outer expanded plastic packaging			
	6PH2	receptacle with outer solid plastic packaging			

* Crates are outer packagings with incomplete surfaces. For air transport, crates may not be used as outer packagings of composite packagings.

Table 6-3. Index of inner packagings

Code	*Kind*	*Paragraph*
	Glass	3.2.1
	Plastic	3.2.2
	Metal cans, tins or tubes	3.2.3
	Paper bags	3.2.4
	Plastic bags	3.2.5
>	Fibre cans or boxes	3.2.6
≠	Metal or plastic flexible tubes	3.2.7

Chapter 2

MARKING OF PACKAGINGS OTHER THAN INNER PACKAGINGS

Introductory Notes

Note 1.— The marks indicate that the packaging which bears them corresponds to a successfully tested design type and that it complies with the provisions of Chapters 3 and 4 which are related to the manufacture, but not to the use, of the packaging. In itself, therefore, the marks do not necessarily confirm that the packaging may be used for any particular substance.

Note 2.— The marks are intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities. In relation to the use of a new packaging, the original marks are a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.

Note 3.— The marks do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings. For example, a packaging having an X or Y mark may be used for substances to which a packing group having a lesser degree of danger has been assigned with the relevant maximum permissible value of the relative density, determined by taking into account the factor 1.5 or 2.25 indicated in the test requirements for packagings in Chapter 4 as appropriate, i.e. a Packing Group I packaging tested for products with a relative density of 1.2 could be used as a Packing Group II packaging for products with a relative density of 1.8 or a Packing Group III packaging for products with a relative density of 2.7, provided of course that all the performance criteria can still be met with the higher relative density.

2.1 MARKING REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

2.1.1 Each packaging intended for use according to these Instructions must bear marks which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the marks, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L capacity or less or of 30 kg maximum net mass, when they must be at least 6 mm in height and except for packagings of 5 L capacity or less or of 5 kg maximum net mass when they must be of an appropriate size. The marks must show:

a) the United Nations packaging symbol 

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6. For embossed metal packagings the capital letters “UN” may be applied as the symbol;

b) the code designating the type of packaging according to 1.2;

c) a code in two parts:

1) a letter designating the packing group(s) for which the design type has been successfully tested:

X for Packing Groups I, II and III
Y for Packing Groups II and III
Z for Packing Group III only;

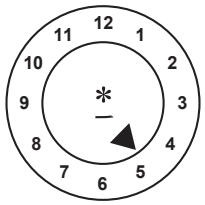
2) A) for single packagings intended to contain liquids: the relative density, rounded off to the first decimal, for which the design type has been tested; this may be omitted when the relative density does not exceed 1.2;

B) for packagings intended to contain solids or inner packagings: the maximum gross mass, in kilograms, at which the design type has been tested;

d) 1) for single packagings intended to contain liquids: the hydraulic test pressure which the packaging was shown to withstand, in kPa rounded down to the nearest 10 kPa;

2) for packagings intended to contain solids or inner packagings: the letter “S”;

e) the last two digits of the year during which the packaging was manufactured. Packagings of types 1H1, 1H2, 3H1 and 3H2 must also be appropriately marked with the month of manufacture; this may be marked on the packaging in a different place from the remainder of the mark. An appropriate method is:



* The last two digits of the year of manufacture may be displayed at that place. In such a case, and when the clock is placed adjacent to the UN design type mark, the indication of the year in the mark may be waived. However, when the clock is not placed adjacent to the UN design type mark, the two digits of the year in the mark and in the clock must be identical.

Note.— Other methods that provide the minimum required information in a durable, visible and legible form are also acceptable.

f) the State authorizing the allocation of the mark, indicated by the distinguishing sign used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

g) the name of the manufacturer or other identification of the packaging specified by the appropriate national authority.

2.1.2 In addition to the durable marks prescribed in 2.1.1, every new metal drum of a capacity greater than 100 L must bear the marks described in 2.1.1. a) to e) on the bottom, with an indication of the nominal thickness of at least the metal used in the body (in mm, to 0.1 mm), in a permanent form (e.g. embossed). When the nominal thickness of either head of a metal drum is thinner than that of the body, the nominal thicknesses of the top head, body and bottom head must be marked on the bottom in a permanent form (e.g. embossed), for example “1.0-1.2-1.0” or “0.9-1.0-1.0”. Nominal thicknesses of metal must be determined according to the appropriate ISO Standard, for example ISO 3574:1999 for steel. The marks indicated in 2.1.1 f) and g) must not be applied in a permanent form (e.g. embossed) except as provided for in 2.1.5.

2.1.3 Every packaging liable to undergo a reconditioning process other than those referred to in 2.1.2 must bear the marks indicated in 2.1.1 a) to e) in a permanent form. Marks are permanent if they are able to withstand the reconditioning process (e.g. embossed). For packagings other than metal drums of a capacity greater than 100 L, these permanent marks may replace the corresponding durable marks prescribed in 2.1.1.

2.1.4 For re-manufactured metal drums, if there is no change to the packaging type and no replacement or removal of integral structural components, the required marks need not be permanent (e.g. embossed). Every other re-manufactured metal drum must bear the marks indicated in 2.1.1 a) to e) in a permanent form (e.g. embossed) on the top head or side.

2.1.5 Metal drums made from materials (e.g. stainless steel) designed to be reused repeatedly may bear the marks indicated in 2.1.1 f) and g) in a permanent form (e.g. embossed).

2.1.6 Packagings manufactured with recycled plastic material as defined in 1;3 must be marked “REC”. This mark must be placed near the marks prescribed in 2.1.1.

2.1.7 Marks must be applied in the sequence of the sub-paragraphs in 2.1.1; each mark required in these sub-paragraphs and when appropriate sub-paragraphs h) to j) of 2.1.8 must be clearly separated, e.g. by a slash or space, so as to be easily identified; for examples see 2.1.10; 2.1.11; 2.1.12; 2.1.13 and 2.1.14. Any additional marks authorized by the appropriate national authority must still enable the other marks required in 2.1.1 to be correctly identified.

2.1.8 After reconditioning a packaging, the reconditioner must apply to it, in sequence, durable marks showing:

h) the State in which the reconditioning was carried out, indicated by the distinguishing sign used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

i) the name of the reconditioner or other identification of the packaging specified by the appropriate national authority;

j) the year of reconditioning; the letter “R”; and for every packaging successfully passing the leakproofness test in 4.4, the additional letter “L”.

2.1.9 When, after reconditioning, the marks required by 2.1.1 a) to d) no longer appear on the top head or the side of a metal drum, the reconditioner must apply them in a durable form followed by those required by 2.1.8. These marks must not identify a greater performance capability than that for which the original design type had been tested and marked.

2.1.10 Examples for marking NEW packagings:

for a new fibreboard box

(un) 4G/Y145/S/02 as in 2.1.1 a), b), c)1), c)2)B), d)2) and e)
NL/VL823 as in 2.1.1 f) and g)

for a new steel drum to contain liquids

(un) 1A1/Y1.4/150/98 as in 2.1.1 a), b), c)1), c)2)A), d)1) and e)
NL/VL824 as in 2.1.1 f) and g)

for a new steel drum to contain solids, or inner packagings

(un) 1A2/Y150/S/01 as in 2.1.1 a), b), c)1), c)2)B), d)2) and e)
NL/VL825 as in 2.1.1 f) and g)

for a new plastic box of equivalent specification

(un) 4HW/Y136/S/98 as in 2.1.1 a), b), c)1), c)2)B), d)2) and e)
NL/VL826 as in 2.1.1 f) and g)

for a remanufactured steel drum to contain liquids

(un) 1A2/Y/100/01 as in 2.1.1 a), b), c)1), c)2)A), d)1) and e)
USA/MM5 as in 2.1.1 f) and g)

2.1.11 Examples for marking RECONDITIONED packagings:

(un) 1A1/Y1.4/150/97 as in 2.1.1 a), b), c)1), c)2)A), d)1) and e)
NL/RB/01 RL as in 2.1.8 h), i) and j)

(un) 1A2/Y150/S/99 as in 2.1.1 a), b), c)1), c)2)B), d)2) and e)
USA/RB/00 R as in 2.1.8 h), i) and j)

2.1.12 Example for marking packagings for infectious substances:

(un) 4G/CLASS 6.2/01 as in 6.4.2 a), b), c) and d)
S/SP-9989-ERIKSSON as in 6.4.2 e) and f)

2.1.13 Example for marking SALVAGE packagings:

(un) 1A2T/Y300/S/01 as in 2.1.1 a), b), c)2)B), d)2) and e)
USA/abc as in 2.1.1 f) and g)

2.1.14 Example for marking intermediate bulk containers:

(un) 13H3/Z/03 01 as in as in 8.1.2 a), b),c), and d)
F/Meunier1713/0/1000 as in 8.1.2 e), f), g) and h

Note.— The marking for which examples are given in 2.1.10, 2.1.11, 2.1.12, 2.1.13 and 2.1.14 may be applied in a single line or in multiple lines provided the correct sequence is respected.

2.1.15 Where a packaging conforms to more than one tested packaging design type, the packaging may bear more than one mark to indicate the relevant performance test requirements that have been met. The marks must appear in close proximity to one another and each mark must appear in its entirety.

———————

Chapter 3

REQUIREMENTS FOR PACKAGINGS

3.1 REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

GENERAL REQUIREMENTS

Any permeation of the substance contained in the packaging must not constitute a danger under normal conditions of transport.

3.1.1 Steel drums

1A1 non-removable head
1A2 removable head

3.1.1.1 Body and heads must be constructed of steel sheet of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.

Note.— In the case of carbon steel drums, "suitable" steels are identified in ISO 3573:1999 "Hot rolled carbon steel sheet of commercial and drawing qualities" and ISO 3574:1999 "Cold-reduced carbon steel of commercial and drawing qualities". For carbon steel drums below 100 litres, "suitable" steels in addition to the above standards are also identified in ISO 11949:1995 "Cold-reduced electrolytic tinplate", ISO 11950:1995 "Cold-reduced electrolytic chromium/chromium oxide-coated steel" and ISO 11951:1995 "Cold-reduced blackplate in coil form for the production of tinplate or electrolytic chromium/chromium oxide-coated steel".

3.1.1.2 Body seams must be welded on drums intended to contain more than 40 L of liquids. Body seams must be mechanically seamed or welded on drums intended to contain solids, or 40 L or less of liquids.

3.1.1.3 Chimes must be mechanically seamed or welded. Separate reinforcing rings may be applied.

3.1.1.4 The body of a drum of a capacity greater than 60 L must, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops they must be fitted tightly on the body and so secured that they cannot shift. Rolling hoops must not be spot welded.

3.1.1.5 Openings for filling, emptying and venting in the bodies or heads of non-removable head (1A1) drums must not exceed 7 cm in diameter. Drums with larger openings are considered to be of the removable head type (1A2). Closures for openings in the bodies and heads of drums must be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges may be mechanically seamed or welded in place. Gaskets or other sealing elements must be used with closures, unless the closure is inherently leakproof.

3.1.1.6 Closure devices for removable head drums must be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of transport. Gaskets or other sealing elements must be used with all removable heads.

3.1.1.7 If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

3.1.1.8 Maximum capacity of drum: 450 L.

3.1.1.9 Maximum net mass: 400 kg.

3.1.2 Aluminium drums

1B1 non-removable head
1B2 removable head

3.1.2.1 Body and heads must be constructed of aluminium at least 99 per cent pure or of an aluminium base alloy. Materials must be of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.

3.1.2.2 All seams must be welded. Chime seams, if any, must be reinforced by the application of separate reinforcing rings.

3.1.2.3 The body of a drum of a capacity greater than 60 L must, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops they must be fitted tightly on the body and so secured that they cannot shift. Rolling hoops must not be spot welded.

3.1.2.4 Openings for filling, emptying and venting in the bodies or heads on non-removable head (1B1) drums must not exceed 7 cm in diameter. Drums with larger openings are considered to be of the removable head type (1B2). Closures for openings in the bodies and heads of drums must be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges must be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements must be used with closures, unless the closure is inherently leakproof.

3.1.2.5 Closure devices for removable head drums must be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of transport. Gaskets or other sealing elements must be used with all removable heads.

3.1.2.6 If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

3.1.2.7 Maximum capacity of drum: 450 L.

3.1.2.8 Maximum net mass: 400 kg.

3.1.3 Drums of metal other than aluminium or steel

1N1 non-removable head
1N2 removable head

3.1.3.1 The body and heads must be constructed of a metal or of a metal alloy other than steel or aluminium. Material must be of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.

3.1.3.2 Chime seams, if any, must be reinforced by the application of separate reinforcing rings. All seams, if any, must be joined (welded, soldered, etc.) in accordance with the technical state-of-the-art for the metal or metal alloy used.

3.1.3.3 The body of a drum of a capacity greater than 60 L must, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops, they must be fitted tightly on the body and so secured that they cannot shift. Rolling hoops must not be spot welded.

3.1.3.4 Openings for filling, emptying and venting in the bodies or heads or non-removable head (1N1) drums must not exceed 7 cm in diameter. Drums with larger openings are considered to be of the removable head type (1N2). Closures for openings in the bodies and heads of drums must be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges must be joined in place (welded, soldered, etc.) in accordance with the technical state of the art for the metal or metal alloy used so that the seam join is leakproof. Gaskets or other sealing elements must be used with closures, unless the closure is inherently leakproof.

3.1.3.5 Closure devices for removable head drums must be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of transport. Gaskets or other sealing elements must be used with all removable heads.

3.1.3.6 If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

3.1.3.7 Maximum capacity of drum: 450 L.

3.1.3.8 Maximum net mass: 400 kg.

3.1.4 Steel or aluminium jerricans

3A1 steel, non-removable head
3A2 steel, removable head
3B1 aluminium, non-removable head
3B2 aluminium, removable head

3.1.4.1 Body and heads must be constructed of a steel sheet of aluminium at least 99 per cent pure or of an aluminium base alloy. Material must be of a suitable type and of adequate thickness in relation to the capacity of the jerrican and to its intended use.

3.1.4.2 Chimes of steel jerricans must be mechanically seamed or welded. Body seams of steel jerricans intended to contain more than 40 L of liquid must be welded. Body seams of steel jerricans intended to contain 40 L or less must be mechanically seamed or welded. For aluminium jerricans, all seams must be welded. Chime seams, if any, must be reinforced by the application of a separate reinforcing ring.

3.1.4.3 Openings in jerricans (3A1 and 3B1) must not exceed 7 cm in diameter. Jerricans with larger openings are considered to be of the removable head type (3A2 and 3B2). Closures must be so designed that they will remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements must be used with closures, unless the closure is inherently leakproof.

3.1.4.4 If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

3.1.4.5 Maximum capacity of jerrican: 60 L.

3.1.4.6 Maximum net mass: 120 kg.

3.1.5 Plywood drums

1D

3.1.5.1 The wood used must be well seasoned, commercially dry and free from any defect likely to lessen the effectiveness of the drum for the purpose intended. If a material other than plywood is used for the manufacture of the heads, it must be of a quality equivalent to the plywood.

3.1.5.2 At least two-ply plywood must be used for the body and at least three-ply plywood for the heads; the plies must be firmly glued together by a water-resistant adhesive with their grain crosswise.

3.1.5.3 The body and heads of the drum and their joins must be of a design appropriate to the capacity of the drum and to its intended use.

3.1.5.4 In order to prevent sifting of the contents, lids must be lined with kraft paper or some other equivalent material which must be securely fastened to the lid and extend to the outside along its full circumference.

3.1.5.5 Maximum capacity of drum: 250 L.

3.1.5.6 Maximum net mass: 400 kg.

3.1.6 Fibre drums

1G

3.1.6.1 The body of the drum must consist of multiple plies of heavy paper or fibreboard (without corrugations) firmly glued or laminated together and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastic material, etc.

3.1.6.2 Heads must be of natural wood, fibreboard, metal, plywood, plastic or other suitable material and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastic material, etc.

3.1.6.3 The body and heads of the drum and their joins must be of a design appropriate to the capacity of the drum and to its intended use.

3.1.6.4 The assembled packaging must be sufficiently water-resistant so as not to delaminate under normal conditions of transport.

3.1.6.5 Maximum capacity of drum: 450 L.

3.1.6.6 Maximum net mass: 400 kg.

3.1.7 Plastic drums and jerricans

1H1 drums, non-removable head
1H2 drums, removable head
3H1 jerricans, non-removable head
3H2 jerricans, removable head

3.1.7.1 The packaging must be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and intended use. Except for recycled plastic material as defined in 1;3, no used material other than production residues or regrind from the same manufacturing process may be used. The packaging must be adequately resistant to aging and to degradation caused either by the substance contained or by ultraviolet radiation. Any permeation of the substance contained must not constitute a danger under normal conditions of transport.

3.1.7.2 If protection against ultraviolet radiation is required, it must be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the life of the packaging. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, retesting may be waived if the carbon black content does not exceed 2 per cent by mass or if the pigment content does not exceed 3 per cent by mass; the content of inhibitors of ultraviolet radiation is not limited.

3.1.7.3 Additives serving purposes other than protection against ultraviolet radiation may be included in the composition of the plastic material provided that they do not adversely affect the chemical and physical properties of the material of the packaging. In such circumstances retesting may be waived.

3.1.7.4 The wall thickness at every point of the packaging must be appropriate to its capacity and intended use, taking into account the stresses to which each point is liable to be exposed.

3.1.7.5 Openings for filling, emptying and venting in the bodies or heads of non-removable head drums (1H1) and jerricans (3H1) must not exceed 7 cm in diameter. Drums and jerricans with larger openings are considered to be of the removable head type (1H2 and 3H2). Closures for openings in the bodies or heads of drums and jerricans must be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements must be used with closures unless the closure is inherently leakproof.

3.1.7.6 Closure devices for removable head drums and jerricans must be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Gaskets must be used with all removable heads unless the drum or jerrican design is such that, where the removable head is properly secured, the drum or jerrican is inherently leakproof.

3.1.7.7 Maximum capacity of drums and jerricans:

1H1, 1H2: 450 L;
3H1, 3H2: 60 L.

3.1.7.8 Maximum net mass:

1H1, 1H2: 400 kg;
3H1, 3H2: 120 kg.

3.1.8 Boxes of natural wood

4C1 ordinary
4C2 with siftproof walls

3.1.8.1 The wood used must be well seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box. The tops and bottoms may be made of water-resistant reconstituted wood such as hardboard, particle board or other suitable type.

3.1.8.2 Fastenings must be resistant to vibration experienced under normal conditions of transport. End grain nailing must be avoided whenever practicable. Joins which are likely to be highly stressed must be made using clenched or annular ring nails or equivalent fastenings.

3.1.8.3 Box 4C2: each part must consist of one piece or be equivalent thereto. Parts are considered equivalent to one piece when one of the following methods of glued assembly is used: Lindermann joint, tongue and groove joint, ship lap or rabbet joint or butt joint with at least two corrugated metal fasteners at each joint.

3.1.8.4 Maximum net mass: 400 kg.

3.1.9 Plywood boxes

4D

3.1.9.1 Plywood used must be at least 3-ply. It must be made from well seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box. All adjacent plies must be glued with water-resistant adhesive. Other suitable materials may be used together with plywood in the construction of boxes. Boxes must be firmly nailed or screwed to corner posts or ends or be assembled by equally suitable devices.

3.1.9.2 Maximum net mass: 400 kg.

3.1.10 Reconstituted wood boxes

4F

3.1.10.1 The walls of boxes must be made of water-resistant reconstituted wood such as hardboard, particle board or other suitable type. The strength of the material used and the method of construction must be appropriate to the capacity of the boxes and their intended use.

3.1.10.2 Other parts of the boxes may be made of other suitable material.

3.1.10.3 Boxes must be securely assembled by means of suitable devices.

3.1.10.4 Maximum net mass: 400 kg.

3.1.11 Fibreboard boxes

4G

3.1.11.1 Strong and good quality solid or double-faced corrugated fibreboard (single or multiwall) must be used, appropriate to the capacity of the box and to its intended use. The water resistance of the outer surface must be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 g/m^2 — see ISO 535:1991. It must have proper bending qualities. Fibreboard must be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting of corrugated fibreboard must be firmly glued to the facings.

3.1.11.2 The ends of boxes may have a wooden frame or be entirely of wood or other suitable material. Reinforcements of wooden battens or other suitable material may be used.

3.1.11.3 Manufacturing joins in the body of boxes must be taped, lapped and glued or lapped and stitched with metal staples. Lapped joins must have an appropriate overlap.

3.1.11.4 Where closing is effected by gluing or taping, a water-resistant adhesive must be used.

3.1.11.5 Boxes must be designed so as to provide a good fit to the contents.

3.1.11.6 Maximum net mass: 400 kg.

3.1.12 Plastic boxes

4H1 expanded plastic boxes
4H2 solid plastic boxes

3.1.12.1 The box must be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and intended use. The box must be adequately resistant to aging and to degradation caused either by the substance contained or by ultraviolet radiation.

3.1.12.2 An expanded plastic box must comprise two parts made of a moulded expanded plastic material, a bottom section containing cavities for the inner packagings and a top section covering and interlocking with the bottom section. The top and bottom sections must be designed so that the inner packagings fit snugly. The closure cap for any inner packaging must not be in contact with the inside of the top section of this box.

3.1.12.3 For dispatch, an expanded plastic box must be closed with a self-adhesive tape having sufficient tensile strength to prevent the box from opening. The adhesive tape must be weather-resistant and its adhesive compatible with the expanded plastic material of the box. Other closing devices at least equally effective may be used.

3.1.12.4 For solid plastic boxes, protection against ultraviolet radiation, if required, must be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the life of the box. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, re-testing may be waived if the carbon black content does not exceed 2 per cent by mass or if the pigment content does not exceed 3 per cent by mass; the content of inhibitors of ultraviolet radiation is not limited.

3.1.12.5 Additives serving purposes other than protection against ultraviolet radiation may be included in the composition of the plastic material provided that they do not adversely affect the chemical or physical properties of the material of the box. Under such circumstances re-testing may be waived.

3.1.12.6 Solid plastic boxes must have closure devices made of a suitable material, of adequate strength and so designed as to prevent the box from unintentional opening.

3.1.12.7 Maximum net mass:

4H1 box: 60 kg;
4H2 box: 400 kg.

3.1.13 Steel, aluminium or other metal boxes

4A steel
4B aluminium
4N metal, other than steel or aluminium

3.1.13.1 The strength of the metal and the construction of the box must be appropriate to the capacity of the box and to its intended use.

3.1.13.2 Boxes must be lined with fibreboard or felt packing pieces or must have an inner liner or coating of suitable material as required. If a double seamed metal liner is used, steps must be taken to prevent the ingress of substances, particularly explosives, into the recesses of the seams.

3.1.13.3 Closures may be of any suitable type; they must remain secured under normal conditions of transport.

3.1.13.4 Maximum net mass: 400 kg.

3.1.14 Textile bags

5L2 siftproof
5L3 water-resistant

3.1.14.1 The textiles used must be of good quality. The strength of the fabric and the construction of the bag must be appropriate to the capacity of the bag and to its intended use.

3.1.14.2 Bags, siftproof, 5L2: the bag must be made siftproof, for example by the use of:

— paper bonded to the inner surface of the bag by a water-resistant adhesive such as bitumen; or

— plastic film bonded to the inner surface of the bag; or

— one or more inner liners made of paper or plastic material.

3.1.14.3 Bags, water-resistant, 5L3: to prevent the entry of moisture the bag must be made waterproof, for example by the use of:

— separate inner liners of water-resistant paper (e.g. waxed kraft paper, tarred paper or plastic-coated kraft paper); or

— plastic film bonded to the inner surface of the bag; or

— one or more inner liners made of plastic material.

3.1.14.4 Maximum net mass: 50 kg.

3.1.15 Woven plastic bags

5H1 without inner lining or coating
5H2 siftproof
5H3 water-resistant

3.1.15.1 Bags must be made from stretched tapes or monofilaments of a suitable plastic material. The strength of the material used and the construction of the bag must be appropriate to the capacity of the bag and to its intended use.

3.1.15.2 If the fabric is woven flat, the bags must be made by sewing or some other method ensuring closure of the bottom and one side. If the fabric is tubular, the bag must be closed by sewing, weaving or some other equally strong method of closure.

3.1.15.3 Bags, siftproof, 5H2: The bag must be made siftproof, for example by means of:

— paper or a plastic film bonded to the inner surface of the bag; or

— one or more separate inner liners made of paper or plastic material.

3.1.15.4 Bags, water-resistant, 5H3: To prevent the entry of moisture, the bag must be made waterproof, for example by means of:

— separate inner liners of water-resistant paper (e.g. waxed kraft paper, double-tarred kraft paper or plastic-coated kraft paper); or

— plastic film bonded to the inner or outer surface of the bag; or

— one or more inner plastic liners.

3.1.15.5 Maximum net mass: 50 kg.

3.1.16 Plastic film bags

5H4

3.1.16.1 Bags must be made of a suitable plastic material. The strength of the material used and the construction of the bag must be appropriate to the capacity of the bag and to its intended use. Joins and closures must withstand pressures and impacts liable to occur under normal conditions of transport.

3.1.16.2 Maximum net mass: 50 kg.

3.1.17 Paper bags

5M1 multiwall
5M2 multiwall, water-resistant

3.1.17.1 Bags must be made of a suitable kraft paper or of an equivalent paper with at least three plies, the middle ply of which may be net-cloth and adhesive bonding to the outer paper plies. The strength of the paper and the construction of the bags must be appropriate to the capacity of the bag and to its intended use. Joins and closures must be siftproof.

3.1.17.2 To prevent the entry of moisture, a bag of four plies or more must be made waterproof by the use of either a water-resistant ply as one of the two outermost plies or a water-resistant barrier made of a suitable protective material between the two outermost plies. A bag of three plies must be made waterproof by the use of a water-resistant ply as the outermost ply. Where there is a danger of the substance contained reacting with moisture or where it is packed damp, a waterproof ply or barrier, such as double-tarred kraft paper, plastic-coated kraft paper, plastic film bonded to the inner surface of the bag, or one or more inner plastic liners, must also be placed next to the substance. Joins and closures must be waterproof.

3.1.17.3 Maximum net mass: 50 kg.

3.1.18 Composite packagings (plastic material)

6HA1 plastic receptacle with outer steel drum
6HA2 plastic receptacle with outer steel crate*/or box
6HB1 plastic receptacle with outer aluminium drum
6HB2 plastic receptacle with outer aluminium crate*/or box
6HC plastic receptacle with outer wooden box
6HD1 plastic receptacle with outer plywood drum
6HD2 plastic receptacle with outer plywood box
6HG1 plastic receptacle with outer fibre drum
6HG2 plastic receptacle with outer fibreboard box
6HH1 plastic receptacle with outer plastic drum
6HH2 plastic receptacle with outer solid plastic box

3.1.18.1 *Inner receptacle*

3.1.18.1.1 The provisions of 3.1.7.1 and 3.1.7.3 to 3.1.7.6 apply to inner plastic receptacles.

3.1.18.1.2 The inner plastic receptacle must fit snugly inside the outer packaging, which must be free of any projection that might abrade the plastic material.

3.1.18.1.3 Maximum capacity of inner receptacles:

6HA1, 6HB1, 6HD1, 6HG1, 6HH1: 250 L;
6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: 60 L.

3.1.18.1.4 Maximum net mass:

6HA1, 6HB1, 6HD1, 6HG1, 6HH1: 400 kg;
6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: 75 kg.

3.1.18.2 *Outer packaging*

3.1.18.2.1 Plastic receptacle with outer steel or aluminium drum 6HA1 or 6HB1; the relevant provisions of 3.1.1 or 3.1.2, as appropriate, apply to the construction of the outer packaging.

3.1.18.2.2 Plastic receptacle with outer steel or aluminium box 6HA2 or 6HB2; the relevant provisions of 3.1.13 apply to the construction of the outer packaging.

* Crates are outer packagings with incomplete surfaces. For air transport, crates may not be used as outer packagings of composite packagings.

3.1.18.2.3 Plastic receptacle with outer wooden box 6HC; the relevant provisions of 3.1.8 apply to the construction of the outer packaging.

3.1.18.2.4 Plastic receptacle with outer plywood drum 6HD1; the relevant provisions of 3.1.5 apply to the construction of the outer packaging.

3.1.18.2.5 Plastic receptacle with outer plywood box 6HD2; the relevant provisions of 3.1.9 apply to the construction of the outer packaging.

3.1.18.2.6 Plastic receptacle with outer fibre drum 6HG1; the provisions of 3.1.6.1 to 3.1.6.4 apply to the construction of the outer packaging.

3.1.18.2.7 Plastic receptacle with outer fibreboard box 6HG2; the relevant provisions of 3.1.11 apply to the construction of the outer packaging.

3.1.18.2.8 Plastic receptacle with outer plastic drum 6HH1; the provisions of 3.1.7.1 and 3.1.7.3 to 3.1.7.7 apply to the construction of the outer packaging.

3.1.18.2.9 Plastic receptacle with outer solid plastic box (including corrugated plastic material) 6HH2; the provisions of 3.1.12.1 and 3.1.12.4 to 3.1.12.6 apply to the construction of the outer packaging.

3.2 REQUIREMENTS FOR INNER PACKAGINGS

3.2.1 Glass

Packagings must be well constructed. The materials of which these packagings and closures are made must be of good quality and, where in contact with the substance or article, not liable to react with it. Closures must be sufficiently tight to prevent leaking and sifting. Stoppers or corks must be held securely in position with wire, adhesive tape, or other positive means. Packagings having necks with moulded screw-threads must have threaded-type caps having a resilient liner completely resistant to the contents.

Glass ampoules must be heat-sealed, gas- and liquid-tight and they must not react chemically when coming into contact with the contents. If glass tubes are also permitted by the appropriate national authority for liquefied gases, they must be thick-walled and free of defects.

3.2.2 Plastic

Packagings must be well constructed. The materials of which these packagings and closures are made must be of good quality polyethylene or other suitable plastic and, where in contact with the substance, resistant to it. Closures must be sufficiently tight to prevent leaking and sifting. Stoppers or corks must be held securely in position with wire, adhesive tape, or other positive means.

3.2.3 Metal cans, tins or tubes

Packagings must be well constructed. The materials of which the packagings and closures are made must be of good quality and, where in contact with the substance, not liable to react with it. Closures must be sufficiently tight to prevent leaking and sifting and threaded-type caps must be equipped with a resilient liner completely resistant to the contents of the packagings.

3.2.4 Paper bags

Shipping sack kraft paper, or equivalent, of at least two sheets of paper must be used.

3.2.5 Plastic bags

The weld-seams and closures of such bags must be siftproof. Plastic bags must have a minimum thickness of 0.1 mm.

3.2.6 Fibre cans or boxes

Packagings must be well constructed and the material of which they are made must be of good quality. Metal tops, bottoms and connections, of suitable thickness, are authorized.

>

3.2.7 Metal or plastic flexible tubes

The materials of construction of flexible tubes and their closures must, where in contact with the organic peroxide, not affect the thermal stability.

Chapter 4

PACKAGING PERFORMANCE TESTS

Introductory Notes

Note 1.— The performance tests specified in this Chapter take account of the material used, and constructional design of packagings. They also take into account whether the goods to be transported are liquid or solid.

Note 2.— The performance tests are designed to ensure that there will be no loss of contents under normal transport conditions. The severity of the tests on a packaging is dependent on the intended contents, taking account of the degree of danger (i.e. packing group), relative density and vapour pressure (for liquids).

4.1 PERFORMANCE AND FREQUENCY OF TESTS

4.1.1 The design type of each packaging must be tested as provided for in this Chapter in accordance with procedures established by the appropriate national authority.

4.1.2 Each packaging design type must successfully pass the tests prescribed in this chapter before being used. A packaging design type is defined by the design, size, material and thickness, manner of construction and packing, but may include various surface treatments. It also includes packagings which differ from the design type only in their lesser design height.

4.1.3 Tests must be repeated on production samples at intervals established by the appropriate national authority. For such tests on paper or fibreboard packagings, preparation at ambient conditions is considered equivalent to the provisions of 4.2.3.

4.1.4 Tests must also be repeated after each modification which alters the design, material or manner of construction of a packaging.

4.1.5 The appropriate national authority may permit the selective testing of packagings that differ only in minor respects from a tested type, e.g. smaller sizes of inner packagings or inner packagings of lower net mass; and packagings such as drums, bags and boxes which are produced with small reductions in external dimension(s).

4.1.6 Reserved.

Note.— For the conditions for using different inner packagings in an outer packaging and permissible variations in inner packagings, see 4;1.1.10.1. These conditions do not limit the use of inner packagings when applying 4.1.7.

4.1.7 Articles or inner packagings of any type for solids or liquids may be assembled and transported, without testing, in an outer packaging under the following conditions:

a) The outer packaging must have been successfully tested in accordance with 4.3 with fragile (e.g. glass) inner packagings containing liquids using the Packing Group I drop height.

b) The total combined gross mass of inner packagings must not exceed one-half the gross mass of inner packagings used for the drop test in a) above.

c) The thickness of cushioning material between inner packagings and between inner packagings and the outside of the packaging must not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single inner packaging was used in the original test, the thicknesses of cushioning between inner packagings must not be less than the thickness of cushioning between the outside of the packaging and the inner packaging in the original test. If either fewer or smaller inner packagings are used (as compared to the inner packagings used in the drop test), sufficient additional cushioning material must be used to take up void spaces.

d) The outer packaging must have passed successfully the stacking test in 4.6 while empty. The total mass of identical packages must be based on the combined mass of inner packagings used for the drop test in a) above.

e) Inner packagings containing liquids must be completely surrounded with a sufficient quantity of absorbent material to absorb the entire liquid contents of the inner packagings.

f) If the outer packaging is intended to contain inner packagings for liquids and is not leakproof, or is intended to contain inner packagings for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally efficient means of containment. For packagings containing liquids, the absorbent material required by e) above must be placed inside the means of containing the liquid contents.

g) Inner packagings containing liquids must comply with 4;1.1.6.

h) Packagings must be marked in accordance with Part 6;2 as having been tested to Packing Group I performance for combination packagings. The marked gross mass in kilograms must be the sum of the mass of the outer packaging plus one half of the mass of the inner packaging(s) as used for the drop test referred to in a) above. Such a packaging mark must also contain a letter "V" as described in 1.2.6.

4.1.8 The appropriate national authority may at any time require proof, by tests in accordance with this Chapter, that serially produced packagings meet the requirements of the design type tests.

4.1.9 If an inner treatment or coating is required for safety reasons, it must retain its protective properties even after the tests.

4.1.10 Provided the validity of the test results is not affected, and with the approval of the appropriate national authority, several tests may be made on one sample.

4.2 PREPARATION OF PACKAGINGS FOR TESTING

4.2.1 Tests must be carried out on packagings prepared as for transport including, with respect to combination packagings, the inner packagings used. Inner or single receptacles or packagings must be filled to not less than 98 per cent of their maximum capacity for liquids or 95 per cent for solids. Bags must only be filled to the maximum mass at which they may be used. For other than bags, combination packagings where the inner packaging is designed to carry liquids and solids, separate testing is required for both liquid and solid contents. The substances or articles to be transported in the packaging may be replaced by other substances or articles except where this would invalidate the results of the tests. For solids, when another substance is used it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass, so long as they are placed so that the test results are not invalidated.

4.2.2 In the drop tests for liquids, when another substance is used, it must be of similar relative density and viscosity to those of the substance being transported. Water may also be used for the liquid drop test under the conditions set forth in 4.3.4.

4.2.3 Paper or fibreboard packagings must be conditioned for at least 24 hours in an atmosphere having a controlled temperature and relative humidity (r.h.). There are three options, one of which must be chosen. The preferred atmosphere is 23°C ± 2°C and 50 per cent ± 2 per cent r.h. The two other options are 20°C ± 2°C and 65 per cent ± 2 per cent r.h., or 27°C ± 2°C and 65 per cent ± 2 per cent r.h.

Note.— Average values must fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±5 per cent relative humidity without significant impairment of test reproducibility.

4.2.4 Additional steps must be taken to ascertain that the plastic material used in the manufacture of plastic drums, plastic jerricans and composite packagings (plastic material) intended to contain liquid complies with the provisions in 3.1.7.1, 3.1.7.3 and 4;1.1.3. This may be done, for example, by submitting sample receptacles or packagings to a preliminary test extending over a long period, for example six months, during which the samples would remain filled with the substances they are intended to contain, and after which the samples must be submitted to the applicable tests listed in 4.3, 4.4, 4.5 and 4.6. For substances which may cause stress-cracking or weakening in plastic drums or jerricans, the sample, filled with the substance or another substance that is known to have at least as severe a stress-cracking influence on the plastic materials in question, must be subjected to a superimposed load equivalent to the total mass of identical packages which might be stacked on it during transport. The minimum stacking height, including the test sample, must be 3 m.

4.3 DROP TEST

4.3.1 Number of test samples (per design type and manufacturer) and drop orientation

For other than flat drops, the centre of gravity must be vertically over the point of impact. Where more than one orientation is possible for a given drop, the orientation most likely to result in failure of the packaging must be used.

Packaging	*Number of test samples*	*Drop orientation*
Steel drums Aluminium drums Steel jerricans Aluminium jerricans Plywood drums Fibre drums Plastic drums and jerricans Composite packagings which are in the shape of a drum	Six (three for each drop)	First drop (using three samples): the packaging must strike the target diagonally on the chime or, if the packaging has no chime, on a circumferential seam or an edge. Second drop (using the other three samples): the packaging must strike the target on the weakest part not tested by the first drop, for example a closure or, for some cylindrical drums, the welded longitudinal seam of the drum body.
Boxes of natural wood Plywood boxes Reconstituted wood boxes Fibreboard boxes Plastic boxes Steel or aluminium boxes Composite packagings which are in the shape of a box	Five (one for each drop)	First drop: flat on the bottom Second drop: flat on the top Third drop: flat on the long side Fourth drop: flat on the short side Fifth drop: on a corner
Bags — single-ply without a side seam, or multi-ply	Three (two drops per bag)	First drop: flat on a wide face Second drop: on an end of the bag
Bags — single-ply with a side seam	Three (three drops per bag)	First drop: flat on a wide face Second drop: flat on a narrow face Third drop: on an end of the bag

4.3.2 Special preparation of test samples for the drop test

4.3.2.1 The temperature of the test sample and its contents must be reduced to –18°C or lower for the following packagings:

a) plastic drums (see 3.1.7);

b) plastic jerricans (see 3.1.7);

c) plastic boxes other than expanded polystyrene boxes (see 3.1.12);

d) composite packagings (plastic material) (see 3.1.18); and

e) combination packagings with plastic inner packagings, other than plastic bags intended to contain solids or articles.

4.3.2.2 Where test samples are prepared in this way, the conditioning specified in 4.2.3 may be waived. Test liquids must be kept in the liquid state by the addition of antifreeze, if necessary.

4.3.2.3 Removable head packagings for liquids must not be dropped until at least 24 hours after filling and closing to allow for any possible gasket relaxation.

4.3.3 Target

The target must be a non-resilient horizontal surface and must be:

a) integral and massive enough to be immovable;

b) flat with a surface kept free from local defects capable of influencing the test results;

c) rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and

d) sufficiently large to ensure that the test package falls entirely upon the surface.

4.3.4 Drop height

For solids and liquids, if the test is performed with the solid or liquid to be transported or with another substance having essentially the same physical characteristics:

Packing Group I	Packing Group II	Packing Group III
1.8 m	1.2 m	0.8 m

For liquids in single packagings and for inner packagings of combination packagings, if the test is performed with water:

a) where the substances to be transported have a relative density not exceeding 1.2:

Packing Group I	Packing Group II	Packing Group III
1.8 m	1.2 m	0.8 m

b) where the substances to be transported have a relative density exceeding 1.2, the drop height must be calculated on the basis of the relative density (d) of the substance to be carried, rounded up to the first decimal, as follows:

Packing Group I	Packing Group II	Packing Group III
d × 1.5 m	d × 1.0 m	d × 0.67 m

Note.— The term water includes water/antifreeze solutions with a minimum specific gravity of 0.95 for testing at –18°C.

4.3.5 Criteria for passing the test

4.3.5.1 Each packaging containing liquid must be leakproof when equilibrium has been reached between the internal and external pressures, except for inner packagings of combination packagings when it is not necessary that the pressures be equalized.

4.3.5.2 Where a packaging for solids undergoes a drop test and its upper face strikes the target, the test sample passes the test if the entire contents are retained by an inner packaging or inner receptacle (e.g. a plastic bag) even if the closure, while retaining its containment function, is no longer siftproof.

4.3.5.3 The packaging or outer packaging of a composite or combination packaging must not exhibit any damage liable to affect safety during transport. Inner receptacles, inner packagings, or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner receptacle or inner packaging(s).

4.3.5.4 Neither the outermost ply of a bag nor an outer packaging may exhibit any damage liable to affect safety during transport.

4.3.5.5 A slight discharge from the closure(s) upon impact is not considered to be a failure of the packaging provided that no further leakage occurs.

4.3.5.6 No rupture is permitted in packagings for goods of Class 1 which would permit the spillage of loose explosive substances or articles from the outer packaging.

4.4 LEAKPROOFNESS TEST

Note.— The leakproofness test must be performed on all design types of packagings intended to contain liquids; however, this test is not required for the inner packagings of combination packagings.

4.4.1 Number of test samples: three test samples per design type and manufacturer.

4.4.2 Test method and pressure to be applied: the packagings including their closures must be restrained under water for 5 minutes while an internal air pressure is applied; the method of restraint must not affect the results of the test. The air pressure (gauge) to be applied must be:

Packing Group I	Packing Group II	Packing Group III
Not less than 30 kPa (0.3 bar)	Not less than 20 kPa (0.2 bar)	Not less than 20 kPa (0.2 bar)

Other methods at least equally effective may be used.

4.4.3 Criterion for passing the test: there must be no leakage.

4.5 INTERNAL PRESSURE (HYDRAULIC) TEST

4.5.1 Packagings to be tested: the internal pressure (hydraulic) test must be carried out on all design types of metal, plastic and composite packagings intended to contain liquids. This test is not required for the inner packagings of combination packagings. For the internal pressure requirements for inner packagings see 4;1.1.6.

4.5.2 Number of test samples: three test samples per design type and manufacturer.

4.5.3 Test method and pressure to be applied: metal packagings including their closures must be subjected to the test pressure for 5 minutes. Plastic packagings and composite packagings (plastic material) including their closures must be subjected to the test pressure for 30 minutes. This pressure is the one to be included in the mark required by 2.1.1 d). The manner in which the packagings are supported must not invalidate the test. The test pressure must be applied continuously and evenly: it must be kept constant throughout the test period. The hydraulic pressure (gauge) applied, as determined by any one of the following methods, must be:

a) not less than the total gauge pressure measured in the packaging (i.e. the vapour pressure of the filling liquid and the partial pressure of the air or other inert gases minus 100 kPa) at 55°C, multiplied by a safety factor of 1.5. This total gauge pressure must be determined on the basis of a maximum degree of filling in accordance with Part 4;1.1.5 and a filling temperature of 15°C. The test pressure must be not less than 95 kPa (not less than 75 kPa for liquids in Packing Group III of Class 3 or Division 6.1); or

b) not less than 1.75 times the vapour pressure at 50°C of the liquid to be transported, minus 100 kPa but with a minimum test pressure of 100 kPa; or

c) not less than 1.5 times the vapour pressure at 55°C of the liquid to be transported, minus 100 kPa but with a minimum test pressure of 100 kPa.

These are expressed as:

a) P_T = (P_{M55} × 1.5) kPa with minima of 95 or 75 kPa;

b) P_T = (Vp_{50} × 1.75) – 100 kPa with a minimum of 100 kPa;

c) P_T = (Vp_{55} × 1.5) – 100 kPa with a minimum of 100 kPa;

where:

P_T = Test pressure in kPa (gauge)

P_{M55} = Pressure measured in the filled packaging at a temperature of 55°C

Vp_{50} = Vapour pressure at 50°C

Vp_{55} = Vapour pressure at 55°C.

4.5.4 In addition, packagings intended to contain liquids of Packing Group I must be tested to a minimum test pressure of 250 kPa (gauge) for a test period of 5 or 30 minutes depending upon the material of construction of the packaging.

4.5.5 Criteria for passing the test: no packaging may leak.

4.6 STACKING TEST

4.6.1 All design types of packagings other than bags must be subjected to a stacking test.

4.6.2 Number of test samples: three test samples per design type and manufacturer.

4.6.3 Test method: the test sample must be subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical packages which might be stacked on it during transport: where the contents of the test samples are liquids with a relative density different from that of the liquid to be transported, the force must be calculated in relation to the latter. The minimum height of the stack including the test sample must be 3 m. The duration of the test must be 24 hours except that plastic drums, jerricans and composite packagings (6HH1 and 6HH2) intended for liquids must be subjected to the stacking test for a period of 28 days at a temperature of not less than 40°C.

4.6.4 Criteria for passing the test: no test sample may leak. In composite packagings or combination packagings, there must be no leakage of the filling substance from the inner receptacle or inner packaging. No test sample must show any deterioration which could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages. Plastic packagings must be cooled to ambient temperature before the assessment.

4.7 TEST REPORT

4.7.1 A test report containing at least the following particulars must be drawn up and must be available to the users of the packaging:

a) name and address of the test facility;

b) name and address of the applicant (where appropriate);

c) a unique test report identification;

d) date of the test report;

e) manufacturer of the packaging;

f) description of the packaging type (e.g. dimensions, materials, closures, thickness, etc.), including method of manufacture (e.g. blow moulding); drawings and/or photographs may be included;

g) maximum capacity;

h) characteristics of the test contents (e.g. the viscosity and relative density for liquids and the particle size for solids) (for plastics packagings subject to the internal pressure test in 4.5, the temperature of the water used);

i) test descriptions and results;

j) a signature and name and status of the signatory.

4.7.2 The test report must contain statements that:

a) the packaging prepared as for transport was tested in accordance with the appropriate provisions of these Instructions or the equivalent provisions of Chapter 6 of the United Nations *Recommendations on the Transport of Dangerous Goods*; and

b) the use of other packaging methods or components may render it invalid.

4.7.3 A copy of the test report must be made available to the appropriate national authority.

4.8 TEST REQUIREMENTS FOR SALVAGE PACKAGING

Salvage packagings (see 1;3.1) must be tested and marked in accordance with the requirements applicable to Packing Group II packagings intended for the transport of solids or inner packagings, except as follows:

a) the test substance used in performing the tests must be water, and the packagings must be filled to not less than 98 per cent of their maximum capacity. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass so long as they are placed so that the test results are not affected. In performing the drop test, the drop height must meet the requirements of 4.3;

b) packagings must have been successfully leakproofness tested at 30 kPa with the test results reflected in the test report required by 4.7.1;

c) packagings for which retention of liquids is a basic function must, in addition, have been successfully tested in accordance with the internal pressure test specified in 4.5; and

d) the marking required by 2.1.1 b) must be followed by the letter “T”.

Chapter 5

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

Note 1.— Aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas are not subject to the requirements of 6;5.1 to 6;5.3.

Note 2.— For open cryogenic receptacles the requirements of Packing Instruction 202 must be met.

5.1 GENERAL REQUIREMENTS

5.1.1 Design and construction

≠ 5.1.1.1 Cylinders and closed cryogenic receptacles must be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during normal conditions of transport and intended use.

5.1.1.2 In recognition of scientific and technological advances, and recognizing that cylinders and closed cryogenic receptacles other than those that bear "UN" certification marks may be used on a national or regional basis, cylinders and closed cryogenic receptacles conforming to requirements other than those specified in these Instructions may be used if approved by the appropriate national authorities in the countries of transport and use.

5.1.1.3 In no case must the minimum wall thickness be less than that specified in the design and construction technical standards.

≠ 5.1.1.4 For welded cylinders and closed cryogenic receptacles, only metals of weldable quality must be welded.

≠ 5.1.1.5 The test pressure of cylinder shells must be in accordance with Packing Instruction 200 or, for a chemical under pressure, with Packing Instruction 218. The test pressure for closed cryogenic receptacles must be in accordance with Packing Instruction 202. The test pressure of a metal hydride storage system must be in accordance with Packing Instruction 214. The test pressure of a cylinder shell for an adsorbed gas must be in accordance with Packing Instruction 219.

5.1.1.6 Not used.

5.1.1.7 Contact between dissimilar metals which could result in damage by galvanic action must be avoided.

5.1.1.8 The following additional requirements apply to the construction of closed cryogenic receptacles for refrigerated liquefied gases.

5.1.1.8.1 The mechanical properties of the metal used must be established for each closed cryogenic receptacle, including the impact strength and the bending coefficient.

≠ 5.1.1.8.2 The closed cryogenic receptacles must be thermally insulated. The thermal insulation must be protected against impact by means of a jacket. If the space between the inner vessel and the jacket is evacuated of air (vacuum-insulation), the jacket must be designed to withstand without permanent deformation an external pressure of at least 100 kPa (1 bar) calculated in accordance with a recognized technical code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. If the jacket is so closed as to be gas-tight (e.g. in the case of vacuum-insulation), a device must be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the inner vessel or its service equipment. The device must prevent moisture from penetrating into the insulation.

5.1.1.8.3 Closed cryogenic receptacles intended for the transport of refrigerated liquefied gases having a boiling point below –182°C at atmospheric pressure must not include materials that may react with oxygen or oxygen-enriched atmospheres in a dangerous manner when located in parts of the thermal insulation where there is a risk of contact with oxygen or oxygen-enriched liquid.

5.1.1.8.4 Closed cryogenic receptacles must be designed and constructed with suitable lifting and securing arrangements.

≠ 5.1.1.9 Additional requirements for the construction of acetylene cylinders

Cylinder shells for UN 1001**— Acetylene, dissolved** and UN 3374 **— Acetylene, solvent free** must be filled with a porous mass, uniformly distributed, of a type that conforms to the requirements and testing specified by a standard or technical code recognized by the appropriate national authority and which:

a) is compatible with the cylinder shell and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and

b) is capable of preventing the spread of decomposition of the acetylene in the porous material.

In the case of UN 1001, the solvent must be compatible with those parts of the cylinder that are in contact with it.

5.1.2 Materials

≠ 5.1.2.1 Construction materials of cylinders and closed cryogenic receptacles which are in direct contact with dangerous goods must not be affected or weakened by the dangerous goods intended and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods).

≠ 5.1.2.2 Cylinders and closed cryogenic receptacles must be made of the materials specified in the design and construction technical standards and the applicable packing instruction for the substances intended for transport in the cylinder and closed cryogenic receptacle. The materials must be resistant to brittle fracture and to stress corrosion cracking as indicated in the design and construction technical standards.

5.1.3 Service equipment

≠ 5.1.3.1 Service equipment subjected to pressure, excluding:

a) porous, absorbent or adsorbent material;

b) pressure relief devices;

c) pressure gauges; or

d) indicators;

must be designed and constructed so that the burst pressure is at least 1.5 times the test pressure of the cylinders and closed cryogenic receptacles.

≠ 5.1.3.2 Service equipment must be configured or designed to prevent damage and unintended opening that could result in the release of the cylinder and closed cryogenic receptacle contents during normal conditions of handling and transport. All closures must be protected in the same manner as is required for valves in 4;4.1.1.8.

≠ 5.1.3.3 Cylinders and closed cryogenic receptacles that are not capable of being handled manually or rolled must be fitted with handling devices (skids, rings, straps) ensuring that they can be safely handled by mechanical means and arranged so as not to impair the strength of, nor cause undue stresses in, the cylinder and closed cryogenic receptacle.

5.1.3.4 Individual cylinders and closed cryogenic receptacles must be equipped with pressure relief devices as specified in Packing Instruction 200(1), 202 or 214, or 5.1.3.6.4 and 5.1.3.6.5. Pressure-relief devices must be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

5.1.3.5 Cylinders and closed cryogenic receptacles whose filling is measured by volume must be provided with a level indicator.

5.1.3.6 *Additional requirements for closed cryogenic receptacles*

5.1.3.6.1 Not used.

5.1.3.6.2 For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure-relief must be provided to prevent excess pressure build-up within the piping.

5.1.3.6.3 Each connection to a closed cryogenic receptacle must be clearly marked to indicate its function (e.g. vapour or liquid phase).

5.1.3.6.4 *Pressure-relief devices*

5.1.3.6.4.1 Every closed cryogenic receptacle, having a nominal capacity in excess of 550 L, must be provided with at least two pressure-relief devices. The pressure-relief device must be of the type that will resist dynamic forces including surge.

5.1.3.6.4.2 Closed cryogenic receptacles, having a nominal capacity of 550 L or less, must be provided with at least one pressure-relief device and may, in addition have a frangible disc in parallel with the spring-loaded device in order to meet the requirements of 5.1.3.6.5. The pressure-relief device must be of the type that will resist dynamic forces including surge.

5.1.3.6.4.3 Connections to pressure-relief devices must be of sufficient size to enable the required discharge to pass unrestricted to the pressure-relief device.

5.1.3.6.4.4 All pressure-relief device inlets must, under maximum filling conditions, be situated in the vapour space of the closed cryogenic receptacle and the devices must be so arranged as to ensure that the escaping vapour is discharged unrestrictedly.

5.1.3.6.5 *Capacity and setting of pressure-relief devices*

Note.— In relation to pressure-relief devices, MAWP means the maximum effective gauge pressure permissible at the top of a loaded closed cryogenic receptacle in its operating position including the highest effective pressure during filling and discharge.

5.1.3.6.5.1 The pressure-relief device must open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110 per cent of the MAWP. It must, after discharge, close at a pressure not lower than 10 per cent below the pressure at which discharge starts and must remain closed at all lower pressures.

5.1.3.6.5.2 Not used.

5.1.3.6.5.3 In the case of the loss of vacuum in a vacuum-insulated closed cryogenic receptacle, the combined capacity of all pressure-relief devices installed must be sufficient so that the pressure (including accumulation) inside the closed cryogenic receptacle does not exceed 120 per cent of the MAWP.

5.1.3.6.5.4 The required capacity of the pressure-relief devices must be calculated in accordance with an established technical code recognized by the appropriate national authority. (See, for example, the Compressed Gas Association (CGA) Publications S-1.2-2003 and S-1.1-2003.)

5.1.4 Approval of cylinders and closed cryogenic receptacles

≠ 5.1.4.1 The conformity of cylinders and closed cryogenic receptacles must be assessed at the time of manufacture as required by the appropriate national authority. The technical documentation must include full specifications on design and construction, and full documentation on the manufacturing and testing.

5.1.4.2 Quality assurance systems must conform to the requirements of the appropriate national authority.

\+ 5.1.4.3 Cylinder shells and the inner vessels of closed cryogenic receptacles must be inspected, tested and approved by an inspection body.

\+ 5.1.4.4 For refillable cylinders, the conformity assessment of the shell and the closure(s) may be carried out separately. In these cases, an additional assessment of the final assembly is not required.

\+ 5.1.4.4.1 For closed cryogenic receptacles, the inner vessels and the closures may be assessed separately, but an additional assessment of the complete assembly is required.

\+ 5.1.4.4.2 For acetylene cylinders, conformity assessment must comprise either:

a) one assessment of conformity covering both the cylinder shell and the contained porous material; or

b) a separate assessment of conformity for the empty cylinder shell and an additional assessment of conformity covering the cylinder shell with the contained porous material.

5.1.5 Initial inspection and testing

≠ 5.1.5.1 New cylinders, other than closed cryogenic receptacles and metal hydride storage systems, must be subjected to inspection and testing during and after manufacture in accordance with the applicable design standards or recognized technical codes including the following:

≠ On an adequate sample of cylinder shells:

a) testing of the mechanical characteristics of the material of construction;

b) verification of the minimum wall thickness;

c) verification of the homogeneity of the material for each manufacturing batch;

≠ d) inspection of the external and internal conditions;

≠ e) inspection of the threads used to fit closures;

f) verification of the conformance with the design standard;

≠ For all cylinder shells:

≠ g) a hydraulic pressure test. Cylinder shells must meet the acceptance criteria specified in the design and construction technical standard or technical code;

Note.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

≠ h) inspection and assessment of manufacturing defects and either repairing them or rendering the cylinder shells unserviceable. In the case of welded cylinder shells, particular attention must be paid to the quality of the welds;

≠ i) an inspection of the marks on the cylinder shells;

≠ j) in addition, cylinder shells intended for the transport of UN 1001 **— Acetylene, dissolved**, and UN 3374 **— Acetylene, solvent free**, must be inspected to ensure proper installation and condition of the porous material and, if applicable, the quantity of solvent.

+ On an adequate sample of closures:

k) verification of materials;

l) verification of dimensions;

m) verification of cleanliness;

n) inspection of completed assembly;

o) verification of the presence of marks;

+ For all closures:

p) testing for leakproofness;

≠ 5.1.5.2 Closed cryogenic receptacles must be subjected to testing and inspection during and after manufacture in accordance with the applicable design standards or recognized technical codes, including the following:

+ On an adequate sample of inner vessels:

a) testing of the mechanical characteristics of the material of construction;

b) verification of the minimum wall thickness;

c) inspection of the external and internal conditions;

d) verification of the conformance with the design standard or technical code;

e) inspection of welds by radiographic, ultrasonic or other suitable non-destructive test method according to the applicable design and construction standard or technical code;

+ For all inner vessels:

f) a hydraulic pressure test. The inner vessel must meet the acceptance criteria specified in the design and construction technical standard or technical code;

Note.— With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

g) inspection and assessment of manufacturing defects and either repairing them or rendering the inner vessel unserviceable;

h) an inspection of the marks;

+ On an adequate sample of closures:

i) verification of materials;

j) verification of dimensions;

k) verification of cleanliness;

l) inspection of completed assembly;

m) verification of the presence of marks.

+ For all closures:

n) testing for leakproofness.

+ On an adequate sample of completed closed cryogenic receptacles:

o) testing the satisfactory operation of service equipment;

p) verification of the conformance with the design standard or technical code.

+ For all completed closed cryogenic pressure receptacles:

q) testing for leakproofness.

≠ 5.1.5.3 For metal hydride storage systems, it must be verified that the inspections and tests specified in 5.1.5.1 a), b), c), d), e) if applicable, f), g), h) and i) have been performed on an adequate sample of the pressure receptacle shells used in the metal hydride storage system. In addition, on an adequate sample of metal hydride storage systems, the inspections and tests specified in 5.1.5.1 c) and f) must be performed, as well as 5.1.5.1 e) if applicable, and inspection of the external conditions of the metal hydride storage system. Additionally, all metal hydride storage systems must undergo the initial inspections and tests specified in 5.1.5.1 h) and i), as well as a leakproofness test and a test of the satisfactory operation of the service equipment.

5.1.6 Periodic inspection and testing

5.1.6.1 Refillable cylinders other than cryogenic receptacles must be subjected to periodic inspections and tests by a body authorized by the appropriate national authority, in accordance with the following:

a) check of the external conditions of the cylinder and verification of the equipment and the external marks;

b) check of the internal conditions of the cylinder (e.g. internal inspection, verification of minimum wall thickness);

≠ c) check of the threads either:

i) if there is evidence of corrosion; or

ii) if the closures or other service equipment are removed;

≠ d) a hydraulic pressure test of the cylinder shell and, if necessary, verification of the characteristics of the material by suitable tests;

Note 1.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

≠ *Note 2.— For seamless steel cylinder shells the check of 5.1.6.1 b) and hydraulic pressure test of 5.1.6.1 d) may be replaced by a procedure conforming to ISO 16148:2016 "Gas cylinders — Refillable seamless steel gas cylinders and tubes — Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing".*

≠ *Note 3.— The check of internal conditions of 5.1.6.1 b) and the hydraulic pressure test of 5.1.6.1.d) may be replaced by ultrasonic examination carried out in accordance with ISO 18119:2018 for seamless steel and seamless aluminium alloy cylinder shells. For a transitional period until 31 December 2024, the standard ISO 10461:2005 +A1:2006 may be used for seamless aluminium alloy cylinders and ISO 6406:2005 may be used for seamless steel cylinder shells for this same purpose.*

≠ e) check of service equipment if to be reintroduced into service. This check may be carried out separately from the inspection of the cylinder shell.

Note.— For the periodic inspection and test frequencies, see Packing Instruction 200 or, for a chemical under pressure, Packing Instruction 218.

5.1.6.2 Cylinders intended for the transport of UN 1001 — **Acetylene, dissolved**, and UN 3374 — **Acetylene, solvent free**, must be examined only as specified in 5.1.6.1 a), c) and e). In addition, the condition of the porous material (e.g. cracks, top clearance, loosening, settlement) must be examined.

5.1.6.3 Pressure relief valves for closed cryogenic receptacles must be subject to periodic inspections and tests.

5.1.7 Requirements for manufacturers

5.1.7.1 The manufacturer must be technically able and must possess all resources required for the satisfactory manufacture of cylinders and closed cryogenic receptacles; this relates in particular to qualified personnel:

a) to supervise the entire manufacturing process;

b) to carry out joining of materials; and

c) to carry out the relevant tests.

≠ 5.1.7.2 A proficiency test of the manufacturers of cylinder shells and the inner vessels of closed cryogenic receptacle must in all instances be carried out by an inspection body approved by the competent authority of the country of approval. Proficiency testing of manufacturers of closures must be carried out if the competent authority requires it. This test must be carried out either during design type approval or during production inspection and certification.

5.1.8 Requirements for inspection bodies

Inspection bodies must be independent from manufacturing enterprises and competent to perform the tests, inspections and approvals required.

5.2 REQUIREMENTS FOR UN CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES

In addition to the general requirements of 5.1, UN cylinders and closed cryogenic receptacles must comply with the requirements of this section, including the standards, as applicable. Manufacture of new UN cylinders and closed cryogenic receptacles or service equipment according to any particular standard in 5.2.1 and 5.2.3 is not permitted after the date shown in the right hand column of the tables.

Note 1.— With the agreement of the appropriate national authority, more recently published versions of the standards, if available, may be used.

≠ *Note 2.— UN cylinders and closed cryogenic receptacles constructed according to standards applicable at the date of manufacture may continue in use subject to the periodic inspection provisions of these Instructions.*

5.2.1 Design, construction and initial inspection and testing

≠ 5.2.1.1 The following standards apply for the design, construction and initial inspection and test of refillable UN cylinder shells, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

	Reference	*Title*	*Applicable for manufacture*
	ISO 9809-1:1999	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. *Note.— The note concerning the F factor in section 7.3 of this standard must not be applied for UN cylinders.*	Until 31 December 2018
≠	ISO 9809-1:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.	Until 31 December 2026
+	ISO 9809-1:2019	Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa.	Until further notice
	ISO 9809-2:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until 31 December 2018
≠	ISO 9809-2:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until 31 December 2026
+	ISO 9809-2:2019	Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1 100 MPa.	Until further notice
	ISO 9809-3:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 31 December 2018
≠	ISO 9809-3:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 31 December 2026
+	ISO 9809-3:2019	Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 3: Normalized steel cylinders and tubes.	Until further notice
	ISO 9809-4:2014	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing – Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa	Until further notice
	ISO 7866:1999	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing. *Note.— The note concerning the F factor in section 7.2 of this standard must not be applied for UN cylinders. Aluminium alloy 6351A — T6 or equivalent must not be authorized.*	Until 31 December 2020
	ISO 7866: 2012+ Cor 1:2014	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing *Note.— Aluminium alloy 6351A or equivalent must not be used.*	Until further notice
	ISO 4706:2008	Gas cylinders — Refillable welded steel cylinders — Test pressure 60 bar and below.	Until further notice
	ISO 18172-1:2007	Gas cylinders — Refillable welded stainless steel cylinders — Part 1: Test pressure 6 MPa and below.	Until further notice

	Reference	Title	Applicable for manufacture
>	ISO 20703:2006	Gas cylinders — Refillable welded aluminium-alloy cylinders — Design, construction and testing.	Until further notice
	ISO 11119-1:2002	Gas cylinders of composite construction — Specification and test methods — Part 1: Hoop wrapped composite gas cylinders.	Until 31 December 2020
	ISO 11119-1:2012	Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 L	Until further notice
	ISO 11119-2:2002	Gas cylinders of composite construction — Specification and test methods — Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners.	Until 31 December 2020
	ISO 11119-2:2012 + Amd 1:2014	Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 L with load-sharing metal liners.	Until further notice
	ISO 11119-3:2002	Gas cylinders of composite construction — Specification and test methods — Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners. *Note.— This standard must not be used for linerless cylinders manufactured from two parts joined together.*	Until 31 December 2020
	ISO 11119-3:2013	Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 L with non-load-sharing metallic or non-metallic liners. *Note.— This standard must not be used for linerless cylinders manufactured from two parts joined together.*	Until further notice
	ISO 11119-4: 2016	Gas cylinders — Refillable composite gas cylinders — Design, construction and testing — Part 4: Fully wrapped fibre reinforced composite gas cylinders up to 150 L with load-sharing welded metallic liners.	Until further notice

≠ *Note 1.— In the above-referenced standards, composite cylinder shells must be designed for a design life of not less than fifteen years*.

≠ *Note 2.— Composite cylinder shells with a design life longer than fifteen years must not be filled after fifteen years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme must be part of the initial design type approval and must specify inspections and tests to demonstrate that composite cylinder shells manufactured accordingly remain safe to the end of their design life. The service life test programme and the results must be approved by the appropriate national authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder shell must not be extended beyond its initial approved design life*.

5.2.1.2 Not used.

5.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5.

Note.— The maximum of 1 000 L volume as mentioned in the ISO standard ISO 21029-1:2004 Cryogenic vessels, does not apply for refrigerated liquefied gases in closed cryogenic receptacles installed in apparatus (e.g. MRI or cooling machines).

For the cylinder shell:

	Reference	Title	Applicable for manufacture
	ISO 9809-1:1999	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. *Note.— The note concerning the F factor in section 7.3 of this standard must not be applied for UN cylinders.*	Until 31 December 2018
≠	ISO 9809-1:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.	Until 31 December 2026
+	ISO 9809-1:2019	Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa.	Until further notice
	ISO 9809-3:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 31 December 2018

	Reference	*Title*	*Applicable for manufacture*
≠	ISO 9809-3:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 31 December 2026
+	ISO 9809-3:2019	Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 3: Normalized steel cylinders and tubes.	Until further notice
	ISO 4706:2008	Gas cylinders — Refillable welded steel cylinders — Test pressure 60 bar and below	Until further notice
	ISO 7866:2012 + Cor 1:2014	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing *Note.— Aluminium alloy 6351A or equivalent must not be used*	Until further notice

For the acetylene cylinder including the porous mass in the cylinder:

Reference	*Title*	*Applicable for manufacture*
ISO 3807-1:2000	Cylinders for acetylene — Basic requirements — Part 1: Cylinders without fusible plugs.	Until 31 December 2020
ISO 3807-2:2000	Cylinders for acetylene — Basic requirements — Part 2: Cylinders with fusible plugs.	Until 31 December 2020
ISO 3807:2013	Gas cylinders — Acetylene cylinders — Basic requirements and type testing	Until further notice

5.2.1.4 The following standard applies for the design, construction and initial inspection and test of UN closed cryogenic receptacles, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

	Reference	*Title*	*Applicable for manufacture*
≠	ISO 21029-1:2004	Cryogenic vessels — Transportable vacuum insulated vessels of not more than 1 000 L volume — Part 1: Design, fabrication, inspection and tests.	Until 31 December 2026
+	ISO 21029-1:2018 + Amd.1:2019	Cryogenic vessels — Transportable vacuum insulated vessels of not more than 1 000 L volume — Part 1: Design, fabrication, inspection and tests.	Until further notice

5.2.1.5 The following standards apply for the design, construction, and initial inspection and test of UN metal hydride storage systems, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

	Reference	*Title*	*Applicable for manufacture*
≠	ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until 31 December 2026
+	ISO 16111:2018	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

5.2.1.6 Not used.

5.2.1.7 The following standards apply for the design, construction and initial inspection and test of UN cylinders for adsorbed gases except that the inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5.

	Reference	*Title*	*Applicable for manufacture*
≠	ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until 31 December 2026
+	ISO 11513:2019	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until further notice
≠	ISO 9809-1:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.	Until 31 December 2026
+	ISO 9809-1:2019	Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa.	Until further notice

5.2.1.8 Not used.

+ 5.2.1.9 The following standards apply for the design, construction and initial inspection and test of non-refillable UN cylinders except that the inspection requirements related to the conformity assessment system and approval must be in accordance with 6;5.2.5.

	Reference	*Title*	*Applicable for manufacture*
+	ISO 11118:1999	Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods.	Until 31 December 2020
+	ISO 13340:2001	Transportable gas cylinders — Cylinder valves for non-refillable cylinders — Specification and prototype testing.	Until 31 December 2020
+	ISO 11118:2015	Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods.	Until 31 December 2026
+	ISO 11118:2015 + Amd.1:2019	Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods.	Until further notice

5.2.2 Materials

≠ In addition to the material requirements specified in the design and construction standards, and any restrictions specified in the applicable Packing Instruction for the gas(es) to be transported (e.g. Packing Instruction 200, Packing Instruction 202 or Packing Instruction 214), the following standards apply to material compatibility:

Reference	*Title*	*Applicable for manufacture*
ISO 11114-1:2012 + A1:2017	Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials.	Until further notice
ISO 11114-2:2013	Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials.	Until further notice

≠ **5.2.3 Closures and their protection**

≠ The following standards apply to the design, construction, and initial inspection and test of closures and their protection:

	Reference	*Title*	*Applicable for manufacture*
	ISO 11117:1998	Gas cylinders — Valve protection caps and valve guards for industrial and medical gas cylinders — Design, construction and tests.	Until 31 December 2014
≠	ISO 11117:2008+ Cor 1:2009	Gas cylinders — Valve protection caps and valve guards — Design, construction and tests.	Until 31 December 2026
+	ISO 11117:2019	Gas cylinders — Valve protection caps and guards — Design, construction and tests.	Until further notice
	ISO 10297:1999	Gas cylinders – Refillable gas cylinder valves – Specification and type testing.	Until 31 December 2008
	ISO 10297:2006	Gas cylinders — Refillable gas cylinder valves — Specification and type testing.	Until 31 December 2020
	ISO 10297:2014	Gas cylinders — Cylinder valves — Specification and type testing	Until 31 December 2022
>	ISO 10297:2014 + A1:2017	Gas cylinders — Cylinder valves — Specification and type testing	Until further notice
	ISO 14246:2014	Gas cylinders — Cylinder valves — Manufacturing tests and examination	Until 31 December 2024
	ISO 14246:2014 + A1:2017	Gas cylinders — Cylinder valves — Manufacturing tests and examination	Until further notice
≠	ISO 17871:2015	Gas cylinders — Quick-release cylinders valves — Specification and type testing *Note.— This standard must not be used for flammable gases.*	Until 31 December 2026
+	ISO 17871:2020	Gas cylinders — Quick-release cylinder valves — Specification and type testing.	Until further notice
	ISO 17879:2017	Gas cylinders — Self-closing cylinder valves — Specification and type testing *Note.— This standard must not be applied to self-closing valves in acetylene cylinders.*	Until further notice

For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

	Reference	*Title*	*Applicable for manufacture*
≠	ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride	Until 31 December 2026
+	ISO 16111:2018	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

5.2.4 Periodic inspection and test

≠ 5.2.4.1 The following standards apply to the periodic inspection and testing of UN cylinders:

	Reference	*Title*	*Applicable for manufacture*
≠	ISO 6406:2005	Seamless steel gas cylinders — Periodic inspection and testing.	Until 31 December 2024
+	ISO 18119:2018	Gas cylinders — Seamless steel and seamless aluminium-alloy gas cylinders and tubes — Periodic inspection and testing.	Until further notice
≠	ISO 10460:2005	Gas cylinders – Welded carbon-steel gas cylinders – Periodic inspection and testing. *Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.*	Until 31 December 2024
+	ISO 10460:2018	Gas cylinders — Welded aluminium-alloy, carbon and stainless steel gas cylinders — Periodic inspection and testing.	Until further notice
≠	ISO 10461:2005/A1:2006	Seamless aluminium-alloy gas cylinders — Periodic inspection and testing.	Until 31 December 2024
≠	ISO 10462:2013	Gas cylinders — Acetylene cylinders — Periodic inspection and maintenance.	Until 31 December 2024

	Reference	Title	Applicable for manufacture
+	ISO 10462:2013 + Amd1:2019	Gas cylinders — Acetylene cylinders — Periodic inspection and maintenance.	Until further notice
≠	ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until 31 December 2024
+	ISO 11513:2019	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until further notice
>	ISO 11623:2015	Gas cylinders — Composite construction — Periodic inspection and testing	Until further notice
	ISO 22434:2006	Transportable gas cylinders — Inspection and maintenance of cylinder valves *Note.— These requirements may be met at times other than at the periodic inspection and test of UN cylinders.*	Until further notice
	ISO 20475:2018	Gas cylinders — Cylinder bundles — Periodic inspection and testing	Until further notice
+	ISO 23088:2020	Gas cylinders — Periodic inspection and testing of welded steel pressure drums — Capacities up to 1 000 L.	Until further notice

5.2.4.2 The following standard applies to the periodic inspection and testing of UN metal hydride storage systems.

	Reference	Title	Applicable for manufacture
≠	ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride	Until 31 December 2024
+	ISO 16111:2018	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

5.2.5 Conformity assessment system and approval for manufacture of cylinders and closed cryogenic receptacles

≠ 5.2.5.1 General

5.2.5.1.1 *Definitions*

For the purposes of this section:

Conformity assessment system: a system for appropriate national authority approval of a manufacturer, by cylinder and closed cryogenic receptacle design type approval, approval of manufacturer's quality system and approval of inspection bodies.

Design type: a cylinder and closed cryogenic receptacle design as specified by a particular cylinder and closed cryogenic receptacle standard.

Verify: confirm by examination or provision of objective evidence that specified requirements have been fulfilled.

+ 5.2.5.1.2 The requirements of 5.2.5 must be used for the conformity assessments of cylinders and closed cryogenic receptacles. Paragraph 5.1.4.4 gives details of which parts of cylinders and closed cryogenic receptacles may be conformity assessed separately. However, the requirements of 5.2.5 may be replaced by requirements specified by the competent authority in the following cases:

a) conformity assessment of closures;

b) Not used; and

c) conformity assessment of the complete assembly of closed cryogenic receptacles provided the inner vessel has been conformity assessed in accordance with the requirements of 5.2.5.

5.2.5.2 *General requirements*

5.2.5.2.1 *Appropriate national authority*

5.2.5.2.1.1 The appropriate national authority that approves the cylinder and closed cryogenic receptacle must approve the conformity assessment system for the purpose of ensuring that cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves a cylinder and closed cryogenic receptacle is not the appropriate national authority in the country of manufacture, the marks of the approval country and the country of manufacture must be indicated in the cylinder and closed cryogenic receptacle marks (see 5.2.7 and 5.2.8).The appropriate national authority of the country of approval must supply to its counterpart in a country of use, upon request, evidence demonstrating compliance to this conformity assessment system.

5.2.5.2.2 The appropriate national authority may delegate its conformity assessment system functions in whole or in part.

5.2.5.2.3 The appropriate national authority must ensure that a current list of approved inspection bodies and their identity marks and approved manufacturers and their identity marks is available.

5.2.5.2.4 *Inspection body*

5.2.5.2.4.1 The inspection body must be approved by the appropriate national authority for the inspection of cylinders and closed cryogenic receptacles and must:

a) have a staff with an organizational structure, capable, trained, competent and skilled, to satisfactorily perform its technical functions;

b) have access to suitable and adequate facilities and equipment;

c) operate in an impartial manner and be free from any influence which could prevent it from doing so;

d) ensure commercial confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;

e) maintain clear demarcation between actual inspection body functions and unrelated functions;

f) operate a documented quality system;

g) ensure that the tests and inspections specified in the relevant cylinder and closed cryogenic receptacle standard and these instructions are performed; and

h) maintain an effective and appropriate report and record system in accordance with 5.2.5.6.

5.2.5.2.5 The inspection body must perform design type approval, and cylinder and closed cryogenic receptacle production testing, inspection and certification to verify conformity with the relevant cylinder and closed cryogenic receptacle standard (see 5.2.5.4 and 5.2.5.5).

5.2.5.2.6 *Manufacturer*

The manufacturer must:

a) operate a documented quality system in accordance with 5.2.5.3;

b) apply for design type approvals in accordance with 5.2.5.4;

c) select an inspection body from the list of approved inspection bodies maintained by the appropriate national authority in the country of approval; and

d) maintain records in accordance with 5.2.5.6.

5.2.5.2.7 *Testing laboratory*

The testing laboratory must have:

a) staff with an organizational structure, sufficient in number, competence and skill; and

b) suitable and adequate facilities and equipment to perform, to the satisfaction of the inspection body, the tests required by the manufacturing standard.

5.2.5.3 *Manufacturer's quality system*

5.2.5.3.1 The quality system must contain all the elements, requirements and provisions adopted by the manufacturer. It must be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The contents must in particular include adequate descriptions of:

a) the organizational structure and responsibilities of personnel with regard to design and product quality;

b) the design control and design verification techniques, processes and procedures that will be used when designing the cylinders and closed cryogenic receptacles;

c) the relevant cylinder and closed cryogenic receptacle manufacturing, quality control, quality assurance, and process operation instructions that will be used;

d) quality records, such as inspection reports, test data and calibration data;

e) management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 5.2.5.3.2;

f) the process describing how customer requirements are met;

g) the process for control of documents and their revision;

h) the means for control of non-conforming cylinders and closed cryogenic receptacles, purchased components, in-process and final materials; and

i) training programmes and qualification procedures for relevant personnel.

5.2.5.3.2 *Audit of the quality system*

5.2.5.3.2.1 The quality system must be initially assessed to determine whether it meets the requirements in 5.2.5.3.1 to the satisfaction of the appropriate national authority.

5.2.5.3.2.2 The manufacturer must be notified of the results of the audit. The notification must contain the conclusions of the audit and any corrective actions required.

5.2.5.3.2.3 Periodic audits must be carried out, to the satisfaction of the appropriate national authority, to ensure that the manufacturer maintains and applies the quality system. Reports of the periodic audits must be provided to the manufacturer.

5.2.5.3.3 *Maintenance of the quality system*

5.2.5.3.3.1 The manufacturer must maintain the quality system as approved in order that it remains adequate and efficient.

5.2.5.3.3.2 The manufacturer must notify the appropriate national authority that approved the quality system, of any intended changes. The proposed changes must be evaluated in order to determine whether the amended quality system will still satisfy the requirements in 5.2.5.3.1.

5.2.5.4 *Approval process*

5.2.5.4.1 *Initial design type approval*

The initial design type approval must consist of the approval of the manufacturer's quality system and the approval of the cylinder and closed cryogenic receptacle design to be produced. An application for an initial design type approval must meet the requirements of 5.2.5.4.2 to 5.2.5.4.6 and 5.2.5.4.9.

5.2.5.4.2 A manufacturer desiring to produce cylinders and closed cryogenic receptacles in accordance with a cylinder and closed cryogenic receptacle standard and these Instructions must apply for, obtain and retain a Design Type Approval Certificate issued by the appropriate national authority in the country of approval for at least one cylinder and closed cryogenic receptacle design type in accordance with the procedure given in 5.2.5.4.9. This certificate must, on request, be submitted to the appropriate national authority of the country of use.

5.2.5.4.3 An application must be made for each manufacturing facility and must include:

a) the name and registered address of the manufacturer and, in addition, if the application is submitted by an authorized representative, its name and address;

b) the address of the manufacturing facility (if different from the above);

c) the name and title of the person(s) responsible for the quality system;

d) the designation of the cylinder and closed cryogenic receptacle and the relevant cylinder and closed cryogenic receptacle standard;

e) details of any refusal of approval of a similar application by any other appropriate national authority;

f) the identity of the inspection body for design type approval;

g) documentation on the manufacturing facility as specified under 5.2.5.3.1;

h) the technical documentation required for design type approval, which must enable verification of the conformity of the cylinders and closed cryogenic receptacles with the requirements of the relevant cylinder and closed cryogenic receptacle design standard. The technical documentation must cover the design and method of manufacture and must contain, as far as is relevant for assessment, at least the following:

i) cylinder and closed cryogenic receptacle design standard, design and manufacturing drawings, showing components and sub-assemblies, if any;

ii) descriptions and explanations necessary for the understanding of the drawings and intended use of the cylinders and closed cryogenic receptacles;

iii) a list of the standards necessary to fully define the manufacturing process;

iv) design calculations and material specifications; and

v) design type approval test reports, describing the results of examinations and tests carried out in accordance with 5.2.5.4.9.

5.2.5.4.4 An initial audit in accordance with 5.2.5.3.2 must be performed to the satisfaction of the appropriate national authority.

5.2.5.4.5 If the manufacturer is denied approval, the appropriate national authority must provide written detailed reasons for such denial.

5.2.5.4.6 Following approval, changes to the information submitted under 5.2.5.4.3 relating to the initial approval must be provided to the appropriate national authority.

5.2.5.4.7 *Subsequent design type approvals*

An application for a subsequent design type approval must encompass the requirements of 5.2.5.4.8 and 5.2.5.4.9, provided a manufacturer is in possession of an initial design type approval. In such a case, the manufacturer's quality system according to 5.2.5.3 must have been approved during the initial design type approval and must be applicable for the new design.

5.2.5.4.8 The application must include:

a) the name and address of the manufacturer and, in addition, if the application is submitted by an authorized representative, its name and address;

b) details of any refusal of approval of a similar application by any other appropriate national authority;

c) evidence that initial design type approval has been granted; and

d) the technical documentation, as described in 5.2.5.4.3 h).

5.2.5.4.9 *Procedure for design type approval*

5.2.5.4.9.1 The inspection body must:

a) examine the technical documentation to verify that:

i) the design is in accordance with the relevant provisions of the standard; and

ii) the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;

b) verify that the production inspections have been carried out as required in accordance with 5.2.5.5;

≠ c) as required by the cylinder and closed cryogenic receptacle standard or technical code, carry out or supervise the tests of pressure receptacles as required for design type approval;

d) perform or have performed the examinations and tests specified in the cylinder and closed cryogenic receptacle standard to determine that:

i) the standard has been applied and fulfilled; and

ii) the procedures adopted by the manufacturer meet the requirements of the standard; and

e) ensure that the various type approval examinations and tests are correctly and competently carried out.

≠ 5.2.5.4.9.2 After prototype testing has been carried out with satisfactory results and all applicable requirements of 5.2.5.4 have been satisfied, a Design Type Approval Certificate must be issued which must include the name and address of the manufacturer, results and conclusions of the examination, and the necessary data for identification of the design type. If it was not possible to evaluate exhaustively the compatibility of the materials of construction with the contents of the cylinder or closed cryogenic receptacle when the certificate was issued, a statement that compatibility assessment was not completed must be included in the design type approval certificate.

5.2.5.4.9.3 If the manufacturer is denied a design type approval, the appropriate national authority must provide written detailed reasons for such denial.

5.2.5.4.10 *Modifications to approved design types*

The manufacturer must either:

a) inform the issuing appropriate national authority of modifications to the approved design type, where such modifications do not constitute a new design, as specified in the cylinder and closed cryogenic receptacle standard; or

b) request a subsequent design type approval where such modifications constitute a new design according to the relevant cylinder and closed cryogenic receptacle standard. This additional approval must be given in the form of an amendment to the original Design Type Approval Certificate.

5.2.5.4.11 Upon request, the appropriate national authority must communicate to any other appropriate national authority, information concerning design type approval, modifications of approvals, and withdrawn approvals.

5.2.5.5 *Production inspection and certification*

5.2.5.5.1 An inspection body, or its delegate, must carry out the inspection and certification of each cylinder. The inspection body selected by the manufacturer for inspection and testing during production may be different from the inspection body used for the design type approval testing.

5.2.5.5.2 Where it can be demonstrated to the satisfaction of the inspection body that the manufacturer has trained and competent inspectors, independent of the manufacturing operations, inspection may be performed by those inspectors. In such a case, the manufacturer must maintain training records of the inspectors.

5.2.5.5.3 The inspection body must verify that the inspections by the manufacturer and tests performed on those cylinders and closed cryogenic receptacles, fully conform to the standards and requirements of these Instructions. Should non-conformance in conjunction with this inspection and testing be determined, the permission to have inspection performed by the manufacturer's inspectors may be withdrawn.

5.2.5.5.4 The manufacturer must, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the cylinder and closed cryogenic receptacle certification marks must be considered a declaration that the cylinder and closed cryogenic receptacle comply with the applicable cylinder and closed cryogenic receptacle standards, the requirements of this conformity assessment system and these Instructions. The inspection body must affix or delegate the manufacturer to affix the cylinder and closed cryogenic receptacle certification marks and the registered mark of the inspection body to each approved cylinder or closed cryogenic receptacle.

5.2.5.5.5 A certificate of compliance, signed by the inspection body and the manufacturer, must be issued before the cylinders and closed cryogenic receptacles are filled.

5.2.5.6 *Records*

Design type approval and certificate of compliance records must be retained by the manufacturer and the inspection body for not less than 20 years.

5.2.6 Approval system for periodic inspection and test of cylinders and closed cryogenic receptacles

5.2.6.1 *Definitions*

For the purposes of this section:

Approval system: means a system for the appropriate national authority approval of a body performing the periodic inspection and test of cylinders and closed cryogenic receptacles (hereinafter referred to as "periodic inspection and test body"), including approval of that body's quality system.

5.2.6.2 *General requirements*

5.2.6.2.1 *Appropriate national authority*

5.2.6.2.1.1 The appropriate national authority must establish an approval system for the purpose of ensuring that the periodic inspection and test of cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves the body performing periodic inspection and test of a cylinder and closed cryogenic receptacle is not the appropriate national authority of the country approving the manufacture of the cylinder, the marks of the approval country of periodic inspection and test must be indicated in the cylinder and closed cryogenic receptacle marks (see 5.2.7).

5.2.6.2.1.2 The appropriate national authority of the country of approval for the periodic inspection and test must supply, upon request, evidence demonstrating compliance with this approval system, including the records of the periodic inspection and test, to its counterpart in a country of use.

5.2.6.2.1.3 The appropriate national authority of the country of approval may terminate the approval certificate referred to in 5.2.6.4.1 upon evidence demonstrating non-compliance with the approval system.

5.2.6.2.2 The appropriate national authority may delegate its functions in this approval system, in whole or in part.

5.2.6.2.3 The appropriate national authority must ensure that a current list of approved periodic inspection and test bodies and their identity marks is available.

5.2.6.2.4 *Periodic inspection and test body*

The periodic inspection and test body must be approved by the appropriate national authority and must:

a) have a staff with an organizational structure, capable, trained, competent and skilled to satisfactorily perform its technical functions;

b) have access to suitable and adequate facilities and equipment;

c) operate in an impartial manner and be free from any influence that could prevent it from doing so;

d) ensure commercial confidentiality;

e) maintain clear demarcation between actual periodic inspection and test body functions and unrelated functions;

f) operate a documented quality system in accordance with 5.2.6.3;

g) apply for approval in accordance with 5.2.6.4;

h) ensure that the periodic inspections and tests are performed in accordance with 5.2.6.5; and

i) maintain an effective and appropriate report and record system in accordance with 5.2.6.6.

5.2.6.3 *Quality system and audit of the periodic inspection and test body*

5.2.6.3.1 *Quality system*

5.2.6.3.1.1 The quality system must contain all the elements, requirements and provisions adopted by the periodic inspection and test body. It must be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

5.2.6.3.1.2 The quality system must include:

a) a description of the organizational structure and responsibilities;

b) the relevant inspection and test, quality control, quality assurance and process operation instructions that will be used;

c) quality records, such as inspection reports, test data, calibration data and certificates;

d) management reviews to ensure the effective operation of the quality system arising from the audits performed in accordance with 5.2.6.3.2;

e) a process for control of documents and their revision;

f) a means for control of non-conforming cylinders and closed cryogenic receptacles; and training programmes and qualification procedures for relevant personnel.

5.2.6.3.2 *Audit*

5.2.6.3.2.1 The periodic inspection and test body and its quality system must be audited in order to determine whether it meets the requirements of these Instructions to the satisfaction of the appropriate national authority.

5.2.6.3.2.2 An audit must be conducted as part of the initial approval process (see 5.2.6.4.3). An audit may be required as part of the process to modify an approval (see 5.2.6.4.6).

5.2.6.3.2.3 Periodic audits must be conducted, to the satisfaction of the appropriate national authority, to ensure that the periodic inspection and test body continues to meet the requirements of these Instructions.

5.2.6.3.2.4 The periodic inspection and test body must be notified of the results of any audit. The notification must contain the conclusions of the audit and any corrective actions required.

5.2.6.3.3 *Maintenance of the quality system*

5.2.6.3.3.1 The periodic inspection and test body must maintain the quality system as approved in order that it remains adequate and efficient.

5.2.6.3.3.2 The periodic inspection and test body must notify the appropriate national authority that approved the quality system, of any intended changes, in accordance with the process for modification of an approval in 5.2.6.4.6.

5.2.6.4 *Approval process for periodic inspection and test bodies*

5.2.6.4.1 *Initial approval*

5.2.6.4.1.1 A body desiring to perform periodic inspection and test of cylinders and closed cryogenic receptacles in accordance with a cylinder and closed cryogenic receptacle standard and these Instructions must apply for, obtain and retain an Approval Certificate issued by the appropriate national authority.

5.2.6.4.1.2 This written approval must, on request, be submitted to the appropriate national authority of a country of use.

5.2.6.4.2 An application must be made for each periodic inspection and test body and must include:

a) the name and address of the periodic inspection and test body and, if the application is submitted by an authorized representative, its name and address;

b) the address of each facility performing the periodic inspection and test;

c) the name and title of the person(s) responsible for the quality system;

d) the designation of the cylinders and closed cryogenic receptacles, the periodic inspection and test methods and the relevant cylinder and closed cryogenic receptacle standards encompassed by the quality system;

e) documentation on each facility, the equipment and the quality system as specified under 5.2.6.3.1;

f) the qualifications and training records of the periodic inspection and test personnel; and

g) details of any refusal of approval of a similar application by any other appropriate national authority.

5.2.6.4.3 The appropriate national authority must:

a) examine the documentation to verify that the procedures are in accordance with the requirements of the relevant cylinder and closed cryogenic receptacle standards and these Instructions; and

b) conduct an audit in accordance with 5.2.6.3.2 to verify that the inspections and tests are carried out as required by the relevant cylinder and closed cryogenic receptacle standards and these Instructions, to the satisfaction of the appropriate national authority.

5.2.6.4.4 After the audit has been carried out with satisfactory results and all applicable requirements of 5.2.6.4 have been satisfied, an Approval Certificate must be issued. It must include the name of the periodic inspection and test body, the registered mark, the address of each facility and the necessary data for identification of its approved activities (e.g. designation of cylinders and closed cryogenic receptacles, periodic inspection and test method and cylinder and closed cryogenic receptacle standards).

5.2.6.4.5 If the periodic inspection and test body is denied approval, the appropriate national authority must provide written detailed reasons for such denial.

5.2.6.4.6 *Modifications to periodic inspection and test body approvals*

5.2.6.4.6.1 Following approval, the periodic inspection and test body must notify the issuing appropriate national authority of any modifications to the information submitted under 5.2.6.4.2 relating to the initial approval.

5.2.6.4.6.2 The modifications must be evaluated in order to determine whether the requirements of the relevant cylinder and closed cryogenic receptacle standards and these Instructions will be satisfied.

5.2.6.4.6.3 An audit in accordance with 5.2.6.3.2 may be required.

5.2.6.4.6.4 The appropriate national authority must accept or reject these modifications in writing, and an amended Approval Certificate must be issued as necessary.

5.2.6.4.7 Upon request, the appropriate national authority must communicate to any other appropriate national authority, information concerning initial approvals, modifications of approvals and withdrawn approvals.

5.2.6.5 *Periodic inspection and test and certification*

5.2.6.5.1 The application of the periodic inspection and test marks to a cylinder and closed cryogenic receptacle must be considered a declaration that the cylinder and closed cryogenic receptacle complies with the applicable cylinder and closed cryogenic receptacle standards and the requirements of these Instructions. The periodic inspection and test body must affix the periodic inspection and test marks, including its registered mark, to each approved cylinder and closed cryogenic receptacle (see 5.2.7.7).

5.2.6.5.2 A record certifying that a cylinder and closed cryogenic receptacle have passed the periodic inspection and test must be issued by the periodic inspection and test body before the cylinder and closed cryogenic receptacle are filled.

5.2.6.6 *Records*

5.2.6.6.1 The periodic inspection and test body must retain records of the periodic inspection and test of cylinders and closed cryogenic receptacles (both passed and failed), including the location of the test facility, for not less than 15 years.

5.2.6.6.2 The owner of the cylinder and closed cryogenic receptacle must retain an identical record until the next periodic inspection and test unless the cylinder and closed cryogenic receptacle are permanently removed from service.

5.2.7 Marking of UN refillable cylinders and closed cryogenic receptacles

≠ *Note.— Marking requirements for UN metal hydride storage systems are given in 5.2.9 and marking requirements for closures are given in 5.2.11.*

≠ 5.2.7.1 Refillable UN cylinder shells and closed cryogenic receptacles must be marked clearly and legibly with certification, operational and manufacturing marks. These marks must be permanently affixed (e.g. stamped, engraved or etched). The marks must be on the shoulder, top end or neck of the cylinder shell and closed cryogenic receptacle or on a permanently affixed component of the cylinder shell and closed cryogenic receptacle (e.g. welded collar or corrosion-resistant plate welded to the outer jacket of a closed cryogenic receptacle). Except for the UN packaging symbol, the minimum size of the marks must be 5 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm. The minimum size of the UN packaging symbol must be 10 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm.

5.2.7.2 The following certification marks must be applied:

a) The UN packaging symbol (u n)

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

≠ b) The technical standard (e.g. ISO 9809-1) used for the design, construction and testing and, for acetylene cylinders, the standard ISO 3807.

c) The character(s) identifying the country of approval, as indicated by the distinguishing signs used on vehicles in international road traffic;

Note 1.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

Note 2.— For the purpose of this mark the State of approval means the State of the appropriate national authority that authorized the initial inspection and test of the individual receptacle at the time of manufacture.

d) The identity mark or stamp of the inspection body that is registered with the appropriate national authority of the country authorizing the marking;

e) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/").

+ *Note.— When an acetylene cylinder is conformity assessed in accordance with 5.1.4.4.2 b) and the inspection bodies for the cylinder shell and the acetylene cylinder are different, their respective marks (d)) are required. Only the initial inspection date (e)) of the completed acetylene cylinder is required. If the country of approval of the inspection body responsible for the initial inspection and test is different, a second mark (c)) must be applied.*

5.2.7.3 The following operational marks must be applied:

f) The test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR";

≠ g) The mass of the empty cylinder and closed cryogenic receptacle including all permanently attached integral parts (e.g. neck ring, foot ring, etc.) in kilograms, followed by the letters "KG". This mass must not include the mass of closure(s), valve protection cap or valve guard, any coating, or porous mass for acetylene. The mass must be expressed to three significant figures rounded up to the last digit. For cylinders and closed cryogenic receptacles of less than 1 kg, the mass must be expressed to two significant figures rounded up to the last digit. In the case of cylinders for UN 1001 **Acetylene, dissolved** and UN 3374 **Acetylene, solvent free**, at least one decimal must be shown after the decimal point and two digits for cylinders of less than 1 kg;

h) The minimum guaranteed wall thickness of the cylinder in millimetres followed by the letters "MM". This mark is not required for cylinders with a water capacity less than or equal to 1 litre or for composite cylinders or for closed cryogenic receptacles;

i) In the case of cylinders for compressed gases, UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, the working pressure in bar, preceded by the letters "PW". In the case of closed cryogenic receptacles, the maximum allowable working pressure preceded by the letters "MAWP";

+ *Note.— When a cylinder shell is intended for use as an acetylene cylinder (including the porous material), the working pressure mark is not required until the acetylene cylinder is completed.*

≠ j) In the case of cylinders for liquefied gases and dissolved gases and closed cryogenic receptacles, the water capacity in litres expressed to three significant figures rounded down to the last digit, followed by the letter "L". If the value of the minimum or nominal water capacity is an integer, the digits after the decimal point may be neglected;

≠ k) In the case of cylinders for UN 1001 **Acetylene, dissolved**:

i) the tare in kilograms consisting of the total of the mass of the empty cylinder shell, the service equipment (including porous material) not removed during filling, any coating, the solvent and the saturation gas expressed to three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal must be shown after the decimal point. For cylinders of less than 1 kg, the mass must be expressed to two significant figures rounded down to the last digit;

ii) the identity of the porous material (e.g. name or trademark); and

iii) the total mass of the filled acetylene cylinder in kilograms followed by the letters "KG";

≠ l) In the case of cylinders for UN 3374 **Acetylene, solvent free**:

i) the tare in kilograms consisting of the total of the mass of the empty cylinder shell, the service equipment (including porous material) not removed during filling and any coating expressed to three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal must be shown after the decimal point. For cylinders of less than 1 kg, the mass must be expressed to two significant figures rounded down to the last digit;

ii) the identity of the porous material; and

iii) the total mass of the filled acetylene cylinder in kilograms followed by the letters "KG".

5.2.7.4 The following manufacturing marks must be applied:

m) Identification of the cylinder thread (e.g. 25E). This mark is not required for closed cryogenic receptacles;

Note.— Information on marks that may be used for identifying threads for cylinders is given in ISO/TR 11364, Gas cylinders — Compilation of national and international valve stem/gas cylinder neck threads and their identification and marking system.

n) The manufacturer's mark registered by the appropriate national authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark must be preceded by the character(s) identifying the country of manufacture, as indicated by the distinguishing signs used on vehicles in international road traffic. The country mark and the manufacturer's mark must be separated by a space or slash;

Note 1.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

+ *Note 2.— For acetylene cylinders, if the manufacturer of the acetylene cylinder and the manufacturer of the cylinder shell are different, only the mark of the manufacturer of the completed acetylene cylinder is required.*

o) The serial number assigned by the manufacturer;

p) In the case of steel cylinders and closed cryogenic receptacles and composite cylinders and closed cryogenic receptacles with steel liner intended for the transport of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see ISO 11114-1:2012);

q) For composite cylinders having a limited design life, the letters "FINAL" followed by the design life shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/");

r) For composite cylinders having a limited design life greater than fifteen years and for composite cylinders and tubes having non-limited design life, the letters "SERVICE" followed by the date fifteen years from the date of manufacture (initial inspection) shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/").

Note.— Once the initial design type has passed the service life test programme requirements in accordance with 5.2.1.1, Note 2, future production no longer requires this initial service life mark. The initial service life mark must be made unreadable on cylinders of a design type that has met the service life test programme requirements.

5.2.7.5 The above marks must be placed in three groups:

a) Manufacturing marks must be the top grouping and must appear consecutively in the sequence given in 5.2.7.4 except for the marks described in 5.2.7.4 q) and r) which must be adjacent to the periodic inspection and test marks of 5.2.7.7;

b) The operational marks in 5.2.7.3 must be the middle grouping and the test pressure f) which must be immediately preceded by the working pressure (i) when the latter is required;

c) Certification marks must be the bottom grouping and must appear in the sequence given in 5.2.7.2.

The following is an example of marking a cylinder:

m) 25E	n) D MF	o) 765432	p) H	
i) PW200PH	f) 300BAR	g) 62.1KG	j) 50L	h) 5.8MM
(un) a)	b) ISO 9809-1	c) F	d) IB	e) 2000/12

5.2.7.6 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. In the case of closed cryogenic receptacles, such marks may be on a separate plate attached to the outer jacket. Such marks must not conflict with required marks.

5.2.7.7 In addition to the preceding marks, each refillable cylinder and closed cryogenic receptacle that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

a) the character(s) identifying the country authorizing the body performing the periodic inspection and test as indicated by the distinguishing sign used on vehicles in international road traffic. This mark is not required if this body is approved by the appropriate national authority of the country approving manufacture;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

b) the registered mark of the body authorized by the appropriate national authority for performing the periodic inspection and test;

c) the date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "/"). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

≠ 5.2.7.8 The marks in accordance with 5.2.7.7 may be engraved on a metallic ring affixed to the cylinder when the valve is installed and which is removable only by disconnecting the valve from the cylinder.

5.2.8 Marking of non-refillable UN cylinders

≠ 5.2.8.1 Non-refillable UN cylinders must be marked clearly and legibly with certification and gas or cylinder specific marks. These marks must be permanently affixed (e.g. stencilled, stamped, engraved or etched) on the cylinder. Except when stencilled, the marks must be on the shoulder, top end or neck of the cylinder shell or on a permanently affixed component of the cylinder (e.g. welded collar). Except for the "UN" mark and the "DO NOT REFILL" mark, the minimum size of the marks must be 5 mm for cylinders with a diameter greater than or equal to 140 mm and 2.5 mm and for cylinders with a diameter less than 140 mm. The minimum size of the "UN" mark must be 10 mm for cylinders with a diameter greater than or equal to 140 mm and 5 mm for cylinders with a diameter less than 140 mm. The minimum size of the "DO NOT REFILL" mark must be 5 mm.

5.2.8.2 The marks listed in 5.2.7.2 to 5.2.7.4 must be applied with the exception of g), h) and m). The serial number o) may be replaced by the batch number. In addition, the words "DO NOT REFILL" in letters of at least 5 mm in height are required.

5.2.8.3 The requirements of 5.2.7.5 must apply.

≠ *Note.— Non-refillable cylinders may, on account of their size, substitute a label for these permanent marks*.

5.2.8.4 Other marks are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

5.2.9 Marking of UN metal hydride storage systems

5.2.9.1 UN metal hydride storage systems must be marked clearly and legibly with the marks listed in 5.2.9.2. These marks must be permanently affixed (e.g. stamped, engraved, or etched) on the metal hydride storage system. The marks must be on the shoulder, top end or neck of the metal hydride storage system or on a permanently affixed component of the metal hydride storage system. Except for the United Nations packaging symbol, the minimum size of the marks must be:

— 5 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm; and

— 2.5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

The minimum size of the United Nations packaging symbol must be:

— 10 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm; and

— 5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

5.2.9.2 The following marks must be applied:

a) The UN packaging symbol 

This symbol must not be used for any purpose other than for certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

b) "ISO 16111" (the technical standard used for design, manufacture and testing);

c) The character(s) identifying the country of approval, as indicated by the distinguishing signs used on vehicles in international road traffic;

Note 1.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

Note 2.— For the purpose of this mark the State of approval means the State of the appropriate national authority that authorized the initial inspection and test of the individual system at the time of manufacture.

d) The identity mark or stamp of the inspection body that is registered with the appropriate national authority of the country authorizing the marking;

e) The date of the initial inspection, the year (four digits), followed by the month (two digits) and separated by a slash (i.e. "/");

f) The test pressure of the cylinder in bar, preceded by the letters "PH" and followed by the letters "BAR";

g) The rated charging pressure of the metal hydride storage system in bar, preceded by the letters “RCP” and followed by the letters “BAR”;

h) The manufacturer’s mark registered by the appropriate national authority. When the country of manufacture is not the same as the country of approval, then the manufacturer’s mark must be preceded by the character(s) identifying the country of manufacture, as indicated by the distinguishing signs used on vehicles in international road traffic. The country mark and the manufacturer’s mark must be separated by a space or slash;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

i) The serial number assigned by the manufacturer;

j) In the case of steel cylinders and composite cylinders with steel liner, the letter “H” showing compatibility of the steel (see 1SO 11114-1:2012); and

k) In the case of metal hydride storage systems having limited life, the date of expiry, denoted by the letters “FINAL” followed by the year (four digits), followed by the month (two digits) and separated by a slash (i.e. “/”).

The certification marks specified in a) to e) above must appear consecutively in the sequence given. The test pressure referred to in f) must be immediately preceded by the rated charging pressure referred to in g). The manufacturing marks specified in h) to k) must appear consecutively in the sequence given.

5.2.9.3 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

5.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

a) the character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign used on vehicles in international road traffic. This mark is not required if this body is approved by the appropriate national authority of the country approving manufacture;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

b) the registered mark of the body authorized by the appropriate national authority for performing periodic inspection and test;

c) the date of the periodic inspection and test, the year (two digits), followed by the month (two digits) and separated by a slash (i.e.“/”). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

+ **5.2.10 Not used.**

+ **5.2.11 Marking of closures for refillable UN cylinders and closed cryogenic receptacles**

+ 5.2.11.1 For closures, the following permanent marks must be applied clearly and legibly (e.g. stamped, engraved or etched):

a) manufacturer’s identification mark;

b) design standard or design standard designation;

c) date of manufacture (year and month or year and week); and

d) the identity mark of the inspection body responsible for the initial inspection and test, if applicable.

+ 5.2.11.2 The valve test pressure must be marked when it is less than the test pressure which is indicated by the rating of the valve filling connection.

5.3 REQUIREMENTS FOR NON-UN CYLINDERS AND NON-UN CLOSED CRYOGENIC RECEPTACLES

5.3.1 Cylinders and closed cryogenic receptacles not designed, constructed, inspected, tested and approved according to the requirements of 5.2 must be designed, constructed, inspected, tested and approved in accordance with the provisions of a technical code recognized by the appropriate national authority and the general requirements of 5.1.

5.3.2 Cylinders and closed cryogenic receptacles designed, constructed, inspected, tested and approved under the provisions of this section must not be marked with the UN packaging symbol.

5.3.3 For metallic cylinders, the construction must be such that the minimum burst ratio (burst pressure divided by test pressure) is:

1.50 for refillable cylinders,
2.00 for non-refillable cylinders.

5.3.4 Marking must be in accordance with the requirements of the appropriate national authority of the country of use.

5.4 REQUIREMENTS FOR AEROSOL DISPENSERS, SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

\+ 5.4.1 The internal pressure of aerosol dispensers at 50°C must not exceed 1.2 MPa (12 bar) when using flammable liquefied gases, 1.32 MPa (13.2 bar) when using non-flammable liquefied gases, and 1.5 MPa (15 bar) when using non-flammable compressed or dissolved gases. In case of a mixture of several gases, the stricter limit applies.

\+ 5.4.2 For aerosol dispensers, the liquid content must not completely fill the closed receptacle at 55°C.

\+ 5.4.3 The capacity of metal receptacles must not exceed 1 000 mL; plastics receptacles must not exceed 500 mL.

\+ 5.4.4 Each model of receptacles (aerosol dispensers or cartridges) must, before being put into service, satisfy a hydraulic pressure test.

\+ 5.4.4.1 The internal pressure to be applied (test pressure) must be 1.5 times the internal pressure at 50°C, with a minimum pressure of 1 MPa (10 bar).

\+ 5.4.4.2 The hydraulic pressure tests must be carried out on at least five empty receptacles of each model:

a) until the prescribed test pressure is reached, by which time no leakage or visible permanent deformation must have occurred; and

b) until leakage or bursting occurs; the dished end, if any, must yield first and the receptacle must not leak or burst until a pressure 1.2 times the test pressure has been reached or passed.

≠ 5.4.5 Each filled aerosol dispenser or gas cartridge or fuel cell cartridge must be subjected to a test in a hot water bath in accordance with 5.4.5.1 or an approved water bath alternative in accordance with 5.4.5.2.

5.4.5.1 *Hot water bath test*

5.4.5.1.1 The temperature of the water bath and the duration of the test must be such that the internal pressure reaches that which would be reached at 55°C (50°C if the liquid phase does not exceed 95 per cent of the capacity of the aerosol dispenser, gas cartridge or fuel cell cartridge at 50°C). If the contents are sensitive to heat or if the aerosol dispensers, gas cartridges or fuel cell cartridges are made of plastics material which softens at this test temperature, the temperature of the bath must be set at between 20°C and 30°C but, in addition, one aerosol dispenser, gas cartridge or fuel cell cartridge in 2 000 must be tested at the higher temperature.

5.4.5.1.2 No leakage or permanent deformation of an aerosol dispenser, gas cartridge or fuel cell cartridge may occur, except that a plastic aerosol dispenser, gas cartridge or fuel cell cartridge may be deformed through softening provided that it does not leak.

5.4.5.2 *Alternative methods*

≠ With the approval of the appropriate national authority, alternative methods which provide an equivalent level of safety may be used provided that the requirements of 5.4.2.5.1 and, as appropriate, 5.4.2.5.2 or 5.4.2.5.3 are met.

5.4.5.2.1 *Quality system*

5.4.5.2.1.1 Aerosol dispenser, gas cartridge or fuel cell cartridge fillers and component manufacturers must have a quality system. The quality system must implement procedures to ensure that all aerosol dispensers, gas cartridges or fuel cell cartridges that leak or that are deformed are rejected and not offered for transport.

5.4.5.2.1.1.1 The quality system must include:

a) a description of the organizational structure and responsibilities;

b) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;

c) quality records, such as inspection reports, test data, calibration data and certificates;

d) management reviews to ensure the effective operation of the quality system;

e) a process for control of documents and their revision;

f) a means for control of non-conforming aerosol dispensers, gas cartridges or fuel cell cartridges;

g) training programmes and qualification procedures for relevant personnel; and

h) procedures to ensure that there is no damage to the final product.

5.4.5.2.1.1.2 An initial audit and periodic audits must be conducted to the satisfaction of the appropriate national authority. These audits must ensure the approved system is and remains adequate and efficient. Any proposed changes to the approved system must be notified to the appropriate national authority in advance.

5.4.5.2.2 *Aerosol dispensers*

5.4.5.2.2.1 *Pressure and leak testing of aerosol dispensers before filling*

Each empty aerosol dispenser must be subjected to a pressure equal to or in excess of the maximum expected in the filled aerosol dispensers at 55°C (50°C if the liquid phase does not exceed 95 percent of the capacity of the receptacle at 50°C). This must be at least two-thirds of the design pressure of the aerosol dispenser. If any aerosol dispenser shows evidence of leakage at a rate equal to or greater than 3.3×10^{-2} mbar.l.s^{-1} at the test pressure, distortion or other defect, it must be rejected.

5.4.5.2.2.2 *Testing of the aerosol dispensers after filling*

5.4.5.2.2.2.1 Prior to filling, the filler must ensure that the crimping equipment is set appropriately and the specified propellant is used.

5.4.5.2.2.2.2 Each filled aerosol dispenser must be weighed and leak tested. The leak detection equipment must be sufficiently sensitive to detect at least a leak rate of 2.0×10^{-3} mbar.l.s^{-1} at 20°C.

5.4.5.2.2.3 Any filled aerosol dispenser which shows evidence of leakage, deformation or excessive mass must be rejected.

5.4.5.2.3 *Gas cartridges and fuel cell cartridges*

5.4.5.2.3.1 *Pressure testing of gas cartridges and fuel cell cartridges*

5.4.5.2.3.1.1 Each gas cartridge or fuel cell cartridge must be subjected to a test pressure equal to or in excess of the maximum expected in the filled receptacle at 55°C (50°C if the liquid phase does not exceed 95 per cent of the capacity of the receptacle at 50°C). This test pressure must be that specified for the gas cartridge or fuel cell cartridge and must not be less than two thirds the design pressure of the gas cartridge or fuel cell cartridge. If any gas cartridge or fuel cell cartridge shows evidence of leakage at a rate equal to or greater than 3.3×10^{-2} mbar.l.s^{-1} at the test pressure, distortion or any other defect, it must be rejected.

5.4.5.2.3.2 *Leak testing gas cartridges and fuel cell cartridges*

5.4.5.2.3.2.1 Prior to filling and sealing, the filler must ensure that the closures (if any) and the associated sealing equipment are closed appropriately and the specified gas is used.

5.4.5.2.3.2.2 Each filled gas cartridge or fuel cell cartridge must be checked for the correct mass of gas and must be leak tested. The leak detection equipment must be sufficiently sensitive to detect at least a leak rate of 2.0×10^{-3} mbar.l.s^{-1} at 20°C.

5.4.5.2.3.2.3 Any gas cartridge or fuel cell cartridge that has a gas mass not in conformity with the declared mass limits or shows evidence of leakage or deformation, must be rejected.

≠ 5.4.5.3 With the approval of the appropriate national authority, aerosols and receptacles, small, are not subject to 5.4.5.1 and 5.4.5.2 if they are required to be sterile, but may be adversely affected by water bath testing, provided:

a) they contain a non-flammable gas and either:

i) contain other substances that are constituent parts of pharmaceutical products for medical, veterinary or similar purposes; or

ii) contain other substances used in the production process for pharmaceutical products; or

iii) are used in medical, veterinary or similar applications;

b) an equivalent level of safety is achieved by the manufacturer's use of alternative methods for leak detection and pressure resistance, such as helium detection and water bathing using a statistical sample of at least 1 in 2 000 from each production batch; and

c) for pharmaceutical products according to a) i) and iii) above, they are manufactured under the authority of a national health administration. If required by the appropriate national authority, the principles of Good Manufacturing Practice (GMP) established by the World Health Organization (WHO)[1] must be followed.

1. WHO Publication: Quality assurance of pharmaceuticals. A compendium of guidelines and related materials. Volume 2: Good manufacturing practices and inspection.

Chapter 6

PACKAGINGS FOR INFECTIOUS SUBSTANCES OF CATEGORY A (UN 2814 AND UN 2900)

6.1 GENERAL

The requirements of this chapter apply to packagings intended for the transport of infectious substances of Category A, UN 2814 and UN 2900.

6.2 REQUIREMENTS FOR PACKAGINGS

≠ 6.2.1 The requirements for packagings in this section are based on packagings, as specified in Chapter 2, currently used. In order to take into account progress in science and technology, there is no objection to the use of packagings having specifications different from those in this chapter provided that they are equally effective, acceptable to the competent authority and able to successfully fulfil the requirements described in 6.5. Methods of testing other than those described in these Instructions are acceptable provided they are equivalent.

6.2.2 Packagings must be manufactured and tested under a quality assurance programme which satisfies the competent authority in order to ensure that each packaging meets the requirements of this chapter.

\+ *Note.— ISO 16106:2020 Transport packages for dangerous goods — Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings — Guidelines for the application of ISO 9001 provides acceptable guidance on procedures that may be followed.*

6.2.3 Manufacturers and subsequent distributors of packagings must provide information regarding procedures to be followed (including closure instructions for inner packagings and receptacles), a description of the types and dimensions of the closures (including required gaskets) and any other components needed to ensure that packages, as presented for transport, are capable of passing the applicable performance tests of this chapter.

6.3 CODE FOR DESIGNATING TYPES OF PACKAGINGS

6.3.1 The codes for designating types of packagings are set out in 6;1.2.

6.3.2 The letters “U” or “W” may follow the packaging code. The letter “U” signifies a special packaging conforming to the requirements of 6.5.1.6. The letter “W” signifies that the packaging, although of the same type indicated by the code, is manufactured to a specification different from that in Chapter 3 and is considered equivalent under the requirements of 6.2.1.

6.4 MARKING

Note 1.— The marks indicate that the packaging which bears them corresponds to a successfully tested design type and that it complies with the provisions of this chapter which are related to the manufacture, but not to the use, of the packaging.

Note 2.— The marks are intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities.

Note 3.— The marks do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings.

6.4.1 Each packaging intended for use according to these Instructions must bear marks which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the marks, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L capacity or less or of 30 kg maximum net mass, when they must be at least 6 mm in height and except for packagings of 5 L capacity or less or of 5 kg maximum net mass, when they must be of an appropriate size.

6.4.2 A packaging that meets the requirements of this section and of 6.5 shall be marked with:

a) the United Nations packaging symbol; (un)

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

b) the code designating the type of packaging according to the requirements of 6;1.3;

c) the text “CLASS 6.2”;

d) the last two digits of the year of manufacture of the packaging;

e) the State authorizing the allocation of the mark, indicated by the distinguishing sign used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

f) the name of the manufacturer or other identification of the packaging specified by the competent authority; and

g) for packagings meeting the requirements of 6.5.1.6, the letter “U”, inserted immediately following the mark required in b) above.

6.4.3 Marks must be applied in the sequence of the sub-paragraphs in 6.4.2; each mark required in these sub-paragraphs must be clearly separated, e.g. by a slash or space, so as to be easily identified. For an example see 6.4.4. Any additional markings authorized by a competent authority must still enable the marks required in 6.4.1 to be correctly identified.

6.4.4 Example of a marking:

(un) 4G/CLASS 6.2/06 as in 6.4.2 a), b), c) and d)
S/SP-9989-ERIKSSON as in 6.4.2 e) and f)

6.5 TEST REQUIREMENTS FOR PACKAGINGS

6.5.1 Performance and frequency of tests

6.5.1.1 The design type of each packaging must be tested as provided for in this chapter in accordance with procedures established by the competent authority.

6.5.1.2 Each packaging design type must successfully pass the tests prescribed in this chapter before being used. A packaging design type is defined by the design, size, material and thickness, manner of construction and packing, but may include various surface treatments. It also includes packagings which differ from the design type only in their lesser design height.

6.5.1.3 Tests must be repeated on production samples at intervals established by the competent authority.

6.5.1.4 Tests must also be repeated after each modification which alters the design, material or manner of construction of a packaging.

6.5.1.5 The competent authority may permit the selective testing of packagings that differ only in minor respects from a tested type, e.g. smaller sizes or lower net mass of primary receptacles; and packagings such as drums and boxes which are produced with small reductions in external dimension(s).

6.5.1.6 Primary receptacles of any type may be assembled within a secondary packaging and transported without testing in the rigid outer packaging under the following conditions:

a) The rigid outer packaging combination must have been successfully tested in accordance with 6.5.2.2 with fragile (e.g. glass) primary receptacles.

b) The total combined gross mass of primary receptacles must not exceed one-half the gross mass of primary receptacles used for the drop test in a) above.

c) The thickness of cushioning between primary receptacles and between primary receptacles and the outside of the secondary packaging must not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single primary receptacle was used in the original test, the thickness of cushioning between primary receptacles must not be less than the thickness of cushioning between the outside of the secondary packaging and the primary receptacle in the original test. When either fewer or smaller primary receptacles are used (as compared to the primary receptacles used in the drop test), sufficient additional cushioning material must be used to take up the void spaces.

d) The rigid outer packaging must have successfully passed the stacking test in 4.6 while empty. The total mass of identical packages must be based on the combined mass of packagings used in the drop test in a) above.

e) For primary receptacles containing liquids, an adequate quantity of absorbent material to absorb the entire liquid content of the primary receptacles must be present.

f) If the rigid outer packaging is intended to contain primary receptacles for liquids and is not leakproof, or is intended to contain primary receptacles for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally effective means of containment.

g) In addition to the marks prescribed in 6.4.2 a) to f), packagings must be marked in accordance with 6.4.2 g).

6.5.1.7 The competent authority may at any time require proof, by tests in accordance with this chapter, that serially produced packagings meet the requirements of the design type tests.

6.5.1.8 Provided the validity of the test results is not affected, and with the approval of the competent authority, several tests may be made on one sample.

6.5.2 Preparation of packagings for testing

6.5.2.1 Samples of each packaging must be prepared as for transport except that the liquid or solid infectious substance must be replaced by water or, where conditioning at –18°C is specified, by a water/antifreeze mixture. Each primary receptacle must be filled to not less than 98 per cent of its capacity.

Note.— The term water includes water/antifreeze solution with a minimum specific gravity of 0.95 for testing at –18°C.

6.5.2.2 *Tests and number of samples required*

Table 6-4. Tests required for packaging types

Type of packaging[a]			*Tests required*					
	Primary receptacle		*Water spray 6.5.3.5.1*	*Cold conditioning 6.5.3.5.2*	*Drop 6.5.3*	*Additional drop 6.5.3.5.3*	*Puncture 6.5.4*	*Stacking 6;4.6*
Rigid outer packaging	*Plastics*	*Other*	*No. of samples*	*No. of samples*	*No. of samples*	*No. of samples*	*No. of samples*	*No. of samples*
Fibreboard box	X		5	5	10		2	
		X	5	0	5		2	
Fibreboard drum	X		3	3	6		2	
		X	3	0	3		2	Required on three samples when testing a "U"-marked packaging, as defined in 6.5.1.6 for specific provisions.
Plastics box	X		0	5	5	Required on one sample when the packaging is intended to contain dry ice.	2	
		X	0	5	5		2	
Plastics drum/ jerrican	X		0	3	3		2	
		X	0	3	3		2	
Boxes of other material	X		0	5	5		2	
		X	0	0	5		2	
Drums/ jerricans of other material	X		0	3	3		2	
		X	0	0	3		2	

a. *Type of packaging* categorizes packagings for test purposes according to the kind of packaging and its material characteristics.

Note 1.— In instances where a primary receptacle is made of two or more materials, the material most liable to damage determines the appropriate test.

Note 2.— The material of the secondary packagings are not taken into consideration when selecting the test or conditioning for the test.

6.5.2.2.1 *Explanation for use of Table 6-4*

6.5.2.2.1.1 If the packaging to be tested consists of a fibreboard outer box with a plastics primary receptacle, five samples must undergo the water spray test (see 6.5.3.5.1) prior to dropping and another five must be conditioned to –18°C (see 6.5.3.5.2) prior to dropping. If the packaging is to contain dry ice, then one further single sample must be dropped in accordance with 6.5.3.5.3.

6.5.2.2.1.2 Packagings prepared as for transport must be subjected to the tests in 6.5.3 and 6.5.4. For outer packagings, the headings in Table 6-4 relate to fibreboard or similar materials whose performance may be rapidly affected by moisture, plastics which may embrittle at low temperature, and other materials such as metal whose performance is not affected by moisture or temperature.

6.5.3 Drop test

6.5.3.1 *Drop height and target*

6.5.3.1.1 Samples must be subjected to free-fall drops from a height of 9 metres onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with 6;4.3.3.

6.5.3.2 *Number of test samples and drop orientation*

6.5.3.2.1 Where the samples are in the shape of a box, five must be dropped, one in each of the following orientations:

a) flat on the base;

b) flat on the top;

c) flat on the longest side;

d) flat on the shortest side;

e) on a corner.

≠ 6.5.3.2.2 Where the samples are in the shape of a drum or a jerrican, three must be dropped, one in each of the following orientations:

a) diagonally on the top edge, with the centre of gravity directly above the point of impact;

b) diagonally on the base edge;

c) flat on the body or side.

6.5.3.3 While the sample must be released in the required orientation, it is accepted that for aerodynamic reasons the impact may not take place in that orientation.

6.5.3.4 Following the appropriate drop sequence, there must be no leakage from the primary receptacle(s), which must remain protected by cushioning/absorbent material in the secondary packaging.

6.5.3.5 *Special preparation of test sample for the drop test*

6.5.3.5.1 *Fibreboard — water spray test*

Fibreboard outer packagings: The sample must be subjected to a water spray that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour. It must then be subjected to the test described in 6.5.3.1.

6.5.3.5.2 *Plastics material — cold conditioning*

Plastics primary receptacles or outer packagings: The temperature of the test sample and its contents must be reduced to -18°C or lower for a period of at least 24 hours and within 15 minutes of removal from that atmosphere the test sample must be subjected to the test described in 6.5.3.1. Where the sample contains dry ice, the conditioning period may be reduced to four hours.

6.5.3.5.3 *Packagings intended to contain dry ice — additional drop test*

Where the packaging is intended to contain dry ice, a test additional to that specified in 6.5.3.1 and, when appropriate, in 6.5.3.5.1 or 6.5.3.5.2 must be carried out. One sample must be stored so that all the dry ice dissipates and then that sample must be dropped in one of the orientations described in 6.5.3.2.1 or in 6.5.3.2.2, as appropriate, which must be that most likely to result in failure of the packaging.

6.5.4 Puncture test

6.5.4.1 *Packagings with a gross mass of 7 kg or less*

Samples must be placed on a level, hard surface. A cylindrical steel rod with a mass of at least 7 kg, a diameter of 38 mm and the impact end edges of a radius not exceeding 6 mm (see Figure 6-1) must be dropped in a vertical free fall from a height of one metre measured from the impact end to the impact surface of the sample. One sample must be placed on its base. A second sample must be placed in an orientation perpendicular to that used for the first sample. In each instance, the steel rod must be aimed to impact the primary receptacle. Following each impact, penetration of the secondary packaging is acceptable, provided that there is no leakage from the primary receptacle(s).

6.5.4.2 *Packagings with a gross mass exceeding 7 kg*

Samples are dropped onto the end of a cylindrical steel rod. The rod must be set vertically on a level, hard surface. It must have a diameter of 38 mm with the upper end edges of a radius not exceeding 6 mm (see Figure 6-1). The rod must protrude from the surface a distance at least equal to the distance between the centre of the primary receptacle(s) and the outer surface of the outer packaging, with a minimum protrusion of 200 mm. One sample is dropped with its top face lowermost in a vertical free fall from a height of 1 m, measured from the top of the steel rod. A second sample is dropped from the same height in an orientation perpendicular to that used for the first sample. In each instance, the packaging must be so orientated that the steel rod would be capable of penetrating the primary receptacle(s). Following each impact, penetration of the secondary packaging is acceptable provided that there is no leakage from the primary receptacle(s).

6.5.5 Test report

6.5.5.1 A written test report containing at least the following particulars must be prepared and must be available to the users of the packaging:

a) name and address of the test facility;

b) name and address of the applicant (where appropriate);

c) a unique test report identification;

d) date of the test and of the report;

e) manufacturer of the packaging;

f) description of the packaging design type (e.g. dimensions, materials, closures, thickness, etc.), including method of manufacture (e.g. blow moulding) and which may include drawing(s) and/or photograph(s);

g) maximum capacity;

h) test contents;

i) test descriptions and results;

j) a signature and the name and status of the signatory.

6.5.5.2 The test report must contain statements that the packaging prepared for transport was tested in accordance with the appropriate requirements of this chapter and that the use of other packaging methods or components may render it invalid. A copy of the test report must be available to the appropriate national authority.

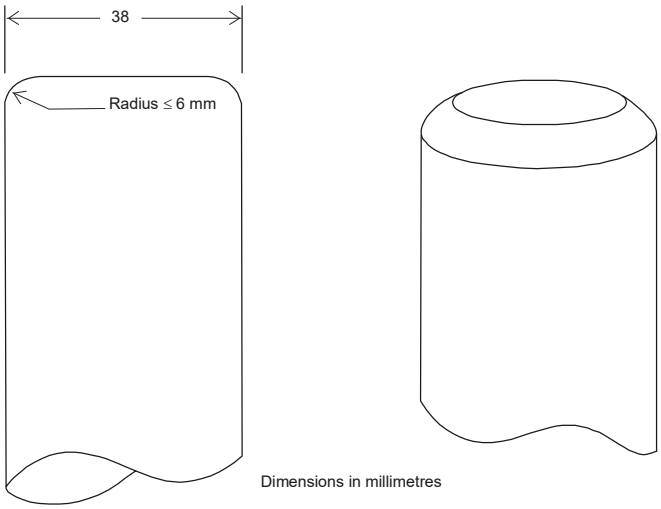


Figure 6-1. Cylindrical steel rod used for puncture test

Chapter 7

REQUIREMENTS FOR THE CONSTRUCTION, TESTING AND APPROVAL OF PACKAGES FOR RADIOACTIVE MATERIAL AND FOR THE APPROVAL OF SUCH MATERIAL

Parts of this Chapter are affected by State Variations CA 1, CA 3, CA 4, DE 2, IR 4, JP 8, JP 26, US 10; see Table A-1

7.1 GENERAL REQUIREMENTS

7.1.1 The package must be so designed in relation to its mass, volume and shape that it can be easily and safely transported. In addition, the package must be so designed that it can be properly secured in the aircraft during transport.

7.1.2 The design must be such that any lifting attachments on the package will not fail when used in the intended manner and that, if failure of the attachments should occur, the ability of the package to meet other requirements of these Instructions would not be impaired. The design must take account of appropriate safety factors to cover snatch lifting.

7.1.3 Attachments and any other features on the outer surface of the package which could be used to lift it must be designed either to support its mass in accordance with the requirements of 7.1.2 or must be removable or otherwise rendered incapable of being used during transport.

7.1.4 As far as practicable, the package must be designed so that the external surfaces are free from protruding features and can be easily decontaminated.

7.1.5 As far as practicable, the outer layer of the package must be designed so as to prevent the collection and the retention of water.

7.1.6 Any features added to the package at the time of transport which are not part of the package must not reduce its safety.

7.1.7 The package must be capable of withstanding the effects of any acceleration, vibration or vibration resonance, which may arise under routine conditions of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole. In particular, nuts, bolts and other securing devices must be designed so as to prevent them from becoming loose or being released unintentionally, even after repeated use.

7.1.8 The design of the package must take into account ageing mechanisms.

7.1.9 The materials of the packaging and any components or structures must be physically and chemically compatible with each other and with the radioactive contents. Account must be taken of their behaviour under irradiation.

7.1.10 All valves through which the radioactive contents could escape must be protected against unauthorized operation.

7.1.11 The design of the package must take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.

7.1.12 A package must be so designed that it provides sufficient shielding to ensure that, under routine conditions of transport and with the maximum radioactive contents that the package is designed to contain, the dose rate at any point on the external surface of the package would not exceed the values specified in 2;7.2.4.1.1.2, 4;9.1.10 and 4;9.1.11, as applicable, with account taken of 7;2.10.3.3 c).

7.1.13 For radioactive material having other dangerous properties, the package design must take into account those properties (see Part 2, Introductory Chapter, 3.1, 3.2 and 4;9.1.5).

7.2 ADDITIONAL REQUIREMENTS FOR PACKAGES TRANSPORTED BY AIR

7.2.1 The temperature of the accessible surfaces must not exceed 50°C at an ambient temperature of 38°C with no account taken of insolation.

7.2.2 Packages must be designed so that, if they were exposed to ambient temperatures ranging from –40°C to +55°C, the integrity of the containment would not be impaired.

7.2.3 Packages containing radioactive material must be capable of withstanding, without loss or dispersal of radioactive contents from the containment system, an internal pressure that produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa.

7.3 REQUIREMENTS FOR EXCEPTED PACKAGES

An excepted package must be designed to meet the requirements specified in 7.1.1 to 7.1.13 and 7.2 and, in addition, the requirements of 7.6.2 if it contains fissile material allowed by one of the provisions of 2;7.2.3.5.1 a) to f).

7.4 REQUIREMENTS FOR INDUSTRIAL PACKAGES

7.4.1 Industrial packages Types 1, 2 and 3 (Types IP-1, IP-2 and IP-3) must meet the requirements specified in 7.1, 7.2 and 7.6.2.

7.4.2 A Type IP-2 package must, if it were subjected to the tests specified in 7.14.4 and 7.14.5, prevent:

a) loss or dispersal of the radioactive contents; and

b) more than a 20 per cent increase in the maximum dose rate at any external surface of the package.

7.4.3 A Type IP-3 package must meet all the requirements specified in 7.6.2 to 7.6.15.

7.4.4 Alternative requirements for industrial packages Types 2 and 3 (Types IP-2 and IP-3)

7.4.4.1 Packages may be used as a Type IP-2 package, provided that:

a) they satisfy the requirements of 7.4.1;

b) they are designed to satisfy the requirements prescribed for Packing Group I or II in Part 6, Chapters 1 to 4, of these Instructions; and

c) when subjected to the tests required for Packing Group I or II in Part 6, Chapter 4, they would prevent:

   i) loss or dispersal of the radioactive contents; and

   ii) more than a 20 per cent increase in the maximum dose rate at any external surface of the package.

7.4.4.2 Freight containers with the characteristics of a permanent enclosure may also be used as Industrial package Type 2 or 3 (Type IP-2 or IP-3), provided that:

a) the radioactive contents are restricted to solid materials;

b) they satisfy the requirements of 7.4.1; and

c) they are designed to conform to ISO 1496-1:1990: “Series 1 freight containers — Specification and testing — Part 1: General cargo containers” and subsequent amendments 1:1993, 2:1998, 3:2005, 4:2006 and 5:2006, excluding dimensions and ratings. They must be designed so that, if subjected to the tests prescribed in that document and to the accelerations occurring during routine conditions of transport, they would prevent:

   i) loss or dispersal of the radioactive contents; and

   ii) more than a 20 per cent increase in the maximum dose rate at any external surface of the freight containers.

7.5 REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE

7.5.1 Packages designed to contain uranium hexafluoride must meet the requirements which pertain to the radioactive and fissile properties of the material prescribed elsewhere in these Instructions. Except as allowed in 7.5.4, uranium hexafluoride in quantities of 0.1 kg or more must also be packaged and transported in accordance with the provisions of ISO 7195:2005: “Nuclear Energy — Packaging of uranium hexafluoride (UF_6) for transport”, and the requirements of 7.5.2 and 7.5.3. The package must also meet the requirements prescribed elsewhere in these Instructions, which pertain to the radioactive and fissile properties of the material.

7.5.2 Each package designed to contain 0.1 kg or more of uranium hexafluoride must be designed so that the package would meet the following requirements:

a) withstand, without leakage and without unacceptable stress, as specified in ISO 7195:2005, the structural test as specified in 7.20 except as allowed in 7.5.4;

b) withstand, without loss or dispersal of the uranium hexafluoride, the free drop test specified in 7.14.4; and

c) withstand, without rupture of the containment system, the thermal test specified in 7.16.3 except as allowed in 7.5.4.

7.5.3 Packages designed to contain 0.1 kg or more of uranium hexafluoride must not be provided with pressure relief devices.

7.5.4 Subject to the multilateral approval, packages designed to contain 0.1 kg or more of uranium hexafluoride may be transported if the packages are designed:

a) to international or national standards other than ISO 7195:2005 provided an equivalent level of safety is maintained; and/or

b) to withstand, without leakage and without unacceptable stress, a test pressure of less than 2.76 MPa, as specified in 7.20; and/or

c) to contain 9 000 kg or more of uranium hexafluoride and the packages do not meet the requirement of 7.5.2 c).

In all other respects, the requirements specified in 7.5.1 to 7.5.3 must be satisfied.

7.6 REQUIREMENTS FOR TYPE A PACKAGES

7.6.1 Type A packages must be designed to meet the requirements of 7.1, 7.2 and 7.6.2 to 7.6.17.

7.6.2 The smallest overall external dimension of the package must not be less than 10 cm.

7.6.3 The outside of the package must incorporate a feature such as a seal, which is not readily breakable and which, while intact, will be evidence that it has not been opened.

7.6.4 Any tie-down attachments on the package must be designed so that, under normal and accident conditions of transport, the forces in those attachments must not impair the ability of the package to meet the requirements of these Instructions.

7.6.5 The design of the package must take into account temperatures ranging from –40°C to +70°C for the components of the packaging. Attention must be given to freezing temperatures for liquids and to the potential degradation of packaging materials within the given temperature range.

7.6.6 The design and manufacturing techniques must be in accordance with national or international standards, or other requirements, acceptable to the competent authority.

7.6.7 The design must include a containment system securely closed by a positive fastening device which cannot be opened unintentionally or by a pressure which may arise within the package.

7.6.8 Special form radioactive material may be considered as a component of the containment system.

7.6.9 If the containment system forms a separate unit of the package, the containment system must be capable of being securely closed by a positive fastening device which is independent of any other part of the packaging.

7.6.10 The design of any component of the containment system must take into account, where applicable, the radiolytic decomposition of liquids and other vulnerable materials and the generation of gas by chemical reaction and radiolysis.

7.6.11 The containment system must retain its radioactive contents under a reduction of ambient pressure to 60 kPa.

7.6.12 All valves, other than pressure relief valves, must be provided with an enclosure to retain any leakage from the valve.

7.6.13 A radiation shield, which encloses a component of the package specified as a part of the containment system, must be designed so as to prevent the unintentional release of that component from the shield. Where the radiation shield and such component within it form a separate unit, the radiation shield must be capable of being securely closed by a positive fastening device, which is independent of any other packaging structure.

7.6.14 A package must be designed so that if it were subjected to the tests specified in 7.14, it would prevent:

a) loss or dispersal of the radioactive contents; and

b) more than a 20 per cent increase in the maximum dose rate at any external surface of the package.

7.6.15 The design of a package intended for liquid radioactive material must make provision for ullage to accommodate variations in the temperature of the contents, dynamic effects and filling dynamics.

7.6.16 Type A packages to contain liquids

A Type A package designed to contain liquid radioactive material must, in addition:

a) be adequate to meet the conditions specified in 7.6.14 a) if the package is subjected to the tests specified in 7.15; and

b) either:

i) be provided with sufficient absorbent material to absorb twice the volume of the liquid contents. Such absorbent material must be suitably positioned so as to contact the liquid in the event of leakage; or

ii) be provided with a containment system composed of primary inner and secondary outer containment components, designed to enclose the liquid contents completely and ensure their retention within the secondary outer containment components, even if the primary inner components leak.

7.6.17 Type A packages to contain gas

A Type A package designed for gases must prevent loss or dispersal of the radioactive contents if the package were subjected to the tests specified in 7.15, except for a Type A package designed for tritium gas or for noble gases.

7.7 REQUIREMENTS FOR TYPE B(U) PACKAGES

7.7.1 Type B(U) packages must be designed to meet the requirements specified in 7.1, 7.2 and 7.6.2 to 7.6.15, except 7.6.14 a), and, in addition, to the requirements specified in 7.7.2 to 7.7.15.

7.7.2 A package must be designed so that, under the ambient conditions specified in 7.7.5 and 7.7.6, heat generated within the package by the radioactive contents does not, under normal conditions of transport, as demonstrated by the tests in 7.14, adversely affect the package in such a way that it would fail to meet the applicable requirements for containment and shielding if left unattended for a period of one week. Particular attention must be paid to the effects of heat, which may cause one or more of the following:

a) alter the arrangement, the geometrical form or the physical state of the radioactive contents or, if the radioactive material is enclosed in a can or receptacle (for example, clad fuel elements), cause the can, receptacle or radioactive material to deform or melt;

b) lessening of the efficiency of the packaging through differential thermal expansion or cracking or melting of the radiation shielding material;

c) in combination with moisture, accelerate corrosion.

7.7.3 A package must be so designed that, under the ambient condition specified in 7.7.5 and in the absence of isolation, the temperature of the accessible surfaces of a package must not exceed 50°C, unless the package is transported under exclusive use.

7.7.4 In order to meet the requirements of 7.2.1, account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.

7.7.5 The ambient temperature must be assumed to be 38°C.

7.7.6 The solar insolation conditions must be assumed to be as specified in Table 6-5.

7.7.7 A package which includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in 7.16.3 must be so designed that such protection will remain effective if the package is subjected to the tests specified in 7.14 and 7.16.2 a) and b) or 7.16.2 b) and c), as appropriate. Any such protection on the exterior of the package must not be rendered ineffective by ripping, cutting, skidding, abrasion or rough handling.

7.7.8 A package must be so designed that, if it were subjected to:

a) the tests specified in 7.14, it would restrict the loss of radioactive contents to not more than 10^{-6} A_2 per hour; and

b) the tests specified in 7.16.1, 7.16.2 b), 7.16.3 and 7.16.4 and either the tests in:

i) 7.16.2 c), when the package has a mass not greater than 500 kg, an overall density not greater than 1 000 kg/m^3 based on the external dimensions, and radioactive contents greater than 1 000 A_2 not as special form radioactive material; or

ii) 7.16.2 a), for all other packages,

it would meet the following requirements:

— retain sufficient shielding to ensure that the dose rate at 1 m from the surface of the package would not exceed 10 mSv/h with the maximum radioactive contents which the package is designed to contain; and

— restrict the accumulated loss of radioactive contents in a period of one week to not more than 10 A_2 for krypton-85 and not more than A_2 for all other radionuclides.

Where mixtures of different radionuclides are present, the provisions of 2;7.2.2.4 to 2;7.2.2.6 must apply except that for krypton-85, an effective A_2(i) value equal to 10 A_2 may be used. For case a) above, the assessment must take into account the external non-fixed contamination limits of 4;9.1.2.

Table 6-5. Insolation data

Case	*Form and location of surface*	*Insolation for 12 hours per day (W/m^2)*
1	Flat surfaces transported horizontally — downward facing	0
2	Flat surfaces transported horizontally — upward facing	800
3	Surfaces transported vertically	200*
4	Other downward facing (not horizontal) surfaces	200*
5	All other surfaces	400*

* Alternatively, a sine function may be used, with an absorption coefficient adopted and the effects of possible reflection from neighbouring objects neglected.

7.7.9 A package for radioactive contents with activity greater than 10^5 A_2 must be designed so that if it were subjected to the enhanced water immersion test specified in 7.17, there would be no rupture of the containment system.

7.7.10 Compliance with the permitted activity release limits must depend neither upon filters nor upon a mechanical cooling system.

7.7.11 A package must not include a pressure relief system from the containment system, which would allow the release of radioactive material to the environment under the conditions of the tests specified in 7.14 and 7.16.

7.7.12 A package must be designed so that if it were at the maximum normal operating pressure and it were subjected to the tests specified in 7.14 and 7.16, the level of strains in the containment system would not attain values which would adversely affect the package in such a way that it would fail to meet the applicable requirements.

7.7.13 A package must not have a maximum normal operating pressure in excess of a gauge pressure of 700 kPa.

7.7.14 A package containing low dispersible radioactive material must be so designed so that any features added to the low dispersible radioactive material that are not part of it, or any internal components of the packaging must not adversely affect the performance of the low dispersible radioactive material.

7.7.15 A package must be designed for an ambient temperature range from –40°C to +38°C.

7.8 REQUIREMENTS FOR TYPE B(M) PACKAGES

Type B(M) packages must meet the requirements for Type B(U) packages specified in 7.7.1, except that for packages to be transported solely within a specified country or solely between specified countries, conditions other than those given in 7.6.5, 7.7.4 to 7.7.6 and 7.7.9 to 7.7.15 may be assumed with the approval of the competent authorities of these countries. The requirements for Type B(U) packages specified in 7.7.4 and 7.7.9 to 7.7.15 must be met as far as practicable.

7.9 REQUIREMENTS FOR TYPE C PACKAGES

7.9.1 Type C packages must be designed to meet the requirements specified in 7.1, 7.2 and 7.6.2 to 7.6.15, except as specified in 7.6.14 a), and the requirements specified in 7.7.2 to 7.7.6, 7.7.10 to 7.7.15 and 7.9.2 to 7.9.4.

7.9.2 A package must be capable of meeting the assessment criteria prescribed for tests in 7.7.8 b) and 7.7.12 after burial in an environment defined by a thermal conductivity of 0.33 W/(m.K) and a temperature of 38°C in the steady state. Initial conditions for the assessment must assume that any thermal insulation of the package remains intact, the package is at the maximum normal operating pressure and the ambient temperature is 38°C.

7.9.3 A package must be designed so that, if it were at the maximum normal operating pressure and subjected to:

a) the tests specified in 7.14, it would restrict the loss of radioactive contents to not more than 10^{-6} A_2 per hour; and

b) the test sequences in 7.19.1, it would:

   i) retain sufficient shielding to ensure that the dose rate at 1 m from the surface of the package would not exceed 10 mSv/h with the maximum radioactive contents which the package is designed to contain; and

   ii) restrict the accumulated loss of radioactive contents in a period of one week to not more than 10 A_2 for krypton-85 and not more than A_2 for all other radionuclides.

Where mixtures of different radionuclides are present, the provisions of 2;7.2.2.4 to 2;7.2.2.6 must apply, except that for krypton-85 an effective A_2(i) value equal to 10 A_2 may be used. For case a) above, the assessment must take into account the external contamination limits of 4;9.1.2.

7.9.4 A package must be so designed that there will be no rupture of the containment system following performance of the enhanced water immersion test specified in 7.17.

7.10 REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

7.10.1 Fissile material must be transported so as to:

a) maintain subcriticality during routine, normal and accident conditions of transport; in particular, the following contingencies must be considered:

   i) water leaking into or out of packages;

   ii) the loss of efficiency of built-in neutron absorbers or moderators;

   iii) rearrangement of the contents either within the package or as a result of loss from the package;

   iv) reduction of spaces within or between packages;

   v) packages becoming immersed in water or buried in snow; and

   vi) temperature changes; and

b) meet the requirements:

   i) of 7.6.2;

   ii) prescribed elsewhere in these Instructions and which pertain to the radioactive properties of the material;

   iii) of 7.6.3, unless the material is excepted by 2;7.2.3.5; and

   iv) of 7.10.4 to 7.10.14, unless the material is excepted by 2;7.2.3.5, 7.10.2 or 7.10.3.

7.10.2 Packages containing fissile material that meet the provisions of subparagraph d) and one of the provisions of a) to c) below are excepted from the requirements of 7.10.4 to 7.10.14.

a) Packages containing fissile material in any form provided that:

i) the smallest external dimension of the package is not less than 10 cm;

ii) the criticality safety index of the package is calculated using the following formula:

$$CSI=50x5x\left[\left(\frac{\textit{Mass of U-235 in package(g)}}{Z}\right)+\left(\frac{\textit{Mass of other fissile nuclides}^{*}\textit{ in package (g)}}{280}\right)\right]$$

where the values of Z are taken from Table 6-6.

* Plutonium may be of any isotopic composition provided that the amount of Pu-241 is less than that of Pu-240 in the package.

iii) the CSI of any package does not exceed 10;

b) packages containing fissile material in any form provided that:

i) the smallest external dimension of the package is not less than 30 cm;

ii) the package, after being subjected to the tests specified in 7.14.1 to 7.14.6:

— retains its fissile material contents;

— preserves the minimum overall outside dimensions of the package to at least 30 cm;

— prevents the entry of a 10 cm cube;

iii) the criticality safety index of the package is calculated using the following formula:

$$CSI=50x2x\left[\left(\frac{\textit{Mass of U-235 in package(g)}}{Z}\right)+\left(\frac{\textit{Mass of other fissile nuclides}^{*}\textit{ in package (g)}}{280}\right)\right]$$

where the values of Z are taken from Table 6-6.

* Plutonium may be of any isotopic composition provided that the amount of Pu-241 is less than that of Pu-240 in the package

(iv) the criticality safety index of any package does not exceed 10;

c) packages containing fissile material in any form provided that:

i) the smallest external dimension of the package is not less than 10 cm;

ii) the package, after being subjected to the tests specified in 7.14.1 to 7.14.6:

— retains its fissile material contents;

— preserves the minimum overall outside dimensions of the package to at least 10 cm;

— prevents the entry of a 10 cm cube;

iii) the criticality safety index of the package is calculated using the following formula:

$$CSI=50x2x\left[\left(\frac{\textit{Mass of U-235 in package(g)}}{450}\right)+\left(\frac{\textit{Mass of other fissile nuclides}^{*}\textit{ in package (g)}}{280}\right)\right]$$

* Plutonium may be of any isotopic composition provided that the amount of Pu-241 is less than that of Pu-240 in the package

iv) the total mass of fissile nuclides in any package does not exceed 15 g;

d) the total mass of beryllium, hydrogenous material enriched in deuterium, graphite and other allotropic forms of carbon in an individual package must not be greater than the mass of fissile nuclides in the package except where the total concentration of these materials does not exceed 1 g in any 1 000 g of material. Beryllium incorporated in copper alloys up to 4 per cent in weight of the alloy does not need to be considered.

Table 6-6. Values of Z for calculation of criticality safety index in accordance with 7.10.2

Enrichment[a]*	*Z*
Uranium enriched up to 1.5%	2 200
Uranium enriched up to 5%	850
Uranium enriched up to 10%	660
Uranium enriched up to 20%	580
Uranium enriched up to 100%	450

* If a package contains uranium with varying enrichments of U-235, then the value corresponding to the highest enrichment must be used for Z.

7.10.3 Packages containing not more than 1 000 g of plutonium are excepted from the application of 7.10.4 to 7.4.14 provided that:

a) not more than 20 per cent of the plutonium by mass is fissile nuclides;

b) the criticality safety index of the package is calculated using the following formula:

$$CSI=50x2x\left(\frac{\textit{Mass}\text{ of plutonium (g)}}{1\,000}\right)$$

c) if uranium is present with the plutonium, the mass of uranium must be no more than 1 per cent of the mass of the plutonium.

7.10.4 Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of 7.10.8 to 7.10.13 must be performed assuming that each parameter that is not known has the value which gives the maximum neutron multiplication consistent with the known conditions and parameters in these assessments.

7.10.5 For irradiated nuclear fuel the assessments of 7.10.8 to 7.10.13 must be based on an isotopic composition demonstrated to provide:

a) the maximum neutron multiplication during the irradiation history; or

b) a conservative estimate of the neutron multiplication for the package assessments. After irradiation but prior to shipment, a measurement must be performed to confirm the conservatism of the isotopic composition.

7.10.6 The package, after being subjected to the tests specified in 7.14, must:

a) preserve the minimum overall outside dimensions of the package to at least 10 cm; and

b) prevent the entry of a 10-cm cube.

7.10.7 The package must be designed for an ambient temperature range of –40°C to +38°C unless the competent authority specifies otherwise in the certificate of approval for the package design.

7.10.8 For a package in isolation, it must be assumed that water can leak into or out of all void spaces of the package, including those within the containment system. However, if the design incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features must include either of the following:

a) multiple high standard water barriers not less than two of which would remain watertight if the package were subject to the tests prescribed in 7.10.13 b), a high degree of quality control in the manufacture, maintenance and repair of packagings and tests to demonstrate the closure of each package before each shipment; or

b) for packages containing uranium hexafluoride only, with maximum enrichment of 5 mass per cent uranium-235:

   i) packages where, following the tests prescribed in 7.10.13 b), there is no physical contact between the valve or the plug and any other component of the packaging other than at its original point of attachment and where, in addition, following the test prescribed in 7.16.3, the valves and the plug remain leaktight; and

ii) a high degree of quality control in the manufacture, maintenance and repair of packagings coupled with tests to demonstrate closure of each package before each shipment.

7.10.9 It must be assumed that the confinement system is closely reflected by at least 20 cm of water or such greater reflection as may additionally be provided by the surrounding material of the packaging. However, when it can be demonstrated that the confinement system remains within the packaging following the tests prescribed in 7.10.13 b), close reflection of the package by at least 20 cm of water may be assumed in 7.10.10 c).

7.10.10 The package must be subcritical under the conditions of 7.10.8 and 7.10.9, with the package conditions that result in the maximum neutron multiplication consistent with:

a) routine conditions of transport (incident free);

b) the tests specified in 7.10.12 b);

c) the tests specified in 7.10.13 b).

7.10.11:

a) The package must be subcritical under conditions consistent with the Type C package tests specified in 7.19.1 assuming reflection by at least 20 cm of water but no water-in leakage.

b) In the assessment of 7.10.10 use of special features as specified in 7.10.8 provided that leakage of water into or out of the void spaces is prevented when the package is submitted to the Type C package tests specified in 7.19.1 followed by the water leakage test specified in 7.18.3.

7.10.12 A number “N” must be derived, such that five times “N” must be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication consistent with the following:

a) There must not be anything between the packages, and the package arrangement must be reflected on all sides by at least 20 cm of water; and

b) The state of the packages must be their assessed or demonstrated condition if they had been subjected to the tests specified in 7.14.

7.10.13 A number “N” must be derived, such that two times “N” must be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication consistent with the following:

a) hydrogenous moderation between packages, and the package arrangement reflected on all sides by at least 20 cm of water; and

b) the tests specified in 7.14 followed by whichever of the following is the more limiting:

i) the tests specified in 7.16.2 b) and, either 7.16.2 c) for packages having a mass not greater than 500 kg and an overall density not greater than 1 000 kg/m^3 based on the external dimensions, or 7.16.2 a) for all other packages; followed by the test specified in 7.16.3 and completed by the tests specified in 7.18.1 to 7.18.3; or

ii) the test specified in 7.16.4; and

c) where any part of the fissile material escapes from the containment system following the tests specified in 7.10.13 b), it must be assumed that fissile material escapes from each package in the array and all of the fissile material must be arranged in the configuration and moderation that results in the maximum neutron multiplication with close reflection by at least 20 cm of water.

7.10.14 The criticality safety index (CSI) for packages containing fissile material must be obtained by dividing the number 50 by the smaller of the two values of N derived in 7.10.12 and 7.10.13 (i.e. CSI = 50/N). The value of the CSI may be zero, provided that an unlimited number of packages is subcritical (i.e. N is effectively equal to infinity in both cases).

7.11 TEST PROCEDURES AND DEMONSTRATION OF COMPLIANCE

≠ 7.11.1 Demonstration of compliance with the performance standards required in 2;7.2.3.3.1, 2;7.2.3.3.2, 2;7.2.3.4.1, 2;7.2.3.4.2, 2;7.2.3.4.3 and 6;7.1 to 6;7.10 must be accomplished by any of the methods listed below or by a combination thereof:

a) Performance of tests with specimens representing special form radioactive material, or low dispersible radioactive material or with prototypes or samples of the packaging, where the contents of the specimen or the packaging for the tests must simulate, as closely as practicable, the expected range of radioactive contents and the specimen or packaging to be tested must be prepared as presented for transport;

b) Reference to previous satisfactory demonstrations of a sufficiently similar nature;

c) Performance of tests with models of appropriate scale incorporating those features which are significant with respect to the item under investigation when engineering experience has shown results of such tests to be suitable for design purposes. When a scale model is used, the need for adjusting certain test parameters, such as penetrator diameter or compressive load, must be taken into account;

d) Calculation, or reasoned argument, when the calculation procedures and parameters are generally agreed to be reliable or conservative.

≠ 7.11.2 After the specimen, prototype or sample has been subjected to the tests, appropriate methods of assessment must be used to assure that the requirements for the test procedures have been fulfilled in compliance with the performance and acceptance standards prescribed in 2;7.2.3.3.1, 2;7.2.3.3.2, 2;7.2.3.4.1, 2;7.2.3.4.2, 2;7.2.3.4.3 and 6;7.1 to 6;7.10.

7.11.3 All specimens must be inspected before testing in order to identify and record faults or damage including the following:

a) divergence from the design;

b) defects in manufacture;

c) corrosion or other deterioration; and

d) distortion of features.

The containment system of the package must be clearly specified. The external features of the specimen must be clearly identified so that reference may be made simply and clearly to any part of such a specimen.

7.12 TESTING THE INTEGRITY OF THE CONTAINMENT SYSTEM AND SHIELDING AND EVALUATING CRITICALITY SAFETY

After each test or group of tests or sequence of the applicable tests, as appropriate, specified in 7.14 to 7.20:

a) faults and damages must be identified and recorded;

b) it must be determined whether the integrity of the containment system and shielding has been retained to the extent required in 7.1 to 7.10 for the package under test; and

c) it must be determined, for packages containing fissile material, whether the assumptions and conditions used in the assessments required by 7.10.1 to 7.10.14 for one or more packages are valid.

7.13 TARGET FOR DROP TESTS

The target for the drop tests specified in 2;7.2.3.3.5 a), 7.14.4, 7.15 a), 7.16.2 and 7.19.2 must be a flat, horizontal surface of such a character that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase the damage to the specimen.

7.14 TESTS FOR DEMONSTRATING ABILITY TO WITHSTAND NORMAL CONDITIONS OF TRANSPORT

7.14.1 The tests are: the water spray test, the free drop test, the stacking test and the penetration test. Specimens of the package must be subjected to the free drop test, the stacking test and the penetration test, preceded in each case by the water spray test. One specimen may be used for all the tests, provided that the requirements of 7.14.2 are fulfilled.

7.14.2 The time interval between the conclusion of the water spray test and the succeeding test must be such that the water has soaked in to the maximum extent, without appreciable drying of the exterior of the specimen. In the absence of any evidence to the contrary, this interval must be taken to be two hours if the water spray is applied from four directions simultaneously. No time interval must elapse, however, if the water spray is applied from each of the four directions consecutively.

7.14.3 Water spray test: the specimen must be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour.

7.14.4 Free drop test: the specimen must drop onto the target so as to suffer maximum damage in respect of the safety features to be tested.

a) The height of the drop, measured from the lowest point of the specimen to the upper surface of the target, must be not less than the distance specified in Table 6-7 for the applicable mass. The target must be as defined in 7.13;

b) For rectangular fibreboard or wood packages not exceeding a mass of 50 kg, a separate specimen must be subjected to a free drop onto each corner from a height of 0.3 m;

c) For cylindrical fibreboard packages not exceeding a mass of 100 kg, a separate specimen must be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.

Table 6-7. Free drop distance for testing packages to normal conditions of transport

Package mass (kg)	*Free drop distance (m)*
Package mass < 5 000	1.2
5 000 ≤ Package mass < 10 000	0.9
10 000 ≤ Package mass < 15 000	0.6
15 000 ≤ Package mass	0.3

7.14.5 Stacking test: unless the shape of the packaging effectively prevents stacking, the specimen must be subjected, for a period of 24 hours, to a compressive load equal to the greater of the following:

a) the equivalent of five times the maximum weight of the package; and

b) the equivalent of 13 kPa multiplied by the vertically projected area of the package.

The load must be applied uniformly to two opposite sides of the specimen, one of which must be the base on which the package would typically rest.

7.14.6 Penetration test: the specimen must be placed on a rigid, flat, horizontal surface which will not move significantly while the test is being carried out.

a) A bar of 3.2 cm in diameter with a hemispherical end and a mass of 6 kg must be dropped and directed to fall, with its longitudinal axis vertical, onto the centre of the weakest part of the specimen so that, if it penetrates sufficiently far, it will hit the containment system. The bar must not be significantly deformed by the test performance;

b) The height of the drop of the bar, measured from its lower end to the intended point of impact on the upper surface of the specimen, must be 1 m.

7.15 ADDITIONAL TESTS FOR TYPE A PACKAGES DESIGNED FOR LIQUIDS AND GASES

A specimen or separate specimens must be subjected to each of the following tests, unless it can be demonstrated that one test is more severe for the specimen in question than the other, in which case one specimen must be subjected to the more severe test.

a) Free drop test: the specimen must drop onto the target so as to suffer the maximum damage in respect of containment. The height of the drop measured from the lowest part of the specimen to the upper surface of the target must be 9 m. The target must be as defined in 7.13;

b) Penetration test: the specimen must be subjected to the test specified in 7.14.6 except that the height of the drop must be increased to 1.7 m from the 1 m specified in 7.14.6 b).

7.16 TESTS FOR DEMONSTRATING THE ABILITY TO WITHSTAND ACCIDENT CONDITIONS IN TRANSPORT

7.16.1 The specimen must be subjected to the cumulative effects of the tests specified in 7.16.2 and 7.16.3, in that order. Following these tests, either this specimen or a separate specimen must be subjected to the effect(s) of the water immersion test(s) as specified in 7.16.4 and, if applicable, 7.17.

7.16.2 Mechanical test: the mechanical test consists of three different drop tests. Each specimen must be subjected to the applicable drops as specified in 7.7.8 or 7.10.13. The order in which the specimen is subjected to the drops must be such that, on completion of the mechanical test, the specimen must have suffered such damage as will lead to the maximum damage in the thermal test which follows:

a) For drop I, the specimen must drop onto the target so as to suffer the maximum damage, and the height of the drop measured from the lowest point of the specimen to the upper surface of the target must be 9 m. The target must be as defined in 7.13;

b) For drop II, the specimen must drop onto a bar rigidly mounted perpendicularly on the target so as to suffer the maximum damage. The height of the drop measured from the intended point of impact of the specimen to the upper surface of the bar must be 1 m. The bar must be of solid mild steel of circular cross-section, (15.0 ± 0.5 cm) in diameter and 20 cm long unless a longer bar would cause greater damage, in which case a bar of sufficient length to cause maximum damage must be used. The upper end of the bar must be flat and horizontal with its edge rounded off to a radius of not more than 6 mm. The target on which the bar is mounted must be as described in 7.13;

c) For drop III, the specimen must be subjected to a dynamic crush test by positioning the specimen on the target so as to suffer maximum damage by the drop of a 500 kg mass from 9 m onto the specimen. The mass must consist of a solid mild steel plate 1 m by 1 m and must fall in a horizontal attitude. The lower face of the steel plate must have its edges and corners rounded off to a radius of not more than 6 mm. The height of the drop must be measured from the underside of the plate to the highest point of the specimen. The target on which the specimen rests must be as defined in 7.13.

7.16.3 Thermal test: the specimen must be in thermal equilibrium under conditions of an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 6-5 and subject to the design maximum rate of internal heat generation within the package from the radioactive contents. Alternatively, any of these parameters are allowed to have different values prior to and during the test, provided due account is taken of them in the subsequent assessment of package response. The thermal test must then consist of:

a) exposure of a specimen for a period of 30 minutes to a thermal environment which provides a heat flux at least equivalent to that of a hydrocarbon fuel/air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800°C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value which the package may be demonstrated to possess if exposed to the fire specified, followed by;

b) exposure of the specimen to an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 6-5 and subject to the design maximum rate of internal heat generation within the package by the radioactive contents for a sufficient period to ensure that temperatures in the specimen are decreasing in all parts of the specimen and/or are approaching initial steady-state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, provided due account is taken of them in the subsequent assessment of package response.

During and following the test, the specimen must not be artificially cooled and any combustion of materials of the specimen must be permitted to proceed naturally.

7.16.4 Water immersion test: the specimen must be immersed under a head of water of at least 15 m for a period of not less than eight hours in the attitude which will lead to maximum damage. For demonstration purposes, an external gauge pressure of at least 150 kPa must be considered to meet these conditions.

7.17 ENHANCED WATER IMMERSION TEST FOR TYPE B(U) AND TYPE B(M) PACKAGES CONTAINING MORE THAN 10^5 A_2, AND TYPE C PACKAGES

Enhanced water immersion test: the specimen must be immersed under a head of water of at least 200 m for a period of not less than one hour. For demonstration purposes, an external gauge pressure of at least 2 MPa must be considered to meet these conditions.

7.18 WATER LEAKAGE TEST FOR PACKAGES CONTAINING FISSILE MATERIAL

7.18.1 Packages for which water in-leakage or out-leakage to the extent which results in the greatest reactivity has been assumed, for purposes of assessment under 7.10.8 to 7.10.13, must be excepted from the test.

7.18.2 Before the specimen is subjected to the water leakage test specified below, it must be subjected to the tests in 7.16.2 b) and either 7.16.2 a) or c) as required by 7.10.13 and the test specified in 7.16.3.

7.18.3 The specimen must be immersed under a head of water of at least 0.9 m for a period of not less than eight hours and in the attitude for which maximum leakage is expected.

7.19 TESTS FOR TYPE C PACKAGES

7.19.1 Specimens must be subjected to the effects of each of the following test sequences in the orders specified:

a) the tests specified in 7.16.2 a), 7.16.2 c), 7.19.2 and 7.19.3; and

b) the test specified in 7.19.4.

Separate specimens are allowed to be used for each of the sequences in a) and b).

7.19.2 Puncture/tearing test: the specimen must be subjected to the damaging effects of a vertical solid probe made of mild steel. The orientation of the package specimen and the impact point on the package surface must be such as to cause maximum damage at the conclusion of the test sequence specified in 7.19.1 a).

a) The specimen, representing a package having a mass less than 250 kg, must be placed on a target and subjected to a probe having a mass of 250 kg and falling from a height of 3 m above the intended impact point. For this test, the probe must be a 20 cm in diameter cylindrical bar with the striking end forming a frustum of a right circular cone with the following dimensions: 30 cm in height and 2.5 cm in diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed must be as specified in 7.13;

b) For packages having a mass of 250 kg or more, the base of the probe must be placed on a target and the specimen dropped onto the probe. The height of the drop, measured from the point of impact with the specimen to the upper surface of the probe must be 3 m. For this test, the probe must have the same properties and dimensions as specified in a) above, except that the length and mass of the probe must be such as to incur maximum damage to the specimen. The target on which the base of the probe is placed must be as specified in 7.13.

7.19.3 Enhanced thermal test: the conditions for this test must be as specified in 7.16.3, except that the exposure to the thermal environment must be for a period of 60 minutes.

7.19.4 Impact test: the specimen must be subject to an impact on a target at a velocity of not less than 90 m/s, at such an orientation as to suffer maximum damage. The target must be as defined in 7.13, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.

7.20 TESTS FOR PACKAGINGS DESIGNED TO CONTAIN URANIUM HEXAFLUORIDE

Specimens that comprise or simulate packagings designed to contain 0.1 kg or more of uranium hexafluoride must be tested hydraulically at an internal pressure of at least 1.38 MPa but, when the test pressure is less than 2.76 MPa, the design must require multilateral approval. For re-testing packagings, any other equivalent non-destructive testing may be applied subject to multilateral approval.

7.21 APPROVALS OF PACKAGE DESIGNS AND MATERIALS

7.21.1 The approval of designs for packages containing 0.1 kg or more of uranium hexafluoride requires that:

a) each design that meets the requirements of 7.5.4 requires multilateral approval;

b) each design that meets the requirements of 7.5.1 to 7.5.3 must require unilateral approval by the competent authority of the State of Origin of the design, unless multilateral approval is otherwise required by these Instructions.

7.21.2 Each Type B(U) and Type C package design requires unilateral approval, except that:

a) a package design for fissile material, which is also subject to 5;1.2.2.1 and 7.21.4 must require multilateral approval; and

b) a Type B(U) package design for low dispersible radioactive material must require multilateral approval.

7.21.3 Each Type B(M) package design, including those for fissile material which are also subject to 5;1.2.2.1 and 7.21.4 and those for low dispersible radioactive material, must require multilateral approval.

7.21.4 Each package design for fissile material which is not excepted by any of the paragraphs 2;7.2.3.5.1 a) to f), 7.10.2 and 7.10.3 must require multilateral approval.

7.21.5 The design for special form radioactive material must require unilateral approval. The design for low dispersible radioactive material must require multilateral approval (see also 6.4.23.8 of the UN Recommendations).

7.21.6 The design for a fissile material excepted from fissile classification in accordance with 2;7.2.3.5.1 f) must require multilateral approval.

7.21.7 Alternative activity limits for an exempt consignment of instruments or articles in accordance with 2;7.2.2.2 b) must require multilateral approval.

7.22 APPLICATIONS AND APPROVALS FOR RADIOACTIVE MATERIAL TRANSPORT

See 6.4.23 of the UN Model Regulations.

7.23 REGISTRATION OF SERIAL NUMBERS AND VALIDATION

7.23.1 The competent authority must be informed of the serial number of each packaging manufactured to a design approved by them. The competent authority must maintain a register of such numbers.

7.23.2 Multilateral approval may be by validation of the original certificate issued by the competent authority of the State of Origin of the design or shipment.

7.24 TRANSITIONAL MEASURES FOR CLASS 7

≠ 7.24.1 Packages not requiring competent authority approval of design under the 1985, 1985 (As Amended 1990),1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 and 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material

≠ Packages not requiring competent authority approval of design (excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A packages) must meet these Instructions in full, except that:

a) packages that meet the requirements of the 1985 or 1985 (As Amended 1990) Editions of the IAEA Regulations for the Safe Transport of Radioactive Material:

i) may continue in transport provided that they were prepared for transport prior to 31 December 2003, and are subject to the requirements of 6.4.24.4 of the UN Model Regulations, if applicable;

ii) may continue to be used, provided that all of the following conditions are met:

1) they were not designed to contain uranium hexafluoride;

2) the applicable requirements of 1;6.3 of these Instructions are applied;

3) the activity limits and classification in Part 2;7 of these Instructions are applied;

4) the requirements and controls for transport in Parts 1, 3, 4, 5 and 7 of these Instructions are applied;

5) the packaging was not manufactured or modified after 31 December 2003.

b) packages that meet the requirements of the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 Editions of the IAEA Regulations for the Safe Transport of Radioactive Material:

i) may continue in transport provided that they were prepared for transport prior to 31 December 2025 and are subject to the requirements of 6.4.24.4 of the UN Model Regulations, if applicable; or

ii) may continue to be used, provided that all the following conditions are met:

1) the applicable requirements of 1;6.3 of these Instructions are applied;

2) the activity limits and classification in Part 2;7 of these Instructions are applied;

3) the requirements and controls for transport in Parts 1, 3, 4, 5 and 7 of these Instructions are applied; and

4) the packaging was not manufactured or modified after 31 December 2025.

≠ **7.24.2 Package designs approved under the 1985, 1985 (As amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 and 2012 Editions of the IAEA Regulations for the Safe Transport of Radioactive Material**

≠ 7.24.2.1 Packages requiring competent authority approval of the design must meet these Instructions in full except that:

a) packagings that were manufactured to a package design approved by the competent authority under the provisions of the 1985 or 1985 (As Amended 1990) Editions of the IAEA Regulations for the Safe Transport of Radioactive Material may continue to be used provided that all of the following conditions are met:

i) the package design is subject to multilateral approval;

ii) the applicable requirements of 1;6.3 of these Instructions are applied;

iii) the activity limits and classification in Part 2;7 of these Instructions are applied;

iv) the requirements and controls for transport in in Parts 1, 3, 4, 5 and 7 of these Instructions are applied;

v) for a package containing fissile material and transported by air, the requirement of 7.10.11 is met;

b) packagings that were manufactured to a package design approved by the competent authority under the provisions of the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 Editions of the IAEA Regulations for the Safe Transport of Radioactive Material may continue to be used provided that all of the following conditions are met:

i) the package design is subject to multilateral approval after 31 December 2025;

ii) the applicable requirements of 1;6.3 of these Instructions are applied;

iii) the activity limits and material restrictions of Part 2;7 of these Instructions are applied;

iv) the requirements and controls for transport in Parts 1, 3, 4, 5 and 7 of these Instructions are applied.

≠ 7.24.2.2 No new manufacture of packagings to a package design meeting the provisions of the 1985 and 1985 (As Amended 1990) Editions of the IAEA Regulations for the Safe Transport of Radioactive Material is permitted to commence.

≠ 7.24.2.3 No new manufacture of packagings of a package design meeting the provisions of the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 Editions of the IAEA Regulations for the Safe Transport of Radioactive Material is permitted to commence after 31 December 2028.

≠ **7.24.3 Special form radioactive material approved under the 1985, 1985 (As amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 and 2012 Editions of the IAEA Regulations for the Safe Transport of Radioactive Material**

≠ Special form radioactive material manufactured to a design which had received unilateral approval by the competent authority under the 1985, 1985 (As Amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 and 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material may continue to be used when in compliance with the mandatory management system in accordance with the applicable requirements of 1;6.3. There must be no new manufacture of special form radioactive material to a design that had received unilateral approval by the competent authority under the 1985 or 1985 (As amended 1990) Editions of the IAEA Regulations for the Safe Transport of Radioactive Material. No new manufacture of special form radioactive material to a design that had received unilateral approval by the competent authority under the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 and 2012 Editions of the IAEA Regulations for the Safe Transport of Radioactive Material is permitted to commence after 31 December 2025.

Chapter 8

REQUIREMENTS FOR INTERMEDIATE BULK CONTAINERS

8.1 MARKING OF PACKAGING FOR INTERMEDIATE BULK CONTAINERS

8.1.1 Intermediate bulk containers, which meet the requirements of Chapter 6.5 of the UN Recommendations, must be marked with a packaging mark.

8.1.2 The packaging mark consists of:

a) the United Nations packaging symbol (un)

For metal IBCs on which the mark is stamped or embossed, the capital letters “UN” may be applied instead of the symbol;

b) the code designating the type of IBC as shown in Packing Instruction 956 and as described in detail in Chapter 6.5 of the UN Model Recommendations;

c) a capital letter designating the packing group(s) for which the design type has been approved:

1) X for Packing Groups I, II and III;

2) Y for Packing Groups II and III;

3) Z for Packing Group III only;

d) the month and year (last two digits) of manufacture;

e) the State authorizing the allocation of the mark; indicated by the distinguishing sign used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

f) the name or symbol of the manufacturer and other identification of the IBC, as specified by the appropriate national authority;

g) the stacking test load in kg. For IBCs not designed for stacking, the figure “0” must be shown;

h) the maximum permissible gross mass in kg.

8.1.3 The maximum permitted stacking load applicable when the IBC is in use must be displayed on a symbol as shown in Figure 6-2 or Figure 6-3. The symbol must be durable and clearly visible.

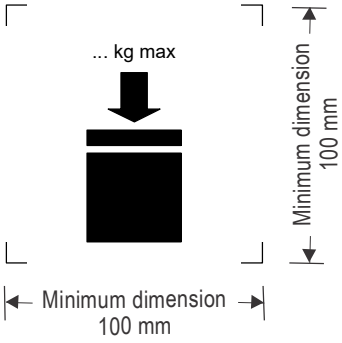


Figure 6-2. IBCs capable of being stacked

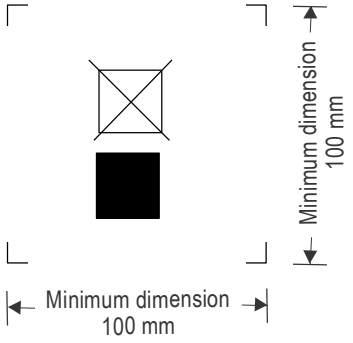


Figure 6-3. IBCs not capable of being stacked

The minimum dimensions must be 100 mm x 100 mm. The letters and numbers indicating the mass must be at least 12 mm high. The area within the printer's marks indicated by the dimensional arrows must be square. Where dimensions are not specified, all features must be in approximate proportion to those shown. The mass marked above the symbol must not exceed the load imposed during the design type test (see 6.5.6.6.4 of the UN Model Regulations) divided by 1.8.

Note.— The provisions of 8.1.3 apply to all IBCs manufactured, repaired or remanufactured as from 1 January 2011.

8.1.4 Example of a mark is:

(un)	13H3/Z/03 01	as in as in 8.1.2 a), b),c), and d)
	F/Meunier1713/0/1000	as in 8.1.2 e), f), g) and h)

Part 7

OPERATOR'S RESPONSIBILITIES

INTRODUCTORY NOTES

Note 1.— Annex 19 — *Safety Management* includes safety management provisions for air operators. Further guidance is contained in the *Safety Management Manual (SMM)* (Doc 9859).

Note 2.— The carriage of dangerous goods is included in the scope of the operator's safety management system (SMS).

Note 3.— This Part details the responsibilities of operators with regard to the acceptance, handling and loading of dangerous goods. However, nothing contained herein should be interpreted as requiring an operator to transport a particular article or substance or as preventing an operator from imposing special requirements on the transport of a particular article or substance. Also, nothing in this Part is intended to preclude a ground handling agent from carrying out some or all of the functions of an operator. However, such ground handling agents are subject to the operator's responsibilities of Part 7.

———————————

Chapter 1

ACCEPTANCE PROCEDURES

Parts of this Chapter are affected by State Variations AU 5, CA 1, CA 4, CH 3, CN 1, DK 2, FR 3, HK 1, HR 4, HR 5, IN 1, IN 2, IN 3, IR 1, IR 2, IR 4, IT 1, IT 5, MO 1, MY 2, NL 3, PL 1, RS 2, RU 2, SG 1, SG 2, UA 1, US 10, US 13, VE 7; see Table A-1

1.1 CARGO ACCEPTANCE PROCEDURES

1.1.1 Operators' acceptance staff must be adequately trained to assist them in identifying and detecting dangerous goods presented as general cargo.

1.1.2 Cargo acceptance staff should seek confirmation from shippers about the contents of any item of cargo where there are suspicions that it may contain dangerous goods, with the aim of preventing undeclared dangerous goods from being loaded on an aircraft as general cargo. Many innocuous-looking items may contain dangerous goods, and a list of general descriptions which, experience has shown, are often applied to such items is shown in Chapter 6.

Note 1.— Diamond-shaped GHS pictograms on packages may indicate the presence of dangerous goods. While some pictograms identify substances that only pose a hazard for supply and use, other GHS pictograms contain symbols that are largely equivalent to the symbols contained in the hazard labels used in transport, and which may therefore be classified as dangerous goods. For more information, see http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html.

Note 2.— Often general names are used in the description of the content of a cargo shipment. To assist in the detection of undeclared dangerous goods, acceptance staff should check shipping documents with the general description stated on the air waybill and, if necessary, request documentary evidence from shippers that the shipment does not contain dangerous goods.

1.2 ACCEPTANCE OF DANGEROUS GOODS BY OPERATORS

1.2.1 An operator must not accept for transport aboard an aircraft a package or overpack containing dangerous goods or a freight container containing radioactive material or a unit load device containing the dangerous goods as described in 1.4.1 b) and c) unless:

a) it is accompanied by two copies of the dangerous goods transport document; or

b) the information applicable to the consignment is provided in electronic form; or

c) it is accompanied, where permitted, by alternative documentation.

1.2.2 Where a dangerous goods transport document is provided in accordance with 1.2.1 a), one copy must accompany the consignment to final destination and one copy must be retained by the operator at a location on the ground where it will be possible to obtain access to it within a reasonable period; the document must be retained at this point until the goods have arrived at final destination, after which time it may be stored elsewhere.

1.2.3 When the information applicable to the consignment is provided in electronic form, the information must be available to the operator at all times during transport to final destination. The data must be able to be produced as a paper document without delay. When a paper document is produced, the data must be presented as required by 5;4.

1.3 THE ACCEPTANCE CHECK

1.3.1 Before a consignment consisting of a package or overpack containing dangerous goods, a freight container containing radioactive material or a unit load device containing dangerous goods as described in 1.4 is first accepted for carriage by air, the operator must, by use of a checklist, verify the following:

a) the documentation or, when provided, the electronic data, complies with the detailed requirements specified in 5;4;

b) the quantity of dangerous goods stated on the dangerous goods transport document is within the limits per package on a passenger or cargo aircraft as appropriate;

c) the package, overpack or freight container marks accord with the details stated on the accompanying dangerous goods transport document and are clearly visible;

d) where required, the letter in the packaging specification mark designating the packing group for which the design type has been successfully tested is appropriate for the dangerous goods contained within. This does not apply to overpacks where the specification mark is not visible;

e) proper shipping names, UN numbers, labels, and special handling instructions appearing on the interior package(s) are clearly visible or reproduced on the outside of an overpack;

f) the labelling of the package, overpack or freight container is as required by 5;3;

g) the outer packaging of a combination packaging or the single packaging is permitted by the applicable packing instruction, and, when visible, is of the type stated on the accompanying dangerous goods transport document;

h) the package or overpack does not contain different dangerous goods which require segregation from each other according to Table 7-1; and

i) the package, overpack, freight container or unit load device is not leaking and there is no indication that its integrity has been compromised.

1.3.2 The operator must be able to identify the person who performed the acceptance check.

Note 1.— Minor discrepancies, such as the omission of dots and commas in the proper shipping name appearing on the transport document or on package marks, or minor variations in hazard labels which do not affect the obvious meaning of the label, are not considered as errors if they do not compromise safety and should not be considered as reason for rejecting a consignment.

Note 2.— Where packages are contained in an overpack or freight container, as permitted by 1.4, the checklist should establish the correct marking and labelling of such an overpack or freight container and not the individual packages contained in them. Where packages are contained in a unit load device, as permitted by 1.4.1, the checklist should not require the checking of packages individually for the correct marking and labelling.

Note 3.— An acceptance check is not required for dangerous goods in excepted quantities and radioactive material in excepted packages.

Note 4.— Although the acceptance check required in 1.3.1 is only required to be conducted when a consignment of dangerous goods is first accepted for carriage by air, the operator of any subsequent aircraft used as part of the same journey should verify that packages, overpacks, freight containers or unit load devices continue to meet the requirements of these Instructions in respect of marking, labelling and inspection for damage.

1.4 ACCEPTANCE OF FREIGHT CONTAINERS AND UNIT LOAD DEVICES

1.4.1 An operator must not accept from a shipper a freight container or a unit load device containing dangerous goods other than:

a) a freight container for radioactive material (see 6;7.1);

b) a unit load device containing consumer commodities prepared according to Packing Instruction Y963;

c) a unit load device containing dry ice used as a refrigerant for other than dangerous goods prepared according to Packing Instruction 954 provided that the unit load device does not contain dangerous goods other than UN 3373, **Biological substance, Category B** or ID 8000, **Consumer commodity** or goods not subject to these Instructions; or

d) a unit load device containing magnetized material.

1.4.2 When an operator accepts a unit load device containing consumer commodities or dry ice as permitted by 1.4.1, the operator must attach an identification tag as required by 2.8.1 to the unit load device.

1.5 SPECIAL RESPONSIBILITIES IN ACCEPTING INFECTIOUS SUBSTANCES

1.5.1 Routing

Whatever the mode used, transport must be made by the quickest possible routing. If trans-shipment is necessary, precautions must be taken to ensure special care, expeditious handling and monitoring of the substances in transit.

1.6 UNDELIVERABLE CONSIGNMENTS OF RADIOACTIVE MATERIAL

Where a consignment is undeliverable, the consignment must be placed in a safe location and the appropriate competent authority must be informed as soon as possible and a request made for instructions on further action.

1.7 CONDUCTING SAFETY RISK ASSESSMENTS

Operators must include the transport of dangerous goods, including lithium batteries and cells as cargo, in the scope of their:

a) safety management system (SMS) in accordance with Annex 19; and

b) specific safety risk assessment on the transport of items in the cargo compartment in accordance with Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*.

Note 1.— Guidance on implementation of an SMS is contained in the Safety Management Manual (SMM) *(Doc 9859).*

Note 2.— Guidance on the conduct of a specific safety risk assessment on the transport of items in the cargo compartment is contained in the Cargo Compartment Operational Safety Manual *(Doc 10102)*.

+ *Note 3.— Specific guidance on safety risk assessments related to consignments containing COVID-19 pharmaceuticals is provided at www.icao.int/safety/OPS/OPS-Normal/Pages/Safety-transport-vaccines.aspx.*

Chapter 2

STORAGE AND LOADING

Parts of this Chapter are affected by State Variations CA 1, CA 4, IR 2, IR 4, JP 10, JP 11, JP 12, US 15; see Table A-1

2.1 LOADING RESTRICTIONS ON THE FLIGHT DECK AND FOR PASSENGER AIRCRAFT

2.1.1 Dangerous goods must not be carried in an aircraft cabin occupied by passengers or on the flight deck of an aircraft, except as permitted by 1;2.2.1 and 8;1 and for radioactive material, excepted packages under 2;7.2.4.1.1. Dangerous goods may be carried in a main deck cargo compartment of a passenger aircraft provided that compartment meets all the certification requirements for a Class B or a Class C aircraft cargo compartment. Dangerous goods bearing the “Cargo aircraft only” label must not be carried on a passenger aircraft.

2.1.2 Under the conditions specified in S-7;2.2 of the Supplement, the State of Origin and the State of the Operator may approve the transport of dangerous goods in main deck cargo compartments of passenger aircraft that do not meet the requirements in 2.1.1.

Note.— Cargo compartment classification is described in the ICAO document Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (Doc 9481).

2.1.3 For additional requirements concerning the loading of dangerous goods for carriage by helicopters, see Part 7;7.

2.2 INCOMPATIBLE DANGEROUS GOODS

2.2.1 Segregation

2.2.1.1 Packages containing dangerous goods which might react dangerously one with another must not be stowed on an aircraft next to each other or in a position that would allow interaction between them in the event of leakage. As a minimum, the segregation scheme shown in Table 7-1 must be followed in order to maintain acceptable segregation between packages containing dangerous goods having different hazards. The scheme applies irrespective of whether the hazard is the primary or subsidiary hazard.

2.2.1.2 Packages and overpacks containing UN 3480 — **Lithium ion batteries** prepared in accordance with Section IA or Section IB of Packing Instruction 965 and packages and overpacks containing UN 3090 — **Lithium metal batteries** prepared in accordance with Section IA or Section IB of Packing Instruction 968 must not be stowed on an aircraft next to, or in a position that would allow interaction with, packages or overpacks containing dangerous goods which bear a Class 1, other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1 hazard label. To maintain acceptable segregation between packages and overpacks, the segregation requirements shown in Table 7-1 must be followed. The segregation requirements apply based on all hazard labels applied on the package or overpack, irrespective of whether the hazard is the primary or subsidiary hazard.

2.2.2 Separation of explosive substances and articles

2.2.2.1 Only explosives in Division 1.4, Compatibility Group S, are permitted to be transported on passenger aircraft. Only the following explosives may be transported on a cargo aircraft:

Division 1.3: Compatibility Groups C, G

Division 1.4: Compatibility Groups B, C, D, E, G, S.

2.2.2.2 The extent to which explosives may be stowed together in an aircraft is determined by their “compatibility”. Explosives are considered to be compatible if they can be stowed together without significantly increasing either the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident.

2.2.2.3 Explosives in Compatibility Group S may be stowed with explosives in all compatibility groups.

2.2.2.4 For explosives of different division numbers and compatibility groups, the separation scheme shown in Table 7-2 must be followed in order to maintain acceptable distances between such packages.

Table 7-1. Segregation between packages

	Class or division										
Hazard label	*1*	*2.1*	*2.2, 2.3*	*3*	*4.1*	*4.2*	*4.3*	*5.1*	*5.2*	*8*	*9 see 2.2.1.2*
1	Note 1	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
2.1	Note 2	—	—	—	—	—	—	—	—	—	x
2.2, 2.3	Note 2	—	—	—	—	—	—	—	—	—	—
3	Note 2	—	—	—	—	—	—	x	—	—	x
4.1	Note 2	—	—	—	—	—	—	—	—	—	x
4.2	Note 2	—	—	—	—	—	—	x	—	—	—
4.3	Note 2	—	—	—	—	—	—	—	—	x	—
5.1	Note 2	—	—	x	—	x	—	—	—	—	x
5.2	Note 2	—	—	—	—	—	—	—	—	—	—
8	Note 2	—	—	—	—	—	x	—	—	—	—
9 see 2.2.1.2	Note 2	x	—	x	x	—	—	x	—	—	—

An “x” at the intersection of a row and column indicates that packages containing these classes of dangerous goods may not be stowed next to or in contact with each other, or in a position which would allow interaction in the event of leakage of the contents. Thus, a package containing Class 3 dangerous goods may not be stowed next to or in contact with a package containing Division 5.1 dangerous goods.

Note 1.— See 2.2.2.2 through 2.2.2.4.

Note 2.— This class or division must not be stowed together with explosives other than those in Division 1.4, Compatibility Group S.

Note 3.— Packages containing dangerous goods with multiple hazards in the class or divisions which require segregation in accordance with Table 7-1 need not be segregated from other packages bearing the same UN number.

Note 4. — UN 3528, ***Engines, internal combustion, flammable liquid powered****,* ***Engines, fuel cell, flammable liquid powered****,* ***Machinery internal combustion, flammable liquid powered*** *and* ***Machinery, fuel cell, flammable liquid powered*** *need not be segregated from packages containing dangerous goods in Division 5.1.*

Table 7-2. Separation of explosive substances and articles

Division and compatibility group	1.3C	1.3G	1.4B	1.4C	1.4D	1.4E	1.4G	1.4S
1.3C			x					
1.3G			x					
1.4B	x	x		x	x	x	x	
1.4C			x					
1.4D			x					
1.4E			x					
1.4G			x					
1.4S								

An “x” at the intersection of a row and column indicates that explosives of these divisions and compatibility groups must be loaded into separate unit load devices and, when stowed aboard the aircraft, the unit load devices must be separated by other cargo with a minimum separation distance of 2 m. When not loaded in a unit load device, these explosives must be loaded into different, non-adjacent loading positions and separated by other cargo with a minimum separation distance of 2 m.

2.3 HANDLING AND LOADING OF PACKAGES CONTAINING LIQUID DANGEROUS GOODS

During the course of air transport, a package of dangerous goods bearing the package orientation label prescribed in 5;3 must be loaded and stowed aboard an aircraft and handled at all times in accordance with such a label. Single packagings with end closures containing liquid dangerous goods must be loaded and stowed aboard an aircraft with those closures upwards, notwithstanding that such single packages may also have side closures.

2.4 LOADING AND SECURING OF DANGEROUS GOODS

2.4.1 Loading of cargo aircraft

2.4.1.1 Packages or overpacks of dangerous goods bearing the “Cargo aircraft only” label must be loaded for carriage by a cargo aircraft in accordance with one of the following provisions:

a) in a Class C aircraft cargo compartment; or

b) in a unit load device equipped with a fire detection/suppression system equivalent to that required by the certification requirements of a Class C aircraft cargo compartment as determined by the appropriate national authority (a ULD that is determined by the appropriate national authority to meet the Class C aircraft cargo compartment standards must include “Class C compartment” on the ULD tag); or

c) in such a manner that in the event of an emergency involving such packages or overpacks, a crew member or other authorized person can access those packages or overpacks, and can handle and, where size and mass permit, separate such packages or overpacks from other cargo; or

d) external carriage by a helicopter; or

e) with the approval of the State of the Operator, for helicopter operations, in the cabin (see Part S-7;2.4 of the Supplement).

Note.— Cargo compartment classification is described in the ICAO document Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods *(Doc 9481).*

2.4.1.2 The requirements of 2.4.1.1 a), b) or c) do not apply to:

a) flammable liquids (Class 3), Packing Group III, other than those with a subsidiary hazard of Class 8;

b) toxic substances (Division 6.1) with no subsidiary hazard other than Class 3;

c) infectious substances (Division 6.2);

d) radioactive material (Class 7);

e) miscellaneous dangerous goods (Class 9);

f) UN 3528 — **Engine, internal combustion, flammable liquid powered** or **Engine, fuel cell, flammable liquid powered** or **Machinery, internal combustion, flammable liquid powered** or **Machinery, fuel cell, flammable liquid powered**; and

g) UN 3529 — **Engine, internal combustion, flammable gas powered** or **Engine, fuel cell, flammable gas powered** or **Machinery, internal combustion, flammable gas powered** or **Machinery, fuel cell, flammable gas powered**.

Note — When transporting goods in a non-pressurized cargo compartment, there will be a large pressure differential up to 75 kPa at cruise altitudes. Packages that are filled at a normal atmospheric pressure may not be capable of withstanding this pressure differential. Confirmation of the suitability of the packagings from the shipper should be obtained.

2.4.2 Securing of dangerous goods

The operator must secure dangerous goods in the aircraft in a manner that will prevent any movement. For packages or overpacks containing radioactive material, the securing must be adequate to ensure that the separation requirements in 2.9 are met at all times.

2.4.3 General loading requirements

When dangerous goods subject to the provisions herein are loaded in an aircraft, the operator must protect the packages of dangerous goods from being damaged, including by the movement of baggage, mail, stores or other cargo. Particular attention must be paid to the handling of packages during their preparation for transport, the type of aircraft on which they are to be carried and the method required to load that aircraft, so that accidental damage is not caused through dragging or mishandling of the packages.

2.5 DAMAGED PACKAGES OF DANGEROUS GOODS

Where any package of dangerous goods loaded on an aircraft appears to be damaged or leaking, the operator must remove such package from the aircraft, or arrange for its removal by an appropriate authority or organization, and thereafter arrange for its safe disposal. In the case of a package which appears to be leaking, the operator must ensure the remainder of the consignment is in a proper condition for transport by air and that no other package, baggage or cargo has been contaminated. See 3.1 and 3.2 of this Part concerning action to be taken in the event of damage to packages containing infectious substances in Class 6 and radioactive materials in Class 7.

2.6 VISIBILITY OF MARKINGS AND LABELS

During the course of air transport, including storage, markings and labels required by these Instructions must not be covered or obscured by any part of or attachment to the packaging or any other label or marking.

≠ 2.7 REPLACEMENT OF MARKS AND LABELS

≠ When an operator discovers that any of the marks required by 5;2.4.9, 5;2.4.11, 5;2.4.12 or 5;2.4.16 or labels for packages of dangerous goods have become lost, detached or illegible the operator must replace them with appropriate marks or labels in accordance with the information provided on the dangerous goods transport document or other transport document, such as an air waybill, when applicable.

2.8 IDENTIFICATION OF UNIT LOAD DEVICES CONTAINING DANGEROUS GOODS

2.8.1 Each unit load device containing dangerous goods which require a class hazard label must display an identification tag on its exterior indicating that dangerous goods are contained within the unit load device, unless those hazard class labels are themselves visible.

2.8.2 The identification tag must:

a) have a border of prominent red hatchings on both sides and be visible at all times;

b) have minimum dimensions of 148 mm × 210 mm; and

c) be legibly marked with the primary and subsidiary hazard class(es) or division(s) numbers of such dangerous goods.

2.8.3 When placed inside a protective tag holder, the information on the identification tag must be legible and visible.

2.8.4 If the unit load device contains packages bearing the “Cargo aircraft only” label, either that label must be visible or the identification tag must indicate that the unit load device can be loaded only on a cargo aircraft.

2.8.5 The identification tag must be removed from the unit load device immediately after the dangerous goods have been unloaded.

2.9 SPECIAL PROVISIONS APPLICABLE TO THE CARRIAGE OF RADIOACTIVE MATERIAL

2.9.1 Limitation of exposure of persons to radiation

2.9.1.1 The radiation exposure of transport and storage personnel must be so controlled that none of them are likely to receive a radiation dose in excess of that permitted for members of the public. In special cases, arrangements may be made with the competent authority for radiological control to have such personnel classified as radiation workers and to comply with the necessary provisions.

2.9.1.2 All relevant transport and storage personnel must receive such instructions as are necessary concerning the hazards involved and the precautions to be observed.

2.9.1.3 The practice should be followed of keeping exposure to radiation as low as reasonably achievable. The separation distances shown in Tables 7-3 and 7-4 are minimum values, and greater distances should be used where feasible. As far as possible, packages of radioactive materials stowed in underfloor cargo compartments of passenger aircraft should be placed on the compartment floor.

Note.— The separation distances from packages of radioactive material to passengers specified in Table 7-3 are based on a 0.02 mSv/h reference dose rate at a seat height of 0.4 m.

2.9.2 Activity limits

The total activity in all aircraft, for carriage of LSA material or SCO in Type IP-1, Type IP-2, Type IP-3, must not exceed the limits shown in Table 7-5.

2.9.3 Stowage during transport and storage in transit

2.9.3.1 Consignments must be securely stowed.

2.9.3.2 Provided that its average surface heat flux does not exceed 15 W/m^2 and that the immediately surrounding cargo is not in sacks or bags, a package or overpack may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the competent authority in an applicable certificate of approval.

2.9.3.3 Loading of freight containers and accumulation of packages, overpacks and freight containers must be controlled as follows:

a) Except under the condition of exclusive use, the total number of packages, overpacks and freight containers aboard a single aircraft must be so limited that the total sum of the transport indexes aboard the aircraft does not exceed the values shown in Table 7-6. For consignments of LSA-I material, there is no limit on the sum of the transport indexes;

b) Where a consignment is transported under exclusive use, there is no limit on the sum of the transport indexes aboard a single aircraft, but the requirement on minimum separation distances established in 2.9.6 applies;

c) The dose rate under routine conditions of transport must not exceed 2 mSv/h at any point on the external surface of the aircraft;

d) The total sum of the criticality safety indexes in a freight container and aboard an aircraft must not exceed the values shown in Table 7-7.

2.9.3.4 Any package or overpack having either a transport index greater than 10, or any consignment having a criticality safety index greater than 50, must be transported only under exclusive use.

2.9.4 Additional requirements relating to transport and storage during transit of fissile material

2.9.4.1 Any group of packages, overpacks and freight containers containing fissile material stored in transit in any one storage area must be so limited that the total sum of the criticality safety indexes in the group does not exceed 50. Each group must be stored so as to maintain a spacing of at least 6 m from other such groups.

Table 7-3. Minimum distance from surface of packages, overpacks and freight containers of radioactive material to the nearest inside surface of passenger cabin or flight deck partitions or floors, irrespective of carriage duration

Total sum of transport indexes	*Minimum distance (metres)*
0.1 – 1.0	0.30
1.1 – 2.0	0.50
2.1 – 3.0	0.70
3.1 – 4.0	0.85
4.1 – 5.0	1.00
5.1 – 6.0	1.15
6.1 – 7.0	1.30
7.1 – 8.0	1.45
8.1 – 9.0	1.55
9.1 – 10.0	1.65
10.1 – 11.0	1.75
11.1 – 12.0	1.85
12.1 – 13.0	1.95

Total sum of transport indexes	*Minimum distance (metres)*
13.1 – 14.0	2.05
14.1 – 15.0	2.15
15.1 – 16.0	2.25
16.1 – 17.0	2.35
17.1 – 18.0	2.45
18.1 – 20.0	2.60
20.1 – 25.0	2.90
25.1 – 30.0	3.20
30.1 – 35.0	3.50
35.1 – 40.0	3.75
40.1 – 45.0	4.00
45.1 – 50.0	4.25

If more than one package, overpack or freight container is placed in the aircraft, the minimum separation distance for each individual package, overpack or freight container must be determined in accordance with the above table, on the basis of the sum of the transport index numbers of the individual packages, overpacks or freight containers. Alternatively, if the packages, overpacks or freight containers are separated into groups, the minimum distance from the nearest inside surface of the passenger cabin or flight deck partitions or floors to each group is the distance applicable to the sum of the transport indexes within the individual groups, provided that each group is separated from each other group by at least three times the distance applicable to the one that has the larger sum of transport indexes.

Note.— For total sum of transport indexes over 50 to be carried by cargo aircraft only, see Table 7-4.

Table 7-4. Minimum distance from surface of packages, overpacks and freight containers of radioactive material, carried by cargo aircraft only, to the nearest inside surface of the flight deck partitions or floor, or other areas occupied by personnel, irrespective of carriage duration

Total sum of transport indexes	*Minimum distance (metres)*	*Total sum of transport indexes*	*Minimum distance (metres)*
50.1 – 60.0	4.65	180.1 – 190.0	8.55
60.1 – 70.0	5.05	190.1 – 200.0	8.75
70.1 – 80.0	5.45	200.1 – 210.0	9.00
80.1 – 90.0	5.80	210.1 – 220.0	9.20
90.1 – 100.0	6.10	220.1 – 230.0	9.40
100.1 – 110.0	6.45	230.1 – 240.0	9.65
110.1 – 120.0	6.70	240.1 – 250.0	9.85
120.1 – 130.0	7.00	250.1 – 260.0	10.05
130.1 – 140.0	7.30	260.1 – 270.0	10.25
140.1 – 150.0	7.55	270.1 – 280.0	10.40
150.1 – 160.0	7.80	280.1 – 290.0	10.60
160.1 – 170.0	8.05	290.1 – 300.0	10.80
170.1 – 180.0	8.30		

If more than one package, overpack or freight container is placed in the aircraft, the minimum separation distance for each individual package, overpack or freight container must be determined in accordance with the above table, on the basis of the sum of the transport index numbers of the individual packages, overpacks or freight containers. Alternatively, if the packages, overpacks or freight containers are separated into groups, the minimum distance from the nearest inside surface of the flight deck partition or floor to each group is the distance applicable to the sum of transport indexes within the individual groups, provided that each group is separated from each other group by at least three times the distance applicable to the one that has the larger sum of transport indexes.

Note.— For smaller sums of transport indexes, see Table 7-3. Distances for total sum of transport indexes over 200 apply to exclusive use only.

Table 7-5. Aircraft activity limits for LSA material and SCO in industrial packages

Nature of material	*Activity limit for aircraft*
LSA-I	No limit
LSA-II and LSA-III non-combustible solids	No limit
LSA-II and LSA-III combustible solids, and all liquids and gases	100 A_2
SCO	100 A_2

Table 7-6. Transport index limits for freight containers and aircraft not under exclusive use

Type of freight container or aircraft	*Limit on total sum of transport indexes in a freight container or aboard an aircraft*
Freight container	
Small freight container	50
Large freight container	50
Aircraft	
Passenger	50
Cargo	200

Table 7-7. Critical safety indexes limits for freight containers and aircraft containing fissile material

	Limit on total sum of criticality safety indexes in a freight container or aboard an aircraft	
Type of freight container or aircraft	*Not under exclusive use*	*Under exclusive use*
Freight container		
Small freight container	50	n.a.
Large freight container	50	100
Aircraft		
Passenger	50	n.a.
Cargo	50	100

2.9.4.2 Where the total sum of the criticality safety indexes on board an aircraft or in a freight container exceeds 50, as permitted in Table 7-7, storage must be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or freight containers containing fissile material or other conveyances carrying radioactive material.

2.9.4.3 Fissile material meeting one of the provisions in a) to f) of 2;7.2.3.5.1 must meet the following requirements:

a) only one of the provisions in a) to f) of 2;7.2.3.5.1 is allowed per consignment;

b) only one approved fissile material in packages classified in accordance with 2;7.2.3.5.1 f) is allowed per consignment unless multiple materials are authorized in the certificate of approval;

c) fissile material in packages classified in accordance with 2;7.2.3.5.1 c) must be transported in a consignment with no more than 45 g of fissile nuclides;

d) fissile material in packages classified in accordance with 2;7.2.3.5.1 d) must be transported in a consignment with no more than 15 g of fissile nuclides;

e) fissile material classified in accordance with 2;7.2.3.5.1 e) must be transported under exclusive use on an aircraft with no more than 45 g of fissile nuclides.

2.9.5 Transport by air

2.9.5.1 Type B(M) packages and consignments under exclusive use must not be transported on passenger aircraft.

2.9.5.2 Vented Type B(M) packages, packages which require external cooling by an ancillary cooling system, packages subject to operational controls during transport, and packages containing liquid pyrophoric materials must not be transported by air.

2.9.5.3 Packages or overpacks having a surface dose rate greater than 2 mSv/h must not be transported by air except by special arrangement.

2.9.5.4 Except in the case of shipment under special arrangement, mixing of packages of different kinds of radioactive material, including fissile material, and mixing of different kinds of packages with different transport indexes is permitted without specific competent authority approval. In the case of shipments under special arrangement, mixing is not permitted except as specifically authorized under the special arrangement.

2.9.6 Separation

2.9.6.1 *Separation from persons*

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from persons. The minimum separation distances to be applied are shown in Tables 7-3 and 7-4 and these distances are from the surface of the packages, overpacks or freight containers to the nearest inside surface of the passenger cabin or flight deck partitions or floors, irrespective of the duration of the carriage of the radioactive material. Table 7-4 applies only when radioactive material is being carried by a cargo aircraft, and in those circumstances the minimum distances must be applied as above and also to any other areas occupied by persons.

2.9.6.2 *Separation from undeveloped photographic film*

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from undeveloped photographic films or plates. The minimum separation distances to be applied are shown in Table 7-8 and these distances are from the surface of the packages, overpacks or freight containers to the surface of the packages of undeveloped photographic films or plates.

2.9.6.3 *Separation from live animals*

Categories II — Yellow and III — Yellow packages, overpacks or freight containers must be separated from live animals by a distance of at least 0.5 metres for journeys not exceeding 24 hours, and by a distance of at least 1.0 metres for journeys longer than 24 hours.

2.10 LOADING OF MAGNETIZED MATERIAL

Magnetized material must be loaded so that headings of aircraft compasses are maintained within the tolerances prescribed by the applicable aircraft airworthiness requirements and, where practical, in locations minimizing possible effects on compasses. Multiple packages may produce a cumulative effect. For magnetized material transported under the conditions of an approval described in Packing Instruction 953, loading must be in accordance with conditions specified in the authorizing approval.

Note.— Masses of ferro-magnetic metals such as automobiles, automobile parts, metal fencing, piping and metal construction material, even if not meeting the definition of magnetized materials may affect aircraft compasses, as may packages or items which individually do not meet the definition of magnetized material but cumulatively may have a magnetic field strength of a magnetized material.

Table 7-8. Minimum distance in metres from surface of each package, overpack or freight container of radioactive material to undeveloped photographic films or plates, for carriage lasting up to 48 hours

Total sum of transport indexes	*Duration of carriage*					
	2 hours or less	*2-4 hours*	*4-8 hours*	*8-12 hours*	*12-24 hours*	*24-48 hours*
1	0.4	0.6	0.9	1.1	1.5	2.2
2	0.6	0.8	1.2	1.5	2.2	3.1
3	0.7	1.0	1.5	1.8	2.6	3.8
4	0.8	1.2	1.7	2.2	3.1	4.4
5	0.8	1.3	1.9	2.4	3.4	4.8
10	1.4	2.0	2.8	3.5	4.9	6.9
20	2.0	2.8	4.0	4.9	6.9	10.0
30	2.4	3.5	4.9	6.0	8.6	12.0
40	2.9	4.0	5.7	6.9	10.0	14.0
50	3.2	4.5	6.3	7.9	11.0	16.0

Note.— The above is calculated so that the radiation dose received by the films does not exceed 0.1 mSv (10 mrem).

2.11 LOADING OF DRY ICE

2.11.1 Dry ice (carbon dioxide, solid), when shipped by itself or when used as a refrigerant for other commodities, may be carried provided the operator has made suitable arrangements dependent on the aircraft type, the aircraft ventilation rates, the method of packing and stowing, whether animals will be carried on the same flight, and other factors. The operator must ensure that ground staff are informed that the dry ice is being loaded or is on board the aircraft.

2.11.2 Where dry ice is contained in a unit load device prepared by a single shipper in accordance with Packing Instruction 954 and the operator, after acceptance, adds additional dry ice, then the operator must ensure that the information provided to the pilot-in-command reflects that revised quantity of dry ice.

Note.— For arrangements between the shipper and operator see Packing Instruction 954.

2.12 LOADING OF UN 2211, POLYMERIC BEADS, EXPANDABLE OR UN 3314, PLASTICS MOULDING COMPOUND

A total of not more than 100 kg net mass of expandable polymeric beads (or granules), or plastic moulding materials, referenced to Packing Instruction 957, may be carried in any inaccessible cargo compartment on any aircraft.

2.13 LOADING OF BATTERY-POWERED MOBILITY AIDS CARRIED UNDER THE PROVISIONS OF PART 8

2.13.1 Loading of mobility aids powered by non-spillable wet batteries or batteries which comply with Special Provision A123 or A199

≠ 2.13.1.1 An operator must secure, by use of straps, tie-downs or other restraint devices, a battery-powered mobility aid with installed battery(ies). The mobility aid, the battery(ies), electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo.

2.13.1.2 An operator must verify that:

≠ a) the passenger has confirmed that the battery(ies) is:

1) a non-spillable wet battery that complies with Special Provision A67;

2) a dry battery that complies with Special Provision A123; or

3) a nickel-metal hydride battery that complies with Special Provision A199;

b) the battery terminals are protected from short circuits (e.g. by being enclosed within a battery container);

≠ c) the battery(ies) is either:

1) adequately protected against damage by the design of the mobility aid and securely attached to the mobility aid. The electrical circuits must be isolated following the manufacturer's instructions; or

2) removed from the mobility aid, following the manufacturer's instructions; and

d) a maximum of one non-spillable wet spare battery is carried per passenger.

2.13.1.3 An operator must ensure that any battery(ies) removed from the mobility aid and any spare battery are carried in strong, rigid packagings, protected from short circuit and stowed in the cargo compartment.

≠ 2.13.1.4 The operator must inform the pilot-in-command of the location of any mobility aids with installed battery(ies), removed battery(ies) and spare battery(ies).

2.13.2 Loading of mobility aids powered by spillable batteries

≠ 2.13.2.1 An operator must secure, by use of straps, tie-downs or other restraint devices, a battery-powered mobility aid with installed battery(ies). The mobility aid, the battery(ies), electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo.

≠ 2.13.2.2 An operator must verify that:

a) the battery terminals are protected from short circuits (e.g. by being enclosed within a battery container);

b) the battery(ies) is fitted, where feasible, with spill resistant-vent caps; and

c) the battery(ies) is either:

1) adequately protected against damage by the design of the mobility aid and securely attached to the mobility aid. The electrical circuits must be isolated following the manufacturer's instructions; or

2) removed from the mobility aid, following the manufacturer's instructions when required by 2.13.2.3.

≠ 2.13.2.3 An operator must load, stow, secure, and unload a spillable battery-powered mobility aid in an upright position. If the mobility aid cannot be loaded, stowed, secured and unloaded always in an upright position or if the mobility aid does not adequately protect the battery(ies), the operator must remove the battery(ies) and carry it (them) in strong, rigid packagings, as follows:

a) packagings must be leak-tight, impervious to battery fluid and be protected against being overturned by securing them to pallets or by securing them in cargo compartments using appropriate means of securement;

b) battery(ies) must be protected against short circuits, secured upright in these packagings and surrounded by compatible absorbent material sufficient to absorb its (their) total liquid contents; and

c) packagings must be marked “Battery, wet, with wheelchair” or “Battery, wet, with mobility aid” and be labelled with a Corrosive” label (Figure 5-24) and with package orientation labels (Figure 5-29) as required by 5;3.

2.13.2.4 The operator must inform the pilot-in-command of the location of any mobility aids with installed spillable battery(ies) and removed battery(ies).

2.13.3 Loading of mobility aids powered by lithium ion batteries

≠ 2.13.3.1 An operator must secure, by use of straps, tie-downs or other restraint devices, a battery-powered mobility aid with installed battery(ies). The mobility aid, the battery(ies), electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo.

≠ 2.13.3.2 An operator must verify that:

a) the battery terminals are protected from short circuits (e.g. by being enclosed within a battery container);

b) the battery(ies) is either:

1) adequately protected against damage by the design of the mobility aid and securely attached to the mobility aid. The electrical circuits must be isolated following the manufacturer's instructions; or

2) removed from the mobility aid, following the manufacturer's instructions; and

c) each removed battery does not exceed 300 Wh. A maximum of one spare battery not exceeding 300 Wh or two spare batteries each not exceeding 160 Wh may be carried.

≠ 2.13.3.3 An operator must ensure that any battery(ies) removed from the mobility aid and any spare battery(ies) is (are) carried in the cabin and protected from damage (e.g., by placing each battery in a protective pouch) and the battery terminals protected from short circuit (by insulating the terminals, e.g. by taping over exposed terminals).

≠ 2.13.3.4 The operator must inform the pilot-in-command of the location of any mobility aids with installed lithium ion battery(ies), removed battery(ies) and spare battery(ies).

2.14 HANDLING OF SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES

During the course of transport, packages or unit load devices containing self-reactive substances of Division 4.1 or organic peroxides of Division 5.2 must be shaded from direct sunlight, stored away from all sources of heat in a well-ventilated area.

2.15 HANDLING AND LOADING OF INTERMEDIATE BULK CONTAINERS (IBCs)

During handling and loading of intermediate bulk containers (IBCs), account must be taken of the IBC markings specified in 6;2.4.3, if present.

Chapter 3

INSPECTION AND DECONTAMINATION

Parts of this Chapter are affected by State Variations AE 4, CA 4, FR 4, GH 4, IT 4, OM 6, VE 2; see Table A-1

3.1 INSPECTION FOR DAMAGE OR LEAKAGE

3.1.1 It is the operator's responsibility to ensure that a package or overpack containing dangerous goods is not loaded onto an aircraft or into a unit load device unless it has been inspected immediately prior to loading and found free from evidence of leakage or damage.

3.1.2 A unit load device must not be loaded aboard an aircraft unless the device has been inspected and found free from any evidence of leakage from or damage to any dangerous goods contained therein.

3.1.3 Packages or overpacks containing dangerous goods must be inspected for signs of damage or leakage upon unloading from the aircraft or unit load device. If evidence of damage or leakage is found, the position where the dangerous goods or unit load device was stowed on the aircraft must be inspected for damage or contamination and any hazardous contamination removed. The special responsibilities of operators regarding infectious substances are detailed in 3.1.4.

3.1.4 If any person responsible for the carriage of packages containing infectious substances becomes aware of damage to or leakage from such a package, that person must:

a) avoid handling the package or keep handling to a minimum;

b) inspect adjacent packages for contamination and put aside any that may have been contaminated;

c) inform the appropriate public health authority or veterinary authority and provide information on any other countries of transit where persons may have been exposed to danger;

d) notify the shipper and/or the consignee.

3.2 DAMAGED OR LEAKING PACKAGES OF RADIOACTIVE MATERIAL, CONTAMINATED PACKAGINGS

3.2.1 If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package must be restricted and a qualified person must, as soon as possible, assess the extent of contamination and the resultant dose rate of the package. The scope of the assessment must include the package, the aircraft, the adjacent loading and unloading areas and, if necessary, all other material which has been carried in the aircraft. When necessary, additional steps for the protection of persons' property and the environment, in accordance with provisions established by the relevant competent authority, must be taken to overcome and minimize the consequences of such leakage or damage.

3.2.2 Packages damaged or leaking radioactive contents in excess of allowable limits for normal conditions of transport may be removed to an acceptable interim location under supervision, but must not be forwarded until repaired or reconditioned and decontaminated.

3.2.3 An aircraft and equipment used regularly for the transport of radioactive material must be periodically checked to determine the level of contamination. The frequency of such checks must be related to the likelihood of contamination and the extent to which radioactive material is transported.

3.2.4 Except as provided in 3.2.5, any aircraft or equipment or part thereof which has become contaminated above the limits specified in 4;9.1.2 in the course of the transport of radioactive material, or which shows a dose rate in excess of 5 μSv/h at the surface, must be decontaminated as soon as possible by a qualified person and must not be re-used unless the following conditions are met:

a) the non-fixed contamination must not exceed the limits specified in 4;9.1.2; and

b) the dose rate resulting from the fixed contamination must not exceed 5 μSv/h at the surface.

3.2.5 An overpack, freight container, or aircraft dedicated to the transport of radioactive material under exclusive use must be excepted from the requirements of 4;9.1.4 and 3.2.4 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

3.3 DEALING WITH SUSPECTED CONTAMINATED BAGGAGE OR CARGO

If an operator becomes aware that baggage or cargo not identified as containing dangerous goods has been contaminated and it is suspected that dangerous goods may be the cause of the contamination, the operator must take reasonable steps to identify the nature and source of the contamination before proceeding with the loading of the contaminated baggage or cargo. If the contaminating substance is found or suspected to be a substance classified as dangerous goods by these Instructions, the operator must isolate the baggage or cargo and take appropriate steps to nullify any identified hazard before the baggage or cargo is transported further by air.

Chapter 4

PROVISION OF INFORMATION

Parts of this Chapter are affected by State Variations AU 4, CA 4, CA 12, FR 5,GB 4, KP 3, KW 4, MY 4, MY 5, US 12, US 13, US 15, VE 3, VU 3, VU 4; see Table A-1

INTRODUCTORY NOTE

Operators' responsibilities for the provision of information to passengers are shown in Part 8.

4.1 INFORMATION TO THE PILOT-IN-COMMAND

4.1.1 As early as practicable before departure of the aircraft, but in no case later than when the aircraft moves under its own power, the operator of an aircraft in which dangerous goods are to be carried must:

a) provide the pilot-in-command with accurate and legible written or printed information concerning dangerous goods that are to be carried as cargo; and

b) provide personnel with responsibilities for operational control of the aircraft (e.g. the flight operations officer, flight dispatcher, or designated ground personnel responsible for flight operations) with the same information that is required to be provided to the pilot-in-command (e.g. a copy of the written information provided to the pilot-in-command). Each operator must specify the personnel (job title or function) to be provided this information in their operations manual and/or other appropriate manuals.

For helicopter operations, with the approval of the State of the Operator, the information provided to the pilot-in-command may be abbreviated or be by other means (e.g. radio communication, as part of the working flight documentation such as a journey log or operational flight plan) where circumstances make it impractical to produce written or printed information or on a dedicated form (see Part S-7;4.8 of the Supplement).

Note 1.— This includes information about dangerous goods loaded at a previous departure point and which are to be carried on the subsequent flight.

Note 2.— Information required under 7;4.1.1 b) should be readily available to the operator's personnel whose responsibilities most closely align with the duties of the flight operations officer/flight dispatcher described in Annex 6, Part I — International Commercial Air Transport — Aeroplanes*, Chapter 4, 4.6. These personnel are intended to provide the information required by 4.6 to facilitate emergency response.*

4.1.1.1 Except as otherwise provided, the information required by 4.1.1 must include the following:

a) the date of the flight;

b) the air waybill number (when issued);

c) the proper shipping name (the technical name(s) shown on the dangerous goods transport document is not required) and UN Number or ID number as listed in these Instructions. When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the proper shipping name of "oxygen generator, chemical" must be supplemented with the statement "Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144".

d) the class or division, and subsidiary hazard(s) corresponding to the subsidiary hazard label(s) applied, by numerals, and in the case of Class 1, the compatibility group;

e) the packing group shown on the dangerous goods transport document;

f) the number of packages and their exact loading location. For radioactive material see g) below;

g) the net quantity, or gross mass if applicable, of each package, except that this does not apply to radioactive material or other dangerous goods where the net quantity or gross mass is not required on the dangerous goods transport document (see 5;4.1.4) or, when applicable, alternative written documentation. For a consignment consisting of multiple packages containing dangerous goods bearing the same proper shipping name and UN number or ID number, only the total quantity and an indication of the quantity of the largest and smallest package at each loading location need to be provided. For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the dangerous goods transport document;

h) for radioactive material the number of packages, overpacks or freight containers, their category, their transport index (if applicable) and their exact loading location;

i) whether the package must be carried on cargo aircraft only;

j) the aerodrome at which the package(s) is to be unloaded;

k) where applicable, an indication that the dangerous goods are being carried under a State exemption; and

l) the telephone number where a copy of the information provided to the pilot-in-command can be obtained during the flight if the operator allows the pilot-in-command to provide a telephone number instead of the details about the dangerous goods on board the aircraft, as specified in 4.3.

4.1.2 For UN 1845 — **Carbon dioxide, solid** (dry ice), the information required by 4.1.1 may be replaced by the UN number, proper shipping name, class, total quantity in each cargo compartment on the aircraft and the aerodrome at which the package(s) is to be unloaded.

4.1.3 For UN 3480 (**Lithium ion batteries**) and UN 3090 (**Lithium metal batteries**), the information required by 4.1.1 may be replaced by the UN number, proper shipping name, class, total quantity at each specific loading location, the aerodrome at which the package(s) is to be unloaded and whether the package must be carried on cargo aircraft only. UN 3480 (**Lithium ion batteries**) and UN 3090 (**Lithium metal batteries**) carried under a State exemption must meet all of the requirements of 4.1.

4.1.4 The information provided to the pilot-in-command must also include a signed confirmation, or some other indication, from the person responsible for loading the aircraft that there was no evidence of any damage to or leakage from the packages or any leakage from the unit load devices loaded on the aircraft.

4.1.5 The information provided to the pilot-in-command must be readily available to the pilot-in-command during flight.

4.1.6 This information provided to the pilot-in-command should be presented on a dedicated form and should not be by means of air waybills, dangerous goods transport documents, invoices, etc.

4.1.7 The pilot-in-command must indicate on a copy of the information provided to the pilot-in-command, or in some other way, that the information has been received.

4.1.8 A legible copy of the information provided to the pilot-in-command must be retained on the ground. This copy must have an indication on it, or with it, that the pilot-in-command has received the information. A copy, or the information contained in it, must be readily accessible to the flight operations officer, flight dispatcher, or designated ground personnel responsible for flight operations until after the arrival of the flight.

4.1.9 In addition to the languages which may be required by the State of the Operator, English should be used for the information provided to the pilot-in-command.

4.1.10 In the event that the volume of information provided to the pilot-in-command is such that in-flight radiotelephony transmission would be impracticable in an emergency situation, a summary of the information should also be provided by the operator, containing at least the quantities and class or division of the dangerous goods in each cargo compartment.

4.1.11 The dangerous goods listed in Table 7-9 need not appear on the information provided to the pilot-in-command.

Table 7-9. Dangerous goods not required to appear in the information to the pilot-in-command

UN Number	*Item*	*Reference*
n/a	Dangerous goods packed in excepted quantities	3;5.1.1
UN 2807	**Magnetized material** with field strengths causing a compass deflection of not more than 2 degrees at a distance of 4.6 m	Packing Instruction 953
UN 2908	**Radioactive material, excepted package — empty packaging**	1;6.1.5.1 a)
UN 2909	**Radioactive material, excepted package — articles manufactured from natural uranium** or **depleted uranium** or **natural thorium**	1;6.1.5.1 a)
UN 2910	**Radioactive material, excepted package — limited quantity of material**	1;6.1.5.1 a)
UN 2911	**Radioactive material, excepted package — instruments** or **articles**	1;6.1.5.1 a)
UN 3091	**Lithium metal batteries contained in equipment** (including lithium alloy batteries) when meeting the requirements of Packing Instruction 970, Section II	Packing Instruction 970, Section II
UN 3091	**Lithium metal batteries packed with equipment** (including lithium alloy batteries) when meeting the requirements of Packing Instruction 969, Section II	Packing Instruction 969, Section II

UN Number	*Item*	*Reference*
+ UN 3164	**Articles, pressurized, hydraulic** containing non-flammable gas when meeting the requirements of Packing Instruction 208 a)	Packing Instruction 208, a)
+ UN 3164	**Articles, pressurized, pneumatic** containing non-flammable gas when meeting the requirements of Packing Instruction 208 a)	Packing Instruction 208, a)
UN 3245	**Genetically modified micro-organisms**	Packing Instruction 959
UN 3245	**Genetically modified organisms**	Packing Instruction 959
> UN 3373	**Biological substance, Category B**	Packing Instruction 650, sub-paragraph 11
UN 3481	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 967, Section II	Packing Instruction 967, Section II
UN 3481	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 966, Section II	Packing Instruction 966, Section II

4.2 INFORMATION TO BE PROVIDED TO EMPLOYEES

An operator must provide such information in the operations manual and/or other appropriate manuals as will enable flight crews and other employees to carry out the functions for which they are responsible with regard to the transport of dangerous goods. This information must include instructions as to the action to be taken in the event of emergencies involving dangerous goods, and details of the location and numbering system of cargo compartments together with:

a) the maximum quantity of dry ice permitted in each compartment; and

b) if radioactive material is to be carried, instructions on the loading of such dangerous goods based on the requirements of 7;2.9.

Where applicable, this information must also be provided to ground handling agents.

4.3 INFORMATION TO BE PROVIDED BY THE PILOT-IN-COMMAND IN CASE OF IN-FLIGHT EMERGENCY

If an in-flight emergency occurs, the pilot-in-command must, as soon as the situation permits, inform the appropriate air traffic services unit, for the information of aerodrome authorities, of any dangerous goods carried as cargo on board an aircraft. Wherever possible this information should include the proper shipping name and/or UN number, the class/division and, for Class 1, the compatibility group, any identified subsidiary hazard(s), the quantity and the location on board the aircraft, or a telephone number where a copy of the information provided to the pilot-in-command can be obtained. When it is not considered possible to include all the information, those parts thought most relevant in the circumstances or a summary of the quantities and class or division of dangerous goods in each cargo compartment should be given.

4.4 REPORTING OF DANGEROUS GOODS ACCIDENTS AND INCIDENTS

An operator must report dangerous goods accidents and incidents to the appropriate authorities of the State of the Operator and the State in which the accident or incident occurred in accordance with the reporting requirements of those appropriate authorities.

Note.— This includes incidents involving dangerous goods that are not subject to all or part of these Instructions through the application of an exception or of a special provision (e.g. an incident involving the short circuiting of a dry cell battery that is required to meet short-circuit prevention conditions in a special provision of 3;3).

4.5 REPORTING OF UNDECLARED OR MISDECLARED DANGEROUS GOODS

An operator must report any occasion when undeclared or misdeclared dangerous goods are discovered in cargo or mail. Such a report must be made to the appropriate authorities of the State of the Operator and the State in which this occurred. An operator must also report any occasion when dangerous goods not permitted under 8;1.1.1 are discovered by the operator, or the operator is advised by the entity that discovers the dangerous goods, either in the baggage or on the person, of passengers or crew members. Such a report must be made to the appropriate authority of the State in which this occurred.

4.6 REPORTING OF DANGEROUS GOODS OCCURRENCES

An operator must report to the appropriate authority of the State of the Operator any occasion when:

a) dangerous goods are discovered to have been carried when not loaded, segregated, separated or secured in accordance with Part 7;2; or

b) dangerous goods are discovered to have been carried without information having been provided to the pilot-in-command in accordance with Part 7;4.1.

4.7 INFORMATION BY THE OPERATOR IN CASE OF AN AIRCRAFT ACCIDENT OR INCIDENT

4.7.1 In the event of:

a) an aircraft accident; or

b) a serious incident where dangerous goods carried as cargo may be involved,

the operator of the aircraft carrying dangerous goods as cargo must, without delay, provide to emergency services responding to the accident or serious incident, information about the dangerous goods on board, as shown on the copy of the information provided to the pilot-in-command. As soon as possible, the operator must also provide this information to the appropriate authorities of the State of the Operator and the State in which the accident or serious incident occurred.

4.7.2 In the event of an aircraft incident, if requested to do so, the operator of an aircraft carrying dangerous goods as cargo must, without delay, provide to emergency services responding to the incident and to the appropriate authority of the State in which the incident occurred, information about the dangerous goods on board, as shown on the copy of the information provided to the pilot-in-command.

Note.— The terms "accident", "serious incident" and "incident" are as defined in Annex 13.

4.7.3 Operators must address the provisions of 4.7.1 and 4.7.2 in appropriate manuals and accident contingency plans.

4.8 CARGO ACCEPTANCE AREAS — PROVISION OF INFORMATION

An operator or the operator's handling agent must ensure that notices giving information about the transport of dangerous goods are sufficient in number, prominently displayed and provided at a visible location(s) at the cargo acceptance points to alert shippers/agents about any dangerous goods that may be contained in their cargo consignment(s). These notices must include visual examples of dangerous goods, including batteries.

4.9 EMERGENCY RESPONSE INFORMATION

The operator must ensure that for consignments for which a dangerous goods transport document is required by these Instructions, appropriate information is immediately available at all times for use in emergency response to accidents and incidents involving dangerous goods in air transport. The information must be available to the pilot-in-command and can be provided by:

a) the ICAO document *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481); or

b) any other document which provides appropriate information concerning the dangerous goods on board.

4.10 TRAINING

An operator must ensure training is provided in accordance with the detailed requirements of 1;4 to all relevant employees, including those of agencies employed to act on the operator's behalf, to enable them to carry out the functions for which they are responsible with regard to the transport of dangerous goods, passengers and their baggage, cargo and mail.

4.11 RETENTION OF DOCUMENTS OR INFORMATION

4.11.1 The operator must ensure that at least one copy of the documents or information appropriate to the transport by air of a consignment of dangerous goods is retained for a minimum period of three months after the flight on which the dangerous goods were transported. As a minimum, the documents or information which must be retained are the dangerous goods transport documents, the acceptance checklist (when this is in a form which requires completion), the identification of the person who performed the acceptance check and the written information to the pilot-in-command. These documents or the information must be made available to the appropriate national authority upon request.

4.11.2 For each package or overpack containing dangerous goods or freight container containing radioactive material or unit load device containing dangerous goods as described in 1.4 that was not accepted by an operator due to an error or omission by the shipper in packaging, labelling, marking or documentation, a copy of the documentation as well as the acceptance checklist (when this is in a form which requires completion) and the identification of the person who performed the acceptance check should be retained for a minimum period of three months after the completion of the acceptance checklist.

Note.— Where the documents or information are kept electronically or in a computer system, they should be capable of being reproduced in a printed manner.

Chapter 5

PROVISIONS CONCERNING PASSENGERS AND CREW

5.1 INFORMATION TO PASSENGERS

5.1.1 Operators must inform passengers about dangerous goods that passengers are forbidden to transport aboard an aircraft. The notification system must be described in their operations manual and/or other appropriate manuals. If the ticket purchase and/or boarding pass issuance can be completed by a passenger without the involvement of another person, the notification system must include an acknowledgement by the passenger that he or she has been presented with the information. The information must be provided to passengers:

a) at the point of ticket purchase or, if this is not practical, made available in another manner to passengers prior to boarding pass issuance; and

b) at boarding pass issuance, or when no boarding pass is issued, prior to boarding the aircraft.

Note.— The information may be provided in text or pictorial form, electronically, or verbally, as described in the operator's manuals.

5.1.2 An operator or the operator's handling agent and the airport operator must ensure that information on the types of dangerous goods which passengers are forbidden to transport aboard an aircraft is communicated effectively to them. This information must be presented at each of the places at an airport where tickets are issued, boarding passes are issued, passenger baggage is dropped off and aircraft boarding areas are maintained, and at any other location where passengers are issued boarding passes and/or checked baggage is accepted. This information must include visual examples of dangerous goods forbidden from transport aboard an aircraft.

5.1.3 An operator, of passenger aircraft, should have information on those dangerous goods which may be carried by passengers in accordance with 8;1.1.2 made available prior to the boarding pass issuance process on their websites or other sources of information.

5.2 PASSENGER CHECK-IN PROCEDURES

5.2.1 Operators' check-in staff must be adequately trained to assist them in identifying and detecting dangerous goods carried by passengers other than as permitted in 8;1.1.2.

5.2.2 With the aim of preventing dangerous goods, which passengers are not permitted to have, from being taken aboard an aircraft in passengers' baggage or on their person, check-in staff should seek confirmation from a passenger that they are not carrying dangerous goods that are not permitted, and seek further confirmation about the contents of any item where there are suspicions that it may contain dangerous goods that are not permitted. Many innocuous-looking items may contain dangerous goods, and a list of general descriptions which, experience has shown, often apply to such items is shown in 7;6.

5.2.3 With the aim of preventing dangerous goods, which a passenger is not permitted to have, from being taken aboard an aircraft in excess baggage consigned as cargo, any organization or enterprise accepting excess baggage consigned as cargo should seek confirmation from the passenger, or a person acting on behalf of the passenger, that the excess baggage does not contain dangerous goods that are not permitted and seek further confirmation about the contents of any item where there are suspicions that it may contain dangerous goods that are not permitted.

Chapter 6

PROVISIONS TO AID RECOGNITION OF UNDECLARED DANGEROUS GOODS

6.1 With the aim of preventing undeclared dangerous goods from being loaded on an aircraft and of preventing passengers from taking on board those dangerous goods which they are not permitted to have in their baggage (see Table 8-1), information about:

a) general descriptions that are often used for items in cargo or in passengers' baggage which may contain dangerous goods;

b) other indications that dangerous goods may be present (e.g. labels, markings); and

c) those dangerous goods which may be carried by passengers in accordance with Table 8-1,

must be provided to cargo reservations and sales staff, cargo acceptance staff, passenger reservations and sales staff and passenger check-in staff as appropriate and must be readily available to such staff. The following is a list of general descriptions and the types of dangerous goods that may be included in any item bearing that description.

aircraft on ground (AOG) spares — may contain explosives (flares or other pyrotechnics), chemical oxygen generators, unserviceable tire assemblies, cylinders of compressed gas (oxygen, carbon dioxide or fire extinguishers), fuel in equipment, wet or lithium batteries, matches

automobile parts/supplies (car, motor, motorcycle) — may include engines, including fuel cell engines, carburettors or fuel tanks that contain or have contained fuel, wet or lithium batteries, compressed gases in tire inflation devices and fire extinguishers, air bags, flammable adhesives, paints, sealants and solvents, etc.

battery-powered devices/equipment — may contain wet or lithium batteries.

breathing apparatus — may indicate cylinders of compressed air or oxygen, chemical oxygen generators or refrigerated liquefied oxygen

camping equipment — may contain flammable gases (butane, propane, etc.), flammable liquids (kerosene, gasoline, etc.) or flammable solids (hexamine, matches, etc.)

cars, car parts — see automobile parts, etc.

chemicals — may contain items meeting any of the criteria for dangerous goods, particularly flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances

consolidated consignments (groupages) — may contain any of the defined classes of dangerous goods

cryogenic (liquid) — indicates refrigerated liquefied gases such as argon, helium, neon, nitrogen, etc.

cylinders — may contain compressed or liquefied gas

dental apparatus — may contain flammable resins or solvents, compressed or liquefied gas, mercury and radioactive material

diagnostic specimens — may contain infectious substances

diving equipment — may contain cylinders of compressed gas (e.g. air or oxygen). May also contain high intensity diving lamps that can generate extreme heat when operated in air. In order to be carried safely, the bulb or battery should be disconnected

drilling and mining equipment — may contain explosive(s) and/or other dangerous goods

dry shipper (vapour shipper) — may contain free liquid nitrogen. Dry shippers are not subject to these Instructions only when they do not permit the release of any free liquid nitrogen irrespective of the orientation of the packaging

electrical/electronic equipment — may contain magnetized material, mercury in switch gear, electron tubes, wet or lithium batteries or fuel cells or fuel cell cartridges that contain or have contained fuel

electrically powered apparatus (wheelchairs, lawnmowers, golf carts, etc.) — may contain wet or lithium batteries or fuel cells or fuel cell cartridges that contain or have contained fuel

expeditionary equipment — may contain explosives (flares), flammable liquids (gasoline), flammable gas (gas for camping equipment) or other dangerous goods

film crew and media equipment — may contain explosive pyrotechnic devices, generators incorporating internal combustion engines, wet or lithium batteries, fuel, heat-producing items, etc.

frozen embryos — may be packed in refrigerated liquefied gas or dry ice

frozen fruit, vegetables, etc. — may be packed in dry ice (solid carbon dioxide)

fuel control units — may contain flammable liquids

hot-air balloon — may contain cylinders with flammable gas, fire extinguishers, engines internal combustion, batteries, etc.

household goods — may contain items meeting any of the criteria for dangerous goods. Examples include flammable liquids such as solvent-based paint, adhesives, polishes, aerosols (for passengers, those not permitted under Table 8-1), bleach, corrosive oven or drain cleaners, ammunition, matches, etc.

instruments — may conceal barometers, manometers, mercury switches, rectifier tubes, thermometers, etc., containing mercury

laboratory/testing equipment — may contain items meeting any of the criteria for dangerous goods, particularly flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances, lithium batteries, cylinders of compressed gas, etc.

machinery parts — may contain flammable adhesives, paints, sealants and solvents, wet and lithium batteries, mercury, cylinders of compressed or liquefied gas, etc.

magnets and other items of similar material — may individually or cumulatively meet the definition of magnetized material (see 2;9.2 d))

medical supplies/equipment — may contain items meeting any of the criteria for dangerous goods, particularly flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances, lithium batteries

metal construction material — may contain ferromagnetic material which may be subject to special stowage requirements due to the possibility of affecting aircraft instruments (see 2;9.2 d))

metal fencing — may contain ferromagnetic material which may be subject to special stowage requirements due to the possibility of affecting aircraft instruments (see 2;9.2 d))

metal piping — may contain ferromagnetic material which may be subject to special stowage requirements due to the possibility of affecting aircraft instruments (see 2;9.2 d))

passengers' baggage — may contain items meeting any of the criteria for dangerous goods not permitted under Table 8-1

pharmaceuticals — may contain items meeting any of the criteria for dangerous goods, particularly radioactive material, flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances

photographic supplies/equipment — may contain items meeting any of the criteria for dangerous goods, particularly heat-producing devices, flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances, lithium batteries

racing car or motorcycle team equipment — may contain engines, including fuel cell engines, carburettors or fuel tanks that contain fuel or residual fuel, wet and lithium batteries, flammable aerosols, nitromethane or other gasoline additives, cylinders of compressed gases, etc.

refrigerators — may contain liquefied gases or an ammonia solution

repair kits — may contain organic peroxides and flammable adhesives, solvent-based paints, resins, etc.

samples for testing — may contain items meeting any of the criteria for dangerous goods, particularly infectious substances, flammable liquids, flammable solids, oxidizers, organic peroxides, toxic or corrosive substances

semen — may be packed with dry ice or refrigerated liquefied gas (see also dry shipper)

ships' spares — may contain explosives (flares), cylinders of compressed gas (life rafts), paint, lithium batteries (emergency locator transmitters), etc.

sporting goods/sports team equipment — may contain cylinders of compressed or liquefied gas (air, carbon dioxide, etc.), lithium batteries, propane torches, first aid kits, flammable adhesives, aerosols, etc.

swimming pool chemicals — may contain oxidizing or corrosive substances

switches in electrical equipment or instruments — may contain mercury

tool boxes — may contain explosives (power rivets), compressed gases or aerosols, flammable gases (Butane cylinders or torches), flammable adhesives or paints, corrosive liquids, lithium batteries, etc.

torches — micro torches and utility lighters may contain flammable gas and be equipped with an electronic starter. Larger torches may consist of a torch head (often with a self-igniting switch) attached to a container or cylinder of flammable gas

unaccompanied passengers' baggage/personal effects — may contain items meeting any of the criteria for dangerous goods not permitted under Table 8-1

Note.— Excess baggage carried as cargo may contain certain dangerous goods, as provided for by 1;1.1.5.1 h).

vaccines — may be packed in dry ice (solid carbon dioxide)

Chapter 7

HELICOPTER OPERATIONS

Note.— The requirements in this chapter are in addition to the other provisions of these Instructions that apply to all operators (e.g. Part 7 and Part 1;4).

7.1.1 Due to the differences in the type of operations carried out by helicopters compared with aeroplanes, there may be circumstances when the full provisions of these Instructions are not appropriate or necessary, due to the operations involving unmanned sites, remote locations, mountainous areas or construction sites, etc. In such circumstances and when appropriate, the State of the Operator may grant an approval in order to permit the carriage of dangerous goods without all of the normal requirements of these Instructions being fulfilled. When States other than the State of the Operator have notified ICAO that they require prior approval of such operations, approval must also be obtained from the States of Origin and destination, as appropriate.

7.1.2 When loading dangerous goods for open external carriage by a helicopter, consideration should also be given to the type of packaging used and to the protection of those packagings, where necessary, from the effects of airflow and weather (e.g. by damage from rain or snow), in addition to the general loading provisions of 7;2.

7.1.3 When dangerous goods are carried suspended from a helicopter, the operator must ensure that consideration is given to the dangers of static discharge upon landing or release of the load.

7.1.4 When helicopters are carrying passengers, in accordance with Part S-7;2.2.4 of the Supplement, the State of the Operator may grant an approval to permit the carriage of dangerous goods either:

a) in the cabin, when those dangerous goods are associated with and accompanied by the passengers; or

b) in cargo compartments that do not meet the requirements of Part 7;2.1.1.

Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

Chapter 1

PROVISIONS FOR DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

Parts of this Chapter are affected by State Variations MO 3, US 15, VE 9, VE 10; see Table A-1

1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

1.1.1 Passengers or crew are forbidden to carry dangerous goods either as or in carry-on baggage, checked baggage or on their person unless the dangerous goods are:

a) permitted in accordance with Table 8-1; and

b) for personal use only.

1.1.2 Except for the reporting provisions of 7;4.4 and 7;4.5, the provisions of these Instructions do not apply to the dangerous goods permitted by Table 8-1 when those dangerous goods are:

a) carried by passengers or crew for personal use only;

b) contained in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage); or

c) contained within items of excess baggage sent as cargo as permitted by 1;1.1.5.1 h).

1.1.3 The entry in Table 8-1 that most appropriately describes the item or article must be selected.

Note.— For instance, electronic cigarettes must meet the requirements of the entry for "Battery-powered portable electronic smoking devices" not the entry for lithium batteries or non-spillable batteries.

1.1.4 An item or article that contains multiple dangerous goods must meet all applicable entries.

Note.— For instance, the restrictions and conditions for entries 1) and 14) of Table 8-1 apply to an avalanche backpack that contains lithium batteries and gas cartridges.

1.1.5 Baggage intended to be carried in the cabin that is placed in the cargo compartment must only contain dangerous goods permitted in checked baggage. When baggage intended as carry-on is taken by the operator and placed into the cargo compartment for carriage, the operator must confirm with the passenger that dangerous goods which are only permitted in carry-on baggage have been removed.

1.1.6 Any organization or enterprise other than an operator (such as a travel agent), involved in the air transport of passengers, should provide passengers with information about the types of dangerous goods which they are forbidden to carry aboard an aircraft. This information should consist of, as a minimum, notices at those locations where there is an interface with the passengers.

1.1.7 Where provision is made for the purchase of tickets via the Internet, information on the types of dangerous goods which a passenger is forbidden to carry aboard an aircraft should be provided in either text or pictorial form and should be such that ticket purchase cannot be completed until the passenger, or a person acting on their behalf, has indicated that they have understood the restrictions on dangerous goods in baggage.

1.1.8 The Organization for the Prohibition of Chemical Weapons (OPCW) and government agencies listed in Table 8-2 may carry instruments containing dangerous goods in accordance with Table 8-2.

1.1.9 Except for the reporting provisions of 7;4.4 and 7;4.5, the provisions of these Instructions do not apply to the dangerous goods permitted in accordance with Table 8-2 when those dangerous goods are:

a) carried by staff members of the OPCW on official travel or government agencies listed in Table 8 2 on official travel;

b) contained in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage); or

c) contained within items of excess baggage sent as cargo as permitted by 1;1.1.5.1 h).

+ 1.1.10 Active devices must meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems.

Note 1.— The following dangerous goods may be commonly carried by passengers on other modes of transport, however, they are prohibited either as or in carry-on baggage or checked baggage:

a) personal medical oxygen devices that utilize liquid oxygen;

b) electroshock weapons (e.g. tasers) containing dangerous goods such as explosives, compressed gases, lithium batteries, etc.;

c) "strike anywhere" matches;

d) lighter fuel and lighter refills;

e) premixing burner lighter (see the Glossary of Terms in Attachment 2) without a means of protection against unintentional activation; and

f) battery-powered lighters powered by a lithium ion or lithium metal battery (e.g. laser plasma lighters, tesla coil lighters, flux lighters, arc lighters and double arc lighters) without a safety cap or means of protection against unintentional activation.

Note 2.— Exceptions found in these Instructions are not reproduced in Table 8-1. The following dangerous goods are not subject to these Instructions:

— Radio-pharmaceuticals contained within the body of a person as the result of medical treatment; and

— Energy efficient lamps when in retail packaging and intended for personal or home use (see 1;2.6).

Note 3.— States may implement additional restrictions in the interests of aviation security.

Table 8-1. Provisions for dangerous goods carried by passengers or crew

Dangerous Goods	*Location*		*Approval of the operator(s) is required*	*Restrictions*
	Checked baggage	*Carry-on baggage*		
Batteries				
1) Lithium batteries (including portable electronic devices)	Yes (except for g) and h))	Yes	(see c) and d))	a) each battery must be of a type which meets the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3; b) each battery must not exceed the following: — for lithium metal batteries, a lithium content of 2 grams; or — for lithium ion batteries, a Watt-hour rating of 100 Wh; c) each battery may exceed 100 Wh but not exceed 160 Wh Watt-hour rating for lithium ion with the approval of the operator; d) each battery may exceed 2 grams but not exceed 8 grams lithium content for lithium metal for portable medical electronic devices with the approval of the operator; e) batteries contained in portable electronic devices should be carried as carry-on baggage; however, if carried as checked baggage: — measures must be taken to prevent unintentional activation and to protect the devices from damage; and — the devices must be completely switched off (not in sleep or hibernation mode); f) batteries and heating elements must be isolated in portable electronic devices capable of generating extreme heat, which could cause a fire if activated, by removal of the heating element, battery or other components; g) spare batteries, including power banks: — must be carried as carry-on baggage; and — must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); h) baggage equipped with a lithium battery(ies) exceeding: — for lithium metal batteries, a lithium content of 0.3 grams; or — for lithium ion batteries, a Watt-hour rating of 2.7 Wh must be carried as carry-on baggage unless the battery(ies) is removed from the baggage, in which case the battery(ies) must be carried in accordance with g); i) no more than two spare batteries meeting the requirements of c) or d) may be carried per person.

Dangerous Goods	Location: Checked baggage	Location: Carry-on baggage	Approval of the operator(s) is required	Restrictions
2) Non-spillable wet, nickel-metal hydride, and dry batteries	Yes	Yes	No	a) for a non-spillable battery: i) must meet the requirements of Special Provision A67; ii) each battery must not exceed a voltage of 12 volts and a Watt-hour rating of 100 Wh; iii) each battery must be protected from short circuit by the effective insulation of exposed terminals; iv) no more than two spare batteries per person may be carried; and v) if contained in equipment, the equipment must be either protected from unintentional activation, or each battery must be disconnected and its exposed terminals insulated; b) for a dry battery or nickel-metal hydride battery, each battery must comply with Special Provision A123 or A199, respectively; and c) batteries and heating elements must be isolated in battery-powered equipment capable of generating extreme heat, by removal of the heating element, battery or other components.
3) Battery-powered portable electronic smoking devices (e.g. e-cigarettes, ecigs, ecigars, epipes, personal vaporizers, electronic nicotine delivery systems)	No	Yes	No	a) if powered by lithium batteries, each battery must comply with restrictions of 1) a), b) and g); b) the devices and/or batteries must not be recharged on board the aircraft; and c) measures must be taken to prevent unintentional activation of the heating element while on board the aircraft.

Dangerous Goods	*Location*		*Approval of the operator(s) is required*	*Restrictions*
	Checked baggage	*Carry-on baggage*		
4) Mobility aids (e.g. wheelchairs) powered by: – spillable batteries; – non-spillable wet batteries; – dry batteries; – nickel-metal hydride batteries; or – lithium ion batteries	Yes	(see e))	Yes	a) for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg); b) the passenger should make advance arrangements with each operator and provide information on the type of battery installed and on the handling of the mobility aid (including instructions on how to isolate the battery); c) in the case of a dry battery or nickel-metal hydride battery, each battery must comply with Special Provision A123 or A199, respectively; d) in the case of a non-spillable wet battery: i) each battery must comply with Special Provision A67; and ii) a maximum of one spare battery may be carried per passenger; e) in the case of a lithium ion battery: i) each battery must be of a type which meets the requirements of each test in the *UN Manual of Tests and Criteria*, Part III, subsection 38.3; ii) when the mobility aid does not provide adequate protection to the battery: — the battery must be removed in accordance with the manufacturer's instructions; — the battery must not exceed 300 Wh; — the battery terminals must be protected from short circuit (by insulating the terminals, e.g. by taping over exposed terminals); — the battery must be protected from damage (e.g. by placing each battery in a protective pouch); and — the battery must be carried in the cabin; iii) a maximum of one spare battery not exceeding 300 Wh or two spare batteries not exceeding 160 Wh each may be carried. Spare batteries must be carried in the cabin.

Dangerous Goods	Location: Checked baggage	Location: Carry-on baggage	Approval of the operator(s) is required	Restrictions
Flames and fuel sources				
5) Cigarette lighter Small packet of safety matches	No	(see b))	No	a) no more than one per person; b) must be carried on the person; c) must not contain unabsorbed liquid fuel (other than liquefied gas); and d) if a cigarette lighter is powered by lithium batteries, each battery must comply with restrictions of 1) a), b) and g) and 3) b) and c).
6) Alcoholic beverages containing more than 24 per cent but not more than 70 per cent alcohol by volume	Yes	Yes	No	a) must be in retail packagings; and b) no more than 5 L total net quantity per person. *Note.— Alcoholic beverages containing not more than 24 per cent alcohol by volume are not subject to any restrictions.*
7) Internal combustion engines or fuel cell engines	Yes	No	No	Measures must be taken to nullify the hazard. Refer to Special Provision A70 for more information.
8) Fuel cells containing fuel	No	Yes	No	a) fuel cell cartridges may only contain flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydride;
Spare fuel cell cartridges	Yes	Yes	No	b) refuelling of fuel cells on board an aircraft is not permitted except that the installation of a spare cartridge is allowed; c) the maximum quantity of fuel in any fuel cell or fuel cell cartridge must not exceed: — for liquids 200 mL; — for solids 200 grams; — for liquefied gases, 120 mL for non-metallic fuel cell cartridges or 200 mL for metal fuel cell or fuel cell cartridges; and — for hydrogen in metal hydride, the fuel cell or fuel cell cartridges must have a water capacity of 120 mL or less; d) each fuel cell and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, and must be marked with a manufacturer's certification that it conforms to the specification. In addition, each fuel cell cartridge must be marked with the maximum quantity and type of fuel in the cartridge; e) fuel cell cartridges containing hydrogen in metal hydride must comply with the requirements in Special Provision A162; f) no more than two spare fuel cell cartridges may be carried by a passenger;

	Dangerous Goods	Location: Checked baggage	Location: Carry-on baggage	Approval of the operator(s) is required	Restrictions
					g) fuel cells containing fuel are permitted in carry-on baggage only; h) interaction between fuel cells and integrated batteries in a device must conform to IEC 62282-6-100 Ed. 1, including Amendment 1. Fuel cells whose sole function is to charge a battery in the device are not permitted; i) fuel cells must be of a type that will not charge batteries when the portable electronic device is not in use and must be durably marked by the manufacturer: "APPROVED FOR CARRIAGE IN AIRCRAFT CABIN ONLY" to so indicate; and j) in addition to the languages which may be required by the State of Origin for the markings specified above, English should be used.
Gases in cylinders and cartridges					
	9) Cylinders of oxygen or air required for medical use	Yes	Yes	Yes	a) no more than 5 kg gross mass per cylinder; b) cylinders, valves and regulators, where fitted, must be protected from damage which could cause inadvertent release of the contents; c) advance arrangements recommended; and d) the pilot-in-command must be informed of the number of oxygen or air cylinders loaded on board the aircraft and their loading location(s).
	10) Cartridges of Division 2.2 worn for the operation of mechanical limbs	Yes	Yes	No	Spare cartridges of a similar size are also allowed, if required, to ensure an adequate supply for the duration of the journey.
	11) Cartridge of hydrocarbon gas contained in hair styling equipment	Yes	Yes	No	a) no more than one per person; b) the safety cover must be securely fitted over the heating element; and c) spare cartridges must not be carried.
≠	12) Cartridges of Division 2.2 with no subsidiary hazard fitted into a self-inflating personal safety device, intended to be worn by a person, such as a life-jacket or vest	Yes	Yes	Yes	a) no more than two personal safety devices per person; b) the personal safety device(s) must be packed in such a manner that they cannot be accidentally activated; c) must be for inflation purposes; d) no more than two cartridges are fitted into each device; and e) no more than two spare cartridges per device.
	13) Cartridges of Division 2.2 with no subsidiary hazard for other than a self-inflating personal safety device	Yes	Yes	Yes	a) no more than four cartridges per person; and b) the water capacity of each cartridge must not exceed 50 mL. *Note.— For carbon dioxide, a gas cartridge with a water capacity of 50 mL is equivalent to a 28 g cartridge.*

Dangerous Goods	Location: Checked baggage	Location: Carry-on baggage	Approval of the operator(s) is required	Restrictions
14) Cartridges and cylinders of Division 2.2 with no subsidiary hazard contained in an avalanche rescue backpack	Yes	Yes	Yes	a) no more than one avalanche rescue backpack per person; b) the backpack must be packed in such a manner that it cannot be accidentally activated; c) may contain a pyrotechnic trigger mechanism which must not contain more than 200 mg net of Division 1.4S; and d) the airbags within the backpack must be fitted with pressure relief valves.
Radioactive material				
15) Radioisotopic cardiac pacemakers or other medical devices	n/a (see restrictions)	n/a (see restrictions)	No	Must be implanted into a person or fitted externally as the result of medical treatment.
Mercury				
16) Small medical or clinical thermometer which contains mercury	Yes	No	No	a) no more than one per person; and b) must be in its protective case.
Other dangerous goods				
17) Non-radioactive medicinal articles (including aerosols), toiletry articles (including aerosols) and aerosols in Division 2.2 with no subsidiary hazard	Yes	Yes	No	a) no more than 0.5 kg or 0.5 L total net quantity per single article; b) no more than 2 kg or 2 L total net quantity of all articles (e.g. four aerosol cans of 0.5 L each) per person; c) release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents; and d) the release of gas must not cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties.
18) Dry ice	Yes	Yes	Yes	a) no more than 2.5 kg per person; b) used to pack perishables that are not subject to these Instructions; c) the package must permit the release of carbon dioxide gas; and d) when carried as checked baggage, each package must be marked: i) "DRY ICE" or "CARBON DIOXIDE, SOLID"; and ii) the net weight of dry ice or an indication that the net weight is 2.5 kg or less.
19) Cartridges in Division 1.4S (UN 0012 or UN 0014 only)	Yes	No	Yes	a) no more than 5 kg gross mass per person; b) must be securely packaged; c) must not include ammunition with explosive or incendiary projectiles; and d) allowances for more than one person must not be combined into one or more packages.
20) Permeation devices	Yes	No	No	Instructions on how to package permeation devices for calibrating air quality monitoring equipment are found in Special Provision A41.

Dangerous Goods	*Location*		*Approval of the operator(s) is required*	*Restrictions*
	Checked baggage	*Carry-on baggage*		
21) Non-infectious specimens in flammable solutions	Yes	Yes	No	Instructions on how to package and mark specimens are found in Special Provision A180.
22) Refrigerated liquid nitrogen	Yes	Yes	No	Must be contained in insulated packagings (e.g. dry shippers) that would not allow the build-up of pressure and be fully absorbed in a porous material so that there is no free liquid that could be released from the packaging. Refer to Special Provision A152 for more information.
23) Dangerous goods incorporated in security-type equipment, such as attaché cases, cash boxes, cash bags, etc.	Yes	No	Yes	The security-type equipment must be equipped with an effective means of preventing accidental activation and the dangerous goods incorporated in the equipment must meet the conditions of Special Provision A178.

Table 8-2. Provisions for instruments carried by OPCW and government agencies

Dangerous goods	*Location*		*Approval of the operator(s) is required*	*Restrictions*
	Checked baggage	*Carry-on baggage*		
1) Instruments containing radioactive material (i.e. chemical agent monitor (CAM) and/or rapid alarm and identification device monitor (RAID-M))	Yes	Yes	Yes	a) the instruments must not exceed the activity limits specified in Table 2-14 of these Instructions; b) must be securely packed; and c) must be carried by staff members of the Organization for the Prohibition of Chemical Weapons (OPCW) on official travel.
2) A mercurial barometer or mercurial thermometer	No	Yes	Yes	a) must be carried by a representative of a government weather bureau or similar official agency; b) must be packed in a strong outer packaging, having a sealed inner liner or a bag of strong leakproof and puncture-resistant material impervious to mercury, which will prevent the escape of mercury from the package irrespective of its position; and c) the pilot-in-command must be informed of the barometer or thermometer.

Attachment 1

LISTS OF PROPER SHIPPING NAMES

Chapter 1

LIST OF UN NUMBERS WITH ASSOCIATED PROPER SHIPPING NAMES

0004 **Ammonium picrate** dry or wetted with less than 10% water, by mass

0005 **Cartridges for weapons** with bursting charge

0006 **Cartridges for weapons** with bursting charge

0007 **Cartridges for weapons** with bursting charge

0009 **Ammunition, incendiary** with or without burster, expelling charge or propelling charge

0010 **Ammunition, incendiary** with or without burster, expelling charge or propelling charge

0012 **Cartridges for weapons, inert projectile**

or **Cartridges, small arms**

0014 **Cartridges for tools, blank**

or **Cartridges for weapons, blank**

or **Cartridges, small arms, blank**

0015 **Ammunition, smoke** with or without burster, expelling charge or propelling charge

0016 **Ammunition, smoke** with or without burster, expelling charge or propelling charge

0018 **Ammunition, tear-producing** with burster, expelling charge or propelling charge

0019 **Ammunition, tear-producing** with burster, expelling charge or propelling charge

0020 **Ammunition, toxic** with burster, expelling charge or propelling charge

0021 **Ammunition, toxic** with burster, expelling charge or propelling charge

0027 **Black powder**, granular or as a meal

or **Gunpowder**, granular or as a meal

0028 **Black powder, compressed**

or **Black powder in pellets**

or **Gunpowder, compressed**

or **Gunpowder in pellets**

0029 **Detonators, non-electric** for blasting

0030 **Detonators, electric** for blasting

0033 **Bombs** with bursting charge

0034 **Bombs** with bursting charge

0035 **Bombs** with bursting charge

0037 **Bombs, photo-flash**

0038 **Bombs, photo-flash**

0039 **Bombs, photo-flash**

0042 **Boosters** without detonator

0043 **Bursters**, explosive

0044 **Primers, cap type**

0048 **Charges, demolition**

0049 **Cartridges, flash**

0050 **Cartridges, flash**

0054 **Cartridges, signal**

0055 **Cases, cartridge, empty, with primer**

0056 **Charges, depth**

0059 **Charges, shaped** without detonator

0060 **Charges, supplementary, explosive**

0065 **Cord, detonating**, flexible

0066 **Cord, igniter**

0070 **Cutters, cable, explosive**

0072 **Cyclonite, wetted** with not less than 15% water, by mass

or **Cyclotrimethylenetrinitramine, wetted** with not less than 15% water, by mass

or **Hexogen, wetted** with not less than 15% water, by mass

or **RDX, wetted** with not less than 15% water, by mass

0073 **Detonators for ammunition**

0074 **Diazodinitrophenol, wetted** with not less than 40% water, or mixture of alcohol and water, by mass

0075 **Diethyleneglycol dinitrate, desensitized** with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass

0076 **Dinitrophenol**, dry or wetted with less than 15% water, by mass

0077 **Dinitrophenolates**, alkali metals, dry or wetted with less than 15% water, by mass

0078 **Dinitroresorcinol**, dry or wetted with less than 15% water, by mass

0079 **Dipicrylamine**

or **Hexanitrodiphenylamine**

or **Hexyl**

0081 **Explosive, blasting, type A**

0082 **Explosive, blasting, type B**

0083 **Explosive, blasting, type C**

0084 **Explosive, blasting, type D**

0092 **Flares, surface**

0093 **Flares, aerial**

0094 **Flash powder**

0099 **Fracturing devices, explosive**, without detonator for oil wells

0101 **Fuse, non-detonating**

0102 **Cord, detonating**, metal clad

or **Fuse, detonating**, metal clad

0103 **Fuse, igniter**, tubular, metal clad

0104 **Cord, detonating, mild effect**, metal clad

or **Fuse, detonating, mild effect**, metal clad

0105 **Fuse, safety**

0106 **Fuzes, detonating**

0107 **Fuzes, detonating**

0110 **Grenades, practice**, hand or rifle

0113 **Guanyl nitrosaminoguanylidene hydrazine, wetted** with not less than 30% water, by mass

0114 **Guanyl nitrosaminoguanyltetrazene, wetted** with not less than 30% water, or mixture of alcohol and water, by

or **Tetrazene, wetted** with not less than 30% water, or mixture of alcohol and water, by mass

0118 **Hexolite**, dry or wetted with less than 15% water, by mass

or **Hexotol**, dry or wetted with less than 15% water, by mass

0121 **Igniters**

0124 **Jet perforating guns, charged**, oil well, without detonator

0129 **Lead azide, wetted** with not less than 20% water, or mixture of alcohol and water, by mass

0130 **Lead styphnate, wetted** with not less than 20% water, or mixture of alcohol and water, by mass

or **Lead trinitroresorcinate, wetted** with not less than 20% water, or mixture of alcohol and water, by mass

0131 **Lighters, fuse**

0132 **Deflagrating metal salts of aromatic nitro-derivatives, n.o.s.**

0133 **Mannitol hexanitrate, wetted** with not less than 40% water, or mixture of alcohol and water, by mass

or **Nitromannite, wetted** with not less than 40% water, or mixture of alcohol and water, by mass

0135 **Mercury fulminate, wetted** with not less than 20% water, or mixture of alcohol and water, by mass

0136 **Mines** with bursting charge

0137 **Mines** with bursting charge

0138 **Mines** with bursting charge

0143 **Nitroglycerin, desensitized** with not less than 40% non-volatile water-insoluble phlegmatizer, by mass

0144 **Nitroglycerin solution in alcohol** with more than 1% but not more than 10% nitroglycerin

0146 **Nitrostarch**, dry or wetted with less than 20% water, by mass

0147 **Nitro urea**

0150 **Pentaerythrite tetranitrate, desensitized** with not less than 15% phlegmatizer by mass

or **Pentaerythrite tetranitrate, wetted** with not less than 25% water, by mass

or **Pentaerythritol tetranitrate, desensitized** with not less than 15% phlegmatizer, by mass

or **Pentaerythritol tetranitrate, wetted** with not less than 25% water, by mass

or **PETN, desensitized** with not less than 15% phlegmatizer, by mass

or **PETN, wetted** with not less than 25% water, by mass

0151 **Pentolite**, dry or wetted with less than 15% water, by mass

0153 **Picramide**

or **Trinitroaniline**

0154 **Picric acid**, dry or wetted with less than 30% water, by mass

or **Trinitrophenol**, dry or wetted with less than 30% water, by mass

0155 **Picryl chloride**

or **Trinitrochlorobenzene**

0159 **Powder cake, wetted** with not less than 25% water, by mass

or **Powder paste, wetted** with not less than 25% water, by mass

0160 **Powder, smokeless**

0161 **Powder, smokeless**

0167 **Projectiles** with bursting charge

0168 **Projectiles** with bursting charge

0169 **Projectiles** with bursting charge

0171 **Ammunition, illuminating** with or without burster, expelling charge or propelling charge

0173 **Release devices, explosive**

0174 **Rivets, explosive**

0180 **Rockets** with bursting charge

0181 **Rockets** with bursting charge

0182 **Rockets** with bursting charge

0183 **Rockets** with inert head

0186 **Rocket motors**

0190 **Samples, explosive**, other than initiating explosives

0191 **Signal devices, hand**

0192 **Signals, railway track, explosive**

0193 **Signals, railway track, explosive**

0194 **Signals, distress**, ship

0195 **Signals, distress**, ship

0196 **Signals, smoke**

0197 **Signals, smoke**

0204 **Sounding devices, explosive**

0207 **Tetranitroaniline**

0208 **Tetryl**

or **Trinitrophenylmethylnitramine**

0209 **TNT**, dry or wetted with less than 30% water, by mass

or **Trinitrotoluene**, dry or wetted with less than 30% water, by mass

0212 **Tracers for ammunition**

0213 **Trinitroanisole**

0214 **Trinitrobenzene**, dry or wetted with less than 30% water, by mass

0215 **Trinitrobenzoic acid**, dry or wetted with less than 30% water, by mass

0216 **Trinitro-m-cresol**

0217 **Trinitronaphthalene**

0218 **Trinitrophenetole**

0219 **Styphnic acid**, dry or wetted with less than 20% water, or mixture of alcohol and water, by mass

or **Trinitroresorcinol**, dry or wetted with less than 20% water, or mixture of alcohol and water, by mass

0220 **Urea nitrate**, dry or wetted with less than 20% water, by mass

0221 **Warheads, torpedo** with bursting charge

0222 **Ammonium nitrate**

0224 **Barium azide**, dry or wetted with less than 50% water, by mass

0225 **Boosters with detonator**

0226 **Cyclotetramethylenetetranitramine, wetted** with not less than 15% water, by mass

or **HMX, wetted** with not less than 15% water, by mass

or **Octogen, wetted** with not less than 15% water, by mass

0234 **Sodium dinitro-o-cresolate**, dry or wetted with less than 15% water, by mass

0235 **Sodium picramate**, dry or wetted with less than 20% water, by mass

0236 **Zirconium picramate**, dry or wetted with less than 20% water, by mass

0237 **Charges, shaped, flexible, linear**

0238 **Rockets, line-throwing**

0240 **Rockets, line-throwing**

0241 **Explosive, blasting, type E**

0242 **Charges, propelling, for cannon**

0243 **Ammunition, incendiary, white phosphorus** with burster, expelling charge or propelling charge

0244 **Ammunition, incendiary, white phosphorus** with burster, expelling charge or propelling charge

0245 **Ammunition, smoke, white phosphorus** with burster, expelling charge or propelling charge

0246 **Ammunition, smoke, white phosphorus** with burster, expelling charge or propelling charge

0247 **Ammunition, incendiary**, liquid or gel, with burster, expelling charge or propelling charge

0248 **Contrivances, water-activated** with burster, expelling charge or propelling charge

0249 **Contrivances, water-activated** with burster, expelling charge or propelling charge

0250 **Rocket motors with hypergolic liquids** with or without expelling charge

0254 **Ammunition, illuminating** with or without burster, expelling charge or propelling charge

0255 **Detonators, electric** for blasting

0257 **Fuzes, detonating**

0266 **Octol**, dry or wetted with less than 15% water, by mass

or **Octolite**, dry or wetted with less than 15% water, by mass

0267 **Detonators, non-electric** for blasting

0268 **Boosters with detonator**

0271 **Charges, propelling**

0272 **Charges, propelling**

0275 **Cartridges, power device**

0276 **Cartridges, power device**

0277 **Cartridges, oil well**

0278 **Cartridges, oil well**

0279 **Charges, propelling, for cannon**

0280 **Rocket motors**

0281 **Rocket motors**

0282 **Nitroguanidine**, dry or wetted with less than 20% water,

or **Picrite**, dry or wetted with less than 20% water, by mass

0283 **Boosters** without detonator

0284 **Grenades**, hand or rifle, with bursting charge

0285 **Grenades**, hand or rifle, with bursting charge

0286 **Warheads, rocket** with bursting charge

0287 **Warheads, rocket** with bursting charge

0288 **Charges, shaped, flexible, linear**

0289 **Cord, detonating**, flexible

0290 **Cord, detonating**, metal clad

or **Fuse, detonating**, metal clad

0291 **Bombs** with bursting charge

0292 **Grenades**, hand or rifle, with bursting charge

0293 **Grenades**, hand or rifle, with bursting charge

0294 **Mines** with bursting charge

0295 **Rockets** with bursting charge

0296 **Sounding devices, explosive**

0297 **Ammunition, illuminating** with or without burster, expelling charge or propelling charge

0299 **Bombs, photo-flash**

0300 **Ammunition, incendiary** with or without burster, expelling charge or propelling charge

0301 **Ammunition, tear-producing** with burster, expelling charge or propelling charge

0303 **Ammunition, smoke** with or without burster, expelling charge or propelling charge

0305 **Flash powder**

0306 **Tracers for ammunition**

0312 **Cartridges, signal**

0313 **Signals, smoke**

0314 **Igniters**

0315 **Igniters**

0316 **Fuzes, igniting**

0317 **Fuzes, igniting**

0318 **Grenades, practice**, hand or rifle

0319 **Primers, tubular**

0320 **Primers, tubular**

0321 **Cartridges for weapons** with bursting charge

0322 **Rocket motors with hypergolic liquids** with or without expelling charge

0323 **Cartridges, power device**

0324 **Projectiles** with bursting charge

0325 **Igniters**

0326 **Cartridges for weapons, blank**

0327 **Cartridges for weapons, blank**

or **Cartridges, small arms, blank**

0328 **Cartridges for weapons, inert projectile**

0329 **Torpedoes** with bursting charge

0330 **Torpedoes** with bursting charge

0331 **Agent, blasting, type B**

or **Explosive, blasting, type B**

0332 **Agent, blasting, type E**

or **Explosive, blasting, type E**

0333 **Fireworks**

0334 **Fireworks**

0335 **Fireworks**

0336 **Fireworks**

0337 **Fireworks**

0338 **Cartridges for weapons, blank**

or **Cartridges, small arms, blank**

0339 **Cartridges for weapons, inert projectile**

or **Cartridges, small arms**

0340 **Nitrocellulose**, dry or wetted with less than 25% water (or alcohol), by mass

0341 **Nitrocellulose**, unmodified or plasticized with less than 18% plasticizing substance, by mass

0342 **Nitrocellulose, wetted** with not less than 25% alcohol, by mass

0343 **Nitrocellulose, plasticized** with not less than 18% plasticizing substance, by mass

0344 **Projectiles** with bursting charge

0345 **Projectiles**, inert with tracer

0346 **Projectiles** with burster or expelling charge

0347 **Projectiles** with burster or expelling charge

0348 **Cartridges for weapons** with bursting charge

0349 **Articles, explosive, n.o.s.**

0350 **Articles, explosive, n.o.s.**

0351 **Articles, explosive, n.o.s.**

0352 **Articles, explosive, n.o.s.**

0353 **Articles, explosive, n.o.s.**

0354 **Articles, explosive, n.o.s.**

0355 **Articles, explosive, n.o.s.**

0356 **Articles, explosive, n.o.s.**

0357 **Substances, explosive, n.o.s.**

0358 **Substances, explosive, n.o.s.**

0359 **Substances, explosive, n.o.s.**

0360 **Detonator assemblies, non-electric** for blasting

0361 **Detonator assemblies, non-electric** for blasting

0362 **Ammunition, practice**

0363 **Ammunition, proof**

0364 **Detonators for ammunition**

0365 **Detonators for ammunition**

0366 **Detonators for ammunition**

0367 **Fuzes, detonating**

0368 **Fuzes, igniting**

0369 **Warheads, rocket** with bursting charge

0370 **Warheads, rocket** with burster or expelling charge

0371 **Warheads, rocket** with burster or expelling charge

0372 **Grenades, practice**, hand or rifle

0373 **Signal devices, hand**

0374 **Sounding devices, explosive**

0375 **Sounding devices, explosive**

0376 **Primers, tubular**

0377 **Primers, cap type**

0378 **Primers, cap type**

0379 **Cases, cartridge, empty, with primer**

0380 **Articles, pyrophoric**

0381 **Cartridges, power device**

0382 **Components, explosive train, n.o.s.**

0383 **Components, explosive train, n.o.s.**

0384 **Components, explosive train, n.o.s.**

0385 **5-Nitrobenzotriazol**

0386 **Trinitrobenzenesulphonic acid**

0387 **Trinitrofluorenone**

0388 **TNT and hexanitrostilbene mixture**

or **TNT and trinitrobenzene mixture**

or **Trinitrotoluene and hexanitrostilbene mixture**

or **Trinitrotoluene and trinitrobenzene mixture**

0389 **TNT mixture containing trinitrobenzene and hexanitrostilbene**

or **Trinitrotoluene mixture containing trinitrobenzene and hexanitrostilbene**

0390 **Tritonal**

0391 **Cyclonite and cyclotetramethylenetetranitramine mixture, desensitized** with not less than 10% phlegmatizer, by mass

or **Cyclonite and cyclotetramethylenetetranitramine mixture, wetted** with not less than 15% water, by mass

or **Cyclotrimethylenetrinitramine and cyclotetramethylenetetranitramine mixture, desensitized** with not less than 10% phlegmatizer, by mass

or **Cyclotrimethylenetrinitramine and cyclotetramethylenetetranitramine mixture, wetted** with not less than 15% water, by mass

or **Hexogen and cyclotetramethylenetetranitramine mixture, desensitized** with not less than 10% phlegmatizer, by mass

or **Hexogen and cyclotetramethylenetetranitramine mixture, wetted** with not less than 15% water, by mass

or **RDX and cyclotetramethylenetetranitramine mixture, desensitized** with not less than 10% phlegmatizer, by mass

or **RDX and cyclotetramethylenetetranitramine mixture, wetted** with not less than 15% water, by mass

0392 **Hexanitrostilbene**

0393 **Hexotonal**

0394 **Styphnic acid, wetted** with not less than 20% water, or mixture of alcohol and water, by mass

or **Trinitroresorcinol, wetted** with not less than 20% water, or mixture of alcohol and water, by mass

0395 **Rocket motors, liquid fuelled**

0396 **Rocket motors, liquid fuelled**

0397 **Rockets, liquid fuelled** with bursting charge

0398 **Rockets, liquid fuelled** with bursting charge

0399 **Bombs with flammable liquid** with bursting charge

0400 **Bombs with flammable liquid** with bursting charge

0401 **Dipicryl sulphide**, dry or wetted with less than 10% water, by mass

0402 **Ammonium perchlorate**

0403 **Flares, aerial**

0404 **Flares, aerial**

0405 **Cartridges, signal**

0406 **Dinitrosobenzene**

0407 **Tetrazol-1-acetic acid**

0408 **Fuzes, detonating** with protective features

0409 **Fuzes, detonating** with protective features

0410 **Fuzes, detonating** with protective features

0411 **Pentaerythrite tetranitrate** with not less than 7% wax, by mass

or **Pentaerythritol tetranitrate** with not less than 7% wax, by mass

or **PETN** with not less than 7% wax, by mass

0412 **Cartridges for weapons** with bursting charge

0413 **Cartridges for weapons, blank**

0414 **Charges, propelling, for cannon**

0415 **Charges, propelling**

0417 **Cartridges for weapons, inert projectile**

or **Cartridges, small arms**

0418 **Flares, surface**

0419 **Flares, surface**

0420 **Flares, aerial**

0421 **Flares, aerial**

0424 **Projectiles**, inert with tracer

0425 **Projectiles**, inert with tracer

0426 **Projectiles** with burster or expelling charge

0427 **Projectiles** with burster or expelling charge

0428 **Articles, pyrotechnic** for technical purposes

0429 **Articles, pyrotechnic** for technical purposes

0430 **Articles, pyrotechnic** for technical purposes

0431 **Articles, pyrotechnic** for technical purposes

0432 **Articles, pyrotechnic** for technical purposes

0433 **Powder cake, wetted** with not less than 17% alcohol, by mass

or **Powder paste, wetted** with not less than 17% alcohol, by mass

0434 **Projectiles** with burster or expelling charge

0435 **Projectiles** with burster or expelling charge

0436 **Rockets** with expelling charge

0437 **Rockets** with expelling charge

0438 **Rockets** with expelling charge

0439 **Charges, shaped** without detonator

0440 **Charges, shaped** without detonator

0441 **Charges, shaped** without detonator

0442 **Charges, explosive, commercial** without detonator

0443 **Charges, explosive, commercial** without detonator

0444 **Charges, explosive, commercial** without detonator

0445 **Charges, explosive, commercial** without detonator

0446 **Cases, combustible, empty, without primer**

0447 **Cases, combustible, empty, without primer**

0448 **5-Mercaptotetrazol-1-acetic acid**

0449 **Torpedoes, liquid fuelled** with or without bursting charge

0450 **Torpedoes, liquid fuelled** with inert head

0451 **Torpedoes** with bursting charge

0452 **Grenades, practice**, hand or rifle

0453 **Rockets, line-throwing**

0454 **Igniters**

0455 **Detonators, non-electric** for blasting

0456 **Detonators, electric** for blasting

0457 **Charges, bursting, plastics bonded**

0458 **Charges, bursting, plastics bonded**

0459 **Charges, bursting, plastics bonded**

0460 **Charges, bursting, plastics bonded**

0461 **Components, explosive train, n.o.s.**

0462 **Articles, explosive, n.o.s.**

0463 **Articles, explosive, n.o.s.**

0464 **Articles, explosive, n.o.s.**

0465 **Articles, explosive, n.o.s.**

0466 **Articles, explosive, n.o.s.**

0467 **Articles, explosive, n.o.s.**

0468 **Articles, explosive, n.o.s.**

0469 **Articles, explosive, n.o.s.**

0470 **Articles, explosive, n.o.s.**

0471 **Articles, explosive, n.o.s.**

0472 **Articles, explosive, n.o.s.**

0473 **Substances, explosive, n.o.s.**

0474 **Substances, explosive, n.o.s.**

0475 **Substances, explosive, n.o.s.**

0476 **Substances, explosive, n.o.s.**

0477 **Substances, explosive, n.o.s.**

0478 **Substances, explosive, n.o.s.**

0479 **Substances, explosive, n.o.s.**

0480 **Substances, explosive, n.o.s.**

0481 **Substances, explosive, n.o.s.**

0482 **Substances, EVI, n.o.s.**

or **Substances, explosive, very insensitive, n.o.s.**

0483 **Cyclonite, desensitized**

or **Cyclotrimethylenetrinitramine, desensitized**

or **Hexogen, desensitized**

or **RDX, desensitized**

0484 **Cyclotetramethylene-tetranitramine, desensitized**

or **HMX, desensitized**

or **Octogen, desensitized**

0485 **Substances, explosive, n.o.s.**

0486 **Articles, EEI**

or **Articles, explosive, extremely insensitive**

0487 **Signals, smoke**

0488 **Ammunition, practice**

0489 **DINGU**

or **Dinitroglycoluril**

0490 **Nitrotriazolone**

or **NTO**

0491 **Charges, propelling**

0492 **Signals, railway track, explosive**

0493 **Signals, railway track, explosive**

0494 **Jet perforating guns, charged**, oil well, without detonator

0495 **Propellant, liquid**

0496 **Octonal**

0497 **Propellant, liquid**

0498 **Propellant, solid**

0499 **Propellant, solid**

0500 **Detonator assemblies, non-electric** for blasting

0501 **Propellant, solid**

0502 **Rockets** with inert head

0503 **Safety devices, pyrotechnic**

0504 **1H-Tetrazole**

0505 **Signals, distress**, ship

0506 **Signals, distress**, ship

0507 **Signals, smoke**

0508 **1-Hydroxybenzotriazole, anhydrous**, dry or wetted with less than 20% water, by mass

0509 **Powder, smokeless**

0510 **Rocket motors**

0511 **Detonators, electronic** programmable for blasting

0512 **Detonators, electronic** programmable for blasting

0513 **Detonators, electronic** programmable for blasting

1001 **Acetylene, dissolved**

1002 **Air, compressed**

1003 **Air, refrigerated liquid**

1005 **Ammonia, anhydrous**

1006 **Argon, compressed**

1008 **Boron trifluoride**

1009 **Bromotrifluoromethane**

or **Refrigerant gas R 13B1**

1010 **Butadienes and hydrocarbon mixture, stabilized**, containing more than 40% butadienes

or **Butadienes, stabilized**

1011 **Butane**

1012 **Butylene**

1013 **Carbon dioxide**

1016 **Carbon monoxide, compressed**

1017 **Chlorine**

1018 **Chlorodifluoromethane**

or **Refrigerant gas R 22**

1020 **Chloropentafluoroethane**

or **Refrigerant gas R 115**

1021 **1-Chloro-1,2,2,2-tetrafluoroethane**

or **Refrigerant gas R 124**

1022 **Chlorotrifluoromethane**

or **Refrigerant gas R 13**

1023 **Coal gas, compressed**

1026 **Cyanogen**

1027 **Cyclopropane**

1028 **Dichlorodifluoromethane**

or **Refrigerant gas R 12**

1029 **Dichlorofluoromethane**

or **Refrigerant gas R 21**

1030 **1,1-Difluoroethane**

or **Refrigerant gas R 152a**

1032 **Dimethylamine, anhydrous**

1033 **Dimethyl ether**

1035 **Ethane**

1036 **Ethylamine**

1037 **Ethyl chloride**

1038 **Ethylene, refrigerated liquid**

1039 **Ethyl methyl ether**

1040 **Ethylene oxide**

or **Ethylene oxide with nitrogen** up to a total pressure of 1 MPa at 50°C

1041 **Ethylene oxide and carbon dioxide mixture** with more than 9% but not more than 87% ethylene oxide

1043 **Fertilizer ammoniating solution** with free ammonia

1044 **Fire extinguishers** with compressed or liquefied gas

1045 **Fluorine, compressed**

1046 **Helium, compressed**

1048 **Hydrogen bromide, anhydrous**

1049 **Hydrogen, compressed**

1050 **Hydrogen chloride, anhydrous**

1051 **Hydrogen cyanide, stabilized** containing less than 3% water

1052 **Hydrogen fluoride, anhydrous**

1053 **Hydrogen sulphide**

1055 **Isobutylene**

1056 **Krypton, compressed**

1057 **Lighter refills** containing flammable gas

or **Lighters** containing flammable gas

1058 **Liquefied gases**, non-flammable, charged with nitrogen, carbon dioxide or air

1060 **Methylacetylene and propadiene mixture, stabilized**

1061 **Methylamine, anhydrous**

1062 **Methyl bromide** with not more than 2% chloropicrin

1063 **Methyl chloride**

or **Refrigerant gas R 40**

1064 **Methyl mercaptan**

1065 **Neon, compressed**

1066 **Nitrogen, compressed**

1067 **Dinitrogen tetroxide**

or **Nitrogen dioxide**

1069 **Nitrosyl chloride**

1070 **Nitrous oxide**

1071 **Oil gas, compressed**

1072 **Oxygen, compressed**

1073 **Oxygen, refrigerated liquid**

1075 **Petroleum gases, liquefied**

1076 **Phosgene**

1077 **Propylene**

1078 **Refrigerant gas, n.o.s.**

1079 **Sulphur dioxide**

1080 **Sulphur hexafluoride**

1081 **Tetrafluoroethylene, stabilized**

1082 **Refrigerant gas R 1113**

or **Trifluorochloroethylene, stabilized**

1083 **Trimethylamine, anhydrous**

1085 **Vinyl bromide, stabilized**

1086 **Vinyl chloride, stabilized**

1087 **Vinyl methyl ether, stabilized**

1088 **Acetal**

1089 **Acetaldehyde**

1090 **Acetone**

1091 **Acetone oils**

1092 **Acrolein, stabilized**

1093 **Acrylonitrile, stabilized**

1098 **Allyl alcohol**

1099 **Allyl bromide**

1100 **Allyl chloride**

1104 **Amyl acetates**

1105 **Pentanols**

1106 **Amylamine**

1107 **Amyl chloride**

1108 **n-Amylene**

or **1-Pentene**

1109 **Amyl formates**

1110 **n-Amyl methyl ketone**

1111 **Amyl mercaptan**

1112 **Amyl nitrate**

1113 **Amyl nitrite**

1114 **Benzene**

1120 **Butanols**

1123 **Butyl acetates**

1125 **n-Butylamine**

1126 **1-Bromobutane**

1127 **Chlorobutanes**

1128 **n-Butyl formate**

1129 **Butyraldehyde**

1130 **Camphor oil**

1131 **Carbon disulphide**

1133 **Adhesives** containing flammable liquid

1134 **Chlorobenzene**

1135 **Ethylene chlorohydrin**

1136 **Coal tar distillates, flammable**

1139 **Coating solution** (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining)

1143 **Crotonaldehyde**

or **Crotonaldehyde, stabilized**

1144 **Crotonylene**

1145 **Cyclohexane**

1146 **Cyclopentane**

1147 **Decahydronaphthalene**

1148 **Diacetone alcohol**

1149 **Dibutyl ethers**

1150 **1,2-Dichloroethylene**

1152 **Dichloropentanes**

1153 **Ethylene glycol diethyl ether**

1154 **Diethylamine**

1155 **Diethyl ether**

or **Ethyl ether**

1156 **Diethyl ketone**

1157 **Diisobutyl ketone**

1158 **Diisopropylamine**

1159 **Diisopropyl ether**

1160 **Dimethylamine aqueous solution**

1161 **Dimethyl carbonate**

1162 **Dimethyldichlorosilane**

1163 **Dimethylhydrazine, unsymmetrical**

1164 **Dimethyl sulphide**

1165 **Dioxane**

1166 **Dioxolane**

1167 **Divinyl ether, stabilized**

1170 **Ethanol**

or **Ethanol solution**

or **Ethyl alcohol**

or **Ethyl alcohol solution**

1171 **Ethylene glycol monoethyl ether**

1172 **Ethylene glycol monoethyl ether acetate**

1173 **Ethyl acetate**

1175 **Ethylbenzene**

1176 **Ethyl borate**

1177 **2-Ethylbutyl acetate**

1178 **2-Ethylbutyraldehyde**

1179 **Ethyl butyl ether**

1180 **Ethyl butyrate**

1181 **Ethyl chloroacetate**

1182 **Ethyl chloroformate**

1183 **Ethyldichlorosilane**

1184 **Ethylene dichloride**

1185 **Ethyleneimine, stabilized**

1188 **Ethylene glycol monomethyl ether**

1189 **Ethylene glycol monomethyl ether acetate**

1190 **Ethyl formate**

1191 **Octyl aldehydes**

1192 **Ethyl lactate**

1193 **Ethyl methyl ketone**

or **Methyl ethyl ketone**

1194 **Ethyl nitrite solution**

1195 **Ethyl propionate**

1196 **Ethyltrichlorosilane**

1197 **Extracts, liquid**, for flavour or aroma

1198 **Formaldehyde solution, flammable**

1199 **Furaldehydes**

1201 **Fusel oil**

1202 **Diesel fuel**

or **Gas oil**

or **Heating oil, light**

1203 **Gasoline**

or **Motor spirit**

or **Petrol**

1204 **Nitroglycerin solution in alcohol** with not more than 1% nitroglycerin

1206 **Heptanes**

1207 **Hexaldehyde**

1208 **Hexanes**

1210 **Printing ink**, flammable

or **Printing ink related material** (including printing ink thinning or reducing compound), flammable

1212 **Isobutanol**

or **Isobutyl alcohol**

1213 **Isobutyl acetate**

1214 **Isobutylamine**

1216 **Isooctene**

1218 **Isoprene, stabilized**

1219 **Isopropanol**

or **Isopropyl alcohol**

1220 **Isopropyl acetate**

1221 **Isopropylamine**

1222 **Isopropyl nitrate**

1223 **Kerosene**

1224 **Ketones, liquid, n.o.s.**

1228 **Mercaptan mixture, liquid, flammable, toxic, n.o.s.**

or **Mercaptans, liquid, flammable, toxic, n.o.s.**

1229 **Mesityl oxide**

1230 **Methanol**

1231 **Methyl acetate**

1233 **Methylamyl acetate**

1234 **Methylal**

1235 **Methylamine, aqueous solution**

1237 **Methyl butyrate**

1238 **Methyl chloroformate**

1239 **Methyl chloromethyl ether**

1242 **Methyldichlorosilane**

1243 **Methyl formate**

1244 **Methylhydrazine**

1245 **Methyl isobutyl ketone**

1246 **Methyl isopropenyl ketone, stabilized**

1247 **Methyl methacrylate monomer, stabilized**

1248 **Methyl propionate**

1249 **Methyl propyl ketone**

1250 **Methyltrichlorosilane**

1251 **Methyl vinyl ketone, stabilized**

1259 **Nickel carbonyl**

1261 **Nitromethane**

1262 **Octanes**

1263 **Paint** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)

or **Paint related material** (including paint thinning or reducing compound)

1264 **Paraldehyde**

1265 **Pentanes**, liquid

1266 **Perfumery products** with flammable solvents

1267 **Petroleum crude oil**

1268 **Petroleum distillates, n.o.s.**

or **Petroleum products, n.o.s.**

1272 **Pine oil**

1274 **n-Propanol**

or **Propyl alcohol, normal**

1275 **Propionaldehyde**

1276 **n-Propyl acetate**

1277 **Propylamine**

1278 **1-Chloropropane**

1279 **1,2-Dichloropropane**

1280 **Propylene oxide**

1281 **Propyl formates**

1282 **Pyridine**

1286 **Rosin oil**

1287 **Rubber solution**

1288 **Shale oil**

1289 **Sodium methylate solution** in alcohol

1292 **Tetraethyl silicate**

1293 **Tinctures, medicinal**

1294 **Toluene**

1295 **Trichlorosilane**

1296 **Triethylamine**

1297 **Trimethylamine, aqueous solution**, not more than 50% trimethylamine, by mass

1298 **Trimethylchlorosilane**

1299 **Turpentine**

1300 **Turpentine substitute**

1301 **Vinyl acetate, stabilized**

1302 **Vinyl ethyl ether, stabilized**

1303 **Vinylidene chloride, stabilized**

1304 **Vinyl isobutyl ether, stabilized**

1305 **Vinyltrichlorosilane**

1306 **Wood preservatives, liquid**

1307 **Xylenes**

1308 **Zirconium suspended in a flammable liquid**

1309 **Aluminium powder, coated**

1310 **Ammonium picrate, wetted** with not less than 10% water, by mass

1312 **Borneol**

1313 **Calcium resinate**

1314 **Calcium resinate, fused**

1318 **Cobalt resinate, precipitated**

1320 **Dinitrophenol, wetted** with not less than 15% water, by mass

1321 **Dinitrophenolates, wetted** with not less than 15% water, by mass

1322 **Dinitroresorcinol, wetted** with not less than 15% water, by mass

1323 **Ferrocerium**

1324 **Films, nitrocellulose base**, gelatin coated, except scrap

1325 **Flammable solid, organic, n.o.s.**

1326 **Hafnium powder, wetted** with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns

1327 **Bhusa**

or **Hay**

or **Straw**

1328 **Hexamethylenetetramine**

1330 **Manganese resinate**

1331 **Matches, 'strike anywhere'**

1332 **Metaldehyde**

1333 **Cerium**, slabs, ingots or rods

1334 **Naphthalene, crude**

or **Naphthalene, refined**

1336 **Nitroguanidine, wetted** with not less than 20% water, by mass

or **Picrite, wetted** with not less than 20% water by mass

1337 **Nitrostarch, wetted** with not less than 20% water, by mass

1338 **Phosphorus, amorphous**

1339 **Phosphorus heptasulphide**, free from yellow and white phosphorus

1340 **Phosphorus pentasulphide**, free from yellow and white phosphorus

1341 **Phosphorus sesquisulphide**, free from yellow and white phosphorus

1343 **Phosphorus trisulphide**, free from yellow and white phosphorus

1344 **Picric acid, wetted** with not less than 30% water, by mass

or **Trinitrophenol, wetted** with not less than 30% water, by mass

1345 **Rubber scrap**, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%

or **Rubber shoddy**, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%

1346 **Silicon powder, amorphous**

1347 **Silver picrate, wetted** with not less than 30% water, by mass

1348 **Sodium dinitro-o-cresolate, wetted** with not less than 15% water, by mass

1349 **Sodium picramate, wetted** with not less than 20% water, by mass

1350 **Sulphur**

1352 **Titanium powder, wetted** with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns

1353 **Fabrics impregnated with weakly nitrated nitrocellulose, n.o.s.**

or **Fibres impregnated with weakly nitrated nitrocellulose, n.o.s.**

1354 **Trinitrobenzene, wetted** with not less than 30% water, by mass

1355 **Trinitrobenzoic acid, wetted** with not less than 30% water, by mass

1356 **TNT, wetted** with not less than 30% water, by mass

or **Trinitrotoluene, wetted** with not less than 30% water, by mass

1357 **Urea nitrate, wetted** with not less than 20% water, by mass

1358 **Zirconium powder, wetted** with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns

1360 **Calcium phosphide**

1361 **Carbon**, animal or vegetable origin

1362 **Carbon, activated**

1363 **Copra**

1364 **Cotton waste, oily**

1365 **Cotton, wet**

1369 **p-Nitrosodimethylaniline**

1372 **Fibres, animal** burnt, wet or damp

or **Fibres, vegetable** burnt, wet or damp

1373 **Fabrics, animal, n.o.s.**, with oil

or **Fabrics, synthetic, n.o.s**, with oil

or **Fabrics, vegetable, n.o.s.**, with oil

or **Fibres, animal, n.o.s.**, with oil

or **Fibres, synthetic, n.o.s.**, with oil

or **Fibres, vegetable, n.o.s.**, with oil

1374 **Fish meal, unstabilized**

or **Fish scrap, unstabilized**

1376 **Iron oxide, spent** (obtained from coal gas purification)

or **Iron sponge, spent** (obtained from coal gas

1378 **Metal catalyst, wetted** with a visible excess of liquid

1379 **Paper, unsaturated oil treated**, incompletely dried (including carbon paper)

1380 **Pentaborane**

1381 **Phosphorus, white, dry**

or **Phosphorus, white, in solution**

or **Phosphorus, white, under water**

or **Phosphorus, yellow, dry**

or **Phosphorus, yellow, in solution**

or **Phosphorus, yellow, under water**

1382 **Potassium sulphide** with less than 30% water of crystallization

or **Potassium sulphide, anhydrous**

1383 **Pyrophoric alloy, n.o.s.**

or **Pyrophoric metal, n.o.s.**

1384 **Sodium dithionite**

or **Sodium hydrosulphite**

1385 **Sodium sulphide** with less than 30% water of crystallization

or **Sodium sulphide, anhydrous**

1386 **Seed cake** with more than 1.5% oil and not more than 11% moisture

1387 **Wool waste, wet**

1389 **Alkali metal amalgam, liquid**

1390 **Alkali metal amides**

1391 **Alkali metal dispersion**

or **Alkaline earth metal dispersion**

1392 **Alkaline earth metal amalgam, liquid**

1393 **Alkaline earth metal alloy, n.o.s.**

1394 **Aluminium carbide**

1395 **Aluminium ferrosilicon powder**

1396 **Aluminium powder, uncoated**

1397 **Aluminium phosphide**

1398 **Aluminium silicon powder, uncoated**

1400 **Barium**

1401 **Calcium**

1402 **Calcium carbide**

1403 **Calcium cyanamide** with more than 0.1% of calcium carbide

1404 **Calcium hydride**

1405 **Calcium silicide**

1407 **Caesium**

1408 **Ferrosilicon** with 30% or more but less than 90% silicon

1409 **Metal hydrides, water-reactive, n.o.s.**

1410 **Lithium aluminium hydride**
1411 **Lithium aluminium hydride, ethereal**
1413 **Lithium borohydride**
1414 **Lithium hydride**
1415 **Lithium**
1417 **Lithium silicon**
1418 **Magnesium alloys powder**
or **Magnesium powder**
1419 **Magnesium aluminium phosphide**
1420 **Potassium metal alloys, liquid**
1421 **Alkali metal alloy, liquid, n.o.s.**
1422 **Potassium sodium alloys, liquid**
1423 **Rubidium**
1426 **Sodium borohydride**
1427 **Sodium hydride**
1428 **Sodium**
1431 **Sodium methylate**
1432 **Sodium phosphide**
1433 **Stannic phosphides**
1435 **Zinc ashes**
1436 **Zinc dust**
or **Zinc powder**
1437 **Zirconium hydride**
1438 **Aluminium nitrate**
1439 **Ammonium dichromate**
1442 **Ammonium perchlorate**
1444 **Ammonium persulphate**
1445 **Barium chlorate, solid**
1446 **Barium nitrate**
1447 **Barium perchlorate, solid**
1448 **Barium permanganate**
1449 **Barium peroxide**
1450 **Bromates, inorganic, n.o.s.**
1451 **Caesium nitrate**
1452 **Calcium chlorate**
1453 **Calcium chlorite**
1454 **Calcium nitrate**
1455 **Calcium perchlorate**
1456 **Calcium permanganate**
1457 **Calcium peroxide**
1458 **Chlorate and borate mixture**
1459 **Chlorate and magnesium chloride mixture, solid**
1461 **Chlorates, inorganic, n.o.s.**
1462 **Chlorites, inorganic, n.o.s.**
1463 **Chromium trioxide, anhydrous**
1465 **Didymium nitrate**
1466 **Ferric nitrate**
1467 **Guanidine nitrate**
1469 **Lead nitrate**
1470 **Lead perchlorate, solid**
1471 **Lithium hypochlorite, dry**
or **Lithium hypochlorite mixture**
1472 **Lithium peroxide**
1473 **Magnesium bromate**
1474 **Magnesium nitrate**
1475 **Magnesium perchlorate**
1476 **Magnesium peroxide**
1477 **Nitrates, inorganic, n.o.s.**
1479 **Oxidizing solid, n.o.s.**
1481 **Perchlorates, inorganic, n.o.s.**
1482 **Permanganates, inorganic, n.o.s.**
1483 **Peroxides, inorganic, n.o.s.**
1484 **Potassium bromate**
1485 **Potassium chlorate**
1486 **Potassium nitrate**
1487 **Potassium nitrate and sodium nitrite mixture**
1488 **Potassium nitrite**
1489 **Potassium perchlorate**
1490 **Potassium permanganate**
1491 **Potassium peroxide**
1492 **Potassium persulphate**
1493 **Silver nitrate**
1494 **Sodium bromate**
1495 **Sodium chlorate**
1496 **Sodium chlorite**
1498 **Sodium nitrate**
1499 **Sodium nitrate and potassium nitrate mixture**
1500 **Sodium nitrite**
1502 **Sodium perchlorate**
1503 **Sodium permanganate**
1504 **Sodium peroxide**
1505 **Sodium persulphate**
1506 **Strontium chlorate**
1507 **Strontium nitrate**
1508 **Strontium perchlorate**
1509 **Strontium peroxide**

1510 **Tetranitromethane**

1511 **Urea hydrogen peroxide**

1512 **Zinc ammonium nitrite**

1513 **Zinc chlorate**

1514 **Zinc nitrate**

1515 **Zinc permanganate**

1516 **Zinc peroxide**

1517 **Zirconium picramate, wetted** with not less than 20% water, by mass

1541 **Acetone cyanohydrin, stabilized**

1544 **Alkaloid salts, solid, n.o.s.**

or **Alkaloids, solid, n.o.s.**

1545 **Allyl isothiocyanate, stabilized**

1546 **Ammonium arsenate**

1547 **Aniline**

1548 **Aniline hydrochloride**

1549 **Antimony compound, inorganic, solid, n.o.s.**

1550 **Antimony lactate**

1551 **Antimony potassium tartrate**

1553 **Arsenic acid, liquid**

1554 **Arsenic acid, solid**

1555 **Arsenic bromide**

1556 **Arsenic compound, liquid, n.o.s.**, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides

1557 **Arsenic compound, solid, n.o.s.**, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides

1558 **Arsenic**

1559 **Arsenic pentoxide**

1560 **Arsenic trichloride**

1561 **Arsenic trioxide**

1562 **Arsenical dust**

1564 **Barium compound, n.o.s.**

1565 **Barium cyanide**

1566 **Beryllium compound, n.o.s.**

1567 **Beryllium powder**

1569 **Bromoacetone**

1570 **Brucine**

1571 **Barium azide, wetted** with not less than 50% water, by mass

1572 **Cacodylic acid**

1573 **Calcium arsenate**

1574 **Calcium arsenate and calcium arsenite mixture, solid**

1575 **Calcium cyanide**

1577 **Chlorodinitrobenzenes, liquid**

1578 **Chloronitrobenzenes, solid**

1579 **4-Chloro-o-toluidine hydrochloride, solid**

1580 **Chloropicrin**

1581 **Chloropicrin and methyl bromide mixture** with more than 2% chloropicrin

1582 **Chloropicrin and methyl chloride mixture**

1583 **Chloropicrin mixture, n.o.s.**

1585 **Copper acetoarsenite**

1586 **Copper arsenite**

1587 **Copper cyanide**

1588 **Cyanides, inorganic, solid, n.o.s.**

1589 **Cyanogen chloride, stabilized**

1590 **Dichloroanilines, liquid**

1591 **o-Dichlorobenzene**

1593 **Dichloromethane**

1594 **Diethyl sulphate**

1595 **Dimethyl sulphate**

1596 **Dinitroanilines**

1597 **Dinitrobenzenes, liquid**

1598 **Dinitro-o-cresol**

1599 **Dinitrophenol solution**

1600 **Dinitrotoluenes, molten**

1601 **Disinfectant, solid, toxic, n.o.s.**

1602 **Dye intermediate, liquid, toxic, n.o.s.**

or **Dye, liquid, toxic, n.o.s.**

1603 **Ethyl bromoacetate**

1604 **Ethylenediamine**

1605 **Ethylene dibromide**

1606 **Ferric arsenate**

1607 **Ferric arsenite**

1608 **Ferrous arsenate**

1611 **Hexaethyl tetraphosphate**

1612 **Hexaethyl tetraphosphate and compressed gas mixture**

1613 **Hydrocyanic acid, aqueous solution** with not more than 20% hydrogen cyanide

or **Hydrogen cyanide, aqueous solution** with not more than 20% hydrogen cyanide

1614 **Hydrogen cyanide, stabilized** containing less than 3% water and absorbed in a porous inert material

1616 **Lead acetate**

1617 **Lead arsenates**

1618 **Lead arsenites**

1620 **Lead cyanide**

1621 **London Purple**
1622 **Magnesium arsenate**
1623 **Mercuric arsenate**
1624 **Mercuric chloride**
1625 **Mercuric nitrate**
1626 **Mercuric potassium cyanide**
1627 **Mercurous nitrate**
1629 **Mercury acetate**
1630 **Mercury ammonium chloride**
1631 **Mercury benzoate**
1634 **Mercury bromides**
1636 **Mercury cyanide**
1637 **Mercury gluconate**
1638 **Mercury iodide**
1639 **Mercury nucleate**
1640 **Mercury oleate**
1641 **Mercury oxide**
1642 **Mercury oxycyanide, desensitized**
1643 **Mercury potassium iodide**
1644 **Mercury salicylate**
1645 **Mercury sulphate**
1646 **Mercury thiocyanate**
1647 **Methyl bromide and ethylene dibromide mixture, liquid**
1648 **Acetonitrile**
1649 **Motor fuel anti-knock mixture**
1650 **beta-Naphthylamine, solid**
1651 **Naphthylthiourea**
1652 **Naphthylurea**
1653 **Nickel cyanide**
1654 **Nicotine**
1655 **Nicotine compound, solid, n.o.s.**
or **Nicotine preparation, solid, n.o.s.**
1656 **Nicotine hydrochloride, liquid**
or **Nicotine hydrochloride solution**
1657 **Nicotine salicylate**
1658 **Nicotine sulphate solution**
1659 **Nicotine tartrate**
1660 **Nitric oxide, compressed**
1661 **Nitroanilines** (o-,m-,p-)
1662 **Nitrobenzene**
1663 **Nitrophenols** (o-,m-,p-)
1664 **Nitrotoluenes, liquid**
1665 **Nitroxylenes, liquid**
1669 **Pentachloroethane**
1670 **Perchloromethyl mercaptan**
1671 **Phenol, solid**
1672 **Phenylcarbylamine chloride**
1673 **Phenylenediamines** (o-,m-,p-)
1674 **Phenylmercuric acetate**
1677 **Potassium arsenate**
1678 **Potassium arsenite**
1679 **Potassium cuprocyanide**
1680 **Potassium cyanide, solid**
1683 **Silver arsenite**
1684 **Silver cyanide**
1685 **Sodium arsenate**
1686 **Sodium arsenite, aqueous solution**
1687 **Sodium azide**
1688 **Sodium cacodylate**
1689 **Sodium cyanide, solid**
1690 **Sodium fluoride, solid**
1691 **Strontium arsenite**
1692 **Strychnine**
or **Strychnine salts**
1693 **Tear gas substance, liquid, n.o.s.**
1694 **Bromobenzyl cyanides, liquid**
1695 **Chloroacetone, stabilized**
1697 **Chloroacetophenone, solid**
1698 **Diphenylamine chloroarsine**
1699 **Diphenylchloroarsine, liquid**
1700 **Tear gas candles**
1701 **Xylyl bromide, liquid**
1702 **1,1,2,2-Tetrachloroethane**
1704 **Tetraethyl dithiopyrophosphate**
1707 **Thallium compound, n.o.s.**
1708 **Toluidines, liquid**
1709 **2,4-Toluylenediamine, solid**
1710 **Trichloroethylene**
1711 **Xylidines, liquid**
1712 **Zinc arsenate**
or **Zinc arsenate and zinc arsenite mixture**
or **Zinc arsenite**
1713 **Zinc cyanide**
1714 **Zinc phosphide**
1715 **Acetic anhydride**
1716 **Acetyl bromide**

1717 **Acetyl chloride**

1718 **Butyl acid phosphate**

1719 **Caustic alkali liquid, n.o.s.**

1722 **Allyl chloroformate**

1723 **Allyl iodide**

1724 **Allyltrichlorosilane, stabilized**

1725 **Aluminium bromide, anhydrous**

1726 **Aluminium chloride, anhydrous**

1727 **Ammonium hydrogendifluoride, solid**

1728 **Amyltrichlorosilane**

1729 **Anisoyl chloride**

1730 **Antimony pentachloride, liquid**

1731 **Antimony pentachloride solution**

1732 **Antimony pentafluoride**

1733 **Antimony trichloride**

1736 **Benzoyl chloride**

1737 **Benzyl bromide**

1738 **Benzyl chloride**

1739 **Benzyl chloroformate**

1740 **Hydrogendifluorides, solid, n.o.s.**

1741 **Boron trichloride**

1742 **Boron trifluoride acetic acid complex, liquid**

1743 **Boron trifluoride propionic acid complex, liquid**

1744 **Bromine**

or **Bromine solution**

1745 **Bromine pentafluoride**

1746 **Bromine trifluoride**

1747 **Butyltrichlorosilane**

1748 **Calcium hypochlorite, dry**

or **Calcium hypochlorite mixture, dry** with more than 39% available chlorine (8.8% available oxygen)

1749 **Chlorine trifluoride**

1750 **Chloroacetic acid solution**

1751 **Chloroacetic acid, solid**

1752 **Chloroacetyl chloride**

1753 **Chlorophenyltrichlorosilane**

1754 **Chlorosulphonic acid** (with or without sulphur trioxide)

1755 **Chromic acid solution**

1756 **Chromic fluoride, solid**

1757 **Chromic fluoride solution**

1758 **Chromium oxychloride**

1759 **Corrosive solid, n.o.s.**

1760 **Corrosive liquid, n.o.s.**

1761 **Cupriethylenediamine solution**

1762 **Cyclohexenyltrichlorosilane**

1763 **Cyclohexyltrichlorosilane**

1764 **Dichloroacetic acid**

1765 **Dichloroacetyl chloride**

1766 **Dichlorophenyltrichlorosilane**

1767 **Diethyldichlorosilane**

1768 **Difluorophosphoric acid, anhydrous**

1769 **Diphenyldichlorosilane**

1770 **Diphenylmethyl bromide**

1771 **Dodecyltrichlorosilane**

1773 **Ferric chloride, anhydrous**

1774 **Fire extinguisher charges**, corrosive liquid

1775 **Fluoroboric acid**

1776 **Fluorophosphoric acid, anhydrous**

1777 **Fluorosulphonic acid**

1778 **Fluorosilicic acid**

1779 **Formic acid** with more than 85% acid by mass

1780 **Fumaryl chloride**

1781 **Hexadecyltrichlorosilane**

1782 **Hexafluorophosphoric acid**

1783 **Hexamethylenediamine solution**

1784 **Hexyltrichlorosilane**

1786 **Hydrofluoric acid and sulphuric acid mixture**

1787 **Hydriodic acid**

1788 **Hydrobromic acid**, more than 49% strength

or **Hydrobromic acid**, not more than 49% strength

1789 **Hydrochloric acid**

1790 **Hydrofluoric acid**, with more than 60% hydrogen fluoride

or **Hydrofluoric acid**, with not more than 60% hydrogen fluoride

1791 **Hypochlorite solution**

1792 **Iodine monochloride, solid**

1793 **Isopropyl acid phosphate**

1794 **Lead sulphate** with more than 3% free acid

1796 **Nitrating acid mixture** with more than 50% nitric acid

or **Nitrating acid mixture** with not more than 50% nitric acid

1798 **Nitrohydrochloric acid**

1799 **Nonyltrichlorosilane**

1800 **Octadecyltrichlorosilane**

1801 **Octyltrichlorosilane**

1802 **Perchloric acid** with not more than 50% acid, by mass

1803 **Phenolsulphonic acid, liquid**

1804 **Phenyltrichlorosilane**

1805 **Phosphoric acid, solution**

1806 **Phosphorus pentachloride**

1807 **Phosphorus pentoxide**

1808 **Phosphorus tribromide**

1809 **Phosphorus trichloride**

1810 **Phosphorus oxychloride**

1811 **Potassium hydrogendifluoride, solid**

1812 **Potassium fluoride, solid**

1813 **Potassium hydroxide, solid**

1814 **Potassium hydroxide solution**

1815 **Propionyl chloride**

1816 **Propyltrichlorosilane**

1817 **Pyrosulphuryl chloride**

1818 **Silicon tetrachloride**

1819 **Sodium aluminate solution**

1823 **Sodium hydroxide, solid**

1824 **Sodium hydroxide solution**

1825 **Sodium monoxide**

1826 **Nitrating acid mixture, spent** with more than 50% nitric acid

or **Nitrating acid mixture, spent** with not more than 50% nitric acid

1827 **Stannic chloride, anhydrous**

1828 **Sulphur chlorides**

1829 **Sulphur trioxide, stabilized**

1830 **Sulphuric acid** with more than 51% acid

1831 **Sulphuric acid, fuming**

1832 **Sulphuric acid, spent**

1833 **Sulphurous acid**

1834 **Sulphuryl chloride**

1835 **Tetramethylammonium hydroxide solution**

1836 **Thionyl chloride**

1837 **Thiophosphoryl chloride**

1838 **Titanium tetrachloride**

1839 **Trichloroacetic acid**

1840 **Zinc chloride solution**

1841 **Acetaldehyde ammonia**

1843 **Ammonium dinitro-o-cresolate, solid**

1845 **Carbon dioxide, solid**

or **Dry ice**

1846 **Carbon tetrachloride**

1847 **Potassium sulphide, hydrated** with not less than 30% water of crystallization

1848 **Propionic acid** with not less than 10% and less than 90% acid by mass

1849 **Sodium sulphide, hydrated** with not less than 30% water

1851 **Medicine, liquid, toxic, n.o.s.**

1854 **Barium alloys, pyrophoric**

1855 **Calcium alloys, pyrophoric**

or **Calcium, pyrophoric**

1856 **Rags, oily**

1857 **Textile waste, wet**

1858 **Hexafluoropropylene**

or **Refrigerant gas R 1216**

1859 **Silicon tetrafluoride**

1860 **Vinyl fluoride, stabilized**

1862 **Ethyl crotonate**

1863 **Fuel, aviation, turbine engine**

1865 **n-Propyl nitrate**

1866 **Resin solution**, flammable

1868 **Decaborane**

1869 **Magnesium** in pellets, turnings or ribbons

or **Magnesium alloys** with more than 50% magnesium in pellets, turnings or ribbons

1870 **Potassium borohydride**

1871 **Titanium hydride**

1872 **Lead dioxide**

1873 **Perchloric acid** with more than 50% but not more than 72% acid, by mass

1884 **Barium oxide**

1885 **Benzidine**

1886 **Benzylidene chloride**

1887 **Bromochloromethane**

1888 **Chloroform**

1889 **Cyanogen bromide**

1891 **Ethyl bromide**

1892 **Ethyldichloroarsine**

1894 **Phenylmercuric hydroxide**

1895 **Phenylmercuric nitrate**

1897 **Tetrachloroethylene**

1898 **Acetyl iodide**

1902 **Diisooctyl acid phosphate**

1903 **Disinfectant, liquid, corrosive, n.o.s.**

1905 **Selenic acid**

1906 **Sludge acid**

1907 **Soda lime** with more than 4% sodium hydroxide

1908 **Chlorite solution**

1910 **Calcium oxide**

1911 **Diborane**

1912 **Methyl chloride and methylene chloride mixture**

1913 **Neon, refrigerated liquid**

1914 **Butyl propionates**

1915 **Cyclohexanone**

1916 **2,2'-Dichlorodiethyl ether**

1917 **Ethyl acrylate, stabilized**

1918 **Isopropylbenzene**

1919 **Methyl acrylate, stabilized**

1920 **Nonanes**

1921 **Propyleneimine, stabilized**

1922 **Pyrrolidine**

1923 **Calcium dithionite**

or **Calcium hydrosulphite**

1928 **Methyl magnesium bromide in ethyl ether**

1929 **Potassium dithionite**

or **Potassium hydrosulphite**

1931 **Zinc dithionite**

or **Zinc hydrosulphite**

1932 **Zirconium scrap**

1935 **Cyanide solution, n.o.s.**

1938 **Bromoacetic acid solution**

1939 **Phosphorus oxybromide**

1940 **Thioglycolic acid**

1941 **Dibromodifluoromethane**

1942 **Ammonium nitrate** with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance

1944 **Matches, safety** (book, card or strike on box)

1945 **Matches, wax 'vesta'**

1950 **Aerosols**, flammable

or **Aerosols**, flammable, containing substances in Division 6.1, Packing Group II

or **Aerosols**, flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III

or **Aerosols**, flammable, containing toxic gas

or **Aerosols**, flammable, corrosive, containing substances in Class 8, Packing Group II

or **Aerosols**, flammable, corrosive, containing substances in Class 8, Packing Group III

or **Aerosols**, flammable (engine starting fluid)

or **Aerosols**, flammable, toxic, containing substances in Division 6.1, Packing Group III

or **Aerosols**, non-flammable

or **Aerosols**, non-flammable, containing substances in Class 8, Packing Group II

or **Aerosols**, non-flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III

or **Aerosols**, non-flammable, containing substances in Division 6.1, Packing Group II (other than tear gas devices)

or **Aerosols**, non-flammable, containing toxic gas

or **Aerosols**, non-flammable, corrosive, containing substances in Class 8, Packing Group III

or **Aerosols**, non-flammable (tear gas devices)

or **Aerosols**, non-flammable, toxic, containing substances in Division 6.1, Packing Group III

or **Aerosols**, oxidizing

1951 **Argon, refrigerated liquid**

1952 **Ethylene oxide and carbon dioxide mixture**, with not more than 9% ethylene oxide

1953 **Compressed gas, toxic, flammable, n.o.s.**

1954 **Compressed gas, flammable, n.o.s.**

1955 **Compressed gas, toxic, n.o.s.**

1956 **Compressed gas, n.o.s.**

1957 **Deuterium, compressed**

1958 **1,2-Dichloro-1,1,2,2-tetrafluoroethane**

or **Refrigerant gas R 114**

1959 **1,1-Difluoroethylene**

or **Refrigerant gas R 1132a**

1961 **Ethane, refrigerated liquid**

1962 **Ethylene**

1963 **Helium, refrigerated liquid**

1964 **Hydrocarbon gas mixture, compressed, n.o.s.**

1965 **Hydrocarbon gas mixture, liquefied, n.o.s.**

1966 **Hydrogen, refrigerated liquid**

1967 **Insecticide gas, toxic, n.o.s.**

1968 **Insecticide gas, n.o.s.**

1969 **Isobutane**

1970 **Krypton, refrigerated liquid**

1971 **Methane, compressed**

or **Natural gas, compressed** with high methane content

1972 **Methane, refrigerated liquid** with high methane content

or **Natural gas, refrigerated liquid** with high methane content

1973 **Chlorodifluoromethane and chloropentafluoroethane mixture** with fixed boiling point, with approximately 49% chlorodifluoromethane

or **Refrigerant gas R 502**

1974 **Chlorodifluorobromomethane**

or **Refrigerant gas R 12B1**

1975 **Nitric oxide and dinitrogen tetroxide mixture**

or **Nitric oxide and nitrogen dioxide mixture**

1976 **Octafluorocyclobutane**

or **Refrigerant gas R C318**

1977 **Nitrogen, refrigerated liquid**

1978 **Propane**

1982 **Refrigerant gas R 14**

or **Tetrafluoromethane**

1983 **1-Chloro-2,2,2-trifluoroethane**

or **Refrigerant gas R 133a**

1984 **Refrigerant gas R 23**

or **Trifluoromethane**

1986 **Alcohols, flammable, toxic, n.o.s.**

1987 **Alcohols, n.o.s.**

1988 **Aldehydes, flammable, toxic, n.o.s.**

1989 **Aldehydes, n.o.s.**

1990 **Benzaldehyde**

1991 **Chloroprene, stabilized**

1992 **Flammable liquid, toxic, n.o.s.**

1993 **Flammable liquid, n.o.s.**

1994 **Iron pentacarbonyl**

1999 **Tars, liquid**, including road oils, and cutback bitumens

2000 **Celluloid**, in blocks, rods, rolls, sheets, tubes, etc. (except scrap)

2001 **Cobalt naphthenates, powder**

2002 **Celluloid, scrap**

2004 **Magnesium diamide**

2006 **Plastics, nitrocellulose-based, self-heating, n.o.s.**

2008 **Zirconium powder, dry**

2009 **Zirconium, dry**, finished sheets, strip or coiled wire (thinner than 18 microns)

2010 **Magnesium hydride**

2011 **Magnesium phosphide**

2012 **Potassium phosphide**

2013 **Strontium phosphide**

2014 **Hydrogen peroxide, aqueous solution** with more than 40% but not more than 60% hydrogen peroxide (stabilized as necessary)

or **Hydrogen peroxide, aqueous solution** with not less than 20% but not more than 40% hydrogen peroxide (stabilized as necessary)

2015 **Hydrogen peroxide, aqueous solution, stabilized** with more than 60% hydrogen peroxide

or **Hydrogen peroxide, stabilized**

2016 **Ammunition, toxic, non-explosive** without burster or expelling charge, non-fuzed

2017 **Ammunition, tear-producing, non-explosive** without burster or expelling charge, non-fuzed

2018 **Chloroanilines, solid**

2019 **Chloroanilines, liquid**

2020 **Chlorophenols, solid**

2021 **Chlorophenols, liquid**

2022 **Cresylic acid**

2023 **Epichlorohydrin**

2024 **Mercury compound, liquid, n.o.s.**

2025 **Mercury compound, solid, n.o.s.**

2026 **Phenylmercuric compound, n.o.s.**

2027 **Sodium arsenite, solid**

2028 **Bombs, smoke, non-explosive** with corrosive liquid, without initiating device

2029 **Hydrazine, anhydrous**

2030 **Hydrazine, aqueous solution** with more than 37% hydrazine by mass

2031 **Nitric acid**, other than red fuming, with at least 65% but not more than 70% nitric acid

or **Nitric acid**, other than red fuming, with more than 20% and less than 65% nitric acid

or **Nitric acid**, other than red fuming, with more than 70% nitric acid

or **Nitric acid**, other than red fuming, with not more than 20% nitric acid

2032 **Nitric acid, red fuming**

2033 **Potassium monoxide**

2034 **Hydrogen and methane mixture, compressed**

2035 **Refrigerant gas R 143a**

or **1,1,1-Trifluoroethane**

2036 **Xenon**

2037 **Gas cartridges**, (flammable) without a release device, non-refillable

or **Gas cartridges** (non-flammable) without a release device, non-refillable

or **Gas cartridges** (oxidizing) without a release device, non-refillable

or **Gas cartridges** (toxic & corrosive) without a release device, non-refillable

or **Gas cartridges** (toxic, flammable & corrosive) without a release device, non-refillable

or **Gas cartridges** (toxic & flammable) without a release device, non-refillable

or **Gas cartridges** (toxic, oxidizing & corrosive) without a release device, non-refillable

or **Gas cartridges** (toxic & oxidizing) without a release device, non-refillable

or **Gas cartridges** (toxic) without a release device, non-refillable

or **Receptacles, small, containing gas** (flammable) without a release device, non-refillable

or **Receptacles, small, containing gas** (non-flammable) without a release device, non-refillable

or **Receptacles, small, containing gas** (oxidizing) without a release device, non-refillable

or **Receptacles, small, containing gas** (toxic & corrosive) without a release device, non-refillable

or **Receptacles, small, containing gas** (toxic, flammable & corrosive) without a release device, non-refillable

or **Receptacles, small, containing gas** (toxic & flammable) without a release device, non-refillable

or **Receptacles, small, containing gas** (toxic, oxidizing & corrosive) without a release device, non-refillable

or **Receptacles, small, containing gas** (toxic & oxidizing) without a release device, non-refillable

or **Receptacles, small, containing gas** (toxic) without a release device, non-refillable

2038 **Dinitrotoluenes, liquid**

2044 **2,2-Dimethylpropane**

2045 **Isobutyl aldehyde**

or **Isobutyraldehyde**

2046 **Cymenes**

2047 **Dichloropropenes**

2048 **Dicyclopentadiene**

2049 **Diethylbenzene**

2050 **Diisobutylene, isomeric compounds**

2051 **2-Dimethylaminoethanol**

2052 **Dipentene**

2053 **Methyl isobutyl carbinol**

2054 **Morpholine**

2055 **Styrene monomer, stabilized**

2056 **Tetrahydrofuran**

2057 **Tripropylene**

2058 **Valeraldehyde**

2059 **Nitrocellulose solution, flammable** with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose

2067 **Ammonium nitrate based fertilizer**

2071 **Ammonium nitrate based fertilizer**

2073 **Ammonia solution**, relative density less than 0.880 at 15ºC in water, with more than 35% but not more than 50% ammonia

2074 **Acrylamide, solid**

2075 **Chloral, anhydrous, stabilized**

2076 **Cresols, liquid**

2077 **alpha-Naphthylamine**

2078 **Toluene diisocyanate**

2079 **Diethylenetriamine**

2186 **Hydrogen chloride, refrigerated liquid**

2187 **Carbon dioxide, refrigerated liquid**

2188 **Arsine**

2189 **Dichlorosilane**

2190 **Oxygen difluoride, compressed**

2191 **Sulphuryl fluoride**

2192 **Germane**

2193 **Hexafluoroethane**

or **Refrigerant gas R 116**

2194 **Selenium hexafluoride**

2195 **Tellurium hexafluoride**

2196 **Tungsten hexafluoride**

2197 **Hydrogen iodide, anhydrous**

2198 **Phosphorus pentafluoride**

2199 **Phosphine**

2200 **Propadiene, stabilized**

2201 **Nitrous oxide, refrigerated liquid**

2202 **Hydrogen selenide, anhydrous**

2203 **Silane**

2204 **Carbonyl sulphide**

2205 **Adiponitrile**

2206 **Isocyanate solution, toxic, n.o.s.**

or **Isocyanates, toxic, n.o.s.**

2208 **Calcium hypochlorite mixture, dry** with more than 10% but not more than 39% available chlorine

2209 **Formaldehyde solution** with not less than 25% formaldehyde

2210 **Maneb**

or **Maneb preparation** with not less than 60% maneb

2211 **Polymeric beads, expandable**, evolving flammable

2212 **Asbestos, amphibole** (amosite, tremolite, actinolite, anthophyllite, crocidolite)

2213 **Paraformaldehyde**

2214 **Phthalic anhydride** with more than 0.05% of maleic anhydride

2215 **Maleic anhydride**

or **Maleic anhydride, molten**

2216 **Fish meal, stabilized**

or **Fish scrap, stabilized**

2217 **Seed cake** with not more than 1.5% oil and not more than 11% moisture

2218 **Acrylic acid, stabilized**

2219 **Allyl glycidyl ether**

2222 **Anisole**

2224 **Benzonitrile**

2225 **Benzenesulphonyl chloride**

2226 **Benzotrichloride**

2227 **n-Butyl methacrylate, stabilized**

2232 **2-Chloroethanal**

2233 **Chloroanisidines**

2234 **Chlorobenzotrifluorides**

2235 **Chlorobenzyl chlorides, liquid**

2236 **3-Chloro-4-methylphenyl isocyanate, liquid**

2237 **Chloronitroanilines**

2238 **Chlorotoluenes**

2239 **Chlorotoluidines, solid**

2240 **Chromosulphuric acid**

2241 **Cycloheptane**

2242 **Cycloheptene**

2243 **Cyclohexyl acetate**

2244 **Cyclopentanol**

2245 **Cyclopentanone**

2246 **Cyclopentene**

2247 **n-Decane**

2248 **Di-n-butylamine**

2249 **Dichlorodimethyl ether, symmetrical**

2250 **Dichlorophenyl isocyanates**

2251 **Bicyclo [2.2.1]-hepta-2, 5-diene, stabilized**

or **2,5-Norbornadiene, stabilized**

2252 **1,2-Dimethoxyethane**

2253 **N,N-Dimethylaniline**

2254 **Matches, fusee**

2256 **Cyclohexene**

2257 **Potassium**

2258 **1,2-Propylenediamine**

2259 **Triethylenetetramine**

2260 **Tripropylamine**

2261 **Xylenols, solid**

2262 **Dimethylcarbamoyl chloride**

2263 **Dimethylcyclohexanes**

2264 **N,N-Dimethylcyclohexylamine**

2265 **N,N-Dimethylformamide**

2266 **Dimethyl-N-propylamine**

2267 **Dimethyl thiophosphoryl chloride**

2269 **3,3'-Iminodipropylamine**

2270 **Ethylamine, aqueous solution** with not less than 50% but not more than 70% ethylamine

2271 **Ethyl amyl ketone**

2272 **N-Ethylaniline**

2273 **2-Ethylaniline**

2274 **N-Ethyl-N-benzylaniline**

2275 **2-Ethylbutanol**

2276 **2-Ethylhexylamine**

2277 **Ethyl methacrylate, stabilized**

2278 **n-Heptene**

2279 **Hexachlorobutadiene**

2280 **Hexamethylenediamine, solid**

2281 **Hexamethylene diisocyanate**

2282 **Hexanols**

2283 **Isobutyl methacrylate, stabilized**

2284 **Isobutyronitrile**

2285 **Isocyanatobenzotrifluorides**

2286 **Pentamethylheptane**

2287 **Isoheptene**

2288 **Isohexene**

2289 **Isophoronediamine**

2290 **Isophorone diisocyanate**

2291 **Lead compound, soluble, n.o.s.**

2293 **4-Methoxy-4-methylpentan-2-one**

2294 **N-Methylaniline**

2295 **Methyl chloroacetate**

2296 **Methylcyclohexane**

2297 **Methylcyclohexanone**

2298 **Methylcyclopentane**

2299 **Methyl dichloroacetate**

2300 **2-Methyl-5-ethylpyridine**

2301 **2-Methylfuran**

2302 **5-Methylhexan-2-one**
2303 **Isopropenylbenzene**
2304 **Naphthalene, molten**
2305 **Nitrobenzenesulphonic acid**
2306 **Nitrobenzotrifluorides, liquid**
2307 **3-Nitro-4-chlorobenzotrifluoride**
2308 **Nitrosylsulphuric acid, liquid**
2309 **Octadiene**
2310 **Pentane-2,4-dione**
2311 **Phenetidines**
2312 **Phenol, molten**
2313 **Picolines**
2315 **Polychlorinated biphenyls, liquid**
2316 **Sodium cuprocyanide, solid**
2317 **Sodium cuprocyanide solution**
2318 **Sodium hydrosulphide** with less than 25% water of crystallization
2319 **Terpene hydrocarbons, n.o.s.**
2320 **Tetraethylenepentamine**
2321 **Trichlorobenzenes, liquid**
2322 **Trichlorobutene**
2323 **Triethyl phosphite**
2324 **Triisobutylene**
2325 **1,3,5-Trimethylbenzene**
2326 **Trimethylcyclohexylamine**
2327 **Trimethylhexamethylenediamines**
2328 **Trimethylhexamethylene diisocyanate**
2329 **Trimethyl phosphite**
2330 **Undecane**
2331 **Zinc chloride, anhydrous**
2332 **Acetaldehyde oxime**
2333 **Allyl acetate**
2334 **Allylamine**
2335 **Allyl ethyl ether**
2336 **Allyl formate**
2337 **Phenyl mercaptan**
2338 **Benzotrifluoride**
2339 **2-Bromobutane**
2340 **2-Bromoethyl ethyl ether**
2341 **1-Bromo-3-methylbutane**
2342 **Bromomethylpropanes**
2343 **2-Bromopentane**
2344 **Bromopropanes**
2345 **3-Bromopropyne**
2346 **Butanedione**
2347 **Butyl mercaptan**
2348 **Butyl acrylates, stabilized**
2350 **Butyl methyl ether**
2351 **Butyl nitrites**
2352 **Butyl vinyl ether, stabilized**
2353 **Butyryl chloride**
2354 **Chloromethyl ethyl ether**
2356 **2-Chloropropane**
2357 **Cyclohexylamine**
2358 **Cyclooctatetraene**
2359 **Diallylamine**
2360 **Diallyl ether**
2361 **Diisobutylamine**
2362 **1,1-Dichloroethane**
2363 **Ethyl mercaptan**
2364 **n-Propylbenzene**
2366 **Diethyl carbonate**
2367 **alpha-Methylvaleraldehyde**
2368 **alpha-Pinene**
2370 **1-Hexene**
2371 **Isopentenes**
2372 **1,2-Di-(dimethylamino) ethane**
2373 **Diethoxymethane**
2374 **3,3-Diethoxypropene**
2375 **Diethyl sulphide**
2376 **2,3-Dihydropyran**
2377 **1,1-Dimethoxyethane**
2378 **2-Dimethylaminoacetonitrile**
2379 **1,3-Dimethylbutylamine**
2380 **Dimethyldiethoxysilane**
2381 **Dimethyl disulphide**
2382 **Dimethylhydrazine, symmetrical**
2383 **Dipropylamine**
2384 **Di-n-propyl ether**
2385 **Ethyl isobutyrate**
2386 **1-Ethylpiperidine**
2387 **Fluorobenzene**
2388 **Fluorotoluenes**
2389 **Furan**
2390 **2-Iodobutane**
2391 **Iodomethylpropanes**

2392 **Iodopropanes**
2393 **Isobutyl formate**
2394 **Isobutyl propionate**
2395 **Isobutyryl chloride**
2396 **Methacrylaldehyde, stabilized**
2397 **3-Methylbutan-2-one**
2398 **Methyl tert-butyl ether**
2399 **1-Methylpiperidine**
2400 **Methyl isovalerate**
2401 **Piperidine**
2402 **Propanethiols**
2403 **Isopropenyl acetate**
2404 **Propionitrile**
2405 **Isopropyl butyrate**
2406 **Isopropyl isobutyrate**
2407 **Isopropyl chloroformate**
2409 **Isopropyl propionate**
2410 **1,2,3,6-Tetrahydropyridine**
2411 **Butyronitrile**
2412 **Tetrahydrothiophene**
2413 **Tetrapropyl orthotitanate**
2414 **Thiophene**
2416 **Trimethyl borate**
2417 **Carbonyl fluoride**
2418 **Sulphur tetrafluoride**
2419 **Bromotrifluoroethylene**
2420 **Hexafluoroacetone**
2421 **Nitrogen trioxide**
2422 **Octafluorobut-2-ene**
or **Refrigerant gas R 1318**
2424 **Octafluoropropane**
or **Refrigerant gas R 218**
2426 **Ammonium nitrate, liquid** (hot concentrated solution)
2427 **Potassium chlorate, aqueous solution**
2428 **Sodium chlorate, aqueous solution**
2429 **Calcium chlorate, aqueous solution**
2430 **Alkylphenols, solid, n.o.s.** (including C_2-C_{12} homologues)
2431 **Anisidines**
2432 **N,N-Diethylaniline**
2433 **Chloronitrotoluenes, liquid**
2434 **Dibenzyldichlorosilane**
2435 **Ethylphenyldichlorosilane**
2436 **Thioacetic acid**
2437 **Methylphenyldichlorosilane**
2438 **Trimethylacetyl chloride**
2439 **Sodium hydrogendifluoride**
2440 **Stannic chloride pentahydrate**
2441 **Titanium trichloride mixture, pyrophoric**
or **Titanium trichloride, pyrophoric**
2442 **Trichloroacetyl chloride**
2443 **Vanadium oxytrichloride**
2444 **Vanadium tetrachloride**
2446 **Nitrocresols, solid**
2447 **Phosphorus, white, molten**
2448 **Sulphur, molten**
2451 **Nitrogen trifluoride**
2452 **Ethylacetylene, stabilized**
2453 **Ethyl fluoride**
or **Refrigerant gas R 161**
2454 **Methyl fluoride**
or **Refrigerant gas R 41**
2456 **2-Chloropropene**
2457 **2,3-Dimethylbutane**
2458 **Hexadiene**
2459 **2-Methyl-1-butene**
2460 **2-Methyl-2-butene**
2461 **Methylpentadiene**
2463 **Aluminium hydride**
2464 **Beryllium nitrate**
2465 **Dichloroisocyanuric acid, dry**
or **Dichloroisocyanuric acid salts**
2466 **Potassium superoxide**
2468 **Trichloroisocyanuric acid, dry**
2469 **Zinc bromate**
2470 **Phenylacetonitrile, liquid**
2471 **Osmium tetroxide**
2473 **Sodium arsanilate**
2474 **Thiophosgene**
2475 **Vanadium trichloride**
2477 **Methyl isothiocyanate**
2478 **Isocyanates, flammable, toxic, n.o.s.**
or **Isocyanate solution, flammable, toxic, n.o.s.**
2480 **Methyl isocyanate**
2481 **Ethyl isocyanate**
2482 **n-Propyl isocyanate**

2483 **Isopropyl isocyanate**

2484 **tert-Butyl isocyanate**

2485 **n-Butyl isocyanate**

2486 **Isobutyl isocyanate**

2487 **Phenyl isocyanate**

2488 **Cyclohexyl isocyanate**

2490 **Dichloroisopropyl ether**

2491 **Ethanolamine**

or **Ethanolamine solution**

2493 **Hexamethyleneimine**

2495 **Iodine pentafluoride**

2496 **Propionic anhydride**

2498 **1,2,3,6-Tetrahydrobenzaldehyde**

2501 **Tris-(1-aziridinyl) phosphine oxide solution**

2502 **Valeryl chloride**

2503 **Zirconium tetrachloride**

2504 **Tetrabromoethane**

2505 **Ammonium fluoride**

2506 **Ammonium hydrogen sulphate**

2507 **Chloroplatinic acid, solid**

2508 **Molybdenum pentachloride**

2509 **Potassium hydrogen sulphate**

2511 **2-Chloropropionic acid**

2512 **Aminophenols** (o-,m-,p-)

2513 **Bromoacetyl bromide**

2514 **Bromobenzene**

2515 **Bromoform**

2516 **Carbon tetrabromide**

2517 **1-Chloro-1,1-difluoroethane**

or **Refrigerant gas R 142b**

2518 **1,5,9-Cyclododecatriene**

2520 **Cyclooctadienes**

2521 **Diketene, stabilized**

2522 **2-Dimethylaminoethyl methacrylate, stabilized**

2524 **Ethyl orthoformate**

2525 **Ethyl oxalate**

2526 **Furfurylamine**

2527 **Isobutyl acrylate, stabilized**

2528 **Isobutyl isobutyrate**

2529 **Isobutyric acid**

2531 **Methacrylic acid, stabilized**

2533 **Methyl trichloroacetate**

2534 **Methylchlorosilane**

2535 **4-Methylmorpholine**

or **N-Methylmorpholine**

2536 **Methyltetrahydrofuran**

2538 **Nitronaphthalene**

2541 **Terpinolene**

2542 **Tributylamine**

2545 **Hafnium powder, dry**

2546 **Titanium powder, dry**

2547 **Sodium superoxide**

2548 **Chlorine pentafluoride**

2552 **Hexafluoroacetone hydrate, liquid**

2554 **Methylallyl chloride**

2555 **Nitrocellulose with water**, not less than 25% water by mass

2556 **Nitrocellulose with alcohol**, not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass

2557 **Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture without plasticizer, without pigment**

or **Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture without plasticizer, with pigment**

or **Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture with plasticizer, without pigment**

or **Nitrocellulose**, with not more than 12.6% nitrogen, by dry mass, **mixture with plasticizer, with pigment**

2558 **Epibromohydrin**

2560 **2-Methylpentan-2-ol**

2561 **3-Methyl-1-butene**

2564 **Trichloroacetic acid solution**

2565 **Dicyclohexylamine**

2567 **Sodium pentachlorophenate**

2570 **Cadmium compound**

2571 **Alkylsulphuric acids**

2572 **Phenylhydrazine**

2573 **Thallium chlorate**

2574 **Tricresyl phosphate** with more than 3% ortho isomer

2576 **Phosphorus oxybromide, molten**

2577 **Phenylacetyl chloride**

2578 **Phosphorus trioxide**

2579 **Piperazine**

2580 **Aluminium bromide solution**

2581 **Aluminium chloride solution**

2582 **Ferric chloride solution**

2583 **Alkylsulphonic acids, solid** with more than 5% free sulphuric acid

or **Arylsulphonic acids, solid** with more than 5% free sulphuric acid

2584 **Alkylsulphonic acids, liquid** with more than 5% free sulphuric acid

or **Arylsulphonic acids, liquid** with more than 5% free sulphuric acid

2585 **Alkylsulphonic acids, solid** with not more than 5% free sulphuric acid

or **Arylsulphonic acids, solid** with not more than 5% free sulphuric acid

2586 **Alkylsulphonic acids, liquid** with not more than 5% free sulphuric acid

or **Arylsulphonic acids, liquid** with not more than 5% free sulphuric acid

2587 **Benzoquinone**

2588 **Pesticide, solid, toxic, n.o.s.**

2589 **Vinyl chloroacetate**

2590 **Asbestos, chrysotile**

2591 **Xenon, refrigerated liquid**

2599 **Chlorotrifluoromethane and trifluoromethane azeotropic mixture** with approximately 60% chlorotrifluoromethane

or **Refrigerant gas R 503**

2601 **Cyclobutane**

2602 **Dichlorodifluoromethane and difluoroethane azeotropic mixture** with approximately 74% dichlorodifluoromethane

or **Refrigerant gas R 500**

2603 **Cycloheptatriene**

2604 **Boron trifluoride diethyl etherate**

2605 **Methoxymethyl isocyanate**

2606 **Methyl orthosilicate**

2607 **Acrolein dimer, stabilized**

2608 **Nitropropanes**

2609 **Triallyl borate**

2610 **Triallylamine**

2611 **Propylene chlorohydrin**

2612 **Methyl propyl ether**

2614 **Methallyl alcohol**

2615 **Ethyl propyl ether**

2616 **Triisopropyl borate**

2617 **Methylcyclohexanols**, flammable

2618 **Vinyltoluenes, stabilized**

2619 **Benzyldimethylamine**

2620 **Amyl butyrates**

2621 **Acetyl methyl carbinol**

2622 **Glycidaldehyde**

2623 **Firelighters, solid** with flammable liquid

2624 **Magnesium silicide**

2626 **Chloric acid, aqueous solution** with not more than 10% chloric acid

2627 **Nitrites, inorganic, n.o.s.**

2628 **Potassium fluoroacetate**

2629 **Sodium fluoroacetate**

2630 **Selenates**

or **Selenites**

2642 **Fluoroacetic acid**

2643 **Methyl bromoacetate**

2644 **Methyl iodide**

2645 **Phenacyl bromide**

2646 **Hexachlorocyclopentadiene**

2647 **Malononitrile**

2648 **1,2-Dibromobutan-3-one**

2649 **1,3-Dichloroacetone**

2650 **1,1-Dichloro-1-nitroethane**

2651 **4,4'-Diaminodiphenylmethane**

2653 **Benzyl iodide**

2655 **Potassium fluorosilicate**

2656 **Quinoline**

2657 **Selenium disulphide**

2659 **Sodium chloroacetate**

2660 **Nitrotoluidines (mono)**

2661 **Hexachloroacetone**

2664 **Dibromomethane**

2667 **Butyltoluenes**

2668 **Chloroacetonitrile**

2669 **Chlorocresols solution**

2670 **Cyanuric chloride**

2671 **Aminopyridines** (o-,m-,p-)

2672 **Ammonia solution**, relative density between 0.880 and 0.957 at 15ºC in water, with more than 10% but not more than 35% ammonia

2673 **2-Amino-4-chlorophenol**

2674 **Sodium fluorosilicate**

2676 **Stibine**

2677 **Rubidium hydroxide solution**

2678 **Rubidium hydroxide**

2679 **Lithium hydroxide solution**

2680 **Lithium hydroxide**

2681 **Caesium hydroxide solution**

2682 **Caesium hydroxide**

2683 **Ammonium sulphide solution**

2684 **3-Diethylaminopropylamine**

2685 **N,N-Diethylethylenediamine**

2686 **2-Diethylaminoethanol**

2687 **Dicyclohexylammonium nitrite**

2688 **1-Bromo-3-chloropropane**

2689 **Glycerol alpha-monochlorohydrin**

2690 **N,n-Butylimidazole**

2691 **Phosphorus pentabromide**

2692 **Boron tribromide**

2693 **Bisulphites, aqueous solution, n.o.s.**

2698 **Tetrahydrophthalic anhydrides** with more than 0.05% of maleic anhydride

2699 **Trifluoroacetic acid**

2705 **1-Pentol**

2707 **Dimethyldioxanes**

2709 **Butylbenzenes**

2710 **Dipropyl ketone**

2713 **Acridine**

2714 **Zinc resinate**

2715 **Aluminium resinate**

2716 **1,4-Butynediol**

2717 **Camphor**, synthetic

2719 **Barium bromate**

2720 **Chromium nitrate**

2721 **Copper chlorate**

2722 **Lithium nitrate**

2723 **Magnesium chlorate**

2724 **Manganese nitrate**

2725 **Nickel nitrate**

2726 **Nickel nitrite**

2727 **Thallium nitrate**

2728 **Zirconium nitrate**

2729 **Hexachlorobenzene**

2730 **Nitroanisoles, liquid**

2732 **Nitrobromobenzene, liquid**

2733 **Amines, flammable, corrosive, n.o.s.**

or **Polyamines, flammable, corrosive, n.o.s.**

2734 **Amines, liquid, corrosive, flammable, n.o.s.**

or **Polyamines, liquid, corrosive, flammable, n.o.s.**

2735 **Amines, liquid, corrosive, n.o.s.**

or **Polyamines, liquid, corrosive, n.o.s.**

2738 **N-Butylaniline**

2739 **Butyric anhydride**

2740 **n-Propyl chloroformate**

2741 **Barium hypochlorite** with more than 22% available chlorine

2742 **Chloroformates, toxic, corrosive, flammable, n.o.s.**

2743 **n-Butyl chloroformate**

2744 **Cyclobutyl chloroformate**

2745 **Chloromethyl chloroformate**

2746 **Phenyl chloroformate**

2747 **tert-Butylcyclohexyl chloroformate**

2748 **2-Ethylhexyl chloroformate**

2749 **Tetramethylsilane**

2750 **1,3-Dichloropropanol-2**

2751 **Diethylthiophosphoryl chloride**

2752 **1,2-Epoxy-3-ethoxypropane**

2753 **N-Ethylbenzyltoluidines, liquid**

2754 **N-Ethyltoluidines**

2757 **Carbamate pesticide, solid, toxic**

2758 **Carbamate pesticide, liquid, flammable, toxic**, flash point less than 23ºC

2759 **Arsenical pesticide, solid, toxic**

2760 **Arsenical pesticide, liquid, flammable, toxic**, flash point less than 23ºC

2761 **Organochlorine pesticide, solid, toxic**

2762 **Organochlorine pesticide, liquid, flammable, toxic**, flash point less than 23°C

2763 **Triazine pesticide, solid, toxic**

2764 **Triazine pesticide, liquid, flammable, toxic**, flash point less than 23°C

2771 **Thiocarbamate pesticide, solid, toxic**

2772 **Thiocarbamate pesticide, liquid, flammable, toxic**, flash point less than 23°C

2775 **Copper based pesticide, solid, toxic**

2776 **Copper based pesticide, liquid, flammable, toxic**, flash point less than 23ºC

2777 **Mercury based pesticide, solid, toxic**

2778 **Mercury based pesticide, liquid, flammable, toxic**, flash point less than 23°C

2779 **Substituted nitrophenol pesticide, solid, toxic**

2780 **Substituted nitrophenol pesticide, liquid, flammable, toxic**, flash point less than 23°C

2781 **Bipyridilium pesticide, solid, toxic**

2782 **Bipyridilium pesticide, liquid, flammable, toxic**, flash point less than 23ºC

2783 **Organophosphorus pesticide, solid, toxic**

2784 **Organophosphorus pesticide, liquid, flammable, toxic**, flash point less than 23°C

2785 **4-Thiapentanal**

2786 **Organotin pesticide, solid, toxic**

2787 **Organotin pesticide, liquid, flammable, toxic**, flash point less than 23°C

2788 **Organotin compound, liquid, n.o.s.**

2789 **Acetic acid, glacial**

or **Acetic acid solution**, more than 80% acid, by mass

2790 **Acetic acid solution**, more than 10% but less than 50% acid, by mass

or **Acetic acid solution**, not less than 50% but not more than 80% acid, by mass

2793 **Ferrous metal borings** in a form liable to self-heating

or **Ferrous metal cuttings** in a form liable to self-heating

or **Ferrous metal shavings** in a form liable to self-heating

or **Ferrous metal turnings** in a form liable to self-heating

2794 **Batteries, wet, filled with acid**, electric storage

2795 **Batteries, wet, filled with alkali**, electric storage

2796 **Battery fluid, acid**

or **Sulphuric acid** with not more than 51% acid

2797 **Battery fluid, alkali**

2798 **Phenylphosphorus dichloride**

2799 **Phenylphosphorus thiodichloride**

2800 **Batteries, wet, non-spillable**, electric storage

2801 **Dye intermediate, liquid, corrosive, n.o.s.**

or **Dye, liquid, corrosive, n.o.s.**

2802 **Copper chloride**

2803 **Gallium**

2805 **Lithium hydride, fused solid**

2806 **Lithium nitride**

2807 **Magnetized material**

2809 **Mercury**

2810 **Toxic liquid, organic, n.o.s.**

2811 **Toxic solid, organic, n.o.s.**

2812 **Sodium aluminate, solid**

2813 **Water-reactive solid, n.o.s.**

2814 **Infectious substance, affecting humans**

2815 **N-Aminoethylpiperazine**

2817 **Ammonium hydrogendifluoride solution**

2818 **Ammonium polysulphide solution**

2819 **Amyl acid phosphate**

2820 **Butyric acid**

2821 **Phenol solution**

2822 **2-Chloropyridine**

2823 **Crotonic acid, solid**

2826 **Ethyl chlorothioformate**

2829 **Caproic acid**

2830 **Lithium ferrosilicon**

2831 **1,1,1-Trichloroethane**

2834 **Phosphorous acid**

2835 **Sodium aluminium hydride**

2837 **Bisulphates, aqueous solution**

2838 **Vinyl butyrate, stabilized**

2839 **Aldol**

2840 **Butyraldoxime**

2841 **Di-n-amylamine**

2842 **Nitroethane**

2844 **Calcium manganese silicon**

2845 **Pyrophoric liquid, organic, n.o.s.**

2846 **Pyrophoric solid, organic, n.o.s.**

2849 **3-Chloropropanol-1**

2850 **Propylene tetramer**

2851 **Boron trifluoride dihydrate**

2852 **Dipicryl sulphide, wetted** with not less than 10% water, by mass

2853 **Magnesium fluorosilicate**

2854 **Ammonium fluorosilicate**

2855 **Zinc fluorosilicate**

2856 **Fluorosilicates, n.o.s.**

2857 **Refrigerating machines** containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)

2858 **Zirconium, dry**, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)

2859 **Ammonium metavanadate**

2861 **Ammonium polyvanadate**

2862 **Vanadium pentoxide**, non-fused form

2863 **Sodium ammonium vanadate**

2864 **Potassium metavanadate**

2865 **Hydroxylamine sulphate**

2869 **Titanium trichloride mixture**

2870 **Aluminium borohydride**

or **Aluminium borohydride in devices**

2871 **Antimony powder**

2872 **Dibromochloropropanes**

2873 **Dibutylaminoethanol**

2874 **Furfuryl alcohol**

2875 **Hexachlorophene**

2876 **Resorcinol**

2878 **Titanium sponge granules**

or **Titanium sponge powders**

2879 **Selenium oxychloride**

2880 **Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water

or **Calcium hypochlorite, hydrated mixture** with not less than 5.5% but not more than 16% water

2881 **Metal catalyst, dry**

2900 **Infectious substance, affecting animals** only

2901 **Bromine chloride**

2902 **Pesticide, liquid, toxic, n.o.s.**

2903 **Pesticide, liquid, toxic, flammable, n.o.s.**, flash point not less than 23°C

2904 **Chlorophenolates, liquid**

or **Phenolates, liquid**

2905 **Chlorophenolates, solid**

or **Phenolates, solid**

2907 **Isosorbide dinitrate mixture** with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate

2908 **Radioactive material, excepted package — empty packaging**

2909 **Radioactive material, excepted package — articles manufactured from natural uranium** or **depleted uranium** or **natural thorium**

2910 **Radioactive material, excepted package — limited quantity of material**

2911 **Radioactive material, excepted package — instruments** or **articles**

2912 **Radioactive material, low specific activity (LSA-I)**, non-fissile or fissile excepted

2913 **Radioactive material, surface contaminated objects (SCO-I, SCO-II or SCO-III)**, non-fissile or fissile excepted

2915 **Radioactive material, Type A package**, non-special form, non-fissile or fissile excepted

2916 **Radioactive material, Type B(U) package**, non-fissile or fissile excepted

2917 **Radioactive material, Type B(M) package**, non-fissile or fissile excepted

2919 **Radioactive material, transported under special arrangement**, non-fissile or fissile excepted

2920 **Corrosive liquid, flammable, n.o.s.**

2921 **Corrosive solid, flammable, n.o.s.**

2922 **Corrosive liquid, toxic, n.o.s.**

2923 **Corrosive solid, toxic, n.o.s.**

2924 **Flammable liquid, corrosive, n.o.s.**

2925 **Flammable solid, corrosive, organic, n.o.s.**

2926 **Flammable solid, toxic, organic, n.o.s.**

2927 **Toxic liquid, corrosive, organic, n.o.s.**

2928 **Toxic solid, corrosive, organic, n.o.s.**

2929 **Toxic liquid, flammable, organic, n.o.s.**

2930 **Toxic solid, flammable, organic, n.o.s.**

2931 **Vanadyl sulphate**

2933 **Methyl 2-chloropropionate**

2934 **Isopropyl 2-chloropropionate**

2935 **Ethyl 2-chloropropionate**

2936 **Thiolactic acid**

2937 **alpha-Methylbenzyl alcohol, liquid**

2940 **Cyclooctadiene phosphines**

or **9-Phosphabicyclononanes**

2941 **Fluoroanilines**

2942 **2-Trifluoromethylaniline**

2943 **Tetrahydrofurfurylamine**

2945 **N-Methylbutylamine**

2946 **2-Amino-5-diethylaminopentane**

2947 **Isopropyl chloroacetate**

2948 **3-Trifluoromethylaniline**

2949 **Sodium hydrosulphide, hydrated** with not less than 25% water of crystallization

2950 **Magnesium granules, coated**, particle size not less than 149 microns

2956 **5-tert-Butyl-2,4,6-trinitro-m-xylene**

or **Musk xylene**

2965 **Boron trifluoride dimethyl etherate**

2966 **Thioglycol**

2967 **Sulphamic acid**

2968 **Maneb preparation, stabilized** against self-heating

or **Maneb stabilized** against self-heating

2969 **Castor beans**

or **Castor flake**

or **Castor meal**

or **Castor pomace**

2977 **Radioactive material, uranium hexafluoride, fissile**

2978 **Radioactive material, uranium hexafluoride**, non-fissile or fissile excepted

2983 **Ethylene oxide and propylene oxide mixture**, not more than 30% ethylene oxide

2984 **Hydrogen peroxide, aqueous solution** with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)

2985 **Chlorosilanes, flammable, corrosive, n.o.s.**

2986 **Chlorosilanes, corrosive, flammable, n.o.s.**

2987 **Chlorosilanes, corrosive, n.o.s.**

2988 **Chlorosilanes, water-reactive, flammable, corrosive, n.o.s.**

2989 **Lead phosphite, dibasic**

2990 **Life-saving appliances, self-inflating**

2991 **Carbamate pesticide, liquid, toxic, flammable**, flash point not less than 23ºC

2992 **Carbamate pesticide, liquid, toxic**

2993 **Arsenical pesticide, liquid, toxic, flammable**, flash point not less than 23ºC

2994 **Arsenical pesticide, liquid, toxic**

2995 **Organochlorine pesticide, liquid, toxic, flammable**, flash point not less than 23°C

2996 **Organochlorine pesticide, liquid, toxic**

2997 **Triazine pesticide, liquid, toxic, flammable**, flash point not less than 23°C

2998 **Triazine pesticide, liquid, toxic**

3005 **Thiocarbamate pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3006 **Thiocarbamate pesticide, liquid, toxic**

3009 **Copper based pesticide, liquid, toxic, flammable**, flash point not less than 23ºC

3010 **Copper based pesticide, liquid, toxic**

3011 **Mercury based pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3012 **Mercury based pesticide, liquid, toxic**

3013 **Substituted nitrophenol pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3014 **Substituted nitrophenol pesticide, liquid, toxic**

3015 **Bipyridilium pesticide, liquid, toxic, flammable**, flash point not less than 23ºC

3016 **Bipyridilium pesticide, liquid, toxic**

3017 **Organophosphorus pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3018 **Organophosphorus pesticide, liquid, toxic**

3019 **Organotin pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3020 **Organotin pesticide, liquid, toxic**

3021 **Pesticide, liquid, flammable, toxic, n.o.s.**, flash point less than 23°C

3022 **1,2-Butylene oxide, stabilized**

3023 **2-Methyl-2-heptanethiol**

3024 **Coumarin derivative pesticide, liquid, flammable, toxic**, flash point less than 23ºC

3025 **Coumarin derivative pesticide, liquid, toxic, flammable**, flash point not less than 23ºC

3026 **Coumarin derivative pesticide, liquid, toxic**

3027 **Coumarin derivative pesticide, solid, toxic**

3028 **Batteries, dry, containing potassium hydroxide solid**, electric storage

3048 **Aluminium phosphide pesticide**

3054 **Cyclohexyl mercaptan**

3055 **2-(2-Aminoethoxy)ethanol**

3056 **n-Heptaldehyde**

3057 **Trifluoroacetyl chloride**

3064 **Nitroglycerin solution in alcohol** with more than 1% but not more than 5% nitroglycerin

3065 **Alcoholic beverages** containing more than 70% alcohol by volume

or **Alcoholic beverages** containing more than 24% but not more than 70% alcohol by volume

3066 **Paint** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)

or **Paint related material** (including paint thinning or reducing compound)

3070 **Ethylene oxide and dichlorodifluoromethane mixture**, with not more than 12.5% ethylene oxide

3071 **Mercaptan mixture, liquid, toxic, flammable, n.o.s.**

or **Mercaptans, liquid, toxic, flammable, n.o.s.**

3072 **Life-saving appliances, not self-inflating** containing dangerous goods as equipment

3073 **Vinylpyridines, stabilized**

3077 **Environmentally hazardous substance, solid, n.o.s.**

3078 **Cerium**, turnings or gritty powder

3079 **Methacrylonitrile, stabilized**

3080 **Isocyanate solution, toxic, flammable, n.o.s.**

or **Isocyanates, toxic, flammable, n.o.s.**

3082 **Environmentally hazardous substance, liquid, n.o.s.**

3083 **Perchloryl fluoride**

3084 **Corrosive solid, oxidizing, n.o.s.**

3085 **Oxidizing solid, corrosive, n.o.s.**

3086 **Toxic solid, oxidizing, n.o.s.**

3087 **Oxidizing solid, toxic, n.o.s.**

3088 **Self-heating solid, organic, n.o.s.**

3089 **Metal powder, flammable, n.o.s.**

3090 **Lithium metal batteries** (including lithium alloy batteries)

3091 **Lithium metal batteries contained in equipment** (including lithium alloy batteries)

or **Lithium metal batteries packed with equipment** (including lithium alloy batteries)

3092 **1-Methoxy-2-propanol**

3093 **Corrosive liquid, oxidizing, n.o.s.**

3094 **Corrosive liquid, water-reactive, n.o.s.**

3095 **Corrosive solid, self-heating, n.o.s.**

3096 **Corrosive solid, water-reactive, n.o.s.**

3097 **Flammable solid, oxidizing, n.o.s.**

3098 **Oxidizing liquid, corrosive, n.o.s.**

3099 **Oxidizing liquid, toxic, n.o.s.**

3100 **Oxidizing solid, self-heating, n.o.s.**

3103 **Organic peroxide type C, liquid**

3104 **Organic peroxide type C, solid**

3105 **Organic peroxide type D, liquid**

3106 **Organic peroxide type D, solid**

3107 **Organic peroxide type E, liquid**

3108 **Organic peroxide type E, solid**

3109 **Organic peroxide type F, liquid**

3110 **Organic peroxide type F, solid**

3113 **Organic peroxide type C, liquid, temperature controlled**

3114 **Organic peroxide type C, solid, temperature controlled**

3115 **Organic peroxide type D, liquid, temperature controlled**

3116 **Organic peroxide type D, solid, temperature controlled**

3117 **Organic peroxide type E, liquid, temperature controlled**

3118 **Organic peroxide type E, solid, temperature controlled**

3119 **Organic peroxide type F, liquid, temperature controlled**

3120 **Organic peroxide type F, solid, temperature controlled**

3121 **Oxidizing solid, water-reactive, n.o.s.**

3122 **Toxic liquid, oxidizing, n.o.s.**

3123 **Toxic liquid, water-reactive, n.o.s.**

3124 **Toxic solid, self-heating, n.o.s.**

3125 **Toxic solid, water-reactive, n.o.s.**

3126 **Self-heating solid, corrosive, organic, n.o.s.**

3127 **Self-heating solid, oxidizing, n.o.s.**

3128 **Self-heating solid, toxic, organic, n.o.s.**

3129 **Water-reactive liquid, corrosive, n.o.s.**

3130 **Water-reactive liquid, toxic, n.o.s.**

3131 **Water-reactive solid, corrosive, n.o.s.**

3132 **Water-reactive solid, flammable, n.o.s.**

3133 **Water-reactive solid, oxidizing, n.o.s.**

3134 **Water-reactive solid, toxic, n.o.s.**

3135 **Water-reactive solid, self-heating, n.o.s.**

3136 **Trifluoromethane, refrigerated liquid**

3137 **Oxidizing solid, flammable, n.o.s.**

3138 **Ethylene, acetylene and propylene mixture, refrigerated liquid** containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene

3139 **Oxidizing liquid, n.o.s.**

3140 **Alkaloid salts, liquid, n.o.s.**

or **Alkaloids, liquid, n.o.s.**

3141 **Antimony compound, inorganic, liquid, n.o.s.**

3142 **Disinfectant, liquid, toxic, n.o.s.**

3143 **Dye intermediate, solid, toxic, n.o.s.**

or **Dye, solid, toxic, n.o.s.**

3144 **Nicotine compound, liquid, n.o.s.**

or **Nicotine preparation, liquid, n.o.s.**

3145 **Alkylphenols, liquid, n.o.s.** (including C_2-C_{12} homologues)

3146 **Organotin compound, solid, n.o.s.**

3147 **Dye intermediate, solid, corrosive, n.o.s.**

or **Dye, solid, corrosive, n.o.s.**

3148 **Water-reactive liquid, n.o.s.**

3149 **Hydrogen peroxide and peroxyacetic acid mixture** with acid(s), water and not more than 5% peroxyacetic acid, **stabilized**

3150 **Devices, small, hydrocarbon gas powered** with release device

or **Hydrocarbon gas refills for small devices** with release device

3151 **Halogenated monomethyldiphenylmethanes, liquid**

or **Polyhalogenated biphenyls, liquid**

or **Polyhalogenated terphenyls, liquid**

3152 **Halogenated monomethyldiphenylmethanes, solid**

or **Polyhalogenated biphenyls, solid**

or **Polyhalogenated terphenyls, solid**

3153 **Perfluoro (methyl vinyl ether)**

3154 **Perfluoro (ethyl vinyl ether)**

3155 **Pentachlorophenol**

3156 **Compressed gas, oxidizing, n.o.s.**

3157 **Liquefied gas, oxidizing, n.o.s.**

3158 **Gas, refrigerated liquid, n.o.s.**

3159 **Refrigerant gas R 134a**

or **1,1,1,2-Tetrafluoroethane**

3160 **Liquefied gas, toxic, flammable, n.o.s.**

3161 **Liquefied gas, flammable, n.o.s.**

3162 **Liquefied gas, toxic, n.o.s.**

3163 **Liquefied gas, n.o.s.**

3164 **Articles, pressurized, hydraulic** containing non-flammable gas

or **Articles, pressurized, pneumatic** containing non-flammable gas

3165 **Aircraft hydraulic power unit fuel tank** (containing a mixture of anhydrous hydrazine and methyl hydrazine) (M86 fuel)

3166 **Vehicle, flammable gas powered**

or **Vehicle, flammable liquid powered**

or **Vehicle, fuel cell, flammable gas powered**

or **Vehicle, fuel cell, flammable liquid powered**

3167 **Gas sample, non-pressurized, flammable, n.o.s.**, not refrigerated liquid

3168 **Gas sample, non-pressurized, toxic, flammable, n.o.s.**, not refrigerated liquid

3169 **Gas sample, non-pressurized, toxic, n.o.s.**, not refrigerated liquid

3170 **Aluminium remelting by-products**

or **Aluminium smelting by-products**

3171 **Battery-powered equipment**

or **Battery-powered vehicle**

3172 **Toxins, extracted from living sources, liquid, n.o.s.**

3174 **Titanium disulphide**

3175 **Solids containing flammable liquid, n.o.s.**

3176 **Flammable solid, organic, molten, n.o.s.**

3178 **Flammable solid, inorganic, n.o.s.**

3179 **Flammable solid, toxic, inorganic, n.o.s.**

3180 **Flammable solid, corrosive, inorganic, n.o.s.**

3181 **Metal salts of organic compounds, flammable, n.o.s.**

3182 **Metal hydrides, flammable, n.o.s.**

3183 **Self-heating liquid, organic, n.o.s.**

3184 **Self-heating liquid, toxic, organic, n.o.s.**

3185 **Self-heating liquid, corrosive, organic, n.o.s.**

3186 **Self-heating liquid, inorganic, n.o.s.**

3187 **Self-heating liquid, toxic, inorganic, n.o.s.**

3188 **Self-heating liquid, corrosive, inorganic, n.o.s.**

3189 **Metal powder, self-heating, n.o.s.**

3190 **Self-heating solid, inorganic, n.o.s.**

3191 **Self-heating solid, toxic, inorganic, n.o.s.**

3192 **Self-heating solid, corrosive, inorganic, n.o.s.**

3194 **Pyrophoric liquid, inorganic, n.o.s.**

3200 **Pyrophoric solid, inorganic, n.o.s.**

3205 **Alkaline earth metal alcoholates, n.o.s.**

3206 **Alkali metal alcoholates, self-heating, corrosive, n.o.s.**

3208 **Metallic substance, water-reactive, n.o.s.**

3209 **Metallic substance, water-reactive, self-heating, n.o.s.**

3210 **Chlorates, inorganic, aqueous solution, n.o.s.**

3211 **Perchlorates, inorganic, aqueous solution, n.o.s.**

3212 **Hypochlorites, inorganic, n.o.s.**

3213 **Bromates, inorganic, aqueous solution, n.o.s.**

3214 **Permanganates, inorganic, aqueous solution, n.o.s.**

3215 **Persulphates, inorganic, n.o.s.**

3216 **Persulphates, inorganic, aqueous solution, n.o.s.**

3218 **Nitrates, inorganic, aqueous solution, n.o.s.**

3219 **Nitrites, inorganic, aqueous solution, n.o.s.**

3220 **Pentafluoroethane**

or **Refrigerant gas R 125**

3223 **Self-reactive liquid type C**

3224 **Self-reactive solid type C**

3225 **Self-reactive liquid type D**

3226 **Self-reactive solid type D**

3227 **Self-reactive liquid type E**

3228 **Self-reactive solid type E**

3229 **Self-reactive liquid type F**

3230 **Self-reactive solid type F**

3233 **Self-reactive liquid type C, temperature controlled**

3234 **Self-reactive solid type C, temperature controlled**

3235 **Self-reactive liquid type D, temperature controlled**

3236 **Self-reactive solid type D, temperature controlled**

3237 **Self-reactive liquid type E, temperature controlled**

3238 **Self-reactive solid type E, temperature controlled**

3239 **Self-reactive liquid type F, temperature controlled**

3240 **Self-reactive solid type F, temperature controlled**

3241 **2-Bromo-2-nitropropane-1,3-diol**

3242 **Azodicarbonamide**

3243 **Solids containing toxic liquid, n.o.s.**

3244 **Solids containing corrosive liquid, n.o.s.**

3245 **Genetically modified micro-organisms**

or **Genetically modified organisms**

3246 **Methanesulphonyl chloride**

3247 **Sodium peroxoborate, anhydrous**

3248 **Medicine, liquid, flammable, toxic, n.o.s.**

3249 **Medicine, solid, toxic, n.o.s.**

3250 **Chloroacetic acid, molten**

3251 **Isosorbide-5-mononitrate**

3252 **Difluoromethane**

or **Refrigerant gas R 32**

3253 **Disodium trioxosilicate**

3254 **Tributylphosphane**

3255 **tert-Butyl hypochlorite**

3256 **Elevated temperature liquid, flammable, n.o.s.**, with flash point above 60°C, at or above its flash point

3257 **Elevated temperature liquid, n.o.s.**, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)

3258 **Elevated temperature solid, n.o.s.**, at or above 240°C

3259 **Amines, solid, corrosive, n.o.s.**

or **Polyamines, solid, corrosive, n.o.s.**

3260 **Corrosive solid, acidic, inorganic, n.o.s.**

3261 **Corrosive solid, acidic, organic, n.o.s.**

3262 **Corrosive solid, basic, inorganic, n.o.s.**

3263 **Corrosive solid, basic, organic, n.o.s.**

3264 **Corrosive liquid, acidic, inorganic, n.o.s.**

3265 **Corrosive liquid, acidic, organic, n.o.s.**

3266 **Corrosive liquid, basic, inorganic, n.o.s.**

3267 **Corrosive liquid, basic, organic, n.o.s.**

3268 **Safety devices**, electrically initiated

3269 **Polyester resin kit**, liquid base material

3270 **Nitrocellulose membrane filters** with not more than 12.6% nitrogen, by dry mass

3271 **Ethers, n.o.s.**

3272 **Esters, n.o.s.**

3273 **Nitriles, flammable, toxic, n.o.s.**

3274 **Alcoholates solution, n.o.s.**, in alcohol

3275 **Nitriles, toxic, flammable, n.o.s.**

3276 **Nitriles, liquid, toxic, n.o.s.**

3277 **Chloroformates, toxic, corrosive, n.o.s.**

3278 **Organophosphorus compound, liquid, toxic, n.o.s.**

3279 **Organophosphorus compound, toxic, flammable, n.o.s.**

3280 **Organoarsenic compound, liquid, n.o.s.**

3281 **Metal carbonyls, liquid, n.o.s.**

3282 **Organometallic compound, liquid, toxic, n.o.s.**

3283 **Selenium compound, solid, n.o.s.**

3284 **Tellurium compound, n.o.s.**

3285 **Vanadium compound, n.o.s.**

3286 **Flammable liquid, toxic, corrosive, n.o.s.**

3287 **Toxic liquid, inorganic, n.o.s.**

3288 **Toxic solid, inorganic, n.o.s.**

3289 **Toxic liquid, corrosive, inorganic, n.o.s.**

3290 **Toxic solid, corrosive, inorganic, n.o.s.**

3291 **Biomedical waste, n.o.s.**

or **Clinical waste, unspecified, n.o.s.**

or **Medical waste, n.o.s.**

or **Regulated medical waste, n.o.s.**

3292 **Batteries, containing sodium**

or **Cells, containing sodium**

3293 **Hydrazine, aqueous solution** with not more than 37% hydrazine, by mass

3294 **Hydrogen cyanide, solution in alcohol** with not more than 45% hydrogen cyanide

3295 **Hydrocarbons, liquid, n.o.s.**

3296 **Heptafluoropropane**

or **Refrigerant gas R 227**

3297 **Ethylene oxide and chlorotetrafluoroethane mixture**, with not more than 8.8% ethylene oxide

3298 **Ethylene oxide and pentafluoroethane mixture**, with not more than 7.9% ethylene oxide

3299 **Ethylene oxide and tetrafluoroethane mixture**, with not more than 5.6% ethylene oxide

3300 **Ethylene oxide and carbon dioxide mixture**, with more than 87% ethylene oxide

3301 **Corrosive liquid, self-heating, n.o.s.**

3302 **2-Dimethylaminoethyl acrylate, stabilized**

3303 **Compressed gas, toxic, oxidizing, n.o.s.**

3304 **Compressed gas, toxic, corrosive, n.o.s.**

3305 **Compressed gas, toxic, flammable, corrosive, n.o.s.**

3306 **Compressed gas, toxic, oxidizing, corrosive, n.o.s.**

3307 **Liquefied gas, toxic, oxidizing, n.o.s.**

3308 **Liquefied gas, toxic, corrosive, n.o.s.**

3309 **Liquefied gas, toxic, flammable, corrosive, n.o.s.**

3310 **Liquefied gas, toxic, oxidizing, corrosive, n.o.s.**

3311 **Gas, refrigerated liquid, oxidizing, n.o.s.**

3312 **Gas, refrigerated liquid, flammable, n.o.s.**

3313 **Organic pigments, self-heating**

3314 **Plastics moulding compound** in dough, sheet or extruded rope form evolving flammable vapour

3315 **Chemical sample, toxic**

3316 **Chemical kit**

or **First aid kit**

3317 **2-Amino-4,6-dinitrophenol, wetted** with not less than 20% water by mass

3318 **Ammonia solution**, relative density less than 0.880 at 15ºC in water, with more than 50% ammonia

3319 **Nitroglycerin mixture, desensitized, solid, n.o.s.** with more than 2% but not more than 10% nitroglycerin, by mass

3320 **Sodium borohydride and sodium hydroxide solution**, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide, by mass

3321 **Radioactive material, low specific activity (LSA-II)**, non-fissile or fissile excepted

3322 **Radioactive material, low specific activity (LSA-III)**, non-fissile or fissile excepted

3323 **Radioactive material, Type C package**, non-fissile or fissile excepted

3324 **Radioactive material, low specific activity (LSA-II), fissile**

3325 **Radioactive material, low specific activity (LSA-III), fissile**

3326 **Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**

3327 **Radioactive material, Type A package, fissile**, non-special form

3328 **Radioactive material, Type B(U) package, fissile**

3329 **Radioactive material, Type B(M) package, fissile**

3330 **Radioactive material, Type C package, fissile**

3331 **Radioactive material, transported under special arrangement, fissile**

3332 **Radioactive material, Type A package, special form**, non-fissile or fissile excepted

3333 **Radioactive material, Type A package, special form, fissile**

3334 **Aviation regulated liquid, n.o.s.**

3335 **Aviation regulated solid, n.o.s.**

3336 **Mercaptan mixture, liquid, flammable, n.o.s.**

or **Mercaptans, liquid, flammable, n.o.s.**

3337 **Refrigerant gas R 404A**

3338 **Refrigerant gas R 407A**

3339 **Refrigerant gas R 407B**

3340 **Refrigerant gas R 407C**

3341 **Thiourea dioxide**

3342 **Xanthates**

3343 **Nitroglycerin mixture, desensitized, liquid flammable, n.o.s.** with not more than 30% nitroglycerin, by mass

3344 **Pentaerythrite tetranitrate mixture desensitized, solid, n.o.s.** with more than 10% but not more than 20% PETN, by mass

or **Pentaerythritol tetranitrate mixture desensitized, solid, n.o.s.** with more than 10% but not more than 20% PETN, by mass

or **PETN mixture desensitized, solid, n.o.s.** with more than 10% but not more than 20% PETN, by mass

3345 **Phenoxyacetic acid derivative pesticide, solid, toxic**

3346 **Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic**, flash point less than 23°C

3347 **Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3348 **Phenoxyacetic acid derivative pesticide, liquid, toxic**

3349 **Pyrethroid pesticide, solid, toxic**

3350 **Pyrethroid pesticide, liquid flammable, toxic**, flash point less than 23°C

3351 **Pyrethroid pesticide, liquid, toxic, flammable**, flash point not less than 23°C

3352 **Pyrethroid pesticide, liquid, toxic**

3354 **Insecticide gas, flammable, n.o.s.**

3355 **Insecticide gas, toxic, flammable, n.o.s.**

3356 **Oxygen generator, chemical** (including when contained in associated equipment, e.g. passenger service units (PSUs), protective breathing equipment (PBE), etc.)

3357 **Nitroglycerin mixture, desensitized, liquid, n.o.s.** with not more than 30% nitroglycerin, by mass

3358 **Refrigerating machines** containing flammable, non-toxic, liquefied gas

3359 **Fumigated cargo transport unit**

3360 **Fibres, vegetable, dry**

3361 **Chlorosilanes, toxic, corrosive, n.o.s.**

3362 **Chlorosilanes, toxic, corrosive, flammable, n.o.s.**

3363 **Dangerous goods in apparatus**

or **Dangerous goods in articles**

or **Dangerous goods in machinery**

3364 **Picric acid, wetted** with not less than 10% water, by mass

or **Trinitrophenol, wetted** with not less than 10% water, by mass

3365 **Picryl chloride, wetted** with not less than 10% water, by mass

or **Trinitrochlorobenzene, wetted** with not less than 10% water, by mass

3366 **TNT, wetted** with not less than 10% water, by mass

or **Trinitrotoluene, wetted** with not less than 10% water, by mass

3367 **Trinitrobenzene, wetted** with not less than 10% water, by mass

3368 **Trinitrobenzoic acid, wetted** with not less than 10% water, by mass

3369 **Sodium dinitro-o-cresolate, wetted** with not less than 10% water, by mass

3370 **Urea nitrate, wetted** with not less than 10% water, by mass

3371 **2-Methylbutanal**

3373 **Biological substance, Category B**

3374 **Acetylene, solvent free**

3375 **Ammonium nitrate emulsion** intermediate for blasting explosives

or **Ammonium nitrate gel** intermediate for blasting explosives

or **Ammonium nitrate suspension** intermediate for blasting explosives

3376 **4-Nitrophenylhydrazine** with not less than 30% water, by mass

3377 **Sodium perborate monohydrate**

3378 **Sodium carbonate peroxyhydrate**

3379 **Desensitized explosive, liquid, n.o.s.**

3380 **Desensitized explosive, solid, n.o.s.**

3381 **Toxic by inhalation liquid, n.o.s.** with an LC_{50}lower than or equal to 200 mL/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}

3382 **Toxic by inhalation liquid, n.o.s.** with an LC_{50}lower than or equal to 1 000 mL/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}

3383 **Toxic by inhalation liquid, flammable, n.o.s.** with an LC_{50}lower than or equal to 200 mL/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}

3384 **Toxic by inhalation liquid, flammable, n.o.s.** with an LC_{50} lower than or equal to 1 000 mL/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}

3385 **Toxic by inhalation liquid, water-reactive, n.o.s.** with an LC_{50} lower than or equal to 200 mL/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}

3386 **Toxic by inhalation liquid, water-reactive, n.o.s.** with an LC_{50}lower than or equal to 1 000 mL/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}

3387 **Toxic by inhalation liquid, oxidizing, n.o.s.** with an LC_{50}lower than or equal to 200 mL/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}

3388 **Toxic by inhalation liquid, oxidizing, n.o.s.** with an LC_{50} lower than or equal to 1 000 mL/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}

3389 **Toxic by inhalation liquid, corrosive, n.o.s.** with an LC_{50}lower than or equal to 200 mL/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}

3390 **Toxic by inhalation liquid, corrosive, n.o.s.** with an LC_{50}lower than or equal to 1 000 mL/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}

3391 **Organometallic substance, solid, pyrophoric**

3392 **Organometallic substance, liquid, pyrophoric**

3393 **Organometallic substance, solid, pyrophoric, water reactive**

3394 **Organometallic substance, liquid, pyrophoric, water reactive**

3395 **Organometallic substance, solid, water reactive**

3396 **Organometallic substance, solid, water reactive, flammable**

3397 **Organometallic substance, solid, water reactive, self-heating**

3398 **Organometallic substance, liquid, water reactive**

3399 **Organometallic substance, liquid, water reactive, flammable**

3400 **Organometallic substance, solid, self-heating**

3401 **Alkali metal amalgam, solid**

3402 **Alkaline earth metal amalgam, solid**

3403 **Potassium metal alloys, solid**

3404 **Potassium sodium alloys, solid**

3405 **Barium chlorate solution**

3406 **Barium perchlorate solution**

3407 **Chlorate and magnesium chloride mixture solution**

3408 **Lead perchlorate solution**

3409 **Chloronitrobenzenes, liquid**

3410 **4-Chloro-o-toluidine hydrochloride solution**

3411 **beta-Naphthylamine solution**

3412 **Formic acid** with not less than 5% but less than 10% acid by mass

or **Formic acid** with not less than 10% but not more than 85% acid by mass

3413 **Potassium cyanide solution**

3414 **Sodium cyanide solution**

3415 **Sodium fluoride solution**

3416 **Chloroacetophenone, liquid**

3417 **Xylyl bromide, solid**

3418 **2,4-Toluylenediamine solution**

3419 **Boron trifluoride acetic acid complex, solid**

3420 **Boron trifluoride propionic acid complex, solid**

3421 **Potassium hydrogendifluoride solution**

3422 **Potassium fluoride solution**

3423 **Tetramethylammonium hydroxide, solid**

3424 **Ammonium dinitro-o-cresolate solution**

3425 **Bromoacetic acid, solid**

3426 **Acrylamide solution**

3427 **Chlorobenzyl chlorides, solid**

3428 **3-Chloro-4-methylphenyl isocyanate, solid**

3429 **Chlorotoluidines, liquid**

3430 **Xylenols, liquid**

3431 **Nitrobenzotrifluorides, solid**

3432 **Polychlorinated biphenyls, solid**

3434 **Nitrocresols, liquid**

3436 **Hexafluoroacetone hydrate, solid**

3437 **Chlorocresols, solid**

3438 **alpha-Methylbenzyl alcohol, solid**

3439 **Nitriles, solid, toxic, n.o.s.**

3440 **Selenium compound, liquid, n.o.s.**

3441 **Chlorodinitrobenzenes, solid**

3442 **Dichloroanilines, solid**

3443 **Dinitrobenzenes, solid**

3444 **Nicotine hydrochloride, solid**

3445 **Nicotine sulphate, solid**

3446 **Nitrotoluenes, solid**

3447 **Nitroxylenes, solid**

3448 **Tear gas substance, solid, n.o.s.**

3449 **Bromobenzyl cyanides, solid**

3450 **Diphenylchloroarsine, solid**

3451 **Toluidines, solid**

3452 **Xylidines, solid**

3453 **Phosphoric acid, solid**

3454 **Dinitrotoluenes, solid**

3455 **Cresols, solid**

3456 **Nitrosylsulphuric acid, solid**

3457 **Chloronitrotoluenes, solid**

3458 **Nitroanisoles, solid**

3459 **Nitrobromobenzene, solid**

3460 **N-Ethylbenzyltoluidines, solid**

3462 **Toxins, extracted from living sources, solid, n.o.s.**

3463 **Propionic acid** with not less than 90% acid by mass

3464 **Organophosphorus compound, solid, toxic, n.o.s.**

3465 **Organoarsenic compound, solid, n.o.s.**

3466 **Metal carbonyls, solid, n.o.s.**

3467 **Organometallic compound, solid, toxic, n.o.s.**

3468 **Hydrogen in a metal hydride storage system**

or **Hydrogen in a metal hydride storage system contained in equipment**

or **Hydrogen in a metal hydride storage system packed with equipment**

3469 **Paint, flammable, corrosive** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)

or **Paint related material, flammable, corrosive** (including paint thinning or reducing compound)

3470 **Paint, corrosive, flammable** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)

or **Paint related material corrosive, flammable** (including paint thinning or reducing compound)

3471 **Hydrogendifluorides, solution, n.o.s.**

3472 **Crotonic acid, liquid**

3473 **Fuel cell cartridges**, containing flammable liquids

or **Fuel cell cartridges contained in equipment**, containing flammable liquids

or **Fuel cell cartridges packed with equipment**, containing flammable liquids

3474 **1-Hydroxybenzotriazole monohydrate**

3475 **Ethanol and gasoline mixture**, with more than 10% ethanol

or **Ethanol and motor spirit mixture**, with more than 10% ethanol

or **Ethanol and petrol mixture**, with more than 10% ethanol

3476 **Fuel cell cartridges**, containing water-reactive substances

or **Fuel cell cartridges contained in equipment**, containing water-reactive substances

or **Fuel cell cartridges packed with equipment**, containing water-reactive substances

3477 **Fuel cell cartridges**, containing corrosive substances

or **Fuel cell cartridges contained in equipment**, containing corrosive substances

or **Fuel cell cartridges packed with equipment**, containing corrosive substances

3478 **Fuel cell cartridges**, containing liquefied flammable gas

or **Fuel cell cartridges contained in equipment**, containing liquefied flammable gas

or **Fuel cell cartridges packed with equipment**, containing liquefied flammable gas

3479 **Fuel cell cartridges**, containing hydrogen in metal hydride

or **Fuel cell cartridges contained in equipment**, containing hydrogen in metal hydride

or **Fuel cell cartridges packed with equipment**, containing hydrogen in metal hydride

3480 **Lithium ion batteries** (including lithium ion polymer batteries)

3481 **Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)

or **Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)

3482 **Alkali metal dispersion, flammable**

or **Alkaline earth metal dispersion, flammable**

3483 **Motor fuel anti-knock mixture, flammable**

3484 **Hydrazine aqueous solution, flammable** with more than 37% hydrazine, by mass

3485 **Calcium hypochlorite, dry, corrosive** with more than 39% available chlorine (8.8% available oxygen)

or **Calcium hypochlorite mixture, dry, corrosive** with more than 39% available chlorine (8.8% available oxygen)

3486 **Calcium hypochlorite mixture, dry, corrosive** with more than 10% but not more than 39% available chlorine

3487 **Calcium hypochlorite, hydrated, corrosive** with not less than 5.5% but not more than 16% water

or **Calcium hypochlorite, hydrated mixture, corrosive** with not less than 5.5% but not more than 16% water

3488 **Toxic by inhalation liquid, flammable, corrosive, n.o.s.** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}

3489 **Toxic by inhalation liquid, flammable, corrosive, n.o.s.** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}

3490 **Toxic by inhalation liquid, water-reactive, flammable, n.o.s.** with an LC_{50} lower than or equal to 200 mL/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}

3491 **Toxic by inhalation liquid, water-reactive, flammable, n.o.s.** with an LC_{50} lower than or equal to 1 000 mL/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}

3494 **Petroleum sour crude oil, flammable, toxic**

3495 **Iodine**

3496 **Batteries, nickel-metal hydride**

3497 **Krill meal**

3498 **Iodine monochloride, liquid**

3499 **Capacitor, electric double layer** (with an energy storage capacity greater than 0.3 Wh)

3500 **Chemical under pressure, n.o.s.**

3501 **Chemical under pressure, flammable, n.o.s.**

3502 **Chemical under pressure, toxic, n.o.s.**

3503 **Chemical under pressure, corrosive, n.o.s.**

3504 **Chemical under pressure, flammable, toxic, n.o.s.**

3505 **Chemical under pressure, flammable, corrosive, n.o.s.**

3506 **Mercury contained in manufactured articles**

3507 **Uranium hexafluoride, radioactive material, excepted package**, less than 0.1 kg per package, non-fissile or fissile-excepted

3508 **Capacitor, asymmetric** (with an energy storage capacity greater than 0.3Wh)

3509 **Packagings, discarded, empty, uncleaned**

3510 **Adsorbed gas, flammable, n.o.s.**

3511 **Adsorbed gas, n.o.s.**

3512 **Adsorbed gas, toxic, n.o.s.**

3513 **Adsorbed gas, oxidizing, n.o.s.**

3514 **Adsorbed gas, toxic, flammable, n.o.s.**

3515 **Adsorbed gas, toxic, oxidizing, n.o.s.**

3516 **Adsorbed gas, toxic, corrosive, n.o.s.**

3517 **Adsorbed gas, toxic, flammable, corrosive, n.o.s.**

3518 **Adsorbed gas, toxic, oxidizing, corrosive, n.o.s.**

3519 **Boron trifluoride, adsorbed**

3520 **Chlorine, adsorbed**

3521 **Silicon tetrafluoride, adsorbed**

3522 **Arsine, adsorbed**

3523 **Germane, adsorbed**

3524 **Phosphorus pentafluoride, adsorbed**

3525 **Phosphine, adsorbed**

3526 **Hydrogen selenide, adsorbed**

3527 **Polyester resin kit**, solid base material

3528 **Engine, fuel cell, flammable liquid powered**

or **Engine, internal combustion, flammable liquid powered**

or **Machinery, fuel cell, flammable liquid powered**

or **Machinery, internal combustion, flammable liquid powered**

3529 **Engine, fuel cell, flammable gas powered**

or **Engine, internal combustion, flammable gas powered**

or **Machinery, fuel cell, flammable gas powered**

or **Machinery, internal combustion, flammable gas powered**

3530 **Engine, internal combustion**

or **Machinery, internal combustion**

3531 **Polymerizing substance, solid, stabilized, n.o.s.**

3532 **Polymerizing substance, liquid, stabilized, n.o.s.**

3533 **Polymerizing substance, solid, temperature controlled, n.o.s.**

3534 **Polymerizing substance, liquid, temperature controlled, n.o.s.**

3535 **Toxic solid, flammable, inorganic, n.o.s.**

3536 **Lithium batteries installed in cargo transport unit** lithium ion batteries or lithium metal batteries

3537 **Articles containing flammable gas, n.o.s.**

3538 **Articles containing non-flammable, non toxic gas, n.o.s.**

3539 **Articles containing toxic gas, n.o.s.**

3540 **Articles containing flammable liquid, n.o.s.**

3541 **Articles containing flammable solid, n.o.s.**

3542 **Articles containing a substance liable to spontaneous combustion, n.o.s.**

3543 **Articles containing a substance which emits flammable gas in contact with water, n.o.s.**

3544 **Articles containing oxidizing substance, n.o.s.**

3545 **Articles containing organic peroxide, n.o.s.**

3546 **Articles containing toxic substance, n.o.s.**

3547 **Articles containing corrosive substance, n.o.s.**

3548 **Articles containing miscellaneous dangerous goods, n.o.s.**

3549 **Medical waste, Category A, affecting animals** only, solid

or **Medical waste, Category A, affecting humans**, solid

3550 **Cobalt dihydroxide powder**, containing not less than 10% respirable particles

8000 **Consumer commodity**

Chapter 2

LIST OF N.O.S. AND GENERIC PROPER SHIPPING NAMES

Substances or articles not mentioned specifically by name in Table 3-1 must be classified in accordance with 3;1.2.7. Thus the name in Table 3-1 which most appropriately describes the substance or article should be used as the proper shipping name.

In the list that follows, all the n.o.s. entries and the main generic entries from Table 3-1 are shown, grouped by hazard class or division. Within each hazard class or division the names are placed into three groups, where appropriate, as follows:

— specific entries covering a group of substances or articles of a particular chemical or technical nature;

— pesticide entries, for Class 3 and Division 6.1;

— general entries covering a group of substances or articles having one or more general dangerous properties.

An asterisk following a name indicates that the technical name must be added, see 3;1.2.7.

THE MOST SPECIFIC APPLICABLE NAME MUST ALWAYS BE USED

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
CLASS 1			
1		0190	**Samples, explosive*,** other than initiating explosive
Division 1.1			
1.1C		0462	**Articles, explosive, n.o.s.***
1.1D		0463	**Articles, explosive, n.o.s.***
1.1E		0464	**Articles, explosive, n.o.s.***
1.1F		0465	**Articles, explosive, n.o.s.***
1.1L		0354	**Articles, explosive, n.o.s.***
1.1B		0461	**Components, explosive train, n.o.s.***
1.1C		0497	**Propellant, liquid**
1.1C		0498	**Propellant, solid**
1.1A		0473	**Substances, explosive, n.o.s.***
1.1C		0474	**Substances, explosive, n.o.s.***
1.1D		0475	**Substances, explosive, n.o.s.***
1.1G		0476	**Substances, explosive, n.o.s.***
1.1L		0357	**Substances, explosive, n.o.s.***
Division 1.2			
1.2K	6.1	0020	**Ammunition, toxic*** with burster, expelling charge or propelling charge
1.2C		0466	**Articles, explosive, n.o.s.***
1.2D		0467	**Articles, explosive, n.o.s.***
1.2E		0468	**Articles, explosive, n.o.s.***
1.2F		0469	**Articles, explosive, n.o.s.***
1.2L		0355	**Articles, explosive, n.o.s.***
1.2B		0382	**Components, explosive train, n.o.s.***
1.2L		0248	**Contrivances, water-activated*** with burster, expelling charge or propelling charge
1.2L		0358	**Substances, explosive, n.o.s.***
Division 1.3			
1.3K	6.1	0021	**Ammunition, toxic*** with burster, expelling charge or propelling charge
1.3C		0470	**Articles, explosive, n.o.s.***
1.3L		0356	**Articles, explosive, n.o.s.***
1.3L		0249	**Contrivances, water-activated*** with burster, expelling charge or propelling charge
1.3C		0132	**Deflagrating metal salts of aromatic nitro-derivatives, n.o.s.**
1.3C		0495	**Propellant, liquid**
1.3C		0499	**Propellant, solid**

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
1.3C		0477	**Substances, explosive, n.o.s.***
1.3G		0478	**Substances, explosive, n.o.s.***
1.3L		0359	**Substances, explosive, n.o.s.***
Division 1.4			
1.4B		0350	**Articles, explosive, n.o.s.***
1.4C		0351	**Articles, explosive, n.o.s.***
1.4D		0352	**Articles, explosive, n.o.s.***
1.4E		0471	**Articles, explosive, n.o.s.***
1.4F		0472	**Articles, explosive, n.o.s.***
1.4G		0353	**Articles, explosive, n.o.s.***
1.4S		0349	**Articles, explosive, n.o.s.***
1.4B		0383	**Components, explosive train, n.o.s.***
1.4S		0384	**Components, explosive train, n.o.s.***
1.4C		0501	**Propellant, solid**
1.4C		0479	**Substances, explosive, n.o.s.***
1.4D		0480	**Substances, explosive, n.o.s.***
1.4G		0485	**Substances, explosive, n.o.s.***
1.4S		0481	**Substances, explosive, n.o.s.***
Division 1.5			
1.5D		0482	**Substances, E.V.I., n.o.s.***
1.5D		0482	**Substances, explosive, very insensitive, n.o.s.***
Division 1.6			
1.6N		0486	**Articles, E.E.I.**
1.6N		0486	**Articles, explosive, extremely insensitive**
CLASS 2			
Division 2.1			
Specific entries			
2.1		1964	**Hydrocarbon gas mixture, compressed, n.o.s.***
2.1		1965	**Hydrocarbon gas mixture, liquefied, n.o.s.***
2.1		3354	**Insecticide gas, flammable, n.o.s.***
General entries			
2.1		3510	**Adsorbed gas, flammable, n.o.s.***
2.1		1950	**Aerosols,** flammable
2.1	See 2;0.6	3537	**Articles containing flammable gas, n.o.s.***
2.1		1954	**Compressed gas, flammable, n.o.s.***
2.1		3312	**Gas, refrigerated liquid, flammable, n.o.s.***
2.1		3167	**Gas sample, non-pressurized, flammable, n.o.s.,** not refrigerated liquid
2.1		3161	**Liquefied gas, flammable, n.o.s.***
2.1		3501	**Chemical under pressure, flammable, n.o.s.***
2.1	8	3505	**Chemical under pressure, flammable, corrosive, n.o.s.***
2.1	6.1	3504	**Chemical under pressure, flammable, toxic, n.o.s.***
Division 2.2			
Specific entries			
2.2		1968	**Insecticide gas, n.o.s.***
2.2		1078	**Refrigerant gas, n.o.s.***
2.2		3500	**Chemical under pressure, n.o.s.***
2.2	8	3503	**Chemical under pressure, corrosive, n.o.s.***
2.2	6.1	3502	**Chemical under pressure, toxic, n.o.s.***
General entries			
2.2		3511	**Adsorbed gas, n.o.s.***
2.2	5.1	3513	**Adsorbed gas, oxidizing, n.o.s.***
2.2		1950	**Aerosols,** non-flammable
2.2	See 2;0.6	3538	**Articles containing non-flammable, non toxic gas, n.o.s.***
2.2		1956	**Compressed gas, n.o.s.***
2.2	5.1	3156	**Compressed gas, oxidizing, n.o.s.***
2.2		3158	**Gas, refrigerated liquid, n.o.s.***
2.2	5.1	3311	**Gas, refrigerated liquid, oxidizing, n.o.s.***
2.2		3163	**Liquefied gas, n.o.s.***
2.2	5.1	3157	**Liquefied gas, oxidizing, n.o.s.***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
Division 2.3			
Specific entries			
2.3		1967	**Insecticide gas, toxic, n.o.s.***
2.3	2.1	3355	**Insecticide gas, toxic, flammable, n.o.s.***
General entries			
2.3	See 2;0.6	3539	**Articles containing toxic gas, n.o.s.***
2.3		3512	**Adsorbed gas, toxic, n.o.s.***
2.3	2.1	3514	**Adsorbed gas, toxic, flammable, n.o.s.***
2.3	5.1	3515	**Adsorbed gas, toxic, oxidizing, n.o.s.***
2.3	8	3516	**Adsorbed gas, toxic, corrosive, n.o.s.***
2.3	2.1 & 8	3517	**Adsorbed gas, toxic, flammable, corrosive, n.o.s.***
2.3	5.1 & 8	3518	**Adsorbed gas, toxic, oxidizing, corrosive, n.o.s.***
2.3	2.1	1950	**Aerosols,** flammable, containing toxic gas
2.3		1950	**Aerosols,** non-flammable, containing toxic gas
2.3		1955	**Compressed gas, toxic, n.o.s.***
2.3	8	3304	**Compressed gas, toxic, corrosive, n.o.s.***
2.3	2.1	1953	**Compressed gas, toxic, flammable, n.o.s.***
2.3	2.1 & 8	3305	**Compressed gas, toxic, flammable, corrosive, n.o.s.***
2.3	5.1	3303	**Compressed gas, toxic, oxidizing, n.o.s.***
2.3	5.1 & 8	3306	**Compressed gas, toxic, oxidizing, corrosive, n.o.s.***
2.3		3169	**Gas sample, non-pressurized, toxic, n.o.s.,** not refrigerated liquid
2.3	2.1	3168	**Gas sample, non-pressurized, toxic, flammable, n.o.s.,** not refrigerated liquid
2.3		3162	**Liquefied gas, toxic, n.o.s.***
2.3	8	3308	**Liquefied gas, toxic, corrosive, n.o.s.***
2.3	2.1	3160	**Liquefied gas, toxic, flammable, n.o.s.***
2.3	2.1 & 8	3309	**Liquefied gas, toxic, flammable, corrosive, n.o.s.***
2.3	5.1	3307	**Liquefied gas, toxic, oxidizing, n.o.s.***
2.3	5.1 & 8	3310	**Liquefied gas, toxic, oxidizing, corrosive, n.o.s.***
CLASS 3			
Specific entries			
3	8	3274	**Alcoholates solution, n.o.s.*,** in alcohol
3		1987	**Alcohols, n.o.s.***
3	6.1	1986	**Alcohols, flammable, toxic, n.o.s.***
3		1989	**Aldehydes, n.o.s.***
3	6.1	1988	**Aldehydes, flammable, toxic, n.o.s.***
3	8	2733	**Amines, flammable, corrosive, n.o.s.***
3	8	2985	**Chlorosilanes, flammable, corrosive, n.o.s.**
3		3379	**Desensitized explosive, liquid, n.o.s.***
3		3272	**Esters, n.o.s.***
3		3271	**Ethers, n.o.s.***
3		3295	**Hydrocarbons, liquid, n.o.s.**
3	6.1	2478	**Isocyanate solution, flammable, toxic, n.o.s.***
3	6.1	2478	**Isocyanates, flammable, toxic, n.o.s.***
3		1224	**Ketones, liquid, n.o.s.***
3	6.1	3248	**Medicine, liquid, flammable, toxic, n.o.s.**
3		3336	**Mercaptan mixture, liquid, flammable, n.o.s.***
3		3336	**Mercaptans, liquid, flammable, n.o.s.***
3	6.1	1228	**Mercaptan mixture, liquid, flammable, toxic, n.o.s.***
3	6.1	1228	**Mercaptans, liquid, flammable, toxic, n.o.s.***
3	6.1	3273	**Nitriles, flammable, toxic, n.o.s.***
3		3357	**Nitroglycerin mixture, desensitized, liquid, n.o.s.**, with not more than 30% nitroglycerin, by mass
3		3343	**Nitroglycerin mixture, desensitized, liquid, flammable, n.o.s.** with not more than 30% nitroglycerin, by mass
3		1268	**Petroleum distillates, n.o.s.**
3		1268	**Petroleum products, n.o.s.**
3	8	2733	**Polyamines, flammable, corrosive, n.o.s.***
3		2319	**Terpene hydrocarbons, n.o.s.**
Pesticides			
3	6.1	2760	**Arsenical pesticide, liquid, flammable, toxic***, flash point <23°C
3	6.1	2782	**Bipyridilium pesticide, liquid, flammable, toxic***, flash point <23°C
3	6.1	2758	**Carbamate pesticide, liquid, flammable, toxic***, flash point <23°C
3	6.1	2776	**Copper based pesticide, liquid, flammable, toxic***, flash point <23°C
3	6.1	3024	**Coumarin derivative pesticide, liquid, flammable, toxic***, flash point <23°C

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
3	6.1	2772	**Thiocarbamate pesticide, liquid, flammable, toxic*** , flash point <23°C
3	6.1	2778	**Mercury based pesticide, liquid, flammable, toxic*** , flash point <23°C
3	6.1	2762	**Organochlorine pesticide, liquid, flammable, toxic*** , flash point <23°C
3	6.1	2784	**Organophosphorus pesticide, liquid, flammable, toxic*** , flash point <23°C
3	6.1	2787	**Organotin pesticide, liquid, flammable, toxic*** , flash point <23°C
3	6.1	3021	**Pesticide, liquid, flammable, toxic, n.o.s.*** , flash point <23°C
3	6.1	3346	**Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic,** flash point <23°C
3	6.1	3350	**Pyrethroid pesticide, liquid flammable, toxic,** flash point <23°C
3	6.1	2780	**Substituted nitrophenol pesticide, liquid, flammable, toxic*** , flash point <23°C
3	6.1	2764	**Triazine pesticide, liquid, flammable, toxic*** , flash point <23°C
General entries			
3	See 2;0.6	3540	**Articles containing flammable liquid, n.o.s.***
3		3256	**Elevated temperature liquid, flammable, n.o.s.*,** with flash point above 60°C, at or above its flash point
3		1993	**Flammable liquid, n.o.s.***
3	8	2924	**Flammable liquid, corrosive, n.o.s.***
3	6.1	1992	**Flammable liquid, toxic, n.o.s.***
3	6.1 & 8	3286	**Flammable liquid, toxic, corrosive, n.o.s.***
CLASS 4			
Division 4.1			
Specific entries			
4.1		3380	**Desensitized explosive, solid, n.o.s.***
4.1		1353	**Fabrics impregnated with weakly nitrated nitrocellulose, n.o.s.**
4.1		1353	**Fibres impregnated with weakly nitrated nitrocellulose, n.o.s.**
4.1		3182	**Metal hydrides, flammable, n.o.s.***
4.1		3089	**Metal powder, flammable, n.o.s.**
4.1		3319	**Nitroglycerin mixture, desensitized, solid, n.o.s.** with more than 2% but not more than 10% nitroglycerin, by mass
4.1		3344	**Pentaerythrite tetranitrate mixture, desensitized, solid, n.o.s.** with more than 10% but not more than 20% PETN, by mass
4.1		3344	**Pentaerythritol tetranitrate mixture desensitized, solid, n.o.s.*** with more than 10% but not more than 20% PETN, by mass
4.1		3344	**PETN mixture desensitized, solid, n.o.s.*** with more than 10% but not more than 20% PETN, by mass
4.1		3221	**Self-reactive liquid type B***
4.1		3223	**Self-reactive liquid type C***
4.1		3225	**Self-reactive liquid type D***
4.1		3227	**Self-reactive liquid type E***
4.1		3229	**Self-reactive liquid type F***
4.1		3231	**Self-reactive liquid type B, temperature controlled***
4.1		3233	**Self-reactive liquid type C, temperature controlled***
4.1		3235	**Self-reactive liquid type D, temperature controlled***
4.1		3237	**Self-reactive liquid type E, temperature controlled***
4.1		3239	**Self-reactive liquid type F, temperature controlled***
4.1		3222	**Self-reactive solid type B***
4.1		3224	**Self-reactive solid type C***
4.1		3226	**Self-reactive solid type D***
4.1		3228	**Self-reactive solid type E***
4.1		3230	**Self-reactive solid type F***
4.1		3232	**Self-reactive solid type B, temperature controlled***
4.1		3234	**Self-reactive solid type C, temperature controlled***
4.1		3236	**Self-reactive solid type D, temperature controlled***
4.1		3238	**Self-reactive solid type E, temperature controlled***
4.1		3240	**Self-reactive solid type F, temperature controlled***
General entries			
4.1	See 2;0.6	3541	**Articles containing flammable solid, n.o.s.***
4.1	8	3180	**Flammable solid, corrosive, inorganic, n.o.s.***
4.1	8	2925	**Flammable solid, corrosive, organic, n.o.s.***
4.1		3178	**Flammable solid, inorganic, n.o.s.***
4.1		1325	**Flammable solid, organic, n.o.s.***
4.1		3176	**Flammable solid, organic, molten, n.o.s.***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
4.1	5.1	3097	**Flammable solid, oxidizing, n.o.s.***
4.1	6.1	3179	**Flammable solid, toxic, inorganic, n.o.s.***
4.1	6.1	2926	**Flammable solid, toxic, organic, n.o.s.***
4.1		3181	**Metal salts of organic compounds, flammable, n.o.s.***
4.1		3532	**Polymerizing substance, liquid, stabilized, n.o.s.***
4.1		3534	**Polymerizing substance, liquid, temperature controlled, n.o.s.***
4.1		3531	**Polymerizing substance, solid, stabilized, n.o.s.***
4.1		3533	**Polymerizing substance, solid, temperature controlled, n.o.s.***
4.1		3175	**Solids containing flammable liquid, n.o.s.***
Division 4.2			
Specific entries			
4.2	8	3206	**Alkali metal alcoholates, self-heating, corrosive, n.o.s.***
4.2		3205	**Alkaline earth metal alcoholates, n.o.s.***
4.2		1373	**Fabrics, animal, n.o.s.,** with oil
4.2		1373	**Fabrics, vegetable, n.o.s.,** with oil
4.2		1373	**Fabrics, synthetic, n.o.s.,** with oil
4.2		1373	**Fibres, animal** or **vegetable** or **synthetic, n.o.s.,** with oil
4.2		2881	**Metal catalyst, dry**
4.2		1378	**Metal catalyst, wetted** with a visible excess of liquid
4.2		3189	**Metal powder, self-heating, n.o.s.***
4.2		3313	**Organic pigments, self-heating**
4.2		3392	**Organometallic substance, liquid, pyrophoric**
4.2	4.3	3394	**Organometallic substance, liquid, pyrophoric, water-reactive**
4.2		3391	**Organometallic substance, solid, pyrophoric**
4.2	4.3	3393	**Organometallic substance, solid, pyrophoric, water-reactive**
4.2		3400	**Organometallic substance, solid, self-heating**
4.2		2006	**Plastics, nitrocellulose-based, self-heating, n.o.s.*** or **Pyrophoric alloy, n.o.s.***
4.2		1383	**Pyrophoric alloy, n.o.s.***
4.2		1383	**Pyrophoric metal, n.o.s.***
4.2		3342	**Xanthates**
General entries			
4.2	See 2;0.6	3542	**Articles containing a substance liable to spontaneous combustion, n.o.s.***
4.2		3194	**Pyrophoric liquid, inorganic, n.o.s.***
4.2		2845	**Pyrophoric liquid, organic, n.o.s.***
4.2		3200	**Pyrophoric solid, inorganic, n.o.s.***
4.2		2846	**Pyrophoric solid, organic, n.o.s.***
4.2	8	3188	**Self-heating liquid, corrosive, inorganic, n.o.s.***
4.2	8	3185	**Self-heating liquid, corrosive, organic, n.o.s.***
4.2		3186	**Self-heating liquid, inorganic, n.o.s.***
4.2		3183	**Self-heating liquid, organic, n.o.s.***
4.2	6.1	3187	**Self-heating liquid, toxic, inorganic, n.o.s.***
4.2	6.1	3184	**Self-heating liquid, toxic, organic, n.o.s.***
4.2	8	3192	**Self-heating solid, corrosive, inorganic, n.o.s.***
4.2	8	3126	**Self-heating solid, corrosive, organic, n.o.s.***
4.2		3190	**Self-heating solid, inorganic, n.o.s.***
4.2		3088	**Self-heating solid, organic, n.o.s.***
4.2	5.1	3127	**Self-heating solid, oxidizing, n.o.s.***
4.2	6.1	3191	**Self-heating solid, toxic, inorganic, n.o.s.***
4.2	6.1	3128	**Self-heating solid, toxic, organic, n.o.s.***
Division 4.3			
Specific entries			
4.3		1421	**Alkali metal alloy, liquid, n.o.s.**
4.3		1389	**Alkali metal amalgam, liquid**
4.3		3401	**Alkali metal amalgam, solid**
4.3		1390	**Alkali metal amides**
4.3		1391	**Alkali metal dispersion**
4.3		1393	**Alkaline earth metal alloy, n.o.s.**
4.3		1392	**Alkaline earth metal amalgam, liquid**
4.3		3402	**Alkaline earth metal amalgam, solid**
4.3		1391	**Alkaline earth metal dispersion**
4.3	3 & 8	2988	**Chlorosilanes, water-reactive, flammable, corrosive, n.o.s.**
4.3		1409	**Metal hydrides, water-reactive, n.o.s.***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
4.3		3208	**Metallic substance, water-reactive, n.o.s.***
4.3	4.2	3209	**Metallic substance, water-reactive, self-heating, n.o.s.***
4.3		3398	**Organometallic substance, liquid, water-reactive**
4.3	3	3399	**Organometallic substance, liquid, water-reactive, flammable**
4.3		3395	**Organometallic substance, solid, water-reactive**
4.3	4.1	3396	**Organometallic substance, solid, water-reactive, flammable**
4.3	4.2	3397	**Organometallic substance, solid, water-reactive, self-heating**
General entries			
4.3	See 2;06	3543	**Articles containing a substance which emits flammable gas in contact with water, n.o.s.***
4.3		3148	**Water-reactive liquid, n.o.s.***
4.3	8	3129	**Water-reactive liquid, corrosive, n.o.s.***
4.3	6.1	3130	**Water-reactive liquid, toxic, n.o.s.***
4.3		2813	**Water-reactive solid, n.o.s.***
4.3	8	3131	**Water-reactive solid, corrosive, n.o.s.***
4.3	4.1	3132	**Water-reactive solid, flammable, n.o.s.***
4.3	5.1	3133	**Water-reactive solid, oxidizing, n.o.s.***
4.3	4.2	3135	**Water-reactive solid, self-heating, n.o.s.***
4.3	6.1	3134	**Water-reactive solid, toxic, n.o.s.***
CLASS 5			
Division 5.1			
Specific entries			
5.1		1450	**Bromates, inorganic, n.o.s.***
5.1		3213	**Bromates, inorganic, aqueous solution, n.o.s.***
5.1		1461	**Chlorates, inorganic, n.o.s.***
5.1		3210	**Chlorates, inorganic, aqueous solution, n.o.s.***
5.1		1462	**Chlorites, inorganic, n.o.s.***
5.1		3212	**Hypochlorites, inorganic, n.o.s.***
5.1		1477	**Nitrates, inorganic, n.o.s.**
5.1		3218	**Nitrates, inorganic, aqueous solution, n.o.s.**
5.1		2627	**Nitrites, inorganic, n.o.s.***
5.1		3219	**Nitrites, inorganic, aqueous solution, n.o.s.***
5.1		1481	**Perchlorates, inorganic, n.o.s.**
5.1		3211	**Perchlorates, inorganic, aqueous solution, n.o.s.**
5.1		1482	**Permanganates, inorganic, n.o.s.***
5.1		3214	**Permanganates, inorganic, aqueous solution, n.o.s.***
5.1		1483	**Peroxides, inorganic, n.o.s.**
5.1		3215	**Persulphates, inorganic, n.o.s.**
5.1		3216	**Persulphates, inorganic, aqueous solution, n.o.s.**
General entries			
5.1	See 2;0.6	3544	**Articles containing oxidizing substance, n.o.s.***
5.1		3139	**Oxidizing liquid, n.o.s.***
5.1	8	3098	**Oxidizing liquid, corrosive, n.o.s.***
5.1	6.1	3099	**Oxidizing liquid, toxic, n.o.s.***
5.1		1479	**Oxidizing solid, n.o.s.***
5.1	8	3085	**Oxidizing solid, corrosive, n.o.s.***
5.1	4.1	3137	**Oxidizing solid, flammable, n.o.s.***
5.1	4.2	3100	**Oxidizing solid, self-heating, n.o.s.***
5.1	6.1	3087	**Oxidizing solid, toxic, n.o.s.***
5.1	4.3	3121	**Oxidizing solid, water-reactive, n.o.s.***
Division 5.2			
Specific entries			
5.2		3101	**Organic peroxide type B, liquid***
5.2		3111	**Organic peroxide type B, liquid, temperature controlled***
5.2		3102	**Organic peroxide type B, solid***
5.2		3112	**Organic peroxide type B, solid, temperature controlled***
5.2		3103	**Organic peroxide type C, liquid***
5.2		3113	**Organic peroxide type C, liquid, temperature controlled***
5.2		3104	**Organic peroxide type C, solid***
5.2		3114	**Organic peroxide type C, solid, temperature controlled***
5.2		3105	**Organic peroxide type D, liquid***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
5.2		3115	**Organic peroxide type D, liquid, temperature controlled***
5.2		3106	**Organic peroxide type D, solid***
5.2		3116	**Organic peroxide type D, solid, temperature controlled***
5.2		3107	**Organic peroxide type E, liquid***
5.2		3117	**Organic peroxide type E, liquid, temperature controlled***
5.2		3108	**Organic peroxide type E, solid***
5.2		3118	**Organic peroxide type E, solid, temperature controlled***
5.2		3109	**Organic peroxide type F, liquid***
5.2		3119	**Organic peroxide type F, liquid, temperature controlled***
5.2		3110	**Organic peroxide type F, solid***
5.2		3120	**Organic peroxide type F, solid, temperature controlled***
General entries			
5.2	See 2;0.6	3545	**Articles containing organic peroxide, n.o.s.***
CLASS 6			
Division 6.1			
Specific entries			
6.1		3140	**Alkaloid salts, liquid, n.o.s.***
6.1		3140	**Alkaloids, liquid, n.o.s.***
6.1		1544	**Alkaloid salts, solid, n.o.s.***
6.1		1544	**Alkaloids, solid, n.o.s.***
6.1		3141	**Antimony compound, inorganic, liquid, n.o.s.***
6.1		1549	**Antimony compound, inorganic, solid, n.o.s.***
6.1		1556	**Arsenic compound, liquid, n.o.s.***
6.1		1557	**Arsenic compound, solid, n.o.s.***
6.1		1564	**Barium compound, n.o.s.***
6.1		1566	**Beryllium compound, n.o.s.***
6.1		2570	**Cadmium compound**
6.1	8	3277	**Chloroformates, toxic, corrosive, n.o.s.***
6.1	3 & 8	2742	**Chloroformates, toxic, corrosive, flammable, n.o.s.***
6.1	8	3361	**Chlorosilanes, toxic, corrosive, n.o.s.***
6.1	3 & 8	3362	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.***
6.1		1583	**Chloropicrin mixture, n.o.s.***
6.1		1588	**Cyanides, inorganic, solid, n.o.s.***
6.1		1935	**Cyanide solution, n.o.s.***
6.1		3142	**Disinfectant, liquid, toxic, n.o.s.***
6.1		1601	**Disinfectant, solid, toxic, n.o.s.***
6.1		1602	**Dye intermediate, liquid, toxic, n.o.s.***
6.1		1602	**Dye, liquid, toxic, n.o.s.***
6.1		3143	**Dye intermediate, solid, toxic, n.o.s.***
6.1		3143	**Dye, solid, toxic, n.o.s.***
6.1		2856	**Fluorosilicates, n.o.s.***
6.1		2206	**Isocyanate solution, toxic, n.o.s.***
6.1		2206	**Isocyanates, toxic, n.o.s.***
6.1	3	3080	**Isocyanate solution, toxic, flammable, n.o.s.***
6.1	3	3080	**Isocyanates, toxic, flammable, n.o.s.***
6.1		2291	**Lead compound, soluble, n.o.s.***
6.1		1851	**Medicine, liquid, toxic, n.o.s.**
6.1		3249	**Medicine, solid, toxic, n.o.s.**
6.1	3	3071	**Mercaptan mixture, liquid, toxic, flammable, n.o.s.***
6.1	3	3071	**Mercaptans, liquid, toxic, flammable, n.o.s.***
6.1		2024	**Mercury compound, liquid, n.o.s.***
6.1		2025	**Mercury compound, solid, n.o.s.***
6.1		3281	**Metal carbonyls, liquid, n.o.s.***
6.1		3466	**Metal carbonyls, solid, n.o.s.***
6.1		3144	**Nicotine compound, liquid, n.o.s.***
6.1		1655	**Nicotine compound, solid, n.o.s.***
6.1		3144	**Nicotine preparation, liquid, n.o.s.***
6.1		1655	**Nicotine preparation, solid, n.o.s.***
6.1		3276	**Nitriles, liquid, toxic, n.o.s.***
6.1	3	3275	**Nitriles, toxic, flammable, n.o.s.***
6.1		3439	**Nitriles, solid, toxic, n.o.s.***
6.1		3280	**Organoarsenic compound, liquid, n.o.s.***
6.1		3465	**Organoarsenic compound, solid, n.o.s.***
6.1		3282	**Organometallic compound, liquid, toxic, n.o.s.***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
6.1		3467	**Organometallic compound, solid, toxic, n.o.s.***
6.1		3278	**Organophosphorus compound, liquid, toxic, n.o.s.***
6.1	3	3279	**Organophosphorus compound, toxic, flammable, n.o.s.***
6.1		3464	**Organophosphorus compound, solid, toxic, n.o.s.***
6.1		2788	**Organotin compound, liquid, n.o.s.**
6.1		3146	**Organotin compound, solid, n.o.s.**
6.1		2026	**Phenylmercuric compound, n.o.s.***
6.1		3440	**Selenium compound, liquid, n.o.s.***
6.1		3283	**Selenium compound, solid, n.o.s.***
6.1		1693	**Tear gas substance, liquid, n.o.s.***
6.1		3448	**Tear gas substance, solid, n.o.s.***
6.1		3284	**Tellurium compound, n.o.s.***
6.1		1707	**Thallium compound, n.o.s.**
6.1		3285	**Vanadium compound, n.o.s.***
Pesticides			
(a) Solid			
6.1		2759	**Arsenical pesticide, solid, toxic***
6.1		2781	**Bipyridilium pesticide, solid, toxic***
6.1		2757	**Carbamate pesticide, solid, toxic***
6.1		2775	**Copper based pesticide, solid, toxic***
6.1		3027	**Coumarin derivative pesticide, solid, toxic***
6.1		2771	**Thiocarbamate pesticide, solid, toxic***
6.1		2777	**Mercury based pesticide, solid, toxic***
6.1		2761	**Organochlorine pesticide, solid, toxic***
6.1		2783	**Organophosphorus pesticide, solid, toxic***
6.1		2786	**Organotin pesticide, solid, toxic***
6.1		2588	**Pesticide, solid, toxic, n.o.s.***
6.1		3345	**Phenoxyacetic acid derivative pesticide, solid, toxic**
6.1		3349	**Pyrethroid pesticide, solid, toxic**
6.1		2779	**Substituted nitrophenol pesticide, solid, toxic***
6.1		2763	**Triazine pesticide, solid, toxic***
(b) Liquid			
6.1		2994	**Arsenical pesticide, liquid, toxic***
6.1	3	2993	**Arsenical pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3016	**Bipyridilium pesticide, liquid, toxic***
6.1	3	3015	**Bipyridilium pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		2992	**Carbamate pesticide, liquid, toxic***
6.1	3	2991	**Carbamate pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3010	**Copper based pesticide, liquid, toxic***
6.1	3	3009	**Copper based pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3026	**Coumarin derivative pesticide, liquid, toxic***
6.1	3	3025	**Coumarin derivative pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3012	**Mercury based pesticide, liquid, toxic***
6.1	3	3011	**Mercury based pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		2996	**Organochlorine pesticide, liquid, toxic***
6.1	3	2995	**Organochlorine pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3018	**Organophosphorus pesticide, liquid, toxic***
6.1	3	3017	**Organophosphorus pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3020	**Organotin pesticide, liquid, toxic***
6.1	3	3019	**Organotin pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		2902	**Pesticide, liquid, toxic, n.o.s.***
6.1	3	2903	**Pesticide, liquid, toxic, flammable, n.o.s.*,** flash point ≥23°C
6.1		3348	**Phenoxyacetic acid derivative pesticide, liquid, toxic***
6.1	3	3347	**Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable,** flash point ≥23°C
6.1	3	3352	**Pyrethroid pesticide, liquid, toxic**
6.1	3	3351	**Pyrethroid pesticide, liquid, toxic, flammable,** flash point ≥23°C
6.1		3014	**Substituted nitrophenol pesticide, liquid, toxic***
6.1	3	3013	**Substituted nitrophenol pesticide, liquid, toxic, flammable*,** flash point ≥23°C
6.1		3006	**Thiocarbamate pesticide, liquid, toxic***
6.1	3	3005	**Thiocarbamate pesticide, liquid, toxic, flammable*, flash point** ≥23°C
6.1		2998	**Triazine pesticide, liquid, toxic***
6.1	3	2997	**Triazine pesticide, liquid, toxic, flammable*,** flash point ≥23°C
General entries			
6.1	See 2;0.6	3546	**Articles containing toxic substance, n.o.s.***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
6.1		3315	**Chemical sample, toxic**
6.1		3243	**Solids containing toxic liquid, n.o.s.***
6.1	8	3389	**Toxic by inhalation liquid, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1	8	3390	**Toxic by inhalation liquid, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1	3	3383	**Toxic by inhalation liquid, flammable, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1	3	3384	**Toxic by inhalation liquid, flammable, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1	3 & 8	3488	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1	3 & 8	3489	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1		3381	**Toxic by inhalation liquid, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1		3382	**Toxic by inhalation liquid, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1	5.1	3387	**Toxic by inhalation liquid, oxidizing, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1	5.1	3388	**Toxic by inhalation liquid, oxidizing, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1	3 & 4.3	3490	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1	3 & 4.3	3491	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1	4.3	3385	**Toxic by inhalation liquid, water-reactive, n.o.s.*** with an LC_{50} lower than or equal to 200 ml/m^3 and saturated vapour concentration greater than or equal to 500 LC_{50}
6.1	4.3	3386	**Toxic by inhalation liquid, water-reactive, n.o.s.*** with an LC_{50} lower than or equal to 1 000 ml/m^3 and saturated vapour concentration greater than or equal to 10 LC_{50}
6.1	8	3289	**Toxic liquid, corrosive, inorganic, n.o.s.***
6.1	8	2927	**Toxic liquid, corrosive, organic, n.o.s.***
6.1	3	2929	**Toxic liquid, flammable, organic, n.o.s.***
6.1		3287	**Toxic liquid, inorganic, n.o.s.***
6.1		2810	**Toxic liquid, organic, n.o.s.***
6.1	5.1	3122	**Toxic liquid, oxidizing, n.o.s.***
6.1	4.3	3123	**Toxic liquid, water-reactive, n.o.s.***
6.1	8	3290	**Toxic solid, corrosive, inorganic, n.o.s.***
6.1	8	2928	**Toxic solid, corrosive, organic, n.o.s.***
6.1	4.1	3535	**Toxic solid, flammable, inorganic, n.o.s***
6.1	4.1	2930	**Toxic solid, flammable, organic, n.o.s.***
6.1		3288	**Toxic solid, inorganic, n.o.s.***
6.1		2811	**Toxic solid, organic, n.o.s.***
6.1	5.1	3086	**Toxic solid, oxidizing, n.o.s.***
6.1	4.2	3124	**Toxic solid, self-heating, n.o.s.***
6.1	4.3	3125	**Toxic solid, water-reactive, n.o.s.***
6.1		3172	**Toxins, extracted from living sources, liquid, n.o.s.***
6.1		3462	**Toxins, extracted from living sources, solid, n.o.s.***
Division 6.2			
Specific entries			
6.2		3373	**Biological substance, Category B**
6.2		3291	**Biomedical waste, n.o.s.**
6.2		3291	**Clinical waste, unspecified, n.o.s**
6.2		3291	**Medical waste, n.o.s.**
6.2		3291	**Regulated medical waste, n.o.s.**

	Class or Division	Subsidiary hazard	UN No.	Proper shipping name
	General entries			
	6.2		2900	**Infectious substance, affecting animals*** only
	6.2		2814	**Infectious substance, affecting humans***
	CLASS 7			
	General entries			
	7		2908	**Radioactive material, excepted package — empty packaging**
	7		2909	**Radioactive material, excepted package — articles manufactured from natural uranium** or **depleted uranium** or **natural thorium**
	7		2910	**Radioactive material, excepted package — limited quantity of material**
	7		2911	**Radioactive material, excepted package — instruments** or **articles**
	7		2912	**Radioactive material, low specific activity (LSA-I),** non-fissile or fissile excepted
≠	7		2913	**Radioactive material, surface contaminated objects (SCO-I, SCO-II** or **SCO-III),** non-fissile or fissile excepted
	7		2915	**Radioactive material, Type A package, non-special form,** non-fissile or fissile excepted
	7		2916	**Radioactive material, Type B(U) package,** non-fissile or fissile excepted
	7		2917	**Radioactive material, Type B(M) package,** non-fissile or fissile excepted
	7		2919	**Radioactive material, transported under special arrangement,** non-fissile or fissile excepted
	7		3321	**Radioactive material, low specific activity (LSA-II),** non-fissile or fissile excepted
	7		3322	**Radioactive material, low specific activity (LSA-III),** non-fissile or fissile excepted
	7		3323	**Radioactive material, Type C package,** non-fissile or fissile excepted
	7		3324	**Radioactive material, low specific activity (LSA-II) fissile**
	7		3325	**Radioactive material, low specific activity (LSA-III) fissile**
	7		3326	**Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**
	7		3327	**Radioactive material, Type A package, fissile,** non-special form
	7		3328	**Radioactive material, Type B(U) package, fissile**
	7		3329	**Radioactive material, Type B(M) package, fissile**
	7		3330	**Radioactive material, Type C package, fissile**
	7		3331	**Radioactive material, transported under special arrangement, fissile**
	7		3332	**Radioactive material, Type A package, special form,** non-fissile or fissile excepted
	7		3333	**Radioactive material, Type A package, special form, fissile**
	CLASS 8			
	Specific entries			
	8		3145	**Alkylphenols, liquid, n.o.s.** (including C_2-C_{12} homologues)
	8		2430	**Alkylphenols, solid, n.o.s.** (including C_2-C_{12} homologues)
	8		2735	**Amines, liquid, corrosive, n.o.s.***
	8	3	2734	**Amines, liquid, corrosive, flammable, n.o.s.***
	8		3259	**Amines, solid, corrosive, n.o.s.***
	8		2837	**Bisulphates, aqueous solution**
	8		2693	**Bisulphites, aqueous solution, n.o.s.**
	8		1719	**Caustic alkali liquid, n.o.s.***
	8		2987	**Chlorosilanes, corrosive, n.o.s.**
	8	3	2986	**Chlorosilanes, corrosive, flammable, n.o.s.**
	8		1903	**Disinfectant, liquid, corrosive, n.o.s.***
	8		2801	**Dye intermediate, liquid, corrosive, n.o.s.***
	8		3147	**Dye intermediate, solid, corrosive, n.o.s.***
	8		2801	**Dye, liquid, corrosive, n.o.s.***
	8		3147	**Dye, solid, corrosive, n.o.s.***
	8		1740	**Hydrogendifluorides, solid, n.o.s.**
	8		3471	**Hydrogendifluorides, solution, n.o.s.**
	8		2735	**Polyamines, liquid, corrosive, n.o.s.***
	8	3	2734	**Polyamines, liquid, corrosive, flammable, n.o.s.***
	8		3259	**Polyamines, solid, corrosive, n.o.s.***

Class or Division	*Subsidiary hazard*	*UN No.*	*Proper shipping name*
General entries			
8	See 2;0.6	3547	**Articles containing corrosive substance, n.o.s.***
8		1760	**Corrosive liquid, n.o.s.***
8		3264	**Corrosive liquid, acidic, inorganic, n.o.s.***
8		3265	**Corrosive liquid, acidic, organic, n.o.s.***
8		3266	**Corrosive liquid, basic, inorganic, n.o.s.***
8		3267	**Corrosive liquid, basic, organic, n.o.s.***
8	3	2920	**Corrosive liquid, flammable, n.o.s.***
8	5.1	3093	**Corrosive liquid, oxidizing, n.o.s.***
8	4.2	3301	**Corrosive liquid, self-heating, n.o.s.***
8	6.1	2922	**Corrosive liquid, toxic, n.o.s.***
8	4.3	3094	**Corrosive liquid, water-reactive, n.o.s.***
8		1759	**Corrosive solid, n.o.s.***
8		3260	**Corrosive solid, acidic, inorganic, n.o.s.***
8		3261	**Corrosive solid, acidic, organic, n.o.s.***
8		3262	**Corrosive solid, basic, inorganic, n.o.s.***
8		3263	**Corrosive solid, basic, organic, n.o.s.***
8	4.1	2921	**Corrosive solid, flammable, n.o.s.***
8	5.1	3084	**Corrosive solid, oxidizing, n.o.s.***
8	4.2	3095	**Corrosive solid, self-heating, n.o.s.***
8	6.1	2923	**Corrosive solid, toxic, n.o.s.***
8	4.3	3096	**Corrosive solid, water-reactive, n.o.s.***
8		3244	**Solids containing corrosive liquid, n.o.s.***
CLASS 9			
General entries			
9	See 2;0.6	3548	**Articles containing miscellaneous dangerous goods, n.o.s.***
9		2212	**Asbestos, amphibole***
9		3334	**Aviation regulated liquid, n.o.s.***
9		3335	**Aviation regulated solid, n.o.s.***
9		3257	**Elevated temperature liquid, n.o.s.***
9		3258	**Elevated temperature solid, n.o.s.***
9		3082	**Environmentally hazardous substance, liquid, n.o.s.***
9		3077	**Environmentally hazardous substance, solid, n.o.s.***
9		3245	**Genetically modified micro-organisms**
9		3245	**Genetically modified organisms**

Attachment 2

GLOSSARY OF TERMS

Caution: These explanations are only for information. They must not be relied upon for purposes of hazard classification and may not necessarily reflect the information provided to the United Nations at the time the UN numbers were assigned.

Glossary of terms

	Term and explanation	*UN Number(s), when relevant*
≠	**AIRCRAFT ENGINES.** Generic term for engines powering flying craft fuelled by flammable liquid (jet-fuel, petrol, kerosene, etc.) which applies to piston designs, turbine designs and includes auxiliary power units (APU).	3528
	ALUMINIUM PROCESSING BY-PRODUCTS. The material, consisting of skimmings of virgin aluminium, rising to the surface of impure molten aluminium metal.	3170
	ALUMINIUM POWDER. The uncoated powder may evolve hydrogen in contact with water, and finely divided dust may be ignited by naked lights or sparks. Coated aluminium powders which have been treated with oils or wax for printing or paint purposes are generally not dangerous.	1309, 1396
	AMMUNITION. Generic term related mainly to articles of military application consisting of all kinds of bombs, grenades, rockets, mines, projectiles and other similar devices or contrivances.	—
	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge. Ammunition designed to produce a single source of intense light for lighting up an area. The term includes illuminating cartridges, grenades and projectiles; and illuminating and target identification bombs. The term excludes the following articles which are listed separately: CARTRIDGES, SIGNAL; SIGNAL DEVICES, HAND; SIGNALS, DISTRESS; FLARES, AERIAL; and FLARES, SURFACE.	0171, 0254, 0297
	AMMUNITION, INCENDIARY. Ammunition containing incendiary substance which may be a solid, liquid or gel including white phosphorus. Except when the composition is an explosive per se, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes: AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge; AMMUNITION, INCENDIARY, with or without burster, expelling charge or propelling charge; AMMUNITION, INCENDIARY, WHITE PHOSPHORUS, with burster, expelling charge or propelling charge.	0009, 0010, 0243, 0244, 0247, 0300
	AMMUNITION, PRACTICE. Ammunition without a main bursting charge, containing a burster or expelling charge. Normally it also contains a fuze and a propelling charge. The term excludes the following articles which are listed separately: GRENADES, PRACTICE.	0362, 0488
	AMMUNITION, PROOF. Ammunition containing pyrotechnic substance used to test the performance or strength of new ammunition, weapon components or assemblies.	0363
	AMMUNITION, SMOKE. Ammunition containing smoke-producing substance such as chlorosulphonic acid mixture, titanium tetrachloride or white phosphorus; or smoke-producing pyrotechnic composition based on hexachloroethane or red phosphorus. Except when the substance is an explosive per se, the ammunition also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes 'grenades, smoke' but excludes SIGNALS, SMOKE which are listed separately. The term includes: AMMUNITION, SMOKE, with or without burster, expelling charge or propelling charge; AMMUNITION, SMOKE, WHITE PHOSPHORUS, with burster, expelling charge or propelling charge.	0015, 0016, 0245, 0246, 0303
	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge. Ammunition containing tear-producing substance. It also contains one or more of the following: a pyrotechnic substance; a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.	0018, 0019, 0301
	AMMUNITION, TOXIC, with burster, expelling charge or propelling charge. Ammunition containing toxic agent. It also contains one or more of the following: a pyrotechnic substance; a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.	0020, 0021
	ARSENICAL DUST. Smelter dust which contains large proportions of arsenic. These dusts are hazardous due to their toxic characteristics.	1562
	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI). Articles that contain only extremely insensitive substances and which demonstrate a negligible probability of accidental initiation or propagation (under normal conditions of transport). *Note.— An extremely insensitive substance is a substance which although capable of sustaining a detonation has demonstrated through tests that it is so insensitive that there is very little probability of accidental initiation.*	0486

Term and explanation	*UN Number(s), when relevant*
ARTICLES, PYROPHORIC. Articles which contain a pyrophoric substance capable of spontaneous ignition when exposed to air and an explosive substance or component. The term excludes articles containing white phosphorus.	0380
ARTICLES, PYROTECHNIC for technical purposes. Articles which contain pyrotechnic substances and are used for technical purposes such as heat generation, gas generation, theatrical effects, etc. The term excludes the following articles which are listed separately: all ammunition; CARTRIDGES, SIGNAL; CUTTERS, CABLE, EXPLOSIVE; FIREWORKS; FLARES, AERIAL; FLARES, SURFACE; RELEASE DEVICES, EXPLOSIVE; RIVETS, EXPLOSIVE; SIGNAL DEVICES, HAND; SIGNALS, DISTRESS; SIGNALS, RAILWAY TRACK, EXPLOSIVE; SIGNALS, SMOKE.	0428, 0429, 0430, 0431, 0432
ASBESTOS. Asbestos is a generic name for naturally occurring mineral silicate fibres of the Serpentine and Amphibole series. In the Serpentine series is Chrysotile. In the Amphibole series are Actinolite, Amosite, Anthophyllite, Crocidolite and Tremolite. All types of asbestos can be hazardous to health, Amphibole asbestos being the more dangerous type.	2212, 2590
AUXILIARY EXPLOSIVE COMPONENT, isolated. An “isolated auxiliary explosive component’’ is a small device that explosively performs an operation related to the article’s functioning, other than its main explosive loads’ performance. Functioning of the component does not cause any reaction of the main explosive loads contained within the article.	
BATTERIES, CONTAINING SODIUM. Articles consisting of a series of CELLS, CONTAINING SODIUM that are secured within, and fully enclosed by a metal casing so constructed and closed as to prevent the release of dangerous goods under normal conditions of transport. Although designed and intended to provide a source of electrical energy, these batteries are electrically inert at any temperature at which the sodium contained in the battery is in a solid state.	3292
BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE, SOLID. Storage batteries filled with potassium hydroxide, solid which are shipped from the factory in their original dry state and filled with the dry alkali. Water would be added to the battery before first being used.	3028
BATTERIES, WET, FILLED WITH ACID OR ALKALI. A series of metal plates immersed in an electrolyte, which is usually dilute sulphuric acid, but for a certain type of battery the electrolyte is a solution of potassium hydroxide. Both of these electrolytes are corrosive liquids. The casing for the acid containing batteries is commonly plastic. Storage batteries of either of these types, when containing electrolyte, are classed as corrosive liquids. Storage batteries in transit may cause damage by leakage of the electrolyte or may produce fire by accidental short-circuiting of the terminals.	2794, 2795
BLACK POWDER (GUNPOWDER). Substance consisting of an intimate mixture of charcoal or other carbon and either potassium nitrate or sodium nitrate, with or without sulphur. It may be meal, granular, compressed or pelletized.	0027, 0028
BOMBS. Explosive articles which are dropped from aircraft. They may contain a flammable liquid with bursting charge, a photo-flash composition or a bursting charge. The term excludes torpedoes (aerial) and includes: BOMBS, PHOTO-FLASH; BOMBS with bursting charge; BOMBS WITH FLAMMABLE LIQUID, with bursting charge.	0033, 0034, 0035, 0037, 0038, 0039, 0291, 0299, 0399, 0400
BOOSTERS. Articles consisting of a charge of detonating explosive with or without means of initiation. They are used to increase the initiating power of detonators or detonating cord.	0042, 0225, 0268, 0283
BURSTERS, explosive. Articles consisting of a small charge of explosive used to open projectiles, or other ammunition in order to disperse their contents.	0043
CAPS, TOY (AMORCES). Articles consisting of a small quantity of an explosive substance between two strips or discs of paper or contained in a plastic cup or covered by varnishing or other means.	—
CARTRIDGES ACTUATING FOR FIRE EXTINGUISHER. Contrivances containing a small explosive charge with a primer, the functioning of which ruptures a metal piece (for example, a bursting disc) and thereby actuates a fire extinguisher.	—
CARTRIDGES, BLANK. Articles which consist of a cartridge case with a centre or rim fire primer and a confined charge of smokeless or black powder but no projectile. Used for training, saluting or in starter pistols, etc.	0014, 0326, 0327, 0338, 0413
CARTRIDGES, FLASH. Articles consisting of a casing, a primer and flash powder, all assembled in one piece ready for firing.	0049, 0050

Term and explanation	*UN Number(s), when relevant*
CARTRIDGES FOR WEAPONS. 1) Fixed (assembled) or semi-fixed (partially-assembled) ammunition designed to be fired from weapons. Each cartridge includes all the components necessary to function the weapon once. The name and description should be used for small arms cartridges that cannot be described as 'cartridges, small arms'. Separate loading ammunition is included under this name and description when the propelling charge and projectile are packed together (see also 'Cartridges, blank'). 2) Incendiary, smoke, toxic and tear-producing cartridges are described in this Attachment under 'ammunition, incendiary' etc.	0005, 0006, 0007, 0014, 0321, 0326, 0327, 0338, 0348, 0412, 0413
CARTRIDGES FOR WEAPONS, INERT PROJECTILE. Ammunition consisting of a projectile without bursting charge but with a propelling charge. The presence of a tracer can be disregarded for classification purposes provided that the predominant hazard is that of the propelling charge.	0012, 0328, 0339, 0417
CARTRIDGES, OIL WELL. Articles consisting of a casing of thin fibre, metal or other material containing only propellant which projects a hardened projectile. The term excludes the following articles which are listed separately: CHARGES, SHAPED.	0277, 0278
CARTRIDGES, POWER DEVICE. Articles designed to accomplish mechanical actions. They consist of a casing with a charge of deflagrating explosive and a means of ignition. The gaseous products of the deflagration produce inflation, linear or rotary motion or activate diaphragms, valves or switches or project fastening devices or extinguishing agents.	0275, 0276, 0323, 0381
CARTRIDGES, SIGNAL. Articles designed to fire coloured flares or other signals from signal pistols, etc.	0054, 0312, 0405
CARTRIDGES, SMALL ARMS. Ammunition consisting of a cartridge case fitted with a centre or rim fire primer and containing both a propelling charge and solid projectile(s). They are designed to be fired in weapons of calibre not larger than 19.1 mm. Shot-gun cartridges of any calibre are included in this definition. The term excludes: CARTRIDGES, SMALL ARMS, BLANK listed separately; and some small arms cartridges which are listed under CARTRIDGES FOR WEAPONS, INERT PROJECTILE.	0012, 0328, 0339, 0417
CASES, CARTRIDGE, EMPTY, WITH PRIMER. Articles consisting of a cartridge case made from metal, plastics or other non-flammable material, in which the only explosive component is the primer.	0055, 0379
CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER. Articles consisting of cartridge cases made partly or entirely from nitrocellulose.	0446, 0447
CELLS, CONTAINING SODIUM. Articles consisting of hermetically sealed, metal casings which fully enclose the dangerous goods and which are so constructed and closed as to prevent the release of the dangerous goods under normal conditions of transport. In addition to sodium, cells covered by this entry may also contain sulphur, but no other dangerous goods. Although designed and intended to provide a source of electrical energy, these cells are electrically inert at any temperature at which the sodium contained in the cell is in a solid state.	3292
CHARGES, BURSTING. Articles consisting of a charge of detonating explosive such as hexolite, octolite or plastics bonded explosive designed to produce effect by blast or fragmentation.	—
CHARGES, DEMOLITION. Articles containing a charge of a detonating explosive in a casing of fibreboard, plastic, metal or other material. The term excludes the following articles which are listed separately: bombs, mines, etc.	0048
CHARGES, DEPTH. Articles consisting of a charge of detonating explosive contained in a drum or projectile. They are designed to detonate under water.	0056
CHARGES, EXPELLING. A charge of deflagrating explosive designed to eject the payload from the parent articles without damage.	—
CHARGES, EXPLOSIVE, COMMERCIAL without detonator. Articles consisting of a charge of detonating explosive without means of initiation, used for explosive welding, jointing, forming and other metallurgical processes.	0442, 0443, 0444, 0445
CHARGES, PROPELLING. Articles consisting of a propellant charge in any physical form, with or without a casing, for use as a component of rocket motors or for reducing the drag of projectiles.	0271, 0272, 0415, 0491
CHARGES, PROPELLING FOR CANNON. Articles consisting of a propellant charge in any physical form, with or without a casing, for use in a cannon.	0242, 0279, 0414
CHARGES, SHAPED, without detonator. Articles consisting of a casing containing a charge of detonating explosive with a cavity lined with rigid material, without means of initiation. They are designed to produce a powerful, penetrating jet effect.	0059, 0439, 0440, 0441

Term and explanation	*UN Number(s), when relevant*
CHARGES, SHAPED, FLEXIBLE, LINEAR. Articles consisting of a V-shaped core of a detonating explosive clad by a flexible metal sheath.	0237, 0288
CHARGES, SUPPLEMENTARY, EXPLOSIVE. Articles consisting of a small removable booster used in the cavity of a projectile between the fuze and the bursting charge.	0060
COAL GAS COMPRESSED. The gas obtained by the destructive distillation of bituminous coal.	1023
COATING SOLUTION. Material such as automobile undercoating, drum or barrel lining material, etc., which cannot properly be described as cement, but presents similar hazards during transport. It usually contains flammable solvents.	1139
COMPONENTS, EXPLOSIVE TRAIN, N.O.S. Articles containing an explosive designed to transmit the detonation or deflagration within an explosive train.	0382, 0383, 0384, 0461
CONSUMER COMMODITY. A material which is packed and distributed in a form intended or suitable for retail sales for the purposes of personal care or household use.	—
CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge. Articles whose functioning depends upon physico-chemical reaction of their contents with water.	0248, 0249
CONVEYANCE. A conveyance is a means of transportation such as an aircraft, boat, road vehicle, scooter or lift truck.	
COPRA. The dried meat of coconuts used to produce coconut oil. Copra contains up to 67% oil and may be subject to spontaneous combustion.	1363
CORD, DETONATING, flexible. Articles consisting of a core of detonating explosive enclosed in spun fabric with plastic or other covering unless the spun fabric is siftproof.	0065, 0289
CORD (FUSE), DETONATING, metal clad. Articles consisting of a core of detonating explosive clad by a soft metal tube with or without protective covering. When the core contains a sufficiently small quantity of explosive, the words 'mild effect' are added.	0102, 0104, 0290
CORD, IGNITER. Article consisting of textile yarns covered with black powder or another fast burning pyrotechnic composition and of a flexible protective covering; or it consists of a core of black powder surrounded by a flexible woven fabric. It burns progressively along its length with an external flame and is used to transmit ignition from a device to a charge or primer.	0066
CUTTERS, CABLE, EXPLOSIVE. Articles consisting of a knife-edged device which is driven by a small charge of deflagrating explosive into an anvil.	0070
DETONATOR ASSEMBLIES, NON-ELECTRIC, for blasting. Non-electric detonators assembled with and activated by such means as safety fuse, shock tube, flash tube or detonating cord. They may be of instantaneous design or incorporate delay elements. Detonating relays incorporating detonating cord are included. Other detonating relays are included in 'Detonators, non-electric'.	0360, 0361
DETONATORS. Articles consisting of a small metal or plastic tube containing explosives such as lead azide, PETN or combinations of explosives. They are designed to start a detonation train. They may be constructed to detonate instantaneously, or may contain a delay element. The term includes: DETONATORS FOR AMMUNITION and Detonators for blasting both electric and non-electric; Detonating relays without flexible detonating cord are included.	0029, 0030, 0073, 0255, 0267, 0364, 0365, 0366, 0455 0456, 0500
DETONATORS, ELECTRONIC programmable for blasting. Detonators with enhanced safety and security features, utilizing electronic components to transmit a firing signal with validated commands and secure communications. Detonators of this type cannot be initiated by other means.	0511, 0512, 0513
DRESSING, LEATHER. A preparation which usually contains a solvent or other liquid with a low flash point.	—
DYE INTERMEDIATE, N.O.S. A cyclic compound, containing an amino, hydroxy, sulfonic acid, or quinone group or a combination of these groups used in the manufacture of dyes.	1602, 2801, 3143, 3147
ELECTROLYTE. The term commonly applied to the dilute sulphuric acid used in ordinary lead plate storage batteries. The solution of potassium hydroxide used in some storage batteries is also called electrolyte.	—
ENTIRE LOAD. Such a substantial proportion that the practical hazard should be assessed by assuming simultaneous explosion of the whole of the explosive content of the load or package.	—
EXPLODE. The verb used to indicate those explosive effects capable of endangering life and property through blast, heat and projection of missiles. It encompasses both deflagration and detonation.	—
EXPLOSION OF THE TOTAL CONTENTS. The phrase is used in testing a single article or package or a small stack of articles or packages.	—

Term and explanation	*UN Number(s), when relevant*
EXPLOSIVE, BLASTING. Detonating explosive substances used in mining, construction and similar tasks. Blasting explosives are assigned to one of five types. In addition to the ingredients listed, blasting explosives may also contain inert components such as kieselguhr, and minor ingredients such as colouring agents and stabilizers.	0081, 0082, 0083, 0084, 0241, 0331, 0332
EXPLOSIVE, BLASTING, TYPE A. Substances consisting of liquid organic nitrates such as nitroglycerin or a mixture of such ingredients with one or more of the following: nitrocellulose, ammonium nitrate or other inorganic nitrates, aromatic nitro derivatives or combustible materials such as wood-meal and aluminium powder. Such explosives must be in powdery, gelatinous or elastic form. The term includes dynamite, gelatine, blasting and gelatine dynamites.	0081
EXPLOSIVE, BLASTING, TYPE B. Substances consisting of a) a mixture of ammonium nitrate or other inorganic nitrates with an explosive such as trinitrotoluene, with or without other substances such as wood-meal and aluminium powder, or b) a mixture of ammonium nitrate or other inorganic nitrates with other combustible substances which are not explosive ingredients. Such explosives must not contain nitroglycerin, similar liquid organic nitrates, or chlorates.	0082, 0331
EXPLOSIVE, BLASTING, TYPE C. Substances consisting of a mixture of either potassium or sodium chlorate or potassium, sodium or ammonium perchlorate with organic nitro derivatives or combustible materials such as wood-meal or aluminium powder or a hydrocarbon. Such explosives must not contain nitroglycerin or similar liquid organic nitrates.	0083
EXPLOSIVE, BLASTING, TYPE D. Substances consisting of a mixture of organic nitrated compounds and combustible materials such as hydrocarbons and aluminium powder. Such explosives must not contain nitroglycerin, similar liquid organic nitrates, chlorates or ammonium nitrate. The term generally includes plastic explosives.	0084
EXPLOSIVE, BLASTING, TYPE E. Substances consisting of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizers, some or all of which are in solution. The other constituents may include nitro-derivatives such as trinitrotoluene, hydrocarbons or aluminium powder. The term includes explosives, emulsion; explosives, slurry and explosives, water gel.	0241, 0332
EXPLOSIVE, DEFLAGRATING. A substance, e.g. a propellant, which reacts by deflagration rather than detonation when ignited and used in its normal manner.	—
EXPLOSIVE, DETONATING. A substance which reacts by detonation rather than deflagration when initiated and used in its normal manner.	—
EXPLOSIVE, EXTREMELY INSENSITIVE SUBSTANCE (EIS). A substance which has demonstrated through tests that it is so insensitive that there is very little probability of accidental initiation.	—
EXPLOSIVE, PRIMARY. An explosive substance manufactured with a view to producing a practical effect by explosion which is very sensitive to heat, impact or friction and which, even in very small quantities, either detonates or burns very rapidly. It is able to transmit detonation (in the case of initiating explosive) or deflagration to secondary explosives close to it. The main primary explosives are mercury fulminate, lead azide and lead styphnate.	—
EXPLOSIVE, SECONDARY. An explosive substance which is relatively insensitive (when compared to primary explosives), which is usually initiated by primary explosives with or without the aid of boosters or supplementary charges. Such an explosive may react as a deflagrating or as a detonating explosive.	—
EXTRACTS, AROMATIC OR EXTRACTS, FLAVOURING. Substances used for fragrances or for flavouring foods or beverages. Where they contain a solvent or other liquid with a sufficiently low flash point they are classified as flammable liquids. However, where they contain a liquid which has corrosive or toxic properties they must be classified according to that criteria. They may have obnoxious properties such that in the event of a leakage from the package they may cause extreme discomfort to the crew or passengers.	1169, 1197
FILMS, NITROCELLULOSE BASE. A type of film which consists mainly of nitrocellulose. As such the material has a low ignition temperature and burns rapidly when ignited, evolving gases which are toxic. When new and in good condition the film is reasonably stable and free from liability to spontaneous heating and combustion. Film that has deteriorated badly becomes very unstable and may be liable to spontaneous heating unless kept under water.	1324
FIRE EXTINGUISHER CHARGES. These commonly consist of packages containing sodium bicarbonate (a dry powder) which is non-hazardous, and bottles containing concentrated sulphuric acid, a corrosive liquid.	1774
FIRELIGHTERS. These are usually made from peat, wood shavings, or sawdust and a flammable liquid.	2623
FIREWORKS. Pyrotechnic articles designed for entertainment.	0333, 0334, 0335 0336, 0337

	Term and explanation	*UN Number(s), when relevant*
	FLARES. Articles containing pyrotechnic substances which are designed for use to illuminate, identify, signal or warn. The term includes: FLARES, AERIAL; FLARES, SURFACE.	0092, 0093, 0403, 0404, 0418, 0419, 0420, 0421
	FLASH POWDER. Pyrotechnic substance which, when ignited, produces an intense light.	0094, 0305
	FRACTURING DEVICES, EXPLOSIVE, for oil wells, without detonator. Articles consisting of a charge of detonating explosive contained in a casing without means of initiation. They are used to fracture the rock around a drill shaft to assist the flow of crude oil from the rock.	0099
	FUEL CELL. *See Part 1;3.1.*	
	FUEL CELL CARTRIDGE. An article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell.	3473, 3476, 3477, 3478, 3479
≠	**FUEL CELL ENGINE.** *See Part 1;3.1.*	3528, 3529
	FUSE/FUZE. Although these two words have a common origin (French *fusée, fusil*) and are sometimes considered to be different spellings of the same word, it is useful to maintain the convention that FUSE refers to a cord-like igniting device whereas FUZE refers to a device used in ammunition which incorporates mechanical, electrical, chemical or hydrostatic components to initiate a train by deflagration or detonation.	—
	FUSE, IGNITER, tubular, metal clad. Article consisting of a metal tube with a core of deflagrating explosive.	0103
	FUSE, INSTANTANEOUS, NON-DETONATING (QUICKMATCH). Article consisting of cotton yarns impregnated with fine black powder (quickmatch). It burns with an external flame and is used in ignition trains for fireworks, etc.	0101
	FUSE, SAFETY. Article consisting of a core of fine-grained black powder surrounded by a flexible woven fabric with one or more protective outer coverings. When ignited it burns at a predetermined rate without any external explosive effect.	0105
	FUZES. Articles designed to start a detonation or a deflagration in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components and generally protective features. The term includes: FUZES, DETONATING; FUZES, DETONATING with protective features; FUZES, IGNITING.	0106, 0107, 0257, 0316, 0317, 0367, 0368, 0408, 0409, 0410
	GALLIUM. A silvery-white metal with a melting point of 30°C; it may be under-cooled to almost 0°C without solidifying. It has the property of very rapidly penetrating the grain boundaries of aluminium alloys and other metals and causing embrittlement.	2803
	GAS DRIPS, Hydrocarbon. The liquid that condenses on compression of Pintsch Gas or the condensate from gas mains. It consists principally of a mixture of benzene and unsaturated hydrocarbons.	3295
+	**GAS TURBINE ENGINES**. Generic term used for turbine engines fuelled by flammable liquid, flammable gas or other combustible fuels. They may power fixed wing aircraft, rotorcraft, hover craft (cushion craft), marine vessels, land vehicles, pumps and power-generating plants.	3528, 3529
	GRENADES, hand or rifle. Articles which are designed to be thrown by hand or to be projected by a rifle. The term includes: GRENADES, hand or rifle, with bursting charge; GRENADES, PRACTICE, hand or rifle. The term excludes 'grenades, smoke' which are listed under AMMUNITION, SMOKE.	0110, 0284, 0285, 0292, 0293, 0318, 0372, 0452
	HYDROCARBON GAS, COMPRESSED. Hydrocarbon gas under high pressure, but not in the liquid condition.	1964
	HYDROCARBON GAS, LIQUEFIED. Hydrocarbon gas from natural gas or from distillation of petroleum which are liquefied by pressure.	1965
	HYPOCHLORITE SOLUTION. Water solutions containing a soluble hypochlorite varying over a wide range in concentration. The solutions are alkaline and corrosive but are not flammable. If the hypochlorite solution contacts strong acids, a decomposition takes place to produce the noxious chlorine-type gases.	1791
	IGNITERS. Articles containing one or more explosive substances used to start deflagration in an explosive train. They may be actuated chemically, electrically or mechanically. This term excludes the following articles which are listed separately: CORD, IGNITER; FUSE, IGNITER; FUSE, INSTANTANEOUS, NON-DETONATING; FUZES, IGNITING; LIGHTERS, FUSE; PRIMERS, CAP TYPE; PRIMERS, TUBULAR.	0121, 0314, 0315, 0325, 0454

Term and explanation	*UN Number(s), when relevant*
IGNITION, MEANS OF. A general term used in connection with the method employed to ignite a deflagrating train of explosive or pyrotechnic substances (e.g. a primer for a propelling charge, an igniter for a rocket motor, an igniting fuze).	—
INITIATION, MEANS OF. (1) A device intended to cause the detonation of an explosive (e.g. detonator, detonator for ammunition, detonating fuze). (2) The term "with its own means of initiation" means that the contrivance has its normal initiating device assembled to it and this device is considered to present a significant risk during transport but not one great enough to be unacceptable. The term does not apply, however, to a contrivance packed together with its means of initiation provided the device is packaged so as to eliminate the risk of causing detonation of the contrivance in the event of accidental functioning of the initiating device. The means of initiating can even be assembled to the contrivance provided there are protective features such that the device is unlikely to cause detonation of the contrivance in conditions which are associated with transport. (3) For the purposes of classification any means of initiation without two effective protective features should be regarded as Compatibility Group B; an article with its own means of initiation, without two effective protective features, would be Compatibility Group F. However, a means of initiation which itself possesses two effective protective features would be Compatibility Group D; and an article with a means of initiation which possesses two effective protective features would be Compatibility Group D or E. Means of initiation adjudged as having two effective protective features should have been approved by the appropriate national authority. A common and effective way of achieving the necessary degree of protection is to use a means of initiation which incorporates two or more independent safety features.	—
IRON OXIDE, SPENT OR IRON SPONGE, SPENT. A mixture of wood shavings with iron oxide and possibly lime or other material, which has been obtained from coal gas purification after saturation with sulphur. This spent material is very liable to spontaneous heating and ignition.	1376
ISOCYANATES, N.O.S. OR ISOCYANATE SOLUTION, N.O.S. These include a number of chemical products used in the manufacture of plastic foams, synthetic rubber, etc. Some are sufficiently toxic or lachrymatory to need classification as toxic substances, particularly isocyanates in pure form. Others may need to be classified as flammable liquids, depending on their characteristics, and a number may not be subject to these Instructions.	2206, 2478, 3080
JET PERFORATING GUNS, CHARGED, oil well, without detonator. Articles consisting of a steel tube or metallic strip into which are inserted shaped charges connected by detonating cord, without means of initiation.	0124, 0494
LACQUER BASE OR LACQUER CHIPS, NITROCELLULOSE, DRY. It may consist of a colloided solid mixture of nitrocellulose, pigment, gums, and a plasticizer.	—
LIGHTERS, FUSE. Articles of various design actuated by friction, percussion or electricity and used to ignite safety fuse.	0131
LITHIUM BATTERY. Two or more cells which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking and protective devices. A single cell battery is considered a "cell" and must be tested according to the testing requirements for "cells" for the purposes of these Instructions and the UN *Manual of Tests and Criteria* (see also the explanation for "lithium cell"). *Note.— Units that are commonly referred to as "battery packs", "modules" or "battery assemblies" having the primary function of providing a source of power to another piece of equipment are, for the purposes of these Instructions and the UN* Manual of Tests and Criteria, *treated as batteries.*	3090, 3091, 3480, 3481
LITHIUM CELL. A single encased electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals. Under these Instructions and the UN *Manual of Tests and Criteria*, to the extent the encased electrochemical unit meets the definition of "cell" herein, it is a "cell", not a "battery", regardless of whether the unit is termed a "battery" or a "single cell battery" outside of these Instructions and the UN *Manual of Tests and Criteria*.	3090, 3091, 3480, 3481
LITHIUM SILICON. A so-called alloy of metallic lithium and silicon used for industrial purposes.	1417
MAGNESIUM SCRAP. Borings, clippings, scalpings, shavings, sheets or turnings from machining operations or cuttings from thin magnesium metal sheets. The scrap can be ignited by external flame and burns intensely and persistently. It does not heat spontaneously. The scrap may have a bright metal lustre or may be dull and sometimes have a painted surface.	—
MASS EXPLOSION. An explosion which affects almost the entire load virtually instantaneously.	—
MATCHES, SAFETY. Matches, contained in a book, card or box, which are only ignited when struck on a prepared surface.	1944
MATCHES, `STRIKE ANYWHERE' OR FUSEE. They usually contain phosphorus sesquisulphide, potassium chlorate and other ingredients. The 'strike-anywhere' matches are readily ignited by friction on almost any dry surface.	1331, 2254

Term and explanation	*UN Number(s), when relevant*
METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED. A flammable gas mixture that is reasonably stable at ordinary temperatures. Although this is an acetylene derivative, the gas is not shipped dissolved in liquid and cylinders do not require an absorbent filler.	1060
MINES. Articles consisting normally of metal or composition receptacles and a bursting charge. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes 'Bangalore torpedoes'.	0136, 0137, 0138, 0294
MOTOR FUEL ANTI-KNOCK MIXTURE. A mixture of one or more organic lead components such as tetra-ethyl lead, triethylmethyl lead, diethyldimethyl lead, ethyltrimethyl lead, and tetramethyl lead, with one or more halogen compounds such as ethylene dibromide and ethylene dichloride.	1649
NITRATING ACID MIXTURE. A mixture of nitric and sulphuric acids used for the nitration of glycerin, cellulose or other organic substances. This acid mixture coming in contact with organic matter commonly causes fire, unless the mixture contains much water.	1796, 1826
OIL GAS, COMPRESSED. A gas made by the reaction of steam at high temperatures on gas oil or similar fractions of petroleum, or by high-temperature cracking of gas oil. The gas is flammable, but it is classified as a toxic gas because it contains a high proportion of carbon monoxide.	1071
OXYGEN GENERATOR, CHEMICAL. A device containing chemicals which upon activation releases oxygen as a product of chemical reaction. Chemical oxygen generators are used for the generation of oxygen for respiratory support, e.g. in aircraft, submarines, spacecraft, bomb shelters and breathing apparatus. Oxidizing salts such as chlorates and perchlorates of lithium, sodium and potassium, which are used in chemical oxygen generators, evolve oxygen when heated. These salts are mixed (compounded) with a fuel, usually iron powder, to form a chlorate candle, which produces oxygen by continuous reaction. The fuel is used to generate heat by oxidation. Once the reaction begins, oxygen is released from the hot salt by thermal decomposition (a thermal shield is used around the generator). A portion of the oxygen reacts with the fuel to produce more heat which produces more oxygen, and so on. Initiation of the reaction can be achieved by a percussion device, friction device or electric wire.	3356
PLASTIC SOLVENT, N.O.S. A name commonly used for mixtures of liquids employed for dissolving plastics or for thinning plastic cements. In general, they may contain flammable liquids, such as acetone, amyl acetate, or some of the alcohols or ketones. The classification is determined by the flash point.	—
POLYESTER RESIN KIT. The proper shipping name 'Polyester resin kit' covers different kits such as filler, bonding and sealing compounds, chemical anchors and fibreglass repair kits. A polyester resin kit commonly consists of an unsaturated polyester resin mixed with styrene and a separate hardener (usually a phlegmatized organic peroxide) as a minor component. The main component (viscous liquid or paste) is inherently flammable due to the styrene content (flash point 29°C to 32°C).	3269, 3527
POLYMERIC BEADS, EXPANDABLE. Semi-processed products used to manufacture polymeric articles, and which have been impregnated with a flammable gas or liquid as a blowing agent. They may evolve small quantities of flammable gas during transport.	2211
POTASSIUM SODIUM ALLOYS. Mixtures of metallic sodium and potassium that are solid at ordinary temperatures. All mixtures, regardless of physical state, will react vigorously with water and may be self-igniting. The mixtures are all combustible.	1422
POTASSIUM SULPHIDE, ANHYDROUS. A reddish-coloured solid having a strong odour. It is hygroscopic and oxidizes spontaneously on contact with air. Spontaneous ignition may occur in material improperly packed.	1382
POWDER CAKE, (POWDER PASTE) WETTED. Substance consisting of nitrocellulose impregnated with not more than 60 per cent of nitroglycerin or other liquid organic nitrates or a mixture of these.	0159, 0433
POWDER, SMOKELESS. Substance based on nitrocellulose used as propellant. The term includes propellants with a single base (nitrocellulose (NC) alone), those with a double base (such as NC and nitroglycerin (NG)) and those with a triple base (such as NC/NG/nitroguanidine). Cast, pressed or bag-charges of smokeless powder are listed under CHARGES, PROPELLING or CHARGES, PROPELLING FOR CANNON.	0160, 0161
PREMIXING BURNER LIGHTER. Gas lighter in which fuel and air are mixed before being supplied for combustion, such as lighters producing a blue flame.	
PRIMERS, CAP TYPE. Articles consisting of a metal or plastic cap containing a small amount of primary explosive mixture that is readily ignited by impact. They serve as igniting elements in small arms cartridges, and in percussion primers for propelling charges.	0044, 0377, 0378
PRIMERS, TUBULAR. Articles consisting of a primer for ignition and an auxiliary charge of deflagrating explosive such as black powder used to ignite the propelling charge in a cartridge case for cannon, etc.	0319, 0320, 0376

Term and explanation	*UN Number(s), when relevant*
PROJECTILES. Articles such as a shell or bullet which are projected from a cannon or other artillery gun, rifle or other small arm. They may be inert, with or without tracer, or may contain a burster or expelling charge or a bursting charge. The term includes: PROJECTILES, inert, with tracer; PROJECTILES, with burster or expelling charge; PROJECTILES, with bursting charge.	0167, 0168, 0169, 0324, 0344, 0345, 0346, 0347, 0424, 0425, 0426, 0427, 0434, 0435
PROPELLANT, LIQUID. A substance consisting of a deflagrating liquid explosive, used for propulsion.	0495, 0497
PROPELLANTS. Deflagrating explosives used for propulsion or for reducing the drag of projectiles.	—
PROPELLANT, SOLID. A substance consisting of a deflagrating solid explosive, used for propulsion.	0498, 0499
PYROPHORIC LIQUID/SOLID, ORGANIC/INORGANIC. A substance that may ignite in air at or below room temperature in the absence of added heat, shock or friction.	2845, 2846, 3194, 3200
PYROXYLIN SOLUTION. Pyroxylin (nitrocellulose) or soluble cotton dissolved in amyl acetate or other organic solvents. Pyroxylin solution is used as a basis for the manufacture of lacquer, leather coating compounds, leather substitutes, cements, etc. It is generally more viscous than ordinary lacquers.	—
RELEASE DEVICES, EXPLOSIVE. Articles consisting of a small charge of explosive with means of initiation. They sever rods or links to release equipment quickly.	0173
ROCKET MOTORS. Articles consisting of a solid, liquid or hypergolic fuel contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile. The term includes: ROCKET MOTORS; ROCKET MOTORS WITH HYPERGOLIC LIQUIDS, with or without expelling charge; ROCKET MOTORS, LIQUID FUELLED.	0186, 0250, 0280, 0281, 0322, 0395, 0396
ROCKETS. Articles consisting of a rocket motor and a payload which may be an explosive warhead or other device. The term includes guided missiles and: ROCKETS, LINE-THROWING; ROCKETS, LIQUID FUELLED, with bursting charge; ROCKETS, with bursting charge; ROCKETS, with expelling charge; ROCKETS, with inert head.	0180, 0181, 0182, 0183, 0238, 0240, 0295, 0397, 0398, 0436, 0437, 0438, 0453
SAFETY DEVICES, ELECTRICALLY INITIATED. Articles which contain pyrotechnical substances or dangerous goods of other classes and are used in vehicles, vessels or aircraft to enhance safety to persons. Examples are: air bag inflators, air bag modules, seat-belt pretensioners and pyromechanical devices. These pyromechanical devices are assembled components for tasks such as but not limited to separation, locking, or release-and-drive or occupant restraint. The term includes **Safety devices, pyrotechnic**.	0503, 3268
SECURITY TYPE EQUIPMENT. Equipment such as attaché cases, cash boxes, cash bags, etc., incorporating dangerous goods, for example lithium batteries, gas cartridges and/or pyrotechnic material.	
SIGNALS. Articles containing pyrotechnic substances designed to produce signals by means of sound, flame or smoke or any combinations thereof. The term includes: SIGNAL DEVICES, HAND; SIGNALS, DISTRESS, ship; SIGNALS, RAILWAY TRACK, EXPLOSIVE; SIGNALS, SMOKE.	0191, 0192, 0193, 0194, 0195, 0196, 0197, 0313, 0373, 0487, 0492, 0493
SLUDGE ACID. The acid waste resulting from oil refining, or from nitrating processes. It generally has somewhat the same hazards as the original acid.	1906
SODA LIME. A mixture of calcium oxide or calcium hydroxide with sodium hydroxide.	1907
SODIUM SULPHIDE, ANHYDROUS. A yellow or reddish-coloured solid having a strong odour. It is hygroscopic and oxidizes spontaneously on contact with air. Spontaneous ignition may occur in material improperly packed.	1385
SOLVENTS. Substances capable of dissolving other substances to form a uniformly dispersed mixture or solution. Examples of organic solvent groups are esters, ethers, ketones, amines and nitrated and chlorinated hydrocarbons. Many solvents are flammable and toxic to varying degrees.	—
SOUNDING DEVICES, EXPLOSIVE. Articles consisting of a charge of detonating explosive. They are dropped from ships and function when they reach a predetermined depth or the sea bed.	0204, 0296, 0374, 0375
STABILIZED. Stabilized means that the substance is in a condition that precludes uncontrolled reaction. This may be achieved by methods such as the addition of an inhibiting chemical, degassing the substance to remove dissolved oxygen and inerting the air space in the package, or maintaining the substance under temperature control.	

Term and explanation	*UN Number(s), when relevant*
SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S. Substances that present a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation (under normal conditions of transport) and that have passed Test Series 5.	0482
SULPHURIC ACID, FUMING. Sulphuric acid in which an excess of sulphur trioxide has been dissolved. It evolves toxic fumes whilst ordinary sulphuric acid does not.	1831
SULPHURIC ACID, SPENT. Sulphuric acid usually of high concentration, which has been used for chemical processes and contains residual organic matter.	1832
TORPEDOES. Articles containing an explosive or non-explosive propulsion system and designed to be propelled through water. They contain an inert head or a warhead. The term includes: TORPEDOES, LIQUID FUELLED, with inert head; TORPEDOES, LIQUID FUELLED, with or without bursting charge; TORPEDOES, with bursting charge.	0329, 0330, 0449, 0450, 0451
TOTAL CONTENTS. Such a substantial proportion that the practical hazard should be assessed by assuming simultaneous explosion of the whole of the explosive content of the load or package.	—
TRACERS FOR AMMUNITION. Sealed articles containing pyrotechnic substances, designed to reveal the trajectory of a projectile.	0212, 0306
TURPENTINE SUBSTITUTE. A petroleum distillate which might contain some aromatic components and which usually has a flash point of approximately 40°C. White spirit is a synonym for turpentine substitute.	1300
WARHEADS. Articles consisting of detonating explosives. They are designed to be fitted to a rocket, guided missile or torpedo. They may contain a burster or expelling charge or bursting charge. The term includes: WARHEADS, ROCKET, with burster or expelling charge; WARHEADS, ROCKET, with bursting charge; WARHEADS, TORPEDO, with bursting charge.	0221, 0286, 0287, 0369, 0370, 0371
WATT-HOUR RATING. Expressed in watt-hours, the watt-hour rating is calculated by multiplying a cell's or battery's rated capacity, in ampere-hours, by its nominal voltage.	3480, 3481
ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID. Very finely divided metallic zirconium which is usually suspended in some highly volatile and flammable liquid. If spilled, the material is liable to self-ignition.	1308

Attachment 3

NOTIFIED VARIATIONS FROM THE INSTRUCTIONS

Chapter 1

VARIATIONS NOTIFIED BY STATES

1.1 Paragraph 2.2.1 of Annex 18 provides that Contracting States shall take the necessary measures to achieve compliance with the detailed provisions of these Technical Instructions. However, where a Contracting State does adopt different provisions from those specified in these Technical Instructions, 2.5 of Annex 18 requires that ICAO be notified promptly of such State provisions for publication in the Technical Instructions.

≠ 1.2 Those different provisions which were notified to ICAO by States, prior to 31 May 2022, appear in Table A-1. The variations notified by States, unless the context makes it otherwise apparent, apply as follows:

a) where such variations result in more restrictive provisions than those contained in these Instructions, they apply to the transport of dangerous goods by air:

1) to, from or through all territory subject to the sovereignty of the notifying State by all operators; and

2) outside the territory of the notifying State to all operators for whom the notifying State is the State of the Operator;

b) where such variations result in less restrictive provisions than those contained in these Instructions, the variations are listed for information only and may only be applied within the territory of the notifying State by operators for whom the notifying State is the State of the Operator.

1.3 Throughout the Instructions, the identifying code of each State variation has been placed beneath the heading of the Chapter(s) principally affected. Where State variations apply to specific articles or substances, the identifying code appears in column 6 of Table 3-1 against the appropriate proper shipping name.

1.4 The table of State variations (Table A-1) is based on data provided by the States concerned. This table is provided for information only and any further details required should be obtained from the appropriate government department.

1.5 Table A-1 is also published on the ICAO website at www.icao.int/safety/DangerousGoods. If a State needs to make variations based on new requirements appearing in this edition of the Instructions, it should notify ICAO by using the form appearing at the end of this Chapter. Such variations will appear on the ICAO website.

1.6 Variations have been notified by the following States:

Australia — AU
Belgium — BE
≠ Brazil — BR
Brunei Darussalam — BN
Cambodia — KH
Canada — CA
China — CN
Hong Kong SAR, China — HK
Macao SAR, China — MO
≠ Croatia — HR
Democratic People's Republic of Korea — KP
Denmark — DK
\+ Eritrea — ER
\+ Fiji — FJ
≠ France — FR
Germany — DE
Ghana — GH
India — IN
Iran (Islamic Republic of) — IR
Italy — IT
Jamaica — JM
Japan — JP
Kuwait — KW
Kyrgyz Republic — KG
Luxembourg — LU
Malaysia — MY
≠ Netherlands — NL
Nepal — NP
≠ Oman — OM
Pakistan — PK
Peru — PE
Poland — PL
Romania — RO
Russian Federation — RU
Saudi Arabia — SA
Serbia — RS
Singapore — SG
South Africa — ZA
≠ Spain — ES
Sri Lanka — VC
\+ Sweden — SE
Switzerland — CH
Türkiye — TR
Ukraine — UA
United Arab Emirates — AE
United Kingdom — GB
United States — US
Vanuatu — VU
Venezuela (Bolivarian Republic of) — VE
\+ Yemen — YE
Zimbabwe — ZW

Table A-1. State variations

The identifying code for each State variation consists of the two-letter identifier for that State plus a sequential number. Variations are listed in the alphabetical order of these identifying codes. For each variation the relevant Part and Chapter or paragraph numbers of the Instructions are given.

Identifying code	*Variation*	*Relevant paragraphs*
	AE — UNITED ARAB EMIRATES	
AE 1	Transportation of dangerous goods to, from or within the UAE must be subject to compliance with the provisions of these Instructions and the UAE Civil Aviation Regulations (CAR Part VI, Chapter 2) – Transport of Dangerous Goods by Air which can be accessed at the General Civil Aviation Authority (GCAA) official website: www.gcaa.ae.	
AE 2	UAE originating dangerous goods shipments shall only be offered and accepted for air transport by a GCAA dangerous goods certified entity according to the GCAA Dangerous Goods Certification requirements as defined in the UAE Civil Aviation Regulations (CAR Part VI, Chapter 2).	1;4
AE 3	The request to carry dangerous goods under Special Provision A1, A2 or other State exemptions or approvals shall be submitted to dangerousgoods@gcaa.gov.ae at least seven working days before the planned flight and addressed to: GCAA Dangerous Goods Section Aviation Security Affairs Sector P.O. Box 6558 Abu Dhabi United Arab Emirates	1;1 3;3
AE 4	The process to return or dispose undelivered dangerous goods destined to the UAE must be conducted by the air operator by which the shipment has arrived within seven working days from the date the shipment arrived in the UAE. The process to return or dispose dangerous goods transshipments and transit shipments via the UAE must be conducted by the air operator by which the shipment has arrived within seven working days from the date the shipment arrived in the UAE.	7;3
AE 5	On shipments to, from, within or transiting through the UAE, emergency response information, as described below, must be provided for all dangerous goods for which a Transport Document is required. The Transport Document (shipper's declaration for dangerous goods) required by these Instructions must include a 24-hour emergency response telephone number, which must include the international code and area code, for use in the event of an incident or accident involving dangerous goods. The number must be monitored by an individual who can be contacted in case of an emergency and who: 1) is able to converse in English; 2) is knowledgeable of the hazards and characteristics of the dangerous goods being transported; 3) has comprehensive emergency response and accident mitigation information for the dangerous goods or has immediate access to a person who possesses such knowledge and information. On lithium battery shipments under Section II of Packing Instruction 965, 966, 967, 968, 969 and 970 to, from, within or transiting through the UAE, emergency response information, as described above, must be shown in the handling information column of the Master Air Waybill.	5;4
AE 6	Import, export and transit permit(s) must be obtained from the Radiation Safety Department of the UAE Federal Authority for Nuclear Regulation (FANR) before forwarding radioactive material to, from and via the UAE. For further details, please visit: www.fanr.gov.ae.	5;4
AE 7	Foreign air operators may carry dangerous goods to, from and via the UAE provided the air operator is approved to carry dangerous goods by the State Civil Aviation Authority of the State of Registry or the State of the Operator or the State of Origin.	1;1
AE 8	For shipments of arms, ammunition, explosives and all other Class 1 dangerous goods, the consignee must apply to the Ministry of Interior to obtain import or transit approval 15 working days before the scheduled arrival date of the shipment. For shipments of arms and ammunition, the shipper must apply to the Ministry of Defense to obtain export approval 15 working days before the scheduled departure date of the shipment.	1;1

Identifying code	*Variation*	*Relevant paragraphs*

The air operator must obtain prior permission from the Ministry of Interior a minimum 48 hours before forwarding UAE destined or transshipment of arms, ammunitions, explosives and all other Class 1 dangerous goods.

The air operator shall not export arms and ammunition except with prior permission obtained from the UAE Ministry of Defense before forwarding the shipment.

AE 9 At their discretion, States' Civil Aviation Authorities and Foreign Air Operators may communicate dangerous goods occurrences that need to be reported and investigated by the UAE General Civil Aviation Authority (GCAA) through the UAE GCAA online Reporting of Dangerous Goods Occurrences (RODGO) system. States' Civil Aviation Authorities and Foreign Air Operators are encouraged to send their request to obtain their access to the RODGO system to RODGO.Investigation@gcaa.gov.ae and communicate any dangerous goods occurrences related issues to the UAE General Civil Aviation Authority.

AU — AUSTRALIA

The Australian national authority for Annex 18 and competent authority for these Instructions is the:

Civil Aviation Safety Authority (CASA)
GPO Box 2005
Canberra ACT 2601
Australia
E-mail: dg@casa.gov.au
Telephone: +61 131757
Facsimile: +61 2 6217 1300
Website: www.casa.gov.au/dg

AU 1 Dangerous goods requiring approval under Special Provisions A1 or A2 of the Technical Instructions may only be carried on a passenger or cargo aircraft in Australian territory with the approval of the Civil Aviation Safety Authority (CASA). Applications for approval should be lodged with CASA at least ten days prior to the proposed flight. Table 3-1 3;3

AU 2 **Import and/or export of radioactive material to Australia** Table 3-1 3;3

A permit is required to import or export radioactive materials and can be obtained on application to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). There are two categories of import permit available; one applies to medical radioisotopes, the other to non-medical radioisotopes. It is prohibited to import radioactive waste to Australia.

Further information and application forms are available on the ARPANSA website at:

http://www.arpansa.gov.au

Applications and inquiries can be made to:

Import/Export Permits Officer - ARPANSA
P.O. Box 655
Miranda NSW 1490
Australia

Telephone: +61 2 9541 8333
Facsimile: +61 2 9541 8314
E-mail: info@arpansa.gov.au

Identifying code	*Variation*	*Relevant paragraphs*
AU 3	Infectious substances other than human blood products, human urine and human tissue, are prohibited from entry to Australia without prior approval from Australian Authorities. Requests for approval should be addressed to: Department of Agriculture Biologicals Program GPO Box 858 Canberra ACT 2601 Australia Telephone: +61 2 6272 4578 Facsimile: +61 2 6249 1798 Website: http://www.agriculture.gov.au/import/goods/biological	Table 3-1
AU 4	For the purposes of compliance with 7;4.7, notification of a dangerous goods incident is to be reported to the Civil Aviation Safety Authority (CASA) within two working days. This notification is in addition to, and not instead of, that required under Annex 13.	7;4.7
AU 5	Where a package(s) of dangerous goods is permitted by these Instructions for carriage on both a passenger and cargo aircraft and the package(s) has affixed the "Cargo aircraft only" label in accordance with a State Variation(s) (e.g. US 2, US 10, US 13, etc.), then the package(s) may be transported on both passenger and cargo aircraft within Australia beyond the first port of unloading of the package(s) in Australia, but in these circumstances the "Cargo aircraft only" label must be removed. The "Cargo aircraft only" label may be removed by the operator, the shipper or an agent of the operator or shipper. The shipper must provide the appropriate dangerous goods transport document with the package(s) and, where applicable, an air waybill (or consignment note), prepared in accordance with these Instructions for transport of the package on both a passenger and cargo aircraft within Australia. When following the provisions of AU 05, the operator must complete a dangerous goods acceptance check in accordance with 7;1 prior to further transport of the package(s) aboard an aircraft within Australia.	5;3 5;4 7;1
	BE — BELGIUM	
BE 1	Definition of "explosive substance": According to the Belgian regulations (the law of 28 May 1956, amended, on explosive substances and mixtures and substances and mixtures likely to deflagrate, as well as devices loaded with such substances and mixtures), any substance likely to be used for its explosive, deflagrating or pyrotechnic properties is considered as an explosive substance.	1;3.1
BE 2	Prior authorization of: FPS Economy, S.M.E.s, Self-employed and Energy Directorate General Quality and Safety Safety Regulations Unit North Gate Boulevard du Roi Albert II, 16 1000 Brussels Phone: +32 (0)2 277 77 12 Fax: +32 (0)2 277 54 14 E-mail: explo@economie.fgov.be is required for transport from, to, or in transit through Belgium of any explosive substance. Applications may be made only by persons or corporations having a residence or an office in Belgium. When this is not the case, the applicant must have a responsible representative residing in Belgium and approved by Ministerial Decree. The Safety Regulations Unit may grant exemptions to the methods of packaging. These various provisions are defined in the Royal Decree of 23 September 1958, amended, laying down general rules on the manufacture, storage, possession, sales, transport and use of explosives. When transport (import, export or transit) is authorized on a case-by-case basis and is done partially over land, the application must specify the complete itinerary, including the land portion.	1;1.2 2;1.5 4;3
BE 3	Those substances listed in Table 3-1 with "BE 3" shown in column 6 are defined as "explosive substances" and are subject to the conditions of BE 2.	Table 3-1

Identifying code	*Variation*	*Relevant paragraphs*
BE 4	Prior recognition or authorization of the: Federal Agency for Nuclear Control Ravensteinstraat 36 1000 Brussels Belgium Telephone: +32 (0) 2 289 21 11 Facsimile: +32 (0) 2 289 21 12 E-mail: transport@fanc.fgov.be Website: www.fanc.fgov.be is required for transport from, to or in transit through Belgium of all Class 7 dangerous goods or other dangerous goods with a subsidiary hazard of Class 7.	1;1.2 2;7 5;1.2.2
BE 5	Not used.	
	BN — BRUNEI DARUSSALAM	
BN 1	The national authority responsible for dangerous goods and competent authority for this technical instruction is: Department of Civil Aviation Brunei International Airport Bandar Seri Begawan, BB2713 Brunei Darussalam. Telephone: +6732330142 Facsimile: +6732345345 Email: flightops.regulatory@civil-aviation.gov.bn Website: www.mtic.gov.bn/dca	
BN 2	Negara Brunei Darussalam has selected the English language for use in all documentation and correspondence with respect to the transport of dangerous goods by air. The English version of Annex 18 and the Technical Instructions will be used.	5;4
BN 3	With respect to the transport by air of dangerous goods listed in paragraph 1;2.3.2 of these Instructions, the competent authority from Brunei Darussalam (BN 1) has notified the following instructions: 1) dangerous goods as described in sub-paragraphs a), b) and c) of paragraph 1;2.3.2 of these instructions are not permitted for transport in airmail to, from, or transiting through Brunei Darussalam; and 2) dangerous goods as described in sub-paragraphs d) and e) of paragraph 1;2.3.2 of these instructions are permitted for transport in airmail to or transiting through Brunei Darussalam, only if shipped by a designated postal operator. See the Universal Postal Union's (UPU) website at: http://www.upu.int/fileadmin/documentsFiles/activities/postalSecurity/listAuthorizedDOsLithiumBatteriesEn.pdf	1;2

Identifying code	*Variation*	*Relevant paragraphs*
≠	**BR — BRAZIL**	
	Transport of dangerous goods to, from or within Brazil is subject to compliance with the provisions of these Instructions and the Brazilian Civil Aviation Regulations (RBAC nº 175) and its Supplementary Instructions. Failure to comply with the Technical Instructions and the Brazilian State Variations is a violation of national regulations. A copy of all national regulations can be obtained on the following website: www.anac.gov.br. The Brazilian national authority for Annex 18 and competent authority for these Instructions is the: Agência Nacional de Aviação Civil (ANAC) Superintendência de Padrões Operacionais — SPO Setor Comercial Sul — Quadra 09 — Lote C — Edifício Parque Cidade Corporate Torre A — Asa Sul Brasília — DF Brazil CEP: 70308-200 E-mail: spo@anac.gov.br Website: www.anac.gov.br Transport of radioactive material from or within Brazil is subject to the approval of the National Nuclear Energy Commission (CNEN): Comissão Nuclear de Energia Nuclear (CNEN) Transport Safety Service Rua General Severiano, 90/401 CEP: 22290-900 Email : nbruno@cnen.gov.br Website: www.cnen.gov.br Applications for approvals and exemptions should be sent at least 30 days prior to the proposed flight and must be submitted to ANAC by e-mail (gcta@anac.gov.br). Further information and a form template in English are available on the website: https://www.gov.br/anac/pt-br/assuntos/regulados/empresas-aereas/artigos-perigosos and are provided in Supplementary Instruction IS 175-008.	
BR 1	Articles and substances that have any authorizations by the State of the Operator that differ from the regulations as stated in 1;2.2.2 may only be carried on any aircraft in Brazilian territory with the approval of ANAC. Applications for this approval should be sent at least 30 days prior to the start of operations.	1;2.2.2
BR 2	Battery-powered devices with installed batteries and spare batteries intended as replacements that have any authorizations by the State of the Operator that differ from the regulations as stated in 1;2.2.4 may only be carried on any aircraft in Brazilian territory with the approval of ANAC. Applications for the approval should be sent at least 30 days prior to the start of operations.	1;2.2.4
BR 3	The records mentioned in 1;5.2.4 should be kept by the employer for at least 36 months for flights involving Brazil as the State of Origin or Destination.	1;5.2.4
BR 4	Except otherwise approved by ANAC, an air waybill must be issued for any consignments that contain dangerous goods. The air waybill must be retained for a minimum period of three months after the flight on which the dangerous goods were transported.	5;4.2 7;4.11.1
BR 5	For flights involving Brazil as the State of Origin or Destination, the following documents must accompany the consignment: — in case of packagings manufactured in Brazil with a UN specification mark, ANAC's packaging certificate of approval and the conformity declaration issued by the packaging manufacturer; or — in case of packagings manufactured abroad with a UN specification mark, packaging certificate of approval or any equivalent document issued by other civil aviation authorities or any other appropriate national authorities. The operator must verify, during the acceptance process, if the documents mentioned above, as applicable, are present.	5;4
BR 6	Not used	

Identifying code	*Variation*	*Relevant paragraphs*
BR 7	Where the documents or information mentioned in 7;4.11 are kept electronically or in a computer system, they must be capable of being reproduced in a printed manner.	7;4.11.2, Note
BR 8	Dangerous goods occurrences involving Brazil as any of the States mentioned in 7;4.4, 7;4.5 or 7;4.6 must be reported to ANAC according to the following requirements: — in case of dangerous goods accidents, by phone as soon as possible, and by e-mail (gcta@anac.gov.br) within 48 hours; and — for all other dangerous goods occurrences, as soon as possible by e-mail (gcta@anac.gov.br) and within 30 days from the dangerous goods occurrence date.	7;4.4 7;4.5 7;4.6
BR 9	Operators must submit a monthly report of all dangerous goods transported to, from or within Brazil by the tenth working day of the following month. Further information and a report template are available on the website: www.anac.gov.br and is provided in Supplementary Instruction IS 175-009.	7;4
	CA — CANADA	
	Any request concerning the applicability of variations CA 1, CA 2 or CA 3 must be addressed to: Canadian Nuclear Safety Commission Transport Licensing and Strategic Support Division Directorate of Nuclear Substance Regulation P.O. Box 1046 — Station B 280 Slater Street Ottawa, Ontario Canada K1P 5S9 Telephone: toll free, Canada only: 1-800-668-5284 Telephone: (613) 995-5894 Facsimile: (613) 995-5086 E-mail: transport@cnsc-ccsn.gc.ca	
CA 1	Fissile radioactive material in any quantity may not be transported by aircraft to, from or over Canada without prior permission.	2;7 4;9 5;1, 5;3 6;7 7;1, 7;2
CA 2	“Type IP-1” and “Type IP-2” as prescribed in 4;9.2.5 for LSA material and SCO “not under exclusive use” shall be replaced with “Type IP-3”.	4;9.2
CA 3	Type B(U) radioactive material packages must be approved by the Canadian Nuclear Safety Commission.	2;7 6;7
CA 4	In addition to the Transportation of Dangerous Goods Regulations and the ICAO Technical Instructions, the transportation by air of radioactive material to, from or within Canada is subject to the provisions of the Packaging and Transport of Nuclear Substances Regulations made by the Canadian Nuclear Safety Commission.	2;7 4;9 5;1, 5;2, 5;3, 5;4 6;7 7;1, 7;2, 7;3, 7;4
CA 5	Infectious substances assigned to Category B (UN 3373) and radioactive materials are not permitted in the mail in Canada.	1;2.3
CA 6	The transportation by air of dangerous goods to, from or within Canada is subject to the provisions of the Transportation of Dangerous Goods Regulations and of the ICAO Technical Instructions, as referenced in the said Regulations. Requests for a copy of the Transportation of Dangerous Goods Regulations of Canada in document (Doc No. RE-4631), computer or microfiche format should be sent to: Canada Communication Group — Publishing Ottawa, Ontario Canada K1A 0S9 or see the following website for the text of the Transportation of Dangerous Goods Regulations of Canada: https://laws-lois.justice.gc.ca/eng/regulations/SOR-2001-286/	1;1

Identifying code	*Variation*	*Relevant paragraphs*
CA 7	Dangerous goods requiring approval under Special Provisions A1, A2 or A201 of the Technical Instructions may only be transported to, from or within Canada with the approval of the Canadian authority for the air transport of dangerous goods. The Canadian authority for the transport of dangerous goods for CA 7: Chief, Technical Advisor, Special Regulatory Projects Transport Canada Transport Dangerous Goods Directorate 330 Laurier Street West Ottawa, Ontario Canada K1A 0N5 Facsimile: (613) 993-8639 Email: tdgapprovals-approbationstmd@tc.gc.ca	Table 3-1 Table 3-2
CA 8	The entry into Canada of infectious substances affecting animals, UN 2900, and infectious substances affecting humans, UN 2814, is subject to the requirements of the Health of Animals Act (1990, c.21) and the Human Pathogens Importation Act (2009) and Regulations (SOR/94-558) respectively, and prior approval from the Canadian Food Inspection Agency and/or the Public Health Agency of Canada is required. Requests for approval should be addressed to: Centre for Biosecurity 100 Colonnade Road, Ottawa, Ontario, Canada K1A 0K9 Telephone: (613) 957-1779 Facsimile: (877) 248-3528 http://www.publichealth.gc.ca/ http://www.phac-aspc.gc.ca/lab-bio/regul/hpta-lapht-eng.php	2;6
CA 9	In addition to the information required in 5;4, the dangerous goods transport document must: — have, on the left and right margins, red hatchings that are oriented to the right or to the left; — contain information required on a dangerous goods transport document that is easy to identify, legible, in indelible print and in English or French; — include the words “24-hour number” or “numéro de 24-heures” or an abbreviation of these words, followed by a telephone number, including the area code and country code where applicable, at which the consignor (or his/her representative) can be reached immediately and from whom technical information can be obtained about the dangerous goods in transport, without breaking the telephone connection made by the caller; and — include the ERAP reference number preceded by the letters “ERAP” or “PIU” and the ERAP telephone number, including the area code, at which a person identified in the ERAP can be reached at any time while the dangerous goods are handled or transported (par.7.3(2)(f) of the Canadian Transportation of Dangerous Goods Regulations).	5;4
CA 10	A person must not handle, offer for transport, or transport dangerous goods included in Class 2, Gases, in a means of containment unless the means of containment is manufactured, selected and used in accordance with section 5.10 or 5.11 of the Canadian Transportation of Dangerous Goods Regulations.	4;4
CA 11	A document that is issued to a foreign member of the flight crew of an aircraft registered in a country that is a member State of the International Civil Aviation Organization and which indicates that the crew member is trained to transport dangerous goods by air is a valid training certificate for the purposes of the Canadian Transportation of Dangerous Goods Regulations when that document is valid in a member State. This document must be shown to an inspector upon request.	1;4
CA 12	When a “dangerous goods accident” or a “dangerous goods incident”, as defined in the ICAO Technical Instructions, occurs on board an aircraft in Canada or at a Canadian aerodrome or at a Canadian air cargo handling facility, reporting must be done in accordance with the requirements found in Part 8 — Reporting Requirements, of the Canadian Transportation of Dangerous Goods Regulations.	7;4

Identifying code	*Variation*	*Relevant paragraphs*
CA 13	Most explosives, as defined in the Explosives Act, must be classified by Natural Resources Canada before being imported into Canada. It is the responsibility of the importer to confirm that an explosive is classified in Canada, or that an exemption exists for its import. Explosives manufactured in Canada are required to have been classified before they are transported. Any request concerning the applicability of variation CA 13 must be addressed to: Natural Resources Canada Explosives Safety and Security Branch 588 Booth Street Ottawa, Ontariio Canada K1A 0E4 Telephone: (855) 912-0012 Email: ERDmms@ nrcan.gc.ca Website: https://www.nrcan.gc.ca/explosives	
	CH — SWITZERLAND	
CH 1	Not used.	
CH 2	Not used.	
CH 3	According to the radiological protection ordinance, transport within, as well as into and out of Switzerland does not require a prior authorization for the following UN numbers: 2908, 2909, 2910, 2911, 2912, 2913, 2915, 2916, 2978, 3321, 3332 and 3507. Prior authorizations for transport of Class 7 substances under other UN numbers are issued by the: Federal Office of Public Health Radiation Protection Division 3003 Berne, Switzerland Telephone: +41 58 462 96 14 Facsimile: +41 58 462 83 83 For further information, please contact the surveillance authority: Suva 6002 Lucerne, Switzerland Telephone: +41 41 419 58 51 Facsimile: +41 41 419 62 13	1;1.2 5;1.2 7;1
CH 4	Nuclear materials containing plutonium in any quantity must not be transported in Swiss airspace. Not considered as nuclear materials are any special fissile materials with a weight of up to 15 grams.	2;7 Table 2-12
	CN — CHINA	
CN 1	Operators wishing to carry dangerous goods in aircraft to, from or over China must obtain prior written permission from the Civil Aviation Administration of China. Further information may be obtained from: Department of Air Transport Civil Aviation Administration of China P.O. Box 644 155 Dongsi St. West Beijing, China Telephone: +86 10 64091929 +86 10 64091918 Facsimile: +86 10 64091968	7;1

Identifying code	*Variation*	*Relevant paragraphs*
	HK — HONG KONG SPECIAL ADMINISTRATIVE REGION, CHINA	
HK 1	Operators wishing to carry dangerous goods in aircraft to, from or over the Territory of Hong Kong must obtain prior written permission from the Director of Civil Aviation. Applications must include details of dangerous goods training programmes. Further information may be obtained from the: Director General of Civil Aviation Dangerous Goods Office Airport Standards Division Civil Aviation Department Civil Aviation Department Headquarters Hong Kong International Airport 1 Tung Fai Road Lantau, Hong Kong Telephone: +852 2910 6980/6981/6982 Facsimile: +852 2795 8469	1;4 7;1
HK 2	English must be used in addition to the language which may be required by the State of Origin, and each language must be given equal prominence.	5;2.5 5;4.1.6.3
HK 3	The shipment by air from Hong Kong of explosive articles and substances originating in Hong Kong is prohibited. Explosives previously imported may be exported by air providing that the classification has been approved by the appropriate authority of the State of Origin or Manufacture.	2;1.5 5;1.1
	MO — MACAO SPECIAL ADMINISTRATIVE REGION, CHINA	
MO 1	Operators wishing to carry dangerous goods in aircraft to, from or via Macao, China, must obtain prior written permission from the Civil Aviation Authority — Macao (AACM), China. Further information may be obtained from: Flight Standards Alameda Dr. Carlos D'Assumpção, 336-342 Centro Comercial Cheng Feng, 18º andar Macao, China Tel: (853) 28511213 Fax: (853) 28338089 Email: aacm@aacm.gov.mo Website: www.aacm.gov.mo	7;1
MO 2	Dangerous goods requiring approval under Special Provision A1 or A2 of the Technical Instructions may only be carried on a passenger or cargo aircraft to, from or via Macao with the approval of the Civil Aviation Authority — Macao, China (AACM). Applications for approval must be submitted to the AACM with prescribed form at least ten working days prior to intended flight.	Table 3-1 3;3
MO 3	Lighters and matches of all types are prohibited from carriage in checked baggage, carry-on baggage and on the person.	Table 8-1

Identifying code	*Variation*	*Relevant paragraphs*
	DE — GERMANY	
DE 1	Fissile material as specified under 1) and large sources as specified under 2) shall not be accepted for carriage to/from or through Germany without prior permission by the: Bundesamt für Strahlenschutz Postfach 10 01 49 D-38201 Salzgitter, Germany Telephone: 030 18 333 1770 Facsimile: 030 18 333 1705 1) For the purpose of this variation, fissile material (nuclear fuels), as defined in paragraph 2.1 of the German law on atomic energy, are: a) plutonium-239 and plutonium-241; b) uranium enriched with the isotopes uranium-235 or uranium-233; c) any material containing one or more of the materials given in a) and b); and d) materials of such kind as to enable a continuous self-sustaining chain reaction to be maintained in a suitable installation (reactor) and which are defined in a legal degree. Materials (other than solidified high radioactive fission product solutions from reprocessing of nuclear fuels) containing the isotopes uranium-233, uranium-235, plutonium-239 and plutonium-241 in such quantities that the total quantity of all these isotopes is not more than 15 g or the concentration of all these isotopes in total is not greater than 15 g per 100 kg are exempted from this variation and therefore do not need prior permission. 2) A shipment is to be treated as a large source if the activity per package exceeds 1000 TBq.	1;1.2 5;1.2
DE 2	Applications for approval of Type B packages, packages containing fissile material, shipments, special arrangements and notifications should be addressed to: Bundesamt für Strahlenschutz Postfach 10 01 49 D-38201 Salzgitter, Germany Telephone: 030 18 333 1770 Facsimile: 030 18 333 1705	5;1.2 6;7
DE 3	Applications for approval of special form radioactive material should be addressed to: Bundesanstalt für Materialforschung und prüfung, Fachgruppe III.3 D-12200 Berlin, Germany Telephone: (030) 8104 1330 Facsimile: (030) 8104 1237	2;7.2.3.3
DE 4	For exemptions to the Technical Instructions the following authority should be contacted for all classes: Luftfahrt-Bundesamt Außenstelle Frankfurt Sachgebiet Gefahrgut Kelstarbacher Str. 23 65479 Raunheim Telephone: +49 531 2355 3302 Facsimile: +49 531 2355 3398	1;1.1
DE 5	A substance, mixture or solution, liquid or solid, classified as UN 3077 Environmentally hazardous substance, solid, n.o.s. or UN 3082 Environmentally hazardous substance, liquid, n.o.s. by the regulations of other modes of transport must also be transported by air under these entries.	2;0, 2;9
	DK — DENMARK	
DK 1	The carriage by aircraft to, from, through or over the territory of the Kingdom of Denmark, including Greenland and the Faroe Islands, of: 1) fissile radioactive material as defined in ICAO Doc 9284, 2;7.1.3 in quantities exceeding the limits set out in 2;7.23.5; and	2;7.1.3, 2;7.2.3.5

Identifying code	*Variation*	*Relevant paragraphs*

2) radioactive material:

— in a Type B(U) package containing more than 3000 A_1 or 3000 A_2 or 1000 TBq, whichever is the lower; or
— in a Type B(M) package; or
— in a Type C package containing more than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower; or
— as a special arrangement in the sense of the transport regulations;

shall not be accepted without prior permission by the Civil Aviation Administration. Applications should be sent to the:

National Institute of Radiation Hygiene
Knapholm 7
DK-2730 Herlev
Telephone: 45.44 54 3454 (Mon.–Fri. 10:00–15:00)
Facsimile: 45.44 54 34 50
E-mail: sis@sis.dk

DK 2 — National legislation in Denmark specifies that aircraft in the territory over Denmark and Greenland must not, without prior permission from the Danish Transport Authority, carry weapons, explosives, war equipment or munitions. — 1;1.2 2;1 4;3 7;1

Explosives classified as Class 1.4S according to these Instructions can be carried without prior approval if they are packed and labelled in accordance with the current edition of these Instructions. Explosives must be transported in the cargo hold of the aircraft.

Written applications must be forwarded to:

Danish Transport Authority
Trafikstyrelsen
Edvard Thomsens Vej 14
2300 KBH S
Denmark

Applications must be received by the Danish Transport Authority five working days before the actual flight.

\+ **ER — ERITREA**

ER 1 — The Eritrean Civil Aviation Authority Legislation/Proclamation requires that the transportation of all classes of dangerous goods be carried out in accordance with the Technical Instructions and Part 18 of the Eritrean Civil Aviation Regulations.

ER 2 — Operators intending to carry dangerous goods to, from, within and crossing the Eritrean airspace must obtain prior written permission from the Director General, Civil Aviation Authority of Eritrea.

ER 3 — Cargo agents and freight forwarders accepting or processing dangerous goods for transport by air must ensure that they have a minimum of two dangerous goods certified staff available at all times to handle such consignments.

ES — SPAIN

≠ ES 1 — The competent authority for Spain for the transport of dangerous goods by air is: — 5;2.5 5;4.1.6.3

Agencia Estatal de Seguridad Aérea (AESA)
Dirección de Seguridad de Aeronaves (DSA)
Paseo de la Castellana 112
28020 Madrid
SPAIN

Telephone: +34 91 396 8300
Email: operacional.aesa@seguridadaerea.es

Identifying code	*Variation*	*Relevant paragraphs*
+	**FJ — FIJI**	
FJ 1	Radioactive material in any quantity may not be transported by aircraft to, from, within or over Fiji without prior permission of the Civil Aviation Authority of the Fiji Islands (CAAFI).	2;7
FJ 2	A person must not handle or offer for transport explosives classified as Class 1 in the ICAO Technical Instructions to, from, within or over Fiji without prior permission of CAAFI. This includes ammunition for sporting weapons, Division 1.4S.	2;1
FJ 3	Infectious substances, including diagnostic specimens or biological products are not permitted in national or international mail to, from, within or over Fiji.	1;2.3
FJ 4	The English language shall be used for marking and labelling any form of dangerous goods documentation transported by air.	5;2.5 5;4.1.6.3
	All questions and requests for permission or approval shall be lodged with CAAFI ten days prior to the proposed flight. The correspondence should be addressed to: The Civil Aviation Authority of the Fiji Islands (CAAFI) Private Mail Bag NAP 0354 Nadi Airport Fiji Islands Telephone: (679) 672-1555 Facsimile: (679) 672-1500/(679) 672-5125	
	FR — FRANCE	
FR 1	The competent authority for France for the transport of dangerous goods by air is: Direction Générale de l'Aviation Civile (DGAC) Direction de la Sécurité de l'Aviation Civile (DSAC) Direction technique de la Navigabilité et des Opérations (DSAC/NO) 50, rue Henry Farman 75720 PARIS CEDEX 15 FRANCE Telephone: +33.(0)1.58.09.44.80 Email: dsac-dangerous-goods-bf@aviation-civile.gouv.fr Concerning radioactive materials for civilian use, the competent authority for the issuance of shipment approvals, radioactive material approvals and package design approvals is the Autorité de sûreté nucléaire (ASN), whose address is indicated in FR 2.	
FR 2	All questions relating to the transport by air of radioactive and fissile materials for civilian use should be directed, in accordance with the instructions contained in the variation concerned, to DGAC, ASN and DGSCGC/COGIC: Direction Générale de l'Aviation Civile (DGAC) Direction de la Sécurité de l'Aviation Civile (DSAC) Direction technique de la Navigabilité et des Opérations (DSAC/NO) 50, rue Henry Farman 75720 PARIS CEDEX 15 FRANCE Telephone: +(33).(0)1.58.09.44.80 Email: dsac-dangerous-goods-bf@aviation-civile.gouv.fr Autorité de Sûreté Nucléaire (ASN) Direction du Transport et des Sources (DTS) Bureau du contrôle des transports (BCT) 15, rue Louis Lejeune CS 70013 92541 MONTROUGE CEDEX FRANCE Telephone: +(33).(0)1.46.16.41.05 or +(33).(0)1.46.16.40.00 Email: dts-transport@asn.fr Website: www.asn.fr Direction Générale de la Sécurité Civile et de la Gestion Des Crises (DGSCGC) Centre Opérationnel de Gestion Interministérielle des Crises (COGIC) Place Beauvau 75800 PARIS CEDEX 08 FRANCE Telephone: +(33).(0)1.45.64.46.46 Facsimile: +(33).(0)1.42.65.85.71 Email: cogic-centretrans@interieur.gouv.fr	1;1.2 5;1.2

	Identifying code	*Variation*	*Relevant paragraphs*
	FR 3	Transport by air of the following radioactive material to, from, through or over French territory cannot be performed without a permit issued by ASN: — in the case of radioactive material in special form, if the activity transported in the package is higher than or equal to 3000 A_1, or 100000 A_2 , if the latter value is lower than the 3000 A_1 value; — in the case of all other radioactive material, if the activity transported is higher than or equal to 3000 A_2. Once a permit has been issued, DGAC and DGSCGC/COGIC must be advised of the shipment at least 48 hours in advance.	5;1.2 7;1.1
	FR 4	An aircraft whose internal surfaces have been contaminated by radioactive material may be reused on French territory only after approval by an authorized expert. ASN must be consulted on the selection of the expert. Such approval must be entered in the maintenance log of the aircraft. DGAC must be advised of such contamination and approval before the aircraft is reused.	7;3
	FR 5	In addition to the report to be made to the DGAC, any event occurring in the territory of France involving the transport of radioactive substances must be reported by the operator (or a representative) within 48 hours to the ASN through the ASN teleservices portal (https://teleservices.asn.fr/, under the "Transport of radioactive substances" section). This obligation to report also applies to: — ground handling agents at the airport acting on behalf of the operator; — any entity responsible for the loading/unloading of dangerous goods; and — any entity responsible for the handling and storage of dangerous goods at the airport in French territory. The procedures for reporting to the ASN events associated with the transport of radioactive substances are specified in ASN Guide No. 31 available on the website (www.asn.fr) A Significant Event Report must be produced within two months of the report of the significant event involving the transport of radioactive substances. It must include a detailed analysis of the event and indicate the corrective measures implemented or planned. In case of a radiological emergency, please call the ASN emergency hotline at: +(33).(0).8.00.80.41.35.	7;4
≠	FR 6	With respect to the transport by air of dangerous goods listed in paragraph 1;2.3.2, the competent authority from France (FR 1) has notified the following instructions: 1) dangerous goods as described in sub-paragraph c) of paragraph 1;2.3.2 of these Instructions are not permitted for transport in airmail to, from, or transiting through France; 2) dangerous goods as described in sub-paragraphs a) and b) of paragraph 1;2.3.2 of these Instructions are permitted for transport by the designated postal operator La Poste to, transiting through, or from France only if there is an agreement among designated postal operators; and 3) dangerous goods as described in sub-paragraphs d) and e) of paragraph 1;2.3.2 of these Instructions are permitted for transport in airmail to, transiting through, or from France only if shipped by a designated postal operator (see the Universal Postal Union's (UPU) website at: https://www.upu.int/UPU/media/upu/files/postalSolutions/programmesAndServices/postalSupplyChain/Security/dangerousGoods/30-July-2021_CAA-Approval-for-Lithium-Batteries.pdf).	1;2.3
	FR 7	The emergency response information described below must appear on shipments of dangerous goods to, from, within or transiting through France. This provision does not apply to the transport of magnetized material or dangerous goods for which no transport document is required. Telephone number — The transport document required under the ICAO Technical Instructions must contain a telephone number by means of which emergency response information can be obtained in case of an incident and/or accident involving the dangerous goods being transported. — This telephone number must be available 24 hours a day and must include the regional codes and, for international numbers outside France, the country and city codes needed to complete the call from France. — This telephone number must be monitored at all times by a person who:	5;4

Identifying code	*Variation*	*Relevant paragraphs*
	— is knowledgeable concerning the hazards and characteristics of the dangerous goods being transported; — has comprehensive emergency response and accident mitigation information for the dangerous goods; and — can immediately call upon a person who possesses such knowledge and information.	
FR 8	In accordance with Articles L. 1333-8 and R. 1333-146 of the Code of Public Health, companies conducting the following activities in France must make a declaration to the ASN: — the handling of packages of radioactive substances for transport including a stop at a French airport; — the conveyance of packages of radioactive substances (within the airport area or by air); and — the loading or unloading of packages of radioactive substances onto/from aircraft. Declarations may be made through the ASN teleservices portal (https://teleservices.asn.fr/, under the "Transport of radioactive substances" section). Any change in the company name or the UN numbers of the transported packages requires an amending declaration. An update to the declaration must be made immediately if there is any change in the identity or contact information of the contact person for radiological emergencies. Companies conducting transport operations of sealed radioactive sources or of batches of Category A, B or C sources as defined in Annex 13-7 of the Code of Public Health must receive prior authorization from the ASN. The application procedures for authorization can be found on the website (www.asn.fr). If a company permanently discontinues the activities that have been declared or authorized, it should inform the ASN through the ASN teleservices portal indicated above.	
FR 9	Not used.	
	GB — UNITED KINGDOM	
GB 1	National regulations require that most explosives which are to be imported be classified before they are brought into the United Kingdom, by HM Explosives Inspectorate of the Health and Safety Executive or the Explosives Storage and Transport Committee. It is the responsibility of the importer to obtain the classification. Explosives manufactured in the United Kingdom are required to have been classified before they are transported.	2;1.5 5;1.1
GB 2	Not used.	
GB 4	For the purposes of compliance with Part 7;4.7, notification of dangerous goods on an aircraft involved in an aircraft accident or serious incident or other incident occurring in the United Kingdom, the operator should make initial contact with the Civil Aviation Authority by phone and subsequently transmit a copy of the notification to the pilot in command and any other information requested via email, as follows: Telephone: + 44 (0) 330 022 1915, for notifications Monday to Friday between the hours of 0900 and 1700 UK time, or + 44 (0) 330 022 1500, at all other times. Email: dgo@caa.co.uk This notification is in addition to, and not instead of, that required under Annex 13.	7;4.7
GB 5	Biological substances, Category B (UN 3373) are not permitted in international mail either to or from the United Kingdom. Biological substances, Category B (UN 3373) are not permitted in domestic mail except under special arrangements. Exempt patient specimens are not permitted in international or domestic mail except under special arrangements.	1;2.3
GB 6	When any operator intends to overfly the United Kingdom carrying any package containing radioactive material with an activity greater than: (a) for special form 3000 A_1 or 100000 A_2, whichever is the lower; or (b) for all other radioactive material 3000 A_2, it must notify the Dangerous Goods Office (contact details as in GB 4) at least two working days before the expected date of the flight, providing the information required by 5;1.2.1.4 d), together with the names and addresses of the shipper and consignee, and the contact details for the operator. If the flight does not take place as planned, or if there are any changes in the information provided, the Dangerous Goods Office must be notified immediately. The operator is not required to wait for any acknowledgement or acceptance before carrying out the flight.	

Identifying code	*Variation*	*Relevant paragraphs*
GB 7	In accordance with 1;4.1.2, national regulations require the following dangerous goods training programmes to be subject to review and approval by the Civil Aviation Authority: — operators of aircraft registered in the United Kingdom; — non-United Kingdom operators that provide dangerous goods training to their own staff in order for them to carry out dangerous goods acceptance checks on behalf of other operators; — handling agents that provide dangerous goods training to their own staff in order for them to carry out dangerous goods acceptance checks on behalf of operators; and — companies that provide dangerous goods training to other companies employing categories of personnel identified in Table 1-4, column 1, 2, 3 or 6. Details of the approval requirements can be found in CAP 483, available free of charge from the following website: www.caa.co.uk/publications.	
	GH — GHANA	
GH 1	The Ghana Civil Aviation Authority legislation requires that the transportation of all classes of dangerous goods is done in accordance with the ICAO Technical Instructions, the IATA Dangerous Goods Regulations and Ghana Civil Aviation (Flight Standards) Directives Part 18.	
GH 2	The Ghana Civil Aviation Authority legislation expressly forbids the transportation of the following items by aircraft, except with the prior permission from Ghana Civil Aviation Authority and in accordance with conditions mentioned in this permission: a) weapons and ammunitions; b) explosives, unless required on board the aircraft for its operations; c) poisonous gases; d) Division 6.2 (infectious substances); and e) Class 7 (radioactive material), radioisotopes and similar substances.	
GH 3	The transportation of arms, ammunition and all classes of explosives from/to/through Ghana requires prior permission to be obtained from the National Security (Ministry of Interior) and Ghana Civil Aviation Authority. The transportation of poisonous gases from/to/through Ghana requires prior permission to be obtained from the Environmental Protection Agency, Ghana and Ghana Civil Aviation Authority. The transportation of Division 6.2 (Infectious substances) from/to/through Ghana requires prior permission to be obtained from the Ghana Health Service (Ministry of Health) and Ghana Civil Aviation Authority. The transportation of Class 7 (Radioactive material) radioisotopes and similar substances from/to/through Ghana requires prior permission to be obtained from the Nuclear Regulatory Authority, Ghana and Ghana Civil Aviation Authority.	1;1.2 2;1.5
GH 4	The operator must be responsible to coordinate with the shipper and consignee to return any remaining unclaimed, damaged and/or leaking dangerous goods to the State of Origin whenever instructed to do so by Ghana Civil Aviation Authority. All applications should be directed to: The Director General Ghana Civil Aviation Authority Private Mail Bag Kotoka International Airport Accra, Ghana Telephone: +233(0)302-776171 Fax : +233(0)302-773293 Sita : ACCXTYF; AFTN: DGAAYFYX E-mail : info@caa.com.gh Website: www.gcaa.com.gh	7;3

Identifying code	*Variation*	*Relevant paragraphs*
	HR — CROATIA	
≠ HR 1	The competent national authority in the Republic of Croatia for Annex 18 and these Instructions is: Croatian Civil Aviation Agency (CCAA) Ulica grada Vukovara 284 10 000 Zagreb, Croatia Telephone: +385 1 2369 300 Facsimile: +385 1 2369 301 Email: dg@ccaa.hr Website: www.ccaa.hr	
HR 2	Not used.	
HR 3	Dangerous goods requiring approval under Special Provisions A1 or A2 of these Instructions or other State exemptions or approvals may only be carried on a passenger or cargo aircraft in Croatian territory with the approval of the Croatian Civil Aviation Agency (CCAA). Applications for approval must be lodged with the CCAA at least ten days prior to the proposed flight.	1;1.1 Table 3-1 3;3
≠ HR 4	According to the Act on Radiological and Nuclear Safety (Official Gazette Nos. 141/13,39/15,130/17 and 118/18), for transportation of radioactive materials to and from the Republic of Croatia, the operator must ensure that the consignor/consignee is in possession of a prior approval. Application for prior approval may be addressed to: Ministry of the Interior (MoI) Civil Protection Directorate (CPD), Sector for Radiological and Nuclear Safety Nehajska 5, 10 000 Zagreb, Croatia Telephone: +385 1 38 55 706 Facsimile: +385 1 3788 599 Email: sektor.rns@civilna-zastita.hr Website: https://civilna-zastita.gov.hr/podrucja-djelovanja/radioloska-i-nuklearna-sigurnost/88	1;1.2 5;1.2 7;1
HR 5	According to the Explosive Substances Act (Official Gazette No. 178/04, 109/07, 67/08 and 144/10), for transportation of explosives to and from the Republic of Croatia, the operator must ensure that the consignor/consignee is in possession of a prior approval. Application for prior approval may be addressed to: Ministry of Interior Administrative and Inspection Authority 10 000 Zagreb Ilica 335 Telephone: +385 1 3788 646 Facsimile: +385 1 3788 187 Email: pitanja@mup.hr Website: www.mup.hr	1;1.2 2;1 4;3 7;1
	IN — INDIA	
IN 1	Dangerous goods may be carried to/from/within/over India provided that the operator is certified by the State of the operator to carry such goods and also that all the requirements specified in the ICAO Technical Instructions are complied with.	1;1 7;1
IN 2	For transportation of radioactive materials to/from/within India (not over India), the operator must ensure that the consignor/consignee is in possession of authorization issued by the Government of India in pursuance of Section 16 of the Atomic Energy Act, 1962. Application for permission for carriage of radioactive material may be addressed to: Atomic Energy Regulatory Board Radiological Safety Division Niyamak Bhavan Anushaktinagar Mumbai — 400 094 India	5;1 7;1

Identifying code	*Variation*	*Relevant paragraphs*
IN 3	For carriage of arms, ammunition and munitions of war, etc., to, from or over India, written permission under rule 8 of the Aircraft Rules, 1937, shall be required. Application for such permission may be addressed to: Director General of Civil Aviation Opp. Safdarjung Airport New Delhi — 110 003 India	5;1 7;1
	IR — ISLAMIC REPUBLIC OF IRAN	
IR 1	The importation of radioactive material into the Islamic Republic of Iran is subject to prior permission from the Atomic Energy Organization of the Islamic Republic of Iran. Any request concerning the applicability of this variation must be addressed to: Atomic Energy Organization of the Islamic Republic of Iran Nuclear Safety and Radiation Protection Management P.O. Box 14155 — 4494 Tehran, Islamic Republic of Iran Telephone: +98 21 88 22 11 24 +98 21 82 06 35 74 Facsimile: +98 21 88 22 11 25	1;1.1 5;1.2 7;1.1
IR 2	In addition to the application of the regulations described in Table 7-1, packages containing Division 6.1 from Class 8 and Division 4.1 from Division 4.3 must be separated from each other.	7;1 7;2
IR 3	Dangerous goods which are principally forbidden for air transport and are subjected to Special Provision A1 or A2 of the Technical Instructions may be imported into the Islamic Republic of Iran subject to prior permission from the Civil Aviation Organization of Iran. Application for permission must be made at least fifteen days prior to the proposed flight date and must be addressed to: Vice President C.A.O.I.R. of Iran Deputy of Flight Standard Civil Aviation Organization Mehrabad International Airport Tehran, Islamic Republic of Iran Facsimile: +98 21 66 03 65 52	Table 3-1 3;3
IR 4	Fissile material in quantities exceeding quantities for fissile excepted must not be transported by aircraft to, from, or through the Islamic Republic of Iran without prior permission from: Iranian Nuclear Regulatory Authority (INRA) End of North Kargar St. P.O.Box 14155-1339 Tehran, Islamic Republic of Iran Telephone: +98 21 88 22 10 73 Facsimile: +98 21 88 22 10 72 Email: INRA@aeoi.org.ir	2;7 4;9 5;1 5;2 6;7 7;1 7;2
	IT — ITALY	
IT 1	The transport of radioactive and fissile material to/from/through Italian territory can be performed by authorized carriers only. Application for authorization can be made at the following address: Ministero dello Sviluppo Economico Dipartimento per l'Energia Direzione Generale per l'Energia Nucleare, le Energie Rinnovabili e l'Efficienza Energetica Divisione V — Attività afferenti la fonte primaria nucleare Via Molise, 2 00187 Roma, Italia Telephone: +39 06 4705 2705/2103 Facsimile: +39 064788 7976 E-mail: dgerm.ufficiob6trasporti@sviluppoeconomico.gov.it	1;1.1 5;1.2 7;1

Identifying code	*Variation*	*Relevant paragraphs*
IT 2	Prior approval is requested for shipments of: — Type B (M) packages; — Fissile packages; and — Type B (U) packages containing radioactive material with activity greater than 3000 A_1 or 3000 A_2 as appropriate or 1000 TBq, whichever is the lower. Beyond the approval, such shipments must be notified at least 48 hours in advance to ISPRA. Application for shipment approval and notification can be made at the following address: Instituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) Institute for Environmental Protection and Research Department of Nuclear, Technological and Industrial Risk Radioactive Material Transport Division Via Vitaliano Brancati, 48 00144 Roma, Italia Telephone: +39 06 5007 2978 Facsimile: +39 06 5007 2941 E-mail: trasporti@isprambiente.it	5;1.2.1
IT 3	Application for approval of special form radioactive material, Type B and Type C packages, packages containing fissile material should be addressed to: Instituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) Institute for Environmental Protection and Research Department of Nuclear, Technological and Industrial Risk Radioactive Material Transport Division Via Vitaliano Brancati, 48 00144 Roma, Italia Telephone: +39 06 5007 2978 Facsimile: +39 06 5007 2941 E-mail: trasporti@isprambiente.it	5;1.2.1
IT 4	Further utilization of an aircraft having undergone radioactive contamination must be certified by a qualified expert and registered on the efficiency technical book.	7;3.2
IT 5	Authorizations for transport of weapons, ammunitions and explosives to/from/through Italian territory must be requested as described in the GEN Section of AIP Italia. When the Technical Instructions require that a prior approval or authorization or exemption must be granted by Italy for the safe transport of dangerous goods by air, including for weapons, ammunitions and explosives, it must be requested to ENAC — Ente Nazionale per L'Aviazione Civile (Italian Civil Aviation Authority). See the ICAO public website for current contact information (www.icao.int/safety/DangerousGoods/Pages/Dangerous-Goods-National-Authority.aspx).	1;1 5;1.1 7;1
IT 7	The transport of dangerous goods in portable tanks is subject to prior approval of the shipment by the Italian Competent Authority. Application for the approval, together with a safety analysis, must be made at the following address: Ente nazionale per l'Aviazione Civile (ENAC) Direzione Regolazione Transporto Aereo Viale Castro Pretorio, 118 00185 Roma, Italia Telephone: +39 06 44596404 Facsimile: +39 06 44596531 E-mail: regolazione.trasportoaereo@enac.gov.it	
	JM — JAMAICA	
JM 1	Applications for approval to transport dangerous goods under Special Provision A1 or A2 and exemption applications must be directed to: The Director General Jamaica Civil Aviation Authority 4 Winchester Road Kingston 10 Jamaica, West Indies	3;3

Identifying code	*Variation*	*Relevant paragraphs*
JM 2	On shipments to, from, within or transiting through Jamaica, emergency response information, as described in JM-3, must be provided for all dangerous goods other than magnetized material and dangerous goods for which no Transport Document is required.	5;4
JM 3	*Emergency Response Information.* The Transport Document required by these Technical Instructions must include a 24-hour emergency response telephone number (including all area codes, and for international numbers for locations outside Jamaica, the international access code and country and city codes needed to complete the call from within Jamaica). The number must be monitored by an individual who: — speaks English fluently; — is knowledgeable of the hazards and characteristics of the dangerous good(s) being transported; — has comprehensive emergency response and accident mitigation information for the dangerous good(s); — has immediate access to a person who possesses such knowledge and information.	5;4
JM 4	Transport of dangerous goods by air must be in accordance with the current edition of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284). Failure to comply with the Technical Instructions is a violation of the Jamaica Civil Aviation Regulations, 2012.	
	JP — JAPAN	
JP 2	The maximum dose rate at any point on any external surface of packages, overpacks or freight containers containing radioactive material must not exceed 2 mSv/h even if those are transported under exclusive use.	4;9.1
JP 3	"Excepted radioactive material" must not contain pyrophoric (liquid) or explosive radioactive material.	1;6.1.5
JP 8	All Type B(U) and Type B(M) packages, and packages containing 0.1 kg or more of uranium hexafluoride require both packages design approvals and shipment approvals of the appropriate authorities of Japan.	5;1.2.2 6;7.5.4 6;7.8
JP 9	The labels shall be affixed to two opposite sides of the outside of the unit load device containing radioactive material.	5;3
JP 10	"Excepted radioactive material" must not be carried in the cabin or cockpit of an aircraft.	7;2.1
JP 11	Radioactive material (Class 7), except for "Excepted radioactive material" must not be stowed in the same cargo compartment together with packages containing explosives (Class 1, except for Compatibility Group S).	7;2.2
JP 12	Handling and loading of radioactive material must be made in such a manner that no person other than ground handling and loading staff can have access to the area.	7;2.9
JP 17	The maximum dose rate at a distance of 1 m from the external surfaces of packages, overpacks or freight containers containing radioactive material must not exceed 0.1 mSv/h, except when overpacks or freight containers are transported under exclusive use with the prior notification to the Civil Aviation Bureau of Japan.	4;9 5;1.2.3
JP 20	Not used.	
JP 21	Not used.	
JP 23	Radioactive material of Class 7 in excepted packages with an associated risk of another class specified in 3;5 must be subject to the provisions of 1;6.1.5, 3;5 and to the variations JP 3 and JP 9.	1;6 3;5
JP 24	Any substance bearing "Toxic" label or "Toxic Gas" label must not be packed in the same outer packaging with foodstuffs, feed or other edible substances intended for consumption by humans or animals.	4;1
JP 26	Neither packages containing fissile material (excluding fissile material meeting one of the provisions a) to e) of 2;7.2.3.5.1, 6;7.10.2 or 6;7.10.3) nor packages having greater radioactivity than the following values shall be transported by air within the territorial airspace of Japan: 1) for special form radioactive material — 3000 A_1 or 100000 A_2, whichever is the lower; or 2) for all other radioactive material — 3000 A_2.	2;7.2.3.5 2;7.2.4.6 6;7.10

Identifying code	*Variation*	*Relevant paragraphs*
	KG — KYRGYZ REPUBLIC	
KG 1	Radioactive material in any quantity may not be transported by aircraft to, from, within or over the Kyrgyz Republic without prior permission of the Civil Aviation Authority of the Kyrgyz Republic (CAAKR).	2;7
KG 2	A person must not handle or offer for transport explosives classified as Class 1 to, from, within or over the Kyrgyz Republic without prior permission of the Civil Aviation Authority of the Kyrgyz Republic (CAAKR).	2;1
KG 3	All requests for permission or approval must be lodged with the Civil Aviation Authority of the Kyrgyz Republic (CAAKR) eight days prior to the proposed flight and be addressed to: Civil Aviation Authority Ministry of Transport and Communications Kyrgyz Republic 1, Ajibek Batyra st., Bishkek, 720044 Telephone: +996 (312) 542140, 542141, 542135 Facsimile: +996 (312) 542140, 542141, 542135	
	KH — CAMBODIA	
KH 1	Operators wishing to carry dangerous goods in aircraft to/from or via the Kingdom of Cambodia must obtain prior written approval from the State Secretariat of Civil Aviation. Applications must be made on prescribed forms which can be obtained from the State Secretariat of Civil Aviation. They must be addressed to: Secretary of State State Secretariat of Civil Aviation No. 62, Preah Norodom Blvd., Phnom Penh Kingdom of Cambodia cc: Air Transport Department	1;1
	KP — DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	
KP 1	The Flight Safety Standard Department of General Administration of Civil Aviation of the Democratic People's Republic of Korea is responsible for ensuring compliance with Annex 18 and the Technical Instructions in the Democratic People's Republic of Korea. E-mail: gaca@sillibank.com Facsimile: +850 2 381 4625	
KP 2	Dangerous goods requiring exemption or approval under Special Provision A1 or A2 of the Technical Instructions may be carried on a passenger or cargo aircraft to/from/over the Democratic People's Republic of Korea only with the permission of the Flight Safety Standard Department. Applications for permission for this purpose should be submitted at least ten working days prior to the intended flight.	3;3 Table 3-1
KP 3	A dangerous goods incident or accident is to be notified to the Flight Safety Standard Department of General Administration of Civil Aviation as soon as practically available, but within five working days.	7;4.4
	KW — KUWAIT	
KW 1	The transportation of ammunition and all classes of explosives from/to Kuwait requires prior approval to be obtained from the Ministry of Interior of Kuwait. The request should be submitted four days in advance.	1;1
KW 2	The transportation of radioactive material from/to Kuwait requires prior permission to be obtained from the Ministry of Health of Kuwait. The request should be submitted four days in advance. E Mail: safety@dgca.gov.kw Facsimile: 00965 24765796	
KW 3	Any dangerous goods shipment with an n.o.s.* entry must be accompanied by a material safety data sheet (MSDS)/safety data sheet (SDS).	Table 3-1

Identifying code	*Variation*	*Relevant paragraphs*
KW 4	Any dangerous goods incident or accident must be reported to the Kuwait DGCA within 48 hours. A template is available on https://kcasr.dgca.gov.kw/wp-content/uploads/2018/10/Dangerous-Goods-Occurrence-Report-Form-1126.pdf.	7;4
KW 5	The emergency response contact number and name must be on the shipper's declaration (DGD) for all shipments to/from Kuwait. Call and report the incident to the Airport Management Control Centre (MCC). Telephone: +965 24313397/24727339, Ext. 1537 or 1539 SITA: KWIDDY	5;4
	LU — LUXEMBOURG	
LU 1	Under the Grand-ducal regulation of 14 December 2000 concerning the protection of the population against the dangers arising from ionizing radiation, as modified on 21 July 2006, each airline carrying radioactive material above exemption level (excepted packages, Type A, Type B, etc.) to and from the airport of Luxembourg must be authorized to this effect by the Minister of Health. Information on the licensing procedure can be obtained at: Division de la Radioprotection Allée Marconi — Villa Louvigny L-2120 Luxembourg E-mail: radioprotection@ms.etat.lu Telephone: +352 247 85670 www.radioprotection.lu	
	MY — MALAYSIA	
MY 1	Operators wishing to carry all classes of dangerous goods from, over or to the territory of Malaysia must obtain prior written permission from the Director General, Department of Civil Aviation, Malaysia. Request for approval should be addressed to: The Director General Department of Civil Aviation, Malaysia Level 1-4, Block Podium Lot 4G4, Precinct 4 Federal Government Administrative Centre 62570 Putrajaya, Malaysia. AFTN: WMKKYAYX Tel: 603-8871 4000 Fax: 603-8889 5691	
MY 2	The transport of radioactive material by air to or from Malaysia will be considered for approval by the Director General, Department of Civil Aviation, Malaysia, provided prior permit or approval from the Atomic Energy Licensing Board of Malaysia has been obtained. Application for a permit or approval from the Atomic Energy Licensing Board of Malaysia can be made at the following address: The Atomic Energy Licensing Board of Malaysia Ministry of Science, Technology and Innovation Batu 24, Jalan Dengkil 43800 Dengkil, Selangor Tel: 03-8928 4100 03-8926 7699 Fax: 03-8922 3685	5;1 7;1
MY 3	Individual shippers wishing to transport arms, ammunition and explosives to or from Malaysian territory must first obtain a permit from the Inspector General of Police, Malaysia. Having obtained the permit from the Inspector General of Police, Malaysia, shippers then should forward their application to the Director General, Department of Civil Aviation, Malaysia for approval to carry arms, ammunition and explosives by air.	5;1
MY 4	If an in-flight emergency occurs within Malaysian airspace the pilot-in-command must inform the appropriate air traffic services unit, for the information of aerodrome authorities, of any dangerous goods on board the aircraft. The information must include the primary hazard, subsidiary risks for which labels are required and the quantity and location aboard the aircraft of the dangerous goods. If the situation permits, the information should also include the proper shipping name, class or division, and in the case of Class 1, the compatibility group.	7;4.3

	Identifying code	*Variation*	*Relevant paragraphs*
	MY 5	An operator who is involved in a dangerous goods incident in Malaysian territory must provide the Malaysian Authority with information required to minimize hazards created by any spillage, leakage of fluid or radiation, breakage, or other damage to dangerous goods.	7;4.4
	MY 6	English must be used in addition to the language which may be requested by the State of Origin and each language must be given equal prominence.	5;2.5 5;4.1.6.3
		NL — NETHERLANDS	
	NL 1	Dangerous goods requiring approval under Special Provision A1 or A2 of these Instructions, may not be transported on a passenger aircraft or cargo aircraft (as appropriate) to, from or through the Netherlands without prior approval of the Ministry of Transport, Public Works and Water Management, irrespective of whether or not the Netherlands is the State of Origin. Application for all approvals should be made at least 10 days prior to the proposed flight date and must be submitted to: Human Environment and Transport Inspectorate (CAA — NL) Ministry of Infrastructure and the Environment Certification and Approvals Department Postbus 575 2130 AN Hoofddorp The Netherlands Telephone: +31 70 456 3003 +31 88 489 0000 (outside office hours) Facsimile: +31 70 456 3030 Email: dgmelding@ilent.nl	Table 3-1 3-3
	NL 2	Not used.	
≠	NL 3	Class 7 Transport of radioactive material (Class 7) requires prior notification sent to, or a license issued by: The Authority for Nuclear Safety and Radiation Protection (ANVS) P.O. Box 16001 2500 BA The Hague Netherlands Telephone: +31 88 489 0500 For more information on notifications and application requirements on licensing see the ANVS website: https://english.autoriteitnvs.nl/topics/transport	
	NL 4	Any substance, liquid or solid solutions and mixtures (such as preparations and wastes), which cannot be classified in the other classes and that meet the criteria for substances pollutant to the aquatic environment as described in the European Agreement concerning the international carriage of dangerous goods by road (ADR), are to be assigned as Class 9 — miscellaneous dangerous goods "Environmentally hazardous substance, liquid, n.o.s." or "Environmentally hazardous substance, solid, n.o.s.". This variation does only apply in case of connecting road transport to, through or from the Netherlands. This variation does not apply to transit and overflights.	2;0 2;9
	NL 5	Not used.	
	NL 6	National legislation in the Netherlands specifies that an operator shall not carry dangerous goods without the prior permission of the Civil Aviation Authority in the Netherlands (CAA-NL) and that when such goods are carried, it must be in compliance with the Technical Instructions. This applies to operators carrying dangerous goods to and from the Netherlands (excluding overflight). Permission is provided by the issuance of a dangerous goods licence to the operator and it will only be provided if the operator is in the possession of staff who received training in accordance with the provisions in the Technical Instructions. Operators registered in the Netherlands and in a State other than the Netherlands which are required to operate under and in accordance with EU-OPS do not require permission of the Civil Aviation Authority of the Netherlands providing the permission granted by such a State is held.	1;1.2

Identifying code	*Variation*	*Relevant paragraphs*

Application for a dangerous goods licence must be made at least six weeks before the date of the first flight on which dangerous goods are to be carried. An application form is available from:

Human Environment and Transport Inspectorate (CAA — NL)
Ministry of Infrastructure and the Environment
Certification and Approvals Department
Postbus 575
2130 AN Hoofddorp
The Netherlands
Telephone: +31 70 456 3003
+31 88 489 0000 (outside office hours)
Facsimile: +31 70 456 3030
Email: dgmelding@ilent.nl

NP — NEPAL

NP 1 Operators intending to carry dangerous goods to, from, within and over Nepal must obtain prior written permission from the Director General, Civil Aviation Authority of Nepal. The requests for approval should be addressed to:

Flight Safety Standards Department
Civil Aviation Authority of Nepal
Singamangal, Kathmandu
NEPAL
Telephone: +977-1-4111075/4111119
Facsimile: +977-1-4111198
Email: fssdept@caanepal.gov.np/januka.khanal@caanepal.gov.np

OM — OMAN

≠ OM 1 Transportation of dangerous goods to, from or within Oman must be subject to compliance with the provisions of these Instructions and the Oman Civil Aviation Regulations (CAR — OPS and CAR 92) — Transport of Dangerous Goods by Air which can be accessed at the Civil Aviation Authority (CAA) official website: www.caa.gov.om.

≠ OM 2 From 1 October 2020, Oman originating dangerous goods shipments must only be offered and accepted for air transport by a CAA dangerous goods certified entity according to the CAA Dangerous Goods Certification requirements as defined in the Oman Civil Aviation Regulations (CAR 92, as amended). 1;4

	Identifying code	*Variation*	*Relevant paragraphs*
≠	OM 3	From 1 December 2020: 1. Carriage by aircraft, to, from, through or over the territory of the Sultanate of Oman of: — Class 1 — Explosives; — Class 2 — Division 2.3 Toxic gases (excluding aerosols); — Class 3 — Desensitized explosives; — Class 4 — Division 4.1 Desensitized explosives; — Class 6 — Division 6.1 Substances of Packing Group I, except when transported under the excepted quantity provisions; — Division 6.2 — Infectious substances of Category A (UN Nos. 2814 and 2900); and — Class 7 — Radioactive material; must not be accepted without prior approval from the competent authorities. 2. The request to carry dangerous goods under Special Provision A1, A2 or other State exemptions or approvals must be submitted to: n.alalawi@caa.gov.om and y.alzadjali@caa.gov.om at least 15 working days before the planned flight and addressed to: Civil Aviation Authority Direction General for Civil Aviation Regulation Flight Safety Department Dangerous Goods Entity +968 24354035 +968 24354074	1;2.1 2;3.1 3;3 4;4.1 6;6.1 7;7.1
	OM 4	For shipments of arms, ammunition, explosives and all other Class 1 dangerous goods, the consignee must apply to Royal Oman Police to obtain export, import or transit approval 15 working days before the scheduled arrival date of the shipment.	1;1
+		From 1 December 2020, shipments of arms, ammunitions, explosives and all others Class 1 dangerous goods must be collected as soon as possible and no more than six hours from the time of arrival of the flight.	
	OM 5	Import, export and transit permit(s) must be obtained from the Ministry of Environment and Climate Affairs before forwarding radioactive material to, from and via Oman. For further details, please visit meca.gov.om.	5;4
+	OM 6	In the following cases, applications for foreign military aircraft and diplomatic transit and landing flights approvals must be made 10 working days before the planned flight: — aircraft carrying explosives, weapons and ammunitions; — aircraft carrying army personnel and staff; and — aircraft carrying radioactive material to and from the Sultanate of Oman.	
	OM 7	The process to return or dispose undelivered dangerous goods destined to Oman must be conducted by the air operator by which the shipment has arrived within seven working days from the date the shipment arrived in Oman. The process to return or dispose dangerous goods trans-shipments and transit shipments via Oman must be conducted by the air operator by which the shipment has arrived within seven working days from the date the shipment arrived in Oman.	7;3

Identifying code	*Variation*	*Relevant paragraphs*
OM 8	The emergency response information described below must appear on shipments of dangerous goods to, from, within or transiting through Oman. This provision does not apply to the transport of magnetized material or dangerous goods for which no transport document is required. Telephone number: The transport document required under these Instructions must contain a telephone number by means of which emergency response information can be obtained in case of an incident and/or accident involving the dangerous goods being transported. This telephone number must be available 24 hours a day and must include the regional codes and, for international numbers outside Oman, the country and city codes needed to complete the call from Oman. This telephone number must be monitored at all times by a person who: — is knowledgeable concerning the hazards and characteristics of the dangerous goods being transported; -— has comprehensive emergency response and accident mitigation information for the dangerous goods; and — can immediately call upon a person who possesses such knowledge and information.	5;4
	PE — PERU	
PE 1	Part 110, paragraph 110.5(h) of the Peruvian Aviation Regulations currently in force states that all air shipments of explosives including loads in transit must have a written authorization or exemption issued by the DGCA, as appropriate. Paragraph 110.5(i) sets out the requirements for the granting of authorizations and exemptions.	2;1
PE 2	All shipments of dangerous goods that qualify as controlled products or chemical inputs by the terms of Law 28305 on Controlled Products and Chemical Inputs of Peru must comply with the provisions of said law.	
PE 3	Part 110, paragraph 110.37(d) of the Peruvian Aviation Regulations currently in force states that shippers offering dangerous goods for loading onto an aircraft must provide the air operator with copies of the safety information sheets for the goods to be shipped.	5;4
	PK — PAKISTAN	
PK 1	The English language must be used for marking of packages and overpacks. However, if the language of the State of Origin is to be used, both these languages must be written side by side with prominent effect.	5;2.5
PK 2	A brief text indicating the nature of the risk involved must appear in English on all hazard labels.	5;3
PK 3	While English must be used in addition to the language of the State of Origin for the dangerous goods transport document, the document itself is to conform to the IATA type shipper's declaration.	5;4
	PL — POLAND	
PL 1	Consignments containing spent nuclear fuel or radioactive waste transported to, from, through or over the territory of Poland are subject to prior written notification. Notification should be forwarded at least two weeks prior to shipment to: National Atomic Energy Agency (PAA) Department of Radiological Protection Krucza 36 Street 00-522 Warsaw Poland Telephone: +48 22 695 97 43 Facsimile: +48 22 695 98 71 Email: sekretariat.dor@paa.gov.pl	7;1

Identifying code	*Variation*	*Relevant paragraphs*
	RO — ROMANIA	
RO 1	In accordance with Romanian legislation, all flights within the Bucharest FIR of civil aircraft carrying cargo consisting of weapons, ammunition, explosives, radioactive materials and other materials classified and regulated as dangerous goods can be performed only after obtaining a permit from the Ministry of Transport and Infrastructure. The application for the above-mentioned permit has to be registered with the Romanian Civil Aeronautical Authority at the following address: Romanian Civil Aeronautical Authority (RCAA) Overflight Department Sos. Bucuresti-Ploiesti, Nr. 38-40 Sector 1, Cod 013695 Bucuresti, Romania Telephone: +40 21 208 15 00 Facsimile: +40 21 208 15 83 AFTN: LRBBYRYR SITA: BUHTOYA Email: overflight@caa.ro Romanian AIP section GEN 1.2 contains all details regarding the application form and other required specific documents. In case the consignment contains radioactive materials, the air operator must provide to the Romanian Civil Aeronautical Authority a copy of the authorization issued by the National Commission for the Control of Nuclear Activities (CNCAN). The contact information of the National Commission for the Control of the Nuclear Activities is as follows: National Commission for the Control of the Nuclear Activities B-dul. Libertatii, Nr. 14, Sector 5 Bucuresti, Romania Telephone: +40 21 316 05 72 Facsimile: +40 21 317 38 87	1;1.2 Part 2 5;1.2
RO 2	RO 1 does not apply in cases of air carriers performing medical emergency flights and in cases of flights by air carriers detaining an operator licence in accordance with EU Regulation No. 1008/2008 and which do not carry dangerous goods classified as: — Class 1 — all items; — Class 3 — only desensitized explosives UN 1204, UN 2059, UN 3064, UN 3343, UN 3357 and UN 3379; — Class 6 — only Division 6.2, Category A, UN 2814 and UN 2900 — Class 7 — all items Such carriers must only notify the Romanian Civil Aeronautical Authority before starting the flight with the following information: proper shipping name, UN number, class or division, and quantity.	1;1.2
RO 3	Civil aircraft involved in the carriage of dangerous goods that are forbidden for air transport under normal circumstances, in accordance with the ICAO documents, are not permitted to perform flights within the Bucharest FIR (OMTCT 2066/2006). Waivers from the provisions may be granted by the Romanian Civil Aeronautical Authority only if the respective transport is justified by a major public interest. Such a waiver must be granted with the approval of the Ministry of Transport and Infrastructure.	1;1.1.3 Table 3-1
RO 4	Not used.	

Identifying code	*Variation*	*Relevant paragraphs*

RS — SERBIA

RS 1 — In accordance with the internal regulations of the Republic of Serbia, special approval is required for the transport of dangerous goods in accordance with Special Provision A1 or A2 where the Republic of Serbia is the State of Origin of the goods (if the goods are loaded on board aircraft at some of the airports in the Republic of Serbia) or the State of the Operator. — 3;1 (Table 3-1) 3;3

Application for granting the special approval should be addressed to:

Civil Aviation Directorate of the Republic of Serbia
Skadarska 23
11000 Belgrade
Serbia
Telephone:+381 11 292 70 47
E-mail: flight-permissions@cad.gov.rs

RS 2 — In accordance with the internal regulations of the Republic of Serbia, an operator which holds an air operator certificate issued by the aviation authority of another State is required to obtain prior approval for the transport of dangerous goods to and from the Republic of Serbia. This approval is valid for a period of twelve months. The application for granting this approval should be submitted at least 30 days prior to the planned operations of transporting dangerous goods to and from the territory of the Republic of Serbia. — 7;1

Application for granting the annual approval should be addressed to:

Civil Aviation Directorate of the Republic of Serbia
Skadarska 23
11000 Belgrade
Serbia
Telephone:+381 11 292 70 99
E-mail: ops@cad.gov.rs

RU — RUSSIAN FEDERATION

RU 1 — For all domestic transports in the Russian Federation, the Russian language must be used for all dangerous goods markings and transport documents. For international transports originating in the Russian Federation, Russian and English must be used for dangerous goods markings and transport documents in addition to the languages required by the States of Transit and Destination. — 5;2.5 5;4

RU 2 — An operator planning to transport high consequence dangerous goods indicated in Table 1-7 of the Technical Instructions to, from, within or through the territory of the Russian Federation shall not accept such goods for transport without receiving confirmation from the airport (or from the ground handling agent) that such goods can be handled in the territory of the Russian Federation, as well as confirmation of the consignee's preparedness to accept such goods (if the goods are transported to the territory of the Russian Federation). — 1;5 7;1

RU 3 — Fissile radioactive material in any quantity shall not be accepted in the Russian Federation for carriage on passenger aircraft, and shall not be transported into the Russian Federation, from its territory or through its territory without prior permission from:

Federal Environmental, Technological and Atomic Supervisory Body (ROSTECHNADZOR)
Ul. Taganskaya, 34
109147 Moscow
Russia
Telephone: 495-411-60-22
Facsimile: 495-261-60-43

This variation covers fissile radioactive material and articles thereof containing uranium-233, uranium-235, plutonium and other isotopes of transuranic elements.

Identifying code	*Variation*	*Relevant paragraphs*

SA — SAUDI ARABIA

SA 1 The transport of alcoholic beverages for delivery to any destination in Saudi Arabia is forbidden.

SA 2 The shipper of any dangerous goods must provide a written undertaking to re-ship the consignment at the shipper's cost and risk if the shipment is not cleared and received by the consignee within 15 working days from the arrival of the consignment at any destination in Saudi Arabia.

SA 3 The name, address and telephone number of the consignee must be written in full on the air waybill for dangerous goods being shipped to any destination in Saudi Arabia.

SA 4 Prior permission is required from the concerned government departments for the importation of the following:

a) explosives and munitions of war, which require further approval from:

General Authority Of Civil Aviation (GACA)
Riyadh — King Abdulaziz Center For National Dialogue
Safety, Security & Air Transport
Riyadh — King Abdulaziz Center For National Dialogue
P.O.Box 47360
Riyadh Area Code 11552
Telephone: (966) 8001168888
Facsimile: +966 (11) 5253303
E-mail: Safety-ecoreg@gaca.gov.sa

b) chemical products, except for perfumery products, cosmetics and dry ice;

c) radioactive material. The final destination of radioactive material must be Jeddah, Riyadh or Dammam only, except those for medical purposes, which may be imported to any point in Saudi Arabia.

SA 5 The final destination for radioactive material must be Jeddah, Riyadh or Damman only, except those intended for medical purposes which may be shipped anywhere in Saudi Arabia as long as this intent is indicated on the shipper's declaration.

SA 6 The name, address and telephone number of the consignee must be written in full on each package of dangerous goods being shipped to any destination in Saudi Arabia.

\+ **SE — SWEDEN**

SE 1 Helicopter operations described in Part 7;7.1.1 require prior approval from the Swedish Transport Agency. 7;7.1.1

SG — SINGAPORE

SG 1 In accordance with paragraph 50D of the Singapore Air Navigation Order, air operators wishing to carry dangerous goods into, transiting, or out of Singapore must obtain a dangerous goods permit from the Civil Aviation Authority of Singapore (CAAS). Information and application forms for dangerous goods permits may be obtained from the CAAS website (www.caas.gov.sg). All applications are to be made on prescribed forms and addressed to: 7;1

Dangerous Goods Unit
Airworthiness/Flight Operations Division
Civil Aviation Authority of Singapore
Singapore Changi Airport
P.O. Box 1
Singapore 918141
Telephone: +65 6541 3487
Facsimile: +65 6545 6519
Email: caas_dangerousgoods@caas.gov.sg

Identifying code	*Variation*	*Relevant paragraphs*
SG 2	Singapore Air Navigation Order (ANO) defines munitions of war (MOW) as “weapons and ammunition designed for use in warfare or against any person, including any part designed for such weapons and ammunition”. MOW includes weapons (for sporting and non-sporting purposes) such as rifles, pistols and guns, and weapon components and parts. MOWs may themselves contain or be loaded with explosives, cartridges, charges, primers and ammunitions which are classified as dangerous goods in accordance with these Instructions. Operators wishing to carry munitions of war by air into, transiting, or out of Singapore must obtain an MOW permit and a dangerous goods permit in accordance with paragraphs 50C and 50D of the Air Navigation Order. Information and application forms for MOW permits may be obtained from the CAAS website (www.caas.gov.sg). All applications are to be made on prescribed forms and addressed to: Dangerous Goods Unit Airworthiness/Flight Operations Division Civil Aviation Authority of Singapore Singapore Changi Airport P.O. Box 1 Singapore 918141 Telephone: +65 6541 3487 Facsimile: +65 6545 6519 Email: caas_dangerousgoods@caas.gov.sg	7;1
	TR — TÜRKIYE	
TR 1	The Authority responsible for dangerous goods in Türkiye is the Directorate General of Civil Aviation, one of the departments of the Ministry of Transportation: Directorate General of Civil Aviation Bosna Hersek Cad. 90. Sok. No. 5 Emek — Ankara Telephone: (0312) 215 50 82 215 61 72 215 73 73 Facsimile: (0312) 212 46 84 215 80 94 Comm: CIVIL AIR Telex: 44659 CAD TR AFTN: LTAYAAT SITA: ANKYXYA	
TR 2	In the following cases, applications for diplomatic transit and landing flights authorization shall be made 10 work days before the planned flight: — aircraft carrying explosives, weapons and ammunitions; — aircraft carrying army personnel and staff; — aircraft carrying radioactive material to/from Türkiye.	
	UA — UKRAINE	
UA 1	Transport of radioactive materials to, from or through the territory of Ukraine is subject to prior permission from the State Nuclear Regulatory Administration of Ukraine. The applications should be addressed to: State Nuclear Regulatory Administration of Ukraine 9/11 Arsenaina Street Kiev, 01011 UKRAINE Telephone: 380 (044) 254 33 75 Facsimile: 380 (044) 254 33 11	5;1.2 7;1

Identifying code	*Variation*	*Relevant paragraphs*
	US — UNITED STATES	
US 1	Transport of dangerous goods by air must be in accordance with United States' Regulations (49 CFR 171-180) or these Technical Instructions as limited by 49 CFR Part 171, Subpart C. The requirements of 49 CFR 175 apply to the offering, acceptance, and transportation of dangerous goods in commerce by aircraft to, from, or within the United States, and to any aircraft of United States' registry anywhere in air commerce. Part 175 contains additional requirements applicable to any person who performs, attempts to perform, or is required to perform a function subject to 49 CFR and is also applicable to air passengers and crew. When the Technical Instructions are used for consignments of dangerous goods, failure to comply with the Technical Instructions and all relevant United States' variations is a violation of the United States' regulations. The appropriate national authority for the United States is: Associate Administrator for Hazardous Materials Safety Pipeline and Hazardous Materials Safety Administration U.S. Department of Transportation Washington, D.C. 20590-0001 English must be used for all required package markings and for the dangerous goods transport document. Abbreviations may not be used unless they are specifically authorized by these Instructions or by Subpart C and D of 49 CFR 172. A copy of the transport document, or an electronic image thereof, must be retained by the shipper for not less than two years after the dangerous goods are accepted by the initial operator. Each shipping paper copy must include the date of acceptance by the initial operator, except that the date on the air waybill or bill of lading may be used in place of the date of acceptance by the initial operator. For a hazardous waste, the transport document must be retained for three years after the waste material is accepted by the initial operator. *Note.— The United States' Regulations, as well as interpretations regarding their use, are available via the internet at http://www.phmsa.dot.gov/hazmat/regs. Questions regarding the Regulations may be directed to the Office of Hazardous Materials Safety Information Center at (800) 467-4922, (202) 366-4488 or by e-mail at infocntr@dot.gov.*	1;1.5 5;2.5 5;4.1.6.3
US 2	In addition to the dangerous goods included in the Dangerous Goods List (Table 3-1) with the word "Forbidden" shown in columns 2 and 3, any material forbidden for transport by the United States' Regulations is also forbidden for transport under any circumstances to, from or within the United States (see 49 CFR 173.21 and the Hazardous Materials Table in 49 CFR 172.101). Unless specifically authorized by the Hazardous Material Table in 49 CFR 172.101, the transport of a liquid with a vapour inhalation toxicity meeting the criteria of Division 6.1, Packing Group I or a gas meeting the criteria of Division 2.3 is forbidden for transport aboard passenger and cargo aircraft to, from or within the United States. *Note 1.— Dangerous goods that are forbidden on passenger aircraft by 49 CFR 172.101 (Column 9A) are also forbidden on passenger aircraft even when the ICAO Technical Instructions permit such carriage. Dangerous goods that are forbidden on cargo aircraft by 49 CFR 172.101 (Column 9B) are also forbidden on cargo aircraft even when the ICAO Technical Instructions permit such carriage.* *Note 2.— Dangerous goods not permitted for carriage by passengers or crew in checked or carry-on baggage by 49 CFR 175.10 are not permitted for such carriage even when authorized by Part 8 of these Instructions. For example, the carriage of avalanche rescue backpacks by passenger or crew (see Table 8-1, 17)) is not authorized.*	1;2.1 3;2
US 3	For substances where this variation is identified in column 6 of Table 3-1, the following provisions apply: 1) if A1 appears in column 7, the substance may not be transported to, from or within the United States aboard a passenger aircraft without the prior approval of the appropriate authority of the U.S. (see US 1); 2) if A2 appears in column 7, the substance may not be transported to, from or within the United States aboard a passenger or cargo aircraft without the prior approval of the appropriate authority of the U.S. (see US 1);	3;1 Table 3-1

Identifying code	*Variation*	*Relevant paragraphs*

3) prototype lithium batteries and cells transported in accordance with Special Provision A88, lithium cells or batteries including when packed with equipment or contained in equipment transported in accordance with Special Provision A99, and organic peroxides and self-reactive substances that are not identified by a technical name in 49 CFR 173.225(b) may not be transported to, from, or within the United States aboard a passenger or cargo aircraft without the prior approval of the appropriate authority of the U.S. (see US 1).

US 4 Substances subject to additional requirements for air transport to, from or within the United States are described below. The additional requirements in III also apply to U.S. carriers operating outside the U.S.

I. *Hazardous substances*. When a substance, including its mixtures and solutions, listed in Appendix A to 49 CFR 172.101 is offered for transport in a package in which the net quantity of the substance equals or exceeds the reportable quantity (RQ) indicated for the substance in Appendix A, the substance, mixture or solution is considered a hazardous substance unless:

— it is a petroleum product that is a lubricant or fuel; or
— it is in a concentration less than that shown in the following table based on the RQ specified for the material:

RQ	*Concentration by weight*	
Kilograms	*Per cent*	*PPM*
45.4	0.2	2 000
4.54	0.02	200
0.45	0.002	20

For mixtures of radionuclides, see Note 7 to Appendix A to 49 CFR 172.101.

Hazardous substances, except for those that are hazardous wastes as defined in Section II below, must comply with the following requirements:

a) For a hazardous substance that is a dangerous good according to these Technical Instructions other than under the proper shipping names “ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.” or “ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.”:

1) unless already included in the required shipping name, and except for radioactive material in Class 7, the name of the hazardous substance shall be shown in parentheses, in association with the dangerous goods description on the transport document and in association with the proper shipping name on package marking. If the material contains two or more hazardous substances, at least two hazardous substances, including the two with the lowest reportable quantities (RQs), must be identified; and

2) the letters “RQ” shall be entered on the transport document either before or after the basic description and in association with the proper shipping name required to be marked on the package.

b) For hazardous substances that do not meet any other definition of dangerous goods according to these Technical Instructions:

1) the hazardous substance shall be shipped under the basic dangerous goods description “UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., Class 9, III” or “un 3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., Class 9, III”, as appropriate, and in accordance with the requirements of these Technical Instructions applying to the shipment of goods under this description;

2) except for 4;1.1.6, the package must meet all applicable General Packing Requirements of Part 4, Chapter 1 of these Instructions that would apply to dangerous goods of Packing Group III;

3) the letters “RQ” shall be entered on the transport document either before or after the basic description and in association with the proper shipping name required to be marked on the package; and

4) the name of the hazardous substance shall be shown in parentheses, in association with the dangerous goods description on the transport document and in association with the proper shipping name on package marking. If the material contains two or more hazardous substances, at least two hazardous substances, including the two with the lowest reportable quantities (RQs), must be identified.

Identifying code	*Variation*	*Relevant paragraphs*

Note.— The list of Hazardous Substances and the applicable RQ as shown in Appendix A to 49 CFR 172.101 is available via the internet at:

http://www.phmsa.dot.gov/hazmat/regs/international/icao

II. *Hazardous waste.* A hazardous waste is any material that is subject to the hazardous waste manifest requirements of the United States Environmental Protection Agency (EPA) specified in 40 CFR Part 262. The following requirements apply to the transport of hazardous wastes:

a) For a hazardous waste that is a dangerous good according to these Technical Instructions other than under the proper shipping names "ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S." or "ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.":

1) the word "WASTE" must precede the proper shipping name in the transport document and package markings; and

2) the requirements of 49 CFR 172.205, with respect to the hazardous waste manifest apply.

b) For hazardous wastes that do not meet any other definition of dangerous goods according to these Technical Instructions:

1) the hazardous wastes shall be shipped under the basic dangerous goods description "UN 3082, WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., Class 9, III" or "UN 3077, WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., Class 9, III", as appropriate, and in accordance with the requirements of these Technical Instructions applying to the shipment of goods under this description;

2) the package must meet all applicable General Packing Requirements of Part 4, Chapter 1 that would apply to dangerous goods of Packing Group III;

3) the requirements of 49 CFR 172.205 with respect to the hazardous waste manifest apply; and

4) for those hazardous wastes that meet the definition of a hazardous substance, the letters "RQ" and the name of the hazardous substance in parentheses shall be shown in association with the basic description on transport documents and package markings. association with the basic description on transport documents and package markings. If the material contains two or more hazardous substances, at least two hazardous substances, including the two with the lowest reportable quantities (RQs), must be identified.

Note 1.— Hazardous wastes can only be transported within the United States by carriers who have obtained a Waste Transporter Identification Number from the Environmental Protection Agency (EPA).

Note 2.— The assignment of substances described in I and II above to UN 3077 and UN 3082 is in accordance with special provision A97 of these Technical Instructions.

Note 3.— The list of Hazardous Substances and the applicable RQ as shown in Appendix A to 49 CFR 172.101 is available via the internet at:

http://www.phmsa.dot.gov/hazmat/regs/international/icao

III. *Other materials.* Materials which are not subject to the requirements of these Technical Instructions but meet the definition of a hazard class in 49 CFR Parts 171-180 must be transported in accordance with those regulations.

Identifying code	*Variation*	*Relevant paragraphs*
US 5	An explosives article or substance may not be transported to, from or within the United States without prior approval by the appropriate authority of the U.S. (see US 1), Attention: Approvals and Permits Division (PHH-30)). Consumer fireworks may be approved by the appropriate authority of the United States or certified by an approved fireworks certification agency. Such approval and certification remains valid for subsequent transport of the article or substance provided there is no change in its composition, design or packaging. Except as otherwise provided in 49 CFR 172.320, each package containing an explosives article or substance must be marked with the EX-number (or in the case of consumer fireworks an EX or FC number) assigned in the approval or certification for each substance, article or device contained in the package. The EX-number may also be provided in association with the description of dangerous goods on the transport document rather than marked on the package as provided in 49 CFR 172.320(d). Articles of the kind described in 49 CFR 173.56(h) and 49 CFR 173.166(c)(2) do not require prior approval or an EX-number.	2;1.3
US 6	Cylinders transported to, from or within the United States must be manufactured, inspected and tested in accordance with the applicable specifications given in 49 CFR 178, except that foreign cylinders received in the United States for charging may be transported for purposes of export from the United States in accordance with 49 CFR 171.23(a)(4). Portable tanks other than UN portable tanks manufactured outside the United States that meet the applicable requirements of the UN Model Regulations must be designed and approved in accordance with the requirements of 49 CFR 178.270 through 178.272.	Table 3-1
	Except as provided in 49 CFR 173.306, aerosol containers larger than 120 millilitres capacity (four fluid ounces) must be non-refillable metal or plastic aerosols. Aerosols must consist of a gas compressed, liquefied or dissolved under pressure, with the sole purpose of expelling a nonpoisonous (other than a Division 6.1 Packing Group III material) liquid, paste or powder and fitted with a self-closing release device allowing contents to be ejected by the gas.	2;2 PI 203, PI Y203 (UN 1950)
US 7	Lighters or other similar devices containing flammable gas (e.g. lighters for fireplaces and torches) may not be transported to, from or within the United States, unless the design of the device has been examined and tested by a person authorized by the appropriate authority of the United States (see US 1). For design samples being submitted for examination and testing, see 49 CFR 173.308.	
	Approval numbers issued by the appropriate authority of the United States (see US 1) prior to 1 January 2007 are no longer valid and each lighter design currently in production must be re-examined and tested under the provisions of 49 CFR 173.308.	5;2 5;4
US 10	The following additional requirements or limitations apply to the transport of radioactive material to, from or within the United States: a) Radioactive material, other than that contained in excepted packagings, may not be offered for transport aboard passenger aircraft unless the radioactive material is intended for use in, or incident to, research or medical diagnosis or treatment. The transport document for the radioactive material, other than that contained in excepted packagings aboard a passenger aircraft, must contain a certification stating that the shipment contains radioactive material intended for use in, or incident to, research or medical diagnosis or treatment. Regardless of its intended use, no person may carry a Type B(M) package aboard a passenger-carrying aircraft, a vented Type B(M) package aboard any aircraft, or a liquid pyrophoric Class 7 material aboard any aircraft. b) No person may offer for transport aboard a passenger aircraft a package or an overpack with a transport index greater than 3.0. c) No person may offer or transport plutonium aboard an aircraft unless: 1) the plutonium is contained in a medical device designed for individual human application; 2) the specific activity of the material containing the plutonium is less than 1 Bq/g; 3) the plutonium is shipped in a single package containing no more than an A_2 quantity of plutonium in any isotope or form and is shipped in accordance with applicable provisions of these Instructions for Class 7 radioactive material; or 4) the plutonium is specifically authorized for air shipment by the appropriate authority of the U.S.	5;1.2 7;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) For a package containing radioactive material with an activity greater than: 1) 3000 × A_1; 2) 3000 × A_2; or 3) 1000 TBq (27000 Ci), whichever is least, the notation “highway route controlled quantity” must appear on the transport document.	
	e) Packages containing: 1) 3000 × A_1; 2) 3000 × A_2; or 3) 1000 TBq (27000 Ci); whichever is least, must bear the Radioactive material, Class 7, Category III — Yellow label.	5;1.2.3.1.4
	f) All Type B(U), Type B(M), Type H(U), Type H(M) and fissile package designs must be certified by the U.S. Department of Transportation. Individual packages with a criticality safety index exceeding 50, and shipments of packages with a total criticality safety index greater than 50 on passenger aircraft and 100 on cargo aircraft, may not be transported to, from or within the United States aboard a passenger or cargo aircraft without the prior approval of the appropriate authority of the United States (see US 1). Requests for package design certification and approvals should be directed to the appropriate authority of the U.S., Attention: Radioactive Materials Branch (PHH-23).	6;7.7 6;7.8
	g) Except for low specific activity material and surface contaminated objects, activity limits for Type A and Type B packages shall be limited in accordance with 49 CFR 173.431.	
US 11	A nonspillable wet electric storage battery may only be regarded as not subject to these Instructions if the battery and its outer packaging are plainly and durably marked “NONSPILLABLE” or “NONSPILLABLE BATTERY” and the battery meets the conditions for being regarded as not subject to these Instructions contained in Special Provision A67.	Table 3-2
US 12	On shipments to, from, within or transiting through the U.S., emergency response information as described below must be provided for all dangerous goods other than magnetized material and dangerous goods for which no transport document is required by 49 CFR. *Telephone number.* The transport document required by these Instructions must include an emergency response telephone number (including the area code and, for telephone numbers for locations outside the U.S., the international access code or the "+" (plus) sign, country code and city code needed to complete the call from within the U.S.) for use in the event of an incident involving the dangerous good(s). The number must be monitored at all times while the dangerous good is in transportation, including storage incident to transportation, by a person who: 1) is knowledgeable of the hazards and characteristics of the dangerous good(s) being transported; 2) has comprehensive emergency response and accident mitigation information for the dangerous good(s); or 3) has immediate access to a person who possesses such knowledge and information. The telephone number must be entered on the Transport document and its purpose clearly identified (e.g. “EMERGENCY CONTACT: ***”), either: 1) immediately following the description of the dangerous good listed on the document, or 2) if only one number applies to each dangerous good listed on the Transport document, the information may be entered in a single prominent location, provided that the number is identified as the emergency response telephone number. The telephone number must be the number of the person offering the dangerous goods for transportation or the number of an agency or organization capable of, and accepting responsibility for, providing the detailed information concerning the dangerous good. A person offering a dangerous good for transportation who lists the telephone number of an agency or organization must ensure that agency or organization has received current information on the material before it is offered for transportation.	5;4.1.4 7;4.4

Identifying code	*Variation*	*Relevant paragraphs*

An emergency response telephone number is not required for materials properly described under the shipping names “Battery-powered equipment”, “Battery-powered vehicle”, “Carbon dioxide, solid”, “Castor beans, flakes, meal or pomace”, “Consumer commodity”, “Dry ice”, “Engines, internal combustion”, “Fish meal, stabilized”, “Fish scrap, stabilized”, “Krill meal, PG III”, “Refrigerating machines”, “Vehicle, flammable gas powered”, “Vehicle, flammable liquid powered”, “Wheelchair, electric”, and materials transported under the provisions applicable to limited quantities.

Emergency response information. Emergency response information relative to the dangerous good being transported must be immediately available at all times the dangerous good is present. This information should be appropriate for use in emergency and accident response to an incident, including an incident occurring during ground operations. The information must include as a minimum:

1) the description of the dangerous good in accordance with 5;4. of these Instructions;

2) immediate hazards to health;

3) risks of fire or explosion;

4) immediate precautions to be taken in the event of an accident or incident;

5) immediate methods for handling fires;

6) initial methods for handling spills or leaks in the absence of a fire; and

7) preliminary first aid measures.

The information must be printed in English, available away from the package containing the dangerous goods and immediately accessible in the event of an incident. Methods of compliance include, but are not limited to:

1) including the information on the Transport document;

2) locating the information in a separate document such as a material safety data sheet which includes at least all of the information listed above; or

3) providing the information for use in conjunction with the Transport document (or aboard aircraft, in conjunction with the Information to Pilot-in-Command as required in 7;4.1 of these Instructions), in a separate document, such as the ICAO *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481).

US 13 Operators must comply with all requirements of 49 CFR, Part 175 (see US 1). These requirements include, but are not limited to, the following:

a) A package prepared in accordance with these Technical Instructions for transport to, from or within the United States must not be accepted unless the shipper has complied with all applicable United States variations indicated in these Technical Instructions. — 7;1

b) A copy of the transport document, or an electronic image thereof, must be retained by the initial operator for not less than one year after the dangerous goods are accepted by the initial operator. Each shipping paper copy must include the date of acceptance by the initial operator. The date on the shipping paper may be the date a shipper notifies the air carrier that a shipment is ready for transportation, as indicated on the airway bill or bill of lading, as an alternative to the date the shipment is picked up or accepted by the carrier. For a hazardous waste, the transport document copy must be retained for three years after the waste material is accepted by the initial operator. — 7;1

c) The notification to pilot-in-command must list, and provide the required information for, those additional materials considered to be dangerous goods under United States regulations as indicated through United States variations. — 7;4.1.1

d) Except for limited or excepted quantity materials, substances of Class 9, articles of UN 0012, UN 0014 or UN 0055 meeting the requirements of 49 CFR 173.63 (b), articles of UN 3528 or UN 3529, aircraft batteries transported as items of replacement (49 CFR 175.8), and those articles and substances considered to be dangerous goods under these Technical Instructions but which are not subject to 49 CFR Parts 170-180, the following limitations apply:

1) No more than 25 kg net weight of dangerous goods, and in addition thereto, 75 kg net weight of non-flammable gas, that are permitted to be carried aboard a passenger aircraft may be loaded aboard an aircraft in an inaccessible manner.

2) For transport by cargo aircraft, the following additional substances are also excepted from the above requirement:

Identifying code	*Variation*	*Relevant paragraphs*

i) Class 3 (flammable liquid), Packing Group III (unless the substance is also labelled CORROSIVE).

ii) Division 6.1 (toxic), (unless the substance is also labeled for any hazard class or division except FLAMMABLE LIQUID).

iii) Division 6.2 (infectious substances).

iv) Class 7 (radioactive) material that does not meet the definition of another hazard class.

v) Class 9 (miscellaneous), limited quantity or excepted quantity material.

vi) Articles of UN 0012, UN 0014 or UN 0055 also meeting the requirements of 49 CFR 173.63(b).

vii) Articles of UN 3528 or UN 3529.

Note 1.— Accessible means, on passenger-carrying or cargo-only aircraft, that each package is loaded where a crew member or other authorized person can access, handle, and, when size and weight permit, separate such packages from other cargo during flight, including a freight container in an accessible cargo compartment when packages are loaded in an accessible manner. Additionally, a package is considered accessible when transported on a cargo-only aircraft if it is:

— *in a cargo compartment certified by FAA as a Class C aircraft cargo compartment as defined in 14 CFR 25.857(c); or*

— *in an FAA-certified freight container that has an approved fire or smoke detection system and fire suppression system equivalent to that required by the certification requirements for a Class C aircraft cargo compartment.*

Note 2.— Inaccessible means all other configurations, including packages loaded where a crew member or other authorized person cannot access, handle, and, when size and weight permit, separate such packages from other cargo during flight, including a freight container in an accessible cargo compartment when packages are loaded in an inaccessible manner.

The following table provides the limits imposed by this variation:

Applicability	*Forbidden*	*Quantity limitation: 25 kg net weight of dangerous goods plus 75 kg net weight of non-flammable gas per cargo compartment*	*No limit*
Passenger carrying aircraft	Cargo aircraft only labelled packages	Inaccessible	Accessible
Cargo-only aircraft — packages authorized aboard a passenger-carrying aircraft	Not applicable	Inaccessible	Accessible
Cargo-only aircraft — packages not authorized aboard a passenger-carrying aircraft and displaying a cargo-aircraft-only label	Inaccessible	Not applicable	Accessible

Identifying code	*Variation*	*Relevant paragraphs*
	e) Operators must comply with the incident reporting requirements of 49 CFR 171.15, 171.16 and discrepancy reporting under 175.31. *Note.— Copies of the incident reporting form and guidance for completing it may be downloaded at:* *http://www.phmsa.dot.gov/hazmat/incident-reports*.	7;4.4
US 15	Except as provided for cylinders of compressed oxygen, no person may load or transport to, from or within the United States a package containing a dangerous good requiring an OXIDIZER label in an inaccessible cargo compartment that is not equipped with a fire or smoke detection system and a fire suppression system. Cylinders of compressed oxygen must be transported in accordance with the following: a) No more than a combined total of six cylinders of compressed oxygen per aircraft may be stowed in cargo compartments not equipped with a fire or smoke detection system and a fire suppression system; b) Except for oxygen cylinders allowed to be transported in the passenger compartment under the conditions given below, oxygen cylinders transported on passenger aircraft or in an inaccessible cargo location on a cargo aircraft must be stowed horizontally as close as practicable to the floor of the cargo compartment or unit load device; c) When transported in a Class B compartment or its equivalent (i.e. an accessible compartment equipped with a fire detection system), cylinders of compressed oxygen must be loaded in a manner that a crew member can see, handle and, when size and weight permit, separate the cylinders from other cargo during flight. No more than six cylinders of compressed oxygen and, in addition, one cylinder of medical-use compressed oxygen per passenger needing oxygen at destination — with a rated capacity of 1 000 L (34 cubic feet) or less of oxygen — may be carried in a Class B aircraft cargo compartment or its equivalent; and d) Each cylinder must conform to the requirements identified in US Variation 6 and be packaged as required by US Variation 18.	Table 3-1 PI 200 7;2 7;4.1
	A cylinder containing medical-use compressed oxygen, owned or leased by an aircraft operator or offered for transportation by a passenger needing it for personal medical use at destination, may be carried in the cabin of a passenger aircraft in accordance with the following provisions: a) No more than six cylinders belonging to the aircraft operator and, in addition, no more than one cylinder per passenger needing the oxygen at destination, may be transported in the cabin of the aircraft; b) The rated capacity of each cylinder may not exceed 1 000 L (34 cubic feet); c) Each cylinder must conform to the requirements identified in US Variation 6 and must be placed in an overpack or outer packaging that conforms to the performance criteria of Air Transport Association (ATA) Specification 300 for Category I or placed in a metal, plastic or wood outer packaging that conforms to a UN standard at the Packing Group I or II performance level; and d) Oxygen cylinders transported under these provisions must be included in the information provided to the pilot-in-command in accordance with 7;4.1 of these Instructions.	8;1.1.2
US 16	Safety devices (including air bag inflators, air bag modules and seat-belt pretensioners etc.) may not be transported to, from or within the United States without prior approval by the appropriate authority of the United States (see US 1), Attention: Approvals and Permits Division (PHH-30). Such approval remains valid for subsequent transport provided there is no change in its composition, design or packaging. The dangerous goods transport document (shipping papers) must contain the EX number or product code for each approved safety device in association with the basic description required in 5;4.1.4. If product codes are used, they must be traceable to the specific EX number assigned to the safety device by the appropriate authority of the United States. The EX number or product code is not required to be marked on the outer package. Safety devices classified as Class 9 (UN 3268) in accordance with 49 CFR 173.166(b)(1) are not required to have an EX number assigned or have an EX number indicated on the transport documentation.	
US 17	Shippers and operators must comply with the security requirements as prescribed in 49 CFR Part 172, Subpart I, as applicable.	1;5

Identifying code	*Variation*	*Relevant paragraphs*
US 18	Cylinders containing Oxygen, compressed, UN 1072; Compressed gas, oxidizing, n.o.s., UN 3156; Liquefied gas, oxidizing, n.o.s., UN 3157; Nitrogen trifluoride, UN 2451; or Nitrous oxide, UN 1070 must be packaged as required by 49 CFR 173.302(f) and 173.304(f) and be placed in a rigid outer packaging that meets specified flame penetration and thermal resistance requirements as prescribed in Appendices D and E of 49 CFR Part 178. This requirement does not apply to cylinders containing medical-use compressed oxygen transported in accordance with US Variation 15. An oxygen generator, chemical (as defined in 49 CFR 171.8) may only be transported on cargo aircraft as provided for in 49 CFR 173.168. An oxygen generator, chemical, UN 3356, is not permitted for transport on passenger aircraft unless approved by the appropriate authority of the United States (see US 1). An oxygen generator, chemical, UN 3356, that is transported with a means of initiation attached must be classed and approved by the appropriate authority of the United States (see US 1) in accordance with the procedures specified in 49 CFR 173.56. This includes oxygen generators installed in personal breathing equipment transported in accordance with Special Provision A144 of these Instructions.	
	VC — SRI LANKA	
VC 1	No aircraft operator shall transport dangerous goods by air to, from or over Sri Lanka without explicit approval in writing from the Director General of Civil Aviation, Sri Lanka.	1;1.2
VC 2	Permission is usually granted for a specified period of time, subject to strict compliance with the ICAO Technical Instructions and any other conditions which the Director General of Civil Aviation deems necessary.	1;1.2
VC 3	Application for permission must be made to the: Director General of Civil Aviation Civil Aviation Authority of Sri Lanka 056 152/1, Minuwangoda Road Katunayake Sri Lanka PO BOX 056 Facsimile: 94 11 2257154	1;1.2
VC 4	Infectious substances, including diagnostic specimens and biological products, are not permitted in international mail either to or from Sri Lanka.	1;2.3
VC 5	No transport by air of any weapons, explosives or other dangerous devices, articles or substances which may be used to commit an act of unlawful interference, may take place from, to or in transit through Sri Lanka except by written approval of the Director General of Civil Aviation. Applications can be downloaded through the www.caa.lk website, and duly filled applications must be forwarded to: Director General of Civil Aviation Civil Aviation Authority of Sri Lanka 056 152/1, Minuwangoda Road Katunayake Sri Lanka PO BOX 056 Applications must be received by the Civil Aviation Authority of Sri Lanka three working days before the actual flight, and incomplete applications and applications without proper supporting documents will be rejected.	1;5.4
VC 6	The English language shall be used for marking packages and overpacks.	5;2.5

Identifying code	*Variation*	*Relevant paragraphs*
VC 7	Radioactive-related shipments need prior approval from the Sri Lanka Atomic Energy Regulatory Council when transported by air. Director General Sri Lanka Atomic Energy Regulatory Council 977/18, Kandy Road Bulugaha Junction Kelaniya Facsimile: 94 11 2987857 E-mail: anll@aerc.gov.lk Deputy Director (Authorization Industrial Application, Import & Export) Sri Lanka Atomic Energy Regulatory Council 977/18, Kandy Road Bulugaha Junction Kelaniya Facsimile: 94 112987857 E-mail: kapiladesilva@aerc.gov.lk Deputy Director (Inspection Industrial Application, Enforcement) Sri Lanka Atomic Energy Regulatory Council 977/18, Kandy Road Bulugaha Junction Kelaniya Facsimile: 94 11 2987857 E-mail: prageeth@aerc.gov.lk	1;6.3
VC 8	On shipments to, from or transiting through Sri Lanka, a 24-hour emergency response telephone number of a person who has all the information on the contents in the package (including access, country and city codes) must be provided on the shipper's declaration form.	5;4
	VE — VENEZUELA (BOLIVARIAN REPUBLIC OF)	
VE 1	The national authority of the Bolivarian Republic of Venezuela for the purposes of Annex 18 and the competent authority for the purposes of the Technical Instructions is the National Civil Aviation Institute (INAC): Instituto Nacional de Aeronáutica Civil (INAC) P.O. Box 1060 Caracas República Bolivariana de Venezuela Telephone: 00(58)212-2774563 Fax: 00(58)212-2774563 E-mail: relacionesaeronauticas@inac.gob.ve Website: www.inac.gob.ve A request to transport dangerous goods under Special Provisions A1, A2 or on the basis of other State exemptions or approvals by the competent authorities must be submitted to the Office of the General Manager of Air Safety (GGSA) of the National Civil Aviation Institute (INAC) no later than ten (10) business days prior to the scheduled flight, at the following address: Gerencia General de Seguridad Aeronáutica (GGSA) Instituto Nacional de Aeronáutica Civil (INAC) P.O. Box 1060 Caracas República Bolivariana de Venezuela Tel.: 00(58)212-3551550 Fax: 00(58)212-3552007 E-mail: relacionesaeronauticas@inac.gob.ve	1;1
VE 2	The operator is responsible for coordinating with the consignor and the consignee in the event of the return to the State of Origin of any dangerous goods that are unclaimed, damaged and/or leaking, when instructed to do so by the National Civil Aviation Institute (INAC).	7;3

Identifying code	*Variation*	*Relevant paragraphs*
VE 3	All natural and legal persons, public and private, foreign and national aircraft operators operating in national airspace and any other entity involved in the acceptance and handling of dangerous goods, whether or not for transport to, from or throughout the territory of the Bolivarian Republic of Venezuela, must carry on board any aircraft transporting passengers, cargo and mail an original up-to-date copy of the ICAO *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481), which must be accessible to the crew. The same document must be kept on hand where flight dispatch and operational control activities are carried out. Crew members, flight dispatchers and operations personnel must be able to interpret and take the appropriate actions indicated in said document.	7;4.9
VE 4	The transport of dangerous goods by air to, from and within the Bolivarian Republic of Venezuela shall be subject to compliance with the provisions of the ICAO Technical Instructions and Venezuelan Aviation Regulation No. 110 (RAV 110). To obtain a copy of Venezuelan Aviation Regulation No. 110 (RAV 110), see the National Civil Aviation Institute (INAC) website: www.inac.gob.ve.	1;1
VE 5	Venezuelan Aviation Regulation No. 110 (RAV 110) stipulates that for the transport of dangerous goods, any document issued to a foreign member of the flight crew of an aircraft registered in a member State of the International Civil Aviation Organization indicating that the crew member concerned has received training in the transport of dangerous goods by air constitutes a valid training certificate, so long as said document is valid in a member State. The document must be shown to an inspector upon request.	1;4
VE 6	Venezuelan Aviation Regulation No. 110 (RAV 110) specifies and describes the training requirements for the transport of dangerous goods, in Chapter F. All persons covered in Section 110.1, or companies involved in the handling, etc. of dangerous goods in the Bolivarian Republic of Venezuela must receive training in accordance with Venezuelan Aviation Regulation No. 110 (RAV 110). To obtain a copy of Venezuelan Aviation Regulation No. 110 (RAV 110), see the National Civil Aviation Institute (INAC) website: www.inac.gob.ve.	1;4
VE 7	The information required in documents for the transport of dangerous goods to and from the Bolivarian Republic of Venezuela shall be easily identifiable, legible and printed in indelible ink, in Spanish and English.	5;1 5;4 7;1
VE 8	The transport of dangerous goods is prohibited for general and private aviation unless duly authorized by the Aviation Authority and in accordance with the exceptions set out in the Technical Instructions.	1;1
VE 9	Passengers and crew are strictly prohibited from carrying on their person, inside or as a part of carry-on or checked luggage matches or lighters with fuel in fully solid form, lighters with fuel in liquid form contained in a compartment, liquid gas lighters, lighter fluid and spare cartridges. These items may not be carried on one's person or inside or as a part of carry-on or checked luggage.	8;1 Table 8-1, 15)
VE 10	Electronic cigarettes are strictly prohibited for transport in the checked luggage of passengers and crew. These items may only be carried in hand luggage, and measures must be taken to prevent them from being turned on accidentally. Lithium ion and lithium metal cells and batteries must be individually protected to prevent short-circuits, by placing them in their original store packaging or by isolating the terminals in some other way such as covering the exposed terminals with tape or placing each battery in a plastic bag or protective sheath. Use of such items is prohibited in all phases of flight to, from and throughout the territory of the Bolivarian Republic of Venezuela.	8;1 Table 8-1, 19)
	VU — VANUATU	
VU 1	The marking of packages and overpacks and the Dangerous Goods Transport Document accompanying dangerous goods consignments must be in English or French. If the State of Origin requires another language each shall be given equal prominence.	5;2.5 5;4.1.6.3
VU 2	Infectious substances are prohibited from entry to Vanuatu without prior approval from the Vanuatu Government Department of Health. Requests for approval should be addressed to: Director of Health P.O. Box 102, Port-Vila Vanuatu	1;1.2
VU 3	If an in-flight emergency occurs within Vanuatu airspace the pilot-in-command must inform the appropriate air traffic services unit, for the information of aerodrome authorities, of any dangerous goods on board the aircraft. The information must include the primary hazard, subsidiary risks for which labels are required and the quantity and location aboard the aircraft of the dangerous goods. If the situation permits, the information should also include the proper shipping name, class or division and, in the case of Class 1, the compatibility group.	7;4.3

Identifying code	*Variation*	*Relevant paragraphs*
VU 4	An operator who is involved in a dangerous goods incident in Vanuatu Territory must provide the authorities with information required to minimize hazards created by any spillage, leakage of fluid or other damage to dangerous goods.	7;4
VU 5	All hazards labels, including those identifying a subsidiary risk, must include text indicating the nature of the risk. The text must appear prominently in English or French in the lower half of the label as described in 5;3.5.	5;3.5

\+ **YE — YEMEN**

YE 1 Transportation of dangerous goods to, from or within the Republic of Yemen is subject to compliance with the provisions of these Instructions and Yemen Civil Aviation Regulations (YCAR Part VI — Chapter 2 — Transport of Dangerous Goods by Air) which can be accessed at the Civil Aviation & Methodology Authority (CAMA) official website: www.cama.gov.ye.

YE 2 The competent authority for the Republic of Yemen for the transport of dangerous goods by air is:

Civil Aviation & Methodology Authority (CAMA)
Aviation Safety Affairs Sector
Amran street, Soffan City
Sana'a
Yemen
P.O. Box : 7251
Telephone: +967-1- 337167
Tele/Fax: +967-1- 337168
Email (1): civilaviation@y.net.ye
Email (2): asas@cama.gov.ye

YE 3 The request to carry dangerous goods under Special Provision A1, A2 or other State exemptions or approvals must be submitted to civilaviation@y.net at least 15 working days before the planned flight and addressed to:

Aviation Safety Affairs Sector
Flight Operations Directorate
Dangerous Goods Management
Amran street, Soffan City
Sana'a
Yemen
Telephone: +967-771840864
Email: civilaviation@y.net.ye

YE 4 From 31 May 2021, dangerous goods shipments originating from the Republic of Yemen must be offered and accepted for air transport by CAMA dangerous goods certified operators and entities other than operators according to CAMA Dangerous Goods Certification requirements as prescribed in Yemen Civil Aviation Regulations (YCAR Part VI — Chapter 2).

YE 5 The transport of alcoholic beverages to, from or within the Republic of Yemen is forbidden as prescribed in Yemen Civil Aviation Regulations (YCAR Part VI — Chapter 2).

YE 6 Prior permission is required from the concerned government departments for the importation of the following:

a) explosives and munitions of war; and

b) radioactive material, except those for medical purposes, which may be imported to any point in the Republic of Yemen.

A request for further permission must be sent to:

Civil Aviation & Methodology Authority (CAMA)
Email: civilaviation@y.net.ye

YE 7 Air operators transporting dangerous goods must submit a monthly report of all dangerous goods transported to, from or within the Republic of Yemen by the 10th working day of the following month. Further information and a report form are available on the website: www.cama.gov.ye.

Identifying code	*Variation*	*Relevant paragraphs*
YE 8	The emergency response information described below must appear on shipments of dangerous goods to, from, within or transiting through the Republic of Yemen. This provision does not apply to the transport of magnetized material or dangerous goods for which no transport document is required. Telephone number: The transport document required under the ICAO Technical Instructions must contain a telephone number by means of which emergency response information can be obtained in case of an incident and/or accident involving the dangerous goods being transported. This telephone number must be available 24 hours a day and must include the regional codes and, for international numbers outside the Republic of Yemen, the country and city codes needed to complete the call from the Republic of Yemen. This telephone number must be monitored at all times by a person who: — is knowledgeable concerning the hazards and characteristics of the dangerous goods being transported; — has comprehensive emergency response and accident mitigation information for the dangerous goods; and — can immediately call upon a person who possesses such knowledge and information.	
YE 9	The shipper of any imported dangerous goods shipments must provide a written undertaking to re-ship the consignment at the shipper's cost and risk if the shipment is not cleared and received by the consignee within 15 working days from the arrival of the consignment at any destination in the Repubic of Yemen. The operator must be responsible to coordinate with the shipper to return any remaining unclaimed dangerous goods to the State of Origin whenever instructed to do so by the Yemen Civil Aviation & Methodology Authority (CAMA).	
YE 10	A dangerous goods incident or accident must be notified to the Aviation Safety Affairs Sector of Civil Aviation & Methodology Authority (CAMA) as soon as practically available, but within five working days.	

ZA — SOUTH AFRICA

ZA 1	Applications for approval to transport dangerous goods under Special Provision A1 or A2 and exemption applications must be directed to: The Director of Civil Aviation Lkhaya Lokundiza Building 16, Treur Close Waterfall Park Bekker Street Midrand 1685 Republic of South Africa Enquiries: 27 11 545 1000 Website: www.caa.co.za Email: Dangerous Goods Operations@caa.co.za Individual shippers must obtain a permit for the carriage by air of the following commodities in respect of each consignment before it is tendered for carriage to/from or through the airspace: Explosives: Class 1 Chief Inspector of Explosives Private Bag X624 Pretoria 0001 Republic of South Africa Enquiries: 27 12 393-2748/55/63 Facsimile: 27 12 323-1711 Website: pta-explosives@saps.gov.za	3;1 (Table 3-1) 3;3

Identifying code	*Variation*	*Relevant paragraphs*

For military armaments and ammunition of war:

The Director of Civil Aviation
Lkhaya Lokundiza
Building 16, Treur Close
Waterfall Park
Bekker Street
Midrand
1685
Republic of South Africa

Enquiries: 27 11 545 1000
Website: www.caa.co.za
Email: Dangerous Goods Operations@caa.co.za

(See Note below.)

Note.— Where armaments and/or ammunition are regarded as munitions of war or if they are to be used for military purposes, the approval of the Commissioner for Civil Aviation is required in terms of Article 35 of the Aviation Act No. 74 of 2009.

ZA 2 Transport of dangerous goods by air must be in accordance with the current edition of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, (Doc 9284-AN/905). Failure to comply with the Technical Instructions and all relevant South African variations is a violation of the South African Civil Aviation Regulations, 2011 as amended.

ZA 3 On shipments to, from or transiting through South Africa, the shipper's declaration required by the Technical Instructions, must include a 24-hour emergency response telephone number (including applicable area and international codes) for use in the event of an incident involving the dangerous goods. 5;4.1

The number must be monitored at all times by a person who:

1) is knowledgeable of the hazards and characteristics of the dangerous goods being transported; or

2) has immediate access to a person who possesses such knowledge and information.

ZA 4 Radioactive material and infectious substances (including diagnostic specimens and biological products), are not permitted in airmail either to, from or through South Africa. 1;2.3

ZW — ZIMBABWE

ZW 1 Operators who wish to carry radioactive material in aircraft to, from and over Zimbabwe must obtainw prior written permission from the Radiation Protection Authority of Zimbabwe. Further information may be obtained from:

Radiation Protection Authority of Zimbabwe
1 McCaw Drive
Avondale
Harare
Zimbabwe

Telephone: +263 242 335627
+263 242 335683
+263 242 335792
+263 242 335716
Website: www.rpaz.co.zw

STATE VARIATIONS FROM THE TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

To: Chief, Cargo Safety Section (CSS)
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montreal, Quebec
CANADA H3C 5H7

Email: krooney@icao.int

_____ (State) wishes the following variation(s) to be published on the ICAO website at www.icao.int/safety/DangerousGoods for incorporation in the 2023–2024 Edition of the Technical Instructions:

Variation *Relevant paragraphs*

_____ Signature

_____ Title

Chapter 2

VARIATIONS NOTIFIED BY AIRLINE OPERATORS

2.1 If individual airline operators impose more restrictive requirements than those contained in these Instructions, they are invited to notify such variations to ICAO for inclusion in Table A-2. Operator variations must not be less restrictive than the requirements of the Instructions and should refer only to safety matters and not to special handling or processing requirements.

≠ 2.2 If an operator needs to make variations based on new requirements appearing in this edition of the Instructions, it should notify ICAO by using the form appearing at the end of this Chapter. Variations received by 30 April 2023 will appear in an Addendum to this edition.

2.3 Operator variations are based on data provided by the operators concerned. They are provided for information only and should not be interpreted as having any (ICAO) regulatory status. Further information should be obtained from the appropriate airline operator.

2.4 In Table A-2 the affected Chapter(s) or paragraph(s) is indicated for each operator variation. Note that no reference to operator variations is made under the Chapter headings nor in the list of dangerous goods (Table 3-1). Variations have been notified by the following airlines:

ABSA Cargo — M3
Adria Airways — JP
Aeromexico — AM
Air Bridge Cargo Airline — RU
Air Europa — UX
Air Europa Express — X5
Air Seychelles — HM
Air Tahiti — VT
Atlasjet Ukraine — UH
Brussels Airlines — SN
Canaryfly — PM
CargologicAir — P3
Evelop Airlines — E9
+ Jet2.com — LS
Icelandair — FI
LAN Argentina — 4M
LAN Cargo — UC
LANCO — L7
LAN Colombia — 4C
LAN Ecuador — XL
LAN Express — LU
LAN Peru — LP
MASAIR — Aerotransportes Mas de carga SA. De CV. — M7
Qatar Airways — QR
Swiss International — LX
TAM Airlines — JJ
Transportes del Mercosul — TAM — PZ
WestJet — WS
WestJet Encore — WR

Table A-2. Operator variations notified to ICAO

The identifying code for each operator variation consists of a two- or three-character identifier for that operator plus a sequential number. Variations are listed in the alphabetical order of these identifying codes. For each variation, the relevant Part and Chapter or paragraph numbers of the Instructions are given.

Note.— Unless otherwise indicated, references cited within the text of the operator variations refer to the IATA Dangerous Goods Regulations.

Identifying code	*Variation*	*Relevant paragraphs*
	AM — AEROMEXICO	
AM-01	Class 1 — Explosives will not be accepted for carriage, except for Class 1.4S (and Cartridges, power device (UN 0323) as COMAT). (See subsection 5.1 of the IATA Dangerous Goods Regulations.)	2;1
AM-02	Division 2.1 — Flammable gases and Division 2.3 — Toxic gases will be accepted for carriage subject to prior authorization.	2;2
AM-03	Class 3 — Flammable liquids in Packing Group I which have no subsidiary risk will be accepted for carriage subject to prior authorization. If there is a subsidiary risk, they will not be accepted for carriage. (Exception: COMAT parts and supplies.)	2;3 Table 3-1
AM-04	Divisions 4.1, 4.2 and 4.3 substances in Packing Group I which have no subsidiary risk will be accepted for carriage subject to prior authorization. If there is a subsidiary risk, they will not be accepted for carriage. (Exception: COMAT parts and supplies).	2;4
AM-05	Division 5.1 — Oxidizing substances in Packing Group I will not be accepted for carriage. Division 5.1 — Oxidizing substances in Packing Group II or III will be accepted for carriage subject to prior authorization. Division 5.2 — Organic peroxides will not be accepted for carriage. (Exception: COMAT parts and supplies.)	2;5
AM-06	Division 6.1 — Toxic substances in Packing Group I will not be accepted for carriage. Division 6.1 — Toxic substances in Packing Group II or III will be accepted for carriage subject to prior authorization. Division 6.2 — Infectious substances of Category A are permitted only to authorized shippers previously registered with Aeromexico. Infectious substances of Category B are permitted subject to prior notification and authorization.	2;6
AM-07	Class 7 — Radioactive materials of Categories I, II and III will be accepted for carriage, provided the following conditions are complied with: — the radioactive materials (exception: COMAT parts and supplies) must be for medical diagnosis or medical research or medical treatment; or — to be used in analysis for medical purposes with direct relation to human health; and — the total transport index (TI) in one package or in a group of packages or on the aircraft must not exceed 3.0. The shipper's declaration accompanying each shipment of radioactive material of Category I, II or III must show the following endorsement: "This radioactive material is intended for use in, or incidental to, research or medical diagnosis or treatment". (Este material radiactivo está destinado para uso en, o incidentalmente a investigaciones o diagnósticos o tratamientos médicos). All radioactive materials, including radioactive, excepted packages, require prior authorization.	2;7 5;4

Identifying code	*Variation*	*Relevant paragraphs*
AM-08	Class 8 — Corrosives in Packing Group I which have no subsidiary risk will be accepted for carriage subject to prior authorization. If there is a subsidiary risk, they will not be accepted for carriage. (Exception: COMAT parts and supplies.)	2;8
AM-09	Class 9 — Commodities pertaining to this class will not be accepted for carriage, with the exception of the following products (exception: COMAT parts and supplies): UN 1845 — Carbon dioxide, solid (dry ice) UN 2071 — Ammonium nitrate fertilizers UN 2807 — Magnetized material UN 3072 — Life-saving applicances, not self-inflating UN 3077 — Environmentally hazardous substance, solid, n.o.s.* UN 3082 — Environmentally hazardous substance, liquid, n.o.s.* UN 3091 — Lithium metal batteries packed with equipment UN 3091 — Lithium metal batteries contained in equipment UN 3166 — Engines, internal combustion, flammable liquid powered UN 3166 — Vehicle, flammable liquid powered UN 3245 — Genetically modified micro-organisms UN 3245 — Genetically modified organisms UN 3268 — Air bag modules UN 3268 — Seat-belt pretensioners UN 3316 — Chemical kit UN 3316 — First aid kit UN 3334 — Aviation regulated liquid, n.o.s. UN 3335 — Aviation regulated solid, n.o.s. UN 3363 — Dangerous goods in apparatus UN 3363 — Dangerous goods in machinery UN 3481 — Lithium ion batteries contained in equipment UN 3481 — Lithium ion batteries packed with equipment ID 8000 — Consumer commodity.	2;9 Table 3-1
AM-10	Infected animals, dead or alive, will not be accepted for carriage.	2;6
AM-11	Genetically modified micro-organisms and organisms must not cause a risk to humans, animals or plants.	2;6
AM-12	Requests for authorization to transport dangerous goods which are not listed and those which require prior authorization must be made in advance via email to the following addresses: Fernando Rubio Martínez: frubio@aeromexico.com F. Javier Hernández M.: fhernandez@aeromexico.com	
AM-13	For the purpose of marking and documentation for international flights English must be used in addition to the language indicated by the States of Origin, Transit and Destination in State variations. For domestic flights, Spanish must be used in addition to English.	
AM-14	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in the case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact”, must be inserted on the shipper’s declaration for dangerous goods (DGD) in the “Additional handling information” box, e.g. “Emergency contact +52 55 50 23 55 00”.	5;4
AM-15	In case of shipments transported under State exemptions or approvals (e.g. required by Special Provision A1, A88, A99 or A106), Strategic Partner of Aero Mexico Cargo must be contacted and copies of the DGD and approval or exemption, as applicable, must be provided by fax or other means. Shipments will not be accepted unless approval is granted by the Logistics Management Strategic Partner of Aeromexico Cargo (frubio@aeromexicocargo.com).	
AM-16	Dangerous goods in airmail will not be accepted for carriage.	1;2.3
AM-17	Articles and substances defined by the laws and regulations of Mexico as chemical precursors and essential chemicals are not allowed for transportation by Aeromexico. For further information refer to the following website: http://www.salud.gob.mx/unidades/cdi/nom/compi/a261297.html	

Identifying code	*Variation*	*Relevant paragraphs*
AM-18	Articles and substances meeting the definition of “waste” will not be accepted for carriage.	Table 3-1
	E9 — EVELOP AIRLINES	
E9-01	Not used.	
E9-02	Dangerous goods in consolidations will not be accepted for carriage (see 1.3.3 and 9.1.8 of the IATA Dangerous Goods Regulations).	5;1 7;1 7;2
E9-03	Infected animals, dead or alive, will not be accepted for carriage.	2;6.3.6
E9-04	Class 7 — Radioactive material will not be accepted for carriage.	2;7
E9-05	Wheelchairs with spillable batteries will not be accepted for carriage.	Table 8-1
E9-06	Not used.	
	FI — ICELANDAIR	
FI-01	The maximum total transport index (TI) for Class 7 — Radioactive material permitted onboard Icelandair-operated aeroplane types is as follows: — B757-200/300: Maximum total TI: 12.0 Maximum TI per compartment: 3.0 — B757-200PF/PCF (all-cargo aircraft): Maximum total TI: 50 Separation minima must be observed in accordance with chapter 10.9.3.7 of the IATA Dangerous Goods Regulations and as prescribed in the Icelandair Ground Operations Manual according to aircraft type.	7;2.10.6
FI-02	UN 1845 — Carbon dioxide, solid (dry ice) will be accepted for carriage on Icelandair flights provided the following maximum amounts are met and complied with: **Aeroplane type** — **Maximum quantity permitted** B757-200/300 — 100 kg (220 lb) B757PF/PCF — 300 kg (660 lb) Approval to carry larger quantities may be requested via email at security@icelandair.is.	7;2
FI-03	Magnetized material may be loaded in any cargo hold of Icelandair aeroplanes aft of flight deck. Maximum magnetic field strength is 0.002 gauss at 2.1 meter distance from package. Refer to Icelandair Ground Operations Manual.	7;2
FI-04	The following restrictions apply to the transport of lithium ion and lithium metal batteries: a) UN 3480 — Lithium ion batteries applicable to Section IA and IB of Packing Instruction 965 and UN 3090 — Lithium metal batteries applicable to Section IA and IB of Packing Instruction 968 will only be accepted as cargo on cargo aircraft. Section II of UN 3480 and UN 3090 will no longer be accepted.	

Identifying code	*Variation*	*Relevant paragraphs*

b) All consignments containing the following lithium batteries are forbidden as cargo on passenger aircraft and must be shown on the shipper's declaration for dangerous goods (DGD) as Cargo Aircraft Only with packages bearing the Cargo Aircraft Only label:

— UN 3480 — Lithium ion batteries in accordance with Sections IA and IB of Packing Instruction 965 (RLI);

— UN 3090 — Lithium metal batteries in accordance with Sections IA and IB of Packing Instruction 968 (RLM) already restricted to "Cargo Aircraft Only" as per the IATA Dangerous Goods Regulations (DGR);

— UN 3481 — Lithium ion batteries packed with or contained in equipment in accordance with Section I of Packing Instruction 966 and Packing Instruction 967 (RLI);

— UN 3091 — Lithium metal batteries packed with or contained in equipment in accordance with Section I of Packing Instruction 969 and Packing Instruction 970 (RLM).

c) All consignments containing the following lithium batteries are permitted as cargo on passenger and cargo aircraft:

— UN 3481 — Lithium ion batteries packed with or contained in equipment in accordance with Section II of Packing Instruction 966 and Packing Instruction 967 (ELI);

— UN 3091 — Lithium metal batteries packed with or contained in equipment in accordance with Section II of Packing Instruction 969 and Packing Instruction 970 (ELM).

UN	PI	Section	Description	Passenger Aircraft	Cargo aircraFt	Special Handling Code
3480	965	IA+IB	Lithium ion batteries	x	✓	CAO,DGR,RLI
3481	966	I	Lithium ion batteries packed with equipment	x	✓	
	967		Lithium ion batteries contained in equipment	x	✓	
3090	968	IA+IB	Lithium metal batteries	x	✓	CAO,DGR,RLM
3091	969	I	Lithium metal batteries packed with equipment	x	✓	
	970		Lithium metal batteries contained in equipment	x	✓	

UN	PI	Section	Description	Passenger Aircraft	Cargo aircraFt	Special Handling Code
3480	965	II	Lithium ion batteries	x	X	ELI
3481	966	II	Lithium ion batteries packed with equipment	✓	✓	
	967		Lithium ion batteries contained in equipment	✓	✓	
3090	968	II	Lithium metal batteries	x	X	ELM
3091	969	II	Lithium metal batteries packed with equipment	✓	✓	
	970		Lithium metal batteries contained in equipment	✓	✓	

d) Loading restrictions: Lithium batteries packages and overpacks loaded in a cargo aircraft must be leaded onto the main deck where they are accessible in case of an emergency. For large shipments of lithium batteries, where possible, the lithium batteries packages must be split evenly between the position on the main deck.

Identifying code	*Variation*	*Relevant paragraphs*
	HM — AIR SEYCHELLES	
HM-01	The following dangerous goods are prohibited on Air Seychelles flights: a) Class 1 (explosives) except those of Division 1.4S b) Class 7 (radioactive material)	2;1 2;7
HM-02	Air Seychelles does not carry arms and ammunitions that constitute munitions of war as defined by the Seychelles Civil Aviation Authority.	1;1
HM-03	Dangerous goods in single packaging, composite packaging and cryogenic containers (Dewar) are not accepted for carriage unless over packed or base protected by a wooden pallet or skid or other such material.	4;1
HM-04	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in the case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the shipper’s declaration for dangerous goods (DGD) preferably in the “Additional Handling Information“ box e.g. “Emergency contact + 248 4391370”.	5;4
HM-05	Division1.4S explosives and Divisions 6.2 infectious substances, as defined in the IATA Dangerous Goods Regulations, will not be accepted for carriage unless prior approval and booking arrangement are obtained from: Air Seychelles Cargo Commercial Mahe, Seychelles Telephone: +248 4391048 E-mail: cargocommercial@airseychelles.com	
HM-06	Dangerous goods in excepted quantities will not be accepted.	3;5
HM-07	Dangerous goods as defined in the IATA Dangerous Goods Regulations will not be accepted in airmail.	1;2
HM-08	Dangerous goods as defined in the IATA Dangerous Goods Regulations will not be accepted for carriage on domestic routes unless prior approval is obtained from the Seychelles Civil Aviation Authority.	

Identifying code	*Variation*	*Relevant paragraphs*
	JJ — TAM AIRLINES	
JJ-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other TAM Airlines conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: TAM Dangerous Goods Department Telephone: +55 11 55827626 +56-2-2677-4571/+56-2-25669366 +1-305-772-2894 Email: saofy@tam.com.br and DangerousGoodsBoard@lan.com	1;1.1
JJ-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the declaration for dangerous goods in the “Handling Information” box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
JJ-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper’s declaration must have the following endorsement in the “Additional handling information box”: “Mist, powder or vapour inhalation hazard”, as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.*	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	
JJ-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
JJ-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
JJ-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
JJ-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
JJ-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as pharmaceutical temperature control products (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of JJ and its subsidiaries.	Table 3-1 4;11 8;1

Identifying code	*Variation*	*Relevant paragraphs*
	Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.	
JJ-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current "Accreditation Freight Forwarder Programme" implemented by the TAM Dangerous Goods Department (see JJ-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interterence during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
JJ-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	JP — ADRIA AIRWAYS	
JP-01	Advance arrangements must be made for all shipments of dangerous goods as defined by the IATA Dangerous Goods Regulations. Reservation requests must include UN number, proper shipping name, packing group (if applicable), packing instruction, number of packages, net quantity per package, gross weight, dimensions and for radioactive material transport index and category (if applicable). Dangerous Goods may only be accepted on JP services with a confirmed reservation.	1;6 Table 3-1 3;5 4;11 5;1.1 5;1.3 5;1.4 7;1.2
JP-02	Class 7, fissile materials are forbidden for carriage on JP services.	1;2.3
JP-03	Dangerous goods in air mail including those listed in 2.4.2 of the IATA Dangerous Goods Regulations are forbidden for carriage on JP services.	
JP-04	The following restrictions are applicable for dangerous goods carried by passengers on JP operated flights: — wheelchairs/mobility aids with spillable batteries are forbidden for carriage as baggage; — compressed oxygen or air cylinders required for medical or other use are forbidden in or as carry-on or checked baggage or on one's person. Passengers requiring supplementary compressed oxygen must make a request 72 hours prior to departure to booking@adria.si. Oxygen kit will be provided by Adria Airways subject to availability; — small vehicles powered by lithium batteries such as but not limited to airwheel, solowheel, hoverboard, mini-segway, balance wheel etc. are forbidden for carriage in or as carry-on or checked baggage.	8;1
JP-05	Not used.	

Identifying code	*Variation*	*Relevant paragraphs*
	LP — LAN PERU	
LP-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LAN Perú conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LAN Peru Dangerous Goods Department Telephone: +511-207 8440, Ext. 73135 +56-2-2677-4571/+56-2-25669366 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1
LP-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the declaration for dangerous goods in the “Handling Information” box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
LP-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper’s declaration must have the following endorsement in the “Additional handling information box”: “Mist, powder or vapour inhalation hazard”, as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.*	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	
LP-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
LP-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
LP-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
LP-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
LP-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of LP and its subsidiaries.	Table 3-1 4;11 8;1

	Identifying code	*Variation*	*Relevant paragraphs*
		Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.	
	LP-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current "Accreditation Freight Forwarder Programme" implemented by the LAN Peru Dangerous Goods Department (see LP-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
	LP-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
+		**LS — JET2.COM**	
	LS-01	Munitions of war, including shooting equipment that fires projectiles and ammunition, are forbidden on Jet2.com scheduled flights. For ad-hoc (charter) flights, specific approval must be sought by the client by contacting charters@jet2.com.	1;1
	LS-02	Class 7 dangerous goods are forbidden from carriage in all circumstances.	2;7
	LS-03	Damaged personal electronic devices (PEDs), including power banks and lithium batteries and cells, are forbidden from carriage in all circumstances.	Table 8-1
	LS-04	When carried by passengers or crew, lithium ion batteries, lithium metal batteries, and power banks that do not clearly state the watt-hour rating or lithium metal content, or where the watt-hour rating cannot easily be otherwise ascertained, are forbidden.	Table 8-1
	LS-05	Service freight (company materials) may be carried on company passenger aircraft as approved by Jet2.com Ground Operations, within the limitations of these regulations. Commercial cargo is forbidden for carriage in all circumstances.	Table 8-1
	LS-06	UN 3171 — Battery-powered vehicles, powered by lithium batteries, are forbidden as carry-on or checked baggage, unless excepted as part of this operator variation. This prohibition applies but is not limited to air wheels, solo wheels, balance wheels and hover boards. E-bikes powered by lithium batteries are excepted from this prohibition, providing the battery is carried as spare batteries for portable electronic devices in accordance with Table 8-1 of these Instructions, removed from the device and carried in the cabin.	Table 8-1
		LU — LAN EXPRESS	
	LU-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LAN Express conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LAN Express Dangerous Goods Department Telephone: +56-2-2694-7898 +56-2-677-4571 /+56-2-25669366 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1

Identifying code	*Variation*	*Relevant paragraphs*
LU-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number" must be inserted on the declaration for dangerous goods in the "Handling Information" box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
LU-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper's declaration must have the following endorsement in the "Additional handling information box": "Mist, powder or vapour inhalation hazard", as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.* d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
LU-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
LU-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
LU-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
LU-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
LU-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of LU and its subsidiaries. *Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.*	Table 3-1 4;11 8;1
LU-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current “Accreditation Freight Forwarder Programme” implemented by the LAN Express Dangerous Goods Department (see LU-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4

Identifying code	*Variation*	*Relevant paragraphs*
LU-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	LX — SWISS INTERNATIONAL	
LX-01	The following Class 7 articles or substances will not be accepted for carriage: UN 2919 — Radioactive material, transported under special arrangement), non-fissile or fissile excepted UN 2977 — Radioactive material, uranium hexafluoride, fissile UN 3321 — Radioactive material, low specific activity (LSA-II), non-fissile or fissile excepted UN 3322 — Radioactive material, low specific activity (LSA-III), non-fissile or fissile excepted UN 3324 — Radioactive material, low specific activity (LSA-II), fissile UN 3325 — Radioactive material, low specific activity (LSA-III), fissile UN 3326 — Radioactive material, surface contaminated objects (SCO-I or SCO-II), fissile UN 3327 — Radioactive material, Type A package, fissile UN 3328 — Radioactive material, Type B(U) package, fissile UN 3329 — Radioactive material, Type B(M) package, fissile UN 3330 — Radioactive material, Type C package, fissile UN 3331 — Radioactive material, transported under special arrangement, fissile UN 3333 — Radioactive material, Type A package, special form, fissile.	2;7 Table 3-1
LX-02	Except for ID 8000 — Consumer commodity, dangerous goods in limited quantities ("Y" packing instructions) will not be accepted for carriage. (See 3;4 of these Instructions, 2.7 of the IATA Dangerous Goods Regulations and all "Y" packing instructions.)	3;4
LX-03	Mercurial barometers or thermometers will not be accepted for carriage in baggage, except a small medical or clinical thermometer for personal use when in its protective case.	8;1
LX-04	Camping stoves (fuel or gas) will not be accepted for carriage in baggage. This variation applies also to used camping stoves which have been thoroughly cleaned.	8;1
LX-05	The shipper must provide a 24-hour emergency telephone number of a person who is knowledgeable of the hazards, characteristics and actions to be taken in the case of an accident or incident. The telephone number must include the country and area code and preceded by the words "Emergency contact" or "24-hour number" and must be inserted on the shipper's declaration for dangerous goods, preferably in the "Handling information" box. A 24-hour emergency telephone number is not required for shipments that do not require a shipper's declaration for dangerous goods.	5;4
LX-06	The following items must not be accepted for carriage as cargo on Swiss International: — UN 3090 — Lithium metal batteries in accordance with Section IA, IB and Section II of Packing Instruction 968; — UN 3091 — Lithium metal batteries packed with equipment in accordance with Section I of Packing Instruction 969; — UN 3091 — Lithium metal batteries contained in equipment in accordance with Section I of Packing Instruction 970; and — UN 3480 — Lithium ion batteries in accordance with Section IA, IB and II of Packing Instruction 965. — UN 3481 — Lithium ion batteries packed with equipment in accordance with Section I of Packing Instruction 966. — UN 3481 — Lithium ion batteries contained in equipment in accordance with Section I of Packing Instruction 967.	8;1

Identifying code	*Variation*	*Relevant paragraphs*
LX-07	UN 3171 — Battery-powered vehicles are not accepted as cargo. This prohibition does not apply to UN 3171 — Battery-powered equipment.	Table 3-1
	L7 — LANCO	
L7-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LANCO conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LANCO Dangerous Goods Department Telephone: +57-1-4259600, Ext. 71312 +56-2-26774571/+56-2-25669366 +1 305-7722894 Email: DangerousGoodsBoard@lan.com	1;1.1
L7-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the declaration for dangerous goods in the “Handling Information” box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
L7-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper’s declaration must have the following endorsement in the “Additional handling information box”: “Mist, powder or vapour inhalation hazard”, as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.*	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	
L7-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
L7-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
L7-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
L7-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
L7-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of L7 and its subsidiaries.	Table 3-1 4;11 8;1

Identifying code	*Variation*	*Relevant paragraphs*
	Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.	
L7-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current "Accreditation Freight Forwarder Programme" implemented by the LANCO Dangerous Goods Department (see L7-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
L7-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	M3 — ABSA CARGO	
M3-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other ABSA conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: ABSA Dangerous Goods Department Telephone: +55-19-2138-4454 +56-2-2677-4571 /+56-2-25669366 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1
M3-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number" must be inserted on the declaration for dangerous goods in the "Handling Information" box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4

Identifying code	*Variation*	*Relevant paragraphs*
M3-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper's declaration must have the following endorsement in the "Additional handling information box": "Mist, powder or vapour inhalation hazard", as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.* d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	2;3 2;6 5;4 6;1
M3-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
M3-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
M3-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
M3-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7

Identifying code	*Variation*	*Relevant paragraphs*
M3-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of M3 and its subsidiaries. *Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.*	Table 3-1 4;11 8;1
M3-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current “Accreditation Freight Forwarder Programme” implemented by the ABSA Dangerous Goods Department (see M3-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
M3-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	M7 — MASAIR — AEROTRANSPORTES MAS DE CARGA SA. DE CV.	
M7-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other MASAIR conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: MASAIR Dangerous Goods Department Telephone: +56-2-694-7898 +56-2-677-4571 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1

Identifying code	*Variation*	*Relevant paragraphs*
M7-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number" must be inserted on the declaration for dangerous goods in the "Handling Information" box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
M7-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper's declaration must have the following endorsement in the "Additional handling information box": "Mist, powder or vapour inhalation hazard", as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.* d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	2;3 2;6 5;4 6;1
M7-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with.	2;6.3.2.3.6 5;4

Identifying code	*Variation*	*Relevant paragraphs*
	b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage	
M7-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
M7-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
M7-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
M7-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of M7 and its subsidiaries. *Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.*	Table 3-1 4;11 8;1
M7-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current “Accreditation Freight Forwarder Programme” implemented by the ABSA Dangerous Goods Department (see M7-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
M7-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7

Identifying code	*Variation*	*Relevant paragraphs*
	PM — CANARYFLY	
PM-01	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in the case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including country and area code, preceded by the words “Emergency contact” or “24-hour number” should be shown in the “Additional Handling Information” box of the dangerous goods document and on the package.	5;4
PM-02	Handwritten shipper’s declarations will not be accepted. Handwritten alterations/ amendments are acceptable if each alteration/amendment is legible and signed with the same signature used to sign the declaration.	
PM-03	The waybill for dangerous goods in excepted quantities must show the applicable UN number in addition to the requirements of 2.6.8.2 of the IATA Dangerous Goods Regulations.	3;5
PM-04	Fissile radioactive material will not be accepted for transport.	2;7
	P3— CARGOLOGICAIR	
P3-01	Packages with dangerous goods with a primary hazard of Class 8, labelled "Cargo Aircraft Only", are forbidden for transport on the lower deck of the aircraft.	
P3-02	UN 3090 — Lithium metal batteries, Section IA of Packing Instruction 968 and UN 3091 — Lithium metal batteries contained or packed with equipment, Section I of Packing Instruction 969 and Packing Instruction 970 are accepted for carriage with the prior approval of the airline.Requests for approval must be made via: E-mail: dg@cargologicair.com	
P3-03	UN 3480 — Lithium ion batteries, Section IA of Packing Instruction 965; and UN 3481 — Lithium ion batteries contained or packed with equipment, Section I of Packing Instruction 966 and Packing Instruction 967 are accepted for carriage upon prior approval of the airline. Requests for approval must be made via: E-mail: dg@cargologicair.com	
P3-04	The following are accepted for carriage with a completed and signed CargologicAir shipper's declaration for lithium battery form or equivalent document which can be obtained from local airline offices or via e-mail at dg@cargologicair.com: — UN 3480 — Lithium ion batteries, Section IB and II of Packing Instruction 965; — UN 3481 — Lithium ion batteries contained or packed with equipment, Section II of Packing Instruction 966 and Packing Instruction 967; — UN 3090 — Lithium metal batteries, Section IB and II of Packing Instruction 968; and — UN 3091 — Lithium metal batteries contained or packed with equipment, Section II of Packing Instruction 969 and Packing Instruction 970. Exceptions may be applied and shall be agreed with the airline.	

Identifying code	*Variation*	*Relevant paragraphs*
	PZ — TRANSPORTES DEL MERCOSUL — TAM	
PZ-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other Transportes del Mercosur — TAM Airlines conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: TAM Dangerous Goods Department Telephone: +55 11 55827626 +56-2-2677-4571/+56-2-25669366 +1-305-772-2894 Email: saofy@tam.com.br and DangerousGoodsBoard@lan.com	1;1.1 Table 3-1
PZ-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the declaration for dangerous goods in the “Handling Information” box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	5;4
PZ-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see PZ-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see PZ-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper’s declaration must have the following endorsement in the “Additional handling information box”: “Mist, powder or vapour inhalation hazard”, as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.*	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	
PZ-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	7;2
PZ-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
PZ-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
PZ-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LATAM Dangerous Goods Technical Committee (see PZ-01).	1;6.1.5 2;7
PZ-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of PZ and its subsidiaries.	Table 3-1 4;11 8;1

Identifying code	*Variation*	*Relevant paragraphs*
	Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.	
PZ-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current "Accreditation Freight Forwarder Programme" implemented by the TAM Dangerous Goods Department (see PZ-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
PZ-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	QR — QATAR AIRWAYS	
QR-01	Not used.	
QR-02	Dangerous goods are not permitted in the following: — airmail, including those items permitted by 2.4.2 of the IATA Dangerous Goods Regulations; and — Qatar Airways express cargo product "courier baggage voucher (CBV)".	1;2.3
QR-03	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken during an emergency concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "24-hour emergency contact telephone number" must be inserted on the shipper's declaration for dangerous goods (DGD) in the "Handling information" box.	
QR-04	The following will not be accepted for carriage on Qatar Airways passenger flights: — UN 3091 — Lithium metal batteries contained in equipment; — UN 3091 — Lithium metal batteries packed with equipment. The above include both Section I (fully regulated) and Section II (excepted) of Packing Instructions 969 and 970. Lithium battery powered temperature loggers for pharmaceutical shipments are permitted with prior approval through qrdg@qatarairways.com.qa. The above restrictions are not applicable to QR AOG shipments.	4;11
QR-05	Class 8 — Corrosives. The following items will not be accepted on Qatar Airways passenger and cargo aircraft: — UN 2803 — Gallium — UN 2809 — Mercury — UN 3506 — Mercury contained in manufactured articles including those listed in A69	2;8 Table 3-1
QR-06	Not used.	
QR-07	The following dangerous goods will not be accepted for carriage as cargo: — UN 3090 — Lithium metal cells and batteries, including lithium alloy cells and batteries, prepared in accordance with Sections IA and IB of Packing Instruction 968. UN 3090 prepared in accordance with Section II of Packing Instruction 968 will be accepted for carriage on cargo aircraft only.	Table 3-1 4;11

Identifying code	*Variation*	*Relevant paragraphs*
	— UN 3480 — Lithium ion cells and batteries, including lithium polymer cells and batteries, prepared in accordance with Section IA and Section IB of Packing Instruction 965. UN 3480 prepared in accordance with Section II of Packing Instruction 965 will be accepted on cargo aircraft only. The above items shipped from or consigned to QR technical supplies as COMAT are acceptable only on freighter aircraft, with prior approval given through qrdg@qatarairways.com.qa.	
QR-08	The following packaging restrictions must be adhered to on all Qatar Airways flights: — packages containing lithium cells or batteries must not be placed in an overpack with packages containing any other dangerous goods; — lithium cells and batteries must not be packed in the same outer packaging with any other dangerous goods.	
	RU — AIR BRIDGE CARGO AIRLINE	
RU-01	Packages of dangerous goods with a primary risk of Class 8 labelled "Cargo Aircraft Only" are forbidden for transport on the lower deck of the aircraft on all airline flights.	
RU-02	UN 3090 — Lithium metal batteries in accordancde with Section IA of Packing Instruction 968 and UN 3091 — Lithium metal batteries contained in or packed with equipment in accordance with Section I of Packing Instructions 969 and 970 are accepted for transport upon prior approval of the airline. The required information can be requested via email at dg@airbridgecargo.com.	
RU-03	UN 3480 — Lithium ion batteries in accordance with Section IA of Packing Instruction 965 and UN 3481 — Lithium ion batteries contained in or packed with equipment in accordance with Section I of Packing Instructions 966 and 967 are accepted for transport upon prior approval of the airline. Request for approval must be via email at dg@airbridgecargo.com	Table 3-1 4;11 8;1
RU-04	UN 3480 Section IB, II of PI 965, UN 3481 Section II of PI 966 and PI 967, UN 3090 Section IB, II of PI 968 and UN 3091, Section II of PI 969 and PI 970 are accepted for carriage only with a completed and signed “Shipper's Declaration for Lithium Battery” form. This form should be requested via local offices of the airline or via email at dg@airbridgecargo.com	Table 3-1 4;11 8;1
	SN — BRUSSELS AIRLINES	
SN-01	Used camping stoves (fuel or gas) will not be accepted for carriage in baggage, even if thoroughly cleaned.	8;1
SN-02	Not used.	
SN-03	Exempt patient specimens as defined in paragraph 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations will only be accepted on Brussels Airlines flights after written approval from the Brussels Airlines Dangerous Goods Department: Brussels Airlines DG Department Brussels Airport b–house Building 26 box 1.7 1930 Zaventem BELGIUM Email: dgdepartment@brusselsairlines.com	2;6.3.2.3.6
SN-04	Small lithium battery powered vehicles are prohibited as carry-on or in checked baggage. This prohibition applies but is not limited to air wheels, solo wheels, balance wheels and hover boards. Passengers with reduced mobility travelling with these devices on SN are requested to contact dgdepartment@brusselsairlines.com before the start of their journey.	8;1

Identifying code	*Variation*	*Relevant paragraphs*
	UC — LAN CARGO	
UC-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LAN Cargo conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LAN Cargo Dangerous Goods Department Telephone: +786-265-6150/+1 305-467-7429 +56-2-677-4571/+56-2-25669366 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1
UC-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the declaration for dangerous goods in the “Handling Information” box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
UC-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper’s declaration must have the following endorsement in the “Additional handling information box”: “Mist, powder or vapour inhalation hazard”, as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.*	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	
UC-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
UC-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
UC-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
UC-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
UC-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of UC and its subsidiaries.	Table 3-1 4;11 8;1

Identifying code	*Variation*	*Relevant paragraphs*
	Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.	
UC-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current "Accreditation Freight Forwarder Programme" implemented by the LAN Cargo Dangerous Goods Department (see UC-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
UC-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	UH — ATLASJET UKRAINE	
UH-01	The shipper must provide a 24-hour emergency telephone number of a person/agency, who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number" must be inserted on the on the shipper's declaration for dangerous goods (DGD) in the "Handling Information" box and also on the outside of the package (see 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations). A 24-hour emergency telephone number is not required for shipments that do not require a DGD.	5;4
UH-02	Dangerous goods in consolidations will not be accepted for carriage except for the following shipments: — Consolidated shipments/consolidations containing Carbon dioxide, solid (dry ice) when used as a refrigerant; — One master air waybill with one house air waybill; — One master air waybill with more than one house air waybill from the same shipper and different consignees.	7;1
UH-03	Booking and confirmation are required for all dangerous goods shipments as defined in the IATA Dangerous Goods Regulations (see 1.3.2 and 9.1.2). Atlasjet Ukraine Cargo: Telephone: +38 044 277 41 41 +38 044 277 41 41 (ext. 8648) Facsimile: +38 044 277 41 41 E-mail: cargo-ua@atlasglb.com	
UH-04	A material safety data sheet (MSDS) must be provided for dangerous goods, except for dangerous goods in Class 7, vehicles, dangerous goods in apparatus or machinery and engines, ID 8000, Magnetized material, carbon dioxide, solid (dry ice) and dangerous goods of Division 6.2. The MSDS must be written in English. The MSDS must include the UN number, proper shipping name and other relevant transport information (see 8.0.1 and 8.3 of the IATA Dangerous Goods Regulations).	5;4
UH-05	Explosives will not be accepted for carriage, except substances and articles of Division 1.4S (see Packing Instructions 101–143).	2;1
UH-06	Dangerous Goods in excepted quantities will not be accepted.	3;5

Identifying code	*Variation*	*Relevant paragraphs*
UH-07	Class 8 — Corrosive Substances, Packing Groups I and II will not be accepted for carriage (see 800 series packing instructions).	2;8
UH-08	Class 7 — Radioactive material will not be accepted for carriage.	2;7
UH-09	The following items will not be accepted on Atlasjet Ukraine flights: — UN 2803 — Gallium; — UN 2809 — Mercury; and — UN 3506 — Mercury contained in manufactured articles.	Table 3-1
UH-10	UN 3090 — Lithium metal batteries. Lithium metal cells and batteries are prohibited from carriage as cargo on Atlasjet Ukraine aircraft. This applies to Section IA, IB and Section II of Packing Instruction 968. This prohibition does not apply to: — lithium metal cells and batteries packed with or contained in equipment (UN 3091) in accordance with Packing Instructions 969 and 970 and lithium ion cells and batteries (UN 3480 and UN 3481) in accordance with Packing Instructions 965 to 967; or — lithium batteries (rechargeable and non-rechargeable) covered by the Provisions for Dangerous Goods Carried by Passengers or Crew (see 2.3.2 to 2.3.5 and Table 2.3.A of the IATA Dangerous Goods Regulations).	4;11
UH-11	All shipments of lithium batteries contained in equipment prepared in accordance with Section II of Packing Instruction 967 or 970 must include the mandatory wording on the air waybill as shown in Section II ("Lithium ion batteries in compliance with Section II of PI 967" or "Lithium metal batteries in compliance with Section II of PI 970"). This applies even to shipments where no lithium battery handling label is required to be affixed to the package(s).	4;11
UH-12	Dangerous goods as defined in the IATA Dangerous Goods Regulations will not be accepted in airmail (see 2.4 of the IATA Dangerous Goods Regulations).	1;2.3
	UX — AIR EUROPA	
UX-01	Dangerous goods in excepted quantities will not be accepted for carriage.	3;5
UX-02	Dangerous goods in limited quantities ("Y" packing instructions) will not be accepted for carriage (except for ID 8000 — Consumer commodity, COMAT, AOG, aircraft parts and supplies). (See 3;4 of these Instructions, 2.7 of the IATA Dangerous Goods Regulations and all "Y" packing instructions.)	3;4
UX-03	Dangerous goods in consolidations will not be accepted for carriage, except for: — consolidations containing UN 1845, Carbon dioxide, solid (dry ice) when used as a refrigerant for non-dangerous goods.	7;1
UX-04	Division 6.1 — Toxic substances — dangerous goods in which the primary or secondary hazard belongs to Division 6.1 (except for COMAT, AOG, aircraft parts and supplies) will not be accepted for carriage.	2;6 Table 3-1
UX-05	Dangerous goods of which the primary hazard is Class 4 (4.1, 4.2, 4.3) (except for COMAT, AOG, aircraft parts and supplies) will not be accepted for carriage.	2;4 Table 3-1
UX-06	Dangerous goods of which the primary hazard belongs to Division 5.2 will not be accepted for carriage.	2;5 Table 3-1
UX-07	The following dangerous goods will not be accepted for carriage (see packing instructions [–] listed after each substance): UN 1787 — Hydriodic acid [851, 855, Y840, 852, 856, Y841] UN 2803 — Gallium [867].	Table 3-1
UX-08	Hazardous waste in any form, as defined by any regulation of the IATA Dangerous Goods Regulations, will not be accepted for carriage.	
UX-09	Salvage packagings will not be accepted for carriage.	4;1
UX-10	Class 7 — Radioactive material will not be accepted for carriage.	2;7 Table 3-1

Identifying code	*Variation*	*Relevant paragraphs*
UX-11	UN 3091 — Lithium metal batteries and cells contained in equipment or packed with equipment are prohibited from carriage as cargo. This prohibition does not apply to lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 8-1). For UN 3481 — Lithium ion batteries and cells contained in equipment or packed with equipment, the number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 966 and 967 must be added, for each packing instruction concerned, in the “nature and quantity of goods” box of the air waybill.	Table 3-1 4;11 8;1
	VT — AIR TAHITI	
VT-01	Dangerous goods in limited quantities (“Y” packing instructions) will not be accepted for carriage. (see 3;4 of these Instructions, 2.7 of the IATA Dangerous Goods Regulations and all “Y” packing instructions.)	3;4
VT-02	Only radioactive material of Category I White (“RRY” code) are accepted for carriage. The only exception is for the UN 3332, with transport index not exceeding 1, shipped exclusively by the Laboratoire des Travaux Publics.	2;7
VT-03	From any station other than the main base (Tahiti-Faa’a, “PPT” code), a limited list of approved dangerous goods is published (ask the carrier: resp-md@airtahiti.pf).	
VT-04	For carriage of dangerous goods of Packing Group I, and for carriage of dangerous goods in excepted quantities or de minimis quantities, prior approval from the Air Tahiti dangerous goods manager is required via email at resp-md@airtahiti.pf.	Table 3-1 3;4
VT-05	Not used.	
VT-06	Not used.	
VT-07	All dangerous goods packages must show the package orientation label (“THIS WAY UP”) and two hazard labels on two opposite sides (see 7.2.4.4 of the IATA Dangerous Goods Regulations).	5;3.2.12 b) 7;2
VT-08	Medical and clinical wastes and infected animals are not accepted for carriage.	2;6
VT-09	The carriage of Carbon dioxide (dry ice), UN 1845 on its own is forbidden.	4;11 7;2
VT-10	The carriage of dangerous goods to or from the Cook Islands is forbidden.	
	XL — LAN ECUADOR	
XL-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LAN Ecuador conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LAN Ecuador Dangerous Goods Department Telephone: +593-87614154 +56-2-677-4571 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1

Identifying code	*Variation*	*Relevant paragraphs*
XL-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number" must be inserted on the declaration for dangerous goods in the "Handling Information" box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
XL-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper's declaration must have the following endorsement in the "Additional handling information box": "Mist, powder or vapour inhalation hazard", as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.* d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
XL-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
XL-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
XL-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
XL-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
XL-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of XL and its subsidiaries. *Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.*	Table 3-1 4;11 8;1
XL-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current “Accreditation Freight Forwarder Programme” implemented by the LAN Ecuador Dangerous Goods Department (see XL-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4

Identifying code	*Variation*	*Relevant paragraphs*
XL-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	X5 — AIR EUROPA EXPRESS	
X5-01	Dangerous goods in excepted quantities will not be accepted for carriage.	Table 3-1 3;5
X5-02	Dangerous goods in limited quantities (“Y” packing Instructions) will not be accepted for carriage (except for ID 8000 — Consumer commodity, aircraft parts and supplies, COMAT, AOG).	Table 3-1 3;4
X5-03	Dangerous goods in consolidations will not be accepted for carriage except for consolidations containing UN 1845 — Carbon dioxide, solid (dry ice) when used as a refrigerant for non dangerous goods.	Table 3-1
X5-04	Division 6.1 — Toxic substances — Dangerous goods in which the primary or secondary hazard belongs to Division 6.1 will not be accepted for carriage (except for COMAT, AOG, aircraft parts and supplies).	2;6
X5-05	Dangerous goods of which the primary hazard is Class 4 will not be accepted for carriage (Division 4.1, 4.2 or 4.3) (except for COMAT, AOG, aircraft parts and supplies).	2;4
X5-06	Dangerous goods of which the primary hazard belongs to Division 5.2 will not be accepted for carriage.	2;5
X5-07	The following dangerous goods will not be accepted for carriage: UN 1787 — Hydriodic acid UN 2803 — Gallium	Table 3-1 3;4
X5-08	Hazardous waste in any form, as defined by any regulation, will not be accepted for carriage.	
X5-09	Salvage packagings will not be accepted for carriage.	4;1
X5-10	Class 7 — Radioactive materials will not be accepted for carriage.	2;7
X5-11	UN 3091 — Lithium metal batteries and cells contained in equipment or packed with equipment are prohibited from carriage as cargo. This prohibition does not apply to lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 8-1). For UN 3481 — Lithium ion batteries and cells contained in equipment or packed with equipment, the number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 966 and 967 must be added, for each packing instruction concerned, in the “nature and quantity of goods” box of the air waybill.	Table 3-1 8;1

Identifying code	*Variation*	*Relevant paragraphs*
	WR — WESTJET ENCORE	
WR-01	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in the case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number", must be inserted on the shipper's declaration for dangerous goods in the "Handling information" box, e.g. Emergency Contact +1 403 012-3456 (see 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations).	5;4
WR-02	WestJet Encore Cargo will not accept the following classes of dangerous goods for carriage: — Class 2.3 — Toxic Gases; — Class 7 — Radioactive Materials, with exception of UN 2911, "Radioactive materials, excepted package — instruments or articles".	2;2 2;7
WR-03	Shipments/consignments containing the following dangerous goods classes must obtain approval from the Operator prior to tendering the shipment for carriage. For approval inquiries please contact WestJet Encore Cargo at 1-866-952-2746: — Class 1.4S — Explosives; — Class 5.2 — Organic Peroxides; — Class 6.2 — Infectious Substances, this includes UN 3373, Biological substance, Category B.	2;1 2;5 2;6
WR-04	Salvage packaging will not be accepted for carriage.	4;1.4
WR-05	WestJet Encore will not accept any dangerous goods shipments containing classes or divisions that require segregation from each other as per Table 7-1.	7;1
	WS — WESTJET	
WS-01	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in the case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number", must be inserted on the shipper's declaration for dangerous goods in the "Handling information" box, e.g. Emergency Contact +1 403 012-3456 (see 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations).	5;4
WS-02	WestJet Cargo will not accept the following classes of dangerous goods for carriage: — Class 2.3 — Toxic Gases; — Class 7 — Radioactive Materials, with exception of UN 2911, "Radioactive materials, excepted package — instruments or articles".	2;2 2;7
WS-03	Shipments/consignments containing the following dangerous goods classes must obtain approval from the Operator prior to tendering the shipment for carriage. For approval inquiries please contact WestJet Cargo at 1-866-952-2746: — Class 1.4S — Explosives; — Class 5.2 — Organic Peroxides; — Class 6.2 — Infectious Substances, this includes UN 3373, Biological substance, Category B.	2;1 2;5 2;6
WS-04	Salvage packaging will not be accepted for carriage.	4;1.4

Identifying code	*Variation*	*Relevant paragraphs*
	4C — LAN COLOMBIA	
4C-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LAN Colombia conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LAN Colombia Dangerous Goods Department Telephone: +57-1-4259600, Ext. 71312 +56-2-2677-4571/ +56-2-25669366 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1
4C-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words “Emergency contact” or “24-hour number” must be inserted on the declaration for dangerous goods in the “Handling Information” box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4
4C-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper’s declaration must have the following endorsement in the “Additional handling information box”: “Mist, powder or vapour inhalation hazard”, as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.*	2;3 2;6 5;4 6;1

Identifying code	*Variation*	*Relevant paragraphs*
	d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	
4C-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
4C-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
4C-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
4C-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7
4C-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of 4C and its subsidiaries.	Table 3-1 4;11 8;1

Identifying code	*Variation*	*Relevant paragraphs*
	Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.	
4C-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current "Accreditation Freight Forwarder Programme" implemented by the LAN Colombia Dangerous Goods Department (see 4C-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
4C-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7
	4M — LAN ARGENTINA	
4M-01	Dangerous goods offered for transport under an approval or an exemption as provided by 1.2.5 and 1.2.6 of the IATA Dangerous Goods Regulations and any other LAN Argentina conditions by pre-approval will be accepted only after prior review and approval of the LATAM Dangerous Goods Technical Committee. In addition, UN 1040 and UN 2014, when shipped as excepted quantities in accordance with Special Provisions A131 and A75 respectively, also require prior review and approval of the LATAM Dangerous Goods Technical Committee. An application for approval must be undertaken at least fifteen working days in advance of the scheduled date for the flight. The material safety data sheet (MSDS) or other documentation that covers the shipment must be attached. Applications should be addressed to: LAN Argentina Dangerous Goods Department Telephone: +54-11-44807777, Ext. 7806 +56-2-2677-4571/+56-2-25669366 +1-305-772-2894 Email: DangerousGoodsBoard@lan.com	1;1.1
4M-02	The shipper must provide a 24-hour emergency telephone number of a person/agency who is knowledgeable of the hazards, characteristics and actions to be taken in case of an accident or incident concerning each of the dangerous goods being transported. This telephone number, including the country and area code, preceded by the words "Emergency contact" or "24-hour number" must be inserted on the declaration for dangerous goods in the "Handling Information" box. (See 8.1.6.11 and 10.8.3.11 of the IATA Dangerous Goods Regulations.) An emergency response telephone number is not required for: — battery-powered equipment; — battery-powered vehicle; — flammable gas-powered vehicle; — flammable liquid-powered vehicle; — engine, internal combustion; — dangerous goods in limited quantities as described in 3;4 of these Instructions (2.7 of the IATA Dangerous Goods Regulations); — carbon dioxide, solid (dry ice); — consumer commodity; and — refrigerating machines.	Table 3-1 5;4

Identifying code	*Variation*	*Relevant paragraphs*
4M-03	For toxic substances of Division 6.1 or Division 2.3, the following requirements must be complied with: a) Toxic substances of Division 6.1, Packing Group I, that are toxic by inhalation, will not be accepted for carriage unless a prior approval has been obtained (see LA-01). b) Toxic gases of Division 2.3 will not be accepted for carriage unless a prior approval has been obtained (see LA-01). c) When the substance to be carried has an inhalation, mist, powder or vapour hazard, the shipper's declaration must have the following endorsement in the "Additional handling information box": "Mist, powder or vapour inhalation hazard", as appropriate. *Note 1.— This requirement only applies to the primary risk.* *Note 2.— Where the substance has more than one route of toxicity, the risk that determined the packing group must be used.* d) Solid toxic substances of any kind will not be accepted for carriage in bags 5H1, 5H2, 5H3, 5H4, 5L2, 5L3, 5M1 or 5M2 as single packagings unless contained in a strong hot sealed polyethylene bag at least 200 microns thick. If these types of packages are offered overpacked in a warehouse pallet, they will be accepted for carriage provided: 1) the warehouse pallet is rigid and strong enough to support the weight assembled on it, without bending when picked up and transported by a forklift; 2) the surface of the warehouse pallet is continuous, soft and free of sharp protruding points which could pierce the bags; and 3) the warehouse pallet is provided with separation bars from the floor for the use of a forklift.	2;3 2;6 5;4 6;1
4M-04	Infectious substances will be accepted under specific advance arrangements and the following requirements must be met: a) The shipper must prove by a document such as a fax, telex, letter, etc., that the infectious substance can legally enter the State of Destination and that all the requirements of the States of Origin and Destination of the shipment have been complied with. b) The shipper must attach a certificate duly signed and issued by a medical, scientific or other similar professional which confirms the classification of these specimens in the following cases: — shipment of Biological substance, Category B; — shipment of any patient specimens prepared according to 3.6.2.2.3.6 of the IATA Dangerous Goods Regulations. c) Infected animals, dead (whole bodies) or alive will not be accepted for carriage.	2;6.3.2.3.6 5;4
4M-05	Formaldehyde solutions containing less than 25% of formaldehyde must be shipped under UN 3334 — Aviation regulated liquid, n.o.s.*, Class 9, Packing Group III.	Table 3-1
4M-06	The marking required by 7.1.5 of the IATA Dangerous Goods Regulations and application of hazard and handling labels on packages containing dangerous goods must not be applied to the top or bottom of packages. These markings and labels must be applied to the sides of packages. This requirement does not apply to marking of the full name and address of the shipper and consignee.	5;2 5;3
4M-07	Fissile material as defined in 10.3.7 of the IATA Dangerous Goods Regulations will be accepted only with prior review and approval by the LAN Dangerous Goods Technical Committee (see LA-01).	1;6.1.5 2;7

Identifying code	*Variation*	*Relevant paragraphs*
4M-08	UN 3091 — Lithium metal batteries contained in or packed with equipment are forbidden as cargo on passenger aircraft and must be transported on cargo aircraft only (CAO). This prohibition does not apply to: — lithium batteries covered by the provisions for dangerous goods carried by passengers or crew (see Table 2.3.A of the IATA Dangerous Goods Regulations.); — lithium metal batteries and cells contained in medical equipment being transported for humanitarian reasons. They will only be accepted and may be transported on passenger aircraft whenever a document proving such condition is present. The documents must be issued by health institution or authority; — lithium metal batteries classified as UN 3091, Section II and which are installed in temperature control devices, also known as data loggers. These are used to monitor temperatures in certain products such as Pharma (TCP). They may be transported in passenger aircraft in accordance with current regulations; — lithium metal batteries classfied as UN 3091 that are company materials of 4M and its subsidiaries. *Note.— The number of packages marked with the lithium battery mark in compliance with Section II of Packing Instructions 965, 966, 967, 968, 969 or 970 should be added in the nature of the product box of the air waybill.*	Table 3-1 4;11 8;1
4M-09	Unit load devices or freight containers containing dangerous goods described in 9.1.4, sub-paragraphs (a) to (d) of the IATA Dangerous Goods Regulations or lithium batteries prepared under Section II of Packing Instructions 965 to 970 will be accepted by advance arrangements and contract only in accordance with the current “Accreditation Freight Forwarder Programme” implemented by the LAN Argentina Dangerous Goods Department (see 4M-01). The shipper/freight forwarder must deliver a document certifying that: — the shipment was prepared on secure premises and protected against unlawful interference during preparation, storage and transport; and — packages comply with all requirements of the IATA Dangerous Goods Regulations.	7;1.4
4M-10	UN 3356 — Chemical oxygen generators transported to, from, through or within the United States must be placed in outer packaging that bears the additional tested specification mark of DOT 31FP indicating compliance with 49 CFR 173.168.	4;7

AIRLINE OPERATOR VARIATIONS FROM THE TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

To: Chief, Cargo Safety Section (CSS)
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec
CANADA H3C 5H7

Email: krooney@icao.int

Please include in the Addendum to the 2023–2024 Edition of the Technical Instructions the following operator variation(s):

Variation *Relevant paragraphs*

_____ Signature

_____ Title

(To be returned to reach ICAO not later than 30 April 2023)

Attachment 4

INDEX AND LIST OF TABLES AND FIGURES

INDEX

	Part	*Paragraph*
A		
Abbreviations and symbols		
general	Foreword	—
as used in Table 3-1	3	2.1.2
Acceptance of dangerous goods		
acceptance check	7	1.3
cargo acceptance procedures	7	1.1
checklist	7	1.3
infectious substances — special responsibilities	7	1.5
freight containers and unit load devices	7	1.4
minor discrepancies	3	1.2.2
	7	1.3.1 Note 1
operators — general procedures	7	1.2
undeliverable consignments of radioactive material	7	1.6
Accessibility of 'Cargo aircraft only' packages	7	2.4.1
Accidents and incidents		
aircraft carrying dangerous goods — action by operator	7	4.7
dangerous goods — reporting by operators	7	4.4
dangerous goods — reporting by entities other than operators	1	7
Accumulation of packages and freight containers of radioactive material	7	2.9.3.3
Activity levels of radioactive material	2	7.2.1; 7.2.2
Aerosols		
definition	1	3.1.1
divisions	2	2.5
flammable — criteria	2	2.5.2
packagings — requirements	6	3.2.7
subsidiary risks	2	2.5
Airmail	1	2.3
Air waybill	5	4.2
Aluminium boxes (4B)		
performance tests	6	4
specifications	6	3.1.13
Aluminium drums (1B1, 1B2)		
performance tests	6	4
specifications	6	3.1.2
Amendments to Technical Instructions	1	1.6
Animals		
infected	2	6.3.6
veterinary aid	1	1.1.5.1 b)
separation from radioactive materials	7	2.9.6.3
with dry ice	7	2.11
Annex 18 — relationship	1	1.5
Applicability of the Technical Instructions	1	1.1
Application		
labels	5	3.2
markings	5	2.2
Approvals	1	1.1.2
B		
Bags, paper — specifications	6	3.2.4
Bags, paper, multiwall (5M1), multiwall water-resistant (5M2)		
specifications	6	3.1.17
Bags, plastic — specification	6	3.2.5
Bags, plastic film (5H4)		
performance tests	6	4
specifications	6	3.1.16
Bags, textile (5L2, 5L3)		
performance tests	6	4
specifications	6	3.1.14

	Part	Paragraph
Bags, woven plastic (5H1, 5H2, 5H3)		
performance tests	6	4
specifications	6	3.1.15
Barometers, with government official	8	Table 8-1 23)
Biological products		
classification	2	6.3.3
definition	2	6.3.1.2
Boxes, fibre — specifications	6	3.2.6
Boxes, fibreboard (4G)		
performance tests	6	4
specifications	6	3.1.11
Boxes, natural wood (4C1, 4C2)		
performance tests	6	4
specifications	6	3.1.8
Boxes, plastic (4H1, 4H2)		
performance tests	6	4
specifications	6	3.1.12
Boxes, plywood (4D)		
performance tests	6	4
specifications	6	3.1.9
Boxes, reconstituted wood (4F)		
performance tests	6	4
specifications	6	3.1.10
Boxes, steel or aluminium (4A, 4B)		
performance tests	6	4
specifications	6	3.1.13

C

Cans, fibre — specifications	6	3.2.6
Cans, tins or tubes (metal) — specifications	6	3.2.3
Cargo acceptance procedures	7	1.1
Cargo aircraft		
loading	7	2.4.1
Checklist for acceptance of dangerous goods by operators	7	1.3
Class 1 (Explosives)		
classification	2	1.5
classification codes	2	Table 2-2
compatibility groups	2	1.4
definitions and general provisions	2	1.1
divisions	2	1.3
general packing provisions	4	3.3
general requirements	4	3.2
label specifications	5	3.5.1 c)
package markings	5	2.4.3
packing group	4	3.1
packing instructions	4	3.4
separation of explosive substances and articles	7	2.2.2
Class 2 (Gases)		
aerosols — see Aerosols		
construction and testing	6	5
definitions and general provisions	2	2.1
divisions	2	2.2
hazard precedence	2	2.3
mixtures	2	2.4
packing instructions	4	4.2
refrigerated liquefied — handling label	5	3.2.12 c)
Class 3 (Flammable liquids)		
definition and general provisions	2	3.1
flash point determination	2	3.3
packing group assignment	2	3.2
packing instructions	4	5.1

	Part	*Paragraph*
Class 4 (Flammable solids, etc.)		
definitions and general provisions	2	4.1
flammable solids — classification and packing groups	2	4.2
list of currently assigned self-reactive substances	2	4.2.3.2.4; Table 2-6
packing instructions	4	6.2
substances liable to spontaneous combustion		
classification and packing groups	2	4.3
substances which, in contact with water, emit flammable gases		
classification and packing groups	2	4.4
Class 5 (Oxidizing substances and organic peroxides)		
definitions and general provisions	2	5.1
Division 5.1		
classification	2	5.3.2
desensitization	2	5.3.4
general requirements	4	7.1
list of currently assigned organic peroxides	2	5.3.2.4; Table 2-7
properties	2	5.3.1
oxidizing substances		
classification and packing groups	2	5.2.2
packing instructions	4	7.2
Class 6 (toxic and infectious substances)		
biological products	2	6.3.3
clinical waste	2	6.3.5
definitions	2	6.1
genetically modified organisms and micro-organisms	2	6.3.4
infectious substances		
classification of	2	6.3.2
damage or leakage	7	3.1.4
definitions	2	6.3.1
in airmail	1	2.3
packagings	6	6
test report	6	6.5.5
transport document	5	4.1.5.8
medical waste	2	6.3.5
packing instructions	4	8.1
pesticides, classification	2	6.2.4
toxic substances, packing group assignment	2	6.2.2
Class 7 (Radioactive material)		
accumulation of packages and freight containers	7	2.9.3.3
activity levels	2	7.2.2
approvals of package designs and materials	6	7.21
classification		
general provisions	2	7.2.1
packages	2	7.2.4
criticality safety index	5, 6	1.2.3, 7.10
damaged packages	7	3.2
definitions	2	7.1
documentation		
excepted package	5	1.2.4
competent authority certificates	5	1.2.2
information on dangerous goods transport document	5	4.1.5.6
dose rates for packages and overpacks	4	9.1
	5	1.2.3.1.4
exclusive use	7	2.9.3.4
fissile material		
definition	2	7.1.3
determination of other material characteristics	2	7.2.3.5
packages	4	9.1.1
	6	7.10; 7.18
general provisions	1	6
	5	1.2
in airmail	1	2.3
industrial packages		
requirements	6	7.4
low specific activity (LSA) materials		
definition	2	7.1.3
determination of groups	2	7.2.3.1.2

	Part	*Paragraph*
determination of other material characteristics	2	7.2.3
requirements and controls for transport	4	9.2
material characteristics		
fissile material	2	7.2.3.5
low specific (LSA)	2	7.2.3.1
low dispersible	2	7.2.3.4
special form	2	7.2.3.3
surface contaminated object	2	7.2.3.2
non-compliance	1	6.6
packagings		
requirements	6	7.2
target for drop tests	6	7.13
testing of integrity of containment system and shielding	6	7.12
test procedures	6	7.11
tests for normal conditions of transport	6	7.14
tests for accident conditions in transport	6	7.16
packing requirements	4	9.1
placarding of large freight containers	5	3.6
registration of serial numbers	6	7.23
requirements for		
excepted packages	6	7.3
industrial packages	6	7.4
packages containing fissile material	6	7.10
packages containing Uranium hexafluoride	6	7.5; 7.20
Type A packages	6	7.6; 7.15
gases	6	7.6.17
liquids	6	7.6.16
Type B(M) packages	6	7.8; 7.17
Type B(U) packages	6	7.7; 7.17
Type C packages	6	7.9; 7.19
security	1	5.5
separation		
from film	7	2.9.6.2
from live animals	7	2.9.6.3
from persons	7	2.9.6.1
special form	2	7.2.3.3
surface contaminated object (SCO)		
determination of groups	2	7.2.3.2
requirements and controls for transport	4	9.2
transport index		
definition	2	7.1.3
determination	5	1.2.3
limits	4	9.1.10
exclusive use	7	2.9.3.4
target for drops tests	6	7.13
test procedures	6	7.11
testing the integrity of the containment system and shielding and evaluating criticality safety	6	7.12
tests for demonstrating ability to withstand accident conditions in transport	6	7.16
tests for demonstrating ability to withstand normal conditions of transport	6	7.14
transitional measures for Class 7	6	7.23
Class 8 (Corrosive substances)		
alternative packing group assignment methods for mixtures	2	8.4
definition and general provisions	2	8.1
general classification provisions	2	8.2
packing group assignment for substances and mixtures	2	8.3
packing instructions	4	10
substances forbidden for transport	2	8.5
Class 9 (Miscellaneous)		
assignment	2	9.2
definition	2	9.1
lithium batteries — see Lithium batteries		
magnetized material — explanation	2	9.2.1 d)
packing instructions	4	11
Class hazard label specifications	5	3.5.1
Classification of organometallic substances	2	4.5
Classification of pesticides	2	6.2.4
Classification of substances and articles with multiple hazards	2	Introductory Chapter, 4

	Part	*Paragraph*
Classification of articles as articles containing dangerous goods n.o.s.	2	Introductory Chapter, 4
Clinical waste	2	6.3.5
Coated packagings — testing	6	4.1.9
Compatibility group assignment for explosives	2	Table 2-3
Composite packagings (plastic material) (6HA1, 6HA2, 6HB1, 6HB2, 6HC, 6HD1, 6HD2, 6HG1, 6HG2, 6HH1, 6HH2)		
performance tests	6	4
specifications	6	3.1.18
Consignee identification on packages	5	2.4.2
Contaminated baggage or cargo, suspected	7	3.3
Conversion factors for SI/Non-SI units	1	3.2.3
Corrosives — see Class 8		
Cushioning of inner packagings	4	1.1.10

D

Damaged packages		
inspection for	7	3.1
loading	7	3.1
radioactive material	7	3.2
Dangerous goods		
accident and incident reporting	7	4.4
definitions	1	3.1
excepted quantities	3	5
radioactive material	1	6.1.5
exceptions for the operator	1	2.2
forbidden on aircraft under any circumstance	1	2.1
in airmail	1	2.3
information required	5	4
in passengers' baggage	8	1.1
limited quantities	3	4
list of	3	Table 3-1
multiple hazards	2	Introductory Chapter, 4
not otherwise specified (n.o.s.)	3	1.2.7
numerical list	Att. 1	Chapter 1
packed together	4	1.1.8; 1.1.9
transport document	5	4.1
Definitions (see also Nomenclature)	1	3.1
Documentation for dangerous goods	5	4
Drums, aluminium (1B1, 1B2)		
performance tests	6	4
specifications	6	3.1.2
Drums, fibre (1G)		
performance tests	6	4
specifications	6	3.1.6
Drums, metal other than aluminium or steel (1N1, 1N2)		
performance tests	6	4
specifications	6	3.1.3
Drums, plastic (1H1, 1H2)		
performance tests	6	4
specifications	6	3.1.7
Drums, plywood (1D)		
performance tests	6	4
specifications	6	3.1.5
Drums, steel (1A1, 1A2)		
performance tests	6	4
specifications	6	3.1.1

E

Earthenware, glass or wax receptacles (IP.1) — specifications	6	3.2.1
Emergency response information	7	4.9
Environmentally hazardous substances	2	9.2
marking requirements	5	2.4.9
Excepted packages of radioactive material	1	6.1.5

	Part	*Paragraph*
Excepted quantities of dangerous goods	3	5
Exceptions		
dangerous goods of the operator	1	2.2
general	1	1.1.5
Exemptions — granting of	1	1.1.3
Explanation of terms	Att. 2	—
Explosives — see Class 1		

F

Fibreboard boxes (4G)		
performance tests	6	4
specifications	6	3.1.11
Fibre cans or boxes — specifications	6	3.2.6
Fibre drums (1G)		
performance tests	6	4
specifications	6	3.1.6
Fissile material — see Class 7		
Flammable aerosols — criteria	2	2.5.2
Flammable liquids — see Class 3		
Flammable solids — see Class 4		
Flammable viscous substances with a flash point less than 23°C — grouping	2	3.2.2
Flash point determination	2	3.3
Flight deck — loading restrictions	7	2.1
Forbidden dangerous goods		
under any circumstance	1	2.1
Format of packing instructions	4	2
Freight containers for radioactive material		
loading	7	2.9.3.3
placarding	5	3.6
Frequency of testing of packagings	6	4.1

G

Gas cylinders	6	5
Gases — hazard precedence	2	2.3
Gases, refrigerated liquefied — packaging	6	5
Gases — see Class 2		
Generic proper shipping names, List of	Att. 1	Chapter 2
Genetically modified micro-organisms and organisms	2	6.3.4; 9.1.2
Glass — specifications	6	3.2.1

H

Handling and loading of packages containing liquid dangerous goods	7	2.3
Handling labels	5	3.5.2
Cargo Aircraft Only label	5	3.2.12 a)
Cyrogenic Liquid label	5	3.2.12 c)
Keep Away from Heat label	5	3.2.12 d)
Lithium Battery Handling label (PI 965-PI 970)	5	3.5.2.1
Magnetized Material label (Table 3-1; PI 953 and PI 962 (for UN 3363 if applicable))	5	3.2.11
Package Orientation label (PI 962 (for UN 3363) and PI Y963 (for ID 8000)	4,5	1.1.13; 3.2.12 b)
Radioactive material, excepted package	5	3.2.12 e)
Helicopters		
Information to the pilot-in-command	7	4.1.1
Special provisions for	7	7

	Part	*Paragraph*
I		
ID number	1	3.1
Incidents — see Accidents and Incidents		
Incompatible dangerous goods		
packing together	4	1.1.8
segregation	7	2.2.1
Index of packaging specifications	6	1.3
Industrial packages for radioactive material	6	7.4
Infectious substances — see Class 6		
Information, provision of		
by operator after an aircraft accident or incident	7	4.7
by pilot-in-command in an in-flight emergency	7	4.3
cargo acceptance areas	7	4.8
dangerous goods not required to appear in the information to the pilot-in-command	7	Table 7-9
emergency response	7	4.9
for helicopter operations	7	4.1.1
for lithium batteries	7	4.1.3
to operator's employees	7	4.2
to personnel with responsibilities for operational control of the aircraft	7	4.1
to pilot-in-command	7	4.1
Inner packagings		
specifications	6	3.2
use of cushioning and absorbent materials	4	1.1.10
Inspection for damage or leakage	7	3.1
J		
Jerricans, plastic (3H1, 3H2)		
performance tests	6	4
specifications	6	3.1.7
Jerricans, steel (3A1, 3A2)		
performance tests	6	4
specifications	6	3.1.4
L		
Labels and labelling		
application of labels	5	3.2
labelling of packages and overpacks	5	3
labelling of unit load devices	7	2.8
other modes of transport	5	3.2.14
prohibited labelling	5	3.4
replacement of labels	7	2.7
requirement to label	5	3.1
specifications for labels	5	3.5
Languages to be used		
dangerous goods transport document	5	4.1.6.3
labels	5	3.2.12
markings on packages	5	2.5
Leakage — inspection for	7	3.1
Leaking packages of radioactive material	7	3.2
Limitation of dangerous goods on aircraft	1	2
Limited quantities of dangerous goods	3	4
Liquid dangerous goods		
definition	1	3.1
loading	7	2.3
orientation of combination packagings	4	1.1.13
List of currently assigned organic peroxides	2	5.3.2.4; Table 2-7
List of currently assigned self-reactive substances	2	Table 2-6
List of dangerous goods	3	Table 3-1
List of n.o.s. and generic proper shipping names	Att. 1	Chapter 2

	Part	*Paragraph*
Lithium batteries		
assignment	2	9.3
in airmail	1	2.3.2
packing instructions	4	11
quality management system	2	9.3.1 e)
stowage on aicraft	7	2.2.1
Loading		
battery-powered mobility aids carried under the provisions of Part 8	7	2.13
cargo aircraft	7	2.4.1
dry ice	7	2.11
expandable polymeric beads	7	2.12
lithium batteries	7	2.2.1
magnetized material	7	2.10
restrictions on flight deck and for passenger aircraft	7	2.1
segregation from other dangerous goods	7	2.2.1
Low specific activity radioactive material — see Class 7		

M

Magnetized material		
definition	2	9.2 d)
loading	7	2.11
Markings		
application of	5	2.2
biological substances, Category B	5	2.4.8
Class 1 packages	5	2.4.3
dry ice	5	2.4.7
infectious substances	6	2.2
marking requirements	5	2.4.5
languages to be used	5	2.5
other modes of transport	5	2.4.13
packages and overpacks	5	2.4.10
packaging specifications		
detailed requirements	6	2
general	5	2.4.4
prohibited	5	2.3
proper shipping name and UN number	5	2.4.1
radioactive material requirements	5	2.4.5
refrigerated liquefied gas	5	2.4.6
shipper and consignee identification	5	2.4.2
special marking requirements for:		
biological substances, Category B	5	2.4.8
chemical oxygen generators	5	2.4.14
dry ice	5	2.4.7
environmentally hazardous substances	5	2.4.9; 2.4.15
explosives	5	2.4.3
IBCs used to transport UN 3077	5	2.4.9; 2.4.15
radioactive material	5	2.4.5
refrigerated liquefied gas	5	2.4.6
specifications and requirements	5	2.4
Measurement units and conversion factors	1	3.2
Medical waste	2	6.3.5
Mercury barometer, with government official	8	Table 8-1 23)
Metal cans, tins or tubes — specifications	6	3.2.3
Metal or plastic flexible tubes — specifications	6	3.2.9
Miscellaneous dangerous goods — see Class 9		
Mixtures and solutions containing one dangerous substance	3	1.3
Mixtures of gases	2	2.4
Multiple hazard dangerous goods — classification	2	Introductory Chapter, 4

N

Natural wood boxes (4C1, 4C2)		
performance tests	6	4
specifications	6	3.1.8
Non-SI units of measurement	1	3.2.2

	Part	*Paragraph*
Not otherwise specified (n.o.s.) dangerous goods		
list	Att. 1	Chapter 2
rules for use	3	1.2.7

O

Operator		
acceptance check	7	1.3
acceptance of dangerous goods	7	1
acceptance of infectious substances	7	1.5
decontamination of aircraft	7	3
inspection of packages		
on acceptance	7	1
on unloading	7	3.1.3
prior to loading	7	3.1
loading	7	2
provision of information	7	4
responsibilities	7	—
Opening of dangerous goods packages	1	1.4
Organic peroxides		
additional transport document information	5	4.1.5.4; 4.1.5.8.3
Keep Away from Heat label	5	3.2.12 d)
Organic peroxides, list of currently assigned	2	Table 2-7
Organic peroxides — see Class 5		
Orientation of combination packages containing liquids	4	1.1.13
Overpacks		
labelling	5	3.3
marking	5	2.4.10
Oxidizing substances — see Class 5		

P

Packages and packagings		
aerosol dispensers	6	5
compatibility of parts of packagings	4	1.1.3.1
cylinders and closed cryogenic receptacles	6	5
empty	4	1.1.15
gas cartridges	6	5
minimum size	4	1.1.14
orientation of combination packages containing liquids	4	1.1.13
performance and frequency of tests	6	4.1
preparation for tests	6	4.2
pressure testing of packagings for liquids	4	1.1.6
salvage	4	1.4
additional information on dangerous goods transport document	5	4.1.5.1 d)
test requirements	6	4.8
specification markings		
detailed requirements	6	2
general	5	2.4.4
specifications and tests	6	—
specifications index	6	1.3
supplementary packagings — use of	4	1.1.7
testing requirements	6	4
test report	6	4.7
transitional arrangements for radioactive material	4	1.3
Packing group		
Class 1	4	3.1
criteria for Class 3	2	3.2
criteria for Class 8	2	8.3
criteria for Division 4.1	2	4.2.2.3
criteria for Division 4.2	2	4.3.3
criteria for Division 4.3	2	4.4.3
criteria for Division 5.1	2	5.2.2.2
criteria for Division 5.2	4	7.1.1
criteria for Division 6.1	2	6.2.2
explanation	4	Note 1
performance requirement	4	1.2

	Part	*Paragraph*
Packing instructions		
Class 1	4	3.4
Class 2	4	4.2
Class 3	4	5.1
Class 4	4	6.2
Class 5	4	7.2
Class 6	4	8.1
Class 8	4	10.1
Class 9	4	11
format	4	2
Packing requirements		
compatibility	4	1.1.3
excepted quantities	3	5.2
explosives	4	3.2
general	4	1.1
limited quantities	3	4.2
organic peroxides	4	7.1
self-reactive substances	4	6.1
Packing together of different dangerous goods	4	1.1.8
Paper bags — specifications	6	3.2.4
Paper bags, multiwall, water-resistant (5M2)		
performance tests	6	4
specifications	6	3.1.17
Passenger aircraft — loading restrictions	7	2.1
Passengers		
check-in procedures	7	5.2
permitted dangerous goods in baggage, etc.	8	1.1.2
provision of information to	7	5.1
Pesticides — classification	2	6.2.4
Placarding of large freight containers containing radioactive material	5	3.6
Placarding of portable tanks	5	Ch. 3, Note 3
Plastic — specifications	6	3.2.2
Plastic bags — specifications	6	3.2.5
Plastic boxes (4H1, 4H2)		
performance tests	6	4
specifications	6	3.1.12
Plastic drums (1H1, 1H2)		
performance tests	6	4
specifications	6	3.1.7
Plastic fabric bags — see woven plastic bags		
Plastic film bags (5H4)		
performance tests	6	4
specifications	6	3.1.16
Plastic flexible tubes — specifications	6	3.2.9
Plastic jerricans (3H1, 3H2)		
performance tests	6	4
specifications	6	3.1.7
Plastic receptacles (aerosols) non-refillable (IP.7C) — specifications	6	3.2.8
Plastic receptacles with outer protection (6HA1, 6HA2, 6HB1, 6HB2, 6HC, 6HD1, 6HD2, 6HG1, 6HG2, 6HH1, 6HH2)		
performance tests	6	4
specifications	6	3.1.18
Plywood boxes (4D)		
performance tests	6	4
specifications	6	3.1.9
Plywood drums (1D)		
performance tests	6	4
specifications	6	3.1.5
Poisons — see Class 6		
Portable tanks	4	Introductory Chapter, Note 6
Precedence of hazards	2	Introductory Chapter, 4
Pressure requirements for liquid containers		
all classes except Class 7	4	1.1.6
consumer commodities	4	PI Y963
Division 6.2	4	PI 620
Pressure testing of packagings for liquids	4	1.1.6

	Part	*Paragraph*
Pressure variations in air transport	4	Introductory Chapter, Note 3
Prohibited labelling	5	3.4
Prohibited markings on packages	5	2.3
Proper shipping name and UN number	3	1.2
minor discrepancies	7	1.3.1 Note 1
singular or plural, preferred spelling, alternative spelling	3	1.2.2
Provision of information — see Information, provision of		
Provisions, special	3	Table 3-2
Pyrophoric substances — see Class 4		

R

Radioactive material — see Class 7		
Readily combustible solids — see Class 4		
Reconstituted wood boxes (4F)		
performance tests	6	4
specifications	6	3.1.10
Refrigerated liquefied gases — packaging	6	5
Replacement of labels	7	2.7
Reporting of dangerous goods accidents and incidents		
by operators	7	4.4
by entities other than operators	1	7
Reporting of dangerous goods occurrences	7	4.6
Reporting of undeclared or misdeclared dangerous goods		
by operators	7	4.5
by entities other than operators	1	7

S

Samples, transport of	2	Introductory Chapter, 5
Salvage packagings, see Packages and packagings, salvage		
Securing of dangerous goods	7	2.4.2
Security of dangerous goods		
general	1	5.1
high consequence dangerous goods	1	5.3
security plans	1	5.4
training	1	5.2
Segregation of incompatible dangerous goods	7	2.2
Self-heating substances — see Class 4		
Self-reactive substances		
list of currently assigned	2	Table 2-6
transport document	5	4.1.5.4
Shipper		
documentation	5	4
labelling	5	3
marking	5	2
requirements		
general	5	1.1
responsibilities	5	—
SI units and conversion factors	1	3.2
Special form radioactive material — see Class 7		
Special Marking — see Markings		
Special provisions	3	3
Specification markings for packages and packagings — see Packages and packagings		
Spontaneous combustion substances — see Class 4		
Steel boxes (4A)		
performance tests	6	4
specifications	6	3.1.13
Steel drums (1A1, 1A2)		
performance tests	6	4
specifications	6	3.1.1
Steel jerricans (3A1, 3A2)		
performance tests	6	4
specifications	6	3.1.4

	Part	*Paragraph*
Stowage of toxic and infectious substances	7	2.9
Substances which, in contact with water, emit flammable gases — see Class 4		
Supplement to the Technical Instructions	Foreword	—
Supplementary packaging	4	1.1.7
Surface contaminated object (SCO) — see Class 7		

T

Technical Instructions		
general basis for	Foreword	—
operational use of	Foreword	—
use of	Foreword	—
variations from		
general	Foreword	—
notifications	Att. 3	—
Temperature variations in air transport	4	Introductory Chapter, Note 2
Test report — packaging	6	4.7
Textile bags (5L2, 5L3)		
performance tests	6	4
specifications	6	3.1.14
Tins, tubes or cans — metal — specifications	6	3.2.3
Toxic gases — see Class 2		
Toxic liquids/solids — see Class 6		
Training		
approval of training programmes	1	4.5
establishment of training programmes	1	4.1
for designated postal operators	1	4.7
instructor qualifications and competencies	1	4.6
objective	1	4.2
record of training and assessment	1	4.4
recurrent training and assessment	1	4.3
Transport document for dangerous goods	5	4.1
Transport requirements — general	1	1.2
Tubes, flexible metal or plastic — specifications	6	3.2.9
Type A packages and packagings for radioactive material — see Class 7		
Type B packages and packagings for radioactive material — see Class 7		

U

Ullage		
consumer commodities	4	PI Y963
general	4	1.1.5
Unit load device		
acceptance by operator	7	1.4
labelling	7	2.7
Units		
conversion factors	1	3.2.3
measurement	1	3.2.1
non-SI	1	3.2.2
Unpackaged articles	4	2.9
Use of the Technical Instructions		
guidance in use of the document	Foreword	—
operational	Foreword	—

V

Variations found in air transport		
pressure	4	Introductory Chapter, Note 3
temperature	4	Introductory Chapter, Note 2
Variations from the Technical Instructions		

	Part	*Paragraph*
general	Foreword	—
notifications	Att. 3	—
Vibrations found in air transport	4	Introductory Chapter, Note 4

W

Waste dangerous goods — documentation	5	4.1.4.3 c)
Water-reactive substances — see Class 4		
Wheelchairs, electric and other battery-powered mobility aids	8	Table 8-1 5) and 6)
Woven plastic bags (5H1, 5H2, 5H3)		
performance tests	6	4
specifications	6	3.1.15

LIST OF TABLES

Page

Table 1-1 Authorized equivalents 1-3-10
Table 1-2 Conversion to SI units 1-3-11
Table 1-3 Conversion from SI units 1-3-11
Table 1-4 Content of training courses for staff of designated postal operators 1-4-3
Table 1-5 Indicative list of high consequence dangerous goods 1-5-2
Table 1-6 Transport security thresholds for specific radionuclides 1-5-2
Table 2-1 Precedence of hazards and packing groups for Classes 3, 4 and 8 and for Divisions 5.1 and 6.1 2-0-7
Table 2-2 Classification codes 2-1-3
Table 2-3 Scheme of classification of explosives, combination of hazard division with compatibility group 2-1-4
Table 2-4 Packing group based on flammability 2-3-2
Table 2-5 Viscosity and flashpoints 2-3-2
Table 2-6 List of currently assigned self-reactive substances in packagings 2-4-4
Table 2-7 List of currently assigned organic peroxides in packagings 2-5-5
Table 2-8 Grouping criteria for administration through oral ingestion, dermal contact and inhalation of dusts and mists 2-6-2
Table 2-9 Criteria for inhalation 2-6-2
Table 2-10 Indicative examples of infectious substances included in Category A in any form unless otherwise indicated 2-6-7
Table 2-11 Assignment of UN numbers 2-7-2
Table 2-12 Basic radionuclides values for individual radionuclides 2-7-5
Table 2-13 Basic radionuclide values for unknown radionuclides or mixtures 2-7-20
Table 2-14 Activity limits for excepted packages 2-7-25
Table 2-15 Summary of criteria for assigning packing groups to corrosive substances 2-8-2
Table 2-16 Substances and articles of Class 9 2-9-1
Table 3-1 Dangerous Goods List 3-2-3
Table 3-2 Special provisions 3-3-1
Table 3-3 Excepted quantity codes for Table 3-1 3-5-1
Table 4-1 Examples of required marked test pressures calculated as in 1.1.16 c) 4-1-5
Table 4-2 Industrial package requirements for LSA material and SCO 4-9-3
Table 5-1 Multiplication factors for freight containers 5-1-4
Table 5-2 Categories of packages and overpacks 5-1-5
Table 6-1 Applicability of Chapters 6-1-1
Table 6-2 Index of packagings other than inner packagings 6-1-2
Table 6-3 Index of inner packagings 6-1-4
Table 6-4 Tests required for packaging types 6-6-3
Table 6-5 Insolation data 6-7-5
Table 6-6 Values of Z for calculation of criticality safety index in accordance with 7.10.2 6-7-8
Table 6-7 Free drop distance for testing packages to normal conditions of transport 6-7-11
Table 7-1 Segregation between packages 7-2-2
Table 7-2 Separation of explosive substances and articles 7-2-2
Table 7-3 Minimum distance from surface of packages, overpacks and freight containers of radioactive material to the nearest inside surface of passenger cabin or flight deck partitions or floors, irrespective of carriage duration 7-2-5
Table 7-4 Minimum distance from surface of packages, overpacks and freight containers of radioactive material, carried by cargo aircraft only, to the nearest inside surface of the flight deck partitions or floor, or other areas occupied by personnel, irrespective of carriage duration 7-2-6
Table 7-5 Aircraft activity limits for LSA material and SCO in industrial packages 7-2-7
Table 7-6 Transport index limits for freight containers and aircraft not under exclusive use 7-2-7
Table 7-7 Critical Safety Indexes limits for freight containers and aircraft containing fissile material 7-2-7
Table 7-8 Minimum distance in metres from surface of each package, overpack or freight container of radioactive material to undeveloped photographic films or plates, for carriage lasting up to 48 hours 7-2-9
Table 7-9 Dangerous goods not required to appear in the information to the pilot-in-command 7-4-2
Table 8-1 Provisions for dangerous goods carried by passengers or crew 8-1-3
Table 8-2 Provisions for instruments carried by OPCW and government agencies 8-1-9
Table A-1 State variations A3-1-2
Table A-2 Operator variations A3-2-2

LIST OF FIGURES

Page

Figure 2-1 Criteria for inhalation of vapours 2-6-3
Figure 2-2 Step-wise approach to classify and assign packing group of corrosive mixtures 2-8-3
Figure 2-3 Calculation method 2-8-5
Figure 3-1 Limited quantities mark 3-4-3
Figure 3-2 Excepted quantities mark 3-5-4
Figure 5-1 Basic trefoil symbol with proportions based on a central circle of radius X. The minimum allowable size of X must be 4 mm 5-2-3
Figure 5-2 Symbol (fish and tree): black on white or suitable contrasting background 5-2-4
Figure 5-3 Lithium battery mark 5-2-6
Figure 5-4 Class/division label 5-3-6
Figure 5-5 Explosive, Class 1, Divisions 1.1, 1.2 and 1.3 (label illustration) 5-3-7
Figure 5-6 Explosive, Class 1, Division 1.4 (label illustration) 5-3-7
Figure 5-7 Explosive, Class 1, Division 1.5 (label illustration) 5-3-8
Figure 5-8 Explosive, Class 1, Division 1.6 (label illustration) 5-3-8
Figure 5-9 Flammable gas, Class 2, Division 2.1 (label illustration) 5-3-9
Figure 5-10 Non-flammable, non-toxic gas, Class 2, Division 2.2 (label illustration) 5-3-9
Figure 5-11 Toxic gas, Class 2, Division 2.3 (label illustration) 5-3-10
Figure 5-12 Flammable liquid, Class 3 (label illustration) 5-3-10
Figure 5-13 Flammable solid, Class 4, Division 4.1 (label illustration) 5-3-11
Figure 5-14 Substance liable to spontaneous combustion, Class 4, Division 4.2 (label illustration) 5-3-11
Figure 5-15 Substance which, in contact with water, emits flammable gas, Class 4, Division 4.3 (label illustration) 5-3-12
Figure 5-16 Oxidizing substance, Class 5 (label illustration) 5-3-12
Figure 5-17 Organic peroxide, Class 5, Division 5.2 5-3-13
Figure 5-18 Toxic substance, Class 6, Division 6.1 (label illustration) 5-3-13
Figure 5-19 Infectious substance, Class 6, Division 6.2 (label illustration) 5-3-14
Figure 5-20 Radioactive material, Class 7, Category I (label illustration) 5-3-14
Figure 5-21 Radioactive material, Class 7, Category II (label illustration) 5-3-15
Figure 5-22 Radioactive material, Class 7, Category III (label illustration) 5-3-15
Figure 5-23 Criticality safety index label 5-3-16
Figure 5-24 Corrosive, Class 8 (label illustration) 5-3-16
Figure 5-25 Miscellaneous dangerous goods, Class 9 (label illustration) 5-3-17
Figure 5-26 Miscellaneous dangerous goods, lithium batteries, Class 9 5-3-17
Figure 5-27 Magnetized material (label illustration) 5-3-18
Figure 5-28 Cargo aircraft only (label illustration) 5-3-18
Figure 5-29 Package orientation (label illustration) 5-3-19
Figure 5-30 Radioactive material, Class 7, placard for large freight containers 5-3-20
Figure 5-31 Cryogenic liquid label 5-3-21
Figure 5-32 Keep away from heat 5-3-22
Figure 5-33 Radioactive material, excepted package 5-3-23
Figure 6-1 Cylindrical steel rod used for puncture test 6-6-6
Figure 6-2 IBCs capable of being stacked 6-8-1
Figure 6-3 IBCs not capable of being stacked 6-8-1

— END —

ISBN 978-92-9265-688-1