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Recommendations on the

TRANSPORT OF DANGEROUS GOODS

Model Regulations

Twelfth revised edition

UNITED NATIONS

CONTENTS

RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

NATURE, PURPOSE AND SIGNIFICANCE OF THE RECOMMENDATIONS

1. These Recommendations have been developed by the United Nations Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods in the light of technical progress, the advent of new substances and materials, the exigencies of modern transport systems and, above all, the requirement to ensure the safety of people, property and the environment. They are addressed to governments and international organizations concerned with the regulation of the transport of dangerous goods. They do not apply to the transport of dangerous goods in bulk which, in most countries, is subject to special regulations.

2. The recommendations concerning the transport of dangerous goods are presented in the form of "Model Regulations on the Transport of Dangerous Goods", which are presented as annex to this document. The Model Regulations aim at presenting a basic scheme of provisions that will allow uniform development of national and international regulations governing the various modes of transport; yet they remain flexible enough to accommodate any special requirements that might have to be met. It is expected that governments, intergovernmental organizations and other international organizations, when revising or developing regulations for which they are responsible, will conform to the principles laid down in these Model Regulations, thus contributing to worldwide harmonization in this field. Furthermore, the new structure, format and content should be followed to the greatest extent possible in order to create a more user-friendly approach, to facilitate the work of enforcement bodies and to reduce the administrative burden. Although only a recommendation, the Model Regulations have been drafted in the mandatory sense (i.e., the word "shall" is employed throughout the text rather than "should") in order to facilitate direct use of the Model Regulations as a basis for national and international transport regulations.

3. The scope of the Model Regulations should ensure their value for all who are directly or indirectly concerned with the transport of dangerous goods. Amongst other aspects, the Model Regulations cover principles of classification and definition of classes, listing of the principal dangerous goods, general packing requirements, testing procedures, marking, labelling or placarding, and transport documents. There are, in addition, special requirements related to particular classes of goods. With this system of classification, listing, packing, marking, labelling, placarding and documentation in general use, carriers, consignors and inspecting authorities will benefit from simplified transport, handling and control and from a reduction in time-consuming formalities. In general, their task will be facilitated and obstacles to the international transport of such goods reduced accordingly. At the same time, the advantages will become increasingly evident as trade in goods categorized as "dangerous" steadily grows.

PRINCIPLES UNDERLYING THE REGULATION OF THE TRANSPORT OF DANGEROUS GOODS

4. Transport of dangerous goods is regulated in order to prevent, as far as possible, accidents to persons or property and damage to the environment, the means of transport employed or to other goods. At the same time, regulations should be framed so as not to impede the movement of such goods, other than those too dangerous to be accepted for transport. With this exception, the aim of regulations is to make transport feasible by eliminating risks or reducing them to a minimum. It is a matter therefore of safety no less than one of facilitating transport.

5. The Model Regulations annexed to this document are addressed to all modes of transport. Where less stringent requirements can be applied to only one mode, that fact is *not* indicated unless otherwise specified in these Regulations. For air transport more stringent requirements may occasionally apply.

CLASSIFICATION AND DEFINITIONS OF CLASSES OF DANGEROUS GOODS

6. The classification of goods by type of risk involved has been drawn up to meet technical conditions while at the same time minimizing interference with existing regulations. It should be noted that the numerical order of the classes is not that of the degree of danger.

7. The objective of the recommended definitions is to indicate which goods are dangerous and in which class, according to their specific characteristics, they should be included. These definitions have been devised so as to provide a common pattern which it should prove possible to follow in the various national and international regulations. Used with the list of dangerous goods, the definitions should provide guidance to those who have to use such regulations; and they present a notable degree of standardization while retaining a flexibility that allows diverse situations to be taken into account. Classifications for substances in the Model Regulations are made on the basis of consideration of data submitted to the Committee by governments, intergovernmental organizations and other international organizations in the form recommended in Figure 1. However the actual data submitted are not formally endorsed by the Committee.

8. The Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.3) present the United Nations schemes for the classification of certain types of dangerous goods and gives descriptions of the test methods and procedures, considered to be the most useful, for providing competent authorities with the necessary information to arrive at a proper classification of substances and articles for transport. It should be noted that the Manual is not a concise formulation of testing procedures that will unerringly lead to a proper classification of products and it assumes, therefore, competence on the part of the testing authority and leaves responsibility for classification with them. The competent authority has discretion to dispense with certain tests, to vary the details of tests and to require additional tests, when this is justified, to obtain a reliable and realistic assessment of the hazard of a product.

9. Wastes should be transported under the requirements of the appropriate class considering their hazards and the criteria presented in the Model Regulations. Wastes not otherwise subject to these Regulations but covered under the Basel Convention[1] may be transported under Class 9.

10. Many of the substances listed in Classes 1 to 9 are deemed, without additional labelling, as being environmentally hazardous.

[1] *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989).*

11. Many consignments of goods are treated with fumigants that pose a risk during transport, in particular to workers who may be exposed unknowingly when they open transport units. The Model Regulations address fumigated transport units as consignments that are subject to special documentation and warning sign requirements in the consignment procedures of Part 5.

CONSIGNMENT PROCEDURES

12. Whenever dangerous goods are offered for transport certain measures should be taken to ensure that the potential risks of the dangerous goods offered are adequately communicated to all who may come in contact with the goods in the course of transport. This has traditionally been accomplished through special marking and labelling of packages to indicate the hazards of a consignment and through the inclusion of relevant information in the transport documents and by placarding of transport units. Requirements in this regard are provided in the Model Regulations annexed to this document.

13. The labels recommended in 5.2.2.2 of the Model Regulations should be affixed on goods or packages. The labelling system is based on the classification of dangerous goods and was established with the following aims in mind:

(a) To make dangerous goods easily recognizable from a distance by the general appearance (symbol, colour and shape) of the labels they bear;

(b) To provide, by means of colours on the labels, a useful first guide for handling, stowage and segregation.

14. In certain cases, where the danger of an item of dangerous goods is considered low, or the goods are packed in a limited quantity, exemptions from labelling may be provided. In such cases, marking of packages with the class or division and the packing group number may be required.

15. One of the primary requirements of the transport document for dangerous goods is to convey the fundamental information relative to the hazard of the goods being offered for transport. To achieve this end, it is considered necessary to include certain basic information in the transport document for the dangerous goods consignment unless otherwise exempted in the Model Regulations. It is recognized that individual national authorities or international organizations may consider it necessary to require additional information. However, the basic items of information considered necessary for each dangerous substance, material or article offered for transport by any mode are identified in the Model Regulations.

EMERGENCY RESPONSE

16. The relevant national and/or international organizations should establish emergency provisions to be taken in the event of accidents or incidents during the transport of dangerous goods in order to protect persons, property and the environment. For radioactive material appropriate guidelines for such provisions are contained in "Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material", Safety Series No. 87, IAEA, Vienna (1988).

COMPLIANCE ASSURANCE

17. The competent authority should ensure compliance with these Regulations. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, the classification of dangerous goods and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of the Model Regulations are being met in practice.

TRANSPORT OF RADIOACTIVE MATERIAL

18. The Competent Authority should ensure that the consignment, acceptance for transport and transport of radioactive material is subject to a Radiation Protection Programme as described in the Model Regulations. The competent authority should arrange for periodic assessments of the radiation doses to persons due to the transport of radioactive material, to ensure that the system of protection and safety complies with the AInternational Basic Safety Standards for Protection against Ionizing Radiation and for the safety of Radiation Sources@, Safety Series No. 115, IAEA, Vienna (1996).

Figure 1

DATA SHEET TO BE SUBMITTED TO THE UNITED NATIONS FOR NEW OR AMENDED CLASSIFICATION OF SUBSTANCES

Submitted by . . . . . Date ……..…

Supply all relevant information including sources of basic classification data. Data should relate to the product in the form to be transported. State test methods. Answer all questions - if necessary state "not known" or "not applicable" - If data is not available in the form requested, provide what is available with details. Delete inappropriate words.

Section 1. SUBSTANCE IDENTITY

1.1 Chemical name ……

1.2 Chemical formula ……

1.3 Other names/synonyms ……

1.4.1 UN number …… 1.4.2 CAS number ……

1.5 Proposed classification for the Recommendations

1.5.1 proper shipping name (3.1.2*).. ……

1.5.2 class/division …… subsidiary risk(s) ……
packing group ……

1.5.3 proposed special provisions, if any ……

1.5.4 proposed packing instruction(s) ……

Section 2. PHYSICAL PROPERTIES

2.1 Melting point or range …… °C

2.2 Boiling point or range …… °C

2.3 Relative density at :

2.3.1 15 °C ……

2.3.2 20 °C ……

2.3.3 50 °C ……

2.4 Vapour pressure at :

2.4.1 50 °C …… kPa

2.4.2 65 °C …… kPa

2.5 Viscosity at 20°C** …… m^2/s

2.6 Solubility in water at 20°C…… g/100 ml

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* *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

** *See definition of "liquid" in 1.2.1 of the Model Regulations on the Transport of Dangerous Goods.*

2.7 Physical state at 20°C (2.2.1.1*) solid/liquid/gas**

2.8 Appearance at normal transport temperatures, including colour and odour . ……

……

2.9 Other relevant physical properties ……

……

Section 3. FLAMMABILITY

3.1 Flammable vapour

3.1.1 Flash point (2.3.3*) …… °C oc/cc

3.1.2 Is combustion sustained? (2.3.1.3) yes/no

3.2 Autoignition temperature …… °C

3.3 Flammability range (LEL/UEL) …… %

3.4 Is the substance a flammable solid? (2.4.2*)

3.4.1 If yes, give details ……

……

……

Section 4. CHEMICAL PROPERTIES

4.1 Does the substance require inhibition/stabilization or other treatment such as nitrogen blanket to prevent hazardous reactivity ? yes/no
If yes, state

4.1.1 Inhibitor/stabilizer used ……

4.1.2 Alternative method……

4.1.3 Time effective at 55°C……

4.1.4 Conditions rendering it ineffective……

4.2 Is the substance an explosive according to paragraph 2.1.1.1? (2.1*) yes/no

4.2.1 If yes, give details ……

……

……

……

4.3 Is the substance a desensitized explosive? (2.4.2.4*) yes/no

4.3.1 If yes, give details……

……

……

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* *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

** *See definition of "liquid" in 1.2.1 of the Model Regulations on the Transport of Dangerous Goods.*

4.4 Is the substance a self-reactive substance? (2.4.1*) yes/no

If yes, state

4.4.1 exit box of flow chart ……

What is the self-accelerating decomposition temperature (SADT) for a 50 kg package?……°C

Is the temperature control required? (2.4.2.3.4*) yes/no

4.4.2 proposed control temperature for a 50 kg package …… °C

4.4.3 proposed emergency temperature for a 50 kg package…… °C

4.5 Is the substance pyrophoric? (2.4.3*) yes/no

4.5.1 If yes, give details ……
……
……

4.6 Is the substance liable to self-heating? (2.4.3*) yes/no

4.6.1 If yes, give details ……
……
……

4.7 Is the substance an organic peroxide (2.5.1*) yes/no

If yes state

4.7.1 exit box of flow chart ……

What is the self accelerating decomposition temperature (SADT) for a 50 kg package?……°C

Is temperature control required? (2.5.3.4.1*) yes/no

4.7.2 proposed control temperature for a 50 kg package …… °C

4.7.3 proposed emergency temperature for a 50 kg package…… °C

4.8 Does the substance in contact with water emit flammable gases? (2.4.4*) yes/no

4.8.1 If yes give details ……
……
……

4.9 Does the substance have oxidizing properties (2.5.1*) yes/no

4.9.1 If yes, give details ……
……
……

4.10 Corrosivity (2.8*) to:

4.10.1 mild steel …… mm/year at ……°C

4.10.2 aluminium …… mm/year at ……°C

4.10.3 other packaging materials
(specify) …… ……mm/year at ……
…… ……mm/year at ……

4.11 Other relevant chemical properties ……
……

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* *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

Section 5. HARMFUL BIOLOGICAL EFFECTS

5.1 LD 50, oral (2.6.2.1.1*) ..... mg/kg Animal species .....

5.2 LD 50, dermal (2.6.2.1.2*) ..... mg/kg Animal species .....

5.3 LC 50, inhalation (2.6.2.1.3*) ..... mg/litre Exposure time ..... hours
or ..... ml/m^3 Animal species .....

5.4 Saturated vapour concentration at 20 °C (2.6.2.2.4.3*) ..... ml/m^3

5.5 Skin exposure (2.8*) results Exposure time ..... hours/minutes
Animal species .....

5.6 Other data .....
.....

5.7 Human experience .....
.....

Section 6. SUPPLEMENTARY INFORMATION

6.1 Recommended emergency action

6.1.1 Fire (include suitable and unsuitable extinguishing agents)
.....

6.1.2 Spillage .....

6.2 Is it proposed to transport the substance in:

6.2.1 Intermediate Bulk Containers (6.5*)? yes/no

6.2.2 Portable tanks (6.7*)? yes/no

If yes, give details in Sections 7 and/or 8.

Section 7. INTERMEDIATE BULK CONTAINERS (IBCs) (only complete if yes in 6.2.1*)

7.1 Proposed type(s) .....

Section 8. MULTIMODAL TANK TRANSPORT (only complete if yes in 6.2.2)

8.1 Description of proposed tank (including IMO tank type if known).....
.....

8.2 Minimum test pressure .....

8.3 Minimum shell thickness .....

8.4 Details of bottom openings, if any .....

8.5 Pressure relief arrangements.....

8.6 Degree of filling .....

8.7 Unsuitable construction materials.....

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* *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

Annex

Model Regulations on the

TRANSPORT OF DANGEROUS GOODS

Notes on the structure of the

Model Regulations

These Model Regulations consist of seven parts, each of which is divided into chapters. Chapters are numbered sequentially within each part, with the first digit identifying the part in which the chapter is located. For example, the second chapter in Part 7 would be designated "Chapter 7.2". Chapters are further divided into sections, which, in turn, are normally divided into a number of paragraphs. Sections and paragraphs are numbered sequentially with the first number always being the number of the chapter in which the section or paragraph is contained (e.g., 7.2.1 would be the first section in Chapter 7.2, and "7.2.1.1" would be the first paragraph in that section).

As an exception, and in order to keep a correspondence between the class number and the chapter number in Part 2, the first chapter ("Introduction") of Part 2 has been numbered Chapter 2.0.

When references appear in the text to other provisions of these regulations, the reference will normally consist of the full section or paragraph reference, as described above. In certain cases, however, broader reference may be made to an entire part or chapter by noting only the relevant part (e.g., "Part 5"), or the relevant chapter (e.g., "Chapter 5.4").

Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these regulations, are published as a separate manual ("Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria") (ST/SG/AC.10/11/Rev.3).

PART 1

GENERAL PROVISIONS,

DEFINITIONS AND TRAINING

CHAPTER 1.1

GENERAL PROVISIONS

Introductory notes

NOTE 1: *Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these Regulations are published as a separate Manual (ARecommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria@) (ST/SG/AC.10/11/Rev.3), 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 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 3, Class 4, Division 5.1 and Class 9.

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

NOTE 2: *Part III of the Manual of Tests and Criteria contains some classification procedures, test methods and criteria which are also given in these Regulations.*

1.1.1 Scope and application

1.1.1.1 These Regulations prescribe detailed requirements applicable to the transport of dangerous goods. Except as otherwise provided in these Regulations, no person may offer or accept dangerous goods for transport unless those goods are properly classified, packaged, marked, labelled, placarded, described and certified on a transport document, and otherwise in a condition for transport as required by these Regulations.

1.1.1.2 These Regulations do not apply to the transport of:

(a) Dangerous goods in bulk (except LSA-I and SCO-I material) which, in most countries, are subject to special regulations;

(b) Dangerous goods that are required for the propulsion of the means of transport or the operation of its specialised equipment during transport (e.g. refrigeration units) or that are required in accordance with the operating regulations (e.g. fire extinguishers); and

(c) Dangerous goods, packaged for retail sale, that are carried by individuals for their own use.

NOTE 1: *Specific modal provisions for the transport of dangerous goods as well as derogations from these general requirements can be found in the modal regulations.*

NOTE 2: *Certain special provisions of Chapter 3.3 also indicate substances and articles which are not subject to these Regulations.*

1.1.1.3 In certain parts of these Regulations, a particular action is prescribed, but the responsibility for carrying out the action is not specifically assigned to any particular person. Such responsibility may vary according to the laws and customs of different countries and the international conventions into which these countries have entered. For the purposes of these Regulations, it is not necessary to make this assignment, but only to identify the action itself. It remains the prerogative of each government to assign this responsibility.

1.1.1.4 In the transport of dangerous goods, the safety of persons and protection of property and the environment is assured when these Regulations are complied with. Confidence in this regard is achieved through quality assurance and compliance assurance programmes.

1.1.1.5 ***Exceptions for dangerous goods packed in limited quantities***

Certain dangerous goods packed in limited quantities are exempted from certain requirements of these regulations subject to the conditions laid down in Chapter 3.4.

1.1.1.6 In accordance with the Universal Postal Union Convention, dangerous goods as defined in these Regulations, with the exception of those listed below, are not permitted in the mail. National postal authorities should ensure that provisions are complied with in relation to the transport of dangerous goods. The following dangerous goods may be acceptable in mail subject to the provisions of the national postal authorities:

(a) Infectious substances and solid carbon dioxide (dry ice) when used as a refrigerant for infectious substances; and

(b) Radioactive material in an excepted package conforming to the requirements of 2.7.9.1, the activity of which does not exceed one tenth of that listed in Table 2.7.7.1.2.1.

For international movement by post additional requirements as prescribed by the Acts of the Universal Postal Union apply.

1.1.2 Transport of radioactive material

1.1.2.1 ***General***

1.1.2.1.1 These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These regulations are based on the IAEA Regulations for the Safe Transport of Radioactive Material (TS-R-1 (ST-1, Revised)), IAEA, Vienna (2000). Explanatory material on TS-R-1 can be found in AAdvisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1996 Edition)@, Safety Standard Series No. ST-2, IAEA, Vienna (to be published).

1.1.2.1.2 The objective of these Regulations is to protect persons, property and the environment from the effects of radiation during the transport of radioactive material. This protection is achieved by requiring:

(a) Containment of the radioactive contents;

(b) Control of external radiation levels;

(c) Prevention of criticality; and

(d) Prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to contents limits for packages and conveyances and to performance standards applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing requirements on the design and operation of packages and on the maintenance of packagings, including a consideration of the nature of the radioactive

contents. Finally, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities.

1.1.2.1.3 These Regulations apply to the transport of radioactive material by all modes on land, water or in the air, including transport which 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, transport including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages. A graded approach is applied to the performance standards in these Regulations that is characterized by three general severity levels:

(a) Routine conditions of transport (incident free);

(b) Normal conditions of transport (minor mishaps);

(c) Accident conditions of transport.

1.1.2.2 ***Radiation protection programme***

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

1.1.2.2.2 The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements in 1.1.2.2.3 to 1.1.2.2.5., 7.1.7.1.1, 7.1.7.1.3 and applicable emergency response procedures. Programme documents shall be available, on request, for inspection by the relevant competent authority.

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

1.1.2.2.4 Workers shall receive appropriate training concerning 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.

1.1.2.2.5 For occupational exposures arising from transport activities, where it is assessed that the effective dose:

(a) Is most unlikely to exceed 1 mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping shall be required;

(b) Is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted;

(c) Is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.

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

1.1.2.3 ***Quality assurance***

1.1.2.3.1 Quality assurance programmes based on international, national or other standards acceptable to the competent authority shall be established and implemented for the design, manufacture, testing, documentation, use, maintenance and inspection of all special form radioactive material, low dispersible radioactive material

and packages and for transport and in-transit storage operations to ensure compliance with the relevant provisions of these Regulations. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared to provide facilities for competent authority inspection during manufacture and use and to demonstrate to any cognizant competent authority that:

(a) The manufacturing methods and materials used are in accordance with the approved design specifications; and

(b) All packagings are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications, even after repeated use.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the quality assurance programme.

1.1.2.4 ***Special arrangement***

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

1.1.2.4.2 Consignments for which conformity with any provision applicable to Class 7 is impracticable shall not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the Class 7 provisions of these Regulations is impracticable and that the requisite standards of safety established by these Regulations have been demonstrated through alternative means the competent authority may approve special arrangement transport operations for single or a planned series of multiple consignments. The overall level of safety in transport shall be at least equivalent to that which would be provided if all the applicable requirements had been met. For international consignments of this type, multilateral approval shall be required.

1.1.2.5 ***Radioactive material possessing other dangerous properties***

1.1.2.5.1 In addition to the radioactive and fissile properties, any subsidiary risk of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall 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 regulations.

1.1.3 Dangerous goods forbidden from transport

1.1.3.1 Unless provided otherwise by these Regulations, the following are forbidden from transport:

Any substance or article 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 normal conditions normally encountered in transport.

CHAPTER 1.2

DEFINITIONS AND UNITS OF MEASUREMENT

Introductory note

NOTE: Scope of definitions

This Chapter provides definitions of general applicability that are used throughout these Regulations. Additional definitions of a highly specific nature (e.g., terms relating to construction of intermediate bulk containers or portable tanks) are presented in the relevant chapters.

1.2.1 Definitions

For the purposes of these Regulations:

Aerosols or aerosol dispensers are non-refillable receptacles meeting the requirements of 6.2.4, 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;

Aircraft

Cargo aircraft means any aircraft, other than a passenger aircraft, which is carrying goods or property;

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

Alternative arrangement means an approval granted by the competent authority for a portable tank or MEGC that has been designed, constructed or tested to technical requirements or testing methods other than those specified in these regulations (see, for instance, 6.7.5.11.1);

Bags are flexible packagings made of paper, plastics film, textiles, woven material or other suitable materials;

Boxes are packagings with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fibreboard, plastics 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;

Bundles of cylinders are assemblies of cylinders that are fastened together and which are interconnected by a manifold and transported as a unit. The total water capacity shall not exceed 3000 litres except that bundles intended for the transport of gases of Division 2.3 shall be limited to 1000 litres water capacity;

Carrier means any person, organization or government undertaking the transport of dangerous goods by any means of transport. The term includes both carriers for hire or reward (known as common or contract carriers in some countries) and carriers on own account (known as private carriers in some countries);

Closures are devices which close an opening in a receptacle;

Combination packagings are a combination of packagings for transport purposes, consisting of one or more inner packagings secured in an outer packaging in accordance with 4.1.1.5;

Competent authority means any national body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations;

Compliance assurance means a systematic programme of measures applied by a competent authority which is aimed at ensuring that the provisions of these Regulations are met in practice;

Composite packagings are packagings 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;

Consignee means any person, organization or government which is entitled to take delivery of a consignment;

Consignment means any package or packages, or load of dangerous goods, presented by a consignor for transport;

Consignor means any person, organization or government which prepares a consignment for transport;

Conveyance means

(a) For transport by road or rail: any vehicle;

(b) For transport by water: any vessel, or any hold, compartment, or defined deck area of a vessel; and

(c) For transport by air: any aircraft;

Crates are outer packagings with incomplete surfaces;

Critical temperature is the temperature above which the substance cannot exist in the liquid state;

Cryogenic receptacles are transportable thermally insulated receptacles for refrigerated liquefied gases, of a water capacity of not more than 1000 litres;

Cylinders are transportable pressure receptacles of a water capacity not exceeding 150 litres;

Defined deck area means the area of the weather deck of a vessel, or of a vehicle deck of a roll-on/roll-off ship or a ferry, which is allocated for the stowage of dangerous goods;

Drums are flat-ended or convex-ended cylindrical packagings made of metal, fibreboard, plastics, plywood or other suitable materials. This definition also includes packagings of other shapes e.g. round taper-necked packagings, or pail-shaped packagings. Wooden barrels or jerricans are not covered by this definition;

Filling ratio is 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;

Inspection body is an independent inspection and testing body approved by the competent authority;

Intermediate Bulk Containers (IBCs)

IBCs are rigid or flexible portable packagings, other than those specified in Chapter 6.1, that:

(a) Have a capacity of:

(i) not more than 3.0 m^3 (3,000 litres) for solids and liquids of packing groups II and III;

(ii) not more than 1.5 m^3 for solids of packing group I when packed in flexible, rigid plastics, composite, fibreboard and wooden IBCs;

(iii) not more than 3.0 m^3 for solids of packing group I when packed in metal IBCs;

(iv) not more than 3.0 m^3 for radioactive material of Class 7;

(b) Are designed for mechanical handling;

(c) Are resistant to the stresses produced in handling and transport, as determined by tests;

Remanufactured IBCs are metal, rigid plastics or composite IBCs that:

(a) are produced as a UN type from a non-UN type; or

(b) are converted from one UN design type to another UN design type.

Remanufactured IBCs are subject to the same requirements of these Regulations that apply to new IBCs of the same type (see also design type definition in 6.5.4.1.1).

Repaired IBCs are metal, rigid plastics or composite IBCs that, as a result of impact or for any other cause (e.g. corrosion, embrittlement or other evidence of reduced strength as compared to the design type) are restored so as to conform to the design type and to be able to withstand the design type tests. For the purposes of these Regulations, the replacement of the rigid inner receptacle of a composite IBC with a receptacle conforming to the original manufacturer's specification is considered repair. However, routine maintenance of IBCs (see definition below) is not considered repair. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs are not repairable.

Routine maintenance of IBCs is the routine performance on metal, rigid plastics or composite IBCs of operations such as:

(a) Cleaning;

(b) Removal and reinstallation or replacement of body closures (including associated gaskets), or of service equipment, conforming to the original manufacturer's specifications, provided that the leaktightness of the IBC is verified; or

(c) Restoration of structural equipment not directly performing a dangerous goods containment or discharge pressure retention function so as to conform to the design type (e.g. the straightening of legs or lifting attachments) provided that the containment function of the IBC is not affected.

Inner packagings are packagings for which an outer packaging is required for transport;

Inner receptacles are receptacles which require an outer packaging in order to perform their containment function;

Intermediate packagings are packagings placed between inner packagings, or articles, and an outer packaging;

Jerricans are metal or plastics packagings of rectangular or polygonal cross-section;

Large packagings are packagings consisting of an outer packaging which contains articles or inner packagings and which

(a) Are designed for mechanical handling; and

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

Liner means a separate tube or bag inserted into a packaging, (including IBCs and large packagings) but not forming an integral part of it, including the closures of its openings;

Liquids are dangerous goods which at 50 °C have a vapour pressure of not more than 300 kPa (3 bar), which are not completely gaseous at 20 °C and at a pressure of 101.3 kPa, and which have 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 shall 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 European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)[1].

Manual of Tests and Criteria is the third revised edition of the United Nations publication entitled "*Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*" (ST/SG/AC.10/11/Rev.3);

Maximum capacity as used in 6.1.4 is the maximum inner volume of receptacles or packagings expressed in litres;

Maximum net mass is the maximum net mass of contents in a single packaging or maximum combined mass of inner packagings and the contents thereof and is expressed in kg;

Multiple-element gas containers (MEGCs) are multimodal assemblies of cylinders, tubes and 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;

Outer packaging is 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 means an enclosure used by a single consignor to contain one or more packages and to form one unit for convenience of handling and stowage during transport. Examples of overpacks are a number of packages either:

(a) Placed or stacked on to a load board such as a pallet and secured by strapping, shrink wrapping, stretch wrapping, or other suitable means; or

(b) Placed in a protective outer packaging such as a box or crate;

Packages are the complete product of the packing operation, consisting of the packaging and its contents prepared for transport;

NOTE: *For radioactive material, see 2.7.2.*

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[1] *United Nations publication: [ECE/TRANS/140].*

Packagings are receptacles and any other components or materials necessary for the receptacle to perform its containment function;

NOTE: *For radioactive material, see 2.7.2.*

Portable tank means:

(a) For the purposes of the transport of substances of Classes 3 to 9, a multimodal portable tank having a capacity of more than 450 litres. It includes a shell fitted with service equipment and structural equipment necessary for the transport of dangerous substances;

(b) For the purposes of transport of non-refrigerated, liquefied gases of Class 2, a multimodal tank having a capacity of more than 450 litres. It includes a shell fitted with service equipment and structural equipment necessary for the transport of gases;

(c) For the purposes of transport of refrigerated liquefied gases, a thermally insulated tank having a capacity of more than 450 litres fitted with service equipment and structural equipment necessary for the transport of refrigerated liquefied gases;

The portable tank shall be capable of being loaded and discharged without the need of removal of its structural equipment. It shall possess stabilizing members external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be loaded on to a transport vehicle or ship and is equipped with skids, mountings or accessories to facilitate mechanical handling. Road tank-vehicles, rail tank-wagons, non-metallic tanks, gas cylinders, large receptacles, and intermediate bulk containers (IBCs) are not considered to fall within this definition;

Pressure drums are welded transportable pressure receptacles of a water capacity exceeding 150 litres and of not more than1000 litres, (e.g. cylindrical receptacles equipped with rolling hoops, spheres on skids);

Pressure receptacles is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles and bundles of cylinders;

Quality assurance means 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 in these Regulations is achieved in practice;

Receptacles are containment vessels for receiving and holding substances or articles, including any means of closing;

Reconditioned packagings include:

(a) Metal drums that:

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

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

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

(b) Plastics 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;

Recycled plastics material means 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 shall be assured and documented regularly as part of a quality assurance programme recognized by the competent authority. The quality assurance programme shall include a record of proper pre-sorting and verification that each batch of recycled plastics 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 plastics have 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 under 6.1.1.4 shall include performance of the mechanical design type test in 6.1.5 on packagings manufactured from each batch of recycled plastics material. In this testing, stacking performance may be verified by appropriate dynamic compression testing rather than static load testing;

Remanufactured IBCs (see *"Intermediate Bulk Containers (IBCs)"*)

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); or

(b) Plastics 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 Regulations that apply to a new drum of the same type;

Repaired IBCs (see *"Intermediate Bulk Containers (IBCs)"*)

Reused packagings are packagings to be refilled which have 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;

Routine Maintenance of IBCs (see *"Intermediate Bulk Containers (IBCs)"*)

Salvage packagings are special packagings 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;

Settled pressure is the pressure of the contents of a pressure receptacle in thermal and diffusive equilibrium;

Shipment means the specific movement of a consignment from origin to destination;

Siftproof packagings are packagings impermeable to dry contents including fine solid material produced during transport;

Solids are dangerous goods, other than gases, that do not meet the definition of *liquids* in this paragraph;

Tank means a portable tank (see 6.7.2.1) including a tank container, a road tank vehicle, a rail tank wagon or a receptacle with a capacity of not less than 450 litres to contain solids, liquids, or gases;

Test pressure is the required pressure applied during a pressure test for qualification or requalification;

Tubes are seamless transportable pressure receptacles of a water capacity exceeding 150 litres but not more than 3000 litres;

Vehicle means a road vehicle (including an articulated vehicle, i.e. a tractor and semi-trailer combination), railroad car or railway wagon. Each trailer shall be considered as a separate vehicle;

Vessel means any seagoing vessel or inland waterway craft used for carrying cargo;

Wooden barrels are packagings made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

Working pressure is the settled pressure of a compressed gas at a reference temperature of 15 °C in a full pressure receptacle;

Clarifying examples for certain defined terms

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

The definitions in this section are consistent with the use of the defined terms throughout the Regulations. 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 (plastics material) is such an "inner receptacle" since it is normally not designed to perform a containment function without its "outer packaging" and is not therefore an "inner packaging".

1.2.2 Units of measurement

1.2.2.1 The following units of measurement a/ are applicable in these Regulations:

Measurement of	SI Unit b/		Acceptable alternative unit		Relationship between units	
Length	m	(metre)		--		--
Area	m^2	(square metre)		--		--
Volume	m^3	(cubic metre)	l c/	(litre)	1 l	= 10^{-3} m^3
Time	s	(second)	min	(minute)	1 min	= 60 s
			h	(hour)	1 h	= 3 600 s
			d	(day)	1 d	= 86 400 s
Mass	kg	(kilogramme)	g	(gramme)	1 g	= 10^{-3} kg
			t	(ton)	1 t	= 10^3 kg
Mass density		kg/m^3		kg/l	1 kg/l	= 10^3 kg/m^3
Temperature	K	(kelvin)	°C	(degree Celsius)	0 °C	= 273.15 K
Difference of temperature	K	(kelvin)	°C	"	1 °C	= 1 K
Force	N	(newton)		--	1 N	= 1 kg · m/s^2
Pressure	Pa	(pascal)	bar	(bar)	1 bar	= 10^5 Pa
					1 Pa	= 1 N/m^2
Stress	N/m^2		N/mm^2		1 N/mm^2	= 1 MPa
Work)			kWh	(kilowatt	1 kWh	= 3.6 MJ
Energy)				hour)		
)	J	(joule)			1 J	= 1 N · m = 1 W · s
Quantity)			eV(electronvolt)		1 eV	= 0.1602 × 10^{-18} J
of heat)						
Power	W	(watt)		--	1 W	= 1 J/s = 1 N · m/s
Kinematic viscosity	m^2/s		mm^2/s		1 mm^2/s	= 10^{-6} m^2/s
Dynamic viscosity	Pa · s		mPa · s		1 mPa · s	= 10^{-3} Pa · s
Activity	Bq	(becquerel)				
Dose equivalent	Sv	(sievert)				

Notes to 1.2.2.1:

a/ *The following round figures are applicable for the conversion of the units hitherto used into SI Units.*

Force	*Stress*
$1\ kg = 9.807\ N$	$1\ kg/mm^2 = 9.807\ N/mm^2$
$1\ N = 0.102\ kg$	$1\ N/mm^2 = 0.102\ kg/mm^2$

Pressure

$1\ Pa = 1\ N/m^2 = 10^{-5}\ bar$	$= 1.02 \times 10^{-5}\ kg/cm^2$	$= 0.75 \times 10^{-2}\ torr$
$1\ bar = 10^5\ Pa$	$= 1.02\ kg/cm^2$	$= 750\ torr$
$1\ kg/cm^2 = 9.807 \times 10^4\ Pa$	$= 0.9807\ bar$	$= 736\ torr$
$1\ torr = 1.33 \times 10^2\ Pa$	$= 1.33 \times 10^{-3}\ bar$	$= 1.36 \times 10^{-3} kg/cm^2$

Energy, Work, Quantity of heat

$1\ J = 1\ Nm$	$= 0.278 \times 10^{-6}\ kWh$	$= 0.102\ kgm$	$= 0.239 \times 10^{-3}\ kcal$
$1\ kWh = 3.6 \times 10^6\ J$	$= 367 \times 10^3\ kgm$	$= 860\ kcal$	
$1\ kgm = 9.807\ J$	$= 2.72 \times 10^{-6}\ kWh$	$= 2.34 \times 10^{-3}\ kcal$	
$1\ kcal = 4.19 \times 10^3 J$	$= 1.16 \times 10^{-3}\ kWh$	$= 427\ kgm$	

Power			*Kinematic viscosity*	
$1\ W$	$= 0.102\ kgm/s$	$= 0.86\ kcal/h$	$1\ m^2/s$	$= 10^4\ St$ (Stokes)
$1\ kgm/s$	$= 9.807\ W$	$= 8.43\ kcal/h$	$1\ St$	$= 10^{-4}\ m^2/s$
$1\ kcal/h$	$= 1.16\ W$	$= 0.119\ kgm/s$		

Dynamic viscosity

$1\ Pa \cdot s$	$= 1\ Ns/m^2$	$= 10\ P$ (poise)	$= 0.102\ kgs/m^2$
$1\ P$	$= 0.1\ Pa \cdot s$	$= 0.1\ Ns/m^2$	$= 1.02 \times 10^{-2}\ kgs/m^2$
$1\ kgs/m^2$	$= 9.807\ Pa \cdot s$	$= 9.807\ Ns/m^2$	$= 98.07\ P$

b/ *The International System of Units (SI) is the result of decisions taken at the General Conference on Weights and Measures (Address: Pavillon de Breteuil, Parc de St-Cloud, F-92 310 Sèvres).*

c/ *The abbreviation "L" for litre may also be used in place of the abbreviation "l" when a typewriter cannot distinguish between figure "1" and letter "l".*

The decimal multiples and sub-multiples of a unit may be formed by prefixes or symbols, having the following meanings, placed before the name or symbol of the unit:

Factor			Prefix	Symbol
1 000 000 000 000 000 000	$= 10^{18}$	quintillion	exa	E
1 000 000 000 000 000	$= 10^{15}$	quadrillion	peta	P
1 000 000 000 000	$= 10^{12}$	trillion	tera	T
1 000 000 000	$= 10^{9}$	billion	giga	G
1 000 000	$= 10^{6}$	million	mega	M
1 000	$= 10^{3}$	thousand	kilo	k
100	$= 10^{2}$	hundred	hecto	h
10	$= 10^{1}$	ten	deca	da
0.1	$= 10^{-1}$	tenth	deci	d
0.01	$= 10^{-2}$	hundredth	centi	c
0.001	$= 10^{-3}$	thousandth	milli	m
0.000 001	$= 10^{-6}$	millionth	micro	µ
0.000 000 001	$= 10^{-9}$	billionth	nano	n
0.000 000 000 001	$= 10^{-12}$	trillionth	pico	p
0.000 000 000 000 001	$= 10^{-15}$	quadrillionth	femto	f
0.000 000 000 000 000 001	$= 10^{-18}$	quintillionth	atto	a

NOTE: *10^{9} = 1 billion is United Nations usage in English. By analogy, so is 10^{-9} = 1 billionth.*

1.2.2.2 Whenever the word "weight" is used, it means "mass".

1.2.2.3 Whenever the weight of a package is mentioned, the gross mass is meant unless otherwise stated. The mass of containers or tanks used for the transport of goods is not included in the gross mass.

1.2.2.4 Unless expressly stated otherwise, the sign "%" represents:

(a) In the case of mixtures of solids or of liquids, and also in the case of solutions and of solids wetted by a liquid: a percentage mass based on the total mass of the mixture, the solution or the wetted solid;

(b) In the case of mixtures of compressed gases: when filled by pressure, the proportion of the volume indicated as a percentage of the total volume of the gaseous mixture, or, when filled by mass, the proportion of the mass indicated as a percentage of the total mass of the mixture.

In the case of mixtures of liquefied gases and gases dissolved under pressure: the proportion of the mass indicated as a percentage of the total mass of the mixture.

1.2.2.5 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.

CHAPTER 1.3

TRAINING

1.3.1 Persons engaged in the transport of dangerous goods shall receive training in the contents of dangerous goods requirements commensurate with their responsibilities.

1.3.2 Individuals such as those who classify dangerous goods; pack dangerous goods; mark and label dangerous goods; prepare transport documents for dangerous goods; offer or accept dangerous goods for transport; carry or handle dangerous goods in transport; mark or placard or load or unload packages of dangerous goods into or from transport vehicles, bulk packagings or freight containers; or are otherwise directly involved in the transport of dangerous goods as determined by the competent authority; shall receive the following training:

(a) *General awareness/familiarization training*:

(i) Each person shall receive training designed to provide familiarity with the general provisions of dangerous goods transport requirements;

(ii) Such training shall include a description of the classes of dangerous goods; labelling, marking, placarding and packaging, segregation and compatibility requirements; a description of the purpose and content of the dangerous goods transport document; and a description of available emergency response documents;

(b) *Function-specific training*: Each person shall receive detailed training concerning specific dangerous goods transport requirements which are applicable to the function that person performs;

(c) *Safety training*: Commensurate with the risk of exposure in the event of a release and the functions performed, each person shall receive training on:

(i) Methods and procedures for accident avoidance, such as proper use of package-handling equipment and appropriate methods of stowage of dangerous goods;

(ii) Available emergency response information and how to use it;

(iii) General dangers presented by the various classes of dangerous goods and how to prevent exposure to those hazards, including if appropriate the use of personal protective clothing and equipment; and

(iv) Immediate procedures to be followed in the event of an unintentional release of dangerous goods, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.

1.3.3 The training required by 1.3.2 shall be provided or verified upon employment in a position involving dangerous goods transport and shall be periodically supplemented with retraining as deemed appropriate by the competent authority.

PART 2

CLASSIFICATION

CHAPTER 2.0

INTRODUCTION

2.0.0 Responsibilities

The classification shall be made by the appropriate competent authority when so required or may otherwise be made by the consignor.

2.0.1 Classes, divisions, packing groups

2.0.1.1 *Definitions*

Substances (including mixtures and solutions) and articles subject to these Regulations 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 substances and solid desensitised explosives
- 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

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

2.0.1.2 Many of the substances assigned to Classes 1 to 9 are deemed, without additional labelling, as being environmentally hazardous. Wastes shall be transported under the requirements of the appropriate class considering their hazards and the criteria in these Regulations.

Wastes not otherwise subject to these Regulations but covered under the Basel Convention1 may be transported under Class 9.

2.0.1.3 For packing purposes, substances other than those of Classes 1, 2 and 7, divisions 5.2 and 6.2 and other than 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; and
Packing group III: Substances presenting low danger.

The packing group to which a substance is assigned is indicated in the Dangerous Goods List in Chapter 3.2.

2.0.1.4 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 Chapters 2.1 to 2.9.

2.0.1.5 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 in Chapter 3.2, its class or division, its subsidiary risk(s) and, when applicable, its packing group are taken from this list.

2.0.1.6 Dangerous goods meeting the defining criteria of more than one hazard class or division and which are not listed by name in the Dangerous Goods List, are assigned to a class and division and subsidiary risk(s) on the basis of the precedence of hazards in 2.0.3.

2.0.2 UN numbers and proper shipping names

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

2.0.2.2 Dangerous goods commonly carried are listed in the Dangerous Goods List in Chapter 3.2. Where an article or substance is specifically listed by name, it shall be identified in transport by the proper shipping name in the Dangerous Goods List. For dangerous goods not specifically listed by name "generic" or "not otherwise specified" entries are provided (see 2.0.2.7) to identify the article or substance in transport.

1 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)

Each entry in the Dangerous Goods List is characterized by a UN number. This list also contains relevant information for each entry, such as hazard class, subsidiary risk(s) (if any), packing group (where assigned), packing and tank transport requirements, etc. Entries in the Dangerous Goods List are of the following four types:

(a) Single entries for well-defined substances or articles e.g.

1090 ACETONE
1194 ETHYL NITRITE SOLUTION;

(b) Generic entries for well-defined group of substances or articles e.g.

1133 ADHESIVES
1266 PERFUMERY PRODUCT
2757 CARBAMATE PESTICIDE, SOLID, TOXIC
3101 ORGANIC PEROXIDE, TYPE B, LIQUID;

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

1477 NITRATES, INORGANIC, N.O.S.
1987 ALCOHOLS, N.O.S.;

(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.

1325 FLAMMABLE SOLID, ORGANIC, N.O.S.
1993 FLAMMABLE LIQUID, N.O.S.

2.0.2.3 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 2.4.2.3.3 and Figure 2.4.1.

2.0.2.4 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 2.5.3.3 and Figure 2.5.1.

2.0.2.5 A mixture or solution containing a single dangerous substance specifically listed by name in the Dangerous Goods List and one or more substances not subject to these Regulations shall be assigned the UN number and proper shipping name of the dangerous substance, unless:

(a) The mixture or solution is specifically identified by name in these Regulations; or

(b) The entry in these Regulations specifically indicates that it applies only to the pure substance; or

(c) The hazard class or division, physical state or packing group of the solution or mixture is different from that of the dangerous substances; or

(d) There is significant change in the measures to be taken in emergencies.

In those other cases, except the one described in (a), the mixture or solution shall be treated as a dangerous substance not specifically listed by name in the Dangerous Goods List.

2.0.2.6 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 shall be used including its packaging and labelling provisions.

2.0.2.7 A mixture or solution containing one or more substances identified by name in these Regulations or classified under a N.O.S. entry and one or more substances is not subject to these Regulations 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.

2.0.2.8 Substances or articles which are not specifically listed by name in the Dangerous Goods List shall be classified under a "generic" or "not otherwise specified" ("N.O.S.") entry. The substance or article shall be classified according to the class definitions and test criteria in this Part, and the article or substance classified under the generic or "N.O.S." entry in the Dangerous Goods List which most appropriately describes the article or substance2. This means that a substance is only to be assigned to an entry of type c), as defined in 2.0.2.2, if it cannot be assigned to an entry of type b), and to an entry of type d) if it cannot be assigned to an entry of type b) or c)2.

2.0.3 Precedence of hazard characteristics

2.0.3.1 The table below shall be used to determine the class of a substance, mixture or solution having more than one risk, when it is not named in the Dangerous Goods List in Chapter 3.2. For goods having multiple risks which are not specifically listed by name in the Dangerous Goods List, the most stringent packing group denoted to the respective hazards of the goods takes precedence over other packing groups, irrespective of the precedence of hazard table in this Chapter. The precedence of hazard characteristics of the following have not been dealt with in the Precedence of hazards Table in 2.0.3.3, as these primary characteristics always take precedence:

(a) Substances and articles of Class 1;

(b) Gases of Class 2;

(c) Liquid desensitised 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 toxicity3:

(h) Substances of Division 6.2;

(i) Material of Class 7.

2.0.3.2 Apart from radioactive material in excepted packages (where the other hazardous properties take precedence) radioactive material having other hazardous properties shall always be classified in Class 7and the subsidiary risk shall also be identified.

2 See also the "List of generic or n.o.s. proper shipping names" in Appendix A.

3 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 shall be allocated to Class 8.

2.0.3.3 ***Precedence of hazards***

	Class or Division and Packing Group														
	4.2	4.3	5.1 1	5.1 II	5.1 III	6.1,I Dermal	6.1,I Oral	6.1 II	6.1 III	8,I Liquid	8,I Solid	8,II Liquid	8,II Solid	8,III Liquid	8,III Solid
3 I*		4.3				3	3	3	3	3	-	3	-	3	-
3 II*		4.3				3	3	3	3	8	-	3	-	3	-
3 III*		4.3			6.1	6.1	6.1	3**	8	-	8	-	3	-	
4.1 II*	4.2	4.3	5.1	4.1	4.1	6.1	6.1	4.1	4.1	-	8	-	4.1	-	4.1
4.1 III*	4.2	4.3	5.1	4.1	4.1	6.1	6.1	6.1	4.1	-	8	-	8	-	4.1
4.2 II.....	4.3	5.1	4.2	4.2	6.1	6.1	4.2	4.2	8	8	4.2	4.2	4.2	4.2	
4.2 III.....		4.3	5.1	5.1	4.2	6.1	6.1	6.1	4.2	8	8	8	8	4.2	4.2
4.3 I.....			5.1	4.3	4.3	6.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4.3 II.....			5.1	4.3	4.3	6.1	4.3	4.3	4.3	8	8	4.3	4.3	4.3	4.3
4.3 III.....			5.1	5.1	4.3	6.1	6.1	6.1	4.3	8	8	8	8	4.3	4.3
5.1 I						5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
5.1 II						6.1	5.1	5.1	5.1	8	8	5.1	5.1	5.1	5.1
5.1 III						6.1	6.1	6.1	5.1	8	8	8	8	5.1	5.1
6.1 I, Dermal...										8	6.1	6.1	6.1	6.1	6.1
6.1 I, Oral.....										8	6.1	6.1	6.1	6.1	
6.1 II, Inhalation										8	6.1	6.1	6.1	6.1	
6.1 II, Dermal...										8	6.1	8	6.1	6.1	
6.1 II, Oral.....										8	8	8	6.1	6.1	
6.1 III.....										8	8	8	8	8	8

* *Substances of Division 4.1 other than self-reactive substances and solid desensitized explosives and substances of Class 3 other than liquid desensitized explosives.*

** *6.1 for pesticides.*

\- Denotes an impossible combination.

For hazards not shown in this table, see 2.0.3.

2.0.4 Transport of samples

2.0.4.1 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 shall be assigned on the basis of the consignor's knowledge of the substance and application of:

(a) the classification criteria of these Regulations; and

(b) the precedence of hazards given in 2.0.3.

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

Where this provision is used the proper shipping name shall 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 shall 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 as required by special provision 274.

2.0.4.2 Samples of the substance shall 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 prohibited for transport by 1.1.3;

(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 2.4.2.3.2.4(b) or 2.5.3.2.5.1 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.

CHAPTER 2.1

CLASS 1 - EXPLOSIVES

Introductory notes

NOTE 1: *Class 1 is a restricted class, that is, only those explosive substances and articles that are listed in the Dangerous Goods List in Chapter 3.2 may be accepted for transport. However, competent authorities 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, not otherwise specified" and "Articles, explosive, not otherwise specified". It is the intention that these entries shall 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 commercial carriers.*

NOTE 3: *A number of substances and articles in Class 1 are described in Appendix B. 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.*

2.1.1 Definitions and general provisions

2.1.1.1 Class 1 comprises:

(a) Explosive substances (a substance which 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 shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise; and

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

2.1.1.2 Transport of explosive substances which are unduly sensitive or so reactive as to be subject to spontaneous reaction is prohibited.

2.1.1.3 ***Definitions***

For the purposes of these Regulations, 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.

2.1.1.4 ***Divisions***

Class 1 is divided into six divisions as follows:

(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:

(i) which give rise to considerable radiant heat; or

(ii) which 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 shall 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: *The probability of transition from burning to detonation is greater when large quantities are carried in a ship.*

(f) Division 1.6 *Extremely insensitive articles which do not have a mass explosion hazard*

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

NOTE: *The risk from articles of Division 1.6 is limited to the explosion of a single article.*

2.1.1.5 Any substance or article having or suspected of having explosive characteristics shall first be considered for classification in Class 1 in accordance with the procedures in 2.1.3. Goods are not classified in Class 1 when:

(a) Unless specially authorized, the transport of an explosive substance is prohibited 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.

2.1.2 Compatibility groups

2.1.2.1 Goods of Class 1 are assigned to one of six divisions, depending on the type of hazard they present (see 2.1.1.4) and to one of thirteen compatibility groups which identify the kinds of explosive substances and articles that are deemed to be compatible. The tables in 2.1.2.1.1 and 2.1.2.1.2 show the scheme of classification into compatibility groups, the possible hazard divisions associated with each group and the consequential classification codes.

2.1.2.1.1 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
Explosive substance or article containing an explosive substance and presenting a special risk (e.g. due to water-activation or presence of hypergolic liquids, phosphides or a pyrophoric substance) and needing isolation of each type (see 7.1.3.1.5)	L	1.1L 1.2L 1.3L
Articles containing only extremely insensitive detonating substances	N	1.6N
Substance or article 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 efforts in the immediate vicinity of the package	S	1.4S

2.1.2.1.2 Scheme of classification of explosives, combination of hazard division with compatibility group

	Compatibility Group													
Hazard Division	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	1	3	4	4	3	4	4	2	3	2	3	1	1	35

2.1.2.2 The definitions of compatibility groups in 2.1.2.1.1 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.

2.1.3 Classification procedure

2.1.3.1 *General*

2.1.3.1.1 Any substance or article having or suspected of having explosives characteristics shall be considered for classification in Class 1. Substances and articles classified in Class 1 shall be assigned to the appropriate division and compatibility group.

2.1.3.1.2 Except for substances which are listed by their proper shipping name in the Dangerous Goods List in Chapter 3.2, goods shall not be offered for transport as Class 1 until they have been subjected to the classification procedure prescribed in this section. In addition, the classification procedure shall be undertaken before a new product is offered for transport. In this context a new product is one which, in the opinion of the competent 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 risk into a mass explosion risk.*

2.1.3.1.3 The producer or other applicant for classification of a product shall provide adequate information concerning the names and characteristics of all explosive substances in the product and shall 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.

2.1.3.1.4 A report on the series of tests shall be drawn up in accordance with the requirements of the competent authority. It shall in particular contain information on:

(a) The composition of the substance or the structure of the article;

(b) The quantity of substance or number of articles per test;

(c) The type and construction of the packaging;

(e) The course of the test, including in particular the time elapsing until the occurrence of the first noteworthy reaction of the substance or article, the duration and characteristics of the reaction, and an estimate of the latter's completeness;

(f) The effect of the reaction on the immediate surroundings (up to 25 m from the site of the test);

(g) The effect of the reaction on the more remote surroundings (more than 25 m from the site of the test); and

(h) The atmospheric conditions during the test.

2.1.3.1.5 Verification of the classification shall be undertaken if the substance or article or its packaging is degraded and the degradation might affect the behaviour of the item in the tests.

2.1.3.2 *Procedure*

2.1.3.2.1 Figure 2.1.1 indicates the general scheme for classifying a substance or article which is to be considered for inclusion in Class 1. The assessment is in two stages. First, the potential of a substance or article to explode must be ascertained and its stability and sensitivity, both chemical and physical, must be shown to be acceptable. In order to promote uniform assessments by competent authorities, it is recommended that data from suitable tests be analyzed systematically with respect to the appropriate test criteria using the flow chart of Figure 10.2 in Part I of the *Manual of Tests and Criteria*. If the substance or article is acceptable for Class 1 it is then necessary to proceed to the second stage, to assign the correct hazard division by the flow chart of Figure 10.3 in the same publication.

2.1.3.2.2 The tests for acceptance and the further tests to determine the correct division in Class 1 are conveniently grouped into seven series as listed in Part I of the *Manual of Tests and Criteria*. The numbering of these series relates to the sequence of assessing results rather than the order in which the tests are conducted.

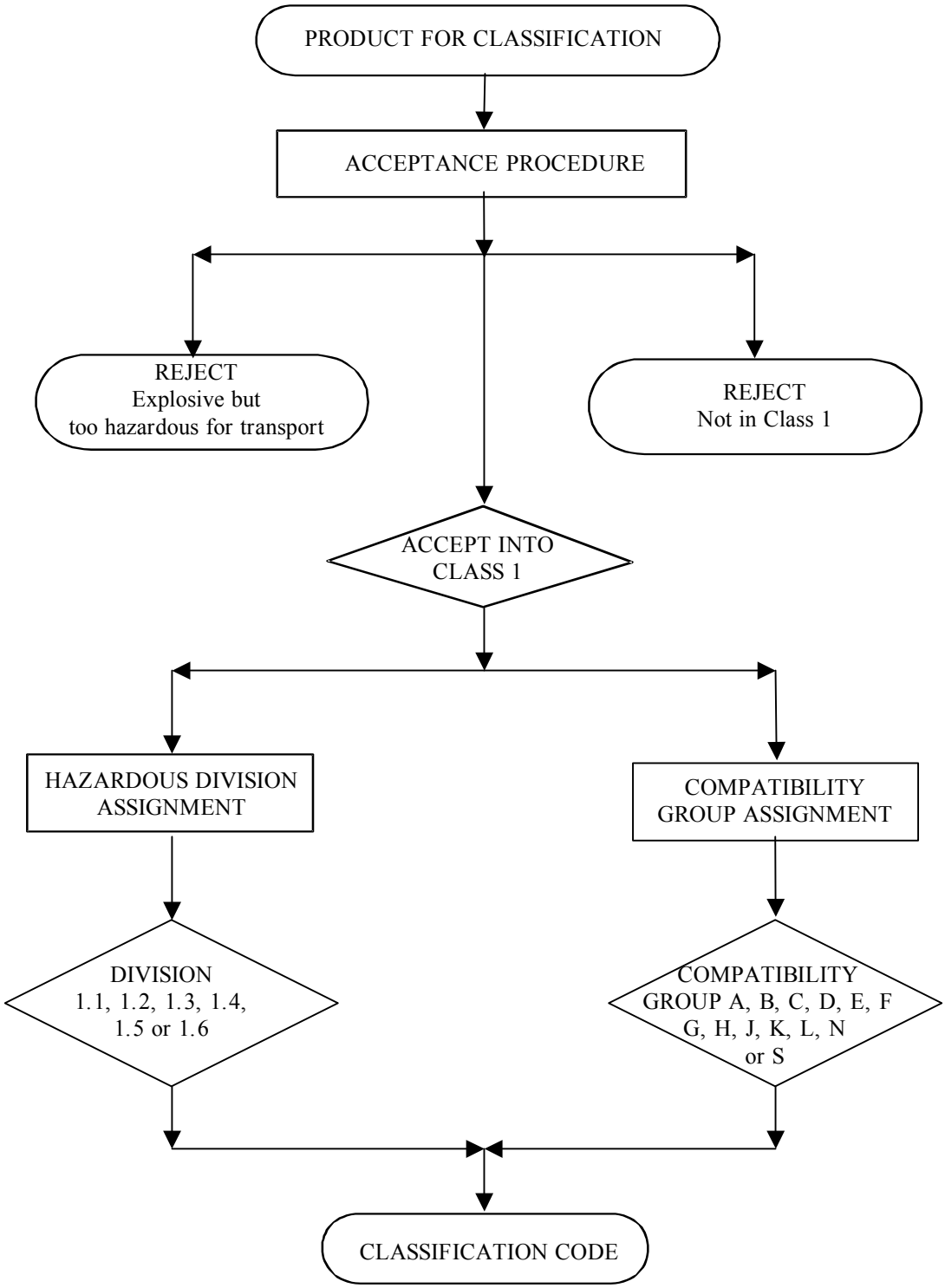
2.1.3.2.3 Scheme of procedure for classifying a substance or article

NOTE 1: *The competent authority which prescribes the definitive test method corresponding to each of the Test Types should specify the appropriate test criteria. Where there is international agreement on test criteria, the details are given in the publication referred to above describing the seven series of tests.*

NOTE 2: *The scheme of assessment is only designed for the classification of packaged substances and articles and for individual unpacked articles. Transport in freight containers, road vehicles and rail wagons may require special tests which take into consideration the quantity (self-confinement) and kind of substance and the container for the substance. Such tests may be specified by the competent authorities.*

NOTE 3: *Since there will be borderline cases with any scheme of testing there should be an ultimate authority who will make the final decision. Such a decision may not receive international acceptance and may therefore be valid only in the country where it is made. The United Nations Committee of Experts on the Transport of Dangerous Goods provides a forum for the discussion of borderline cases. Where international recognition is sought for a classification, the competent authority should submit full details of all tests made including the nature of any variations introduced.*

Figure 2.1.1
SCHEME OF PROCEDURE FOR CLASSIFYING A SUBSTANCE OR ARTICLE



2.1.3.3 *Acceptance procedure*

2.1.3.3.1 The results from preliminary tests and those from Test Series 1 to 4 are used to determine whether or not the product is acceptable for Class 1. If the substance is manufactured with a view to producing a practical explosive or pyrotechnic effect (2.1.1.1 (c)), it is unnecessary to conduct Test Series 1 and 2. If an article, a packaged article or a packaged substance is rejected by Test Series 3 and/or 4 it may be practicable to redesign the article or the packaging to render it acceptable.

NOTE: *Some devices may function accidentally during transport. Theoretical analysis, test data or other evidence of safety should be provided to establish that such an event is very unlikely or that the consequences would not be significant. The assessment should take account of vibration related to the proposed modes of transport, static electricity, electromagnetic radiation at all relevant frequencies (maximum intensity 100 W.m^{-2}), adverse climatic conditions and compatibility of explosive substances with glues, paints and packaging materials with which they may come in contact. All articles containing primary explosive substances should be assessed to evaluate the risk and consequences of accidental functioning during transport. The reliability of fuzes should be assessed taking account of the number of independent safety features. All articles and packaged substances should be assessed to ensure they have been designed in a good workmanlike manner (e.g. there is no possibility of formation of voids or thin films of explosive substance, and no possibility of grinding or nipping explosive substances between hard surfaces).*

2.1.3.4 *Assignment to hazard divisions*

2.1.3.4.1 Assessment of the hazard division is usually made on the basis of test results. A substance or article shall be assigned to the hazard division which corresponds to the results of the tests to which the substance or article, as offered for transport, has been subjected. Other test results, and data assembled from accidents which have occurred, may also be taken into account.

2.1.3.4.2 Test series 5, 6 and 7 are used for the determination of the hazard division. Test series 5 is used to determine whether a substance can be assigned to Division 1.5. Test series 6 is used for the assignment of substances and articles to Divisions 1.1, 1.2, 1.3 and 1.4. Test series 7 is used for the assignment of articles to Division 1.6.

2.1.3.4.3 In the case of Compatibility Group S the tests may be waived by the competent authority if classification by analogy is possible using test results for a comparable article.

2.1.3.5 *Exclusion from Class 1*

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

2.1.3.5.2 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 of Chapter 3.2 in that class or division with a special provision restricting it to the type and size of package tested.

2.1.3.5.3 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) shall be listed in the Dangerous Goods List of Chapter 3.2 with an indication of the highest concentration which excluded it from Class 1 (see 2.3.1.4 and 2.4.2.4.1) and if applicable, the concentration below which it is no longer deemed subject to these Regulations. New solid desensitized explosives subject to these Regulations shall be listed in Division 4.1 and new liquid desensitized explosives shall be listed in Class 3. When the desensitized explosive meets the criteria or definition for another class or division, the corresponding subsidiary risk(s) shall be assigned to it.

CHAPTER 2.2

CLASS 2 - GASES

2.2.1 Definitions and general provisions

2.2.1.1 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.

NOTE: *Carbonated beverages are not subject to these Regulations.*

2.2.1.2 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; or

(d) *Dissolved gas* – a gas which when packaged under pressure for transport is dissolved in a liquid phase solvent.

2.2.1.3 The 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 and aerosols.

2.2.2 Divisions

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

NOTE: *For UN 1950 AEROSOLS, see also the criteria in special provision 63 and for UN 2037 RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) see also special provision 303.*

(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 shall be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used;

(b) Division 2.2 *Non-flammable, non-toxic gases*

Gases which are transported at a pressure not less than 280 kPa at 20 °C, or as refrigerated liquids, and 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;

(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 (as defined in 2.6.2.1) equal to or less than 5,000 ml/m^3 (ppm).

NOTE: *Gases meeting the above criteria owing to their corrosivity are to be classified as toxic with a subsidiary corrosive risk.*

NOTE: *Gases with an LC_{50} lower than or equal to 200 ppm are referenced as "highly toxic gases".*

2.2.2.2 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.

2.2.3 Mixtures of gases

Gas mixtures are to be classified in one of the three divisions (including vapours of substances from other classes) by applying the following procedures:

(a) Flammability shall be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used;

(b) The level of toxicity is determined either by tests to measure the LC_{50} value (as defined in 2.6.2.1) or by a calculation method using the following formula:

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

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

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 risk 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 corrosive components of the mixture is equal to or less than 5,000 ml/m^3 (ppm) when the LC_{50} is calculated by the formula:

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

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

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 ISO.

CHAPTER 2.3

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 Chapter 3.2 shall 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 shall be determined experimentally.*

2.3.1 Definition and general provisions

2.3.1.1 Class 3 includes the following substances:

(a) Flammable liquids (see 2.3.1.2 and 2.3.1.3);

(b) Liquid desensitized explosives (see 2.3.1.4).

2.3.1.2 *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 60.5 °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.

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.*

2.3.1.3 Liquids meeting the definition in 2.3.1.2 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 Regulations. Liquids are considered to be unable to sustain combustion for the purposes of these Regulations (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 *Manual of Tests and Criteria*, Part III, sub-section 32.5.2;

(b) Their fire point according to ISO 2592:2000 is greater than 100 °C; or

(c) They are water miscible solutions with a water content of more than 90% by mass.

2.3.1.4 Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form an homogeneous liquid mixture to suppress their explosives properties (see 2.1.3.5.3). Entries in the Dangerous Goods List for liquid desensitized explosives are : UN 1204, UN 2059, UN 3064, UN 3343 and UN 3357.

2.3.2 Assignment of packing groups

2.3.2.1 The criteria in 2.3.2.6 are used to determine the hazard grouping of a liquid that presents a risk due to flammability.

2.3.2.1.1 For liquids whose only risk is flammability, the packing group for the substance is the hazard grouping shown in 2.3.2.6.

2.3.2.1.2 For a liquid with additional risk(s), the hazard group determined from 2.3.2.6 and the hazard group based on the severity of the additional risk(s) shall be considered, and the classification and packing group determined in accordance with the provisions in Chapter 2.0.

2.3.2.2 Viscous substances such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash point of less than 23 °C may be placed in Packing Group III in conformity with the procedures prescribed in the *Manual of Tests and Criteria*, Part III, sub-section 32.3, on the basis of:

(a) the viscosity expressed as the flowtime in seconds;

(b) the closed-cup flash point;

(c) a solvent separation test.

2.3.2.3 Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes with a flash point of less than 23 °C are included in Packing Group III provided that:

(a) Less than 3% of the clear solvent layer separates in the solvent separation test;

(b) The mixture or any separated solvent does not meet the criteria for Division 6.1 or Class 8.

2.3.2.4 Substances classified as flammable liquids due to their being transported or offered for transport at elevated temperatures are included in packing group III.

2.3.2.5 Viscous substances which:

- have a flash point of 23 °C or above and less than or equal to 60.5 °C;
- are not toxic or corrosive;
- contain not more than 20% nitro-cellulose provided the nitro-cellulose contains not more than 12.6% nitrogen by dry mass; and
- are packed in receptacles of less than 450 l capacity;

are not subject to these Regulations, if:

(a) in the solvent separation test (see *Manual of Tests and Criteria*, Part III, sub-section 32.5.1), the height of the separated layer of solvent is less than 3% of the total height; and

(b) the flowtime in the viscosity test (see *Manual of Tests and Criteria*, Part III, sub-section 32.4.3), with a jet diameter of 6 mm is equal to or greater than:

(i) 60 seconds; or

(ii) 40 seconds if the viscous substance contains not more than 60% of Class 3 substances.

2.3.2.6 Hazard grouping based on flammability:

Packing group	Flash point (closed-cup)	Initial boiling point
I	--	≤35 °C
II	<23 °C	>35 °C
III	≥23 °C ≤60.5 °C	>35 °C

2.3.3 Determination of flash point

The following is a list of documents describing methods for determining the flash point of substances of Class 3:

France (Association française de normalisation, AFNOR, Tour Europe, 92049 Paris La Défense):

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

Germany (Deutscher Normenausschuss):

Standard DIN 51755 (flash points below 65 °C)
Standard DIN 51758 (flash points 65 °C to 165 °C)
Standard DIN 53213 (for varnishes, lacquers and similar viscous liquids with flash points below 65 °C)

Netherlands:

ASTM D93-90
ASTM D3278-89
ISO 1516
ISO 1523
ISO 3679
ISO 3680

Russian Federation (State Committee of the Council of Ministers for Standardization, 113813, GSP, Moscow, M-49 Leninsky Prospect, 9)

GOST 12.1.044-84

United Kingdom (British Standards Institution, Linford Wood, Milton Keynes, MK14 6LE)

British Standard BS EN 22719
British Standard BS 2000 Part 170

United States of America (American Society for Testing Materials, 1916 Race Street, Philadelphia, Penna 19103)

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
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

CHAPTER 2.4

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 Regulations, it refers to a substance which in contact with water emits flammable gas.*

NOTE 2: *Because of the different properties exhibited by 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 Manual of Tests and Criteria, Part III, section 33).*

2.4.1 Definitions and general provisions

2.4.1.1 *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 which are liable to undergo a strongly exothermic reaction; solid 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.

2.4.1.2 As referenced in this Chapter, test methods and criteria, with advice on application of the tests, are given in the *Manual of Tests and Criteria*, for the classification of following types of substances of Class 4:

(a) Flammable solids (Division 4.1);

(b) Self-reactive substances (Division 4.1);

(c) Pyrophoric solids (Division 4.2);

(d) Pyrophoric liquids (Division 4.2);

(e) Self-heating substances (Division 4.2); and

(f) Substances which, in contact with water, emit flammable gases (Division 4.3).

Test methods and criteria for self-reactive substances are given in Part II of the *Manual of Tests and Criteria*, and test methods and criteria for the other types of substances of Class 4 are given in the *Manual of Tests and Criteria*, Part III, section 33.

2.4.2 Division 4.1 - Flammable solids, self-reactive substances and solid desensitized explosives

2.4.2.1 *General*

Division 4.1 includes the following types of substances:

(a) Flammable solids (see 2.4.2.2);

(b) Self-reactive substances (see 2.4.2.3); and

(c) Solid desensitized explosives (see 2.4.2.4);

2.4.2.2 *Division 4.1 Flammable solids*

2.4.2.2.1 *Definitions and properties*

2.4.2.2.1.1 *Flammable solids* are readily combustible solids and solids which may cause fire through friction.

2.4.2.2.1.2 *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 come not only 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.

2.4.2.2.2 *Classification of flammable solids*

2.4.2.2.2.1 Powdered, granular or pasty substances shall 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 method described in the *Manual of Tests and Criteria*, Part III, sub-section 33.2.1, is less than 45 s or the rate of burning is more than 2.2 mm/s. Powders of metals or metal alloys shall 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.

2.4.2.2.2.2 Solids which may cause fire through friction shall be classified in Division 4.1 by analogy with existing entries (e.g. matches) until definitive criteria are established.

2.4.2.2.3 *Assignment of packing groups*

2.4.2.2.3.1 Packing groups are assigned on the basis of the test methods referred to in 2.4.2.2.2.1. For readily combustible solids (other than metal powders), Packing group II shall be assigned if the burning time is less than 45 s and the flame passes the wetted zone. Packing Group II shall be assigned to powders of metal or metal alloys if the zone of reaction spreads over the whole length of the sample in five minutes or less.

2.4.2.2.3.2 Packing groups are assigned on the basis of the test methods referred to in 2.4.2.2.2.1. For readily combustible solids (other than metal powders), Packing group III shall be assigned if the burning time is less than 45 s and the wetted zone stops the flame propagation for at least four minutes. Packing group III shall be assigned to metal powders if the reaction spreads over the whole length of the sample in more than five minutes but not more than ten minutes.

2.4.2.2.3.3 For solids which may cause fire through friction, the packing group shall be assigned by analogy with existing entries or in accordance with any appropriate special provision.

2.4.2.3 *Division 4.1 Self-reactive substances*

2.4.2.3.1 *Definitions and properties*

2.4.2.3.1.1 *Definitions*

For the purposes of these Regulations:

Self-reactive substances are thermally unstable substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). Substances are not 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 assignment procedure of Division 5.1 (see 2.5.2.1.1);

(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 (SADT) (see 2.4.2.3.4) is greater than 75 °C for a 50 kg package.

NOTE 1: *The heat of decomposition can be determined using any internationally recognised method e.g. differential scanning calorimetry and adiabatic calorimetry.*

NOTE 2: *Any substance which shows the properties of a self-reactive substance shall be classified as such, even if this substance gives a positive test result according to 2.4.3.2 for inclusion in Division 4.2.*

2.4.2.3.1.2 *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 shall 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 are, for example, some compounds of the types listed below:

(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.

2.4.2.3.2 *Classification of self-reactive substances*

2.4.2.3.2.1 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 may not be accepted for transport in the packaging in which it is tested, 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.

2.4.2.3.2.2 Self-reactive substances permitted for transport are listed in 2.4.2.3.2.3. For each permitted substance, 2.4.2.3.2.3 assigns the appropriate generic entry in the Dangerous Goods List (UN 3221 to 3240). The generic entries specify:

(a) Self-reactive substance type (B to F);

(b) Physical state (liquid or solid); and

(c) Temperature control, when required (see 2.4.2.3.4).

2.4.2.3.2.3 List of currently assigned self-reactive substances

NOTE 1: *The classification given in this table is based on the technically pure substance (except where a concentration of less than 100% is specified). For other concentrations, the substances may be classified differently following the procedures in 2.4.2.3.3 and 2.4.2.3.4.*

NOTE 2: *The codes "OP1" to "OP8" shown in the column "Packing methods" refer to packing methods in packing instruction P520.*

SELF-REACTIVE SUBSTANCE	Concen-tration (%)	Packing method	Control temper-ature (°C)	Emergency temper-ature (°C)	UN generic entry	Remarks
AZODICARBONAMIDE FORMULATION TYPE B, TEMPERATURE CONTROLLED	< 100	OP5			3232	(1) (2)
AZODICARBONAMIDE FORMULATION TYPE C	< 100	OP6			3224	(3)
AZODICARBONAMIDE FORMULATION TYPE C, TEMPERATURE CONTROLLED	< 100	OP6			3234	(4)
AZODICARBONAMIDE FORMULATION TYPE D	< 100	OP7			3226	(5)
AZODICARBONAMIDE FORMULATION TYPE D, TEMPERATURE CONTROLLED	< 100	OP7			3236	(6)
2,2' -AZODI(2,4-DIMETHYL-4-METHOXYVALERONITRILE)	100	OP7	-5	+5	3236	
2,2' -AZODI(2,4-DIMETHYL-VALERONITRILE)	100	OP7	+10	+15	3236	
2,2' -AZODI(ETHYL-2-METHYLPROPIONATE)	100	OP7	+20	+25	3235	
1,1-AZODI(HEXAHYDROBENZONITRILE)	100	OP7			3226	
2,2'-AZODI(ISOBUTYRONITRILE)	100	OP6	+40	+45	3234	
2,2'-AZODI(ISOBUTYRONITRILE) as a water based paste	≤ 50	OP6			3224	
2,2'-AZODI(2-METHYLBUTYRO-NITRILE)	100	OP7	+35	+40	3236	
BENZENE-1,3-DISULPHONYL HYDRAZIDE, as a paste	52	OP7			3226	
BENZENESULPHONYL HYDRAZIDE	100	OP7			3226	
4-(BENZYL(ETHYL)AMINO)-3-ETHOXY-BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7			3226	
4-(BENZYL(METHYL)AMINO)-3-ETHOXYBENZENEDIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
3-CHLORO-4-DIETHYLAMINOBENZENE-DIAZONIUM ZINC CHLORIDE	100	OP7			3226	
2-DIAZO-1-NAPHTHOL-4-SULPHONYLCHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL-5-SULPHONYL CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL SULPHONIC ACID ESTER MIXTURE, TYPE D	< 100	OP7			3226	(9)

SELF-REACTIVE SUBSTANCE	Concen-tration (%)	Packing method	Control temper-ature (°C)	Emergency temper-ature (°C)	UN generic entry	Remarks
2,5-DIBUTOXY-4-(4-MORPHOLINYL) BENZENEDIAZONIUM, TETRACHLOROZINCATE (2:1)	100	OP8			3228	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM ZINC CHLORIDE	67-100	OP7	+35	+40	3236	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM ZINC CHLORIDE	66	OP7	+40	+45	3236	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM TETRAFLUOROBORATE	100	OP7	+30	+35	3236	
2,5-DIETHOXY-4-(4-MORPHOLINYL)-BENZENEDIAZONIUM SULPHATE	100	OP7			3226	
2,5-DIETHOXY-4-(PHENYLSULPHONYL)-BENZENEDIAZONIUM ZINC CHLORIDE	67	OP7	+40	+45	3236	
DIETHYLENEGLYCOL BIS (ALLYL CARBONATE) + DI-ISOPROPYLPEROXYDICARBONATE	≥ 88 + ≤ 12	OP8	-10	0	3237	
2,5-DIMETHOXY-4-(4-METHYL-PHENYLSULPHONYL)BENZENE-DIAZONIUM ZINC CHLORIDE	79	OP7	+40	+45	3236	
4-(DIMETHYLAMINO)-BENZENEDIAZONIUM TRICHLOROZINCATE (-1)	100	OP8			3228	
4-DIMETHYLAMINO-6-(2-DIMETHYL-AMINOETHOXY) TOLUENE-2-DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
N,N'-DINITROSO-N,N'- DIMETHYL TEREPHTHALAMIDE, as a paste	72	OP6			3224	
N,N'-DINITROSOPENTAMETHYLENE-TETRAMINE	82	OP6			3224	(7)
DIPHENYLOXIDE-4,4'-DISULPHONYL HYDRAZIDE	100	OP7			3226	
4-DIPROPYLAMINOBENZENE-DIAZONIUM ZINC CHLORIDE	100	OP7			3226	
2-(N,N-ETHOXYCARBONYL-PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	63-92	OP7	+40	+45	3236	
2-(N,N-ETHOXYCARBONYL-PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N- CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	62	OP7	+35	+40	3236	

SELF-REACTIVE SUBSTANCE	Concen-tration (%)	Packing method	Control temper-ature (°C)	Emergency temper-ature (°C)	UN generic entry	Remarks
N-FORMYL-2-(NITROMETHYLENE) -1,3-PERHYDROTHIAZINE	100	OP7	+45	+50	3236	
2-(2-HYDROXYETHOXY)-1-(PYRROLIDIN-1-YL)BENZENE-4-DIAZONIUM ZINC CHLORIDE	100	OP7	+ 45	+ 50	3236	
3-(2-HYDROXYETHOXY)-4-(PYRROLIDIN-1-YL)BENZENE DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
2-(N,N-METHYLAMINOETHYL-CARBONYL)-4-(3,4-DIMETHYL-PHENYLSULPHONYL)BENZENE-DIAZONIUM HYDROGEN SULPHATE	96	OP7	+45	+50	3236	
4-METHYLBENZENESULPHONYL-HYDRAZIDE	100	OP7			3226	
3-METHYL-4-(PYRROLIDIN-1-YL) BENZENEDIAZONIUM TETRAFLUOROBORATE	95	OP6	+45	+50	3234	
4-NITROSOPHENOL	100	OP7	+35	+40	3236	
SELF-REACTIVE LIQUID, SAMPLE		OP2			3223	(8)
SELF-REACTIVE LIQUID, SAMPLE, TEMPERATURE CONTROLLED		OP2			3233	(8)
SELF-REACTIVE SOLID, SAMPLE		OP2			3224	(8)
SELF-REACTIVE SOLID, SAMPLE, TEMPERATURE CONTROLLED		OP2			3234	(8)
SODIUM 2-DIAZO-1-NAPHTHOL-4-SULPHONATE	100	OP7			3226	
SODIUM 2-DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP7			3226	
TETRAMINE PALLADIUM (II) NITRATE	100	OP6	+30	+35	3234	

Remarks

(1) Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2(b). The control and emergency temperatures shall be determined by the procedure given in 7.1.4.3 to 7.1.4.3.1.3.

(2) "EXPLOSIVE" subsidiary risk label required.

(3) Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2(c).

(4) Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2(c). The control and emergency temperatures shall be determined by the procedure given in 7.1.4.3 to 7.1.4.3.1.3.

(5) Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2(d).

(6) Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2(d). The control and emergency temperatures shall be determined by the procedure given in 7.1.4.3 to 7.1.4.3.1.3.

(7) With a compatible diluent having a boiling point of not less than 150 °C.

(8) See 2.4.2.3.2.4(b).

(9) 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).

2.4.2.3.2.4 Classification of self-reactive substances not listed in 2.4.2.3.2.3 and assignment to a generic entry shall be made by the competent authority of the country of origin on the basis of a test report. Principles applying to the classification of such substances are provided in 2.4.2.3.3. The applicable classification procedures, test methods and criteria, and an example of a suitable test report, are given in the *Manual of Tests and Criteria*, Part II. The statement of approval shall contain the classification and the relevant transport conditions.

(a) Activators, such as zinc compounds, may be added to some self-reactive substances to change their reactivity. Depending on both the type and the concentration of the activator, this may result in a decrease in thermal stability and a change in explosive properties. If either of these properties is altered, the new formulation shall be assessed in accordance with this classification procedure;

(b) Samples of self-reactive substances or formulations of self-reactive substances not listed in 2.4.2.3.2.3, 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:

(i) The available data indicate that the sample would be no more dangerous than self-reactive substances type B;

(ii) The sample is packaged in accordance with packing method OP2 (see applicable packing instruction) and the quantity per transport unit is limited to 10 kg; and

(iii) 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.

2.4.2.3.3 *Principles for classification of self-reactive substances*

NOTE: *This section refers only to those properties of self-reactive substances which are decisive for their classification. A flow chart, presenting the classification principles in the form of a graphically arranged scheme of questions concerning the decisive properties together with the possible answers, is given in Figure 2.4.1. These properties shall be determined experimentally using the test methods and criteria given in the Manual of Tests and Criteria, Part II.*

2.4.2.3.3.1 A self-reactive substance is 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.

2.4.2.3.3.2 The following principles apply to the classification of self-reactive substances not listed in 2.4.2.3.2.3.

(a) Any substance which can detonate or deflagrate rapidly, as packaged for transport, is prohibited from transport under the provisions for self-reactive substances of Division 4.1 in that packaging (defined as self-reactive substance type A, exit box A of Figure 2.4.1);

(b) Any substance possessing explosive properties and which, as packaged for transport, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package, shall also bear an "EXPLOSIVE" subsidiary risk label. Such a substance may be packaged in amounts of up to 25 kg unless the maximum quantity has to be limited to a lower amount to preclude detonation or rapid deflagration in the package (defined as self-reactive substance type B, exit box B of Figure 2.4.1);

(c) Any substance possessing explosive properties may be transported without an "EXPLOSIVE" subsidiary risk label when the substance as packaged (maximum 50 kg) for transport cannot detonate or deflagrate rapidly or undergo a thermal explosion (defined as self-reactive substance type C, exit box C of Figure 2.4.1);

(d) Any substance which in laboratory testing:

(i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or

(ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or

(iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement; may be accepted for transport in packages of not more than 50 kg net mass (defined as self-reactive substance type D, exit box D of Figure 2.4.1);

(e) Any substance which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement may be accepted for transport in packages of not more than 400 kg/450 litres (defined as self-reactive substance type E, exit box E of Figure 2.4.1);

(f) Any substance which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power may be considered for transport in IBCs or tanks (defined as self-reactive substance type F, exit box F of Figure 2.4.1); (for additional provisions see 4.1.7.2.2 and 4.2.1.13);

(g) Any substance which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power shall be exempted from classification as a self-reactive substance of Division 4.1 provided that the formulation is thermally stable (self-accelerating decomposition temperature 60 °C to 75 °C for a 50 kg package) and any diluent meets the requirements of 2.4.2.3.5 (defined as self-reactive substance type G, exit box G of Figure 2.4.1). If the formulation is not thermally stable or a compatible diluent having a boiling point less than 150 °C is used for desensitization, the formulation shall be defined as SELF-REACTIVE LIQUID/SOLID TYPE F.

Figure 2.4.1: FLOW CHART SCHEME FOR SELF-REACTIVE SUBSTANCES

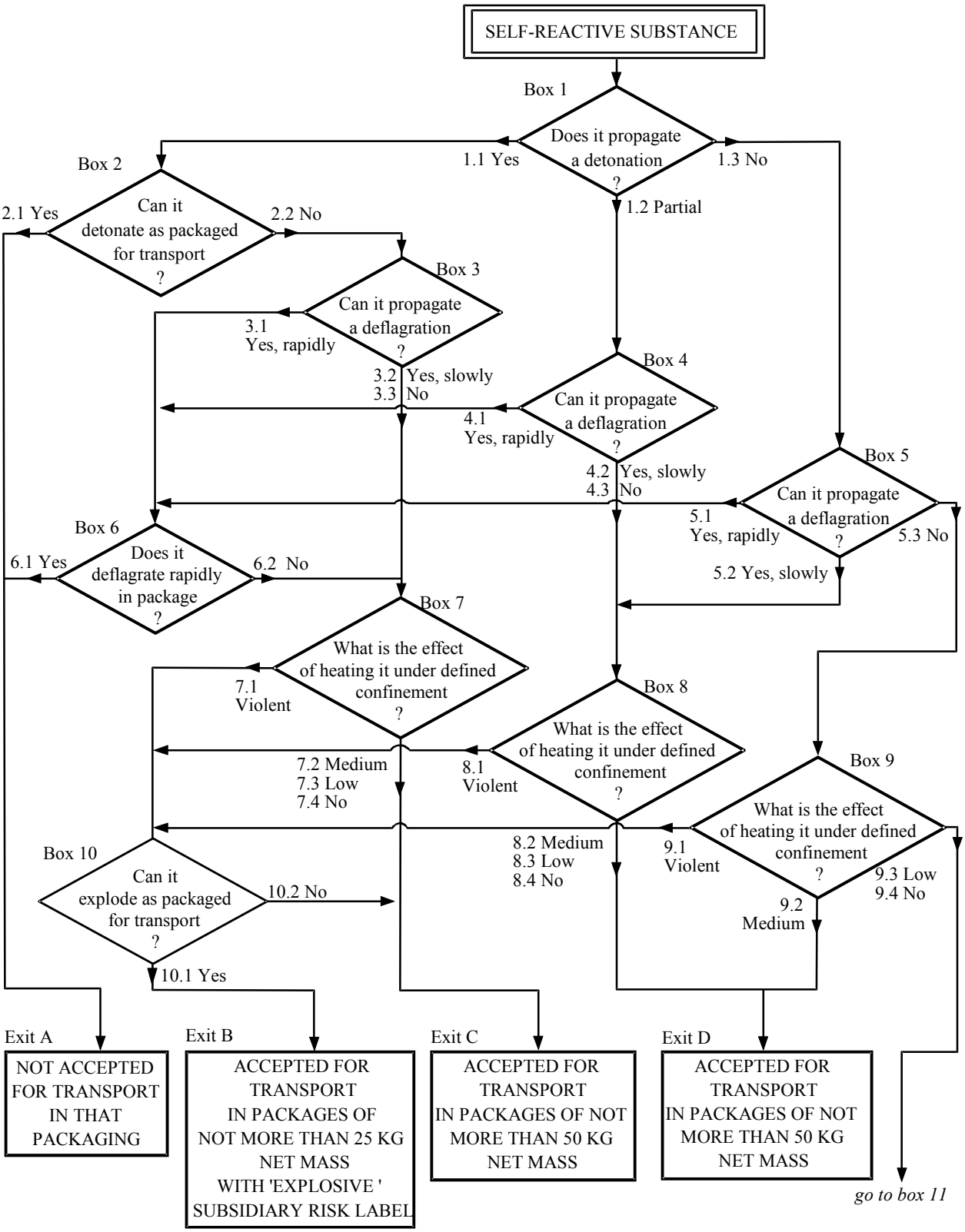
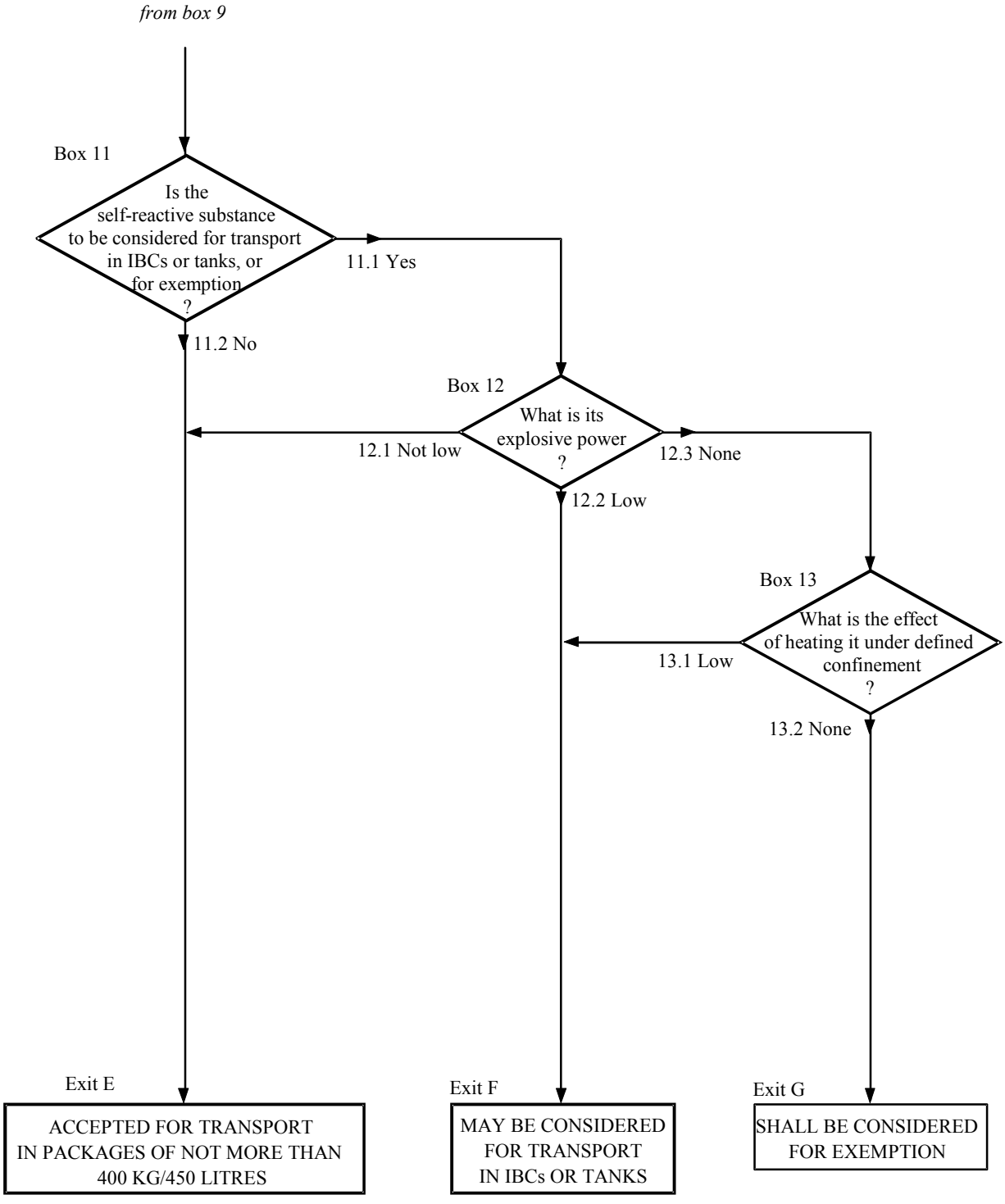


Figure 2.4.1: FLOW CHART SCHEME FOR SELF-REACTIVE SUBSTANCES (cont'd)



2.4.2.3.4 *Temperature control requirements*

Self-reactive substances are subject to temperature control in transport 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 *Manual of Tests and Criteria*, Part II, section 28. The test selected shall be conducted in a manner which is representative, both in size and material, of the package to be transported.

2.4.2.3.5 *Desensitization of self-reactive substances*

2.4.2.3.5.1 In order to ensure safety during transport, self-reactive substances may be desensitized through the use of a diluent. If a diluent is used, the self-reactive substance shall be tested with the diluent present in the concentration and form used in transport.

2.4.2.3.5.2 Diluents which may allow a self-reactive substance to concentrate to a dangerous extent in the event of leakage from a package shall not be used.

2.4.2.3.5.3 The diluent shall 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.

2.4.2.3.5.4 Liquid diluents in liquid formulations requiring temperature control shall have a boiling point of at least 60 °C and a flash point not less than 5 °C. The boiling point of the liquid shall be at least 50 °C higher than the control temperature of the self-reactive substance (see 7.1.4.3.1).

2.4.2.4 ***Division 4.1 Solid desensitized explosives***

2.4.2.4.1 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 (see 2.1.3.5.3). Entries in the Dangerous Goods List for solid desensitized explosives are UN Nos 1310, UN 1320, UN 1321, UN 1322, UN 1336, UN 1337, UN 1344, UN 1347, UN 1348, UN 1349, UN 1354, UN 1355, UN 1356, UN 1357, UN 1517, UN 1571, UN 2555, UN 2556, UN 2557, UN 2852, UN 2907, UN 3317, UN 3319, UN 3344, UN 3364, UN 3365, UN 3366, UN 3367, UN 3368, UN 3369, UN 3370 and UN 3376.

2.4.2.4.2 Substances that:

(a) have been provisionally accepted into Class 1 according to Test Series 1 and 2 but exempted from Class 1 by 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. Though not desensitised explosives, UN 2956, UN 3241, UN 3242 and UN 3251 are such entries that are assigned to Division 4.1.

2.4.3 Division 4.2 - Substances liable to spontaneous combustion

2.4.3.1 *Definitions and properties*

2.4.3.1.1 Division 4.2 includes:

(a) *Pyrophoric substances*, which are substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite within five minutes of coming in contact with air. These are the Division 4.2 substances are the most liable to spontaneous combustion; and

(b) *Self-heating substances*, which are substances, other than pyrophoric 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).

2.4.3.1.2 Self-heating of substances, leading to spontaneous combustion, is caused by reaction of the substance with oxygen (in the air) and the heat developed not being conducted away rapidly enough to the surroundings. Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the auto-ignition temperature is reached.

2.4.3.2 *Classification in Division 4.2*

2.4.3.2.1 Solids are considered pyrophoric solids which shall be classified in Division 4.2 if, in tests performed in accordance with the test method given in the *Manual of Tests and Criteria*, Part III, sub-section 33.3.1.4, the sample ignites in one of the tests.

2.4.3.2.2 Liquids are considered pyrophoric liquids which shall be classified in Division 4.2 if, in tests performed in accordance with the test method given in the *Manual of Tests and Criteria*, Part III, sub-section 33.3.1.5, the liquid ignites in the first part of the test, or if it ignites or chars the filter paper.

2.4.3.2.3 *Self-heating substances*

2.4.3.2.3.1 A substance shall be classified as a self-heating substance of Division 4.2 if, in tests performed in accordance with the test method given in the *Manual of Tests and Criteria*, Part III, sub-section 33.3.1.6:

(a) A positive result is obtained using a 25 mm cube sample 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 cube sample 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 cube sample at 100 °C and the substance is to be transported in packages with a volume of more than 450 litres;

(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 cube sample at 100 °C.

NOTE 1: *Self-reactive substances, except for type G, giving also a positive result with this test method, shall not be classified in Division 4.2 but in Division 4.1 (see 2.4.2.3.1.1).*

2.4.3.2.3.2 A substance shall not be classified in Division 4.2 if:

(a) A negative result is obtained in a test using a 100 mm cube sample 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 cube sample at 140 °C, a negative result is obtained in a test using a 100 mm cube sample at 120 °C and the substance is to be transported in packages with a volume not 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 25 mm cube sample at 140 °C, a negative result is obtained in a test using a 100 mm cube sample at 100 °C and the substance is to be transported in packages with a volume not more than 450 litres.

2.4.3.3 ***Assignment of packing groups***

2.4.3.3.1 Packing group I shall be assigned to all pyrophoric solids and liquids.

2.4.3.3.2 Packing group II shall be assigned to self-heating substances which give a positive result in a test using a 25 mm sample cube at 140 °C.

2.4.3.3.3 Packing group III shall 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 cube sample at 140 °C and the substance is to be transported in packages with a volume of more than 3 m^3;

(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 cube sample at 140 °C, a positive result is obtained in a test using a 100 mm cube sample at 120 °C and the substance is to be transported in packages with a volume of more than 450 litres;

(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 cube sample at 140 °C and a positive result is obtained in a test using a 100 mm cube sample at 100 °C.

2.4.4 Division 4.3 - Substances which in contact with water emit flammable gases

2.4.4.1 ***Definitions and properties***

Certain substances in contact with water may emit flammable gases that 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 light bulbs. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 2.4.4.2 is 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. This test method shall not be applied to pyrophoric substances.

2.4.4.2 *Classification in Division 4.3*

Substances which in contact with water emit flammable gases shall be classified in Division 4.3 if, in tests performed in accordance with the test method given in the *Manual of Tests and Criteria*, Part III, sub-section 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 litre per kilogram of the substance per hour.

2.4.4.3 *Assignment of packing groups*

2.4.4.3.1 Packing group I shall 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 litres per kilogram of substance over any one minute.

2.4.4.3.2 Packing group II shall 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 litres per kilogram of substance per hour, and which does not meet the criteria for packing group I.

2.4.4.3.3 Packing group III shall be assigned to any substance which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 litre per kilogram of substance per hour, and which does not meet the criteria for packing groups I or II.

CHAPTER 2.5

CLASS 5 - OXIDIZING SUBSTANCES AND ORGANIC PEROXIDES

Introductory note

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.*

2.5.1 Definitions and general provisions

Class 5 is divided into two divisions as follows:

(a) Division 5.1 *Oxidizing substances*

Substances which, while in themselves 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 -0-0- 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.

2.5.2 Division 5.1 - Oxidizing substances

2.5.2.1 *Classification in Division 5.1*

2.5.2.1.1 Oxidizing substances are classified in Division 5.1 in accordance with the test methods, procedures and criteria in 2.5.2.2, 2.5.2.3 and the *Manual of Tests and Criteria*, Part III, section 34. In the event of divergence between test results and known experience, judgement based on known experience shall take precedence over test results.

NOTE: *Where substances of this Division are listed in the Dangerous Goods List in Chapter 3.2, reclassification of those substances in accordance with this criteria shall be undertaken only when this is necessary for safety.*

2.5.2.1.2 For substances having other risks, e.g. toxicity or corrosivity, the requirements of Chapter 2.0 shall be met.

2.5.2.2 *Oxidizing solids*

2.5.2.2.1 *Criteria for classification in Division 5.1*

2.5.2.2.1.1 Tests are performed to measure the potential for the 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 *Manual of Tests and Criteria,* Part III, sub-section 34.4.1. 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 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 shall 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.

2.5.2.2.1.2 The classification test results are assessed on the basis of:

(a) The comparison of the mean burning time with those of the reference mixtures; and

(b) Whether the mixture of substance and cellulose ignites and burns.

2.5.2.2.1.3 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 mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose.

2.5.2.2.2 *Assignment of packing groups*

Solid oxidizing substances are assigned to a packing group according to the test procedure in the *Manual of Tests and Criteria*, Part III, section 34.4.1, in accordance with the following criteria:

(a) 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;

(b) 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;

(c) 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 are 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;

(d) 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.

2.5.2.3 *Oxidizing liquids*

2.5.2.3.1 *Criteria for classification in Division 5.1*

2.5.2.3.1.1 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 *Manual of Tests and Criteria*, Part III, sub-section 34.4.2. It measures the pressure rise time during combustion. Whether a liquid is an oxidizing substance of Division 5.1 and, if so, whether packing groups I, II or III shall be assigned, is decided on the basis of the test result (see also Precedence of hazards characteristics in 2.0.3).

2.5.2.3.1.2 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 2070 kPa gauge with those of the reference substances.

2.5.2.3.1.3 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% aqueous nitric acid and cellulose.

2.5.2.3.2 *Assignment of packing groups*

Liquid oxidizing substances are assigned to a packing group according to the test procedure in the *Manual of Tests and Criteria*, Part III, section 34.4.2, in accordance with the following criteria:

(a) 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% perchloric acid and cellulose;

(b) 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% aqueous sodium chlorate solution and cellulose; and the criteria for Packing group I are not met;

(c) 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% aqueous nitric acid and cellulose; and the criteria for Packing groups I and II are not met;

(d) 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 2070 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% aqueous nitric acid and cellulose.

2.5.3 Division 5.2 - Organic peroxides

2.5.3.1 *Properties*

2.5.3.1.1 Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures. The decomposition can be initiated 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 organic peroxide formulation. Decomposition may result in the evolution of harmful, or flammable, gases or vapours. For certain organic peroxides the temperature shall be controlled during transport. Some organic peroxides may 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.

2.5.3.1.2 Contact of organic peroxides with the eyes is to be avoided. Some organic peroxides will cause serious injury to the cornea, even after brief contact, or will be corrosive to the skin.

2.5.3.2 *Classification of organic peroxides*

2.5.3.2.1 Any organic peroxide shall be considered for classification in Division 5.2, unless the organic peroxide formulation contains:

(a) Not more than 1.0% available oxygen from the organic peroxides when containing not more than 1.0% hydrogen peroxide; or

(b) Not more than 0.5% available oxygen from the organic peroxides when containing more than 1.0% but not more than 7.0% hydrogen peroxide.

NOTE: *The available oxygen content (%) 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 %) of organic peroxide i;*
m_i = *molecular mass of organic peroxide i.*

2.5.3.2.2 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 may not be accepted for transport in the packaging in which it is tested, 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.

2.5.3.2.3 Organic peroxides permitted for transport are listed in 2.5.3.2.4. For each permitted substance, 2.5.3.2.4 assigns the appropriate generic entry in the Dangerous Goods List (UN 3101 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 2.5.3.4).

2.5.3.2.3.1 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 shall be determined and, if necessary, temperature control applied as required by 2.5.3.4.

2.5.3.2.4 List of currently assigned organic peroxides

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
ACETYL ACETONE PEROXIDE	≤ 42	≥ 48			≥ 8	OP7			3105	2)
"	≤ 32 as a paste					OP7			3106	20)
ACETYL BENZOYL PEROXIDE	≤ 45	≥ 55				OP7			3105	
ACETYL CYCLOHEXANESULPHONYL PEROXIDE	≤ 82				≥12	OP4	-10	0	3112	3)
"	≤ 32		≥ 68			OP7	-10	0	3115	
tert-AMYL HYDROPEROXIDE	≤ 88	≥ 6			≥ 6	OP8			3107	
tert-AMYL PEROXYACETATE	≤ 62	≥ 38				OP8			3107	
tert-AMYL PEROXYBENZOATE	≤ 100					OP5			3103	
tert-AMYL PEROXY-2-ETHYLHEXANOATE	≤100					OP7	+20	+25	3115	
tert-AMYL PEROXY-2-ETHYLHEXYL CARBONATE	≤100					OP7			3105	
tert-AMYL PEROXYNEODECANOATE	≤ 77		≥ 23			OP7	0	+10	3115	
tert-AMYL PEROXYPIVALATE	≤ 77		≥ 23			OP5	+10	+15	3113	
tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE	≤100					OP5			3101	3)
tert-BUTYL CUMYL PEROXIDE	> 42 - 100					OP7			3105	
"	≤ 42			≥ 58		OP7			3106	
n-BUTYL-4,4-DI-(tert-BUTYLPEROXY)VALERATE	> 52 - 100					OP5			3103	
"	≤ 52			≥ 48		OP7			3106	
"	≤ 42			≥ 58		OP8			3108	
tert-BUTYL HYDROPEROXIDE	> 79 - 90				≥ 10	OP5			3103	13)
"	≤ 80	≥ 20				OP7			3105	4) 13)
"	≤ 79				> 14	OP8			3107	13) 23)
"	≤ 72				≥ 28	OP8, N, M			3109	13)
tert-BUTYL HYDROPEROXIDE + DI-tert-BUTYLPEROXIDE	< 82 +> 9				≥ 7	OP5			3103	13)
tert-BUTYL MONOPEROXYMALEATE	> 52 - 100					OP5			3102	3)
"	≤ 52	≥ 48				OP6			3103	
"	≤ 52			≥ 48		OP8			3108	
"	≤ 52 as a paste					OP8			3108	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
tert-BUTYL MONOPEROXYPHTHALATE	≤ 100					OP5			3102	3)
tert-BUTYL PEROXYACETATE	> 52 - 77	≥ 23				OP5			3101	3)
"	> 32 - 52	≥ 48				OP6			3103	
"	≤ 32	≥ 68				OP8,N			3109	
" (in tanks)	≤ 32		≥ 68			M	+30	+35	3119	
"	≤ 22		≥ 78			OP8			3109	25)
tert-BUTYL PEROXYBENZOATE	> 77 - 100	< 22				OP5			3103	
"	> 52 - 77	≥ 23				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
tert-BUTYL PEROXYBUTYL FUMARATE	≤ 52	≥ 48				OP7			3105	
tert-BUTYL PEROXYCROTONATE	≤ 77	≥ 23				OP7			3105	
tert-BUTYL PEROXYDIETHYLACETATE	≤100					OP5	+20	+25	3113	
tert-BUTYL PEROXYDIETHYLACETATE + tert-BUTYL PEROXYBENZOATE	≤ 33 + ≤ 33	≥ 33				OP7			3105	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	> 52 - 100					OP6	+20	+25	3113	
"	> 32 - 52		≥ 48			OP8	+30	+35	3117	
"	≤ 52			≥ 48		OP8	+20	+25	3118	
"	≤ 32		≥ 68			OP8	+40	+45	3119	
" (in IBCs)	≤ 32		≥ 68			N	+30	+35	3119	
" (in tanks)	≤ 32		≥ 68			M	+15	+20	3119	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE + 2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 12 + ≤ 14	> 14		≥ 60		OP7			3106	
"	≤ 31 + ≤ 36		≥ 33			OP7	+35	+40	3115	
tert-BUTYL PEROXY-2-ETHYLHEXYLCARBONATE	≤ 100					OP7			3105	
tert-BUTYL PEROXYISOBUTYRATE	> 52 - 77		> 23			OP5	+15	+20	3111	3)
"	≤ 52		> 48			OP7	+15	+20	3115	
tert-BUTYLPEROXY ISOPROPYLCARBONATE	≤ 77	≥ 23				OP5			3103	
1-(2-tert-BUTYLPEROXY ISOPROPYL)-3-ISOPROPENYLBENZENE	≤ 77	≥ 23				OP7			3105	
"	≤ 42			≥ 58		OP8			3108	
tert-BUTYL PEROXY-2-METHYLBENZOATE	≤ 100					OP5			3103	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
tert-BUTYL PEROXYNEODECANOATE	> 77 - 100					OP7	-5	+5	3115	
"	≤ 77		≥ 23			OP7	0	+10	3115	
" (in IBCs)	≤ 42 as a stable dispersion in water					N	-5	+5	3119	
"	≤ 52 as a stable dispersion in water					OP8	0	+10	3117	
"	≤ 42 as a stable dispersion in water(frozen)					OP8	0	+10	3118	
"	≤ 32	≥ 68				OP8, N	0	+10	3119	
tert-BUTYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23				OP7	0	+10	3115	
3-tert-BUTYLPEROXY-3-PHENYLPHTHALIDE	≤ 100					OP7			3106	
tert-BUTYL PEROXYPIVALATE	> 67 - 77	≥ 23				OP5	0	+10	3113	
"	> 27 - 67		≥ 33			OP7	0	+10	3115	
"	≤ 27		≥ 73			OP8	+30	+35	3119	
" (in IBCs)	≤ 27		≥ 73			N	+10	+15	3119	
" (in tanks)	≤ 27		≥ 73			M	+5	+10	3119	
tert-BUTYLPEROXY STEARYLCARBONATE	≤ 100					OP7			3106	
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	> 32 - 100					OP7			3105	
"	≤ 32	≥ 68				OP8,N			3109	
" (in tanks)	≤ 32		≥ 68			M	+35	+40	3119	
3-CHLOROPEROXYBENZOIC ACID	> 57 - 86			≥ 14		OP1			3102	3)
"	≤ 57			≥ 3	≥ 40	OP7			3106	
"	≤ 77			≥ 6	≥ 17	OP7			3106	
CUMYL HYDROPEROXIDE	> 90 - 98	≤ 10				OP8			3107	13)
"	≤ 90	≥ 10				OP8, M, N			3109	13) 18)
CUMYL PEROXYNEODECANOATE	≤ 77		≥ 23			OP7	-10	0	3115	
"	≤ 52 as a stable dispersion in water					OP8	-10	0	3119	
" (in IBCs)	≤ 52 as a stable dispersion in water					N	-15	-5	3119	
CUMYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23				OP7	-10	0	3115	
CUMYL PEROXYPIVALATE	≤ 77		≥ 23			OP7	-5	+5	3115	
CYCLOHEXANONE PEROXIDE(S)	≤ 91				≥ 9	OP6			3104	13)
"	≤ 72	≥ 28				OP7			3105	5)
"	≤ 72 as a paste					OP7			3106	5) 20)
"	≤ 32			≥ 68					Exempt	29)

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
DIACETONE ALCOHOL PEROXIDES	≤ 57		≥ 26		≥ 8	OP7	+40	+45	3115	6)
DIACETYL PEROXIDE	≤ 27		≥ 73			OP7	+20	+25	3115	7) 13)
DI-tert-AMYL PEROXIDE	≤ 100					OP8			3107	
1,1-DI-(tert-AMYLPEROXY)CYCLOHEXANE	≤ 82	≥ 18				OP6			3103	
DIBENZOYL PEROXIDE	> 51 - 100			≤ 48		OP2			3102	3)
"	> 77 - 94				≥ 6	OP4			3102	3)
"	≤ 77				≥ 23	OP6			3104	
"	≤ 62			≥ 28	≥ 10	OP7			3106	
"	> 52 - 62 as a paste					OP7			3106	20)
"	> 35 - 52			≥ 48		OP7			3106	
"	> 36 - 42	≥ 18			≤ 40	OP8			3107	
"	> 36 - 42	≥ 58				OP8			3107	
"	≤ 56.5 as a paste				≥15	OP8			3108	
"	≤ 52 as a paste					OP8			3108	20)
"	≤42 as a stable dispersion in water					OP8, N			3109	
"	≤ 35			≥ 65					Exempt	29)
DIBENZYL PEROXYDICARBONATE	≤ 87				≥ 13	OP5	+25	+30	3112	3)
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE	≤ 100					OP6	+30	+35	3114	
"	≤ 42 as a stable dispersion in water					OP8, N	+30	+35	3119	
DI-tert-BUTYL PEROXIDE	> 32 - 100					OP8			3107	
"	≤ 52		≥ 48			OP8, N			3109	25)
"	≤ 32	≤ 68				M			3109	
DI-tert-BUTYL PEROXYAZELATE	≤ 52	≥ 48				OP7			3105	
2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 52	≥ 48				OP6			3103	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE	> 80 - 100					OP5			3101	3)
"	> 52 - 80	≥ 20				OP5			3103	
"	> 42 - 52	≥ 48				OP7			3105	
"	≤ 42	≥ 13		≥ 45		OP7			3106	
"	≤ 27	≥ 36				OP8			3107	21)
"	≤ 42	≥ 58				OP8, N			3109	
"	≤ 13	≥ 13	≥ 74			OP8			3109	
DI-n-BUTYL PEROXYDICARBONATE	> 27 - 52		≥ 48			OP7	-15	-5	3115	
"	≤ 27		≥ 73			OP8	-10	0	3117	
"	≤ 42 as a stable dispersion in water (frozen)					OP8	-15	-5	3118	
DI-sec-BUTYL PEROXYDICARBONATE	> 52 - 100					OP4	-20	-10	3113	
"	≤ 52		≥ 48			OP7	-15	-5	3115	
DI-(2-tert-BUTYLPEROXYISOPROPYL)BENZENE(S)	> 42 - 100			≤ 57		OP7			3106	
"	≤ 42			≥ 58					Exempt	29)
DI-(tert-BUTYLPEROXY) PHTHALATE	> 42 - 52	≥ 48				OP7			3105	
"	≤ 52 as a paste					OP7			3106	20)
"	≤ 42	≥ 58				OP8			3107	
2,2-DI-(tert-BUTYLPEROXY)PROPANE	≤ 52	≥ 48				OP7			3105	
"	≤ 42	≥ 13		≥ 45		OP7			3106	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	> 90 - 100					OP5			3101	3)
"	> 57 - 90	≥ 10				OP5			3103	
"	≤ 77		≥ 23			OP7			3105	
"	≤ 57			≥ 43		OP7			3106	
"	≤ 57	≥ 43				OP8			3107	
"	≤ 32	≥ 26	≥ 42			OP8			3107	
DICETYL PEROXYDICARBONATE	≤ 100					OP7	+30	+35	3116	
"	≤ 42 as a stable dispersion in water					OP8, N	+30	+35	3119	
DI-4-CHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5			3102	3)
"	≤ 52 as a paste					OP7			3106	20)
"	≤ 32			≥ 68					Exempt	29)

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
DICUMYL PEROXIDE	> 42 - 100			≤ 57		OP8, M			3110	12)
"	≤ 52			≥ 48					Exempt	29)
DICYCLOHEXYL PEROXYDICARBONATE	> 91 - 100					OP3	+5	+10	3112	3)
"	≤ 91				≥ 9	OP5	+5	+10	3114	
DIDECANOYL PEROXIDE	≤100					OP6	+30	+35	3114	
2,2-DI-(4,4-DI (tert-BUTYLPEROXY) CYCLOHEXYL) PROPANE	≤ 42			≥ 58		OP7			3106	
"	≤ 22		≥ 78			OP8			3107	
DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5			3102	3)
"	≤ 52 as a paste with silicon oil					OP7			3106	
DI-(2-ETHOXYETHYL) PEROXYDICARBONATE	≤ 52			≥ 48		OP7	-10	0	3115	
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	> 77 - 100					OP5	-20	-10	3113	
"	≤ 77		≥ 23			OP7	-15	-5	3115	
"	≤ 62 as a stable dispersion in water					OP8	-15	-5	3117	
"	≤ 52 as a stable dispersion in water					OP8	-15	-5	3119	
" (in IBCs)	≤ 52 as a stable dispersion in water					N	-20	-10	3119	
"	≤ 42 as a stable dispersion in water (frozen)					OP8	-15	-5	3118	
DIETHYL PEROXYDICARBONATE	≤ 27		≥ 73			OP7	-10	0	3115	
2,2-DIHYDROPEROXYPROPANE	≤ 27			≥ 73		OP5			3102	3)
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	≤100					OP7			3106	
DIISOBUTYRYL PEROXIDE	> 32 - 52		≥ 48			OP5	-20	-10	3111	3)
"	≤ 32		≥ 68			OP7	-20	-10	3115	
DI-ISOPROPYLBENZENE DIHYDROPEROXIDE	≤ 82	≥ 5			≥ 5	OP7			3106	24)
DIISOPROPYL PEROXYDICARBONATE	> 52 - 100					OP2	-15	-5	3112	3)
"	≤ 52		≥ 48			OP7	-20	-10	3115	
"	≤ 28	≥ 72				OP7	-15	-5	3115	
DIISOTRIDECYL PEROXYDICARBONATE	≤100					OP7	-10	0	3115	
DILAUROYL PEROXIDE	≤100					OP7			3106	
"	≤ 42 as a stable dispersion in water					OP8, N			3109	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
DI-(3-METHOXYBUTYL) PEROXYDICARBONATE	≤ 52		≥ 48			OP7	-5	+5	3115	
DI-(2-METHYLBENZOYL) PEROXIDE	≤ 87				≥ 13	OP5	+30	+35	3112	3)
DI-(3-METHYLBENZOYL) PEROXIDE + BENZOYL (3-METHYLBENZOYL) PEROXIDE + DIBENZOYL PEROXIDE	≤ 20 + ≤ 18+≤ 4		≥ 58			OP7	+35	+40	3115	
DI-(4-METHYLBENZOYL) PEROXIDE	≤ 52 as a paste with silicon oil				OP7			3106		
2,5-DIMETHYL-2,5-DI-(BENZOYLPEROXY)HEXANE	> 82 - 100					OP5			3102	3)
"	≤ 82			≥ 18		OP7			3106	
"	≤ 82				≥ 18	OP5			3104	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXANE	> 52 - 100					OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
"	≤47 as a paste					OP8			3108	
"	≤ 52	≥ 48				OP8			3109	
"	≤ 77			≥ 23		OP8			3108	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXYNE-3	> 52 - 86	≥ 14				OP5			3103	26)
"	≤ 52			≥ 48		OP7			3106	
"	> 86 - 100					OP5			3101	3)
2,5-DIMETHYL-2,5-DI-(2-ETHYLHEXANOYLPEROXY)HEXANE	≤100					OP5	+20	+25	3113	
2,5-DIMETHYL-2,5-DIHYDROPEROXYHEXANE	≤ 82				≥ 18	OP6			3104	
2,5-DIMETHYL-2,5-DI-(3,5,5-TRIMETHYLHEXANOYLPEROXY)HEXANE	≤ 77	≥ 23				OP7			3105	
1,1-DIMETHYL-3-HYDROXYBUTYL PEROXYNEOHEPTANOATE	≤ 52	≥ 48				OP8	0	+10	3117	
DIMYRISTYL PEROXYDICARBONATE	≤100					OP7	+20	+25	3116	
"	≤ 42 as a stable dispersion in water					OP8	+20	+25	3119	
" (in IBCs)	≤ 42 as a stable dispersion in water					N	+15	+20	3119	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
DI-(2-NEODECANOYLPEROXYISOPROPYL) BENZENE	≤ 52	≥ 48				OP7	-10	0	3115	
DI-n-NONANOYL PEROXIDE	≤100					OP7	0	+10	3116	
DI-n-OCTANOYL PEROXIDE	≤100					OP5	+10	+15	3114	
DIPEROXY AZELAIC ACID	≤ 27			≥ 73		OP7	+35	+40	3116	
DIPEROXY DODECANE DIACID	> 13 - 42			≥ 58		OP7	+40	+45	3116	
"	≤ 13			≥ 87					Exempt	29)
DI-(2-PHENOXYETHYL) PEROXYDICARBONATE	> 85 - 100					OP5			3102	3)
"	≤ 85				≥ 15	OP7			3106	
DIPROPIONYL PEROXIDE	≤ 27		≥ 73			OP8	+15	+20	3117	
DI-n-PROPYL PEROXYDICARBONATE	≤ 100					OP3	-25	-15	3113	
"	≤ 77		≥ 23			OP5	-20	-10	3113	
DISTEARYL PEROXYDICARBONATE	≤ 87			≥ 13		OP7			3106	
DISUCCINIC ACID PEROXIDE	> 72 - 100					OP4			3102	3) 17)
"	≤ 72				≥ 28	OP7	+10	+15	3116	
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	> 38 - 82	≥ 18				OP7	0	+10	3115	
"	≤ 52 as a stable dispersion in water					OP8, N	+10	+15	3119	
"	≤ 38	≥ 62				OP8	+20	+25	3119	
" (in IBCs)	≤ 38	≥ 62				N	+10	+15	3119	
" (in tanks)	≤ 38	≥ 62				M	0	+5	3119	
DI-(3,5,5-TRIMETHYL-1,2-DIOXOLANYL-3) PEROXIDE	≤ 52 as a paste					OP7	+30	+35	3116	20)
ETHYL 3,3-DI-(tert-AMYLPEROXY)BUTYRATE	≤ 67	≥ 33				OP7			3105	
ETHYL 3,3-DI-(tert-BUTYLPEROXY)BUTYRATE	> 77 - 100					OP5			3103	
"	≤ 77	≥ 23				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
3,3,6,6,9,9-HEXAMETHYL-1,2,4,5-TETRAOXACYCLONONANE	> 52 - 100					OP4			3102	3)
"	≤ 52	≥ 48				OP7			3105	
"	≤ 52			≥ 48		OP7			3106	
tert-HEXYL PEROXYNEODECANOATE	≤ 71	≥ 29				OP7	0	+10	3115	
tert-HEXYL PEROXYPIVALATE	≤ 72		≥ 28			OP7	+10	+15	3115	

ORGANIC PEROXIDE	Concen-tration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing Method	Control Tempera-ture (°C)	Emergency Tempera-ture (°C)	Number (Generic entry)	Subsidiary risks and remarks
ISOPROPYL sec-BUTYL PEROXYDICARBONATE +DI-sec-BUTYL PEROXYDICARBONATE +DI-ISOPROPYL PEROXYDICARBONATE	≤ 32 + ≤ 15 - 18 + ≤ 12 - 15	≥ 38				OP7	-20	-10	3115	
ISOPROPYL sec-BUTYL PEROXYDICARBONATE + DI-sec-BUTYL PEROXYDICARBONATE + DI-ISOPROPYL PEROXYDICARBONATE	≤ 52 + ≤ 28 + ≤ 22					OP5	-20	-10	3111	3)
ISOPROPYLCUMYL HYDROPEROXIDE	≤ 72	≥ 28				OP8, M, N			3109	13)
p-MENTHYL HYDROPEROXIDE	> 72 - 100					OP7			3105	13)
"	≤ 72	≥ 28				OP8, M			3109	27)
METHYLCYCLOHEXANONE PEROXIDE(S)	≤ 67		≥ 33			OP7	+35	+40	3115	
METHYL ETHYL KETONE PEROXIDE(S)	≤ 52	≥ 48				OP5			3101	3) 8) 13)
"	≤ 45	≥ 55				OP7			3105	9)
"	≤ 40	≥ 60				OP8			3107	10)
"	≤ 37	≥ 55			≥ 8	OP7			3105	9)
METHYL ISOBUTYL KETONE PEROXIDE(S)	≤ 62	≥ 19				OP7			3105	22)
ORGANIC PEROXIDE, LIQUID, SAMPLE						OP2			3103	11)
ORGANIC PEROXIDE, LIQUID, SAMPLE, TEMPERATURE CONTROLLED						OP2			3113	11)
ORGANIC PEROXIDE, SOLID, SAMPLE						OP2			3104	11)
ORGANIC PEROXIDE, SOLID, SAMPLE, TEMPERATURE CONTROLLED						OP2			3114	11)
PEROXYACETIC ACID, TYPE D, stabilized	≤ 43					OP7			3105	13) 14) 19)
PEROXYACETIC ACID, TYPE E, stabilized	≤ 43					OP8			3107	13) 15) 19)
PEROXYACETIC ACID, TYPE F, stabilized	≤ 43					OP8, N			3109	13) 16) 19)
"	≤ 41					M	+30	+35	3119	13) 30)
PINANYL HYDROPEROXIDE	56 - 100					OP7			3105	13)
"	< 56	> 44				OP8, M			3109	
1,1,3,3- TETRAMETHYLBUTYL PEROXYNEODECANOATE	≤ 72		≥ 28			OP7	-5	+5	3115	
"	≤ 52 as a stable dispersion in water					OP8, N	-5	+5	3119	
1,1,3,3- TETRAMETHYLBUTYL PEROXYPHENOACETATE	≤ 37		≥ 63			OP7	-10	0	3115	
3,6,9-TRIETHYL-3,6,9-TRIMETHYL -1,4,7-TRIPEROXONANE	≤ 42	≥ 58				OP7			3105	28)

NOTE: *The codes shown in the column "Packing methods" have the following meanings:*

(a) Codes "OP1" to "OP8" refer to packing methods in packing instruction P520;

(b) Code "N" indicates that the substance is permitted in IBCs (see IBC520 and 4.1.7.2.1);

(c) Code "M" indicates that the substance is permitted in tanks (see T23).

Notes on 2.5.3.2.4:

1) Diluent type B may always be replaced by diluent type A.

2) Available oxygen ≤ 4.7%.

3) "EXPLOSIVE" subsidiary risk label required.

4) Diluent may be replaced by di-tert-butyl peroxide.

5) Available oxygen ≤ 9%.

6) With ≤ 9% hydrogen peroxide; available oxygen ≤ 10%.

7) Only non-metallic packagings allowed.

8) Available oxygen > 10%.

9) Available oxygen ≤ 10%.

10) Available oxygen ≤ 8.2%.

11) See 2.5.3.2.5.1.

12) Up to 2000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of large scale trials.

13) "CORROSIVE" subsidiary risk label required.

14) Peroxyacetic acid formulations which fulfil the criteria of 2.5.3.3.2 (d).

15) Peroxyacetic acid formulations which fulfil the criteria of 2.5.3.3.2 (e).

16) Peroxyacetic acid formulations which fulfil the criteria of 2.5.3.3.2 (f).

17) Addition of water to this organic peroxide will decrease its thermal stability.

18) No "CORROSIVE" subsidiary risk label required for concentrations below 80%.

19) Mixtures with hydrogen peroxide, water and acid(s).

20) With diluent type A, with or without water.

21) With ≥ 36%, by mass, ethylbenzene in addition to diluent type A.

22) With ≥ 19%, by mass, methyl isobutyl ketone in addition to diluent type A.

23) With < 6% di-tert-butyl peroxide.

24) With ≤ 8% 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.

25) Diluent type B with boiling point > 110 °C.

26) With < 0.5% hydroperoxides content.

27) For concentrations more than 56%, "CORROSIVE" subsidiary risk label required.

28) Available active oxygen ≤ 7.6% in diluent Type A having a 95% boil-off point in the range of 200 - 260 °C.

29) *Not subject to the requirements of these regulations for Division 5.2.*

30) *Formulation derived from distillation of peroxyacetic acid originating from peroxyacetic acid in concentration of not more than 41% with water, total active oxygen (Peroxyacetic acid+H_2O_2) ≤ 9.5%, which fulfills the criteria of 2.5.3.3.2 (f).*

2.5.3.2.5 Classification of organic peroxides not listed in 2.5.3.2.4 and assignment to a generic entry shall be made by the competent authority of the country of origin on the basis of a test report. Principles applying to the classification of such substances are provided in 2.5.3.3. The applicable classification procedures, test methods and criteria, and an example of a suitable test report, are given in the current edition of the *Manual of Tests and Criteria*, Part II. The statement of approval shall contain the classification and the relevant transport conditions.

2.5.3.2.5.1 Samples of new organic peroxides or new formulations of organic peroxides not listed in 2.5.3.2.4, 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 the following conditions are met:

(a) The available data indicate that the sample would be no more dangerous than ORGANIC PEROXIDE TYPE B;

(b) The sample is packaged in accordance with packing method OP2 (see applicable packing instruction) and the quantity per transport unit is limited to 10 kg;

(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.

2.5.3.3 *Principles for classification of organic peroxides*

NOTE: *This section refers only to those properties of organic peroxides which are decisive for their classification. A flow chart, presenting the classification principles in the form of a graphically arranged scheme of questions concerning the decisive properties together with the possible answers, is given in Figure 2.5.1. These properties shall be determined experimentally. Suitable test methods with pertinent evaluation criteria are given in the Manual of Tests and Criteria, Part II.*

2.5.3.3.1 An organic peroxide formulation shall 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.

2.5.3.3.2 The following principles apply to the classification of organic peroxide formulations not listed in 2.5.3.2.4:

(a) Any organic peroxide formulation which can detonate or deflagrate rapidly, as packaged for transport, is prohibited from transport in that packaging under Division 5.2 (defined as ORGANIC PEROXIDE TYPE A, exit box A of Figure 2.5.1);

(b) Any organic peroxide formulation possessing explosive properties and which, as packaged for transport, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package, shall bear an "EXPLOSIVE" subsidiary risk label. Such an organic peroxide may be packaged in amounts of up to 25 kg unless the maximum quantity has to be limited to a lower amount to preclude detonation or rapid deflagration in the package (defined as ORGANIC PEROXIDE TYPE B, exit box B of Figure 2.5.1);

(c) Any organic peroxide formulation possessing explosive properties may be transported without an "EXPLOSIVE" subsidiary risk label when the substance as packaged (maximum 50 kg) for transport cannot detonate or deflagrate rapidly or undergo a thermal explosion (defined as ORGANIC PEROXIDE TYPE C, exit box C of Figure 2.5.1);

(d) Any organic peroxide formulation which in laboratory testing:

(i) detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or

(ii) does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or

(iii) does not detonate or deflagrate at all and shows a medium effect when heated under confinement;

is acceptable for transport in packages of not more than 50 kg net mass (defined as ORGANIC PEROXIDE TYPE D, exit box D of Figure 2.5.1);

(e) Any organic peroxide formulation which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement is acceptable for transport in packages of not more than 400 kg/450 litres (defined as ORGANIC PEROXIDE TYPE E, exit box E of Figure 2.5.1);

(f) Any organic peroxide formulation which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power may be considered for transport in IBCs or tanks (defined as ORGANIC PEROXIDE TYPE F, exit box F of Figure 2.5.1); for additional requirements see 4.1.7 and 4.2.1.13;

(g) Any organic peroxide formulation which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power shall be exempted from Division 5.2, provided that the formulation is thermally stable (self-accelerating decomposition temperature is 60 °C or higher for a 50 kg package) and for liquid formulations diluent type A is used for desensitization (defined as ORGANIC PEROXIDE TYPE G, exit box G of Figure 2.5.1). If the formulation is not thermally stable or a diluent other than type A is used for desensitization, the formulation shall be defined as ORGANIC PEROXIDE TYPE F.

Figure 2.5.1: FLOW CHART SCHEME FOR ORGANIC PEROXIDES

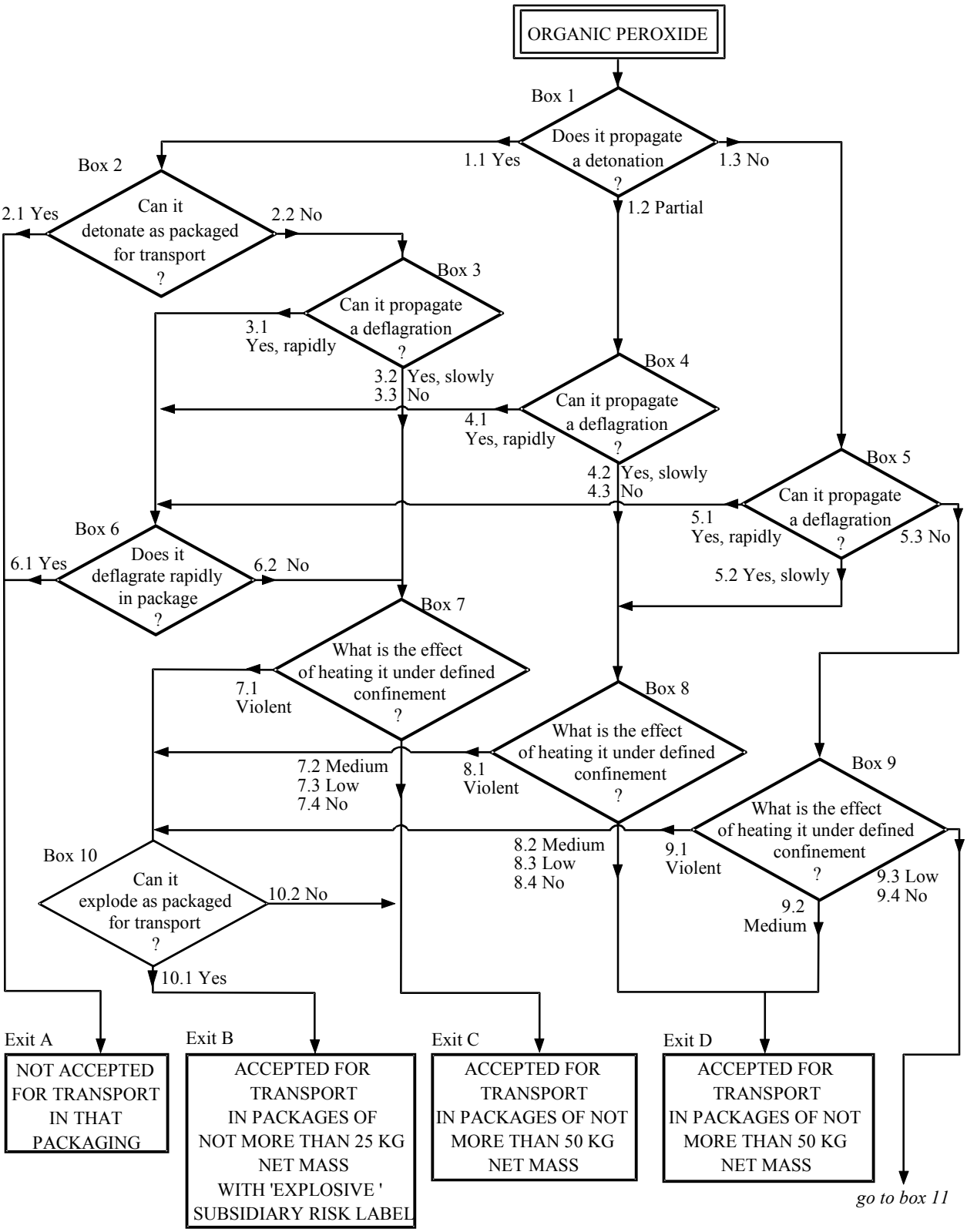
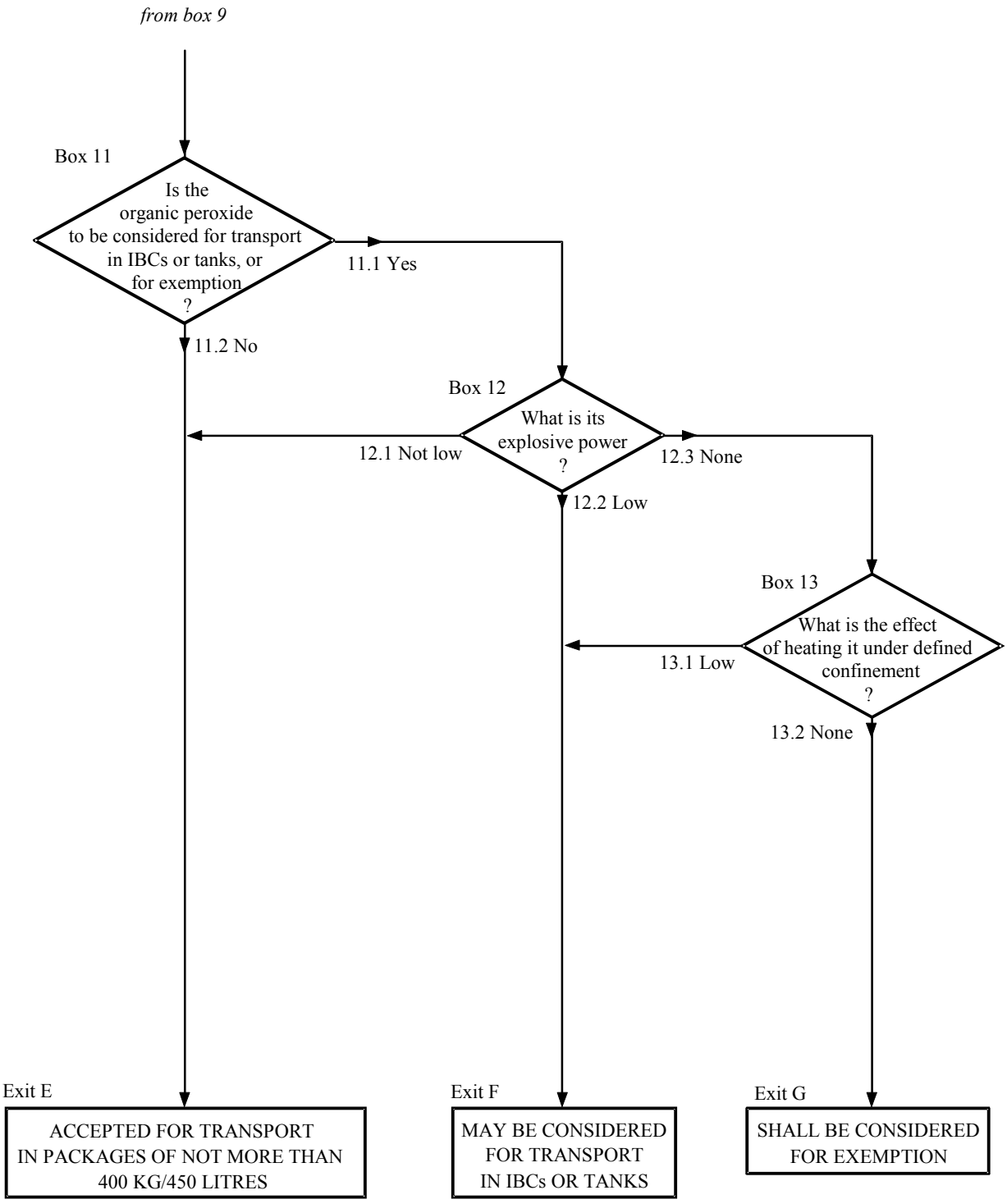


Figure 2.5.1: FLOW CHART SCHEME FOR ORGANIC PEROXIDES (cont=d)



2.5.3.4 *Temperature control requirements*

2.5.3.4.1 The following organic peroxides shall be subjected to temperature control during transport:

(a) Organic peroxides type 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.

2.5.3.4.2 Test methods for determining the SADT are given in the *Manual of Tests and Criteria*, Part II, section 28. The test selected shall be conducted in a manner which is representative, both in size and material, of the package to be transported.

2.5.3.4.3 Test methods for determining the flammability are given in the *Manual of Tests and Criteria*, Part III, sub-section 32.4. Because organic peroxides may react vigorously when heated it is recommended to determine their flash point using small sample sizes such as described in ISO 3679.

2.5.3.5 *Desensitization of organic peroxides*

2.5.3.5.1 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 shall be such that, in case of spillage or fire, the organic peroxide will not concentrate to a dangerous extent.

2.5.3.5.2 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 is at least 60 °C higher than the SADT in a 50 kg package.

2.5.3.5.3 Diluents, other than type A or type B, may be added to organic peroxide formulations as listed in 2.5.3.2.4 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 re-assessed in accordance with the normal acceptance procedure for Division 5.2.

2.5.3.5.4 Water may only be used for the desensitization of organic peroxides which are shown in 2.5.3.2.4 or in the statement of approval according to 2.5.3.2.5 as being with water or as a stable dispersion in water.

2.5.3.5.5 Organic and inorganic solids may be used for desensitization of organic peroxides provided that they are compatible.

2.5.3.5.6 Compatible liquids and solids are those which have no detrimental influence on the thermal stability and hazard type of the organic peroxide formulation.

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* *As determined by test series E as prescribed in the Manual of Tests and Criteria, Part II.*

CHAPTER 2.6

CLASS 6 - TOXIC AND INFECTIOUS SUBSTANCES

Introductory notes

NOTE 1: *Genetically modified micro-organisms and organisms which do not meet the definition of an infectious substance shall be considered for classification in Class 9 and assignment to UN 3245.*

NOTE 2: *Toxins from plant, animal or bacterial sources which do not contain any infectious substances, or toxins that are contained in substances which are not infectious substances, shall be considered for classification in Division 6.1 and assignment to UN 3172.*

2.6.1 Definitions

Class 6 is divided into two divisions as follows:

(a) Division 6.1 *Toxic substances*

These are substances liable either to cause death or serious injury or to harm human health swallowed or inhaled or by skin contact;

(b) Division 6.2 *Infectious substances*

These are substances known or reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) or recombinant micro-organisms (hybrid or mutant), that are known or reasonably expected to cause infectious disease in animals or humans.

2.6.2 Division 6.1 - Toxic substances

2.6.2.1 *Definitions*

For the purposes of these Regulations:

2.6.2.1.1 *LD_{50} for acute oral toxicity* is that dose of the substance administered which is most likely to cause death within 14 days in one half of both male and female young adult albino rats. The number of animals tested shall be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass.

2.6.2.1.2 *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 one half of the animals tested. The number of animals tested shall be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass.

2.6.2.1.3 *LC_{50} for acute toxicity on inhalation* is that concentration of vapour, mist or dust which, administered by continuous inhalation to both male and female young adult albino rats for one hour, is most likely to cause death within 14 days in one half of the animals tested. A solid substance shall be tested if at least 10% (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 microns or less. A liquid substance shall 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% (by mass) of a specimen prepared for inhalation toxicity shall be in the respirable range as defined above. The result is expressed in milligrams per litre of air for dusts and mists or in millilitres per cubic metre of air (parts per million) for vapours.

2.6.2.2 ***Assignment of packing groups***

2.6.2.2.1 Substances of Division 6.1, including pesticides, are allocated among the three packing groups according to their degree of toxic hazard in transport as follows:

(a) *Packing group I*: Substances and preparations presenting a very severe toxicity risk;

(b) *Packing group II*: Substances and preparations presenting a serious toxicity risk;

(c) *Packing group III*: Substances and preparations presenting a relatively low toxicity risk.

2.6.2.2.2 In making this grouping, account shall 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.

2.6.2.2.3 In the absence of human experience the grouping shall be based on data obtained from animal experiments. Three possible routes of administration shall be examined. These routes are exposure through:

(a) Oral ingestion;

(b) Dermal contact; and

(c) Inhalation of dusts, mists, or vapours.

2.6.2.2.3.1 Appropriate animal tests for the various routes of exposure are described in 2.6.2.1. When a substance exhibits a different order of toxicity by two or more of these routes of administration, the highest degree of danger indicated by the tests shall be assigned.

2.6.2.2.4 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.

2.6.2.2.4.1 The grouping criteria for the oral and dermal routes as well as for inhalation of dusts and mists are as shown in the following table.

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	≤40	≤0.5
II	>5-50	>40-200	>0.5-2
III[a]	Solids: >50-200 Liquids: >50-500	>200-1000	>2-10

[a] *Tear gas substances shall be included in Packing group II even if their toxicity data correspond to Packing group III values.*

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 2.8.2.3).*

2.6.2.2.4.2 The criteria for inhalation toxicity of dusts and mists in 2.6.2.2.4.1 are based on LC_{50} data relating to 1 hour exposures and where such information is available it shall be used. However, where only LC_{50} data relating to 4 hours 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 hours) $\times$ 4 is considered the equivalent of LC_{50} (1 hour).

2.6.2.2.4.3 Liquids having toxic vapours shall be assigned to the following packing groups, where "V" is the saturated vapour concentration in millilitres per cubic metre of air (volatility) at 20 °C and standard atmospheric pressure:

(a) *Packing group I*: If $V \geq 10\ LC_{50}$ and $LC_{50} \leq 1{,}000$ ml/m^3;

(b) *Packing group II*: If $V \geq LC_{50}$ and $LC_{50} \leq 3{,}000$ ml/m^3, and not meeting the criteria for packing group I;

(c) *Packing group III*:* If $V \geq 1/5\ LC_{50}$ and $LC_{50} \leq 5{,}000$ ml/m^3, and not meeting the criteria for packing groups I or II.

2.6.2.2.4.4 In Figure 2.6.1, the criteria according to 2.6.2.2.4.3 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 shall be checked using numerical criteria.

2.6.2.2.4.5 The criteria for inhalation toxicity of vapours in 2.6.2.2.4.3 are based on LC_{50} data relating to 1 hour exposure, and where such information is available it shall be used. However, where only LC_{50} data relating to 4 hours 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 hours) $\times$ 2 is considered to be the equivalent of LC_{50} (1 hour).

2.6.2.2.4.6 Mixtures of liquids that are toxic by inhalation shall be assigned to packing groups according to 2.6.2.2.4.7 or 2.6.2.2.4.8.

2.6.2.2.4.7 If LC_{50} data are 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:

$$LC_{50}\,(mixture) = \frac{1}{\sum_{i=1}^{n}\left(\frac{f_i}{LC_{50i}}\right)}$$

where: f_i = mole fraction of the ith component substance of the liquid;
LC_{50i} = mean lethal concentration of the ith component substance in ml/m^3;

(b) Estimate the volatility of each component substance using the formula:

$$V_i = \left(\frac{P_i \, x \, 10^6}{101.3}\right) ml/\,m^3$$

where: P_i = partial pressure of the ith component substance in kPa at 20 °C and one atmosphere pressure;

* *Tear gases are included in Packing group II even if their toxicity data correspond to Packing group III values.*

(c) Calculate the ratio of the volatility to the LC_{50} using the formula:

$$R = \sum_{i=1}^{n} \left(\frac{V_i}{LC_{50_i}} \right);$$

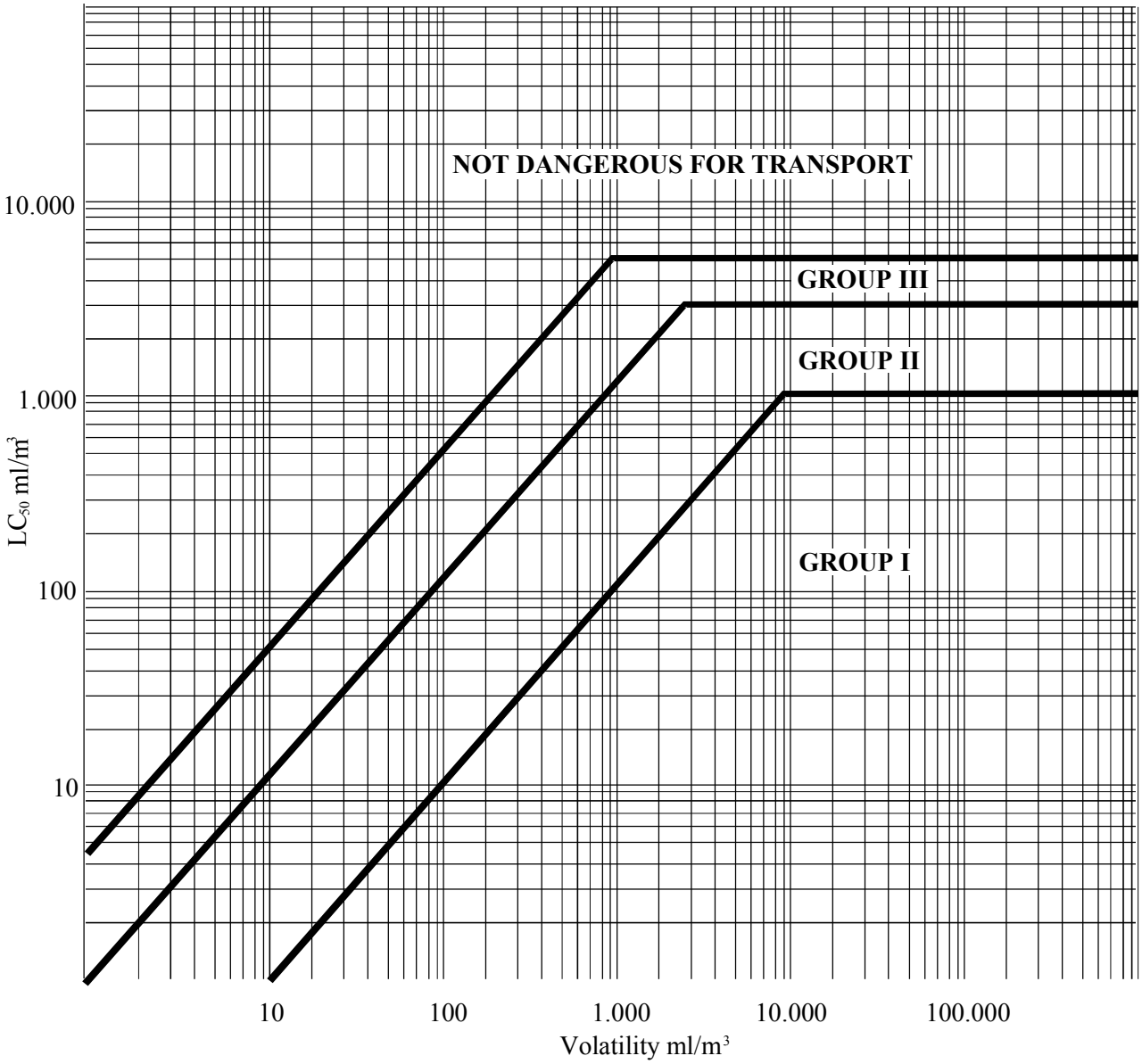
(d) Using the calculated values LC_{50}(mixture) and R, the packing group for the mixture is determined:

(i) *Packing group I*: $R \geq 10$ and LC_{50}(mixture) $\leq$ 1000 ml/m^3;

(ii) *Packing group II* : $R \geq 1$ and LC_{50}(mixture) $\leq$ 3000 ml/m^3 and not meeting criteria for Packing Group I;

(iii) *Packing group III*: $R \geq 1/5$ and LC_{50}(mixture) $\leq$ 5000 ml/m^3 and not meeting criteria for Packing groups I or II.

Figure 2.6.1: INHALATION TOXICITY: PACKING GROUP BORDERLINES



2.6.2.2.4.8 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 determined is 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 1000 ml/m^3 vaporized mixture in air. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have an LC_{50} equal to or less than 1000 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 (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen 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 3000 ml/m^3 vaporized mixture in air. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have an LC_{50} equal to or less than 3000 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 (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen 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 5000 ml/m^3 vaporized mixture in air. Ten albino rats (five male and five female) are exposed to the test atmosphere for one hour and observed for fourteen days. If five or more of the animals die within the fourteen day observation period, the mixture is presumed to have an LC_{50} equal to or less than 5000 ml/m^3;

(ii) The vapour pressure of the liquid mixture is measured and if the vapour concentration is equal to or greater than 1000 ml/m^3, the mixture is presumed to have a volatility equal to or greater than 1/5 the mixture LC_{50}.

2.6.2.3 ***Methods for determining oral and dermal toxicity of mixtures***

2.6.2.3.1 When classifying and assigning the appropriate packing group to mixtures in Division 6.1, in accordance with the oral and dermal toxicity criteria in 2.6.2.2, it is necessary to determine the acute LD_{50} of the mixture.

2.6.2.3.2 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:

$$LD_{50}\ value\ of\ \ preparation = \frac{LD_{50}\ value\ of\ \ active\ substance\ x\ 100}{percentage\ of\ \ active\ substance\ by\ mass}$$

2.6.2.3.3 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, accurate data is 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 % 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.*

2.6.2.4 *Classification of pesticides*

2.6.2.4.1 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 shall be classified under appropriate packing groups in accordance with the criteria given in 2.6.2.2. Substances and preparations which are characterized by subsidiary risks shall be classified according to the precedence of hazard table in Chapter 2.0 with the assignment of appropriate packing groups.

2.6.2.4.2 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 2.6.2.3.

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 Organisation (WHO), 1211 Geneva 27, Switzerland. While that document may be used as a source of LD_{50} data for pesticides, its classification system shall not be used for purposes of transport classification of, or assignment of packing groups to, pesticides, which shall be in accordance with these regulations.*

2.6.2.4.3 The proper shipping name used in the transport of the pesticide shall be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary risks it may exhibit.

2.6.3 Division 6.2 - Infectious substances

2.6.3.1 *Definitions*

For the purposes of these Regulations:

2.6.3.1.1 *Infectious substances* are those substances known or reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) or recombinant micro-organisms (hybrid or mutant), that are known or reasonably expected to cause infectious disease in animals or humans.

NOTE 1: *Infectious substances are not subject to the requirements for this Division if they are unlikely to cause human or animal disease.*

NOTE 2: *Infectious substances are subject to the requirements for this Division only if they are capable of spreading disease when exposure to them occurs.*

2.6.3.1.2 *Biological products* are those products derived from living organisms, that are manufactured and distributed in accordance with the requirements of national governmental 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 and diagnostic products.

For the purposes of these Regulations, biological products are divided into the following groups:

(a) Those which contain pathogens in risk group 1; those which contain pathogens under such conditions that their ability to produce disease is very low to none; and those known not to contain pathogens. Substances in this Group are not considered infectious substances for the purposes of these Regulations;

(b) Those manufactured and packaged in accordance with the requirements of national governmental health 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 the regulations applicable to Division 6.2;

(c) Those known or reasonably expected to contain pathogens in risk groups 2, 3, or 4 (see 2.6.3.2) and which do not meet the criteria of 2.6.3.1.2(b) above. Substances in this Group shall be classified in Division 6.2 under UN 2814 or UN 2900, as appropriate.

NOTE: *Some licensed biological products may present a biohazard in certain parts of the world only. In that case competent authorities may require these biological products to comply with the requirements for infectious substances or may impose other restrictions.*

2.6.3.1.3 *Diagnostic specimens* are any human or animal material, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluids being transported for diagnostic or investigation purposes, but excluding live infected animals.

Diagnostic specimens shall be assigned to UN 3373 unless the source patient or animal has or may have a serious human or animal disease which can be readily transmitted from one individual to another, directly or indirectly, and for which effective treatment and preventive measures are not usually available, in which case they shall be assigned to UN 2814 or UN 2900.

NOTE 1: *Blood which has been collected for the purpose of blood transfusion or for the preparation of blood products, and blood products and any tissues or organs intended for use in transplants are not subject to these Regulations.*

NOTE 2: *Assignment to UN 2814 or UN 2900 shall be based on known medical history of the patient or animal, endemic local conditions, symptoms of the patient or animal, or professional judgement concerning individual circumstances of the patient or animal.*

2.6.3.1.4 *Genetically modified micro-organisms and organisms* are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally. They are divided into the following categories:

(a) Genetically modified micro-organisms which meet the definition of an infectious substance given above shall be classified in Division 6.2 and assigned to UN 2814 or to UN 2900;

(b) Genetically modified organisms, which are known or suspected to be dangerous to humans, animals or the environment, shall be transported in accordance with conditions specified by the competent authorities;

(c) Animals which contain or are contaminated with genetically modified micro-organisms and organisms that meet the definition of an infectious substance shall be transported in accordance with conditions specified by the competent authorities;

(d) Except when authorized for unconditional use by the Governments of the countries of origin, transit and destination, genetically modified micro-organisms which do not meet the definition of infectious substances but which are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction shall be classified in Class 9 and assigned to UN 3245.

2.6.3.1.5 *Wastes (transported under UN 3291)* are wastes derived from the medical treatment of animals or humans or from bio-research where there is a relatively low probability that infectious substances are present. Waste infectious substances which can be specified shall be assigned to UN 2814 or to UN 2900. Decontaminated wastes which previously contained infectious substances are considered non-dangerous unless the criteria of another class are met.

2.6.3.2 *Classification of infectious substances and assignment to risk groups*

2.6.3.2.1 Infectious substances shall be classified in Division 6.2 and assigned to UN 2814 or UN 2900, as appropriate, on the basis of their allocation to one of three risk groups based on criteria developed by the World Health Organization (WHO) and published in the WHO "Laboratory Biosafety Manual, second edition (1993)". A risk group is characterized by the pathogenicity of the organism, the mode and relative ease of transmission, the degree of risk to both an individual and a community, and the reversibility of the disease through the availability of known and effective preventive agents and treatment.

2.6.3.2.2 The criteria for each risk group according to the level of risk are as follows:

(a) Risk Group 4: a pathogen that usually causes serious human or animal disease and that can be readily transmitted from one individual to another, directly or indirectly, and for which effective treatment and preventive measures are not usually available (i.e., high individual and community risk);

(b) Risk Group 3: a pathogen that usually causes serious human or animal disease but does not ordinarily spread from one infected individual to another, and for which effective treatment and preventive measures are available (i.e., high individual risk and low community risk);

(c) Risk Group 2: a pathogen that can cause human or animal disease but is unlikely to be a serious hazard, and, while capable of causing serious infection on exposure, for which there are effective treatment and preventive measures available and the risk of spread of infection is limited (i.e., moderate individual risk and low community risk).

NOTE: *Risk Group 1 includes micro-organisms that are unlikely to cause human or animal disease (i.e., no, or very low, individual or community risk). Substances containing only such micro-organisms are not considered infectious substances for the purposes of these Regulations.*

2.6.3.3 *Biological products*

2.6.3.3.1 Biological products known to contain, or thought likely to contain, any infectious substances shall meet the requirements for infectious substances. Biological products referred to in 2.6.3.1.2 (a) and (b) are not subject to the requirements applicable to Division 6.2.

CHAPTER 2.7

CLASS 7 - RADIOACTIVE MATERIAL

2.7.1 Definition of Class 7

2.7.1.1 *Radioactive material* means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.7.7.2.1 to 2.7.7.2.6.

2.7.1.2 The following radioactive materials are not included in Class 7 for the purposes of these Regulations:

(a) Radioactive material that is an integral part of the means of transport;

(b) Radioactive material moved within an establishment which is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;

(c) Radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;

(d) Radioactive material in consumer products which have received regulatory approval, following their sale to the end user;

(e) Natural material and ores containing naturally occurring radionuclides which are not intended to be processed for use of these radionuclides provided the activity concentration of the material does not exceed 10 times the values specified in 2.7.7.2.

2.7.2 Definitions

A_1 and A_2
A_1 means the activity value of special form radioactive material which is listed in the Table in 2.7.7.2.1 or derived in 2.7.7.2 and is used to determine the activity limits for the requirements of these Regulations.

A_2 means the activity value of radioactive material, other than special form radioactive material, which is listed in the Table in 2.7.7.2.1 or derived in 2.7.7.2 and is used to determine the activity limits for the requirements of these Regulations.

Approval

Multilateral approval means approval by the relevant competent authority both of the country of origin of the design or shipment and of each country through or into which the consignment is to be transported. The term "through or into" specifically excludes "over", i.e. the approval and notification requirements shall not apply to a country over which radioactive material is carried in an aircraft, provided that there is no scheduled stop in that country.

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

Confinement system means 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.

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

Contamination:

Contamination means 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 means contamination that can be removed from a surface during routine conditions of transport.

Fixed contamination means contamination other than non-fixed contamination.

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

Design means the description of special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.

Exclusive use means the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the consignor or consignee.

Fissile material means uranium-233, uranium-235, plutonium-239, plutonium-241, or any combination of these radionuclides. Excepted from this definition is:

(a) Natural uranium or depleted uranium which is unirradiated; and
(b) Natural uranium or depleted uranium which has been irradiated in thermal reactors only.

Freight container in the case of radioactive material transport means an article of transport equipment designed to facilitate the transport of goods, either packaged or unpackaged, by one or more modes of transport without intermediate reloading. It shall be of a permanent enclosed character, rigid and strong enough for repeated use, and shall be fitted with devices facilitating its handling, particularly in transfer between conveyances and from one mode of transport to another. A small freight container is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m^3. Any other freight container is considered to be a large freight container.

Low dispersible radioactive material means either 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, see 2.7.3.

Low toxicity alpha emitters are: 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.

Maximum normal operating pressure means 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.

Package in the case of radioactive material means the packaging with its radioactive contents as presented for transport. The types of packages covered by these Regulations, which are subject to the activity limits and material restrictions of 2.7.7 and meet the corresponding requirements, are:

(a) Excepted package;
(b) Industrial package Type 1 (Type IP-1);
(c) Industrial package Type 2 (Type IP-2);
(d) Industrial package Type 3 (Type IP-3);
(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.

NOTE: *For Apackages@ for other dangerous goods see definitions under 1.2.1.*

Packaging in the case of radioactive material means 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, tank or intermediate bulk container.

NOTE: *For Apackagings@ for other dangerous goods see definitions under 1.2.1.*

Radiation level means the corresponding dose rate expressed in millisieverts per hour.

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

Special form radioactive material, see 2.7.4.1.

Specific activity of a radionuclide means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass or volume of the material in which the radionuclides are essentially uniformly distributed.

Surface contaminated object (SCO), see 2.7.5.

Transport index (TI) assigned to a package, overpack or freight container, or to unpackaged LSA-I or SCO-I, means a number which is used to provide control over radiation exposure.

Unirradiated thorium means thorium containing not more than 10^{-7} g of uranium-233 per gram of thorium-232.

Unirradiated uranium means 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 means the following:

Natural uranium means chemically separated uranium containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

Depleted uranium means uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium means uranium containing a greater mass percentage of uranium-235 than 0.72%. In all cases, a very small mass percentage of uranium-234 is present.

2.7.3 Low specific activity (LSA) material, determination of groups

2.7.3.1 Radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply, is termed low specific activity or LSA material. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

2.7.3.2 LSA material shall 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 which are intended to be processed for the use of these radionuclides;
(ii) solid unirradiated natural uranium or depleted uranium or natural thorium or their solid or liquid compounds or mixtures;
(iii) radioactive material for which the A_2 value is unlimited, excluding fissile material in quantities not excepted under 6.4.11.2; 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 2.7.7.2.1-2.7.7.2.6, excluding fissile material in quantities not excepted under 6.4.11.2.

(b) LSA-II

(i) water with tritium concentration up to 0.8 TBq/L; or
(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, ceramic, etc.);
(ii) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed 0.1 A_2; and
(iii) the estimated average specific activity of the solid, excluding any shielding material, does not exceed 2×10^{-3} A_2/g.

2.7.3.3 LSA-III material shall be a solid of such a nature that if the entire contents of a package were subjected to the test specified in 2.7.3.4 the activity in the water would not exceed 0.1 A_2.

2.7.3.4 LSA-III material shall be tested as follows:

A solid material sample representing the entire contents of the package shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall 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 shall be measured following the 7 day immersion of the test sample.

2.7.3.5 Demonstration of compliance with the performance standards in 2.7.3.4 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.7.4 Requirements for special form radioactive material

2.7.4.1 *Special form radioactive material* means either:

(a) An indispersible solid radioactive material; or

(b) A sealed capsule containing radioactive material that shall be so manufactured that it can be opened only by destroying the capsule.

Special form radioactive material shall have at least one dimension not less than 5 mm.

2.7.4.2 Special form radioactive material shall be of such a nature or shall be so designed that if it is subjected to the tests specified in 2.7.4.4 to 2.7.4.8, it shall meet the following requirements:

(a) It would not break or shatter under the impact, percussion and bending tests 2.7.4.5(a)(b)(c), 2.7.4.6(a) as applicable;

(b) It would not melt or disperse in the applicable heat test 2.7.4.5(d) or 2.7.4.6(b) as applicable; and

(c) The activity in the water from the leaching tests specified in 2.7.4.7 and 2.7.4.8 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.

2.7.4.3 Demonstration of compliance with the performance standards in 2.7.4.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.7.4.4 Specimens that comprise or simulate special form radioactive material shall be subjected to the impact test, the percussion test, the bending test, and the heat test specified in 2.7.4.5 or alternative tests as authorized in 2.7.4.6. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in 2.7.4.7 for indispersible solid material or 2.7.4.8 for encapsulated material.

2.7.4.5 The relevant test methods are:

(a) Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in 6.4.14.

(b) Percussion test: The specimen shall 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 through 1 m. The lower part of the bar shall 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, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage.

(c) Bending test: The test shall 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 shall 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 shall 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 shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm.

(d) Heat test: The specimen shall be heated in air to a temperature of 800°C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.

2.7.4.6 Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

(a) The tests prescribed in 2.7.4.5(a) and 2.7.4.5(b) provided the mass of the special form radioactive material is less than 200 g and they are alternatively subjected to the Class 4 impact test prescribed in ISO 2919:1990 "Radiation protection - Sealed radioactive sources - General requirements and classification"; and

(b) The test prescribed in 2.7.4.5(d) provided they are alternatively subjected to the Class 6 temperature test specified in ISO 2919:1990 "Radiation protection - Sealed radioactive sources - General requirements and classification".

2.7.4.7 For specimens which comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:

(a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20°C;

(b) The water with specimen shall then be heated to a temperature of (50 ± 5)°C and maintained at this temperature for 4 hours;

(c) The activity of the water shall then be determined;

(d) The specimen shall then be kept for at least 7 days in still air at not less than 30°C and relative humidity not less than 90%;

(e) The specimen shall then be immersed in water of the same specification as in (a) above and the water with the specimen heated to (50 ± 5)°C and maintained at this temperature for 4 hours;

(f) The activity of the water shall then be determined.

2.7.4.8 For specimens which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:

(a) The leaching assessment shall consist of the following steps:

(i) the specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6-8 with a maximum conductivity of 1 mS/m at 20°C;
(ii) the water and specimen shall be heated to a temperature of (50 ± 5)°C and maintained at this temperature for 4 hours;
(iii) the activity of the water shall then be determined;
(iv) the specimen shall 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%;
(v) the process in (i), (ii) and (iii) shall be repeated;

(b) The alternative volumetric leakage assessment shall comprise any of the tests prescribed in ISO 9978:1992 "Radiation Protection - Sealed radioactive sources - Leakage test methods", which are acceptable to the competent authority.

2.7.5 Surface contaminated object (SCO), determination of groups

Surface contaminated object (SCO) means a solid object which is not itself radioactive but which has radioactive material distributed on its surfaces. SCO is classified in one of two 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; and

(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; and

(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; and

(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; and

(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.

2.7.6 Determination of transport index and criticality safety index (CSI)

2.7.6.1 *Determination of transport index*

2.7.6.1.1 The transport index (TI) for a package, overpack or freight container, or for unpackaged LSA-I or SCO-I, shall be the number derived in accordance with the following procedure:

(a) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, freight container, or unpackaged LSA-I and SCO-I. The value determined shall be multiplied by 100 and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum radiation level 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 tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in step (a) above shall be multiplied by the appropriate factor from Table 2.7.6.1.1;

(c) The value obtained in steps (a) and (b) above shall 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.

Table 2.7.6.1.1: Multiplication factors for large dimension loads

Size of load[a]		Multiplication factor
	size of load $\leq$ 1 m^2	1
1 m^2 <	size of load $\leq$ 5 m^2	2
5 m^2 <	size of load $\leq$ 20 m^2	3
20 m^2 <	size of load	10

[a] *Largest cross-sectional area of the load being measured*.

2.7.6.1.2 The transport index for each overpack, freight container or conveyance shall be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level, except in the case of non-rigid overpacks for which the transport index shall be determined only as the sum of the TIs of all the packages.

2.7.6.2 ***Determination of criticality safety index (CSI)***

2.7.6.2.1 The criticality safety index (CSI) for packages containing fissile material shall be obtained by dividing the number 50 by the smaller of the two values of N derived in 6.4.11.11 and 6.4.11.12 (i.e. CSI = 50/N). The value of the criticality safety index may be zero, provided that an unlimited number of packages is subcritical (i.e. N is effectively equal to infinity in both cases).

2.7.6.2.2 The criticality safety index for each consignment shall be determined as the sum of the CSIs of all the packages contained in that consignment.

2.7.7 Activity limits and material restrictions

2.7.7.1 ***Contents limits for packages***

2.7.7.1.1 General

The quantity of radioactive material in a package shall not exceed the relevant limits for the package type as specified below.

2.7.7.1.2 Excepted packages

2.7.7.1.2.1 For radioactive material other than articles manufactured of natural uranium, depleted uranium or natural thorium, an excepted package shall not contain activities greater than the following:

(a) Where the radioactive material is enclosed in or is included as a component part of an instrument or other manufactured article, such as a clock or electronic apparatus, the limits specified in columns 2 and 3 of Table 2.7.7.1.2.1 for each individual item and each package, respectively; and

(b) Where the radioactive material is not so enclosed in or is not included as a component of an instrument or other manufactured article, the package limits specified in column 4 of Table 2.7.7.1.2.1.

Table 2.7.7.1.2.1: Activity limits for excepted packages

Physical state of contents	Instruments or article		Materials Package limits[a]
	Item limits[a]	Package limits[a]	
(1)	(2)	(3)	(4)
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

[a] *For mixtures of radionuclides, see 2.7.7.2.4 to 2.7.7.2.6.*

2.7.7.1.2.2 For articles manufactured of natural uranium, depleted uranium or natural thorium, an excepted package may contain any quantity of such material provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

2.7.7.1.3 Industrial packages

The radioactive contents in a single package of LSA material or in a single package of SCO shall be so restricted that the radiation level specified in 4.1.9.2.1 shall not be exceeded, and the activity in a single package shall also be so restricted that the activity limits for a conveyance specified in 7.1.7.2 shall not be exceeded. A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than 3000 A_2.

2.7.7.1.4 Type A packages

2.7.7.1.4.1 Type A packages shall not contain activities greater than the following:

(a) For special form radioactive material - A_1; or

(b) For all other radioactive material - A_2.

2.7.7.1.4.2 For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\Sigma_i \frac{B(i)}{A_1(i)} + \Sigma_j \frac{C(j)}{A_2(j)} \leq 1$$

where

B(i) is the activity of radionuclide i as special form radioactive material and A_1(i) is the A_1 value for radionuclide i; and
C(j) is the activity of radionuclide j as other than special form radioactive material and A_2 (j) is the A_2 value for radionuclide j.

2.7.7.1.5 Type B(U) and Type B(M) packages

2.7.7.1.5.1 Type B(U) and Type B(M) packages shall not contain:

(a) Activities greater than those authorized for the package design;

(b) Radionuclides different from those authorized for the package design; or

(c) Contents in a form, or a physical or chemical state different from those authorized for the package design;

as specified in their certificates of approval.

2.7.7.1.5.2 Type B(U) and Type B(M) packages, if transported by air, shall in addition 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.

2.7.7.1.6 Type C packages

Type C packages shall not contain:

(a) Activities greater than those authorized for the package design;

(b) Radionuclides different from those authorized for the package design; or

(c) Contents in a form, or physical or chemical state different from those authorized for the package design;

as specified in their certificates of approval.

2.7.7.1.7 Packages containing fissile material

Packages containing fissile material shall not contain:

(a) A mass of fissile material different from that authorized for the package design;

(b) Any radionuclide or fissile material different from those authorized for the package design; or

(c) Contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design;

as specified in their certificates of approval where appropriate.

2.7.7.1.8 Packages containing uranium hexafluoride

The mass of uranium hexafluoride in a package shall not exceed a value that would lead to an ullage smaller than 5% at the maximum temperature of the package as specified for the plant systems where the package shall be used. The uranium hexafluoride shall be in solid form and the internal pressure of the package shall be below atmospheric pressure when presented for transport.

2.7.7.2 ***Activity levels***

2.7.7.2.1 The following basic values for individual radionuclides are given in Table 2.7.7.2.1:

(a) A_1 and A_2 in TBq;

(b) Activity concentration for exempt material in Bq/g; and

(c) Activity limits for exempt consignments in Bq.

Table 2.7.7.2.1: Basic radionuclides values for individual radionuclides

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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}
Ba-133m	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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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)
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	5×10^{-2}	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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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}
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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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}
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-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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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}
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-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-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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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
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-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

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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}
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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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}
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}	1×10^{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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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)
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)				

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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-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}
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-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}
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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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^{5}
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)				
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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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)
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}

Radionuclide (atomic number)	A_1	A_2	Activity concentration for exempt material	Activity limit for an exempt consignment
	(TBq)	(TBq)	(Bq/g)	(Bq)
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)
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 include contributions from daughter nuclides with half-lives less than 10 days.

(b) Parent nuclides and their progeny included in secular equilibrium are listed in the following:

Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Cs-137	Ba-137m
Ce-134	La-134
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-220	Po-216
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-226	Ra-222, Rn-218, Po-214
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	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	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
U-240Np-240m	
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 radiation level 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.

2.7.7.2.2 For individual radionuclides which are not listed in Table 2.7.7.2.1 the determination of the basic radionuclide values referred to in 2.7.7.2.1 shall require competent authority approval or, for international transport, multilateral approval. Where the chemical form of each radionuclide is known, it is permissible to use the A_2 value related to its solubility class as recommended by the International Commission on Radiological Protection, if the chemical forms under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 2.7.7.2.2 may be used without obtaining competent authority approval.

Table 2.7.7.2.2: Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	A_1	A_2	Activity concentration for exempt material	Activity limit for exempt consignments
	(TBq)	(TBq)	(Bq/g)	(Bq)
Only beta or gamma emitting nuclides are known to be present	0.1	0.02	1×10^{1}	1×10^{4}
Only alpha emitting nuclides are known to be present	0.2	9×10^{-5}	1×10^{-1}	1×10^{3}
No relevant data are available	0.001	9×10^{-5}	1×10^{-1}	1×10^{3}

2.7.7.2.3 In the calculations of A_1 and A_2 for a radionuclide not in Table 2.7.7.2.1, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, shall 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 shall be those corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.

2.7.7.2.4 For mixtures of radionuclides, the determination of the basic radionuclide values referred to in 2.7.7.2.1 may be determined as follows:

$$X_m = \frac{1}{\Sigma_i \frac{f(i)}{X(i)}}$$

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 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 for exempt material or the activity limit for an exempt consignment in the case of a mixture.

2.7.7.2.5 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 2.7.7.2.4 and 2.7.7.1.4.2. 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.

2.7.7.2.6 For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 2.7.7.2.2 shall be used.

2.7.8 Limits on transport index (TI), criticality safety index (CSI), radiation levels for packages and overpacks

2.7.8.1 Except for consignments under exclusive use, the transport index of any package or overpack shall not exceed 10, nor shall the criticality safety index of any package or overpack exceed 50.

2.7.8.2 Except for packages or overpacks transported under exclusive use by rail or by road under the conditions specified in 7.2.3.1.2(a), or under exclusive use and special arrangement by vessel or by air under the conditions specified in 7.2.3.2.1 or 7.2.3.3.3 respectively, the maximum radiation level at any point on any external surface of a package or overpack shall not exceed 2 mSv/h.

2.7.8.3 The maximum radiation level at any point on any external surface of a package under exclusive use shall not exceed 10 mSv/h.

2.7.8.4 Packages and overpacks shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 2.7.8.4 and with the following requirements:

(a) For a package or overpack, both the transport index and the surface radiation level conditions shall be taken into account in determining which is the appropriate category. Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package or overpack shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category;

(b) The transport index shall be determined following the procedures specified in 2.7.6.1.1 and 2.7.6.1.2;

(c) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use and under the provisions of 7.2.3.1.3, 7.2.3.2.1, or 7.2.3.3.3, as appropriate;

(d) A package transported under a special arrangement shall be assigned to category III-YELLOW;

(e) An overpack which contains packages transported under special arrangement shall be assigned to category III-YELLOW.

Table 2.7.8.4: Categories of packages and overpacks

Conditions		
Transport index	**Maximum radiation level at any point on external surface**	**Category**
0[a]	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1[a]	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[b]

[a] *If the measured TI is not greater than 0.05, the value quoted may be zero in accordance with 2.7.6.1.1(c).*

[b] *Shall also be transported under exclusive use.*

2.7.9 Requirements and controls for transport of excepted packages

2.7.9.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles as specified in 2.7.7.1.2 and empty packagings as specified in 2.7.9.6 may be transported under the following conditions:

(a) The applicable requirements specified in 2.0.3.2, 2.7.9.2, 2.7.9.3-2.7.9.6 (as applicable), 2.7.9.6(d), 4.1.9.1.2, 5.2.1.1, 5.2.1.2, 5.2.1.5.1-5.2.1.5.3, 5.4.1.4(a), 7.1.7.5.2;

(b) The requirements for excepted packages specified in para. 6.4.4;

(c) If the excepted package contains fissile material, one of the fissile exceptions provided by 6.4.11.2 shall apply and the requirement of 6.4.7.2 shall be met; and

(d) The requirements in 1.1.1.6 if transported by post.

2.7.9.2 The radiation level at any point on the external surface of an excepted package shall not exceed 5 μSv/h.

2.7.9.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article, with activity not exceeding the item and package limits specified in columns 2 and 3 respectively of Table 2.7.7.1.2.1, may be transported in an excepted package provided that:

(a) The radiation level 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 (except radioluminescent time-pieces or devices) bears the marking "RADIOACTIVE"; and

(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article).

2.7.9.4 Radioactive material in forms other than as specified in 2.7.9.3, with an activity not exceeding the limit specified in column 4 of Table 2.7.7.1.2.1, may be transported in an excepted package provided that:

(a) The package retains its radioactive contents under routine conditions of transport; and
(b) The package bears the marking "RADIOACTIVE" on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

2.7.9.5 A manufactured article in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be transported as an excepted package provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

2.7.9.6 An empty packaging which had previously contained radioactive material may be transported as an excepted package 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 does not exceed one hundred times the levels specified in 4.1.9.1.2; and

(d) Any labels which may have been displayed on it in conformity with 5.2.2.1.11.1 are no longer visible.

2.7.9.7 The following provisions do not apply to excepted packages and the controls for transport of excepted packages:

2.7.4.1, 2.7.4.2, 4.1.9.1.3, 4.1.9.1.4, 5.1.3.2, 5.1.5.1.1, 5.1.5.1.2, 5.2.2.1.12.1, 5.4.1.5.7.1, 5.4.1.5.7.2, 5.4.1.6, 6.4.6.1, 7.1.6.5.1, 7.1.6.5.3-7.1.6.5.5, 7.1.7.1.1, 7.1.7.1.3, 7.1.7.3.1, 7.1.7.6.1.

2.7.10 Requirements for low dispersible material

2.7.10.1 Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package shall meet the following requirements:

(a) The radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;

(b) If subjected to the tests specified in 6.4.20.3 and 6.4.20.4, 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 2.7.3.4 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 shall be taken into account.

2.7.10.2 Low dispersible material shall be tested as follows:

A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in 6.4.20.3 and the impact test specified in 6.4.20.4. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in 2.7.3.4. After each test it shall be determined if the applicable requirements of 2.7.10.1 have been met.

2.7.10.3 Demonstration of compliance with the performance standards in 2.7.10.1 and 2.7.10.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.

CHAPTER 2.8

CLASS 8 - CORROSIVE SUBSTANCES

2.8.1 Definition

Class 8 substances (corrosive substances) are substances which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport.

2.8.2 Assignment of packing groups

2.8.2.1 *Substances and preparations of Class 8 are divided among the three packing groups according to their degree of hazard in transport as follows:*

(a) *Packing group I*: Very dangerous substances and preparations;

(b) *Packing group II*: Substances and preparations presenting medium danger;

(c) *Packing group III*: Substances and preparations presenting minor danger.

2.8.2.2 Allocation of substances listed in the Dangerous Goods List in Chapter 3.2 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 2.8.2.3) and reactivity with water (including the formation of dangerous decomposition products). New substances, including mixtures, can be assigned to packing groups on the basis of the length of time of contact necessary to produce full thickness destruction of human skin in accordance with the criteria in 2.8.2.4. Substances which are judged not to cause full thickness destruction of human skin shall still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 2.8.2.5(c)(ii).

2.8.2.3 A substance or preparation 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, shall be allocated to Class 8 (see footnote under 2.6.2.2.4.1).

2.8.2.4 In assigning the packing group to a substance in accordance with 2.8.2.2, account shall be taken of human experience in instances of accidental exposure. In the absence of human experience the grouping shall be based on data obtained from experiments in accordance with OECD Guideline 404[1].

2.8.2.5 Packing groups are assigned to corrosive substances in accordance with the following criteria:

(a) *Packing group I* is assigned to substances that cause full thickness destruction of intact skin tissue within an observation period up to 60 minutes starting after the exposure time of three minutes or less;

(b) *Packing group II* is assigned to substances that cause full thickness destruction of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than three minutes but not more than 60 minutes;

[1] *OECD Guidelines for testing of chemicals No. 404 "Acute Dermal Irritation/Corrosion" 1992.*

(c) *Packing group III* is assigned to substances that:

(i) cause full thickness destruction of intact skin tissue within an observation period 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 full thickness destruction of intact skin tissue but which exhibit a corrosion rate on steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 °C. For the purposes of testing steel, type P235 (ISO 9328-2:1991) or a similar type, and for testing aluminium, non-clad types 7075-T6 or AZ5GU-T6 shall be used. An acceptable test is prescribed in ASTM G31-72 (Reapproved 1990).

CHAPTER 2.9

CLASS 9 - MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES

2.9.1 Definition

Class 9 substances and articles (miscellaneous dangerous substances and articles) are substances and articles which during transport present a danger not covered by other classes. This class includes, inter alia, 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.

PART 3

DANGEROUS GOODS LIST
AND
LIMITED QUANTITIES EXCEPTIONS

CHAPTER 3.1

GENERAL

3.1.1 Scope and general provisions

3.1.1.1 The Dangerous Goods List 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.

3.1.1.2 Where a substance or article is specifically listed by name in the Dangerous Goods List, it shall be transported in accordance with the provisions in the List which are appropriate for that substance or article. 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 shall 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 or article shall be used. The classification shall be made by the appropriate competent authority when so required or may otherwise be made by the consignor. Once the class of the substance or article has been so established, all conditions for dispatch and transport, as provided in these Regulations shall be met. Any substance or article having or suspected of having explosive characteristics shall first be considered for inclusion in Class 1. Some collective entries may be of the "generic" or "not otherwise specified" type provided that the regulations contain provisions ensuring safety, both by excluding extremely dangerous goods from normal transport and by covering all subsidiary risks inherent in some goods.

3.1.1.3 The Dangerous Goods List does not include goods which are so dangerous that their transport, except with special authorization, is prohibited. Such goods are not listed because the transport of some goods may be prohibited for some modes of transport and allowed in others and, in addition, because it would be impossible to draw up an exhaustive list. Moreover, any such list would soon cease to be exhaustive because of the frequent introduction of new substances; and the absence of a substance from such a list might give the mistaken impression that that substance could be carried without special restrictions. Inherent instability in goods may take different dangerous forms, for example, explosion, polymerization, with intense evolution of heat, or emission of toxic gases. In respect of most substances, such tendencies can be controlled by correct packing, dilution, stabilization, addition of an inhibitor, refrigeration or other precautions.

3.1.1.4 Where precautionary measures are laid down in the Dangerous Goods List in respect of a given substance or article (e.g. that it shall 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.

3.1.2 Proper shipping name

NOTE 1: *For proper shipping names to be used for dangerous goods transported as limited quantities, see 3.4.8.*

NOTE 2: *For proper shipping names used for the transport of samples, see 2.0.4.*

3.1.2.1 The proper shipping name is that portion of the entry most accurately describing the goods in the Dangerous Goods List, which is shown in upper case characters (plus any numbers, Greek letters, 'sec', 'tert', and the letters m, n, o, p, which form an integral part of the name). An alternative proper shipping name may be shown in brackets following the main proper shipping name [e.g., ETHANOL (ETHYL ALCOHOL)]. Portions of an entry appearing in lower case need not be considered as part of the proper shipping name but may be used.

3.1.2.2 When conjunctions such as "and" or "or" are in lower case or when segments of the name are punctuated by commas, the entire name of the entry need not necessarily be shown in the transport document or package markings. This is the case particularly when a combination of several distinct entries are listed under a single UN Number. Examples illustrating the selection of the proper shipping name for such entries are:

(a) UN 1057 LIGHTERS or LIGHTER REFILLS - The proper shipping name is the most appropriate of the following possible combinations:

LIGHTERS
LIGHTER REFILLS;

(b) UN 3207 ORGANOMETALLIC COMPOUND or COMPOUND SOLUTION or COMPOUND DISPERSION, WATER-REACTIVE, FLAMMABLE, N.O.S.*. The proper shipping name is the most appropriate of the following possible combinations:

ORGANOMETALLIC COMPOUND, WATER-REACTIVE, FLAMMABLE, N.O.S.
ORGANOMETALLIC COMPOUND SOLUTION, WATER-REACTIVE, FLAMMABLE, N.O.S.
ORGANOMETALLIC COMPOUND DISPERSION, WATER-REACTIVE, FLAMMABLE, N.O.S.

each supplemented with the technical name of the goods (see 3.1.2.8.1).

3.1.2.3 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 markings is optional. For instance, "DIMETHYLAMINE AQUEOUS SOLUTION" may alternatively be shown "AQUEOUS SOLUTION OF DIMETHYLAMINE". Commercial or military names for goods of Class 1 which contain the proper shipping name supplemented by additional descriptive text may be used.

3.1.2.4 Unless it is already included in capital letters in the name indicated in Dangerous Goods List, the qualifying word "LIQUID" or "SOLID", as appropriate, shall be added as part of the proper shipping name when a substance specifically listed by name may, due to the differing physical states of the various isomers of the substance, be either a liquid or a solid (e.g. DINITROTOLUENES, LIQUID; DINITROTOLUENES, SOLID).

3.1.2.5 Unless it is already included in capital letters in the name indicated in the Dangerous Goods List, the qualifying word "MOLTEN" shall be added as part of the proper shipping name when a substance, which is a solid in accordance with the definition in 1.2.1, is offered for transport in the molten state (e.g. ALKYLPHENOL, SOLID, N.O.S., MOLTEN).

3.1.2.6 Except for self-reactive substances and organic peroxides and unless it is already included in capital letters in the name indicated in the Dangerous Goods List, the word STABILIZED shall be added as part of the proper shipping name of a substance which, without stabilization, would be forbidden from transport in accordance with 1.1.3 due to it being liable to dangerously react under conditions normally encountered in transport (e.g.: "TOXIC LIQUID, ORGANIC, N.O.S., STABILIZED").

When temperature control is used to stabilize such substances to prevent the development of any dangerous excess pressure, then:

(a) For liquids: where the SADT is less than 50 °C, the provisions of 7.1.4 shall apply;

(b) For gases: the conditions of transport shall be approved by the competent authority.

3.1.2.7 Hydrates may be included under the proper shipping name for the anhydrous substance.

3.1.2.8 ***Generic or "not otherwise specified" (N.O.S.) names***

3.1.2.8.1 Generic and "not otherwise specified" proper shipping names that are assigned to special provision 274 in Column 6 of the Dangerous Goods List shall be supplemented with their technical or chemical group names unless a national law or international convention prohibits its 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 shall 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 also be used. For example: "UN 1993 Flammable liquid, n.o.s. (contains xylene and benzene), 3, PG II".

3.1.2.8.1.1 The technical name shall be a recognized chemical or other name currently used in scientific and technical handbooks, journals and texts. Trade names shall not be used for this purpose. In the case of pesticides, only ISO common name(s), other name(s) in the World Health Organisation (WHO) Recommended Classification of Pesticides by Hazard and Guidelines to Classification, or the name(s) of the active substance(s) may be used.

3.1.2.8.1.2 When a mixture of dangerous goods is described by one of the "N.O.S." or "generic" entries to which special provision 274 has been allocated in the Dangerous Goods List, not more than the two constituents which most predominantly contribute to the hazard or hazards of a mixture 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 risk label, one of the two technical names shown in brackets shall be the name of the constituent which compels the use of the subsidiary risk label.

3.1.2.8.1.3 Examples illustrating the selection of the proper shipping name supplemented with the technical name of goods for such N.O.S. entries are:

UN 2003 METAL ALKYL, WATER-REACTIVE, N.O.S. (trimethylgallium)
UN 2902 PESTICIDE, LIQUID, TOXIC, N.O.S. (drazoxolon).

3.1.3 Mixtures and solutions containing one dangerous substance

3.1.3.1 A mixture or solution containing a dangerous substance identified by name in the Dangerous Goods List and one or more substances not subject to these Regulations shall be treated according to the requirements given for the dangerous substance provided that the packaging is appropriate to the physical state of the mixture or solution, unless:

(a) The mixture or solution is specifically identified by name in these Regulations; or

(b) The entry in these Regulations specifically indicates that it applies only to the pure substance; or

(c) The hazard class, physical state or packing group of the solution or mixture is different from that of the dangerous substance; or

(d) There is significant change in the measures to be taken in emergencies.

3.1.3.2 For solutions and mixtures treated according to the provisions given for the dangerous substance, the qualifying word "SOLUTION" or "MIXTURE", as appropriate, shall 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, e.g., "ACETONE 75% SOLUTION".

3.1.3.3 A mixture or solution containing one or more substances identified by name in these Regulations or classified under a N.O.S. entry and one or more substances is not subject to these Regulations 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.

CHAPTER 3.2

DANGEROUS GOODS LIST

3.2.1 Structure of the dangerous goods list

The Dangerous Goods List is divided into 11 columns as follows:

Column 1 'UN No.' - this column contains the serial number assigned to the article or substance under the United Nations system.

Column 2 'Name and description' - this column contains the proper shipping names in uppercase characters, which may be followed by additional descriptive text presented in lowercase characters (see 3.1.2). An explanation of some of the terms used appears in Appendix B. Proper shipping names may be shown in the plural where isomers of similar classification exist. Hydrates may be included under the proper shipping name for the anhydrous substance, as appropriate.

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 Chapter 2.1.

Column 4 'Subsidiary risk' - this column contains the class or division number of any important subsidiary risks which have been identified by applying the classification system described in Part 2.

Column 5 '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 shall be determined, based on its properties, through application of the hazard grouping criteria as provided in Part 2.

Column 6 'Special provisions' - this column contains a number referring to any special provision(s) indicated in 3.3.1 that are relevant to the article or substance. Special provisions apply to all the packing groups permitted for a particular substance or article unless the wording makes it otherwise apparent.

Column 7 'Limited quantities' - this column provides the maximum quantity per inner packaging authorized for transport of the substance concerned according to the provisions for limited quantities in Chapter 3.4. The word "None" in this column means that the article or substance is not permitted to be transported under the provisions of Chapter 3.4.

Column 8 'Packing instruction' - This column contains alpha numeric codes which refer to the relevant packing instructions specified in section 4.1.4. The packing instructions indicate the packaging (including IBCs and large packagings), which may be used for the transport of substances and articles.

A code including the letter "P" refers to packing instructions for the use of packagings described in Chapters 6.1, 6.2 or 6.3.

A code including the letters "IBC" refers to packing instructions for the use of IBCs described in Chapter 6.5.
A code including the letters "LP" refers to packing instructions for the use of large packagings described in Chapter 6.6.

When a particular code is not provided, it means the substance is not authorized in the type of packaging that may be used according to the packing instructions bearing that code.

When N/R is included in the column it means that the substance or article need not be packaged.

The packing instructions are listed in numerical order in section 4.1.4 as follows:

Sub-section 4.1.4.1: Packing instructions concerning the use of packagings (except IBCs and large packagings) (P)
Sub-section 4.1.4.2: Packing instructions concerning the use of IBCs (IBC)
Sub-section 4.1.4.3: Packing instructions concerning the use of large packagings (LP).

Column 9 'Special packing provisions' - this column contains alpha numeric codes which refer to the relevant special packing provisions specified in section 4.1.4. The special packing provisions indicate the special provisions for packaging (including IBCs and large packagings).

A special packing provision including the letters "PP" refers to special packing provision applicable to the use of packing instructions bearing the Code "P" in 4.1.4.1.

A special packing provision including the letter "B" refers to special packing provision applicable to the use of packing instructions bearing the code "IBC" in 4.1.4.2.

A special provision including the letter "L" refers to special packing provision applicable to packing instructions bearing the code "LP" in 4.1.4.3.

Column 10 'Portable tank instruction' - this column contains a number preceded by the letter "T" which refers to the relevant instruction in 4.2.5 specifying the tank type(s) required for the transport of the substance in portable tanks.

Column 11 'Portable tank special provisions' - this column contains a number preceded by the letters “TP” referring to any special provisions indicated in 4.2.5.3 that apply to the transport of the substance in portable tanks.

3.2.2 Abbreviations and symbols

The following abbreviations or symbols are used in the Dangerous Goods List and have the meanings shown:

Abbreviation	*Column*	*Meaning*
N.O.S.	2	Not otherwise specified.
†	2	Entry for which there is an explanation in Appendix B.

DANGEROUS GOODS LIST

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0004	AMMONIUM PICRATE dry or wetted with less than 10% water, by mass†	1.1D				NONE	P112(a) (b) or (c)	PP26		
0005	CARTRIDGES FOR WEAPONS with bursting charge†	1.1F				NONE	P130			
0006	CARTRIDGES FOR WEAPONS with bursting charge†	1.1E				NONE	P130 LP101	PP67 L1		
0007	CARTRIDGES FOR WEAPONS with bursting charge†	1.2F				NONE	P130			
0009	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge†	1.2G				NONE	P130 LP101	PP67 L1		
0010	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge†	1.3G				NONE	P130 LP101	PP67 L1		
0012	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS†	1.4S				NONE	P130			
0014	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK†	1.4S				NONE	P130			
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge†	1.2G			204	NONE	P130 LP101	PP67 L1		
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge†	1.3G			204	NONE	P130 LP101	PP67 L1		
0018	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge†	1.2G	6.1 8			NONE	P130 LP101	PP67 L1		
0019	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge†	1.3G	6.1 8			NONE	P130 LP101	PP67 L1		
0020	AMMUNITION, TOXIC with burster, expelling charge or propelling charge†	1.2K	6.1		274	NONE	P101			
0021	AMMUNITION, TOXIC with burster, expelling charge or propelling charge†	1.3K	6.1		274	NONE	P101			
0027	BLACK POWDER (GUNPOWDER), granular or as a meal†	1.1D				NONE	P113	PP50		
0028	BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS†	1.1D				NONE	P113	PP51		
0029	DETONATORS, NON-ELECTRIC for blasting†	1.1B				NONE	P131	PP68		
0030	DETONATORS, ELECTRIC for blasting†	1.1B				NONE	P131			
0033	BOMBS with bursting charge†	1.1F				NONE	P130			
0034	BOMBS with bursting charge†	1.1D				NONE	P130 LP101	PP67 L1		
0035	BOMBS with bursting charge†	1.2D				NONE	P130 LP101	PP67 L1		
0037	BOMBS, PHOTO-FLASH†	1.1F				NONE	P130			
0038	BOMBS, PHOTO-FLASH†	1.1D				NONE	P130 LP101	PP67 L1		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0039	BOMBS, PHOTO-FLASH†	1.2G				NONE	P130 LP101	PP67 L1		
0042	BOOSTERS without detonator†	1.1D				NONE	P132 (a) or (b)			
0043	BURSTERS, explosive†	1.1D				NONE	P133	PP69		
0044	PRIMERS, CAP TYPE†	1.4S				NONE	P133			
0048	CHARGES, DEMOLITION†	1.1D				NONE	P130 LP101	PP67 L1		
0049	CARTRIDGES, FLASH†	1.1G				NONE	P135			
0050	CARTRIDGES, FLASH†	1.3G				NONE	P135			
0054	CARTRIDGES, SIGNAL†	1.3G				NONE	P135			
0055	CASES, CARTRIDGE, EMPTY, WITH PRIMER†	1.4S				NONE	P136			
0056	CHARGES, DEPTH†	1.1D				NONE	P130 LP101	PP67 L1		
0059	CHARGES, SHAPED without detonator†	1.1D				NONE	P137	PP70		
0060	CHARGES, SUPPLEMENTARY, EXPLOSIVE†	1.1D				NONE	P132 (a) or (b)			
0065	CORD, DETONATING, flexible†	1.1D				NONE	P139	PP71 PP72		
0066	CORD, IGNITER†	1.4G				NONE	P140			
0070	CUTTERS, CABLE, EXPLOSIVE†	1.4S				NONE	P134 LP102			
0072	CYCLOTRIMETHYLENETRINITRA-MINE (CYCLONITE; HEXOGEN; RDX), WETTED with not less than 15% water, by mass†	1.1D			266	NONE	P112(a)	PP45		
0073	DETONATORS FOR AMMUNITION†	1.1B				NONE	P133			
0074	DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass†	1.1A			266	NONE	P110 (a) or (b)	PP42		
0075	DIETHYLENEGLYCOL DINITRATE, DESENSITIZED with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass†	1.1D			266	NONE	P115	PP53 PP54 PP57 PP58		
0076	DINITROPHENOL, dry or wetted with less than 15% water, by mass†	1.1D	6.1			NONE	P112 (a), (b) or (c)	PP26		
0077	DINITROPHENOLATES, alkali metals, dry or wetted with less than 15% water, by mass†	1.3C	6.1			NONE	P114 (a) or (b)	PP26		
0078	DINITRORESORCINOL, dry or wetted with less than 15% water, by mass†	1.1D				NONE	P112 (a), (b) or (c)	PP26		
0079	HEXANITRODIPHENYLAMINE (DIPICRYLAMINE; HEXYL)†	1.1D				NONE	P112 (b) or (c)			
0081	EXPLOSIVE, BLASTING, TYPE A†	1.1D				NONE	P116	PP63 PP66		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0082	EXPLOSIVE, BLASTING, TYPE B†	1.1D				NONE	P116 IBC100	PP61 PP62 PP65 B9		
0083	EXPLOSIVE, BLASTING, TYPE C†	1.1D			267	NONE	P116			
0084	EXPLOSIVE, BLASTING, TYPE D†	1.1D				NONE	P116			
0092	FLARES, SURFACE†	1.3G				NONE	P135			
0093	FLARES, AERIAL†	1.3G				NONE	P135			
0094	FLASH POWDER†	1.1G				NONE	P113	PP49		
0099	FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	1.1D				NONE	P134 LP102			
0101	FUSE, NON-DETONATING†	1.3G				NONE	P140	PP74 PP75		
0102	CORD (FUSE), DETONATING, metal clad†	1.2D				NONE	P139	PP71		
0103	FUSE, IGNITER, tubular, metal clad†	1.4G				NONE	P140			
0104	CORD (FUSE), DETONATING, MILD EFFECT, metal clad†	1.4D				NONE	P139	PP71		
0105	FUSE, SAFETY†	1.4S				NONE	P140	PP73		
0106	FUZES, DETONATING†	1.1B				NONE	P141			
0107	FUZES, DETONATING†	1.2B				NONE	P141			
0110	GRENADES, PRACTICE, hand or rifle†	1.4S				NONE	P141			
0113	GUANYL NITROSAMINOGUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass†	1.1A			266	NONE	P110 (a) or (b)	PP42		
0114	GUANYL NITROSAMINOGUANYLTETRAZENE (TETRAZENE), WETTED with not less than 30% water, or mixture of alcohol and water, by mass†	1.1A			266	NONE	P110 (a) or (b)	PP42		
0118	HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass†	1.1D				NONE	P112			
0121	IGNITERS†	1.1G				NONE	P142			
0124	JET PERFORATING GUNS, CHARGED, oil well, without detonator†	1.1D				NONE	P101			
0129	LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass†	1.1A			266	NONE	P110 (a) or (b)	PP42		
0130	LEAD STYPHNATE (LEAD TRINITRORESORCINATE), WETTED with not less than 20% water, or mixture of alcohol and water, by mass†	1.1A			266	NONE	P110 (a) or (b)	PP42		
0131	LIGHTERS, FUSE†	1.4S				NONE	P142			
0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.†	1.3C				NONE	P114 (a) or (b)	PP26		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0133	MANNITOL HEXANITRATE (NITROMANNITE), WETTED with not less than 40% water, or mixture of alcohol and water, by mass†	1.1D			266	NONE	P112(a)			
0135	MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass†	1.1A			266	NONE	P110 (a) or (b)	PP42		
0136	MINES with bursting charge†	1.1F				NONE	P130			
0137	MINES with bursting charge†	1.1D				NONE	P130 LP101	PP67 L1		
0138	MINES with bursting charge†	1.2D				NONE	P130 LP101	PP67 L1		
0143	NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass†	1.1D	6.1		266, 271	NONE	P115	PP53 PP54 PP57 PP58		
0144	NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin†	1.1D				NONE	P115	PP45 PP55 PP56 PP59 PP60		
0146	NITROSTARCH, dry or wetted with less than 20% water, by mass†	1.1D				NONE	P112			
0147	NITRO UREA†	1.1D				NONE	P112(b)			
0150	PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), DESENSITIZED with not less than 15% phlegmatizer, by mass†	1.1D			266	NONE	P112(a) or (b)			
0151	PENTOLITE, dry or wetted with less than 15% water, by mass†	1.1D				NONE	P112			
0153	TRINITROANILINE (PICRAMIDE)†	1.1D				NONE	P112 (b) or (c)			
0154	TRINITROPHENOL (PICRIC ACID), dry or wetted with less than 30% water, by mass†	1.1D				NONE	P112 (a), (b) or (c)	PP26		
0155	TRINITROCHLOROBENZENE (PICRYL CHLORIDE)†	1.1D				NONE	P112 (b) or (c)			
0159	POWDER CAKE (POWDER PASTE), WETTED with not less than 25% water, by mass†	1.3C			266	NONE	P111	PP43		
0160	POWDER, SMOKELESS†	1.1C				NONE	P114 (b)	PP50 PP52		
0161	POWDER, SMOKELESS†	1.3C				NONE	P114 (b)	PP50 PP52		
0167	PROJECTILES with bursting charge†	1.1F				NONE	P130			
0168	PROJECTILES with bursting charge†	1.1D				NONE	P130 LP101	PP67 L1		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0169	PROJECTILES with bursting charge†	1.2D				NONE	P130 LP101	PP67 L1		
0171	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge†	1.2G				NONE	P130 LP101	PP67 L1		
0173	RELEASE DEVICES, EXPLOSIVE†	1.4S				NONE	P134 LP102			
0174	RIVETS, EXPLOSIVE	1.4S				NONE	P134 LP102			
0180	ROCKETS with bursting charge†	1.1F				NONE	P130			
0181	ROCKETS with bursting charge†	1.1E				NONE	P130 LP101	PP67 L1		
0182	ROCKETS with bursting charge†	1.2E				NONE	P130 LP101	PP67 L1		
0183	ROCKETS with inert head†	1.3C				NONE	P130 LP101	PP67 L1		
0186	ROCKET MOTORS†	1.3C				NONE	P130 LP101	PP67 L1		
0190	SAMPLES, EXPLOSIVE, other than initiating explosive†				16, 274		P101			
0191	SIGNAL DEVICES, HAND†	1.4G				NONE	P135			
0192	SIGNALS, RAILWAY TRACK, EXPLOSIVE†	1.1G				NONE	P135			
0193	SIGNALS, RAILWAY TRACK, EXPLOSIVE†	1.4S				NONE	P135			
0194	SIGNALS, DISTRESS, ship†	1.1G				NONE	P135			
0195	SIGNALS, DISTRESS, ship†	1.3G				NONE	P135			
0196	SIGNALS, SMOKE†	1.1G				NONE	P135			
0197	SIGNALS, SMOKE†	1.4G				NONE	P135			
0204	SOUNDING DEVICES, EXPLOSIVE†	1.2F				NONE	P134 LP102			
0207	TETRANITROANILINE†	1.1D				NONE	P112 (b) or (c)			
0208	TRINITROPHENYLMETHYLNITRA-MINE (TETRYL)†	1.1D				NONE	P112 (b) or (c)			
0209	TRINITROTOLUENE (TNT), dry or wetted with less than 30% water, by mass†	1.1D				NONE	P112 (b) or (c)	PP46		
0212	TRACERS FOR AMMUNITION†	1.3G				NONE	P133	PP69		
0213	TRINITROANISOLE†	1.1D				NONE	P112 (b) or (c)			
0214	TRINITROBENZENE, dry or wetted with less than 30% water, by mass†	1.1D				NONE	P112			
0215	TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass†	1.1D				NONE	P112			
0216	TRINITRO-m-CRESOL†	1.1D				NONE	P112 (b) or (c)	PP26		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0217	TRINITRONAPHTHALENE†	1.1D				NONE	P112 (b) or (c)			
0218	TRINITROPHENETOLE†	1.1D				NONE	P112 (b) or (c)			
0219	TRINITRORESORCINOL (STYPHNIC ACID), dry or wetted with less than 20% water, or mixture of alcohol and water, by mass†	1.1D				NONE	P112(a), (b) or (c)	PP26		
0220	UREA NITRATE, dry or wetted with less than 20% water, by mass†	1.1D				NONE	P112			
0221	WARHEADS, TORPEDO with bursting charge†	1.1D				NONE	P130 LP101	PP67 L1		
0222	AMMONIUM NITRATE with more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance†	1.1D				NONE	P112 (b) or (c)	PP47		
0224	BARIUM AZIDE, dry or wetted with less than 50% water, by mass†	1.1A	6.1			NONE	P110 (a) or (b)	PP42		
0225	BOOSTERS WITH DETONATOR†	1.1B				NONE	P133	PP69		
0226	CYCLOTETRAMETHYLENETETRA-NITRAMINE (HMX; OCTOGEN), WETTED with not less than 15% water, by mass†	1.1D			266	NONE	P112(a)	PP45		
0234	SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass†	1.3C				NONE	P114(a) or (b)	PP26		
0235	SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass†	1.3C				NONE	P114 (a) or (b)	PP26		
0236	ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass†	1.3C				NONE	P114 (a) or (b)	PP26		
0237	CHARGES, SHAPED, FLEXIBLE, LINEAR†	1.4D				NONE	P138			
0238	ROCKETS, LINE-THROWING†	1.2G				NONE	P130			
0240	ROCKETS, LINE-THROWING†	1.3G				NONE	P130			
0241	EXPLOSIVE, BLASTING, TYPE E†	1.1D				NONE	P116 IBC100	PP61 PP62 PP65 B10		
0242	CHARGES, PROPELLING, FOR CANNON†	1.3C				NONE	P130			
0243	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge†	1.2H				NONE	P130 LP101	PP67 L1		
0244	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge†	1.3H				NONE	P130 LP101	PP67 L1		
0245	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge†	1.2H				NONE	P130 LP101	PP67 L1		
0246	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge†	1.3H				NONE	P130 LP101	PP67 L1		
0247	AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge†	1.3J				NONE	P101			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge†	1.2L			274	NONE	P144	PP77		
0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge†	1.3L			274	NONE	P144	PP77		
0250	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge†	1.3L				NONE	P101			
0254	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge†	1.3G				NONE	P130 LP101	PP67 L1		
0255	DETONATORS, ELECTRIC for blasting†	1.4B				NONE	P131			
0257	FUZES, DETONATING†	1.4B				NONE	P141			
0266	OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass†	1.1D				NONE	P112			
0267	DETONATORS, NON-ELECTRIC for blasting†	1.4B				NONE	P131	PP68		
0268	BOOSTERS WITH DETONATOR†	1.2B				NONE	P133	PP69		
0271	CHARGES, PROPELLING†	1.1C				NONE	P143	PP76		
0272	CHARGES, PROPELLING†	1.3C				NONE	P143	PP76		
0275	CARTRIDGES, POWER DEVICE†	1.3C				NONE	P134 LP102			
0276	CARTRIDGES, POWER DEVICE†	1.4C				NONE	P134 LP102			
0277	CARTRIDGES, OIL WELL†	1.3C				NONE	P134 LP102			
0278	CARTRIDGES, OIL WELL†	1.4C				NONE	P134 LP102			
0279	CHARGES, PROPELLING, FOR CANNON†	1.1C				NONE	P130			
0280	ROCKET MOTORS†	1.1C				NONE	P130 LP101	PP67 L1		
0281	ROCKET MOTORS†	1.2C				NONE	P130 LP101	PP67 L1		
0282	NITROGUANIDINE (PICRITE), dry or wetted with less than 20% water, by mass†	1.1D				NONE	P112			
0283	BOOSTERS without detonator†	1.2D				NONE	P132 (a) or (b)			
0284	GRENADES, hand or rifle, with bursting charge†	1.1D				NONE	P141			
0285	GRENADES, hand or rifle, with bursting charge†	1.2D				NONE	P141			
0286	WARHEADS, ROCKET with bursting charge†	1.1D				NONE	P130 LP101	PP67 L1		
0287	WARHEADS, ROCKET with bursting charge†	1.2D				NONE	P130 LP101	PP67 L1		
0288	CHARGES, SHAPED, FLEXIBLE, LINEAR†	1.1D				NONE	P138			
0289	CORD, DETONATING, flexible†	1.4D				NONE	P139	PP71 PP72		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0290	CORD (FUSE), DETONATING, metal clad†	1.1D				NONE	P139	PP71		
0291	BOMBS with bursting charge†	1.2F				NONE	P130			
0292	GRENADES, hand or rifle, with bursting charge†	1.1F				NONE	P141			
0293	GRENADES, hand or rifle, with bursting charge†	1.2F				NONE	P141			
0294	MINES with bursting charge†	1.2F				NONE	P130			
0295	ROCKETS with bursting charge†	1.2F				NONE	P130			
0296	SOUNDING DEVICES, EXPLOSIVE†	1.1F				NONE	P134 LP102			
0297	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge†	1.4G				NONE	P130 LP101	PP67 L1		
0299	BOMBS, PHOTO-FLASH†	1.3G				NONE	P130 LP101	PP67 L1		
0300	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge†	1.4G				NONE	P130 LP101	PP67 L1		
0301	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge†	1.4G	6.1 8			NONE	P130 LP101	PP67 L1		
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge†	1.4G			204	NONE	P130 LP101	PP67 L1		
0305	FLASH POWDER†	1.3G				NONE	P113	PP49		
0306	TRACERS FOR AMMUNITION†	1.4G				NONE	P133	PP69		
0312	CARTRIDGES, SIGNAL†	1.4G				NONE	P135			
0313	SIGNALS, SMOKE†	1.2G				NONE	P135			
0314	IGNITERS†	1.2G				NONE	P142			
0315	IGNITERS†	1.3G				NONE	P142			
0316	FUZES, IGNITING†	1.3G				NONE	P141			
0317	FUZES, IGNITING†	1.4G				NONE	P141			
0318	GRENADES, PRACTICE, hand or rifle†	1.3G				NONE	P141			
0319	PRIMERS, TUBULAR†	1.3G				NONE	P133			
0320	PRIMERS, TUBULAR†	1.4G				NONE	P133			
0321	CARTRIDGES FOR WEAPONS with bursting charge†	1.2E				NONE	P130 LP101	PP67 L1		
0322	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge†	1.2L				NONE	P101			
0323	CARTRIDGES, POWER DEVICE†	1.4S				NONE	P134 LP102			
0324	PROJECTILES with bursting charge†	1.2F				NONE	P130			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0325	IGNITERS†	1.4G				NONE	P142			
0326	CARTRIDGES FOR WEAPONS, BLANK†	1.1C				NONE	P130			
0327	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK†	1.3C				NONE	P130			
0328	CARTRIDGES FOR WEAPONS, INERT PROJECTILE†	1.2C				NONE	P130 LP101	PP67 L1		
0329	TORPEDOES with bursting charge†	1.1E				NONE	P130 LP101	PP67 L1		
0330	TORPEDOES with bursting charge†	1.1F				NONE	P130			
0331	EXPLOSIVE, BLASTING, TYPE B† (AGENT, BLASTING, TYPE B)	1.5D				NONE	P116 IBC100	PP61 PP62 PP64 PP65		
0332	EXPLOSIVE, BLASTING, TYPE E† (AGENT, BLASTING, TYPE E)	1.5D				NONE	P116 IBC100	PP61 PP62 PP65		
0333	FIREWORKS†	1.1G				NONE	P135			
0334	FIREWORKS†	1.2G				NONE	P135			
0335	FIREWORKS†	1.3G				NONE	P135			
0336	FIREWORKS†	1.4G				NONE	P135			
0337	FIREWORKS†	1.4S				NONE	P135			
0338	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK†	1.4C				NONE	P130			
0339	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS†	1.4C				NONE	P130			
0340	NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass†	1.1D				NONE	P112 (a) or (b)			
0341	NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass†	1.1D				NONE	P112 (b)			
0342	NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass†	1.3C			105	NONE	P114 (a)	PP43		
0343	NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass†	1.3C			105	NONE	P111			
0344	PROJECTILES with bursting charge†	1.4D				NONE	P130 LP101	PP67 L1		
0345	PROJECTILES, inert with tracer†	1.4S				NONE	P130 LP101	PP67 L1		
0346	PROJECTILES with burster or expelling charge†	1.2D				NONE	P130 LP101	PP67 L1		
0347	PROJECTILES with burster or expelling charge†	1.4D				NONE	P130 LP101	PP67 L1		
0348	CARTRIDGES FOR WEAPONS with bursting charge†	1.4F				NONE	P130			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0349	ARTICLES, EXPLOSIVE, N.O.S.	1.4S			178 274	NONE	P101			
0350	ARTICLES, EXPLOSIVE, N.O.S.	1.4B			178 274	NONE	P101			
0351	ARTICLES, EXPLOSIVE, N.O.S.	1.4C			178 274	NONE	P101			
0352	ARTICLES, EXPLOSIVE, N.O.S.	1.4D			178 274	NONE	P101			
0353	ARTICLES, EXPLOSIVE, N.O.S.	1.4G			178 274	NONE	P101			
0354	ARTICLES, EXPLOSIVE, N.O.S.	1.1L			178 274	NONE	P101			
0355	ARTICLES, EXPLOSIVE, N.O.S.	1.2L			178 274	NONE	P101			
0356	ARTICLES, EXPLOSIVE, N.O.S.	1.3L			178 274	NONE	P101			
0357	SUBSTANCES, EXPLOSIVE, N.O.S.	1.1L			178 274	NONE	P101			
0358	SUBSTANCES, EXPLOSIVE, N.O.S.	1.2L			178 274	NONE	P101			
0359	SUBSTANCES, EXPLOSIVE, N.O.S.	1.3L			178 274	NONE	P101			
0360	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting†	1.1B				NONE	P131			
0361	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting†	1.4B				NONE	P131			
0362	AMMUNITION, PRACTICE†	1.4G				NONE	P130 LP101	PP67 L1		
0363	AMMUNITION, PROOF†	1.4G				NONE	P130 LP101	PP67 L1		
0364	DETONATORS FOR AMMUNITION†	1.2B				NONE	P133			
0365	DETONATORS FOR AMMUNITION†	1.4B				NONE	P133			
0366	DETONATORS FOR AMMUNITION†	1.4S				NONE	P133			
0367	FUZES, DETONATING†	1.4S				NONE	P141			
0368	FUZES, IGNITING†	1.4S				NONE	P141			
0369	WARHEADS, ROCKET with bursting charge†	1.1F				NONE	P130			
0370	WARHEADS, ROCKET with burster or expelling charge†	1.4D				NONE	P130 LP101	PP67 L1		
0371	WARHEADS, ROCKET with burster or expelling charge†	1.4F				NONE	P130			
0372	GRENADES, PRACTICE, hand or rifle†	1.2G				NONE	P141			
0373	SIGNAL DEVICES, HAND†	1.4S				NONE	P135			
0374	SOUNDING DEVICES, EXPLOSIVE†	1.1D				NONE	P134 LP102			
0375	SOUNDING DEVICES, EXPLOSIVE†	1.2D				NONE	P134 LP102			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0376	PRIMERS, TUBULAR†	1.4S				NONE	P133			
0377	PRIMERS, CAP TYPE†	1.1B				NONE	P133			
0378	PRIMERS, CAP TYPE†	1.4B				NONE	P133			
0379	CASES, CARTRIDGE, EMPTY, WITH PRIMER†	1.4C				NONE	P136			
0380	ARTICLES, PYROPHORIC†	1.2L				NONE	P101			
0381	CARTRIDGES, POWER DEVICE†	1.2C				NONE	P134 LP102			
0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.†	1.2B			178 274	NONE	P101			
0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.†	1.4B			178 274	NONE	P101			
0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.†	1.4S			178 274	NONE	P101			
0385	5-NITROBENZOTRIAZOL†	1.1D				NONE	P112 (b) or (c)			
0386	TRINITROBENZENESULPHONIC ACID†	1.1D				NONE	P112 (b) or (c)	PP26		
0387	TRINITROFLUORENONE†	1.1D				NONE	P112 (b) or (c)			
0388	TRINITROTOLUENE (TNT) AND TRINITROBENZENE MIXTURE or TRINITROTOLUENE (TNT) AND HEXANITROSTILBENE MIXTURE†	1.1D				NONE	P112 (b) or (c)			
0389	TRINITROTOLUENE (TNT) MIXTURE CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE†	1.1D				NONE	P112 (b) or (c)			
0390	TRITONAL†	1.1D				NONE	P112 (b) or (c)			
0391	CYCLOTRIMETHYLENETRINITRA-MINE (CYCLONITE; HEXOGEN; RDX) AND CYCLOTETRAMETHYLENETETRA-NITRAMINE (HMX; OCTOGEN) MIXTURE, WETTED with not less than 15% water, by mass or CYCLOTRIMETHYLENETRINITRA-MINE (CYCLONITE; HEXOGEN; RDX) AND CYCLOTETRAMETHYLENETETRA-NITRAMINE (HMX; OCTOGEN) MIXTURE, DESENSITIZED with not less than 10% phlegmatizer, by mass†	1.1D			266	NONE	P112 (a) or (b)			
0392	HEXANITROSTILBENE†	1.1D				NONE	P112 (b) or (c)			
0393	HEXOTONAL†	1.1D				NONE	P112 (b)			
0394	TRINITRORESORCINOL (STYPHNIC ACID), WETTED with not less than 20% water, or mixture of alcohol and water, by mass†	1.1D				NONE	P112 (a)	PP26		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0395	ROCKET MOTORS, LIQUID FUELLED†	1.2J				NONE	P101			
0396	ROCKET MOTORS, LIQUID FUELLED†	1.3J				NONE	P101			
0397	ROCKETS, LIQUID FUELLED with bursting charge†	1.1J				NONE	P101			
0398	ROCKETS, LIQUID FUELLED with bursting charge†	1.2J				NONE	P101			
0399	BOMBS WITH FLAMMABLE LIQUID with bursting charge†	1.1J				NONE	P101			
0400	BOMBS WITH FLAMMABLE LIQUID with bursting charge†	1.2J				NONE	P101			
0401	DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass†	1.1D				NONE	P112			
0402	AMMONIUM PERCHLORATE†	1.1D			152	NONE	P112 (b) or (c)			
0403	FLARES, AERIAL†	1.4G				NONE	P135			
0404	FLARES, AERIAL†	1.4S				NONE	P135			
0405	CARTRIDGES, SIGNAL†	1.4S				NONE	P135			
0406	DINITROSOBENZENE†	1.3C				NONE	P114 (b)			
0407	TETRAZOL-1-ACETIC ACID†	1.4C				NONE	P114 (b)			
0408	FUZES, DETONATING with protective features†	1.1D				NONE	P141			
0409	FUZES, DETONATING with protective features†	1.2D				NONE	P141			
0410	FUZES, DETONATING with protective features†	1.4D				NONE	P141			
0411	PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN) with not less than 7% wax, by mass†	1.1D			131	NONE	P112 (b) or (c)			
0412	CARTRIDGES FOR WEAPONS with bursting charge†	1.4E				NONE	P130 LP101	PP67 L1		
0413	CARTRIDGES FOR WEAPONS, BLANK†	1.2C				NONE	P130			
0414	CHARGES, PROPELLING, FOR CANNON†	1.2C				NONE	P130			
0415	CHARGES, PROPELLING†	1.2C				NONE	P143	PP76		
0417	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS†	1.3C				NONE	P130			
0418	FLARES, SURFACE†	1.1G				NONE	P135			
0419	FLARES, SURFACE†	1.2G				NONE	P135			
0420	FLARES, AERIAL†	1.1G				NONE	P135			
0421	FLARES, AERIAL†	1.2G				NONE	P135			
0424	PROJECTILES, inert with tracer†	1.3G				NONE	P130 LP101	PP67 L1		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0425	PROJECTILES, inert with tracer†	1.4G				NONE	P130 LP101	PP67 L1		
0426	PROJECTILES with burster or expelling charge†	1.2F				NONE	P130			
0427	PROJECTILES with burster or expelling charge†	1.4F				NONE	P130			
0428	ARTICLES, PYROTECHNIC for technical purposes†	1.1G				NONE	P135			
0429	ARTICLES, PYROTECHNIC for technical purposes†	1.2G				NONE	P135			
0430	ARTICLES, PYROTECHNIC for technical purposes†	1.3G				NONE	P135			
0431	ARTICLES, PYROTECHNIC for technical purposes†	1.4G				NONE	P135			
0432	ARTICLES, PYROTECHNIC for technical purposes†	1.4S				NONE	P135			
0433	POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass†	1.1C			266	NONE	P111			
0434	PROJECTILES with burster or expelling charge†	1.2G				NONE	P130 LP101	PP67 L1		
0435	PROJECTILES with burster or expelling charge†	1.4G				NONE	P130 LP101	PP67 L1		
0436	ROCKETS with expelling charge†	1.2C				NONE	P130 LP101	PP67 L1		
0437	ROCKETS with expelling charge†	1.3C				NONE	P130 LP101	PP67 L1		
0438	ROCKETS with expelling charge†	1.4C				NONE	P130 LP101	PP67 L1		
0439	CHARGES, SHAPED, without detonator†	1.2D				NONE	P137	PP70		
0440	CHARGES, SHAPED, without detonator†	1.4D				NONE	P137	PP70		
0441	CHARGES, SHAPED, without detonator†	1.4S				NONE	P137	PP70		
0442	CHARGES, EXPLOSIVE, COMMERCIAL without detonator†	1.1D				NONE	P137			
0443	CHARGES, EXPLOSIVE, COMMERCIAL without detonator†	1.2D				NONE	P137			
0444	CHARGES, EXPLOSIVE, COMMERCIAL without detonator†	1.4D				NONE	P137			
0445	CHARGES, EXPLOSIVE, COMMERCIAL without detonator†	1.4S				NONE	P137			
0446	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER†	1.4C				NONE	P136			
0447	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER†	1.3C				NONE	P136			
0448	5-MERCAPTOTETRAZOL-1-ACETIC ACID†	1.4C				NONE	P114(b)			
0449	TORPEDOES, LIQUID FUELLED with or without bursting charge†	1.1J				NONE	P101			
0450	TORPEDOES, LIQUID FUELLED with inert head†	1.3J				NONE	P101			
0451	TORPEDOES with bursting charge†	1.1D				NONE	P130 LP101	PP67 L1		
0452	GRENADES, PRACTICE, hand or rifle†	1.4G				NONE	P141			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0453	ROCKETS, LINE-THROWING†	1.4G				NONE	P130			
0454	IGNITERS†	1.4S				NONE	P142			
0455	DETONATORS, NON-ELECTRIC for blasting†	1.4S				NONE	P131	PP68		
0456	DETONATORS, ELECTRIC for blasting†	1.4S				NONE	P131			
0457	CHARGES, BURSTING, PLASTICS BONDED	1.1D				NONE	P130			
0458	CHARGES, BURSTING, PLASTICS BONDED	1.2D				NONE	P130			
0459	CHARGES, BURSTING, PLASTICS BONDED	1.4D				NONE	P130			
0460	CHARGES, BURSTING, PLASTICS BONDED	1.4S				NONE	P130			
0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.†	1.1B			178 274	NONE	P101			
0462	ARTICLES, EXPLOSIVE, N.O.S.	1.1C			178 274	NONE	P101			
0463	ARTICLES, EXPLOSIVE, N.O.S.	1.1D			178 274	NONE	P101			
0464	ARTICLES, EXPLOSIVE, N.O.S.	1.1E			178 274	NONE	P101			
0465	ARTICLES, EXPLOSIVE, N.O.S.	1.1F			178 274	NONE	P101			
0466	ARTICLES, EXPLOSIVE, N.O.S.	1.2C			178 274	NONE	P101			
0467	ARTICLES, EXPLOSIVE, N.O.S.	1.2D			178 274	NONE	P101			
0468	ARTICLES, EXPLOSIVE, N.O.S.	1.2E			178 274	NONE	P101			
0469	ARTICLES, EXPLOSIVE, N.O.S.	1.2F			178 274	NONE	P101			
0470	ARTICLES, EXPLOSIVE, N.O.S.	1.3C			178 274	NONE	P101			
0471	ARTICLES, EXPLOSIVE, N.O.S.	1.4E			178 274	NONE	P101			
0472	ARTICLES, EXPLOSIVE, N.O.S.	1.4F			178 274	NONE	P101			
0473	SUBSTANCES, EXPLOSIVE, N.O.S.	1.1A			178 274	NONE	P101			
0474	SUBSTANCES, EXPLOSIVE, N.O.S.	1.1C			178 274	NONE	P101			
0475	SUBSTANCES, EXPLOSIVE, N.O.S.	1.1D			178 274	NONE	P101			
0476	SUBSTANCES, EXPLOSIVE, N.O.S.	1.1G			178 274	NONE	P101			
0477	SUBSTANCES, EXPLOSIVE, N.O.S.	1.3C			178 274	NONE	P101			
0478	SUBSTANCES, EXPLOSIVE, N.O.S.	1.3G			178 274	NONE	P101			
0479	SUBSTANCES, EXPLOSIVE, N.O.S.	1.4C			178 274	NONE	P101			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0480	SUBSTANCES, EXPLOSIVE, N.O.S.	1.4D			178 274	NONE	P101			
0481	SUBSTANCES, EXPLOSIVE, N.O.S.	1.4S			178 274	NONE	P101			
0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S.†	1.5D			178 274	NONE	P101			
0483	CYCLOTRIMETHYLENETRINITRA-MINE (CYCLONITE; HEXOGEN; RDX), DESENSITIZED	1.1D				NONE	P112 (b) or (c)			
0484	CYCLOTETRAMETHYLENETETRA-NITRAMINE (HMX; OCTOGEN), DESENSITIZED	1.1D				NONE	P112 (b) or (c)			
0485	SUBSTANCES, EXPLOSIVE, N.O.S.	1.4G			178 274	NONE	P101			
0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)†	1.6N				NONE	P101			
0487	SIGNALS, SMOKE†	1.3G				NONE	P135			
0488	AMMUNITION, PRACTICE†	1.3G				NONE	P130 LP101	PP67 L1		
0489	DINITROGLYCOLURIL (DINGU)†	1.1D				NONE	P112 (b) or (c)			
0490	NITROTRIAZOLONE (NTO)†	1.1D				NONE	P112 (b) or (c)			
0491	CHARGES, PROPELLING†	1.4C				NONE	P143	PP76		
0492	SIGNALS, RAILWAY TRACK, EXPLOSIVE†	1.3G				NONE	P135			
0493	SIGNALS, RAILWAY TRACK, EXPLOSIVE†	1.4G				NONE	P135			
0494	JET PERFORATING GUNS, CHARGED, oil well, without detonator†	1.4D				NONE	P101			
0495	PROPELLANT, LIQUID†	1.3C			224	NONE	P115	PP53 PP54 PP57 PP58		
0496	OCTONAL	1.1D				NONE	P112 (b) or (c)			
0497	PROPELLANT, LIQUID†	1.1C			224	NONE	P115	PP53 PP54 PP57 PP58		
0498	PROPELLANT, SOLID†	1.1C				NONE	P114 (b)			
0499	PROPELLANT, SOLID†	1.3C				NONE	P114 (b)			
0500	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting†	1.4S				NONE	P131			
0501	PROPELLANT, SOLID†	1.4C				NONE	P114 (b)			
0502	ROCKETS with inert head†	1.2C				NONE	P130 LP101	PP67 L1		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0503	AIR-BAG INFLATORS, or AIR-BAG MODULES, or SEAT-BELT PRETENSIONERS	1.4G			235 289	NONE	P135			
0504	1H-TETRAZOLE	1.1D					P112 (c)	PP48		
1001	ACETYLENE, DISSOLVED	2.1				NONE	P200	PP23		
1002	AIR, COMPRESSED	2.2			292	120 ml	P200			
1003	AIR, REFRIGERATED LIQUID	2.2	5.1			NONE	P200		T75	TP22
1005	AMMONIA, ANHYDROUS	2.3	8		23	NONE	P200		T50	
1006	ARGON, COMPRESSED	2.2				120 ml	P200			
1008	BORON TRIFLUORIDE	2.3	8			NONE	P200			
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2.2				120 ml	P200		T50	
1010	BUTADIENES, STABILIZED	2.1				NONE	P200		T50	
1011	BUTANE	2.1				NONE	P200		T50	
1012	BUTYLENE	2.1				NONE	P200		T50	
1013	CARBON DIOXIDE	2.2				120 ml	P200			
1014	CARBON DIOXIDE AND OXYGEN MIXTURE, COMPRESSED	2.2	5.1			NONE	P200			
1015	CARBON DIOXIDE AND NITROUS OXIDE MIXTURE	2.2				120 ml	P200			
1016	CARBON MONOXIDE, COMPRESSED	2.3	2.1			NONE	P200			
1017	CHLORINE	2.3	8			NONE	P200		T50	TP19
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	2.2				120 ml	P200		T50	
1020	CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)	2.2				120 ml	P200		T50	
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2.2				120 ml	P200		T50	
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	2.2				120 ml	P200			
1023	COAL GAS, COMPRESSED	2.3	2.1			NONE	P200			
1026	CYANOGEN	2.3	2.1			NONE	P200			
1027	CYCLOPROPANE	2.1				NONE	P200		T50	
1028	DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	2.2				120 ml	P200		T50	
1029	DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)	2.2				120 ml	P200		T50	
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2.1				NONE	P200		T50	
1032	DIMETHYLAMINE, ANHYDROUS	2.1				NONE	P200		T50	
1033	DIMETHYL ETHER	2.1				NONE	P200		T50	

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1035	ETHANE	2.1				NONE	P200			
1036	ETHYLAMINE	2.1				NONE	P200		T50	
1037	ETHYL CHLORIDE	2.1				NONE	P200		T50	
1038	ETHYLENE, REFRIGERATED LIQUID	2.1				NONE	P200		T75	
1039	ETHYL METHYL ETHER	2.1				NONE	P200			
1040	ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C	2.3	2.1			NONE	P200		T50	TP20
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	2.1				NONE	P200		T50	
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	2.2				120 ml	P200			
1044	FIRE EXTINGUISHERS with compressed or liquefied gas	2.2			225	120 ml	P003			
1045	FLUORINE, COMPRESSED	2.3	5.1 8			NONE	P200			
1046	HELIUM, COMPRESSED	2.2				120 ml	P200			
1048	HYDROGEN BROMIDE, ANHYDROUS	2.3	8			NONE	P200			
1049	HYDROGEN, COMPRESSED	2.1				NONE	P200			
1050	HYDROGEN CHLORIDE, ANHYDROUS	2.3	8			NONE	P200			
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	3	I		NONE	P200			
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	6.1	I		NONE	P200		T10	TP2
1053	HYDROGEN SULPHIDE	2.3	2.1			NONE	P200			
1055	ISOBUTYLENE	2.1				NONE	P200		T50	
1056	KRYPTON, COMPRESSED	2.2				120 ml	P200			
1057	LIGHTERS or LIGHTER REFILLS containing flammable gas	2.1			201	NONE	P003			
1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2.2				120 ml	P200			
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED	2.1				NONE	P200		T50	
1061	METHYLAMINE, ANHYDROUS	2.1				NONE	P200		T50	
1062	METHYL BROMIDE with not more than 2% chloropicrin	2.3			23	NONE	P200		T50	
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2.1				NONE	P200		T50	
1064	METHYL MERCAPTAN	2.3	2.1			NONE	P200		T50	
1065	NEON, COMPRESSED	2.2				120 ml	P200			
1066	NITROGEN, COMPRESSED	2.2				120 ml	P200			

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2.3	5.1 8			NONE	P200		T50	TP21
1069	NITROSYL CHLORIDE	2.3	8			NONE	P200			
1070	NITROUS OXIDE	2.2	5.1			NONE	P200			
1071	OIL GAS, COMPRESSED	2.3	2.1			NONE	P200			
1072	OXYGEN, COMPRESSED	2.2	5.1			NONE	P200			
1073	OXYGEN, REFRIGERATED LIQUID	2.2	5.1			NONE	P200		T75	TP22
1075	PETROLEUM GASES, LIQUEFIED	2.1				NONE	P200		T50	
1076	PHOSGENE	2.3	8			NONE	P200			
1077	PROPYLENE	2.1				NONE	P200		T50	
1078	REFRIGERANT GAS, N.O.S.	2.2			274	120 ml	P200		T50	
1079	SULPHUR DIOXIDE	2.3	8			NONE	P200		T50	TP19
1080	SULPHUR HEXAFLUORIDE	2.2				120 ml	P200			
1081	TETRAFLUOROETHYLENE, STABILIZED	2.1				NONE	P200			
1082	TRIFLUOROCHLOROETHYLENE, STABILIZED	2.3	2.1			NONE	P200		T50	
1083	TRIMETHYLAMINE, ANHYDROUS	2.1				NONE	P200		T50	
1085	VINYL BROMIDE, STABILIZED	2.1				NONE	P200		T50	
1086	VINYL CHLORIDE, STABILIZED	2.1				NONE	P200		T50	
1087	VINYL METHYL ETHER, STABILIZED	2.1				NONE	P200		T50	
1088	ACETAL	3		II		1 L	P001 IBC02		T4	TP1
1089	ACETALDEHYDE	3		I		NONE	P001		T11	TP2 TP7
1090	ACETONE	3		II		1 L	P001 IBC02		T4	TP1
1091	ACETONE OILS	3		II		1 L	P001 IBC02		T4	TP1 TP8
1092	ACROLEIN, STABILIZED	6.1	3	I		NONE	P601		T14	TP2 TP7 TP13
1093	ACRYLONITRILE, STABILISED	3	6.1	I		NONE	P001		T14	TP2 TP13
1098	ALLYL ALCOHOL	6.1	3	I		NONE	P602		T14	TP2 TP13
1099	ALLYL BROMIDE	3	6.1	I		NONE	P001		T14	TP2 TP13
1100	ALLYL CHLORIDE	3	6.1	I		NONE	P001		T14	TP2 TP13

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1104	AMYL ACETATES	3		III		5 L	P001 IBC03 LP01		T2	TP1
1105	PENTANOLS	3		II		1 L	P001 IBC02		T4	TP1 TP29
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1106	AMYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
		3	8	III	223	5 L	P001 IBC03		T4	TP1
1107	AMYL CHLORIDE	3		II		1 L	P001 IBC02		T4	TP1
1108	1-PENTENE (n-AMYLENE)	3		I		NONE	P001		T11	TP2
1109	AMYL FORMATES	3		III		5 L	P001 IBC03 LP01		T2	TP1
1110	n-AMYL METHYL KETONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1111	AMYL MERCAPTAN	3		II		1 L	P001 IBC02		T4	TP1
1112	AMYL NITRATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1113	AMYL NITRITE	3		II		1 L	P001 IBC02		T4	TP1
1114	BENZENE	3		II		1 L	P001 IBC02		T4	TP1
1120	BUTANOLS	3		II		1 L	P001 IBC02		T4	TP1 TP29
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1123	BUTYL ACETATES	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1125	n-BUTYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
1126	1-BROMOBUTANE	3		II		1 L	P001 IBC02		T4	TP1
1127	CHLOROBUTANES	3		II		1 L	P001 IBC02		T4	TP1
1128	n-BUTYL FORMATE	3		II		1 L	P001 IBC02		T4	TP1
1129	BUTYRALDEHYDE	3		II		1 L	P001 IBC02		T4	TP1

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1130	CAMPHOR OIL	3		III		5 L	P001 IBC03 LP01		T2	TP1
1131	CARBON DISULPHIDE	3	6.1	I		NONE	P001	PP31	T14	TP2 TP7 TP13
1133	ADHESIVES containing flammable liquid	3		I		500 ml	P001		T11	TP1 TP8 TP27
		3		II		5 L	P001 IBC02	PP1	T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01	PP1	T2	TP1
1134	CHLOROBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1135	ETHYLENE CHLOROHYDRIN	6.1	3	I		NONE	P001		T14	TP2 TP13
1136	COAL TAR DISTILLATES, FLAMMABLE	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T4	TP1 TP29
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining)	3		I		500 ml	P001		T11	TP1 TP8 TP27
		3		II		5 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1143	CROTONALDEHYDE, STABILIZED	6.1	3	I		NONE	P001		T14	TP2 TP13
1144	CROTONYLENE	3		I		NONE	P001		T11	TP2
1145	CYCLOHEXANE	3		II		1 L	P001 IBC02		T4	TP1
1146	CYCLOPENTANE	3		II		1 L	P001 IBC02		T7	TP1
1147	DECAHYDRONAPHTHALENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1148	DIACETONE ALCOHOL	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1149	DIBUTYL ETHERS	3		III		5 L	P001 IBC03 LP01		T2	TP1
1150	1,2-DICHLOROETHYLENE	3		II		1 L	P001 IBC02		T7	TP2

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1152	DICHLOROPENTANES	3		III		5 L	P001 IBC03 LP01		T2	TP1
1153	ETHYLENE GLYCOL DIETHYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
		3		III		5 L	P001 IBC03 LP01		T2	TP1
1154	DIETHYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
1155	DIETHYL ETHER (ETHYL ETHER)	3		I		NONE	P001		T11	TP2
1156	DIETHYL KETONE	3		II		1 L	P001 IBC02		T4	TP1
1157	DIISOBUTYL KETONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1158	DIISOPROPYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
1159	DIISOPROPYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
1160	DIMETHYLAMINE AQUEOUS SOLUTION	3	8	II		1 L	P001 IBC02		T7	TP1
1161	DIMETHYL CARBONATE	3		II		1 L	P001 IBC02		T4	TP1
1162	DIMETHYLDICHLOROSILANE	3	8	II		NONE	P001 IBC02		T7	TP2 TP13
1163	DIMETHYLHYDRAZINE, UNSYMMETRICAL	6.1	3, 8	I		NONE	P602		T14	TP2 TP13
1164	DIMETHYL SULPHIDE	3		II		1 L	P001 IBC02	B8	T7	TP2
1165	DIOXANE	3		II		1 L	P001 IBC02		T4	TP1
1166	DIOXOLANE	3		II		1 L	P001 IBC02		T4	TP1
1167	DIVINYL ETHER, STABILIZED	3		I		NONE	P001		T11	TP2
1169	EXTRACTS, AROMATIC, LIQUID	3		II		5 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1170	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)	3		II	144	1 L	P001 IBC02	PP2	T4	TP1
		3		III	144 223	5 L	P001 IBC03 LP01	PP2	T2	TP1
1171	ETHYLENE GLYCOL MONOETHYL ETHER	3		III		5 L	P001 IBC03 LP01		T2	TP1
1172	ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1173	ETHYL ACETATE	3		II		1 L	P001 IBC02		T4	TP1
1175	ETHYLBENZENE	3		II		1 L	P001 IBC02		T4	TP1
1176	ETHYL BORATE	3		II		1 L	P001 IBC02		T4	TP1
1177	2-ETHYLBUTYL ACETATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1178	2-ETHYLBUTYRALDEHYDE	3		II		1 L	P001 IBC02		T4	TP1
1179	ETHYL BUTYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
1180	ETHYL BUTYRATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1181	ETHYL CHLOROACETATE	6.1	3	II		100 ml	P001 IBC02		T7	TP2
1182	ETHYL CHLOROFORMATE	6.1	3 8	I		NONE	P602		T14	TP2 TP13
1183	ETHYLDICHLOROSILANE	4.3	3 8	I		NONE	P401		T10	TP2 TP7 TP13
1184	ETHYLENE DICHLORIDE	3	6.1	II		1 L	P001 IBC02		T7	TP1
1185	ETHYLENEIMINE, STABILIZED	6.1	3	I		NONE	P601			
1188	ETHYLENE GLYCOL MONOMETHYL ETHER	3		III		5 L	P001 IBC03 LP01		T2	TP1
1189	ETHYLENE GLYCOL MONOMETHYL ETHER ACETATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1190	ETHYL FORMATE	3		II		1 L	P001 IBC02		T4	TP1
1191	OCTYL ALDEHYDES	3		III		5 L	P001 IBC03 LP01		T2	TP1
1192	ETHYL LACTATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1193	ETHYL METHYL KETONE (METHYL ETHYL KETONE)	3		II		1 L	P001 IBC02		T4	TP1
1194	ETHYL NITRITE SOLUTION	3	6.1	I		NONE	P099			
1195	ETHYL PROPIONATE	3		II		1 L	P001 IBC02		T4	TP1
1196	ETHYLTRICHLOROSILANE	3	8	II		NONE	P001 IBC02		T7	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1197	EXTRACTS, FLAVOURING, LIQUID	3		II		5 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1198	FORMALDEHYDE SOLUTION, FLAMMABLE	3	8	III		5 L	P001 IBC03		T4	TP1
1199	FURALDEHYDES	6.1	3	II		100 ml	P001 IBC02		T7	TP2
1201	FUSEL OIL	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001		T2	TP1
1202	GAS OIL or DIESEL FUEL or HEATING OIL, LIGHT	3		III		5 L	P001 IBC03 LP01		T2	TP1
1203	MOTOR SPIRIT or GASOLINE or PETROL	3		II	243	1 L	P001 IBC02		T4	TP1
1204	NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	3		II		1 L	P001 IBC02	PP5		
1206	HEPTANES	3		II		1 L	P001 IBC02		T4	TP1
1207	HEXALDEHYDE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1208	HEXANES	3		II		1 L	P001 IBC02		T4	TP1
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	3		I	163	500 ml	P001		T11	TP1 TP8
		3		II	163	5 L	P001 IBC02	PP1	T4	TP1 TP8
		3		III	163 223	5 L	P001 IBC03 LP01	PP1	T2	TP1
1212	ISOBUTANOL (ISOBUTYL ALCOHOL)	3		III		5 L	P001 IBC03 LP01		T2	TP1
1213	ISOBUTYL ACETATE	3		II		1 L	P001 IBC02		T4	TP1
1214	ISOBUTYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
1216	ISOOCTENE	3		II		1 L	P001 IBC02		T4	TP1
1218	ISOPRENE, STABILIZED	3		I		NONE	P001		T11	TP2
1219	ISOPROPANOL (ISOPROPYL ALCOHOL)	3		II		1 L	P001 IBC02		T4	TP1
1220	ISOPROPYL ACETATE	3		II		1 L	P001 IBC02		T4	TP1
1221	ISOPROPYLAMINE	3	8	I		NONE	P001		T11	TP2
1222	ISOPROPYL NITRATE	3		II	26	1 L	P099 IBC02	B7		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1223	KEROSENE	3		III		5 L	P001 IBC03 LP01		T2	TP2
1224	KETONES, LIQUID, N.O.S.	3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
1228	MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP27
		3	6.1	III	223 274	5 L	P001 IBC03		T7	TP1 TP28
1229	MESITYL OXIDE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1230	METHANOL	3	6.1	II	279	1 L	P001 IBC02		T7	TP2
1231	METHYL ACETATE	3		II		1 L	P001 IBC02		T4	TP1
1233	METHYLAMYL ACETATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1234	METHYLAL	3		II		1 L	P001 IBC02	B8	T7	TP2
1235	METHYLAMINE, AQUEOUS SOLUTION	3	8	II		1 L	P001 IBC02		T7	TP1
1237	METHYL BUTYRATE	3		II		1 L	P001 IBC02		T4	TP1
1238	METHYL CHLOROFORMATE	6.1	3, 8	I		NONE	P602		T14	TP2 TP13
1239	METHYL CHLOROMETHYL ETHER	6.1	3	I		NONE	P602		T14	TP2
1242	METHYLDICHLOROSILANE	4.3	3 8	I		NONE	P401		T10	TP2 TP7 TP13
1243	METHYL FORMATE	3		I		NONE	P001		T11	TP2
1244	METHYLHYDRAZINE	6.1	3 8	I		NONE	P602		T14	TP2 TP13
1245	METHYL ISOBUTYL KETONE	3		II		1 L	P001 IBC02		T4	TP1
1246	METHYL ISOPROPENYL KETONE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
1247	METHYL METHACRYLATE MONOMER, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
1248	METHYL PROPIONATE	3		II		1 L	P001 IBC02		T4	TP1
1249	METHYL PROPYL KETONE	3		II		1 L	P001 IBC02		T4	TP1
1250	METHYLTRICHLOROSILANE	3	8	I		NONE	P001		T11	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1251	METHYL VINYL KETONE, STABILIZED	6.1	3 8	I		NONE	P601		T14	TP2 TP13
1259	NICKEL CARBONYL	6.1	3	I		NONE	P601			
1261	NITROMETHANE	3		II	26	1 L	P099			
1262	OCTANES	3		II		1 L	P001 IBC02		T4	TP1
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)	3		I	163	500 ml	P001		T11	TP1 TP8
		3		II	163	5 L	P001 IBC02	PP1	T4	TP1 TP8
		3		III	163 223	5 L	P001 IBC03 LP01	PP1	T2	TP1
1264	PARALDEHYDE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1265	PENTANES, liquid	3		I		NONE	P001		T11	TP2
		3		II		1 L	P001 IBC02	B8	T4	TP1
1266	PERFUMERY PRODUCTS with flammable solvents	3		II		5 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1267	PETROLEUM CRUDE OIL	3		I		500 ml	P001		T11	TP1 TP8
		3		II		1 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3		I		500 ml	P001		T11	TP1 TP8 TP9
		3		II		1 L	P001 IBC02		T7	TP1 TP8 TP9 TP28
		3		III	223	5 L	P001 IBC03 LP01		T4	TP1 TP9 TP29
1272	PINE OIL	3		III		5 L	P001 IBC03 LP01		T2	TP1
1274	n-PROPANOL (PROPYL ALCOHOL, NORMAL)	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1275	PROPIONALDEHYDE	3		II		1 L	P001 IBC02		T7	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1276	n-PROPYL ACETATE	3		II		1 L	P001 IBC02		T4	TP1
1277	PROPYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
1278	1-CHLOROPROPANE	3		II		1 L	P001 IBC02	B8	T7	TP2
1279	1,2-DICHLOROPROPANE	3		II		1 L	P001 IBC02		T4	TP1
1280	PROPYLENE OXIDE	3		I		NONE	P001		T11	TP2 TP7
1281	PROPYL FORMATES	3		II		1 L	P001 IBC02		T4	TP1
1282	PYRIDINE	3		II		1 L	P001 IBC02		T4	TP2
1286	ROSIN OIL	3		II		5 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1287	RUBBER SOLUTION	3		II		5 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1288	SHALE OIL	3		II		1 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1289	SODIUM METHYLATE SOLUTION in alcohol	3	8	II		1 L	P001 IBC02		T7	TP1 TP8
		3	8	III	223	5 L	P001 IBC03		T4	TP1
1292	TETRAETHYL SILICATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1293	TINCTURES, MEDICINAL	3		II		1 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1294	TOLUENE	3		II		1 L	P001 IBC02		T4	TP1
1295	TRICHLOROSILANE	4.3	3 8	I		NONE	P401		T14	TP2 TP7 TP13
1296	TRIETHYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	8	I		NONE	P001		T11	TP1
		3	8	II		1 L	P001 IBC02		T7	TP1
		3	8	III	223	5 L	P001 IBC03		T7	TP1
1298	TRIMETHYLCHLOROSILANE	3	8	II		NONE	P001 IBC02		T7	TP2 TP13
1299	TURPENTINE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1300	TURPENTINE SUBSTITUTE	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1301	VINYL ACETATE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
1302	VINYL ETHYL ETHER,STABILIZED	3		I		NONE	P001		T11	TP2
1303	VINYLIDENE CHLORIDE, STABILIZED	3		I		NONE	P001		T12	TP2 TP7
1304	VINYL ISOBUTYL ETHER, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
1305	VINYLTRICHLOROSILANE, STABILIZED	3	8	I		NONE	P001		T11	TP2 TP13
1306	WOOD PRESERVATIVES, LIQUID	3		II		5 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1307	XYLENES	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID	3		I		NONE	P001	PP33		
		3		II		1 L	P001	PP33		
		3		III	223	5 L	P001			
1309	ALUMINIUM POWDER, COATED	4.1		II		1 kg	P002 IBC08	PP38 B2, B4		
		4.1		III	223	5 kg	P002 IBC08 LP02	PP11 B3		
1310	AMMONIUM PICRATE, WETTED with not less than 10% water, by mass	4.1		I	28	NONE	P406	PP26		
1312	BORNEOL	4.1		III		5 kg	P002 IBC08 LP02	B3		
1313	CALCIUM RESINATE	4.1		III		5 kg	P002 IBC06			

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1314	CALCIUM RESINATE, FUSED	4.1		III		5 kg	P002 IBC04			
1318	COBALT RESINATE, PRECIPITATED	4.1		III		5 kg	P002 IBC06			
1320	DINITROPHENOL, WETTED with not less than 15% water, by mass	4.1	6.1	I	28	NONE	P406	PP26		
1321	DINITROPHENOLATES, WETTED with not less than 15% water, by mass	4.1	6.1	I	28	NONE	P406	PP26		
1322	DINITRORESORCINOL, WETTED with not less than 15% water, by mass	4.1		I	28	NONE	P406	PP26		
1323	FERROCERIUM	4.1		II	249	1 kg	P002 IBC08	B2, B4		
1324	FILMS, NITROCELLULOSE BASE, gelatin coated, except scrap	4.1		III		5 kg	P002	PP15		
1325	FLAMMABLE SOLID, ORGANIC, N.O.S.	4.1		II	274	1 kg	P002 IBC08	B2, B4	T3	TP1
		4.1		III	223 274	5 kg	P002 IBC08 LP02	B3	T1	TP1
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	4.1		II		1 kg	P410 IBC06	PP40 B2		
1327	HAY, STRAW or BHUSA	4.1			281	3 kg	P003 IBC08	PP19 B6		
1328	HEXAMETHYLENETETRAMINE	4.1		III		5 kg	P002 IBC08	B3		
1330	MANGANESE RESINATE	4.1		III		5 kg	P002 IBC06			
1331	MATCHES, 'STRIKE ANYWHERE'	4.1		III	293	5 kg	P407	PP27		
1332	METALDEHYDE	4.1		III		5 kg	P002 IBC08 LP02	B3		
1333	CERIUM, slabs, ingots or rods	4.1		II		1 kg	P002 IBC08	B2, B4		
1334	NAPHTHALENE, CRUDE or NAPHTHALENE, REFINED	4.1		III		5 kg	P002 IBC08 LP02	B3		
1336	NITROGUANIDINE (PICRITE), WETTED with not less than 20% water, by mass	4.1		I	28	NONE	P406			
1337	NITROSTARCH, WETTED with not less than 20% water, by mass	4.1		I	28	NONE	P406			
1338	PHOSPHORUS, AMORPHOUS	4.1		III		5 kg	P410 IBC08	B3		
1339	PHOSPHORUS HEPTASULPHIDE, free from yellow and white phosphorus	4.1		II		1 kg	P410 IBC04			
1340	PHOSPHORUS PENTASULPHIDE, free from yellow and white phosphorus	4.3	4.1	II		500 g	P410 IBC04			
1341	PHOSPHORUS SESQUISULPHIDE, free from yellow and white phosphorus	4.1		II		1 kg	P410 IBC04			

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1343	PHOSPHORUS TRISULPHIDE, free from yellow and white phosphorus	4.1		II		1 kg	P410 IBC04			
1344	TRINITROPHENOL, WETTED with not less than 30% water, by mass	4.1		I	28	NONE	P406	PP26		
1345	RUBBER SCRAP or RUBBER SHODDY, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	4.1		II	223	1 kg	P002 IBC08	B2, B4		
1346	SILICON POWDER, AMORPHOUS	4.1		III	32	5 kg	P002 IBC08 LP02	B3		
1347	SILVER PICRATE, WETTED with not less than 30% water, by mass	4.1		I	28	NONE	P406	PP25 PP26		
1348	SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 15% water, by mass	4.1	6.1	I	28	NONE	P406	PP26		
1349	SODIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1		I	28	NONE	P406	PP26		
1350	SULPHUR	4.1		III	242	5 kg	IBC08 LP02	B3	T1	TP1
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	4.1		II		1 kg	P410 IBC06	PP40 B2		
1353	FIBRES or FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	4.1		III		5 kg	P410 IBC08	B3		
1354	TRINITROBENZENE, WETTED with not less than 30% water, by mass	4.1		I	28	NONE	P406			
1355	TRINITROBENZOIC ACID, WETTED with not less than 30% water, by mass	4.1		I	28	NONE	P406			
1356	TRINITROTOLUENE, WETTED with not less than 30% water, by mass	4.1		I	28	NONE	P406			
1357	UREA NITRATE, WETTED with not less than 20% water, by mass	4.1		I	28 227	NONE	P406			
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	4.1		II		1 kg	P410 IBC06	PP40 B2		
1360	CALCIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
1361	CARBON, animal or vegetable origin	4.2		II		NONE	P002 IBC06	PP12		
		4.2		III	223	NONE	P002 IBC08 LP02	PP12 B3		
1362	CARBON, ACTIVATED	4.2		III	223	NONE	P002 IBC08 LP02	PP11 B3		
1363	COPRA	4.2		III	29	NONE	P003 IBC08 LP02	PP20 B3, B6		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1364	COTTON WASTE, OILY	4.2		III		NONE	P003 IBC08 LP02	PP19 B3, B6		
1365	COTTON, WET	4.2		III	29	NONE	P003 IBC08 LP02	PP19 B3, B6		
1366	DIETHYLZINC	4.2	4.3	I		NONE	P400		T21	TP2 TP7
1369	p-NITROSODIMETHYLANILINE	4.2		II		NONE	P410 IBC06	B2		
1370	DIMETHYLZINC	4.2	4.3	I		NONE	P400		T21	TP2 TP7
1372	FIBRES, ANIMAL or FIBRES, VEGETABLE burnt, wet or damp	4.2		III	117	NONE	P410			
1373	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S. with oil	4.2		III		NONE	P410 IBC08	B3		
1374	FISH MEAL (FISH SCRAP), UNSTABILIZED	4.2		II	300	NONE	P410 IBC08	B2, B4		
1376	IRON OXIDE, SPENT or IRON SPONGE, SPENT obtained from coal gas purification	4.2		III	223	NONE	P002 IBC08 LP02	B3		
1378	METAL CATALYST, WETTED with a visible excess of liquid	4.2		II		NONE	P410 IBC01	PP39		
1379	PAPER, UNSATURATED OIL TREATED, incompletely dried (including carbon paper)	4.2		III		NONE	P410 IBC08	B3		
1380	PENTABORANE	4.2	6.1	I		NONE	P601			
1381	PHOSPHORUS, WHITE or YELLOW, DRY or UNDER WATER or IN SOLUTION	4.2	6.1	I		NONE	P405		T9	TP3 TP31
1382	POTASSIUM SULPHIDE, ANHYDROUS or POTASSIUM SULPHIDE with less than 30% water of crystallization	4.2		II		NONE	P410 IBC06	B2		
1383	PYROPHORIC METAL, N.O.S. or PYROPHORIC ALLOY, N.O.S.	4.2		I	274	NONE	P404			
1384	SODIUM DITHIONITE (SODIUM HYDROSULPHITE)	4.2		II		NONE	P410 IBC06	B2		
1385	SODIUM SULPHIDE, ANHYDROUS or SODIUM SULPHIDE with less than 30% water of crystallization	4.2		II		NONE	P410 IBC06	B2		
1386	SEED CAKE with more than 1.5% oil and not more than 11% moisture	4.2		III	29	NONE	P003 IBC08 LP02	PP20 B3, B6		
1387	WOOL WASTE, WET	4.2		III	117	NONE	P410			
1389	ALKALI METAL AMALGAM	4.3		I	182	NONE	P402 P403			
1390	ALKALI METAL AMIDES	4.3		II	182	500 g	P410 IBC07	B2		
1391	ALKALI METAL DISPERSION or ALKALINE EARTH METAL DISPERSION	4.3		I	182 183 282	NONE	P402			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1392	ALKALINE EARTH METAL AMALGAM	4.3		I	183	NONE	P402 P403 IBC04	B1		
1393	ALKALINE EARTH METAL ALLOY, N.O.S.	4.3		II	183	500 g	P410 IBC07	B2		
1394	ALUMINIUM CARBIDE	4.3		II		500 g	P410 IBC07	B2		
1395	ALUMINIUM FERROSILICON POWDER	4.3	6.1	II		500 g	P410 IBC05	B2		
1396	ALUMINIUM POWDER, UNCOATED	4.3		II		500 g	P410 IBC07	B2		
		4.3		III	223	1 kg	P410 IBC08	B4		
1397	ALUMINIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
1398	ALUMINIUM SILICON POWDER, UNCOATED	4.3		III	37 223	1 kg	P410 IBC08	B4		
1400	BARIUM	4.3		II		500 g	P410 IBC07	B2		
1401	CALCIUM	4.3		II		500 g	P410 IBC07	B2		
1402	CALCIUM CARBIDE	4.3		I		NONE	P403 IBC04	B1		
		4.3		II		500 g	P410 IBC07	B2		
1403	CALCIUM CYANAMIDE with more than 0.1% calcium carbide	4.3		III	38	1 kg	P410 IBC08	B4		
1404	CALCIUM HYDRIDE	4.3		I		NONE	P403			
1405	CALCIUM SILICIDE	4.3		II		500 g	P410 IBC07	B2		
		4.3		III	223	1 kg	P410 IBC08	B4		
1407	CAESIUM	4.3		I		NONE	P403 IBC04	B1		
1408	FERROSILICON with 30% or more but less than 90% silicon	4.3	6.1	III	39 223	1 kg	P003 IBC08	PP20 B4		
1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.	4.3		I	274	NONE	P403			
		4.3		II	274	500 g	P410 IBC04			
1410	LITHIUM ALUMINIUM HYDRIDE	4.3		I		NONE	P403			
1411	LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	4.3	3	I		NONE	P402			
1413	LITHIUM BOROHYDRIDE	4.3		I		NONE	P403			
1414	LITHIUM HYDRIDE	4.3		I		NONE	P403			
1415	LITHIUM	4.3		I		NONE	P403 IBC04	B1		
1417	LITHIUM SILICON	4.3		II		500 g	P410 IBC07	B2		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	4.2	I		NONE	P403			
		4.3	4.2	II		NONE	P410 IBC05	B2		
		4.3	4.2	III	223	NONE	P410 IBC08	B4		
1419	MAGNESIUM ALUMINIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
1420	POTASSIUM METAL ALLOYS	4.3		I		NONE	P403 IBC04	B1		
1421	ALKALI METAL ALLOY, LIQUID, N.O.S.	4.3		I	182	NONE	P402			
1422	POTASSIUM SODIUM ALLOYS	4.3		I		NONE	P403 IBC04	B1	T9	TP3 TP7 TP31
1423	RUBIDIUM	4.3		I		NONE	P403 IBC04	B1		
1426	SODIUM BOROHYDRIDE	4.3		I		NONE	P403			
1427	SODIUM HYDRIDE	4.3		I		NONE	P403			
1428	SODIUM	4.3		I		NONE	P403 IBC04	B1	T9	TP3 TP7 TP31
1431	SODIUM METHYLATE	4.2	8	II		NONE	P410 IBC05	B2		
1432	SODIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
1433	STANNIC PHOSPHIDES	4.3	6.1	I		NONE	P403			
1435	ZINC ASHES	4.3		III	223	1 kg	P002 IBC08	B4		
1436	ZINC POWDER or ZINC DUST	4.3	4.2	I		NONE	P403			
		4.3	4.2	II		NONE	P410 IBC07	B2		
		4.3	4.2	III	223	NONE	P410 IBC08	B4		
1437	ZIRCONIUM HYDRIDE	4.1		II		1 kg	P410 IBC04	PP40		
1438	ALUMINIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1439	AMMONIUM DICHROMATE	5.1		II		1 kg	P002 IBC08	B2, B4		
1442	AMMONIUM PERCHLORATE	5.1		II	152	1 kg	P002 IBC06	B2		
1444	AMMONIUM PERSULPHATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1445	BARIUM CHLORATE	5.1	6.1	II		1 kg	P002 IBC06	B2	T4	TP1
1446	BARIUM NITRATE	5.1	6.1	II		1 kg	P002 IBC08	B2, B4		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1447	BARIUM PERCHLORATE	5.1	6.1	II		1 kg	P002 IBC06	B2	T4	TP1
1448	BARIUM PERMANGANATE	5.1	6.1	II		1 kg	P002 IBC06	B2		
1449	BARIUM PEROXIDE	5.1	6.1	II		1 kg	P002 IBC06	B2		
1450	BROMATES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC08	B2, B4		
1451	CAESIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1452	CALCIUM CHLORATE	5.1		II		1 kg	P002 IBC08	B2, B4		
1453	CALCIUM CHLORITE	5.1		II		1 kg	P002 IBC08	B2, B4		
1454	CALCIUM NITRATE	5.1		III	208	5 kg	P002 IBC08 LP02	B3		
1455	CALCIUM PERCHLORATE	5.1		II		1 kg	P002 IBC06	B2		
1456	CALCIUM PERMANGANATE	5.1		II		1 kg	P002 IBC06	B2		
1457	CALCIUM PEROXIDE	5.1		II		1 kg	P002 IBC06	B2		
1458	CHLORATE AND BORATE MIXTURE	5.1		II		1 kg	P002 IBC08	B2, B4		
		5.1		III	223	5 kg	P002 IBC08 LP02	B3		
1459	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE	5.1		II		1 kg	P002 IBC08	B2, B4	T4	TP1
		5.1		III	223	5 kg	P002 IBC08 LP02	B3	T4	TP1
1461	CHLORATES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC06	B2		
1462	CHLORITES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC06	B2		
1463	CHROMIUM TRIOXIDE, ANHYDROUS	5.1	8	II		1 kg	P002 IBC08	B4		
1465	DIDYMIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1466	FERRIC NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1467	GUANIDINE NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1469	LEAD NITRATE	5.1	6.1	II		1 kg	P002 IBC08	B2, B4		
1470	LEAD PERCHLORATE	5.1	6.1	II		1 kg	P002 IBC06	B2	T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1471	LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE	5.1		II		1 kg	P002 IBC08	B2, B4		
1472	LITHIUM PEROXIDE	5.1		II		1 kg	P002 IBC06	B2		
1473	MAGNESIUM BROMATE	5.1		II		1 kg	P002 IBC08	B4		
1474	MAGNESIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1475	MAGNESIUM PERCHLORATE	5.1		II		1 kg	P002 IBC06	B2		
1476	MAGNESIUM PEROXIDE	5.1		II		1 kg	P002 IBC06	B2		
1477	NITRATES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC08	B2, B4		
		5.1		III	223	5 kg	P002 IBC08 LP02	B3		
1479	OXIDIZING SOLID, N.O.S.	5.1		I	274	NONE	P503 IBC05	B1		
		5.1		II	274	1 kg	P002 IBC08	B2, B4		
		5.1		III	223 274	5 kg	P002 IBC08 LP02	B3		
1481	PERCHLORATES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC06	B2		
		5.1		III	223	5 kg	P002 IBC08 LP02	B3		
1482	PERMANGANATES, INORGANIC, N.O.S.	5.1		II	206	1 kg	P002 IBC06	B2		
		5.1		III	206 223	5 kg	P002 IBC08 LP02	B3		
1483	PEROXIDES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC06	B2		
		5.1		III	223	5 kg	P002 IBC08 LP02	B3		
1484	POTASSIUM BROMATE	5.1		II		1 kg	P002 IBC08	B4		
1485	POTASSIUM CHLORATE	5.1		II		1 kg	P002 IBC08	B4		
1486	POTASSIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1487	POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE	5.1		II		1 kg	P002 IBC08	B4		
1488	POTASSIUM NITRITE	5.1		II		1 kg	P002 IBC08	B4		
1489	POTASSIUM PERCHLORATE	5.1		II		1 kg	P002 IBC06	B2		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1490	POTASSIUM PERMANGANATE	5.1		II		1 kg	P002 IBC08	B4		
1491	POTASSIUM PEROXIDE	5.1		I		NONE	P503 IBC06	B1		
1492	POTASSIUM PERSULPHATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1493	SILVER NITRATE	5.1		II		1 kg	P002 IBC08	B4		
1494	SODIUM BROMATE	5.1		II		1 kg	P002 IBC08	B4		
1495	SODIUM CHLORATE	5.1		II		1 kg	P002 IBC08	B4		
1496	SODIUM CHLORITE	5.1		II		1 kg	P002 IBC08	B2, B4		
1498	SODIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1499	SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1500	SODIUM NITRITE	5.1	6.1	III		5 kg	P002 IBC08	B3		
1502	SODIUM PERCHLORATE	5.1		II		1 kg	P002 IBC06	B2		
1503	SODIUM PERMANGANATE	5.1		II		1 kg	P002 IBC06	B2		
1504	SODIUM PEROXIDE	5.1		I		NONE	P503 IBC05	B1		
1505	SODIUM PERSULPHATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1506	STRONTIUM CHLORATE	5.1		II		1 kg	P002 IBC08	B2, B4		
1507	STRONTIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1508	STRONTIUM PERCHLORATE	5.1		II		1 kg	P002 IBC06	B2		
1509	STRONTIUM PEROXIDE	5.1		II		1 kg	P002 IBC06	B2		
1510	TETRANITROMETHANE	5.1	6.1	I		NONE	P602			
1511	UREA HYDROGEN PEROXIDE	5.1	8	III		5 kg	P002 IBC08	B3		
1512	ZINC AMMONIUM NITRITE	5.1		II		1 kg	P002 IBC08	B4		
1513	ZINC CHLORATE	5.1		II		1 kg	P002 IBC08	B2, B4		
1514	ZINC NITRATE	5.1		II		1 kg	P002 IBC08	B4		
1515	ZINC PERMANGANATE	5.1		II		1 kg	P002 IBC06	B2		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1516	ZINC PEROXIDE	5.1		II		1 kg	P002 IBC06	B2		
1517	ZIRCONIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1		I	28	NONE	P406	PP26		
1541	ACETONE CYANOHYDRIN, STABILIZED	6.1		I		NONE	P602		T14	TP2 TP13
1544	ALKALOIDS, SOLID, N.O.S. or ALKALOID SALTS, SOLID, N.O.S.	6.1		I	43 274	NONE	P002 IBC07	B1		
		6.1		II	43 274	500 g	P002 IBC08	B2, B4		
		6.1		III	43 223 274	5 kg	P002 IBC08 LP02	B3		
1545	ALLYL ISOTHIOCYANATE, STABILIZED	6.1	3	II		100 ml	P001 IBC02		T7	TP2
1546	AMMONIUM ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1547	ANILINE	6.1		II	279	100 ml	P001 IBC02		T7	TP2
1548	ANILINE HYDROCHLORIDE	6.1		III		5 kg	P002 IBC08 LP02	B3		
1549	ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.	6.1		III	45	5 kg	P002 IBC08 LP02	B3		
1550	ANTIMONY LACTATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
1551	ANTIMONY POTASSIUM TARTRATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
1553	ARSENIC ACID, LIQUID	6.1		I		NONE	P001		T20	TP2 TP7 TP13
1554	ARSENIC ACID, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
1555	ARSENIC BROMIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1		I	43	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	43	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	43 223	5 L	P001 IBC03 LP01		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1		I	43	NONE	P002 IBC07	B1		
		6.1		II	43	500 g	P002 IBC08	B2, B4		
		6.1		III	43 223	5 kg	P002 IBC08 LP02	B3		
1558	ARSENIC	6.1		II		500 g	P002 IBC08	B2, B4		
1559	ARSENIC PENTOXIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1560	ARSENIC TRICHLORIDE	6.1		I		NONE	P602		T14	TP2 TP13
1561	ARSENIC TRIOXIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1562	ARSENICAL DUST	6.1		II		500 g	P002 IBC08	B2, B4		
1564	BARIUM COMPOUND, N.O.S.	6.1		II	177	500 g	P002 IBC08	B2, B4		
		6.1		III	177 223	5 kg	P002 IBC08 LP02	B3		
1565	BARIUM CYANIDE	6.1		I		NONE	P002 IBC07	B1		
1566	BERYLLIUM COMPOUND, N.O.S.	6.1		II		500 g	P002 IBC08	B2, B4		
		6.1		III	223	5 kg	P002 IBC08 LP02	B3		
1567	BERYLLIUM POWDER	6.1	4.1	II		500 g	P002 IBC08	B2, B4		
1569	BROMOACETONE	6.1	3	II		NONE	P602		T10	TP2 TP13
1570	BRUCINE	6.1		I	43	NONE	P002 IBC07	B1		
1571	BARIUM AZIDE, WETTED with not less than 50% water, by mass	4.1	6.1	I	28	NONE	P406			
1572	CACODYLIC ACID	6.1		II		500 g	P002 IBC08	B2, B4		
1573	CALCIUM ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1574	CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURE, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
1575	CALCIUM CYANIDE	6.1		I		NONE	P002 IBC07	B1		
1577	CHLORODINITROBENZENES, LIQUID	6.1		II	279	100 ml	P001 IBC02		T7	TP2
	CHLORODINITROBENZENES, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4	T7	TP2
1578	CHLORONITROBENZENES	6.1		II	279	500 g	P002 IBC08	B2, B4	T7	TP2

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1579	4-CHLORO-o-TOLUIDINE HYDROCHLORIDE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
1580	CHLOROPICRIN	6.1		I		NONE	P602		T14	TP2 TP13
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	2.3				NONE	P200		T50	
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2.3				NONE	P200		T50	
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1		I		NONE	P602			
		6.1		II		100 ml	P001 IBC02			
		6.1		III	223	5 L	P001 IBC03 LP01			
1585	COPPER ACETOARSENITE	6.1		II		500 g	P002 IBC08	B2, B4		
1586	COPPER ARSENITE	6.1		II		500 g	P002 IBC08	B2, B4		
1587	COPPER CYANIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1588	CYANIDES, INORGANIC, SOLID, N.O.S.	6.1		I	47 274	NONE	P002 IBC07	B1		
		6.1		II	47 274	500 g	P002 IBC08	B2, B4		
		6.1		III	47 223 274	5 kg	P002 IBC08 LP02	B3		
1589	CYANOGEN CHLORIDE, STABILIZED	2.3	8			NONE	P200			
1590	DICHLOROANILINES, LIQUID	6.1		II	279	100 ml	P001 IBC02		T7	TP2
	DICHLOROANILINES, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4		
1591	o-DICHLOROBENZENE	6.1		III	279	5 L	P001 IBC03 LP01		T4	TP1
1593	DICHLOROMETHANE	6.1		III		5 L	P001 IBC03 LP01	B8	T7	TP2
1594	DIETHYL SULPHATE	6.1		II		100 ml	P001 IBC02		T7	TP2
1595	DIMETHYL SULPHATE	6.1	8	I		NONE	P602		T14	TP2 TP13
1596	DINITROANILINES	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
1597	DINITROBENZENES, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
	DINITROBENZENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
1598	DINITRO-o-CRESOL	6.1		II	43	500 g	P002 IBC08	B2, B4	T7	TP2

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1599	DINITROPHENOL SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC03 LP01		T4	TP1
1600	DINITROTOLUENES, MOLTEN	6.1		II		NONE	NONE		T7	TP3
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1		I	274	NONE	P002 IBC07	B1		
		6.1		II	274	500 g	P002 IBC08	B2, B4		
		6.1		III	274	5 kg	P002 IBC08 LP02	B3		
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1		I	274	NONE	P001			
		6.1		II	274	100 ml	P001 IBC02			
		6.1		III	223 274	5 L	P001 IBC03 LP01			
1603	ETHYL BROMOACETATE	6.1	3	II		100 ml	P001 IBC02		T7	TP2
1604	ETHYLENEDIAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
1605	ETHYLENE DIBROMIDE	6.1		I		NONE	P601		T14	TP2 TP13
1606	FERRIC ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1607	FERRIC ARSENITE	6.1		II		500 g	P002 IBC08	B2, B4		
1608	FERROUS ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1611	HEXAETHYL TETRAPHOSPHATE	6.1		II		500 g	P002 IBC08	B2, B4		
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	2.3				NONE	P200			
1613	HYDROCYANIC ACID, AQUEOUS SOLUTION (HYDROGEN CYANIDE, AQUEOUS SOLUTION) with not more than 20% hydrogen cyanide	6.1		I	48	NONE	P601		T14	TP2 TP13
1614	HYDROGEN CYANIDE, STABILIZED, containing less than 3% water and absorbed in a porous inert material	6.1		I		NONE	P099			
1616	LEAD ACETATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
1617	LEAD ARSENATES	6.1		II		500 g	P002 IBC08	B2, B4		
1618	LEAD ARSENITES	6.1		II		500 g	P002 IBC08	B2, B4		
1620	LEAD CYANIDE	6.1		II		500 g	P002 IBC08	B2, B4		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1621	LONDON PURPLE	6.1		II	43	500 g	P002 IBC08	B2, B4		
1622	MAGNESIUM ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1623	MERCURIC ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1624	MERCURIC CHLORIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1625	MERCURIC NITRATE	6.1		II		500 g	P002 IBC08	B2, B4		
1626	MERCURIC POTASSIUM CYANIDE	6.1		I		NONE	P002 IBC07	B1		
1627	MERCUROUS NITRATE	6.1		II		500 g	P002 IBC08	B2, B4		
1629	MERCURY ACETATE	6.1		II		500 g	P002 IBC08	B2, B4		
1630	MERCURY AMMONIUM CHLORIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1631	MERCURY BENZOATE	6.1		II		500 g	P002 IBC08	B2, B4		
1634	MERCURY BROMIDES	6.1		II		500 g	P002 IBC08	B2, B4		
1636	MERCURY CYANIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1637	MERCURY GLUCONATE	6.1		II		500 g	P002 IBC08	B2, B4		
1638	MERCURY IODIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1639	MERCURY NUCLEATE	6.1		II		500 g	P002 IBC08	B2, B4		
1640	MERCURY OLEATE	6.1		II		500 g	P002 IBC08	B2, B4		
1641	MERCURY OXIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1642	MERCURY OXYCYANIDE, DESENSITIZED	6.1		II		500 g	P002 IBC08	B2, B4		
1643	MERCURY POTASSIUM IODIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1644	MERCURY SALICYLATE	6.1		II		500 g	P002 IBC08	B2, B4		
1645	MERCURY SULPHATE	6.1		II		500 g	P002 IBC08	B2, B4		
1646	MERCURY THIOCYANATE	6.1		II		500 g	P002 IBC08	B2, B4		
1647	METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURE, LIQUID	6.1		I		NONE	P602			
1648	ACETONITRILE	3		II		1 L	P001 IBC02		T7	TP2
1649	MOTOR FUEL ANTI-KNOCK MIXTURE	6.1		I	162	NONE	P602		T14	TP2 TP13
1650	beta-NAPHTHYLAMINE	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1651	NAPHTHYLTHIOUREA	6.1		II	43	500 g	P002 IBC08	B2, B4		
1652	NAPHTHYLUREA	6.1		II		500 g	P002 IBC08	B2, B4		
1653	NICKEL CYANIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1654	NICOTINE	6.1		II		100 ml	P001 IBC02			
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1		I	43	NONE	P002 IBC07	B1		
		6.1		II	43	500 g	P002 IBC08	B2, B4		
		6.1		III	43 223	5 kg	P002 IBC08 LP02	B3		
1656	NICOTINE HYDROCHLORIDE, liquid or NICOTINE HYDROCHLORIDE SOLUTION	6.1		II	43	100 ml	P001 IBC02			
	NICOTINE HYDROCHLORIDE, solid	6.1		II	43	500 g	P002 IBC08	B2, B4		
1657	NICOTINE SALICYLATE	6.1		II		500 g	P002 IBC08	B2, B4		
1658	NICOTINE SULPHATE, SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
	NICOTINE SULPHATE, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
1659	NICOTINE TARTRATE	6.1		II		500 g	P002 IBC08	B2, B4		
1660	NITRIC OXIDE, COMPRESSED	2.3	5.1 8			NONE	P200			
1661	NITROANILINES (o-, m-, p-)	6.1		II	279	500 g	P002 IBC08	B2, B4	T7	TP2
1662	NITROBENZENE	6.1		II	279	100 ml	P001 IBC02		T7	TP2
1663	NITROPHENOLS (o-, m-, p-)	6.1		III	279	5 kg	P002 IBC08 LP02	B3	T4	TP3
1664	NITROTOLUENES, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
	NITROTOLUENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
1665	NITROXYLENES, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
	NITROXYLENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4		
1669	PENTACHLOROETHANE	6.1		II		100 ml	P001 IBC02		T7	TP2
1670	PERCHLOROMETHYL MERCAPTAN	6.1		I		NONE	P602		T14	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1671	PHENOL, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4	T6	TP2
1672	PHENYLCARBYLAMINE CHLORIDE	6.1		I		NONE	P602		T14	TP2 TP13
1673	PHENYLENEDIAMINES (o-, m-, p-)	6.1		III	279	5 kg	P002 IBC08 LP02	B3	T7	TP1
1674	PHENYLMERCURIC ACETATE	6.1		II	43	500 g	P002 IBC08	B2, B4		
1677	POTASSIUM ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1678	POTASSIUM ARSENITE	6.1		II		500 g	P002 IBC08	B2, B4		
1679	POTASSIUM CUPROCYANIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1680	POTASSIUM CYANIDE	6.1		I		NONE	P002 IBC07	B1	T14	TP2 TP13
1683	SILVER ARSENITE	6.1		II		500 g	P002 IBC08	B2, B4		
1684	SILVER CYANIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1685	SODIUM ARSENATE	6.1		II		500 g	P002 IBC08	B2, B4		
1686	SODIUM ARSENITE, AQUEOUS SOLUTION	6.1		II	43	100 ml	P001 IBC02		T7	TP2
		6.1		III	43 223	5 L	P001 IBC03 LP01		T4	TP2
1687	SODIUM AZIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1688	SODIUM CACODYLATE	6.1		II		500 g	P002 IBC08	B2, B4		
1689	SODIUM CYANIDE	6.1		I		NONE	P002 IBC07	B1	T14	TP2 TP13
1690	SODIUM FLUORIDE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
1691	STRONTIUM ARSENITE	6.1		II		500 g	P002 IBC08	B2, B4		
1692	STRYCHNINE or STRYCHNINE SALTS	6.1		I		NONE	P002 IBC07	B1		
1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.	6.1		I	274	NONE	P001			
		6.1		II	274	NONE	P001 IBC02			
	TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1		I	274	NONE	P002			
		6.1		II	274	NONE	P002 IBC08	B2, B4		
1694	BROMOBENZYL CYANIDES, LIQUID	6.1		I	138	NONE	P001		T14	TP2 TP13
	BROMOBENZYL CYANIDES, SOLID	6.1		I	138	NONE	P002		T14	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1695	CHLOROACETONE, STABILIZED	6.1	3 8	I		NONE	P001		T14	TP2 TP13
1697	CHLOROACETOPHENONE	6.1		II		NONE	P002 IBC08	B2, B4	T7	TP2 TP13
1698	DIPHENYLAMINE CHLOROARSINE	6.1		I		NONE	P002			
1699	DIPHENYLCHLOROARSINE, LIQUID	6.1		I		NONE	P001			
	DIPHENYLCHLOROARSINE, SOLID	6.1		I		NONE	P002 IBC07	B1		
1700	TEAR GAS CANDLES	6.1	4.1	II		NONE	P600			
1701	XYLYL BROMIDE	6.1		II		NONE	P001 IBC02		T7	TP2 TP13
1702	1,1,2,2-TETRACHLOROETHANE	6.1		II		100 ml	P001 IBC02		T7	TP2
1704	TETRAETHYL DITHIOPYROPHOSPHATE	6.1		II	43	500 g	P002 IBC08	B2, B4		
1707	THALLIUM COMPOUND, N.O.S.	6.1		II	43	500 g	P002 IBC08	B2, B4		
1708	TOLUIDINES, LIQUID	6.1		II	279	100 ml	P001 IBC02		T7	TP2
	TOLUIDINES, SOLID	6.1		II	279	500 g	P002 IBC08	B2, B4	T7	TP2
1709	2,4-TOLUYLENEDIAMINE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
1710	TRICHLOROETHYLENE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
1711	XYLIDINES, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
	XYLIDINES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
1712	ZINC ARSENATE, ZINC ARSENITE or ZINC ARSENATE AND ZINC ARSENITE MIXTURE	6.1		II		500 g	P002 IBC08	B2, B4		
1713	ZINC CYANIDE	6.1		I		NONE	P002 IBC07	B1		
1714	ZINC PHOSPHIDE	4.3	6.1	I		NONE	P403			
1715	ACETIC ANHYDRIDE	8	3	II		1 L	P001 IBC02		T7	TP2
1716	ACETYL BROMIDE	8		II		1 L	P001 IBC02		T8	TP2 TP12
1717	ACETYL CHLORIDE	3	8	II		1 L	P001 IBC02		T8	TP2 TP12
1718	BUTYL ACID PHOSPHATE	8		III		5 L	P001 IBC03 LP01		T4	TP1
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03		T7	TP1 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1722	ALLYL CHLOROFORMATE	6.1	3 8	I		NONE	P001		T14	TP2 TP13
1723	ALLYL IODIDE	3	8	II		1 L	P001 IBC02		T7	TP2 TP13
1724	ALLYLTRICHLOROSILANE, STABILIZED	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1725	ALUMINIUM BROMIDE, ANHYDROUS	8		II		1 kg	P002 IBC08	B2, B4		
1726	ALUMINIUM CHLORIDE, ANHYDROUS	8		II		1 kg	P002 IBC08	B2, B4		
1727	AMMONIUM HYDROGENDIFLUORIDE, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
1728	AMYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1729	ANISOYL CHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
1730	ANTIMONY PENTACHLORIDE, LIQUID	8		II		1 L	P001 IBC02		T7	TP2
1731	ANTIMONY PENTACHLORIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1732	ANTIMONY PENTAFLUORIDE	8	6.1	II		1 L	P001 IBC02		T7	TP2
1733	ANTIMONY TRICHLORIDE	8		II		1 L	P001 IBC02			
1736	BENZOYL CHLORIDE	8		II		1 L	P001 IBC02		T8	TP2 TP12 TP13
1737	BENZYL BROMIDE	6.1	8	II		NONE	P001 IBC02		T8	TP2 TP12 TP13
1738	BENZYL CHLORIDE	6.1	8	II		NONE	P001 IBC02		T8	TP2 TP12 TP13
1739	BENZYL CHLOROFORMATE	8		I		NONE	P001		T10	TP2 TP12 TP13
1740	HYDROGENDIFLUORIDES, N.O.S.	8		II		1 kg	P002 IBC08	B2, B4		
		8		III	223	5 kg	P002 IBC08 LP02	B3		
1741	BORON TRICHLORIDE	2.3	8			NONE	P200			
1742	BORON TRIFLUORIDE ACETIC ACID COMPLEX	8		II		1 L	P001 IBC02		T8	TP2 TP12
1743	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX	8		II		1 L	P001 IBC02		T8	TP2 TP12

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1744	BROMINE or BROMINE SOLUTION	8	6.1	I		NONE	P601		T22	TP2 TP10 TP12 TP13
1745	BROMINE PENTAFLUORIDE	5.1	6.1 8	I		NONE	P200		T22	TP2 TP12 TP13
1746	BROMINE TRIFLUORIDE	5.1	6.1 8	I		NONE	P200		T22	TP2 TP12 TP13
1747	BUTYLTRICHLOROSILANE	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1		II		1 kg	P002 IBC08	B2, B4		
1749	CHLORINE TRIFLUORIDE	2.3	5.1 8			NONE	P200			
1750	CHLOROACETIC ACID SOLUTION	6.1	8	II		100 ml	P001 IBC02		T7	TP2
1751	CHLOROACETIC ACID, SOLID	6.1	8	II		500 g	P002 IBC08	B4		
1752	CHLOROACETYL CHLORIDE	6.1	8	I		NONE	P001		T14	TP2 TP13
1753	CHLOROPHENYLTRICHLORO-SILANE	8		II		NONE	P001 IBC02		T7	TP2
1754	CHLOROSULPHONIC ACID (with or without sulphur trioxide)	8		I		NONE	P001		T20	TP2 TP12
1755	CHROMIC ACID SOLUTION	8		II		1 L	P001 IBC02		T8	TP2 TP12
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1 TP12
1756	CHROMIC FLUORIDE, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
1757	CHROMIC FLUORIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1758	CHROMIUM OXYCHLORIDE	8		I		NONE	P001		T10	TP2 TP12
1759	CORROSIVE SOLID, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1760	CORROSIVE LIQUID, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
1761	CUPRIETHYLENEDIAMINE SOLUTION	8	6.1	II		1 L	P001 IBC02		T7	TP2
		8	6.1	III	223	5 L	P001 IBC03		T7	TP1 TP28
1762	CYCLOHEXENYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1763	CYCLOHEXYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1764	DICHLOROACETIC ACID	8		II		1 L	P001 IBC02		T8	TP2 TP12
1765	DICHLOROACETYL CHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
1766	DICHLOROPHENYLTRICHLORO-SILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1767	DIETHYLDICHLOROSILANE	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1768	DIFLUOROPHOSPHORIC ACID, ANHYDROUS	8		II		1 L	P001 IBC02		T8	TP2 TP12
1769	DIPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1770	DIPHENYLMETHYL BROMIDE	8		II		1 kg	P002 IBC08	B2, B4		
1771	DODECYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1773	FERRIC CHLORIDE, ANHYDROUS	8		III		5 kg	P002 IBC08 LP02	B3		
1774	FIRE EXTINGUISHER CHARGES, corrosive liquid	8		II		1 L	P001	PP4		
1775	FLUOROBORIC ACID	8		II		1 L	P001 IBC02		T7	TP2
1776	FLUOROPHOSPHORIC ACID, ANHYDROUS	8		II		1 L	P001 IBC02		T8	TP2 TP12
1777	FLUOROSULPHONIC ACID	8		I		NONE	P001		T10	TP2 TP12
1778	FLUOROSILICIC ACID	8		II		1 L	P001 IBC02		T8	TP2 TP12
1779	FORMIC ACID	8		II		1 L	P001 IBC02		T7	TP2
1780	FUMARYL CHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
1781	HEXADECYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2
1782	HEXAFLUOROPHOSPHORIC ACID	8		II		1 L	P001 IBC02		T8	TP2 TP12

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1783	HEXAMETHYLENEDIAMINE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1784	HEXYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1786	HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURE	8	6.1	I		NONE	P001		T10	TP2 TP12 TP13
1787	HYDRIODIC ACID	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1788	HYDROBROMIC ACID	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1789	HYDROCHLORIC ACID	8		II		1 L	P001 IBC02		T8	TP2 TP12
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1 TP12
1790	HYDROFLUORIC ACID, with more than 60% hydrogen fluoride	8	6.1	I		NONE	P802	PP79 PP81	T10	TP2 TP12 TP13
	HYDROFLUORIC ACID, with not more than 60% hydrogen fluoride	8	6.1	II		1 L	P001 IBC02		T8	TP2 TP12
1791	HYPOCHLORITE SOLUTION	8		II		1 L	P001 IBC02	PP10 B5	T7	TP2 TP24
		8		III	223	5 L	P001 IBC03 LP01		T4	TP2 TP24
1792	IODINE MONOCHLORIDE	8		II		1 kg	P002 IBC08	B2, B4	T7	TP2
1793	ISOPROPYL ACID PHOSPHATE	8		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
1794	LEAD SULPHATE with more than 3% free acid	8		II		1 kg	P002 IBC08	B2, B4		
1796	NITRATING ACID MIXTURE with more than 50% nitric acid	8	5.1	I		NONE	P001		T10	TP2 TP12 TP13
	NITRATING ACID MIXTURE with not more than 50% nitric acid	8		II		1 L	P001 IBC02		T8	TP2 TP12 TP13
1798	NITROHYDROCHLORIC ACID	8		I		NONE	P802		T10	TP2 TP12 TP13
1799	NONYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1800	OCTADECYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1801	OCTYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
1802	PERCHLORIC ACID with not more than 50% acid, by mass	8	5.1	II		1 L	P001 IBC02		T7	TP2
1803	PHENOLSULPHONIC ACID, LIQUID	8		II		1 L	P001 IBC02		T7	TP2
1804	PHENYLTRICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2
1805	PHOSPHORIC ACID, LIQUID	8		III		5 L	P001 IBC03 LP01		T4	TP1
	PHOSPHORIC ACID, SOLID	8		III		5 kg	P002 IBC08 LP01	B3		
1806	PHOSPHORUS PENTACHLORIDE	8		II		1 kg	P002 IBC08	B2, B4		
1807	PHOSPHORUS PENTOXIDE	8		II		1 kg	P002 IBC08	B2, B4		
1808	PHOSPHORUS TRIBROMIDE	8		II		1 L	P001 IBC02		T7	TP2
1809	PHOSPHORUS TRICHLORIDE	6.1	8	I		NONE	P001		T14	TP2 TP13
1810	PHOSPHORUS OXYCHLORIDE	8		II		NONE	P001		T7	TP2
1811	POTASSIUM HYDROGENDIFLUORIDE	8	6.1	II		1 kg	P002 IBC08	B2, B4	T7	TP2
1812	POTASSIUM FLUORIDE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
1813	POTASSIUM HYDROXIDE, SOLID	8		II		1 kg	P002 IBC08	B2, B4		
1814	POTASSIUM HYDROXIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1815	PROPIONYL CHLORIDE	3	8	II		1 L	P001 IBC02		T7	TP1
1816	PROPYLTRICHLOROSILANE	8	3	II		NONE	P001 IBC02		T7	TP2 TP13
1817	PYROSULPHURYL CHLORIDE	8		II		1 L	P001 IBC02		T8	TP2 TP12
1818	SILICON TETRACHLORIDE	8		II		1 L	P001 IBC02		T7	TP2 TP7
1819	SODIUM ALUMINATE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1823	SODIUM HYDROXIDE, SOLID	8		II		1 kg	P002 IBC08	B2, B4		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1824	SODIUM HYDROXIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1825	SODIUM MONOXIDE	8		II		1 kg	P002 IBC08	B2, B4		
1826	NITRATING ACID MIXTURE, SPENT, with more than 50% nitric acid	8	5.1	I	113	NONE	P001		T10	TP2 TP12 TP13
	NITRATING ACID MIXTURE, SPENT, with not more than 50% nitric acid	8		II	113	1 L	P001 IBC02		T8	TP2 TP12
1827	STANNIC CHLORIDE, ANHYDROUS	8		II		1 L	P001 IBC02		T7	TP2
1828	SULPHUR CHLORIDES	8		I		NONE	P602		T20	TP2 TP12
1829	SULPHUR TRIOXIDE, STABILIZED	8		I		NONE	P001		T20	TP4 TP12 TP13 TP25 TP26
1830	SULPHURIC ACID with more than 51% acid	8		II		1 L	P001 IBC02		T8	TP2 TP12
1831	SULPHURIC ACID, FUMING	8	6.1	I		NONE	P602		T20	TP2 TP12 TP13
1832	SULPHURIC ACID, SPENT	8		II	113	1 L	P001 IBC02		T8	TP2 TP12
1833	SULPHUROUS ACID	8		II		1 L	P001 IBC02		T7	TP2
1834	SULPHURYL CHLORIDE	8		I		NONE	P602		T20	TP2 TP12
1835	TETRAMETHYLAMMONIUM HYDROXIDE	8		II		1 L	P001 IBC02		T7	TP2
1836	THIONYL CHLORIDE	8		I		NONE	P802		T10	TP2 TP12 TP13
1837	THIOPHOSPHORYL CHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
1838	TITANIUM TETRACHLORIDE	8		II		NONE	P001 IBC02		T10	TP2 TP13
1839	TRICHLOROACETIC ACID	8		II		1 kg	P002 IBC08	B2, B4		
1840	ZINC CHLORIDE SOLUTION	8		III	223	5 L	P001 IBC03 LP01		T4	TP1
1841	ACETALDEHYDE AMMONIA	9		III		5 kg	P002 IBC08 LP01	B3, B6		
1843	AMMONIUM DINITRO-o-CRESOLATE	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
1845	CARBON DIOXIDE, SOLID (DRY ICE)	9		III	297	NONE	P003	PP18		

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1846	CARBON TETRACHLORIDE	6.1		II		100 ml	P001 IBC02		T7	TP2
1847	POTASSIUM SULPHIDE, HYDRATED with not less than 30% water of crystallization	8		II		1 kg	P002 IBC08	B2, B4		
1848	PROPIONIC ACID	8		III		5 L	P001 IBC03 LP01		T4	TP1
1849	SODIUM SULPHIDE, HYDRATED with not less than 30% water	8		II		1 kg	P002 IBC08	B2, B4	T7	TP2
1851	MEDICINE, LIQUID, TOXIC, N.O.S.	6.1		II	221	100 ml	P001	PP6		
		6.1		III	221 223	5 L	P001	PP6		
1854	BARIUM ALLOYS, PYROPHORIC	4.2		I		NONE	P404			
1855	CALCIUM, PYROPHORIC or CALCIUM ALLOYS, PYROPHORIC	4.2		I		NONE	P404			
1856	RAGS, OILY	4.2			29 117	NONE	P003 IBC08	PP19 B6		
1857	TEXTILE WASTE, WET	4.2		III	117	NONE	P410			
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2.2				120 ml	P200		T50	
1859	SILICON TETRAFLUORIDE	2.3	8			NONE	P200			
1860	VINYL FLUORIDE, STABILIZED	2.1				NONE	P200			
1862	ETHYL CROTONATE	3		II		1 L	P001 IBC02		T4	TP2
1863	FUEL, AVIATION, TURBINE ENGINE	3		I		500 ml	P001		T11	TP1 TP8 TP28
		3		II		1 L	P001 IBC02		T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
1865	n-PROPYL NITRATE	3		II	26	1 L	P099 IBC02	B7		
1866	RESIN SOLUTION, flammable	3		I		500 ml	P001		T11	TP1 TP8 TP28
		3		II		5 L	P001 IBC02	PP1	T4	TP1 TP8
		3		III	223	5 L	P001 IBC03 LP01	PP1	T2	TP1
1868	DECABORANE	4.1	6.1	II		1 kg	P002 IBC06	B2		
1869	MAGNESIUM or MAGNESIUM ALLOYS with more than 50% magnesium in pellets, turnings or ribbons	4.1		III	59	5 kg	P002 IBC08 LP02	B3		
1870	POTASSIUM BOROHYDRIDE	4.3		I		NONE	P403			

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1871	TITANIUM HYDRIDE	4.1		II		1 kg	P410 IBC04	PP40		
1872	LEAD DIOXIDE	5.1		III		5 kg	P002 IBC08 LP02	B3		
1873	PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass	5.1	8	I	60	NONE	P502	PP28	T10	TP1 TP12
1884	BARIUM OXIDE	6.1		III		5 kg	P002 IBC08 LP02	B3		
1885	BENZIDINE	6.1		II		500 g	P002 IBC08	B2, B4		
1886	BENZYLIDENE CHLORIDE	6.1		II		100 ml	P001 IBC02		T7	TP2
1887	BROMOCHLOROMETHANE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
1888	CHLOROFORM	6.1		III		5 L	P001 IBC03 LP01		T7	TP2
1889	CYANOGEN BROMIDE	6.1	8	I		NONE	P002			
1891	ETHYL BROMIDE	6.1		II		100 ml	P001 IBC02	B8	T7	TP2 TP13
1892	ETHYLDICHLOROARSINE	6.1		I		NONE	P602		T14	TP2 TP13
1894	PHENYLMERCURIC HYDROXIDE	6.1		II		500 g	P002 IBC08	B2, B4		
1895	PHENYLMERCURIC NITRATE	6.1		II		500 g	P002 IBC08	B2, B4		
1897	TETRACHLOROETHYLENE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
1898	ACETYL IODIDE	8		II		1 L	P001 IBC02		T7	TP2 TP13
1902	DIISOOCTYL ACID PHOSPHATE	8		III		5 L	P001 IBC03 LP01		T4	TP1
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8		I	274	NONE	P001			
		8		II	274	1 L	P001 IBC02			
		8		III	223 274	5 L	P001 IBC03 LP01			
1905	SELENIC ACID	8		I		NONE	P002 IBC07	B1		
1906	SLUDGE ACID	8		II		1 L	P001 IBC02		T8	TP2 TP12 TP28
1907	SODA LIME with more than 4% sodium hydroxide	8		III	62	5 kg	P002 IBC08 LP02	B3		

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1908	CHLORITE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2 TP24
		8		III	223	5 L	P001 IBC03 LP01		T4	TP2 TP24
1910	CALCIUM OXIDE	8		III	106	5 kg	P002 IBC08 LP02	B3		
1911	DIBORANE	2.3	2.1			NONE	P200			
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2.1			228	NONE	P200		T50	
1913	NEON, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	
1914	BUTYL PROPIONATES	3		III		5 L	P001 IBC03 LP01		T2	TP1
1915	CYCLOHEXANONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1916	2,2'-DICHLORODIETHYL ETHER	6.1	3	II		100 ml	P001 IBC02		T7	TP2
1917	ETHYL ACRYLATE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1 TP13
1918	ISOPROPYLBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
1919	METHYL ACRYLATE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1 TP13
1920	NONANES	3		III		5 L	P001 IBC03 LP01		T2	TP1
1921	PROPYLENEIMINE, STABILIZED	3	6.1	I		NONE	P001		T14	TP2 TP13
1922	PYRROLIDINE	3	8	II		1 L	P001 IBC02		T7	TP1
1923	CALCIUM DITHIONITE (CALCIUM HYDROSULPHITE)	4.2		II		NONE	P410 IBC06	B2		
1928	METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	4.3	3	I		NONE	P402			
1929	POTASSIUM DITHIONITE (POTASSIUM HYDROSULPHITE)	4.2		II		NONE	P410 IBC06	B2		
1931	ZINC DITHIONITE (ZINC HYDROSULPHITE)	9		III		NONE	P002 IBC08 LP02	B3		
1932	ZIRCONIUM SCRAP	4.2		III	223	NONE	P002 IBC08 LP02	B3		

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1935	CYANIDE SOLUTION, N.O.S.	6.1		I		NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II		100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	223	5 L	P001 IBC03 LP01		T7	TP2 TP13 TP28
1938	BROMOACETIC ACID	8		II		1 L	P001 IBC02		T7	TP2
1939	PHOSPHORUS OXYBROMIDE	8		II		1 kg	P002 IBC08	B2, B4	T7	TP2
1940	THIOGLYCOLIC ACID	8		II		1 L	P001 IBC02		T7	TP2
1941	DIBROMODIFLUOROMETHANE	9		III		5 L	P001 LP01		T11	TP2
1942	AMMONIUM NITRATE, with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substance.	5.1		III	306	5 kg	P002 IBC08 LP02	B3		
1944	MATCHES, SAFETY (book, card or strike on box)	4.1		III	293 294	5 kg	P407			
1945	MATCHES, WAX 'VESTA'	4.1		III	294	5 kg	P407			
1950	AEROSOLS	2			63 190 277	see SP 277	P003	PP17		
1951	ARGON, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2.2				120 ml	P200			
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		274	NONE	P200			
1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1			274	NONE	P200			
1955	COMPRESSED GAS, TOXIC, N.O.S.	2.3			274	NONE	P200			
1956	COMPRESSED GAS, N.O.S.	2.2			274	120 ml	P200			
1957	DEUTERIUM, COMPRESSED	2.1				NONE	P200			
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2.2				120 ml	P200		T50	
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2.1				NONE	P200			
1961	ETHANE, REFRIGERATED LIQUID	2.1				NONE	P200		T75	
1962	ETHYLENE	2.1				NONE	P200			
1963	HELIUM, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	2.1			274	NONE	P200			
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	2.1			274	NONE	P200		T50	
1966	HYDROGEN, REFRIGERATED LIQUID	2.1				NONE	P200		T75	TP23
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2.3			274	NONE	P200			
1968	INSECTICIDE GAS, N.O.S.	2.2			274	120 ml	P200			
1969	ISOBUTANE	2.1				NONE	P200		T50	
1970	KRYPTON, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	
1971	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content	2.1				NONE	P200			
1972	METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with high methane content	2.1				NONE	P200		T75	
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2.2				120 ml	P200		T50	
1974	CHLORODIFLUOROBROMO-METHANE (REFRIGERANT GAS R 12B1)	2.2				120 ml	P200		T50	
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	2.3	5.1 8			NONE	P200			
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	2.2				120 ml	P200		T50	
1977	NITROGEN, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	
1978	PROPANE	2.1				NONE	P200		T50	
1979	RARE GASES MIXTURE, COMPRESSED	2.2				120 ml	P200			
1980	RARE GASES AND OXYGEN MIXTURE, COMPRESSED	2.2				120 ml	P200			
1981	RARE GASES AND NITROGEN MIXTURE, COMPRESSED	2.2				120 ml	P200			
1982	TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)	2.2				120 ml	P200			
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	2.2				120 ml	P200		T50	
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2.2				120 ml	P200			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP27
		3	6.1	III	223 274	5 L	P001 IBC03		T7	TP1 TP28
1987	ALCOHOLS, N.O.S.	3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP27
		3	6.1	III	223 274	5 L	P001 IBC03		T7	TP1 TP28
1989	ALDEHYDES, N.O.S.	3		I	274	NONE	P001		T11	TP1 TP9 TP27
		3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
1990	BENZALDEHYDE	9		III		5 L	P001 IBC03 LP01		T2	TP1
1991	CHLOROPRENE, STABILIZED	3	6.1	I		NONE	P001		T14	TP2 TP6 TP13
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T7	TP2 TP13
		3	6.1	III	223 274	5 L	P001 IBC03		T7	TP1 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1993	FLAMMABLE LIQUID, N.O.S.	3		I	274	NONE	P001		T11	TP1 TP9 TP27
		3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
1994	IRON PENTACARBONYL	6.1	3	I		NONE	P601			
1999	TARS, LIQUID, including road asphalt and oils, bitumen and cut backs	3		II		5 L	P001 IBC02		T3	TP3 TP29
		3		III	223	5 L	P001 IBC03 LP01		T1	TP3
2000	CELLULOID in block, rods, rolls, sheets, tubes, etc., except scrap	4.1		III	223	5 kg	P002 LP02	PP7		
2001	COBALT NAPHTHENATES, POWDER	4.1		III		5 kg	P002 IBC08 LP02	B3		
2002	CELLULOID, SCRAP	4.2		III	223	NONE	P002 IBC08 LP02	PP8 B3		
2003	METAL ALKYLS, WATER-REACTIVE, N.O.S. or METAL ARYLS, WATER-REACTIVE, N.O.S.	4.2	4.3	I	274	NONE	P400		T21	TP2 TP7 TP9
2004	MAGNESIUM DIAMIDE	4.2		II		NONE	P410 IBC06			
2005	MAGNESIUM DIPHENYL	4.2		I		NONE	P404			
2006	PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	4.2		III	274	NONE	P002			
2008	ZIRCONIUM POWDER, DRY	4.2		I		NONE	P404			
		4.2		II		NONE	P410 IBC06	B2		
		4.2		III	223	NONE	P002 IBC08 LP02	B3		
2009	ZIRCONIUM, DRY, finished sheets, strip or coiled wire	4.2		III	223	NONE	P002 LP02			
2010	MAGNESIUM HYDRIDE	4.3		I		NONE	P403			
2011	MAGNESIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
2012	POTASSIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
2013	STRONTIUM PHOSPHIDE	4.3	6.1	I		NONE	P403			
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	5.1	8	II		1 kg	P504 IBC02	PP29 B5	T7	TP2 TP6 TP24

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2015	HYDROGEN PEROXIDE, STABILIZED or HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 60% hydrogen peroxide	5.1	8	I		NONE	P501		T10	TP2 TP6 TP24
2016	AMMUNITION, TOXIC, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1		II		NONE	P600			
2017	AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	8	II		NONE	P600			
2018	CHLOROANILINES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
2019	CHLOROANILINES, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
2020	CHLOROPHENOLS, SOLID	6.1		III	205	5 kg	P002 IBC08 LP02	B3		
2021	CHLOROPHENOLS, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2022	CRESYLIC ACID	6.1	8	II		100 ml	P001 IBC02		T7	TP2 TP13
2023	EPICHLOROHYDRIN	6.1	3	II	279	100 ml	P001 IBC02		T7	TP2 TP13
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1		I	43 66	NONE	P001			
		6.1		II	43 66	100 ml	P001 IBC02			
		6.1		III	43 66 223	5 L	P001 IBC03 LP01			
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1		I	43 66	NONE	P002 IBC07	B1		
		6.1		II	43 66	500 g	P002 IBC08	B2, B4		
		6.1		III	43 66 223	5 kg	P002 IBC08 LP02	B3		
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1		I	43	NONE	P002 IBC07	B1		
		6.1		II	43	500 g	P002 IBC08	B2, B4		
		6.1		III	43 223	5 kg	P002 IBC08 LP02	B3		
2027	SODIUM ARSENITE, SOLID	6.1		II	43	500 g	P002 IBC08	B2, B4		
2028	BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	8		II		NONE	P803			
2029	HYDRAZINE, ANHYDROUS	8	3 6.1	I		NONE	P001			

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2030	HYDRAZINE AQUEOUS SOLUTION with more than 37% hydrazine, by mass	8	6.1	I	298	NONE	P001		T20	TP2 TP13
		8	6.1	II		1 L	P001 IBC02		T15	TP2 TP13
		8	6.1	III		5 L	P001 IBC03 LP01		T4	TP2
2031	NITRIC ACID, other than red fuming, with more than 70% nitric acid	8	5.1	I		NONE	P001	PP81	T10	TP2 TP12 TP13
	NITRIC ACID, other than red fuming, with not more than 70% nitric acid	8		II		1 L	P001 IBC02	PP81	T8	TP2 TP12
2032	NITRIC ACID, RED FUMING	8	5.1 6.1	I		NONE	P602	PP81	T20	TP2 TP12 TP13
2033	POTASSIUM MONOXIDE	8		II		1 kg	P002 IBC08	B2, B4		
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	2.1				NONE	P200			
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2.1				NONE	P200		T50	
2036	XENON	2.2				120 ml	P200			
2037	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable	2			191 277 303	see SP 277	P003	PP17		
2038	DINITROTOLUENES, LIQUID	6.1		II		100 ml	P001 IBC02		T7	TP2
	DINITROTOLUENES, SOLID	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
2044	2,2-DIMETHYLPROPANE	2.1				NONE	P200			
2045	ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)	3		II		1 L	P001 IBC02		T4	TP1
2046	CYMENES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2047	DICHLOROPROPENES	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
2048	DICYCLOPENTADIENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2049	DIETHYLBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2050	DIISOBUTYLENE, ISOMERIC COMPOUNDS	3		II		1 L	P001 IBC02		T4	TP1
2051	2-DIMETHYLAMINOETHANOL	8	3	II		1 L	P001 IBC02		T7	TP2

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2052	DIPENTENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2053	METHYL ISOBUTYL CARBINOL	3		III		5 L	P001 IBC03 LP01		T2	TP1
2054	MORPHOLINE	8	3	I		NONE	P001		T10	TP2
2055	STYRENE MONOMER, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1
2056	TETRAHYDROFURAN	3		II		1 L	P001 IBC02		T4	TP1
2057	TRIPROPYLENE	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
2058	VALERALDEHYDE	3		II		1 L	P001 IBC02		T4	TP1
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3		I	198	NONE	P001		T11	TP1 TP8 TP27
		3		II	198	1 L	P001		T4	TP1 TP8
		3		III	198 223	5 L	P001 LP01		T2	TP1
2067	AMMONIUM NITRATE BASED FERTILIZER	5.1		III	186 306 307	5 kg	P002 IBC08 LP02	B3		
2071	AMMONIUM NITRATE BASED FERTILIZER	9		III	186 193	5 kg	P002 IBC08 LP02			
2073	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 50% ammonia	2.2				120 ml	P200			
2074	ACRYLAMIDE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
2075	CHLORAL, ANHYDROUS, STABILIZED	6.1		II		100 ml	P001 IBC02		T7	TP2
2076	CRESOLS, LIQUID	6.1	8	II		100 ml	P001 IBC02		T7	TP2
	CRESOLS, SOLID	6.1	8	II		500 g	P002 IBC08	B2, B4	T7	TP2
2077	alpha-NAPHTHYLAMINE	6.1		III		5 kg	P002 IBC08 LP02	B3	T3	TP1
2078	TOLUENE DIISOCYANATE	6.1		II	279	100 ml	P001 IBC02		T7	TP2 TP13
2079	DIETHYLENETRIAMINE	8		II		1 L	P001 IBC02		T7	TP2

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2186	HYDROGEN CHLORIDE, REFRIGERATED LIQUID	2.3	8			NONE	P200			
2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	
2188	ARSINE	2.3	2.1			NONE	P200			
2189	DICHLOROSILANE	2.3	2.1 8			NONE	P200			
2190	OXYGEN DIFLUORIDE, COMPRESSED	2.3	5.1 8			NONE	P200			
2191	SULPHURYL FLUORIDE	2.3				NONE	P200			
2192	GERMANE	2.3	2.1			NONE	P200			
2193	HEXAFLUOROETHANE (REFRIGERANT GAS R 116)	2.2				120 ml	P200			
2194	SELENIUM HEXAFLUORIDE	2.3	8			NONE	P200			
2195	TELLURIUM HEXAFLUORIDE	2.3	8			NONE	P200			
2196	TUNGSTEN HEXAFLUORIDE	2.3	8			NONE	P200			
2197	HYDROGEN IODIDE, ANHYDROUS	2.3	8			NONE	P200			
2198	PHOSPHORUS PENTAFLUORIDE	2.3	8			NONE	P200			
2199	PHOSPHINE	2.3	2.1			NONE	P200			
2200	PROPADIENE, STABILIZED	2.1				NONE	P200			
2201	NITROUS OXIDE, REFRIGERATED LIQUID	2.2	5.1			NONE	P200		T75	TP22
2202	HYDROGEN SELENIDE, ANHYDROUS	2.3	2.1			NONE	P200			
2203	SILANE	2.1				NONE	P200			
2204	CARBONYL SULPHIDE	2.3	2.1			NONE	P200			
2205	ADIPONITRILE	6.1		III		5 L	P001 IBC03 LP01		T3	TP1
2206	ISOCYANATES, TOXIC, N.O.S. or ISOCYANATE SOLUTION, TOXIC, N.O.S.	6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP13 TP28
2208	CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 10% but not more than 39% available chlorine	5.1		III		5 kg	P002 IBC08 LP02	B3		
2209	FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	8		III		5 L	P001 IBC03 LP01		T4	TP1
2210	MANEB or MANEB PREPARATION with not less than 60% maneb	4.2	4.3	III	273	NONE	P002 IBC06			
2211	POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	9		III	207	NONE	P002 IBC08	PP14 B3, B6		

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2212	BLUE ASBESTOS (crocidolite) or BROWN ASBESTOS (amosite, mysorite)	9		II	168	1 kg	P002 IBC08	PP37 B2, B4		
2213	PARAFORMALDEHYDE	4.1		III		5 kg	P002 IBC08 LP02	PP12 B3		
2214	PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride	8		III	169	5 kg	P002 IBC08 LP02	B3	T4	TP3
2215	MALEIC ANHYDRIDE	8		III		5 kg	P002 IBC08	B3	T4	TP1
	MALEIC ANHYDRIDE, MOLTEN	8		III		NONE	NONE		T4	TP3
2216	FISH MEAL (FISH SCRAP), STABILIZED	9		III	29 117 300 308	NONE	P900 IBC08	B3		
2217	SEED CAKE with not more than 1.5% oil and not more than 11% moisture	4.2		III	29 142	NONE	P002 IBC08 LP02	PP20 B3, B6		
2218	ACRYLIC ACID, STABILIZED	8	3	II		1 L	P001 IBC02		T7	TP2
2219	ALLYL GLYCIDYL ETHER	3		III		5 L	P001 IBC03 LP01		T2	TP1
2222	ANISOLE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2224	BENZONITRILE	6.1		II		100 ml	P001 IBC02		T7	TP2
2225	BENZENESULPHONYL CHLORIDE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2226	BENZOTRICHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
2227	n-BUTYL METHACRYLATE, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1
2232	2-CHLOROETHANAL	6.1		I		NONE	P001		T14	TP2 TP13
2233	CHLOROANISIDINES	6.1		III		5 kg	P002 IBC08 LP02	B3		
2234	CHLOROBENZOTRIFLUORIDES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2235	CHLOROBENZYL CHLORIDES	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2236	3-CHLORO-4-METHYLPHENYL ISOCYANATE	6.1		II		100 ml	P001 IBC02			
2237	CHLORONITROANILINES	6.1		III		5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2238	CHLOROTOLUENES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2239	CHLOROTOLUIDINES	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
2240	CHROMOSULPHURIC ACID	8		I		NONE	P001		T10	TP2 TP12 TP13
2241	CYCLOHEPTANE	3		II		1 L	P001 IBC02		T4	TP1
2242	CYCLOHEPTENE	3		II		1 L	P001 IBC02		T4	TP1
2243	CYCLOHEXYL ACETATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2244	CYCLOPENTANOL	3		III		5 L	P001 IBC03 LP01		T2	TP1
2245	CYCLOPENTANONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2246	CYCLOPENTENE	3		II		1 L	P001 IBC02	B8	T7	TP2
2247	n-DECANE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2248	DI-n-BUTYLAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
2249	DICHLORODIMETHYL ETHER, SYMMETRICAL	6.1	3	I		NONE	P099			
2250	DICHLOROPHENYL ISOCYANATES	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
2251	BICYCLO[2.2.1]HEPTA-2,5-DIENE, STABILIZED (2,5-NORBORNADIENE, STABILIZED)	3		II		1 L	P001 IBC02		T7	TP2
2252	1,2-DIMETHOXYETHANE	3		II		1 L	P001 IBC02		T4	TP1
2253	N,N-DIMETHYLANILINE	6.1		II		100 ml	P001 IBC02		T7	TP2
2254	MATCHES, FUSEE	4.1		III	293	5 kg	P407			
2256	CYCLOHEXENE	3		II		1 L	P001 IBC02		T4	TP1
2257	POTASSIUM	4.3		I		NONE	P403 IBC04	B1	T9	TP3 TP7 TP31
2258	1,2-PROPYLENEDIAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
2259	TRIETHYLENETETRAMINE	8		II		1 L	P001 IBC02		T7	TP2
2260	TRIPROPYLAMINE	3	8	III		5 L	P001 IBC03		T4	TP1

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2261	XYLENOLS	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
2262	DIMETHYLCARBAMOYL CHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
2263	DIMETHYLCYCLOHEXANES	3		II		1 L	P001 IBC02		T4	TP1
2264	N,N-DIMETHYLCYCLOHEXYLAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
2265	N,N-DIMETHYLFORMAMIDE	3		III		5 L	P001 IBC03 LP01		T2	TP2
2266	DIMETHYL-N-PROPYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP2 TP13
2267	DIMETHYL THIOPHOSPHORYL CHLORIDE	6.1	8	II		100 ml	P001 IBC02		T7	TP2
2269	3,3'-IMINODIPROPYLAMINE	8		III		5 L	P001 IBC03 LP01		T4	TP2
2270	ETHYLAMINE, AQUEOUS SOLUTION with not less than 50% but not more than 70% ethylamine	3	8	II		1 L	P001 IBC02		T7	TP1
2271	ETHYL AMYL KETONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2272	N-ETHYLANILINE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2273	2-ETHYLANILINE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2274	N-ETHYL-N-BENZYLANILINE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2275	2-ETHYLBUTANOL	3		III		5 L	P001 IBC03 LP01		T2	TP1
2276	2-ETHYLHEXYLAMINE	3	8	III		5 L	P001 IBC03		T4	TP1
2277	ETHYL METHACRYLATE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
2278	n-HEPTENE	3		II		1 L	P001 IBC02		T4	TP1
2279	HEXACHLOROBUTADIENE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2280	HEXAMETHYLENEDIAMINE, SOLID	8		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
2281	HEXAMETHYLENE DIISOCYANATE	6.1		II		100 ml	P001 IBC02		T7	TP2 TP13
2282	HEXANOLS	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2283	ISOBUTYL METHACRYLATE, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1
2284	ISOBUTYRONITRILE	3	6.1	II		1 L	P001 IBC02		T7	TP2 TP13
2285	ISOCYANATOBENZOTRIFLUORIDES	6.1	3	II		100 ml	P001 IBC02		T7	TP2
2286	PENTAMETHYLHEPTANE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2287	ISOHEPTENE	3		II		1 L	P001 IBC02		T4	TP1
2288	ISOHEXENE	3		II		1 L	P001 IBC02	B8	T11	TP1
2289	ISOPHORONEDIAMINE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2290	ISOPHORONE DIISOCYANATE	6.1		III		5 L	P001 IBC03 LP01		T4	TP2
2291	LEAD COMPOUND, SOLUBLE, N.O.S.	6.1		III	199	5 kg	P002 IBC08 LP02	B3		
2293	4-METHOXY-4-METHYLPENTAN-2-ONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2294	N-METHYLANILINE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2295	METHYL CHLOROACETATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2296	METHYLCYCLOHEXANE	3		II		1 L	P001 IBC02		T4	TP1
2297	METHYLCYCLOHEXANONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2298	METHYLCYCLOPENTANE	3		II		1 L	P001 IBC02		T4	TP1
2299	METHYL DICHLOROACETATE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2300	2-METHYL-5-ETHYLPYRIDINE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2301	2-METHYLFURAN	3		II		1 L	P001 IBC02		T4	TP1
2302	5-METHYLHEXAN-2-ONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2303	ISOPROPENYLBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2304	NAPHTHALENE, MOLTEN	4.1		III		NONE	NONE		T1	TP3
2305	NITROBENZENESULPHONIC ACID	8		II		1 L	P001 IBC02			
2306	NITROBENZOTRIFLUORIDES	6.1		II		100 ml	P001 IBC02		T7	TP2
2307	3-NITRO-4-CHLOROBENZOTRIFLUORIDE	6.1		II		100 ml	P001 IBC02		T7	TP2
2308	NITROSYLSULPHURIC ACID, LIQUID	8		II		1 L	P001 IBC02		T8	TP2 TP12
	NITROSYLSULPHURIC ACID, SOLID	8		II		1 kg	P002 IBC08	B2, B4	T8	TP2 TP12
2309	OCTADIENE	3		II		1 L	P001 IBC02		T4	TP1
2310	PENTANE-2,4-DIONE	3	6.1	III		5 L	P001 IBC03		T4	TP1
2311	PHENETIDINES	6.1		III	279	5 L	P001 IBC03 LP01		T4	TP1
2312	PHENOL, MOLTEN	6.1		II		NONE	NONE		T7	TP3
2313	PICOLINES	3		III		5 L	P001 IBC03 LP01		T4	TP1
2315	POLYCHLORINATED BIPHENYLS	9		II	305	1L	P906 IBC02		T4	TP1
2316	SODIUM CUPROCYANIDE, SOLID	6.1		I		NONE	P002 IBC07	B1		
2317	SODIUM CUPROCYANIDE SOLUTION	6.1		I		NONE	P001		T14	TP2 TP13
2318	SODIUM HYDROSULPHIDE with less than 25% water of crystallization	4.2		II		NONE	P410 IBC06	B2		
2319	TERPENE HYDROCARBONS, N.O.S.	3		III		5 L	P001 IBC03 LP01		T4	TP1 TP29
2320	TETRAETHYLENEPENTAMINE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2321	TRICHLOROBENZENES, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2322	TRICHLOROBUTENE	6.1		II		100 ml	P001 IBC02		T7	TP2
2323	TRIETHYL PHOSPHITE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2324	TRIISOBUTYLENE	3		III		5 L	P001 IBC03 LP01		T4	TP1
2325	1,3,5-TRIMETHYLBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2326	TRIMETHYLCYCLOHEXYLAMINE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2327	TRIMETHYLHEXAMETHYLENE-DIAMINES	8		III		5 L	P001 IBC03 LP01		T4	TP1
2328	TRIMETHYLHEXAMETHYLENE DIISOCYANATE	6.1		III		5 L	P001 IBC03 LP01		T4	TP2 TP13
2329	TRIMETHYL PHOSPHITE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2330	UNDECANE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2331	ZINC CHLORIDE, ANHYDROUS	8		III		5 kg	P002 IBC08 LP02	B3		
2332	ACETALDEHYDE OXIME	3		III		5 L	P001 IBC03 LP01		T4	TP1
2333	ALLYL ACETATE	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2334	ALLYLAMINE	6.1	3	I		NONE	P602		T14	TP2 TP13
2335	ALLYL ETHYL ETHER	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2336	ALLYL FORMATE	3	6.1	I		NONE	P001		T14	TP2 TP13
2337	PHENYL MERCAPTAN	6.1	3	I		NONE	P001		T14	TP2 TP13
2338	BENZOTRIFLUORIDE	3		II		1 L	P001 IBC02		T4	TP1
2339	2-BROMOBUTANE	3		II		1 L	P001 IBC02		T4	TP1
2340	2-BROMOETHYL ETHYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
2341	1-BROMO-3-METHYLBUTANE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2342	BROMOMETHYLPROPANES	3		II		1 L	P001 IBC02		T4	TP1
2343	2-BROMOPENTANE	3		II		1 L	P001 IBC02		T4	TP1
2344	BROMOPROPANES	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
2345	3-BROMOPROPYNE	3		II		1 L	P001 IBC02		T4	TP1
2346	BUTANEDIONE	3		II		1 L	P001 IBC02		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2347	BUTYL MERCAPTAN	3		II		1 L	P001 IBC02		T4	TP1
2348	BUTYL ACRYLATES, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1
2350	BUTYL METHYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
2351	BUTYL NITRITES	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
2352	BUTYL VINYL ETHER, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
2353	BUTYRYL CHLORIDE	3	8	II		1 L	P001 IBC02		T8	TP2 TP12 TP13
2354	CHLOROMETHYL ETHYL ETHER	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2356	2-CHLOROPROPANE	3		I		NONE	P001		T11	TP2 TP13
2357	CYCLOHEXYLAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
2358	CYCLOOCTATETRAENE	3		II		1 L	P001 IBC02		T4	TP1
2359	DIALLYLAMINE	3	6.1, 8	II		1 L	P001 IBC99		T7	TP1
2360	DIALLYL ETHER	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2361	DIISOBUTYLAMINE	3	8	III		5 L	P001 IBC03		T4	TP1
2362	1,1-DICHLOROETHANE	3		II		1 L	P001 IBC02		T4	TP1
2363	ETHYL MERCAPTAN	3		I		NONE	P001		T11	TP2 TP13
2364	n-PROPYLBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2366	DIETHYL CARBONATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2367	alpha-METHYLVALERALDEHYDE	3		II		1 L	P001 IBC02		T4	TP1
2368	alpha-PINENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2370	1-HEXENE	3		II		1 L	P001 IBC02		T4	TP1
2371	ISOPENTENES	3		I		NONE	P001		T11	TP2
2372	1,2-DI-(DIMETHYLAMINO) ETHANE	3		II		1 L	P001 IBC02		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2373	DIETHOXYMETHANE	3		II		1 L	P001 IBC02		T4	TP1
2374	3,3-DIETHOXYPROPENE	3		II		1 L	P001 IBC02		T4	TP1
2375	DIETHYL SULPHIDE	3		II		1 L	P001 IBC02		T7	TP1 TP13
2376	2,3-DIHYDROPYRAN	3		II		1 L	P001 IBC02		T4	TP1
2377	1,1-DIMETHOXYETHANE	3		II		1 L	P001 IBC02		T7	TP1
2378	2-DIMETHYLAMINOACETONITRILE	3	6.1	II		1 L	P001 IBC02		T7	TP1
2379	1,3-DIMETHYLBUTYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
2380	DIMETHYLDIETHOXYSILANE	3		II		1 L	P001 IBC02		T4	TP1
2381	DIMETHYL DISULPHIDE	3		II		1 L	P001 IBC02		T4	TP1
2382	DIMETHYLHYDRAZINE, SYMMETRICAL	6.1	3	I		NONE	P001		T14	TP2 TP13
2383	DIPROPYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
2384	DI-n-PROPYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
2385	ETHYL ISOBUTYRATE	3		II		1 L	P001 IBC02		T4	TP1
2386	1-ETHYLPIPERIDINE	3	8	II		1 L	P001 IBC02		T7	TP1
2387	FLUOROBENZENE	3		II		1 L	P001 IBC02		T4	TP1
2388	FLUOROTOLUENES	3		II		1 L	P001 IBC02		T4	TP1
2389	FURAN	3		I		NONE	P001		T12	TP2 TP13
2390	2-IODOBUTANE	3		II		1 L	P001 IBC02		T4	TP1
2391	IODOMETHYLPROPANES	3		II		1 L	P001 IBC02		T4	TP1
2392	IODOPROPANES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2393	ISOBUTYL FORMATE	3		II		1 L	P001 IBC02		T4	TP1
2394	ISOBUTYL PROPIONATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2395	ISOBUTYRYL CHLORIDE	3	8	II		1 L	P001 IBC02		T7	TP2
2396	METHACRYLALDEHYDE, STABILIZED	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2397	3-METHYLBUTAN-2-ONE	3		II		1 L	P001 IBC02		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2398	METHYL tert-BUTYL ETHER	3		II		1 L	P001 IBC02		T7	TP1
2399	1-METHYLPIPERIDINE	3	8	II		1 L	P001 IBC02		T7	TP1
2400	METHYL ISOVALERATE	3		II		1 L	P001 IBC02		T4	TP1
2401	PIPERIDINE	8	3	I		NONE	P001		T10	TP2
2402	PROPANETHIOLS	3		II		1 L	P001 IBC02		T4	TP1 TP13
2403	ISOPROPENYL ACETATE	3		II		1 L	P001 IBC02		T4	TP1
2404	PROPIONITRILE	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2405	ISOPROPYL BUTYRATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2406	ISOPROPYL ISOBUTYRATE	3		II		1 L	P001 IBC02		T4	TP1
2407	ISOPROPYL CHLOROFORMATE	6.1	3 8	I		NONE	P602			
2409	ISOPROPYL PROPIONATE	3		II		1 L	P001 IBC02		T4	TP1
2410	1,2,3,6-TETRAHYDROPYRIDINE	3		II		1 L	P001 IBC02		T4	TP1
2411	BUTYRONITRILE	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2412	TETRAHYDROTHIOPHENE	3		II		1 L	P001 IBC02		T4	TP1
2413	TETRAPROPYL ORTHOTITANATE	3		III		5 L	P001 IBC03 LP01		T4	TP1
2414	THIOPHENE	3		II		1 L	P001 IBC02		T4	TP1
2416	TRIMETHYL BORATE	3		II		1 L	P001 IBC02		T7	TP1
2417	CARBONYL FLUORIDE	2.3	8			NONE	P200			
2418	SULPHUR TETRAFLUORIDE	2.3	8			NONE	P200			
2419	BROMOTRIFLUOROETHYLENE	2.1				NONE	P200			
2420	HEXAFLUOROACETONE	2.3	8			NONE	P200			
2421	NITROGEN TRIOXIDE	2.3	5.1 8			NONE	P200			
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2.2				120 ml	P200			
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2.2				120 ml	P200		T50	
2426	AMMONIUM NITRATE, LIQUID (hot concentrated solution)	5.1			252	NONE	NONE		T7	TP1 TP16 TP17

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2427	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1		II		1 kg	P504 IBC02		T4	TP1
		5.1		III	223	5 kg	P504 IBC02		T4	TP1
2428	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1		II		1 kg	P504 IBC02		T4	TP1
		5.1		III	223	5 kg	P504 IBC02		T4	TP1
2429	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1		II		1 kg	P504 IBC02		T4	TP1
		5.1		III	223	5 kg	P504 IBC02		T4	TP1
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C2-C12 homologues)	8		I		NONE	P002 IBC07	B1	T10	TP2 TP9 TP28
		8		II		5 kg	P002 IBC08	B2, B4	T3	TP2
		8		III	223	5 kg	P002 IBC08 LP02	B3	T3	TP1
2431	ANISIDINES	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2432	N,N-DIETHYLANILINE	6.1		III	279	5 L	P001 IBC03 LP01		T4	TP1
2433	CHLORONITROTOLUENES, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
	CHLORONITROTOLUENES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3		
2434	DIBENZYLDICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
2435	ETHYLPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
2436	THIOACETIC ACID	3		II		1 L	P001 IBC02		T4	TP1
2437	METHYLPHENYLDICHLOROSILANE	8		II		NONE	P001 IBC02		T7	TP2 TP13
2438	TRIMETHYLACETYL CHLORIDE	6.1	3 8	I		NONE	P001		T14	TP2 TP13
2439	SODIUM HYDROGENDIFLUORIDE	8		II		1 L	P002 IBC08	B2, B4		
2440	STANNIC CHLORIDE PENTAHYDRATE	8		III		5 kg	P002 IBC08 LP02	B3		
2441	TITANIUM TRICHLORIDE, PYROPHORIC or TITANIUM TRICHLORIDE MIXTURE, PYROPHORIC	4.2	8	I		NONE	P404			
2442	TRICHLOROACETYL CHLORIDE	8		II		NONE	P001		T7	TP2

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2443	VANADIUM OXYTRICHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
2444	VANADIUM TETRACHLORIDE	8		I		NONE	P802		T10	TP2
2445	LITHIUM ALKYLS	4.2	4.3	I		NONE	P400		T21	TP2 TP7
2446	NITROCRESOLS	6.1		III		5 kg	P002 IBC08 LP02	B3		
2447	PHOSPHORUS, WHITE, MOLTEN	4.2	6.1	I		NONE	NONE		T21	TP3 TP7 TP26
2448	SULPHUR, MOLTEN	4.1		III		NONE	IBC01		T1	TP3
2451	NITROGEN TRIFLUORIDE	2.2	5.1			NONE	P200			
2452	ETHYLACETYLENE, STABILIZED	2.1				NONE	P200			
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2.1				NONE	P200			
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2.1				NONE	P200			
2455	METHYL NITRITE	2.2				120 ml	P200			
2456	2-CHLOROPROPENE	3		I		NONE	P001		T11	TP2
2457	2,3-DIMETHYLBUTANE	3		II		1 L	P001 IBC02		T7	TP1
2458	HEXADIENE	3		II		1 L	P001 IBC02		T4	TP1
2459	2-METHYL-1-BUTENE	3		I		NONE	P001		T11	TP2
2460	2-METHYL-2-BUTENE	3		II		1 L	P001 IBC02	B8	T7	TP1
2461	METHYLPENTADIENE	3		II		1 L	P001 IBC02		T4	TP1
2463	ALUMINIUM HYDRIDE	4.3		I		NONE	P403			
2464	BERYLLIUM NITRATE	5.1	6.1	II		1 kg	P002 IBC08	B2, B4		
2465	DICHLOROISOCYANURIC ACID, DRY or DICHLOROISOCYANURIC ACID SALTS	5.1		II	135	1 kg	P002 IBC08	B4		
2466	POTASSIUM SUPEROXIDE	5.1		I		NONE	P503 IBC06	B1		
2468	TRICHLOROISOCYANURIC ACID, DRY	5.1		II		1 kg	P002 IBC08	B4		
2469	ZINC BROMATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2470	PHENYLACETONITRILE, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2471	OSMIUM TETROXIDE	6.1		I		NONE	P002 IBC07	PP30 B1		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2473	SODIUM ARSANILATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2474	THIOPHOSGENE	6.1		II	279	100 ml	P001		T7	TP2
2475	VANADIUM TRICHLORIDE	8		III		5 kg	P002 IBC08 LP02	B3		
2477	METHYL ISOTHIOCYANATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
		3	6.1	III	223 274	5 L	P001 IBC03		T7	TP1 TP13 TP28
2480	METHYL ISOCYANATE	6.1	3	I		NONE	P601			
2481	ETHYL ISOCYANATE	3	6.1	I		NONE	P601		T14	TP2 TP13
2482	n-PROPYL ISOCYANATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2483	ISOPROPYL ISOCYANATE	3	6.1	I		NONE	P001		T14	TP2 TP13
2484	tert-BUTYL ISOCYANATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2485	n-BUTYL ISOCYANATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2486	ISOBUTYL ISOCYANATE	3	6.1	II		1 L	P001		T8	TP2 TP13
2487	PHENYL ISOCYANATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2488	CYCLOHEXYL ISOCYANATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2490	DICHLOROISOPROPYL ETHER	6.1		II		100 ml	P001 IBC02		T7	TP2
2491	ETHANOLAMINE or ETHANOLAMINE SOLUTION	8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2493	HEXAMETHYLENEIMINE	3	8	II		1 L	P001 IBC02		T7	TP1
2495	IODINE PENTAFLUORIDE	5.1	6.1 8	I		NONE	P200			
2496	PROPIONIC ANHYDRIDE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2498	1,2,3,6-TETRAHYDROBENZALDEHYDE	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2501	TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC03 LP01		T4	TP1
2502	VALERYL CHLORIDE	8	3	II		1 L	P001 IBC02		T7	TP2
2503	ZIRCONIUM TETRACHLORIDE	8		III		5 kg	P002 IBC08 LP02	B3		
2504	TETRABROMOETHANE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2505	AMMONIUM FLUORIDE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2506	AMMONIUM HYDROGEN SULPHATE	8		II		1 kg	P002 IBC08	B2, B4		
2507	CHLOROPLATINIC ACID, SOLID	8		III		5 kg	P002 IBC08 LP02	B3		
2508	MOLYBDENUM PENTACHLORIDE	8		III		5 kg	P002 IBC08 LP02	B3		
2509	POTASSIUM HYDROGEN SULPHATE	8		II		1 kg	P002 IBC08	B2, B4		
2511	2-CHLOROPROPIONIC ACID, SOLUTION	8		III		5 L	P001 IBC03 LP01		T4	TP2
	2-CHLOROPROPIONIC ACID, SOLID	8		III		5 kg	P002 IBC08 LP02	B3	T4	TP2
2512	AMINOPHENOLS (o-, m-, p-)	6.1		III	279	5 kg	P002 IBC08 LP02	B3		
2513	BROMOACETYL BROMIDE	8		II		1 L	P001 IBC02		T8	TP2 TP12
2514	BROMOBENZENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2515	BROMOFORM	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2516	CARBON TETRABROMIDE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2.1				NONE	P200		T50	
2518	1,5,9-CYCLODODECATRIENE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2520	CYCLOOCTADIENES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2521	DIKETENE, STABILIZED	6.1	3	I		NONE	P001		T14	TP2 TP13
2522	2-DIMETHYLAMINOETHYL METHACRYLATE	6.1		II		100 ml	P001 IBC02		T7	TP2
2524	ETHYL ORTHOFORMATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2525	ETHYL OXALATE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2526	FURFURYLAMINE	3	8	III		5 L	P001 IBC03		T4	TP1
2527	ISOBUTYL ACRYLATE, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1
2528	ISOBUTYL ISOBUTYRATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2529	ISOBUTYRIC ACID	3	8	III		5 L	P001 IBC03		T4	TP1
2531	METHACRYLIC ACID, STABILIZED	8		II		1 L	P001 IBC02 LP01		T7	TP1 TP18 TP30
2533	METHYL TRICHLOROACETATE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2534	METHYLCHLOROSILANE	2.3	2.1 8			NONE	P200			
2535	4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)	3	8	II		1 L	P001 IBC02		T7	TP1
2536	METHYLTETRAHYDROFURAN	3		II		1 L	P001 IBC02		T4	TP1
2538	NITRONAPHTHALENE	4.1		III		5 kg	P002 IBC08 LP02	B3		
2541	TERPINOLENE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2542	TRIBUTYLAMINE	6.1		II		100 ml	P001 IBC02		T7	TP2
2545	HAFNIUM POWDER, DRY	4.2		I		NONE	P404			
		4.2		II		NONE	P410 IBC06	B2		
		4.2		III	223	NONE	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2546	TITANIUM POWDER, DRY	4.2		I		NONE	P404			
		4.2		II		NONE	P410 IBC06	B2		
		4.2		III	223	NONE	P002 IBC08 LP02	B3		
2547	SODIUM SUPEROXIDE	5.1		I		NONE	P503 IBC06	B1		
2548	CHLORINE PENTAFLUORIDE	2.3	5.1 8			NONE	P200			
2552	HEXAFLUOROACETONE HYDRATE	6.1		II		100 ml	P001 IBC02		T7	TP2
2554	METHYLALLYL CHLORIDE	3		II		1 L	P001 IBC02		T4	TP1 TP13
2555	NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	4.1		II		NONE	P406			
2556	NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	4.1		II		NONE	P406			
2557	NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH or WITHOUT PLASTICIZER, WITH or WITHOUT PIGMENT	4.1		II	241	NONE	P406			
2558	EPIBROMOHYDRIN	6.1	3	I		NONE	P001		T14	TP2 TP13
2560	2-METHYLPENTAN-2-OL	3		III		5 L	P001 IBC03 LP01		T2	TP1
2561	3-METHYL-1-BUTENE	3		I		NONE	P001		T11	TP2
2564	TRICHLOROACETIC ACID SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2565	DICYCLOHEXYLAMINE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2567	SODIUM PENTACHLOROPHENATE	6.1		II		500 g	P002 IBC08	B2, B4		
2570	CADMIUM COMPOUND	6.1		I		NONE	P002 IBC07	B1		
		6.1		II		500 g	P002 IBC08	B2, B4		
		6.1		III	223	5 kg	P002 IBC08 LP02	B3		
2571	ALKYLSULPHURIC ACIDS	8		II	274	1 L	P001 IBC02		T8	TP2 TP12 TP13 TP28
2572	PHENYLHYDRAZINE	6.1		II		100 ml	P001 IBC02		T7	TP2

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2573	THALLIUM CHLORATE	5.1	6.1	II		1 kg	P002 IBC06	B2		
2574	TRICRESYL PHOSPHATE with more than 3% ortho isomer	6.1		II		100 ml	P001 IBC02		T7	TP2
2576	PHOSPHORUS OXYBROMIDE, MOLTEN	8		II		NONE	NONE		T7	TP3 TP13
2577	PHENYLACETYL CHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
2578	PHOSPHORUS TRIOXIDE	8		III		5 kg	P002 IBC08 LP02	B3		
2579	PIPERAZINE	8		III		5 kg	P002 IBC08 LP02	B3	T4	TP1 TP30
2580	ALUMINIUM BROMIDE SOLUTION	8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2581	ALUMINIUM CHLORIDE SOLUTION	8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2582	FERRIC CHLORIDE SOLUTION	8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2583	ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	8		II		1 kg	P002 IBC08	B2, B4		
2584	ALKYSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	8		II		1 L	P001 IBC02		T8	TP2 TP12 TP13
2585	ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	8		III		5 kg	P002 IBC08 LP02	B3		
2586	ALKYLSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	8		III		5 L	P001 IBC03 LP01		T4	TP1
2587	BENZOQUINONE	6.1		II		500 g	P002 IBC08	B2, B4		
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1		I	61 274	NONE	P002 IBC99			
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2589	VINYL CHLOROACETATE	6.1	3	II		100 ml	P001 IBC02		T7	TP2
2590	WHITE ASBESTOS (chrysotile, actinolite, anthophyllite, tremolite)	9		III	168	NONE	P002 IBC08	PP37 B2, B3		
2591	XENON, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	

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							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	2.2				120 ml	P200			
2600	CARBON MONOXIDE AND HYDROGEN MIXTURE, COMPRESSED	2.3	2.1			NONE	P200			
2601	CYCLOBUTANE	2.1				NONE	P200			
2602	DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	2.2				120 ml	P200		T50	
2603	CYCLOHEPTATRIENE	3	6.1	II		1 L	P001 IBC02		T7	TP1 TP13
2604	BORON TRIFLUORIDE DIETHYL ETHERATE	8	3	I		NONE	P001		T10	TP2
2605	METHOXYMETHYL ISOCYANATE	3	6.1	I		NONE	P001		T14	TP2 TP13
2606	METHYL ORTHOSILICATE	6.1	3	I		NONE	P001		T14	TP2 TP13
2607	ACROLEIN DIMER, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1
2608	NITROPROPANES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2609	TRIALLYL BORATE	6.1		III		5 L	P001 IBC03 LP01			
2610	TRIALLYLAMINE	3	8	III		5 L	P001 IBC03		T4	TP1
2611	PROPYLENE CHLOROHYDRIN	6.1	3	II		100 ml	P001 IBC02		T7	TP2 TP13
2612	METHYL PROPYL ETHER	3		II		1 L	P001 IBC02	B8	T7	TP2
2614	METHALLYL ALCOHOL	3		III		5 L	P001 IBC03 LP01		T2	TP1
2615	ETHYL PROPYL ETHER	3		II		1 L	P001 IBC02		T4	TP1
2616	TRIISOPROPYL BORATE	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
2617	METHYLCYCLOHEXANOLS, flammable	3		III		5 L	P001 IBC03 LP01		T2	TP1
2618	VINYLTOLUENES, STABILIZED	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2619	BENZYLDIMETHYLAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
2620	AMYL BUTYRATES	3		III		5 L	P001 IBC03 LP01		T2	TP1
2621	ACETYL METHYL CARBINOL	3		III		5 L	P001 IBC03 LP01		T2	TP1
2622	GLYCIDALDEHYDE	3	6.1	II		1 L	P001 IBC02	B8	T7	TP1
2623	FIRELIGHTERS, SOLID with flammable liquid	4.1		III		5 kg	P002 LP01	PP15		
2624	MAGNESIUM SILICIDE	4.3		II		500 g	P410 IBC07	B2		
2626	CHLORIC ACID, AQUEOUS SOLUTION with not more than 10% chloric acid	5.1		II		1 kg	P504 IBC02			
2627	NITRITES, INORGANIC, N.O.S.	5.1		II	103	1 kg	P002 IBC08	B4		
2628	POTASSIUM FLUOROACETATE	6.1		I		NONE	P002 IBC07	B1		
2629	SODIUM FLUOROACETATE	6.1		I		NONE	P002 IBC07	B1		
2630	SELENATES or SELENITES	6.1		I		NONE	P002 IBC07	B1		
2642	FLUOROACETIC ACID	6.1		I		NONE	P002 IBC07	B1		
2643	METHYL BROMOACETATE	6.1		II		100 ml	P001 IBC02		T7	TP2
2644	METHYL IODIDE	6.1		I		NONE	P001		T14	TP2 TP13
2645	PHENACYL BROMIDE	6.1		II		500 g	P002 IBC08	B2, B4		
2646	HEXACHLOROCYCLOPENTADIENE	6.1		I		NONE	P001		T14	TP2 TP13
2647	MALONONITRILE	6.1		II		500 g	P002 IBC08	B2, B4		
2648	1,2-DIBROMOBUTAN-3-ONE	6.1		II		100 ml	P001 IBC02			
2649	1,3-DICHLOROACETONE	6.1		II		500 g	P002 IBC08	B2, B4		
2650	1,1-DICHLORO-1-NITROETHANE	6.1		II		100 ml	P001 IBC02		T7	TP2
2651	4,4'-DIAMINODIPHENYLMETHANE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
2653	BENZYL IODIDE	6.1		II		100 ml	P001 IBC02		T7	TP2
2655	POTASSIUM FLUOROSILICATE	6.1		III		5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2656	QUINOLINE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2657	SELENIUM DISULPHIDE	6.1		II		500 g	P002 IBC08	B2, B4		
2659	SODIUM CHLOROACETATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2660	NITROTOLUIDINES (MONO)	6.1		III		5 kg	P002 IBC08 LP02	B3		
2661	HEXACHLOROACETONE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2662	HYDROQUINONE	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
2664	DIBROMOMETHANE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2667	BUTYLTOLUENES	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2668	CHLOROACETONITRILE	6.1	3	II		100 ml	P001 IBC99		T7	TP2
2669	CHLOROCRESOLS	6.1		II		100 ml	P001 IBC02		T7	TP2
2670	CYANURIC CHLORIDE	8		II		1 kg	P002 IBC08	B2, B4		
2671	AMINOPYRIDINES (o-, m-, p,)	6.1		II		500 g	P002 IBC08	B2, B4		
2672	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia	8		III		5 L	P001 IBC03 LP01	B11	T7	TP1
2673	2-AMINO-4-CHLOROPHENOL	6.1		II		500 g	P002 IBC08	B2, B4		
2674	SODIUM FLUOROSILICATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2676	STIBINE	2.3	2.1			NONE	P200			
2677	RUBIDIUM HYDROXIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2678	RUBIDIUM HYDROXIDE	8		II		1 kg	P002 IBC08	B2, B4		
2679	LITHIUM HYDROXIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP2

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2680	LITHIUM HYDROXIDE	8		II		1 kg	P002 IBC08	B2, B4		
2681	CAESIUM HYDROXIDE SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2682	CAESIUM HYDROXIDE	8		II		1 kg	P002 IBC08	B2, B4		
2683	AMMONIUM SULPHIDE SOLUTION	8	3 6.1	II		1 L	P001 IBC01		T7	TP2 TP13
2684	3-DIETHYLAMINOPROPYLAMINE	3	8	III		5 L	P001 IBC03		T4	TP1
2685	N,N-DIETHYLETHYLENEDIAMINE	8	3	II		1 L	P001 IBC02		T7	TP2
2686	2-DIETHYLAMINOETHANOL	8	3	II		1 L	P001 IBC02		T7	TP2
2687	DICYCLOHEXYLAMMONIUM NITRITE	4.1		III		5 kg	P002 IBC08 LP02	B3		
2688	1-BROMO-3-CHLOROPROPANE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2689	GLYCEROL alpha-MONOCHLOROHYDRIN	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2690	N,n-BUTYLIMIDAZOLE	6.1		II		100 ml	P001 IBC02		T7	TP2
2691	PHOSPHORUS PENTABROMIDE	8		II		1 kg	P002 IBC08	B2, B4		
2692	BORON TRIBROMIDE	8		I		NONE	P602		T20	TP2 TP12 TP13
2693	BISULPHITES, AQUEOUS SOLUTION, N.O.S.	8		III	274	5 L	P001 IBC03 LP01		T7	TP1 TP28
2698	TETRAHYDROPHTHALIC ANHYDRIDES with more than 0.05% of maleic anhydride	8		III	29 169	5 kg	P002 IBC08 LP02	PP14 B3		
2699	TRIFLUOROACETIC ACID	8		I		NONE	P001		T10	TP2 TP12
2705	1-PENTOL	8		II		1 L	P001 IBC02		T7	TP2
2707	DIMETHYLDIOXANES	3		II		1 L	P001 IBC02		T4	TP1
		3		III	223	5 L	P001 IBC03 LP01		T2	TP1
2709	BUTYLBENZENES	3		III		5 L	P001 IBC03 LP01		T2	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2710	DIPROPYL KETONE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2713	ACRIDINE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2714	ZINC RESINATE	4.1		III		5 kg	P002 IBC06			
2715	ALUMINIUM RESINATE	4.1		III		5 kg	P002 IBC06			
2716	1,4-BUTYNEDIOL	6.1		III		5 kg	P002 IBC08 LP02	B3		
2717	CAMPHOR, synthetic	4.1		III		5 kg	P002 IBC08 LP02	B3		
2719	BARIUM BROMATE	5.1	6.1	II		1 kg	P002 IBC08	B2, B4		
2720	CHROMIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2721	COPPER CHLORATE	5.1		II		1 kg	P002 IBC08	B2, B4		
2722	LITHIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2723	MAGNESIUM CHLORATE	5.1		II		1 kg	P002 IBC08	B2, B4		
2724	MANGANESE NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2725	NICKEL NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2726	NICKEL NITRITE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2727	THALLIUM NITRATE	6.1	5.1	II		500 g	P002 IBC06	B2		
2728	ZIRCONIUM NITRATE	5.1		III		5 kg	P002 IBC08 LP02	B3		
2729	HEXACHLOROBENZENE	6.1		III		5 L	P001 IBC03 LP01			
2730	NITROANISOLES, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
	NITROANISOLES, SOLID	6.1		III	279	5 kg	P002 IBC08 LP02	B3	T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2732	NITROBROMOBENZENES, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
	NITROBROMOBENZENES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3	T4	TP1
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	8	I	274	NONE	P001		T14	TP1 TP9 TP27
		3	8	II	274	1 L	P001 IBC02		T11	TP1 TP27
		3	8	III	223 274	5 L	P001 IBC03		T7	TP1 TP28
2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	8	3	I	274	NONE	P001		T14	TP2 TP9 TP27
		8	3	II	274	1 L	P001 IBC02		T11	TP2 TP27
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP1 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
2738	N-BUTYLANILINE	6.1		II		100 ml	P001 IBC02		T7	TP2
2739	BUTYRIC ANHYDRIDE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2740	n-PROPYL CHLOROFORMATE	6.1	3 8	I		NONE	P602		T20	TP2 TP13
2741	BARIUM HYPOCHLORITE with more than 22% available chlorine	5.1	6.1	II		1 kg	P002 IBC08	B2, B4		
2742	CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	3 8	II		100 ml	P001 IBC01			
2743	n-BUTYL CHLOROFORMATE	6.1	3 8	II		100 ml	P001		T20	TP2 TP13
2744	CYCLOBUTYL CHLOROFORMATE	6.1	3 8	II		100 ml	P001 IBC01		T7	TP2 TP13
2745	CHLOROMETHYL CHLOROFORMATE	6.1	8	II		100 ml	P001 IBC02		T7	TP2 TP13
2746	PHENYL CHLOROFORMATE	6.1	8	II		100 ml	P001 IBC02		T7	TP2 TP13
2747	tert-BUTYLCYCLOHEXYL CHLOROFORMATE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2748	2-ETHYLHEXYL CHLOROFORMATE	6.1	8	II		100 ml	P001 IBC02		T7	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2749	TETRAMETHYLSILANE	3		I		NONE	P001		T14	TP2
2750	1,3-DICHLOROPROPANOL-2	6.1		II		100 ml	P001 IBC02		T7	TP2
2751	DIETHYLTHIOPHOSPHORYL CHLORIDE	8		II		1 kg	P002 IBC08	B2, B4	T7	TP2
2752	1,2-EPOXY-3-ETHOXYPROPANE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2753	N-ETHYLBENZYLTOLUIDINES, LIQUID	6.1		III		5 L	P001 IBC03 LP01		T7	TP1
	N-ETHYLBENZYLTOLUIDINES, SOLID	6.1		III		5 kg	P002 IBC08 LP02	B3	T7	TP1
2754	N-ETHYLTOLUIDINES	6.1		II		100 ml	P001 IBC02		T7	TP2
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08	B3		
2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2772	THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2776	COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2778	MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2780	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2782	BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 74	5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2784	ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2785	4-THIAPENTANAL	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
2787	ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1		I	43 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	43 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	43 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
2789	ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass	8	3	II		1 L	P001 IBC02		T7	TP2
2790	ACETIC ACID SOLUTION, not less than 50% but not more than 80% acid, by mass	8		II		1 L	P001 IBC02		T7	TP2
	ACETIC ACID SOLUTION, more than 10% and less than 50% acid, by mass	8		III		5 L	P001 IBC03 LP01		T4	TP1
2793	FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating	4.2		III	223	NONE	P003 IBC08 LP02	PP20 B3, B6		
2794	BATTERIES, WET, FILLED WITH ACID, electric storage	8			295	1 L	P801			
2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	8			295	1 L	P801			
2796	SULPHURIC ACID with not more than 51% acid or BATTERY FLUID, ACID	8		II		1 L	P001 IBC02		T8	TP2 TP12
2797	BATTERY FLUID, ALKALI	8		II		1 L	P001 IBC02		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2798	PHENYLPHOSPHORUS DICHLORIDE	8		II		1 L	P001 IBC02		T7	TP2 TP28
2799	PHENYLPHOSPHORUS THIODICHLORIDE	8		II		1 L	P001 IBC02		T7	TP2
2800	BATTERIES, WET, NON-SPILLABLE, electric storage	8			238	1 L	P003	PP16		
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
2802	COPPER CHLORIDE	8		III		5 kg	P002 IBC08 LP02	B3		
2803	GALLIUM	8		III		5 kg	P800	PP41		
2805	LITHIUM HYDRIDE, FUSED SOLID	4.3		II		500 g	P410 IBC04			
2806	LITHIUM NITRIDE	4.3		I		NONE	P403 IBC04	B1		
2807	MAGNETIZED MATERIAL	9		III	106					
2809	MERCURY	8		III		5 kg	P800			
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1		I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP9 TP28
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1		I	274	NONE	P002 IBC99			
		6.1		II	274	500 g	P002 IBC08	B2, B4		
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3		
2812	SODIUM ALUMINATE, SOLID	8		III	106	5 kg	P002 IBC08 LP02	B3		
2813	WATER-REACTIVE SOLID, N.O.S.	4.3		I	274	NONE	P403 IBC99			
		4.3		II	274	500 g	P410 IBC07	B2		
		4.3		III	223 274	1 kg	P410 IBC08	B4		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS	6.2			274	NONE	P620			
2815	N-AMINOETHYLPIPERAZINE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2817	AMMONIUM HYDROGENDIFLUORIDE SOLUTION	8	6.1	II		1 L	P001 IBC02		T8	TP2 TP12 TP13
		8	6.1	III	223	5 L	P001 IBC03		T4	TP1 TP12 TP13
2818	AMMONIUM POLYSULPHIDE SOLUTION	8	6.1	II		1 L	P001 IBC02		T7	TP2 TP13
		8	6.1	III	223	5 L	P001 IBC03		T4	TP1 TP13
2819	AMYL ACID PHOSPHATE	8		III		5 L	P001 IBC03 LP01		T4	TP1
2820	BUTYRIC ACID	8		III		5 L	P001 IBC03 LP01		T4	TP1
2821	PHENOL SOLUTION	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC03 LP01		T4	TP1
2822	2-CHLOROPYRIDINE	6.1		II		100 ml	P001 IBC02		T7	TP2
2823	CROTONIC ACID	8		III		5 L	P001 IBC03 LP01		T4	TP1
2826	ETHYL CHLOROTHIOFORMATE	8	3	II		NONE	P001		T7	TP2
2829	CAPROIC ACID	8		III		5 L	P001 IBC03 LP01		T4	TP1
2830	LITHIUM FERROSILICON	4.3		II		500 g	P410 IBC07	B2		
2831	1,1,1-TRICHLOROETHANE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2834	PHOSPHOROUS ACID	8		III		5 kg	P002 IBC08 LP02	B3	T3	TP1
2835	SODIUM ALUMINIUM HYDRIDE	4.3		II		500 g	P410 IBC04			
2837	BISULPHATES, AQUEOUS SOLUTION	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP1
2838	VINYL BUTYRATE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2839	ALDOL	6.1		II		100 ml	P001 IBC02		T7	TP2
2840	BUTYRALDOXIME	3		III		5 L	P001 IBC03 LP01		T2	TP1
2841	DI-n-AMYLAMINE	3	6.1	III		5 L	P001 IBC03		T4	TP1
2842	NITROETHANE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2844	CALCIUM MANGANESE SILICON	4.3		III		1 kg	P410 IBC08	B2, B4		
2845	PYROPHORIC LIQUID, ORGANIC, N.O.S.	4.2		I	274	NONE	P400		T22	TP2 TP7 TP9
2846	PYROPHORIC SOLID, ORGANIC, N.O.S.	4.2		I	274	NONE	P404			
2849	3-CHLOROPROPANOL-1	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2850	PROPYLENE TETRAMER	3		III		5 L	P001 IBC03 LP01		T2	TP1
2851	BORON TRIFLUORIDE DIHYDRATE	8		II		1 kg	P002 IBC08	B2, B4	T7	TP2
2852	DIPICRYL SULPHIDE, WETTED with not less than 10% water, by mass	4.1		I	28	NONE	P406	PP24		
2853	MAGNESIUM FLUOROSILICATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2854	AMMONIUM FLUOROSILICATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2855	ZINC FLUOROSILICATE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2856	FLUOROSILICATES, N.O.S.	6.1		III		5 kg	P002 IBC08 LP02	B3		
2857	REFRIGERATING MACHINES containing non-flammable, non-toxic, liquefied gas or ammonia solutions (UN 2672)	2.2			119	NONE	P003	PP32		
2858	ZIRCONIUM, DRY, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	4.1		III		5 kg	P002 LP02			
2859	AMMONIUM METAVANADATE	6.1		II		500 g	P002 IBC08	B2, B4		
2861	AMMONIUM POLYVANADATE	6.1		II		500 g	P002 IBC08	B2, B4		
2862	VANADIUM PENTOXIDE, non-fused form	6.1		III		5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2863	SODIUM AMMONIUM VANADATE	6.1		II		500 g	P002 IBC08	B2, B4		
2864	POTASSIUM METAVANADATE	6.1		II		500 g	P002 IBC08	B2, B4		
2865	HYDROXYLAMINE SULPHATE	8		III		5 kg	P002 IBC08 LP02	B3		
2869	TITANIUM TRICHLORIDE MIXTURE	8		II		1 kg	P002 IBC08	B2, B4		
		8		III	223	5 kg	P002 IBC08 LP02	B3		
2870	ALUMINIUM BOROHYDRIDE	4.2	4.3	I		NONE	P400			
	ALUMINIUM BOROHYDRIDE IN DEVICES	4.2	4.3	I		NONE	P002	PP13		
2871	ANTIMONY POWDER	6.1		III		5 kg	P002 IBC08 LP02	B3		
2872	DIBROMOCHLOROPROPANES	6.1		II		100 ml	P001 IBC02		T7	TP2
		6.1		III	223	5 L	P001 IBC03 LP01		T4	TP1
2873	DIBUTYLAMINOETHANOL	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2874	FURFURYL ALCOHOL	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2875	HEXACHLOROPHENE	6.1		III		5 kg	P002 IBC08 LP02	B3		
2876	RESORCINOL	6.1		III		5 kg	P002 IBC08 LP02	B3		
2878	TITANIUM SPONGE GRANULES or TITANIUM SPONGE POWDERS	4.1		III	223	5 kg	P002 IBC08 LP02	B3		
2879	SELENIUM OXYCHLORIDE	8	6.1	I		NONE	P001		T10	TP2 TP12 TP13
2880	CALCIUM HYPOCHLORITE, HYDRATED, or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	5.1		II		1 kg	P002 IBC08	B2, B4		
2881	METAL CATALYST, DRY	4.2		I		NONE	P404			
		4.2		II		NONE	P410 IBC06	B2		
		4.2		III	223	NONE	P002			
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only	6.2			274	NONE	P620			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2901	BROMINE CHLORIDE	2.3	5.1 8			NONE	P200			
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2
2904	CHLOROPHENOLATES, LIQUID or PHENOLATES, LIQUID	8		III		5 L	P001 IBC03 LP01			
2905	CHLOROPHENOLATES, SOLID or PHENOLATES, SOLID	8		III		5 kg	P002 IBC08 LP02	B3		
2907	ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	4.1		II	127	NONE	P406 IBC06	PP26 PP80 B2 B12		
2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING	7			290	NONE	See Chapter 2.7			
2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM	7			290	NONE	See Chapter 2.7			
2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL	7			290	NONE	See Chapter 2.7			
2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES	7			290	NONE	See Chapter 2.7			
2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9		T5	TP4
2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9		T5	TP4

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S.	8	3	I	274	NONE	P001		T14	TP2 TP9 TP27
		8	3	II	274	1 L	P001 IBC02		T11	TP2 TP27
2921	CORROSIVE SOLID, FLAMMABLE, N.O.S.	8	4.1	I	274	NONE	P002 IBC99			
		8	4.1	II	274	1 kg	P002 IBC08	B2, B4		
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		8	6.1	II	274	1 L	P001 IBC02		T7	TP2
		8	6.1	III	223 274	5L	P001 IBC03		T7	TP1 TP28
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	6.1	I	274	NONE	P002 IBC99			
		8	6.1	II	274	1 kg	P002 IBC08	B2, B4		
		8	6.1	III	223 274	5kg	P002 IBC08	B3		
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	8	I	274	NONE	P001		T14	TP2 TP9
		3	8	II	274	1 L	P001 IBC02		T11	TP2 TP27
		3	8	III	223 274	5 L	P001 IBC03		T7	TP1 TP28
2925	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	4.1	8	II	274	1 kg	P002 IBC06	B2		
		4.1	8	III	223 274	5 kg	P002 IBC06			
2926	FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	4.1	6.1	II	274	1 kg	P002 IBC06	B2		
		4.1	6.1	III	223 274	5kg	P002 IBC06			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	8	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	8	II	274	100 ml	P001 IBC02		T11	TP2 TP27
2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	6.1	8	I	274	NONE	P001 IBC99			
		6.1	8	II	274	500 g	P002 IBC06	B2		
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	3	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	6.1	4.1	I	274	NONE	P002 IBC99			
		6.1	4.1	II	274	500 g	P002 IBC08	B2, B4		
2931	VANADYL SULPHATE	6.1		II		500 g	P002 IBC08	B2, B4		
2933	METHYL 2-CHLOROPROPIONATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2934	ISOPROPYL 2-CHLOROPROPIONATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2935	ETHYL 2-CHLOROPROPIONATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2936	THIOLACTIC ACID	6.1		II		500 g	P002 IBC08	B2, B4	T7	TP2
2937	alpha-METHYLBENZYL ALCOHOL	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2940	9-PHOSPHABICYCLONONANES (CYCLOOCTADIENE PHOSPHINES)	4.2		II		NONE	P410 IBC06	B2		
2941	FLUOROANILINES	6.1		III		5 L	P001 IBC03 LP01		T4	TP1
2942	2-TRIFLUOROMETHYLANILINE	6.1		III		5 L	P001 IBC03 LP01			
2943	TETRAHYDROFURFURYLAMINE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2945	N-METHYLBUTYLAMINE	3	8	II		1 L	P001 IBC02		T7	TP1
2946	2-AMINO-5-DIETHYLAMINOPENTANE	6.1		III		5 L	P001 IBC03 LP01		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2947	ISOPROPYL CHLOROACETATE	3		III		5 L	P001 IBC03 LP01		T2	TP1
2948	3-TRIFLUOROMETHYLANILINE	6.1		II		100 ml	P001 IBC02		T7	TP2
2949	SODIUM HYDROSULPHIDE with not less than 25% water of crystallization	8		II		1 kg	P002 IBC08	B2, B4	T7	TP2
2950	MAGNESIUM GRANULES, COATED, particle size not less than 149 microns	4.3		III		1 kg	P410 IBC08	B4		
2956	5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE (MUSK XYLENE)	4.1		III	132 133 181	5 kg	P409			
2965	BORON TRIFLUORIDE DIMETHYL ETHERATE	4.3	3 8	I		NONE	P401		T10	TP2 TP7
2966	THIOGLYCOL	6.1		II		100 ml	P001 IBC02		T7	TP2
2967	SULPHAMIC ACID	8		III		5 kg	P002 IBC08 LP02	B3		
2968	MANEB, STABILIZED or MANEB PREPARATION, STABILIZED against self-heating	4.3		III	223	1 kg	P002 IBC08	B4		
2969	CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE	9		II	141	5 kg	P002 IBC08	PP34 B2, B4		
2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE	7	8			NONE	See Chapter 2.7 and section 4.1.9			
2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non fissile or fissile-excepted	7	8			NONE	See Chapter 2.7 and section 4.1.9			
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	3	6.1	I		NONE	P200		T14	TP2 TP7 TP13
2984	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	5.1		III	65	5 kg	P504 IBC02	B5	T4	TP1 TP6 TP24
2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	8	II		NONE	P001 IBC02		T11	TP2 TP13 TP27
2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	8	3	II		NONE	P001 IBC02		T11	TP2 TP27
2987	CHLOROSILANES, CORROSIVE, N.O.S.	8		II		NONE	P001 IBC02		T14	TP2 TP27
2988	CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	4.3	3, 8	I		NONE	P401		T10	TP2 TP7 TP9 TP13
2989	LEAD PHOSPHITE, DIBASIC	4.1		II		1 kg	P002 IBC08	B2, B4		
		4.1		III	223	5 kg	P002 IBC08 LP02	B3		
2990	LIFE-SAVING APPLIANCES, SELF-INFLATING	9			296	NONE	P905			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3021	PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
3022	1,2-BUTYLENE OXIDE, STABILIZED	3		II		1 L	P001 IBC02		T4	TP1
3023	2-METHYL-2-HEPTANETHIOL	6.1	3	I		NONE	P001		T14	TP2 TP13
3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP1 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8			295 304	2 kg	P801			
3048	ALUMINIUM PHOSPHIDE PESTICIDE	6.1		I	153	NONE	P002 IBC07	B1		
3049	METAL ALKYL HALIDES, WATER-REACTIVE, N.O.S. or METAL ARYL HALIDES, WATER-REACTIVE, N.O.S.	4.2	4.3	I	274	NONE	P400		T21	TP2 TP7 TP9
3050	METAL ALKYL HYDRIDES, WATER-REACTIVE, N.O.S. or METAL ARYL HYDRIDES, WATER-REACTIVE, N.O.S.	4.2	4.3	I	274	NONE	P400		T21	TP2 TP7 TP9
3051	ALUMINIUM ALKYLS	4.2	4.3	I		NONE	P400		T21	TP2 TP7 TP9
3052	ALUMINIUM ALKYL HALIDES, LIQUID	4.2	4.3	I		NONE	P400		T21	TP2 TP7
	ALUMINIUM ALKYL HALIDES, SOLID	4.2	4.3	I		NONE	P404			
3053	MAGNESIUM ALKYLS	4.2	4.3	I		NONE	P400		T21	TP2 TP7
3054	CYCLOHEXYL MERCAPTAN	3		III		5 L	P001 IBC03 LP01		T2	TP1
3055	2-(2-AMINOETHOXY)ETHANOL	8		III		5 L	P001 IBC03 LP01		T4	TP1
3056	n-HEPTALDEHYDE	3		III		5 L	P001 IBC03 LP01		T2	TP1
3057	TRIFLUOROACETYL CHLORIDE	2.3	8			NONE	P200		T50	TP21
3064	NITROGLYCERIN, SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3		II		NONE	P300			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3065	ALCOHOLIC BEVERAGES, with more than 70% alcohol by volume	3		II	146	5 L	P001 IBC02	PP2	T4	TP1
	ALCOHOLIC BEVERAGES, with more than 24% but not more than 70% alcohol by volume	3		III	144 145 247	5 L	P001 IBC03	PP2	T2	TP1
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)	8		II	163	1 L	P001 IBC02		T7	TP2
		8		III	163 223	5 L	P001 IBC03		T4	TP1
3070	ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12.5% ethylene oxide	2.2				120 ml	P200		T50	
3071	MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	6.1	3	II	274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
3072	LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	9			296	NONE	P905			
3073	VINYLPYRIDINES, STABILIZED	6.1	3 8	II		100 ml	P001 IBC01		T7	TP2 TP13
3076	ALUMINIUM ALKYL HYDRIDES	4.2	4.3	I		NONE	P400		T21	TP2 TP7
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9		III	179 274	5 kg	P002 IBC08 LP02	PP12 B3		
3078	CERIUM, turnings or gritty powder	4.3		II		500 g	P410 IBC07	B2		
3079	METHACRYLONITRILE, STABILIZED	3	6.1	I		NONE	P001		T14	TP2 TP13
3080	ISOCYANATES, TOXIC, FLAMMABLE, N.O.S. or ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	6.1	3	II	274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9		III	179 274	5 kg	P001 IBC03 LP01		T4	TP1 TP29
3083	PERCHLORYL FLUORIDE	2.3	5.1			NONE	P200			
3084	CORROSIVE SOLID, OXIDIZING, N.O.S.	8	5.1	I	274	NONE	P002			
		8	5.1	II	274	1 kg	P002 IBC06	B2		
3085	OXIDIZING SOLID, CORROSIVE, N.O.S.	5.1	8	I	274	NONE	P503			
		5.1	8	II	274	1 kg	P002 IBC06	B2		
		5.1	8	III	223 274	5 kg	P002 IBC08	B3		
3086	TOXIC SOLID, OXIDIZING, N.O.S.	6.1	5.1	I	274	NONE	P002			
		6.1	5.1	II	274	500 g	P002 IBC06	B2		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	6.1	I	274	NONE	P503			
		5.1	6.1	II	274	1 kg	P002 IBC06	B2		
		5.1	6.1	III	223 274	5 kg	P002 IBC08	B3		
3088	SELF-HEATING SOLID, ORGANIC, N.O.S.	4.2		II	274	NONE	P410 IBC06	B2		
		4.2		III	223 274	NONE	P002 IBC08 LP02	B3		
3089	METAL POWDER, FLAMMABLE, N.O.S.	4.1		II		1 kg	P002 IBC08	B2, B4		
		4.1		III	223	5 kg	P002 IBC06			
3090	LITHIUM BATTERIES	9		II	188 230 310	NONE	P903			
3091	LITHIUM BATTERIES CONTAINED IN EQUIPMENT or LITHIUM BATTERIES PACKED WITH EQUIPMENT	9		II	188 230	NONE	P903			
3092	1-METHOXY-2-PROPANOL	3		III		5 L	P001 IBC03 LP01		T2	TP1
3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.	8	5.1	I	274	NONE	P001			
		8	5.1	II	274	1 L	P001 IBC02			
3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	8	4.3	I	274	NONE	P099			
		8	4.3	II	274	1 L	P001			
3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.	8	4.2	I	274	NONE	P099			
		8	4.2	II	274	1 kg	P002 IBC06	B2		
3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	8	4.3	I	274	NONE	P099			
		8	4.3	II	274	1 kg	P002 IBC06	B2		
3097	FLAMMABLE SOLID, OXIDIZING, N.O.S.	4.1	5.1	II	274	1 kg	P099			
		4.1	5.1	III	223 274	5 kg	P099			
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	8	I	274	NONE	P502			
		5.1	8	II	274	1 kg	P504 IBC01			
		5.1	8	III	223 274	5 kg	P504 IBC02			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	6.1	I	274	NONE	P502			
		5.1	6.1	II	274	1 kg	P504 IBC01			
		5.1	6.1	III	223 274	5 kg	P504 IBC02			
3100	OXIDIZING SOLID, SELF-HEATING, N.O.S.	5.1	4.2	I	274	NONE	P099			
		5.1	4.2	II	274	NONE	P099			
3101	ORGANIC PEROXIDE TYPE B, LIQUID	5.2			122 181 195 274	25 ml	P520			
3102	ORGANIC PEROXIDE TYPE B, SOLID	5.2			122 181 195 274	100 g	P520			
3103	ORGANIC PEROXIDE TYPE C, LIQUID	5.2			122 195 274	25 ml	P520			
3104	ORGANIC PEROXIDE TYPE C, SOLID	5.2			122 195 274	100 g	P520			
3105	ORGANIC PEROXIDE TYPE D, LIQUID	5.2			122 274	125 ml	P520			
3106	ORGANIC PEROXIDE TYPE D, SOLID	5.2			122 274	500 g	P520			
3107	ORGANIC PEROXIDE TYPE E, LIQUID	5.2			122 274	125 ml	P520			
3108	ORGANIC PEROXIDE TYPE E, SOLID	5.2			122 274	500 g	P520			
3109	ORGANIC PEROXIDE TYPE F, LIQUID	5.2			122 274	125 ml	P520 IBC520		T23	
3110	ORGANIC PEROXIDE TYPE F, SOLID	5.2			122 274	500 g	P520 IBC520		T23	
3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	5.2			122 181 195 274	NONE	P520			
3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	5.2			122 181 195 274	NONE	P520			
3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	5.2			122 195 274	NONE	P520			
3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	5.2			122 195 274	NONE	P520			
3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	5.2			122 274	NONE	P520			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	5.2			122 274	NONE	P520			
3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	5.2			122 274	NONE	P520			
3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	5.2			122 274	NONE	P520			
3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	5.2			122 274	NONE	P520 IBC520	B5	T23	
3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	5.2			122 274	NONE	P520 IBC520		T23	
3121	OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	5.1	4.3	I	274	NONE	P099			
		5.1	4.3	II	274	1 kg	P099			
3122	TOXIC LIQUID, OXIDIZING, N.O.S.	6.1	5.1	I	274	NONE	P001			
		6.1	5.1	II	274	100 ml	P001 IBC02			
3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.	6.1	4.3	I	274	NONE	P099			
		6.1	4.3	II	274	100 ml	P001 IBC02			
3124	TOXIC SOLID, SELF-HEATING, N.O.S.	6.1	4.2	I	274	NONE	P099			
		6.1	4.2	II	274	NONE	P002 IBC06	B2		
3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.	6.1	4.3	I	274	NONE	P099			
		6.1	4.3	II	274	500 g	P001 IBC06	B2		
3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	4.2	8	II	274	NONE	P410 IBC05	B2		
		4.2	8	III	223 274	NONE	P002 IBC08	B3		
3127	SELF-HEATING SOLID, OXIDIZING, N.O.S.	4.2	5.1	II	274	NONE	P099			
		4.2	5.1	III	223 274	NONE	P099			
3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	4.2	6.1	II	274	NONE	P410 IBC05	B2		
		4.2	6.1	III	223 274	NONE	P002 IBC08	B3		
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	8	I	274	NONE	P402			
		4.3	8	II	274	500 g	P402 IBC01			
		4.3	8	III	223 274	1 kg	P001 IBC02			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	6.1	I	274	NONE	P402			
		4.3	6.1	II	274	500 g	P402 IBC01			
		4.3	6.1	III	223 274	1 kg	P001 IBC02			
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	8	I	274	NONE	P403			
		4.3	8	II	274	500 g	P410 IBC06	B2		
		4.3	8	III	223 274	1 kg	P410 IBC08	B4		
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	4.1	I	274	NONE	P403 IBC99			
		4.3	4.1	II	274	500 g	P410 IBC04			
		4.3	4.1	III	223 274	1 kg	P410 IBC06			
3133	WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	4.3	5.1	II	274	500 g	P099			
		4.3	5.1	III	223 274	1 kg	P099			
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	6.1	I	274	NONE	P403			
		4.3	6.1	II	274	500 g	P410 IBC05	B2		
		4.3	6.1	III	223 274	1 kg	P410 IBC08	B4		
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	4.2	I	274	NONE	P403			
		4.3	4.2	II	274	NONE	P410 IBC05	B2		
		4.3	4.2	III	223 274	NONE	P410 IBC08	B4		
3136	TRIFLUOROMETHANE, REFRIGERATED LIQUID	2.2				120 ml	P200		T75	
3137	OXIDIZING SOLID, FLAMMABLE, N.O.S.	5.1	4.1	I	274	NONE	P099			
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	2.1				NONE	P200		T75	
3139	OXIDIZING LIQUID, N.O.S.	5.1		I	274	NONE	P502			
		5.1		II	274	1 kg	P504 IBC02			
		5.1		III	223 274	5 kg	P504 IBC02			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1		I	43 274	NONE	P001			
		6.1		II	43 274	100 ml	P001 IBC02			
		6.1		III	43 223 274	5 L	P001 IBC03 LP01			
3141	ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	6.1		III	45	5 L	P001 IBC03 LP01			
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1		I	274	NONE	P001			
		6.1		II	274	100 ml	P001 IBC02			
		6.1		III	223 274	5 L	P001 IBC03 LP01			
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1		I	274	NONE	P002 IBC07	B1		
		6.1		II	274	500 g	P002 IBC08	B2, B4		
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3		
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1		I	43	NONE	P001			
		6.1		II	43	100 ml	P001 IBC02			
		6.1		III	43 223	5 L	P001 IBC03 LP01			
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C2-C12 homologues)	8		I		NONE	P001		T14	TP2 TP9
		8		II		1 L	P001 IBC02		T11	TP2 TP27
		8		III	223	5 L	P001 IBC03 LP01		T7	TP1 TP28
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1		I	43 274	NONE	P002 IBC07	B1		
		6.1		II	43 274	500 g	P002 IBC08	B2, B4		
		6.1		III	43 223 274	5 kg	P002 IBC08 LP02	B3		
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3		I	274	NONE	P402			
		4.3		II	274	500 g	P402 IBC01			
		4.3		III	223 274	1 kg	P001 IBC02			
3149	HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	5.1	8	II	196	1 kg	P504 IBC02	B5	T7	TP2 TP6 TP24
3150	DEVICES, SMALL, HYDROCARBON GAS POWERED or HYDROCARBON GAS REFILLS FOR SMALL DEVICES with release device	2.1				NONE	P003			
3151	POLYHALOGENATED BIPHENYLS, LIQUID or POLYHALOGENATED TERPHENYLS, LIQUID	9		II	203 305	1 L	P906 IBC02			
3152	POLYHALOGENATED BIPHENYLS, SOLID or POLYHALOGENATED TERPHENYLS, SOLID	9		II	203 305	1 kg	P906 IBC08	B2, B4		
3153	PERFLUORO(METHYL VINYL ETHER)	2.1				NONE	P200		T50	
3154	PERFLUORO(ETHYL VINYL ETHER)	2.1				NONE	P200			
3155	PENTACHLOROPHENOL	6.1		II	43	500 g	P002 IBC08	B2, B4		
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	2.2	5.1		274	NONE	P200			
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2.2	5.1		274	NONE	P200			
3158	GAS, REFRIGERATED LIQUID, N.O.S.	2.2			274	120 ml	P200		T75	
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	2.2				120 ml	P200		T50	
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		274	NONE	P200			
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2.1			274	NONE	P200		T50	
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2.3			274	NONE	P200			
3163	LIQUEFIED GAS, N.O.S.	2.2			274	120 ml	P200		T50	
3164	ARTICLES, PRESSURIZED, PNEUMATIC or HYDRAULIC (containing non-flammable gas)	2.2			283	120 ml	P003			
3165	AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3	6.1 8	I		NONE	P301			
3166	ENGINE, INTERNAL COMBUSTION or VEHICLE, FLAMMABLE GAS, POWERED or VEHICLE, FLAMMABLE LIQUID, POWERED	9			106	NONE	NONE			
3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid	2.1			209	NONE	P201			
3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid	2.3	2.1		209	NONE	P201			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid	2.3			209	NONE	P201			
3170	ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS	4.3		II	244	500 g	P410 IBC07	B2		
		4.3		III	223 244	1 kg	P002 IBC08	B4		
3171	BATTERY-POWERED VEHICLE or BATTERY-POWERED EQUIPMENT	9			106 240	NONE	NONE			
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1		I	210 274	NONE	P001			
		6.1		II	210 274	100 ml	P001 IBC02			
		6.1		III	210 223 274	5 L	P001 IBC03 LP01			
	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1		I	210 274	NONE	P002 IBC07	B1		
		6.1		II	210 274	500 g	P002 IBC08	B2, B4		
		6.1		III	210 223 274	5 kg	P002 IBC08	B3		
3174	TITANIUM DISULPHIDE	4.2		III		NONE	P002 IBC08 LP02	B3		
3175	SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.	4.1		II	216 274	1 kg	P002 IBC06	PP9 B2		
3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1		II	274	NONE			T3	TP3 TP9 TP26
		4.1		III	223 274	NONE	IBC01		T1	TP3 TP9 TP26
3178	FLAMMABLE SOLID, INORGANIC, N.O.S.	4.1		II	274	1 kg	P002 IBC08	B2, B4		
		4.1		III	223 274	5 kg	P002 IBC08 LP02	B3		
3179	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	4.1	6.1	II	274	1 kg	P002 IBC06	B2		
		4.1	6.1	III	223 274	5 kg	P002 IBC06			
3180	FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	4.1	8	II	274	1 kg	P002 IBC06	B2		
		4.1	8	III	223 274	5 kg	P002 IBC06			
3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	4.1		II	274	1 kg	P002 IBC08	B2, B4		
		4.1		III	223 274	5 kg	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3182	METAL HYDRIDES, FLAMMABLE, N.O.S.	4.1		II	274	1 kg	P410 IBC04	PP40		
		4.1		III	223 274	5 kg	P002 IBC04			
3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.	4.2		II	274	NONE	P001 IBC02			
		4.2		III	223 274	NONE	P001 IBC02			
3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	4.2	6.1	II	274	NONE	P402 IBC02			
		4.2	6.1	III	223 274	NONE	P001 IBC02			
3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	4.2	8	II	274	NONE	P402 IBC02			
		4.2	8	III	223 274	NONE	P001 IBC02			
3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.	4.2		II	274	NONE	P001 IBC02			
		4.2		III	223 274	NONE	P001 IBC02			
3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	4.2	6.1	II	274	NONE	P402 IBC02			
		4.2	6.1	III	223 274	NONE	P001 IBC02			
3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	4.2	8	II	274	NONE	P402 IBC02			
		4.2	8	III	223 274	NONE	P001 IBC02			
3189	METAL POWDER, SELF-HEATING, N.O.S.	4.2		II	274	NONE	P410 IBC06	B2		
		4.2		III	223 274	NONE	P002 IBC08 LP02	B3		
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.	4.2		II	274	NONE	P410 IBC06	B2		
		4.2		III	223 274	NONE	P002 IBC08 LP02	B3		
3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	4.2	6.1	II	274	NONE	P410 IBC05	B2		
		4.2	6.1	III	223 274	NONE	P002 IBC08	B3		
3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	4.2	8	II	274	NONE	P410 IBC05	B2		
		4.2	8	III	223 274	NONE	P002 IBC08	B3		
3194	PYROPHORIC LIQUID, INORGANIC, N.O.S.	4.2		I	274	NONE	P400			
3200	PYROPHORIC SOLID, INORGANIC, N.O.S.	4.2		I	274	NONE	P404			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3203	PYROPHORIC ORGANOMETALLIC COMPOUND, WATER-REACTIVE, N.O.S., liquid	4.2	4.3	I	274	NONE	P400		T21	TP2 TP7 TP9
	PYROPHORIC ORGANOMETALLIC COMPOUND, WATER-REACTIVE, N.O.S., solid	4.2	4.3	I	274	NONE	P404		T21	TP2 TP7 TP9
3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	4.2		II	183 274	NONE	P410 IBC06	B2		
		4.2		III	183 223 274	NONE	P002 IBC08 LP02	B3		
3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	4.2	8	II	182 274	NONE	P410 IBC05	B2		
		4.2	8	III	182 223 274	NONE	P002 IBC08	B3		
3207	ORGANOMETALLIC COMPOUND or COMPOUND SOLUTION or COMPOUND DISPERSION, WATER-REACTIVE, FLAMMABLE, N.O.S.	4.3	3	I	274	NONE	P402 IBC99		T13	TP2 TP7 TP9
		4.3	3	II	274	500 g	P001 IBC01	B2	T7	TP2 TP7
		4.3	3	III	223 274	1 kg	P001 IBC02	B4	T7	TP2 TP7
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3		I	274	NONE	P403 IBC99			
		4.3		II	274	500 g	P410 IBC07	B2		
		4.3		III	223 274	1 kg	P410 IBC08	B4		
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	4.2	I	274	NONE	P403			
		4.3	4.2	II	274	NONE	P410 IBC05	B2		
		4.3	4.2	III	223 274	NONE	P410 IBC08	B4		
3210	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		II		1 kg	P504 IBC02		T4	TP1
		5.1		III	223	5 kg	P504 IBC02		T4	TP1
3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		II		1 kg	P504 IBC02		T4	TP1
		5.1		III	223	5 kg	P504 IBC02		T4	TP1
3212	HYPOCHLORITES, INORGANIC, N.O.S.	5.1		II		1 kg	P002 IBC08	B2, B4		
3213	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		II		1 kg	P504 IBC02		T4	TP1
		5.1		III	223	5 kg	P504 IBC02		T4	TP1
3214	PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		II	206	1 kg	P504 IBC02		T4	TP1

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3215	PERSULPHATES, INORGANIC, N.O.S.	5.1		III		5 kg	P002 IBC08 LP02	B3		
3216	PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		III		5 kg	P504 IBC02		T4	TP1 TP29
3218	NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		II	270	1 kg	P504 IBC02		T4	TP1
		5.1		III	223 270	5 kg	P504 IBC02		T4	TP1
3219	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1		II	103	1 kg	P504 IBC01		T4	TP1
		5.1		III	103 223	5 kg	P504 IBC02		T4	TP1
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2.2				120 ml	P200		T50	
3221	SELF-REACTIVE LIQUID TYPE B	4.1			181 274	25 ml	P520	PP21		
3222	SELF-REACTIVE SOLID TYPE B	4.1			181 274	100 g	P520	PP21		
3223	SELF-REACTIVE LIQUID TYPE C	4.1			274	25 ml	P520	PP21		
3224	SELF-REACTIVE SOLID TYPE C	4.1			274	100 g	P520	PP21		
3225	SELF-REACTIVE LIQUID TYPE D	4.1			274	125 ml	P520			
3226	SELF-REACTIVE SOLID TYPE D	4.1			274	500 g	P520			
3227	SELF-REACTIVE LIQUID TYPE E	4.1			274	125 ml	P520			
3228	SELF-REACTIVE SOLID TYPE E	4.1			274	500 g	P520			
3229	SELF-REACTIVE LIQUID TYPE F	4.1			274	125 ml	P520 IBC99		T23	
3230	SELF-REACTIVE SOLID TYPE F	4.1			274	500 g	P520 IBC99		T23	
3231	SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED	4.1			181 194 274	NONE	P520	PP21		
3232	SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED	4.1			181 194 274	NONE	P520	PP21		
3233	SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520	PP21		
3234	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520	PP21		
3235	SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520			
3236	SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520			
3237	SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520			
3238	SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520		T23	
3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	4.1			194 274	NONE	P520		T23	
3241	2-BROMO-2-NITROPROPANE-1,3-DIOL	4.1		III	246	5 kg	P520 IBC08	PP22 B3		
3242	AZODICARBONAMIDE	4.1		II	215	1 kg	P409			
3243	SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	6.1		II	217 274	500 g	P002 IBC02	PP9		
3244	SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	8		II	218 274	1 kg	P002 IBC05	PP9		
3245	GENETICALLY MODIFIED MICRO-ORGANISMS	9			219	NONE	P904 IBC99			
3246	METHANESULPHONYL CHLORIDE	6.1	8	I		NONE	P001		T14	TP2 TP12 TP13
3247	SODIUM PEROXOBORATE, ANHYDROUS	5.1		II		1 kg	P002 IBC08	B4		
3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	6.1	II	220 221	1 L	P001	PP6		
		3	6.1	III	220 221 223	5 L	P001	PP6		
3249	MEDICINE, SOLID, TOXIC, N.O.S.	6.1		II	221	500 g	P002	PP6		
		6.1		III	221 223	5 kg	P002	PP6		
3250	CHLOROACETIC ACID, MOLTEN	6.1	8	II		NONE	NONE		T7	TP3 TP28
3251	ISOSORBIDE-5-MONONITRATE	4.1		III	132 226	5 kg	P409			
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2.1				NONE	P200		T50	
3253	DISODIUM TRIOXOSILICATE	8		III		5 kg	P002 IBC08 LP02	B3		
3254	TRIBUTYLPHOSPHANE	4.2		I		NONE	P400			
3255	tert-BUTYL HYPOCHLORITE	4.2	8	I		NONE	P099			
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash point above 60.5 °C, at or above its flash point	3		III		NONE	P099 IBC01		T3	TP3 TP29
3257	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash point (including molten metals, molten salts, etc.)	9		III	232	NONE	P099 IBC01		T3	TP3 TP29
3258	ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	9		III	232	NONE	P099			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8		I	274	NONE	P002 IBC07	B1		
		8		II	274	1 kg	P002 IBC08	B2, B4		
		8		III	223 274	5 kg	P002 IBC08 LP02	B3		
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8		I	274	NONE	P001		T14	TP2 TP9 TP27
		8		II	274	1 L	P001 IBC02		T11	TP2 TP27
		8		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
3268	AIR BAG INFLATORS, or AIR-BAG MODULES, or SEAT-BELT PRETENSIONERS	9		III	280 289	NONE	P902 LP902			
3269	POLYESTER RESIN KIT	3		II	236	5 L	P302			
		3		III	236	5 L	P302			
3270	NITROCELLULOSE MEMBRANE FILTERS, with not more than 12.6% nitrogen, by dry mass	4.1		II	237 286	1 kg	P411			
3271	ETHERS, N.O.S.	3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
3272	ESTERS, N.O.S.	3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
3274	ALCOHOLATES SOLUTION, N.O.S., in alcohol	3	8	II	274	1 L	P001 IBC02			
3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.	6.1	3	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	274	100 ml	P001 IBC02		T11	TP2 TP13 TP27

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3276	NITRILES, TOXIC, N.O.S.	6.1		I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
3277	CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	6.1	8	II	274	100 ml	P001 IBC02		T8	TP2 TP13 TP28
3278	ORGANOPHOSPHORUS COMPOUND, TOXIC, N.O.S., liquid	6.1		I	43 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	43 274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	43 223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
	ORGANOPHOSPHORUS COMPOUND, TOXIC, N.O.S., solid	6.1		I	43 274	NONE	P002 IBC07	B1	T14	T2 TP9 TP27
		6.1		II	43 274	500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	43 223 274	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28
3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	6.1	3	I	43 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	43 274	100 ml	P001		T11	TP2 TP13 TP27
3280	ORGANOARSENIC COMPOUND, N.O.S., liquid	6.1		I	274	NONE	P001	B1	T14	TP2 TP9 TP13 TP27
		6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
	ORGANOARSENIC COMPOUND, N.O.S., solid	6.1		I	274	NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II	274	500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3281	METAL CARBONYLS, N.O.S., liquid	6.1		I	274	NONE	P601		T14	TP2 TP9 TP13 TP27
		6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
	METAL CARBONYLS, N.O.S., solid	6.1		I	274	NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II	274	500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28
3282	ORGANOMETALLIC COMPOUND, TOXIC, N.O.S., liquid	6.1		I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
	ORGANOMETALLIC COMPOUND, TOXIC, N.O.S., solid	6.1		I	274	NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II	274	500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28
3283	SELENIUM COMPOUND, N.O.S.	6.1		I		NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II		500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	223	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28
3284	TELLURIUM COMPOUND, N.O.S.	6.1		I		NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II		500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	223	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3285	VANADIUM COMPOUND, N.O.S.	6.1		I		NONE	P002 IBC07	B1	T14	TP2 TP9 TP27
		6.1		II		500 g	P002 IBC08	B2, B4	T11	TP2 TP27
		6.1		III	223	5 kg	P002 IBC08 LP02	B3	T7	TP1 TP28
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	6.1 8	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1 8	II	274	1 L	P001 IBC99		T11	TP2 TP13 TP27
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1		I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	223 274	5 L	P001 IBC03 LP01		T7	TP1 TP28
3288	TOXIC SOLID, INORGANIC, N.O.S.	6.1		I	274	NONE	P002 IBC99			
		6.1		II	274	500 g	P002 IBC08	B2, B4		
		6.1		III	223 274	5 kg	P002 IBC08 LP02	B3		
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	6.1	8	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	8	II	274	100 ml	P001 IBC02		T11	TP2 TP27
3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	8	I	274	NONE	P002 IBC99			
		6.1	8	II	274	500 g	P002 IBC06	B2		
3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.	6.2		II		NONE	P621 IBC620 LP621			
3292	BATTERIES, CONTAINING SODIUM, or CELLS, CONTAINING SODIUM	4.3		II	239	NONE	P408			
3293	HYDRAZINE,AQUEOUS SOLUTION with not more than 37% hydrazine, by mass	6.1		III	223	5 L	P001 IBC03 LP01		T4	TP1
3294	HYDROGEN CYANIDE, SOLUTION IN ALCOHOL with not more than 45% hydrogen cyanide	6.1	3	I		NONE	P601		T14	TP2 TP13

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3295	HYDROCARBONS, LIQUID, N.O.S.	3		I		500 ml	P001		T11	TP1 TP8 TP9 TP28
		3		II		1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223	5 L	P001 IBC03 LP01		T4	TP1 TP29
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2.2				120 ml	P200		T50	
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE with not more than 8.8% ethylene oxide	2.2				120 ml	P200		T50	
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	2.2				120 ml	P200		T50	
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	2.2				120 ml	P200		T50	
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2.3	2.1			NONE	P200			
3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.	8	4.2	I	274	NONE	P099			
		8	4.2	II	274	NONE	P001			
3302	2-DIMETHYLAMINOETHYL ACRYLATE	6.1		II		100 ml	P001 IBC02		T7	TP2
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	5.1		274	NONE	P200			
3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	8		274	NONE	P200			
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	2.1 8		274	NONE	P200			
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	5.1 8		274	NONE	P200			
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	5.1		274	NONE	P200			
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	8		274	NONE	P200			
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	2.1 8		274	NONE	P200			
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	5.1 8		274	NONE	P200			
3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	2.2	5.1		274	NONE	P200		T75	TP22
3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	2.1			274	NONE	P200		T75	
3313	ORGANIC PIGMENTS, SELF-HEATING	4.2		II		NONE	P002 IBC08	B2, B4		
		4.2		III	223	NONE	P002 IBC08 LP02	B3		

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3314	PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	9		III	207	NONE	P002 IBC08	PP14 B3, B6		
3315	CHEMICAL SAMPLE, TOXIC, liquid or solid	6.1		I	250	NONE	P099			
3316	CHEMICAL KIT or FIRST AID KIT	9			251	NONE	P901			
3317	2-AMINO-4,6-DINITROPHENOL, WETTED with not less than 20% water, by mass	4.1		I	28	NONE	P406	PP26		
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	2.3	8		23	NONE	P200		T50	
3319	NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	4.1		II	272 274	NONE	P099			
3320	SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide by mass	8		II		1 L	P001 IBC02		T7	TP2
		8		III	223	5 L	P001 IBC03 LP01		T4	TP2
3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
									T5	TP4
3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
									T5	TP4
3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE	7			172	NONE	See Chapter 2.7 and section 4.1.9			
3334	AVIATION REGULATED LIQUID, N.O.S.	9			106 274 276	NONE	N/A			

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3335	AVIATION REGULATED SOLID, N.O.S.	9			106 274 276	NONE	N/A			
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3		I	274	NONE	P001		T11	TP2
		3		II	274	1 L	P001 IBC02		T7	TP1 TP8 TP28
		3		III	223 274	5 L	P001 IBC03 LP01		T4	TP1 TP29
3337	REFRIGERANT GAS R 404A	2.2				120 ml	P200		T50	
3338	REFRIGERANT GAS R 407A	2.2				120 ml	P200		T50	
3339	REFRIGERANT GAS R 407B	2.2				120 ml	P200		T50	
3340	REFRIGERANT GAS R 407C	2.2				120 ml	P200		T50	
3341	THIOUREA DIOXIDE	4.2		II		NONE	P002 IBC06	B2		
		4.2		III	223	NONE	P002 IBC08 LP02	B3		
3342	XANTHATES	4.2		II		NONE	P002 IBC06	B2		
		4.2		III	223	NONE	P002 IBC08 LP02	B3		
3343	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3			274 278	NONE	P099			
3344	PENTAERYTHRITE TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	4.1		II	272 274	NONE	P406	PP26 PP80		
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
3346	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1		I	61 274	NONE	P002 IBC07	B1		
		6.1		II	61 274	500 g	P002 IBC08	B2, B4		
		6.1		III	61 223 274	5 kg	P002 IBC08 LP02	B3		
3350	PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point less than 23 °C	3	6.1	I	274	NONE	P001		T14	TP2 TP9 TP13 TP27
		3	6.1	II	274	1 L	P001 IBC02		T11	TP2 TP13 TP27
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point not less than 23 °C	6.1	3	I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1	3	II	61 274	100 ml	P001 IBC02		T11	TP2 TP13 TP27
		6.1	3	III	61 223 274	5 L	P001 IBC03		T7	TP2 TP28
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1		I	61 274	NONE	P001		T14	TP2 TP9 TP13 TP27
		6.1		II	61 274	100 ml	P001 IBC02		T11	TP2 TP27
		6.1		III	61 223 274	5 L	P001 IBC03 LP01		T7	TP2 TP28

UN No.	Name and description	Class or division	Subsid-iary risk	UN packing group	Special provi-sions	Limited quantities	Packagings and IBCs		Portable tanks	
							Packing instruction	Special provi-sions	Portable tank instruction	Portable tank special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S.	2.1			274		P200			
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		274		P200			
3356	OXYGEN GENERATOR, CHEMICAL†	5.1		II	284		P500			
3357	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3		II	274 288		P099			
3358	REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas	2.1			291	NONE	P003	PP32		
3359	FUMIGATED UNIT	9			302	NONE	NONE			
3360	FIBRES, VEGETABLE, DRY	4.1			29 117 299	NONE	P003	PP19		
3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	8	II		NONE	P001 IBC01		T11	TP2 TP13
3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	3 8	II		NONE	P001 IBC01		T11	TP2 TP13
3363	DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN APPARATUS	9			301	NONE	P907			
3364	TRINITROPHENOL (PICRIC ACID), WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP24		
3365	TRINITROCHLOROBENZENE (PICRYL CHLORIDE), WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP24		
3366	TRINITROTOLUENE (TNT), WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP24		
3367	TRINITROBENZENE, WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP24		
3368	TRINITROBENZOIC ACID, WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP24		
3369	SODIUM DINITRO-o-CRESOLATE, WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP24		
3370	UREA NITRATE, WETTED, with not less than 10% water by mass	4.1		I		NONE	P406	PP78		
3371	2-METHYLBUTANAL	3		II		I L	P001 IBC02		T4	TP1
3372	ORGANOMETALLIC COMPOUND, SOLID, WATER-REACTIVE, FLAMMABLE, N.O.S.	4.3	4.1	I	274	NONE	P403 IBC04			
		4.3	4.1	II	274	500 g	P410 IBC04			
		4.3	4.1	III	223 274	1 kg	P410 IBC06			
3373	DIAGNOSTIC SPECIMENS	6.2				NONE	P650			
3374	ACETYLENE, SOLVENT FREE	2.1					P200			
3375	AMMONIUM NITRATE EMULSION or SUSPENSION or GEL, intermediate for blasting explosives	5.1		II	306 309	NONE	P099 IBC99		T2	TP9
3376	4-NITROPHENYLHYDRAZINE, with not less than 30% water, by mass	4.1		I	28	NONE	P406	PP26		

CHAPTER 3.3

SPECIAL PROVISIONS APPLICABLE TO CERTAIN ARTICLES OR SUBSTANCES

3.3.1 When Column 6 of the Dangerous Goods List indicates that a special provision is relevant to a substance or article, the meaning and requirements of that special provision are as set forth below.

16 Samples of new or existing explosive substances or articles may be transported as directed by the competent authorities for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are not wetted or desensitized shall be limited to 10 kg in small packages as specified by the competent authorities. Explosive samples which are wetted or desensitized shall be limited to 25 kg.

23 Even though this substance has a flammability hazard, it only exhibits such hazard under extreme fire conditions in confined areas.

26 This substance is not permitted for transport in portable tanks, or intermediate bulk containers with a capacity exceeding 450 litres, due to potential initiation of explosion when transported in large volumes.

28 This substance may be transported under the 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 (see 2.4.2.4).

29 This substance is exempt from labelling, but shall be marked with the appropriate class or division.

32 This substance is not subject to these Regulations when in any other form.

37 This substance is not subject to these Regulations when coated.

38 This substance is not subject to these Regulations when it contains not more than 0.1% calcium carbide.

39 This substance is not subject to these Regulations when it contains less than 30% or not less than 90% silicon.

43 When offered for carriage as pesticides, these substances shall 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).

45 Antimony sulphides and oxides which contain not more than 0.5% of arsenic calculated on the total weight are not subject to these Regulations.

47 Ferricyanides and ferrocyanides are not subject to these Regulations.

48 The transport of this substance, when it contains more than 20% hydrocyanic acid, is prohibited except with special authorization granted by the competent authorities.

59 These substances are not subject to these Regulations when they contain not more than 50% magnesium.

60 If the concentration is more than 72%, the transport of this substance is prohibited except with special authorization granted by the competent authorities.

61 The technical name which shall supplement the proper shipping name shall be the ISO common name, other name listed in the WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification or the name of the active substance (see also 3.1.2.8.1.1).

62 This substance is not subject to these Regulations when it contains not more than 4% sodium hydroxide.

63 The division of Class 2 and the subsidiary risks depend on the nature of the contents of the aerosol dispenser. The following provisions shall apply:

(a) Division 2.1 applies if the contents include more than 45% by mass, or more than 250 g of flammable components. Flammable components are gases which are flammable in air at normal pressure or substances or preparations in liquid form which have a flash point less than or equal to 100 °C;

(b) Division 2.2 applies when the contents do not meet the above criteria for Division 2.1;

(c) Gases of Division 2.3 shall not be used as a propellant in an aerosol dispenser;

(d) 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 shall have a subsidiary risk of Division 6.1 or Class 8;

(e) Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity shall be prohibited from transport;

(f) Subsidiary risk labels may be required for air transport.

65 Hydrogen peroxide aqueous solutions with less than 8% hydrogen peroxide are not subject to these Regulations.

66 Mercurous chloride and cinnabar are not subject to these Regulations.

103 Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited.

105 Nitrocellulose meeting the descriptions of UN 2556 or UN 2557 may be classified in Division 4.1.

106 Subject to these Regulations only when transported by air.

113 The carriage of chemically unstable mixtures is prohibited.

117 Subject to these Regulations only when transported by sea.

119 Refrigerating machines include machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air conditioning units. Refrigerating machines and refrigerating machine components are not subject to these Regulations if they contain less than 12 kg of gas in Division 2.2 or less than 12 litres ammonia solution (UN 2672).

122 The subsidiary risks, control and emergency temperatures if any, and the generic entry number for each of the currently assigned organic peroxide formulations are given in 2.5.3.2.4.

127 Other inert material or inert material mixture may be used at the discretion of the competent authority, provided this inert material has identical phlegmatizing properties.

131 The phlegmatized substance shall be significantly less sensitive than dry PETN.

132 During the course of transport, this substance shall be protected from direct sunshine and stored (or kept) in a cool and well-ventilated place, away from all sources of heat.

133 When this substance is packed in accordance with P409, the "EXPLOSIVE" label may be dispensed with.

135 The dihydrated sodium salt of dichloroisocyanuric acid is not subject to these Regulations.

138 p-Bromobenzyl cyanide is not subject to these Regulations.

141 Products which have undergone sufficient heat treatment so that they present no hazard during transport are not subject to these Regulations.

142 Solvent extracted soya bean meal containing not more than 1.5% oil and 11% moisture, which is substantially free of flammable solvent, is not subject to these Regulations.

144 An aqueous solution containing not more than 24% alcohol by volume is not subject to these Regulations.

145 Other than for air transport, alcoholic beverages of Packing Group III, when carried in receptacles of 250 litres or less, are not subject to these Regulations.

146 Other than for air and sea transport, alcoholic beverages of Packing Group II, when carried in receptacles of 5 litres or less, are not subject to these Regulations.

152 The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. Appropriate classifications shall be made as required by 2.1.3.

153 This entry applies only 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.

162 Mixtures with a flash point of less than 60.5 °C shall bear a FLAMMABLE LIQUID subsidiary risk label.

163 A substance specifically listed by name in the list of dangerous goods shall not be transported under this entry. Materials transported under this entry may contain 20% or less nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen (by dry mass).

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 Regulations. Manufactured articles containing asbestos and not meeting this provision are nevertheless not subject to these Regulations when packed so that no escape of hazardous quantities of respirable asbestos fibres can occur during transport.

169 Phthalic anhydride in the solid state and tetrahydrophthalic anhydrides, with not more than 0.05% maleic anhydride, are not subject to these Regulations. Phthalic anhydride molten at a temperature above its flash point, with not more than 0.05% maleic anhydride, shall be classified under UN 3256.

172 Radioactive material with a subsidiary risk shall:

(a) be labelled with subsidiary risk labels corresponding to each subsidiary risk exhibited by the material; corresponding placards shall be affixed to transport units in accordance with the relevant provisions of 5.3.1;

(b) be allocated to packing groups I, II or III, as and if appropriate, by application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk.

The description required in 5.4.1.5.7.1 (b) shall include a description of these subsidiary risks (e.g. "Subsidiary risk: 3, 6.1"), the name of the constituents which most predominantly contribute to this (these) subsidiary risk(s), and where applicable, the packing group.

177 Barium sulphate is not subject to these Regulations.

178 This designation shall be used only when no other appropriate designation exists in the list, and only with the approval of the competent authority of the country of origin.

179 This designation shall be used for substances which are dangerous to the aquatic environment or which are marine pollutants that do not meet the classification criteria of any other class or another substance within Class 9. This designation may also be used for wastes not otherwise subject to these Regulations but which are covered under the Basel Convention on the control of Transboundary Movements of Hazardous wastes and their Disposal.

181 Packages containing this type of substance shall bear the "EXPLOSIVE" subsidiary risk label unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.4.1.5.5.1). The provisions of 7.1.3.1 shall also be considered.

182 The group of alkali metals includes lithium, sodium, potassium, rubidium and caesium.

183 The group of alkaline earth metals includes magnesium, calcium, strontium and barium.

186 In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the mixture shall be calculated as ammonium nitrate.

188 Lithium cells and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

(a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion cell, the lithium-equivalent content is not more than 1.5 g;

(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the aggregate lithium-equivalent content is not more than 8 g;

(c) Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part III, sub-section 38.3;

(d) Cells and batteries are separated so as to prevent short circuits and are packed in strong packagings, except when installed in equipment; and

(e) Except when installed in equipment, each package containing more than 24 lithium cells or 12 lithium batteries shall in addition meet the following requirements:

(i) Each package shall be marked indicating that it contains lithium batteries and that special procedures should be followed in the event that the package is damaged;

(ii) Each shipment shall be accompanied with a document indicating that packages contain lithium batteries and that special procedures should be followed in the event a package is damaged;

(iii) Each package is capable of withstanding a 1.2 metre drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

(iv) Except in the case of lithium batteries packed with equipment, packages may not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell, except in the case of a lithium-ion cell the " lithium-equivalent content" in grams is calculated to be 0.3 times the rated capacity in ampere-hours.

190 Aerosol dispensers shall be provided with protection against inadvertent discharge. Aerosols with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to these Regulations.

191 Receptacles, small, containing gas may be considered as similar to aerosols except that they are not fitted with a release device. Receptacles with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to these Regulations.

193 This entry may only be used for uniform ammonium nitrate based fertilizer mixtures of the nitrogen, phosphate or potash type, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon or with not more than 45% ammonium nitrate and unrestricted combustible material. Fertilizers within these composition limits are only subject to these Regulations when transported by air or sea and are not subject to these Regulations if shown by a Trough Test (see *Manual of Tests and Criteria*, Part III, sub-section 38.2) not to be liable to self-sustaining decomposition.

194 The control and emergency temperatures, if any, and the generic entry number for each of the currently assigned self-reactive substances are given in 2.4.2.3.2.3.

195 For certain organic peroxides types B or C, a smaller packaging than that allowed by packing methods OP5 or OP6 respectively has to be used (see 4.1.7 and 2.5.3.2.4).

196 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 shall be transported under the provisions of Division 5.2; see 2.5.3.2.4.

198 Nitrocellulose solutions containing not more than 20% nitrocellulose may be transported as paint or printing ink, as applicable. See UN 1210, UN 1263 and UN 3066.

199 Lead compounds which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less are considered insoluble. See ISO 3711:1990.

201 Lighters and lighter refills shall comply with the provisions of the country in which they were filled. They shall be provided with protection against inadvertent discharge. The liquid portion of the gas shall not exceed 85% of the capacity of the receptacle at 15 °C. The receptacles, including the closures, shall be capable of withstanding an internal pressure of twice the pressure of the liquefied petroleum gas at 55 °C. The valve mechanisms and ignition devices shall be securely sealed, taped or otherwise fastened or designed to prevent operation or leakage of the contents during transport. Lighters shall not contain more than 10 g of liquefied petroleum gas. Lighter refills shall not contain more than 65 g of liquefied petroleum gas.

203 This entry shall not be used for polychlorinated biphenyls, UN 2315.

204 Articles containing smoke-producing substance(s) corrosive according to the criteria for Class 8 shall be labelled with a "CORROSIVE" subsidiary risk label.

205 This entry shall not be used for UN 3155 PENTACHLOROPHENOL.

206 This entry is not intended to include ammonium permanganate, the transport of which is prohibited except with special authorization granted by the competent authorities.

207 Polymeric beads and moulding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.

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% ammonium nitrate and at least 12% water of crystallization, is not subject to these Regulations.

209 The gas shall be at a pressure corresponding to ambient atmospheric pressure at the time the containment system is closed and this shall not exceed 105 kPa absolute.

210 Toxins from plant, animal or bacterial sources which contain infectious substances, or toxins that are contained in infectious substances, shall be classified in Division 6.2.

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 2.4.2.3.2.3).

216 Mixtures of solids which are not subject to these Regulations and flammable liquids may be transported under this entry without first applying the classification criteria of Division 4.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. Sealed packets containing less than 10 ml of a packing group II or III flammable liquid absorbed into a solid material are not subject to these Regulations provided there is no free liquid in the packet.

217 Mixtures of solids which are not subject to these Regulations and toxic liquids may be transported under this entry without first applying the classification criteria of Division 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. This entry shall not be used for solids containing a packing group I liquid.

218 Mixtures of solids which are not subject to these Regulations and corrosive liquids may be transported under this entry without first applying the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging.

219 Genetically modified micro-organisms which are infectious shall be transported as UN 2814 or UN 2900.

220 The technical name of the flammable liquid component only of this solution or mixture shall be shown in parentheses immediately following the proper shipping name.

221 Substances included under this entry shall not be of packing group I.

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 Regulations.

224 Unless it can be demonstrated by testing that the sensitivity of the substance in its frozen state is no greater than in its liquid state, the substance shall remain liquid during normal transport conditions. It shall not freeze at temperatures above -15 °C.

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 g per extinguishing unit.

226 Formulations of these substances containing not less than 30% non-volatile, non-flammable phelgmatizer are not subject to these Regulations.

227 When phlegmatized with water and inorganic inert material the content of urea nitrate may not exceed 75% by mass and the mixture shall not be capable of being detonated by the Series 1, type (a), test in the *Manual of Tests and Criteria*, Part I.

228 Mixtures not meeting the criteria for flammable gases (Division 2.1) shall be transported under UN 3163.

230 This entry applies to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries. Lithium cells and batteries may be transported under this entry 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 *Manual of Tests and Criteria*, Part III, sub-section 38.3;

(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 series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.).

232 This designation shall only be used when the substance does not meet the criteria of any other class. Transport in cargo transport units other than in multimodal tanks shall be in accordance with standards specified by the competent authorities of the country of origin.

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 as life-saving vehicle air-bag inflators or air-bag modules or seat-belt pretensioners.

236 Polyester resin kits consist of two components: a base material (Class 3, Packing group II or III) and an activator (organic peroxide). The organic peroxide shall be type D, E or F, not requiring temperature control. Packing group shall be II or III, according to the criteria for Class 3, applied to the base material. The quantity limit shown in Column 7 of the Dangerous Goods List applies to the base material.

237 The membrane filters, including paper separators, coating or backing materials, etc., that are present in transport, shall not be liable to propagate a detonation as tested by one of the tests described in the *Manual of Tests and Criteria*, Part I, Test series 1(a).

In addition, the competent authority may determine, on the basis of the results of suitable burning rate tests taking account of the standard tests in the *Manual of Tests and Criteria*, Part III, sub-section 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 Regulations applicable to flammable solids in Division 4.1.

238 (a) 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 and 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 is 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 is 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, shall be securely fastened in the battery holder on the equipment and protected in such a manner as to prevent damage and short circuits.*

(b) Non-spillable batteries are not subject to these Regulations if, at a temperature of 55 °C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, when packaged for transport, the terminals are protected from short circuit.

239 Batteries or cells shall not contain dangerous goods other than sodium, sulphur and/or polysulphides. Batteries or cells shall 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 competent authority.

Cells shall 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 shall 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.

Except for air transport, batteries installed in vehicles (UN 3171) are not subject to these Regulations.

240 This entry only applies to vehicles and equipment powered by wet batteries, sodium batteries or lithium batteries and transported with these batteries installed. Examples of such vehicles and equipment are electrically-powered cars, lawnmowers, wheelchairs and other mobility aids.

241 The formulation shall be prepared so that it remains homogeneous and does not separate during transport. Formulations with low nitrocellulose contents and not showing 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 *Manual of Tests and Criteria*, Part I and not being a flammable solid when tested in accordance with test N.1 in the *Manual of Tests and Criteria*, Part III, sub-section 33.2.1.4 (chips, if necessary, crushed and sieved to a particle size of less than 1.25 mm) are not subject to these Regulations.

242 Sulphur is not subject to these Regulations when it has been formed to a specific shape (e.g. prills, granules, pellets, pastilles or flakes).

243 Motor spirit, gasoline and petrol shall be assigned to this entry regardless of variations in volatility.

244 This entry includes e.g. aluminium dross, aluminium skimmings, spent cathodes, spent potliner, and aluminium salt slags.

246 This substance shall be packed in accordance with packing method OP6 (see applicable packing instruction). During transport, it shall be protected from direct sunshine and stored (or kept) in a cool and well-ventilated place, away from all sources of heat.

247 Alcoholic beverages containing more than 24% alcohol but not more than 70% by volume, when transported as part of the manufacturing process, may be transported in wooden casks with a capacity of not more than 500 litres deviating from the requirements of Chapter 6.1, on the following conditions:

(a) The casks shall be checked and tightened before filling;

(b) Sufficient ullage (not less than 3%) shall be left to allow for the expansion of the liquid;

(c) The casks shall be transported with the bungholes pointing upwards;

(d) The casks shall be transported in containers meeting the requirements of the International Convention for Safe Containers (CSC), as amended. Each cask shall be secured in custom-made cradles and be wedged by appropriate means to prevent it from being displaced in any way during transport; and

(e) When carried on board ships, the containers shall be placed in open cargo spaces only.

249 Ferrocerium, stabilized against corrosion, with a minimum iron content of 10% is not subject to these Regulations.

250 This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. The transport of substances under this entry shall be in accordance with the chain of custody and security procedures specified by the Organisation for the Prohibition of Chemical Weapons.

The chemical sample may only be transported providing prior approval has been granted by the competent authority or the Director General of the Organisation for the Prohibition of Chemical Weapons and providing the sample complies with the following provisions:

(a) It shall be packed according to Packing Instruction 623 in the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air; and

(b) During transport it shall be accompanied by a copy of the document of approval for transport, showing the quantity limitations and the packing provisions.

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 medical, analytical or testing purposes. Such kits may not contain dangerous goods for which the word "NONE" has been indicated in Column 7 of the Dangerous Goods List of Chapter 3.2.

Components shall not react dangerously (see 4.1.1.6). The total quantity of dangerous goods in any one kit shall not exceed either 1 L or 1 kg. The packing group assigned to the kit as a whole shall be the most stringent packing group assigned to any individual substance in the kit.

Kits which are carried on board vehicles for first-aid or operating purposes are not subject to these Regulations.

Chemical kits and first aid kits containing dangerous goods in inner packagings which do not exceed the quantity limits applicable to individual substances as specified in column 7 of the Dangerous Goods List may be transported in accordance with Chapter 3.4.

252 Provided the ammonium nitrate remains in solution under all conditions of transport, aqueous solutions of ammonium nitrate, with not more than 0.2% combustible material, in a concentration not exceeding 80%, are not subject to these Regulations.

266 This substance, when containing less alcohol, water or phlegmatizer than specified, shall not be transported unless specifically authorized by the competent authority.

267 Any explosives, blasting, type C containing chlorates shall be segregated from explosives containing ammonium nitrate or other ammonium salts.

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% of the saturation limit.

271 Lactose or glucose or similar materials, may be used as a phlegmatizer provided that the substance contains not less than 90%, by mass, of phlegmatizer. The competent authority may authorize these mixtures to be classified in Division 4.1 on the basis of a test Series 6(c) of Section 16 of Part I of the *Manual of Tests and Criteria* on at least three packages as prepared for transport. Mixtures containing at least 98%, by mass, of phlegmatizer are not subject to these Regulations. Packages containing mixtures with not less than 90%, by mass, of phlegmatizer need not bear a TOXIC subsidiary risk label.

272 This substance shall not be transported under the provisions of Division 4.1 unless specifically authorized by the competent authority (see UN 0143).

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 volume of 1 m^3 of 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.

274 For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8).

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, annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.

277 For aerosols or receptacles containing toxic substances the limited quantity value is 120 ml. For all other aerosols or receptacles the limited quantity value is 1000 ml.

278 These substances shall not be classified and transported unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of Part I of the *Manual of Tests and Criteria* on packages as prepared for transport (see 2.1.3.1). The competent authority shall assign the packing group on the basis of the Chapter 2.3 criteria and the package type used for the Series 6(c) test.

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 these regulations.

280 This entry applies to articles which are used as life-saving vehicle air bag inflators, or air bag modules or seat-belt pretensioners and which contain dangerous goods of Class 1 or dangerous goods of other classes and when transported as component parts and when these articles as presented for transport have been tested in accordance with Test series 6 (c) of Part I of the *Manual of Tests and Criteria*, with no explosion of the device, no fragmentation of device casing or pressure vessel, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or other emergency response efforts in the immediate vicinity.

281 The transport by sea of hay, straw or bhusa, wet, damp or contaminated with oil shall be prohibited. Transport by other modes is also prohibited except with special authorization by the competent authorities.

Hay, straw and bhusa, when not wet, damp or contaminated with oil, are subject to these Regulations only when transported by sea.

282 Suspensions with a flash point of not more than 60.5 °C, shall bear a FLAMMABLE LIQUID subsidiary risk label.

283 Articles, containing gas, intended to function as shock absorbers, including impact energy-absorbing devices, or pneumatic springs are not subject to these Regulations provided each article:

(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 competent 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 that the article does not rocket.

284 An oxygen generator, chemical, containing oxidizing substances shall meet the following conditions:

(a) The generator when containing an explosive actuating device shall only be transported under this entry when excluded from Class 1 in accordance with paragraph
2.1.1.1 (b) of these Regulations;

(b) The generator, without its packaging, shall 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 damage, without loss of its contents and without actuation; and

(c) When a generator is equipped with an actuating device, it shall have at least two positive means of preventing unintentional actuation.

286 Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5g, are not subject to these Regulations when contained individually in an article or a sealed packet.

288 These substances shall not be classified and transported unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of the *Manual of Tests and Criteria* on packages as prepared for transport (see 2.1.3.1).

289 Air bags or seat-belts installed in vehicles or in completed vehicle components such as steering columns, door panels, seats etc. are not subject to these Regulations.

290 When this material meets the definitions and criteria of other classes or divisions as defined in Part 2, it shall be classified in accordance with the predominant subsidiary risk. Such material shall be declared under the proper shipping name and UN number appropriate for the material in that predominant Class or Division, with the addition of the name applicable to this material according to column (2) in the dangerous goods list, and shall be transported in accordance with the provisions applicable to that UN number. In addition, all other requirements specified in 2.7.9.1 shall apply, except 5.2.1.5.2.

291 Flammable liquefied gases shall be contained within refrigerating machine components. These components shall be designed and tested to at least three times the working pressure of the machinery. The refrigerating machines shall 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 Regulations if they contain less than 12 kg of gas.

292 Only mixtures with not more than 23.5% oxygen may be transported under this entry. A Division 5.1 subsidiary risk label is not required for any concentrations within this limit.

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 combined with or attached to the box, book or card that 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.

294 Safety matches and wax "Vesta" matches in outer packagings not exceeding 25 kg net mass are not subject to any other requirement (except marking) of these Regulations when packaged in accordance with packing instruction P407.

295 Batteries need not be individually marked and labelled if the pallet bears the appropriate mark and label.

296 These articles may contain:

(a) Division 2.2 compressed gases;

(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) Electric storage batteries;

(d) First aid kits; or

(e) Strike anywhere matches.

297 For air transport, arrangements between consignor and operator(s) shall be made for each consignment, to ensure that ventilation safety procedures are followed.

Transport units containing solid carbon dioxide, when transported on board ocean vessels, shall be conspicuously marked on two sides "WARNING CO2 SOLID (DRY ICE)". Other packagings containing solid carbon dioxide, when transported on board ocean vessels, shall be marked "CARBON DIOXIDE, SOLID-DO NOT STOW BELOW DECK".

Carbon dioxide, solid (dry ice) is excepted from the shipping paper requirements if the package is marked "Carbon dioxide, solid" or "Dry ice" and is marked with an indication that the substance being refrigerated is used for diagnostic or treatment purposes (e.g., frozen medical specimens).

298 Solutions with a flash point of 60.5 °C or less shall bear a FLAMMABLE LIQUID label.

299 Consignments of COTTON, DRY having a density not less than 360 kg/m^3 according to ISO 8115:1986 "Cotton bales- Dimensions and density" are not subject to these Regulations when transported in closed transport units.

300 Fish meal or fish scrap shall not be transported if the temperature at the time of loading exceeds 35 °C or 5 °C above the ambient temperature whichever is higher.

301 This entry only applies to machinery or apparatus containing dangerous substances as a residue or an integral element of the machinery or apparatus. It shall not be used for machinery or apparatus for which a proper shipping name already exists in the Dangerous Goods List. Machinery and apparatus transported under this entry shall only contain dangerous goods which are authorized to be transported in accordance with the provisions of Chapter 3.4 (Limited quantities). The quantity of dangerous goods in machinery or apparatus shall not exceed the quantity specified in Column 7 of the Dangerous Goods List for each item of dangerous goods contained. If the machinery or apparatus contains more than one item of dangerous goods, the individual substances shall not be capable of reacting dangerously with one another (see 4.1.1.6). When it is required to ensure liquid dangerous goods remain in their intended orientation, package orientation labels meeting the specifications of ISO 780:1997 shall be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction.

The competent authority may exempt from regulation machinery or apparatus which would otherwise be transported under this entry. The transport of dangerous goods in machinery or apparatus where the quantity of dangerous goods exceeds the quantity specified in Column 7 of the Dangerous Goods List is authorized when approved by the competent authority.

302 In the proper shipping name, the word "UNIT" means:

a road freight vehicle;
a railway freight wagon;
a freight container;
a road tank vehicle;
a railway tank wagon; or
a portable tank.

Except when transported by sea, fumigated units are only subject to the provisions of 5.5.2.

303 The classification of UN 2037 shall be based on the gases contained therein and in accordance with the provisions of Chapter 2.2.

304 Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to these Regulations provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: alkali-manganese, zinc-carbon, nickel-metal hydride and nickel-cadmium batteries.

305 These substances are not subject to these Regulations when in concentrations of not more than 50 mg/kg.

306 This entry may only be used for substances that do not exhibit explosive properties of Class 1 when tested in accordance to Test Series 1 and 2 of Class 1 (see *Manual of Tests and Criteria*, Part I).

307 This entry may only be used for uniform mixtures containing ammonium nitrate as the main ingredient within the following composition limits:

(a) Not less than 90 % ammonium nitrate with not more than 0.2% total combustible/organic material calculated as carbon and with added matter, if any, which is inorganic and inert towards ammonium nitrate; or

(b) Less than 90% but more than 70% ammonium nitrate with other inorganic materials or more than 80% but less than 90% ammonium nitrate mixed with calcium carbonate and/or dolomite and not more than 0.4% total combustible/organic material calculated as carbon; or

(c) Nitrogen type ammonium nitrate based fertilizers containing mixtures of ammonium nitrate and ammonium sulphate with more than 45% but less than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon such that the sum of the percentage compositions of ammonium nitrate and ammonium sulphate exceeds 70%.

308 Fish scrap or fish meal shall contain at least 100 ppm of antioxidant (ethoxyquin) at the time of consignment.

309 This entry applies to non sensitised emulsions, suspensions and gels consisting primarily of a mixture of ammonium nitrate and a fuel phase, intended to produce a Type E blasting explosive only after further processing prior to use. The mixture typically has the following composition: 60 - 85 % ammonium nitrate; 5 - 30% water; 2 - 8% fuel; 0.5 - 4 % emulsifier or thickening agent; 0 - 10 % soluble flame supressants and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate. These substances shall not be classified and transported unless authorized by the competent authority.

310 The testing requirements in Chapter 38.3 of the *Manual of Tests and Criteria* do not apply to production runs consisting of not more than 100 lithium cells and batteries, or to pre-production prototypes of lithium cells and batteries when these prototypes are transported for testing, if:

(a) the cells and batteries are transported in an outer packaging that is a metal, plastics or plywood drum or a metal, plastics or wooden box and that meets the criteria for packing group I packagings; and

(b) each cell and battery is individually packed in an inner packaging inside an outer packaging and is surrounded by cushioning material that is non-combustible, and non-conductive.

CHAPTER 3.4

DANGEROUS GOODS PACKED IN LIMITED QUANTITIES

3.4.1 This Chapter provides the provisions applicable to the transport of dangerous goods of certain classes packed in limited quantities. The applicable quantity limit for the inner packaging or article is specified for each substance in Column 7 of the Dangerous Goods List in Chapter 3.2. In addition, the word "None" has been indicated in Column 7 of the Dangerous Goods List in Chapter 3.2 for each entry not permitted to be transported in accordance with this Chapter. All provisions and requirements of these Regulations apply to the transport of limited quantities except as specifically provided in this Chapter.

3.4.2 Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. However, the use of inner packagings is not necessary for the transport of articles such as aerosols or "receptacles, small, containing gas". The packagings shall meet the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 and be so designed that they meet the construction requirements of 6.1.4. The total gross mass of the package shall not exceed 30 kg.

3.4.3 Shrink-wrapped or stretch-wrapped trays meeting the conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 are acceptable as outer packagings for articles or inner packagings containing dangerous goods transported in accordance with this Chapter, except that inner packagings that are liable to break or be easily punctured such as those made of glass, porcelain, stoneware or certain plastics, materials, etc, shall not be transported in such packagings. The total gross mass of the package shall not exceed 20 kg.

3.4.4 Liquid goods of Class 8, Packing Group II in glass, porcelain or stoneware inner packagings shall be enclosed in a compatible and rigid intermediate packaging.

3.4.5 Different dangerous goods packed in limited quantities may be placed in the same outer packaging provided they will not interact dangerously in the event of leakage.

3.4.6 Packages of dangerous goods transported according to this Chapter need not be labelled. Any segregation provisions for dangerous goods need not apply within a vehicle or freight container.

3.4.7 In addition to the provisions for documentation specified in 5.4.1, the words "limited quantity" or "LTD QTY" shall be included with the description of the consignment (see 5.4.1.5.2).

3.4.8 Packages containing dangerous goods in limited quantities need not be marked with the proper shipping name of the contents, but shall be marked with the UN number of the contents (preceded by the letters "UN") placed within a diamond. The width of line forming the diamond shall be at least 2 mm; the number shall be at least 6 mm high. Where more than one substance is included in the package and the substances are assigned to different UN numbers, then the diamond shall be large enough to include each relevant UN number.

3.4.9 Limited quantities of dangerous goods for personal or household use, that are packaged and distributed in a form intended or suitable for sale through retail agencies, may furthermore be exempted from marking of the proper shipping name and UN number on the packaging and from the requirements for a dangerous goods transport document.

PART 4

PACKING AND TANK PROVISIONS

CHAPTER 4.1

USE OF PACKAGINGS, INCLUDING INTERMEDIATE BULK CONTAINERS (IBCs) AND LARGE PACKAGINGS

4.1.1 General provisions for the packing of dangerous goods in packagings, including IBCs and large packagings

NOTE: *The general provisions of this section only apply to the packing of goods of Class 2, Division 6.2 and Class 7 as indicated in 4.1.8.2 (Division 6.2), 4.1.9.1.5 (Class 7) and in the applicable packing instructions of 4.1.4 (packing instructions P201 and P202 for Class 2 and P621, IBC620 and LP621 for Division 6.2).*

4.1.1.1 Dangerous goods shall be packed in good quality packagings, including IBCs and large packagings, which shall be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment 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, including IBCs and large packagings, shall 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 IBCs and large packagings, shall be closed in accordance with the information provided by the manufacturer. No dangerous residue shall adhere to the outside of packages, IBCs and large packagings during transport. These provisions apply, as appropriate, to new, reused, reconditioned or remanufactured packagings, and to new, reused, repaired or remanufactured IBCs, and to new or reused large packagings.

4.1.1.2 Parts of packagings, including IBCs and large packagings, which are in direct contact with dangerous goods:

(a) shall not be affected or significantly weakened by those dangerous goods; and

(b) shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods.

Where necessary, they shall be provided with a suitable inner coating or treatment.

4.1.1.3 Unless provided elsewhere in these Regulations, each packaging, including IBCs and large packagings, except inner packagings, shall conform to a design type successfully tested in accordance with the requirements of 6.1.5, 6.3.2, 6.5.4 or 6.6.5, as applicable.

4.1.1.4 When filling packagings, including IBCs and large packagings, with liquids, sufficient ullage (outage) shall be left to ensure that neither leakage nor permanent distortion of the packaging occurs as a result of an expansion of the liquid caused by temperatures likely to occur during transport. Unless specific requirements are prescribed, liquids shall not completely fill a packaging at a temperature of 55 °C. However, sufficient ullage shall be left in an IBC to ensure that at the mean bulk temperature of 50 °C it is not filled to more than 98% of its water capacity.

4.1.1.4.1 For air transport, packagings intended to contain liquids shall also be capable of withstanding a pressure differential without leakage as specified in the international regulations for air transport.

4.1.1.5 Inner packagings shall be packed 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 that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials, etc., shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material or of the outer packaging.

4.1.1.6 Dangerous goods shall not be packed together in the same outer packaging or in large packagings, 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.

4.1.1.7 The closures of packagings containing wetted or diluted substances shall be such that the percentage of liquid (water, solvent or phlegmatizer) does not fall below the prescribed limits during transport.

4.1.1.7.1 Where two or more closure systems are fitted in series on an IBC, that nearest to the substance being carried shall be closed first.

4.1.1.8 Liquids may only be filled into inner packagings which have an appropriate resistance to internal pressure that may be developed under normal conditions of transport. Where pressure may develop in a package by the emission of gas from the contents (as a result of temperature increase or other cause), the packaging may be fitted with a vent, provided that the gas emitted will not cause danger on account of its toxicity, its flammability, the quantity released, etc. The vent shall be so designed that, when the packaging is in the attitude in which it is intended to be transported, leakages of liquid and the penetration of foreign matter are prevented under normal conditions of transport. Venting of the package is not permitted for air transport.

4.1.1.9 New, remanufactured or reused packagings, including IBCs and large packagings, or reconditioned packagings and repaired IBCs shall be capable of passing the tests prescribed in 6.1.5, 6.3.2, 6.5.4 or 6.6.5, as applicable. Before being filled and handed over for transport, every packaging, including IBCs and large packagings, shall be inspected to ensure that it is free from corrosion, contamination or other damage and every IBC shall be inspected with regard to the proper functioning of any service equipment. Any packaging, which shows signs of reduced strength as compared with the approved design type shall no longer be used or shall be so reconditioned, that it is able to withstand the design type tests. Any IBC which shows signs of reduced strength as compared with the tested design type shall no longer be used or shall be so repaired that it is able to withstand the design type tests.

4.1.1.10 Liquids shall be filled only into packagings, including IBCs, which have an appropriate resistance to the internal pressure that may develop under normal conditions of transport. Packagings and IBCs marked with the hydraulic test pressure prescribed in 6.1.3.1(d) and 6.5.2.2.1, respectively shall be filled only with a liquid having a vapour pressure:

(a) such that the total gauge pressure in the packaging or IBC (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 4.1.1.4 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.

Metal IBCs intended for the carriage of liquids shall not be used to carry liquids having a vapour pressure of more than 110 kPa (1.1 bar) at 50 °C or 130 kPa (1.3 bar) at 55 °C.

EXAMPLES OF REQUIRED MARKED TEST PRESSURES FOR PACKAGINGS, INCLUDING IBCs, CALCULATED AS IN 4.1.1.10 (c)

UN No.	Name	Class	Packing group	Vp55 (kPa)	Vp55 × 1.5 (kPa)	(Vp55 × 1.5) minus 100 (kPa)	Required minimum test pressure gauge under 6.1.5.5.4.(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 table refers to the use of 4.1.1.10 (c) only, which means that the marked test pressure shall 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 6.1.5.5.4 (a), the minimum marked test pressure may be lower.*

NOTE 3: *For diethyl ether the required minimum test pressure under 6.1.5.5.5 is 250 kPa.*

4.1.1.11 Empty packagings, including IBCs and large packagings, that have contained a dangerous substance shall be treated in the same manner as is required by these Regulations for a filled packaging, unless adequate measures have been taken to nullify any hazard.

4.1.1.12 Every packaging, including IBCs, intended to contain liquids shall successfully undergo a suitable leakproofness test, and be capable of meeting the appropriate test level indicated in 6.1.5.4.3, or 6.5.4.7 for the various types of IBCs:

(a) before it is first used for transport;

(b) after remanufacturing or reconditioning of any packaging, before it is re-used for transport;

(c) after the repair or remanufacture of any IBC, before it is re-used for transport.

For this test the packaging, or IBC, need not have its closures fitted. The inner receptacle of a composite packaging or IBC 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 or large packagings.

4.1.1.13 Packagings, including IBCs, used for solids which may become liquid at temperatures likely to be encountered during transport shall also be capable of containing the substance in the liquid state.

4.1.1.14 Packagings, including IBCs, used for powdery or granular substances shall be siftproof or shall be provided with a liner.

4.1.1.15 *Explosives, self-reactive substances and organic peroxides*

Unless specific provision to the contrary is made in these Regulations, the packagings, including IBCs and large packagings, used for goods of Class 1, self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 shall comply with the provisions for the medium danger group (Packing group II).

4.1.1.16 *Use of salvage packagings*

4.1.1.16.1 Damaged, defective, leaking or non-conforming packages, or dangerous goods that have spilled or leaked may be transported in salvage packagings mentioned in 6.1.5.1.11. This does not prevent the use of a bigger size packaging of appropriate type and performance level under the conditions of 4.1.1.16.2.

4.1.1.16.2 Appropriate measures shall be taken to prevent excessive movement of the damaged or leaking packages within a salvage packaging. When the salvage packaging contains liquids, sufficient inert absorbent material shall be added to eliminate the presence of free liquid.

4.1.2 Additional general provisions for the use of IBCs

4.1.2.1 When IBCs are used for the transport of liquids with a flash point of 60.5 °C (closed cup) or lower, or of powders liable to dust explosion, measures shall be taken to prevent a dangerous electrostatic discharge.

4.1.2.2 The periodic testing and inspection requirements for IBCs are provided in Chapter 6.5. An IBC shall not be filled and offered for transport after the date of expiry of the last periodic test required by 6.5.4.14.3, or the date of expiry of the last periodic inspection required by 6.5.1.6.4. However, an IBC filled prior to the date of expiry of the last periodic test or inspection may be transported for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, an IBC may be transported after the date of expiry of the last periodic test or inspection:

(a) after emptying but before cleaning, for purposes of performing the required test or inspection prior to refilling; and

(b) unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection in order to allow the return of dangerous goods or residues for proper disposal or recycling. Reference to this exemption shall be entered in the transport document.

4.1.2.3 For rigid plastics IBCs and composite IBCs with plastics inner receptacles, unless otherwise approved by the competent authority, the period of use permitted for the transport of dangerous liquids shall be five years from the date of manufacture of the receptacle except where a shorter period of use is prescribed because of the nature of the liquid to be transported.

4.1.2.4 IBCs of type 31HZ2 shall be filled to at least 80% of the volume of the outer casing and always be carried in closed transport units.

4.1.2.5 Except for routine maintenance of metal, rigid plastics and composite IBCs performed by the owner of the IBC, whose State and name or authorized symbol is durably marked on the IBC, the party performing routine maintenance shall durably mark the IBC near the manufacturer's UN design type marking to show:

(a) The State in which the routine maintenance was carried out; and

(b) The name or authorized symbol of the party performing the routine maintenance.

4.1.3 General provisions concerning packing instructions

4.1.3.1 Packing instructions applicable to dangerous goods of Classes 1 to 9 are specified in 4.1.4. They are subdivided depending on the type of packagings to which they apply:

4.1.4.1 for packagings other than IBCs and large packagings; these packing instructions are designated by an alphanumeric code comprising the letter "P";

4.1.4.2 for IBCs; these are designated by an alphanumeric code comprising the letters "IBC";

4.1.4.3 for large packagings; these are designated by an alphanumeric code comprising the letters "LP".

Generally, packing instructions specify that the general provisions of 4.1.1, 4.1.2 and/or 4.1.3, as appropriate, are applicable. They may also require compliance with the special provisions of sections 4.1.5, 4.1.6, 4.1.7, 4.1.8 or 4.1.9 when appropriate. Special packing provisions may also be specified in the packing instruction for individual substances or articles. They are also designated by an alphanumeric code comprising the letters:

"PP"	for packagings other than IBCs and large packagings
"B"	for IBCs
"L"	for large packagings.

Unless otherwise specified, each packaging shall conform to the applicable requirements of Part 6. Generally packing instructions do not provide guidance on compatibility and the user should 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.

4.1.3.2 Column 8 of the dangerous goods list shows for each article or substance the packing instruction(s) that shall be used. Column 9 indicates the special packing provisions applicable to specific substances or articles.

4.1.3.3 Each packing instruction shows, where applicable, the acceptable single and combination packagings. For combination packagings, the acceptable outer packagings, inner packagings and when applicable the maximum quantity permitted in each inner or outer packaging, are shown. Maximum net mass and maximum capacity are as defined in 1.2.1.

4.1.3.4 The following packagings shall not be used when the substances being transported are liable to become liquid during transport:

Packagings

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

IBCs

For substances of packing group I:

All types of IBCs;

For substances of packing groups II and III:

Wooden:	11C, 11D and 11F
Fibreboard:	11G
Flexible:	13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2
Composite:	11HZ2 and 21HZ2.

4.1.3.5 Where the packing instructions in this chapter authorize the use of a particular type of outer packaging in a combination packaging (e.g. 4G), packagings bearing the same packaging identification code followed by the letters AV@, AU@ or AW@ marked in accordance with the requirements of Part 6 (e.g. 4GV, 4GU or 4GW) may also be used under the same conditions and limitations applicable to the use of that type of outer packaging according to the relevant packing instructions. For example, a combination packaging marked with the packaging code A4GV@ may be used whenever a combination packaging marked A4G@ is authorized, provided the requirements in the relevant packing instruction regarding types of inner packagings and quantity limitations are respected.

4.1.3.6 Cylinders, bundles of cylinders, pressure drums and tubes conforming to the construction requirements of packing instruction P200 are authorized for the transport of any liquid or solid substance assigned to packing instruction P001 or P002 unless otherwise indicated in the packing instruction or by a special provision in column 9 of the Dangerous Goods List. The capacity of bundles of cylinders and tubes shall not exceed 1000 litres.

4.1.3.7 Packagings or IBCs not specifically authorized in the applicable packing instruction shall not be used for the transport of a substance or article unless specifically approved by the competent authority and provided:

(a) The alternative packaging complies with the general requirements of this Part;

(b) When the packing instruction indicated in the Dangerous Goods List so specifies, the alternative packaging meets the requirements of Part 6;

(c) The competent authority determines that the alternative packaging provides 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 the Dangerous Goods List; and

(d) A copy of the competent authority approval accompanies each consignment or the transport document includes an indication that alternative packaging was approved by the competent authority.

NOTE: *The competent authorities granting such approvals should take action to amend these Model Regulations to include the provisions covered by the approval as appropriate.*

4.1.3.8 *Unpackaged articles other than Class 1 articles*

4.1.3.8.1 Where large and robust articles cannot be packaged in accordance with the requirements of Chapters 6.1 or 6.6 and they have to be transported empty, uncleaned and unpackaged, the competent authority may approve such transport. In doing so the competent authority shall take into account that:

(a) Large and robust articles shall be strong enough to withstand the shocks and loadings normally encountered during transport including trans-shipment between transport units and between transport units and warehouses, as well as any removal from a pallet for subsequent manual or mechanical handling;

(b) All closures and openings shall be sealed so that there can be no loss of contents which might be caused under normal conditions of transport, by vibration, or by changes in temperature, humidity or pressure (resulting from altitude, for example). No dangerous residue shall adhere to the outside of the large and robust articles;

(c) Parts of large and robust articles, which are in direct contact with dangerous goods:

(i) shall not be affected or significantly weakened by those dangerous goods; and

(ii) shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods;

(d) Large and robust articles containing liquids shall be stowed and secured to ensure that neither leakage nor permanent distortion of the article occurs during transport;

(e) They shall be fixed in cradles or crates or other handling devices in such a way that they will not become loose during normal conditions of transport.

4.1.3.8.2 Unpackaged articles approved by the competent authority in accordance with the provisions of 4.1.3.8.1 shall be subject to the consignment procedures of Part 5. In addition the consignor of such articles shall ensure that a copy of any such approval is transported with the large and robust articles.

***NOTE*:** *A large and robust article may include flexible fuel containment systems, military equipment, machinery or equipment containing dangerous goods above the limited quantity thresholds.*

4.1.4 List of packing instructions

4.1.4.1 *Packing instructions concerning the use of packagings (except IBCs and large packagings)*

P001	**PACKING INSTRUCTION (LIQUIDS)**			**P001**
The following packagings are authorized provided the general provisions of **4.1.1** and **4.1.3** are met:				
Combination packagings		**Maximum capacity/Net mass (see 4.1.3.3)**		
Inner packagings	**Outer packagings**	**Packing group I**	**Packing group II**	**Packing group III**
Glass 10 *l* Plastics 30 *l* Metal 40 *l*	**Drums**			
	steel (A2)	250 kg	400 kg	400 kg
	aluminium (1B2)	250 kg	400 kg	400 kg
	other metal (1N2)	250 kg	400 kg	400 kg
	plastics (1H2)	250 kg	400 kg	400 kg
	plywood (1D)	150 kg	400 kg	400 kg
	fibre (1G)	75 kg	400 kg	400 kg
	Boxes			
	steel (4A)	250 kg	400 kg	400 kg
	aluminium (4B)	250 kg	400 kg	400 kg
	natural wood (4C1, 4C2)	150 kg	400 kg	400 kg
	plywood (4D)	150 kg	400 kg	400 kg
	reconstituted wood (4F)	75 kg	400 kg	400 kg
	fibreboard (4G)	75 kg	400 kg	400 kg
	expanded plastics (4H1)	60 kg	60 kg	60 kg
	solid plastics (4H2)	150 kg	400 kg	400 kg
	Jerricans			
	steel (3A2)	120 kg	120 kg	120 kg
	aluminium (3B2)	120 kg	120 kg	120 kg
	plastics (3H2)	120 kg	120 kg	120 kg
Single packagings				
Drums				
steel, non-removable head (1A1)		250 *l*	450 *l*	450 *l*
steel, removable head (1A2)		250 *l*[*]	450 *l*	450 *l*
aluminium, non-removable head (1B1)		250 *l*	450 *l*	450 *l*
aluminium, removable head (1B2)		250 *l*[*]	450 *l*	450 *l*
other metal, non-removable head (1N1)		250 *l*	450 *l*	450 *l*
other metal, removable head (1N2)		250 *l*[*]	450 *l*	450 *l*
plastics, non-removable head (1H1)		250 *l*	450 *l*	450 *l*
plastics, removable head (1H2)		250 *l*[*]	450 *l*	450 *l*

[*] *Only substances with a viscosity more than 200 mm^2/s are permitted.*

P001	PACKING INSTRUCTION (LIQUIDS) (cont=d)		P001
	Maximum capacity/Net mass (see 4.1.3.3.)		
Single packagings (cont=d)	**Packing group I**	**Packing group II**	**Packing group III**
Jerricans			
steel, non-removable head (3A1)	60 *l*	60 *l*	60 *l*
steel, removable head (3A2)	60 *l*[*]	60 *l*	60 *l*
aluminium, non-removable head (3B1)	60 *l*	60 *l*	60 *l*
aluminium, removable head (3B2)	60 *l*[*]	60 *l*	60 *l*
plastics, non-removable head (3H1)	60 *l*	60 *l*	60 *l*
plastics, removable head (3H2)	60 *l*[*]	60 *l*	60 *l*
Composite packagings			
plastics receptacle in steel or aluminium drum (6HA1, 6HB1)	250 *l*	250 *l*	250 *l*
plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)	120 *l*	250 *l*	250 *l*
plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2,6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 *l*	60 *l*	60 *l*
glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in steel, aluminium, wood or fibreboard box or in a wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)	60 *l*	60 *l*	60 *l*

Special packing provisions:

PP1 For UN 1133, UN1210, UN1263 and UN1866, packagings for substances of packing groups II and III in quantities of 5 litres or less per metal or plastics packaging are not required to meet the performance tests in Chapter 6.1 when transported:

(a) in palletized loads, a pallet box or unit load device, e.g. individual packagings placed or stacked and secured by strapping, shrink or stretch-wrapping or other suitable means to a pallet. For sea transport, the palletized loads, pallet boxes or unit load devices shall be firmly packed and secured in closed cargo transport units;

(b) as an inner packaging of a combination packaging with a maximum net mass of 40 kg.

PP2 For UN 3065 and UN1170, wooden barrels (2C1 and 2C2) may be used.

PP4 For UN 1774, packagings shall meet the packing group II performance level.

PP5 For UN 1204, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Gas cylinders and gas receptacles shall not be used for these substances.

PP6 For UN 1851 and UN 3248, the maximum net quantity per package shall be 5 *l*.

PP10 For UN1791, packing group II, the packaging shall be vented.

PP31 For UN 1131, packagings shall be hermetically sealed.

PP33 For UN 1308, packing groups I and II, only combination packagings with a maximum gross mass of 75 kg are allowed.

PP81 For UN 1790 with not more than 85% hydrofluoric acid and UN 2031 with more than 55% nitric acid, the permitted use of plastics, drums and jerricans as single packagings shall be two years from their date of manufacture.

[*] *Only substances with a viscosity more than 200 mm^2/s are permitted.*

P002	PACKING INSTRUCTION (SOLIDS)	P002

The following packagings are authorized provided the general provisions of **4.1.1** and **4.1.3** are met:

Combination packagings		Maximum net mass (see 4.1.3.3)		
Inner packagings	**Outer packagings**	**Packing group I**	**Packing group II**	**Packing group III**
Glass 10 kg Plastics[1] 50 kg Metal 50 kg Paper[1, 2, 3] 50 kg Fibre[1, 2, 3] 50 kg	**Drums**			
	steel (1A2)	400 kg	400 kg	400 kg
	aluminium (1B2)	400 kg	400 kg	400 kg
	other metal (1N2)	400 kg	400 kg	400 kg
	plastics (1H2)	400 kg	400 kg	400 kg
	plywood (1D)	400 kg	400 kg	400 kg
	fibre (1G)	400 kg	400 kg	400 kg
[1] *These inner packagings shall be siftproof.* [2] *These inner packagings shall not be used when the substances being transported may become liquid during transport.*	**Boxes**			
	steel (4A)	400 kg	400 kg	400 kg
	aluminium (4B)	400 kg	400 kg	400 kg
	natural wood (4C1)	250 kg	400 kg	400 kg
	natural wood with sift proof walls (4C2)	250 kg	400 kg	400 kg
	plywood (4D)	250 kg	400 kg	400 kg
	reconstituted wood (4F)	125 kg	400 kg	400 kg
	fibreboard (4G)	125 kg	400 kg	400 kg
	expanded plastics (4H1)	60 kg	60 kg	60 kg
	solid plastics (4H2)	250 kg	400 kg	400 kg
[3] *Paper and fibre inner packagings shall not be used for substances of packing group I.*	**Jerricans**			
	steel (3A2)	120 kg	120 kg	120 kg
	aluminium (3B2)	120 kg	120 kg	120 kg
	plastics (3H2)	120 kg	120 kg	120 kg
Single packagings				
Drums				
steel (1A1 or 1A2[4])		400 kg	400 kg	400 kg
aluminium (1B1 or 1B2[4])		400 kg	400 kg	400 kg
metal, other than steel, or aluminium (1N1 or 1N2[4])		400 kg	400 kg	400 kg
plastics (1H1 or 1H2[4])		400 kg	400 kg	400 kg
fibre (1G)[5]		400 kg	400 kg	400 kg
plywood (1D)[5]		400 kg	400 kg	400 kg
Jerricans				
Steel (3A1 or 3A2[4])		120 kg	120 kg	120 kg
Aluminium (3B1 or 3B2[4])		120 kg	120 kg	120 kg
plastics (3H1 or 3H2[4])		120 kg	120 kg	120 kg

[4] *These packagings shall not be used for substances of packing group I that may become liquid during transport.*

[5] *These packagings shall not be used when the substances being transported may become liquid during transport.*

P002	PACKING INSTRUCTION (SOLIDS) (cont'd)		P002
	Maximum net mass (see 4.1.3.3)		
Single packagings (cont'd)	**Packing group I**	**Packing group II**	**Packing group III**
Boxes			
steel (4A)	Not allowed	400 kg	400 kg
aluminium (4B)	Not allowed	400 kg	400 kg
natural wood (4C1)[5]	Not allowed	400 kg	400 kg
plywood (4D)[5]	Not allowed	400 kg	400 kg
reconstituted wood (4F)[5]	Not allowed	400 kg	400 kg
natural wood with sift proof walls (4C2)[5]	Not allowed	400 kg	400 kg
fibreboard (4G)[5]	Not allowed	400 kg	400 kg
solid plastics (4H2)	Not allowed	400 kg	400 kg
Bags			
bags (5H3, 5H4, 5L3, 5M2)[5]	Not allowed	50 kg	50 kg
Composite packagings:			
plastics receptacle in steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1[5], 6HD1[5], or 6HH1)	400 kg	400 kg	400 kg
plastics receptacle in steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2[5], 6HG2[5] or 6HH2)	75 kg	75 kg	75 kg
glass receptacle in steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1[5] or 6PG1[5]) or in steel, aluminium, wood, or fibreboard box or in wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2[5], or 6PD2[5]) or in solid or expanded plastics packaging (6PH1 or 6PH2[5])	75 kg	75 kg	75 kg

[5] *These packagings shall not be used when the substances being transported may become liquid during transport.*

Special packing provisions:

PP6 For UN 3249, the maximum net mass per package shall be 5 kg.

PP7 For UN 2000, celluloid may be transported unpacked on pallets, wrapped in plastic film and secured by appropriate means, such as steel bands as a full load in closed transport units. Each pallet shall not exceed 1000 kg.

PP8 For UN 2002, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Gas cylinders and gas receptacles shall not be used for these substances.

PP9 For UN 3175, UN 3243 and UN 3244, packagings shall conform to a design type that has passed a leakproofness test at the packing group II performance level.

PP11 For UN 1309, packing group III, and UN 1362, 5H1, 5L1 and 5M1 bags are allowed if they are overpacked in plastic bags and are wrapped in shrink or stretch wrap on pallets.

PP12 For UN 1361, UN 2213 and UN 3077, 5H1, 5L1 and 5M1 bags are allowed when transported in closed transport units.

PP13 For articles classified under UN 2870, only combination packagings meeting the packing group I performance level are authorized.

PP14 For UN 2211, UN 2698 and UN 3314, packagings are not required to meet the performance tests in Chapter 6.1.

PP15 For UN 1324 and UN 2623, packagings shall meet the packing group III performance level.

PP20 For UN 2217, any siftproof, tearproof receptacle may be used.

PP30 For UN 2471, paper or fibre inner packagings are not permitted.

PP34 For UN 2969 (as whole beans), 5H1, 5L1 and 5M1 bags are permitted.

PP37 For UN 2590 and UN 2212, 5M1 bags are permitted. Packages shall be transported in closed freight containers, in other closed type cargo transport units or as stretch or shrink-wrapped unit loads.

PP38 For UN 1309, packing group II, bags are permitted only in closed cargo transport units.

P003	PACKING INSTRUCTION	P003

Dangerous goods shall be placed in suitable outer packagings. The packagings shall meet the provisions of **4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.8 and 4.1.3** and be so designed that they meet the construction requirements of **6.1.4**. Outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use shall be used. Where this packing instruction is used for the transport of articles or inner packagings of combination packagings the packaging shall be designed and constructed to prevent inadvertent discharge of articles during normal conditions of transport.

Special packing provisions:

PP16 For UN 2800, batteries shall be protected from short circuit within the packagings.

PP17 For UN Nos. 1950 and 2037, packagings shall not exceed 55 kg net mass for fibreboard or 125 kg net mass for other packagings.

PP18 For UN 1845, packagings shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings.

PP19 For UN Nos. 1327, 1364, 1365, 1856 and 3360 transport as bales is authorized.

PP20 For UN Nos. 1363, 1386, 1408 and 2793 any siftproof, tearproof receptacle may be used.

PP32 UN Nos. 2857 and 3358 may be transported unpackaged, in crates or in appropriate overpacks.

P099	PACKING INSTRUCTION	P099

Only packagings which are approved by the competent authority may be used (see **4.1.3.7**).

P101	PACKING INSTRUCTION	P101

Only packagings which are approved by the competent authority may be used. The State's distinguishing sign for motor vehicles in international traffic of the country for which the authority acts, shall be marked on the transport documents as follows:

"Packaging approved by the competent authority of..."

P110(a)	PACKING INSTRUCTION	P110(a)
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** plastics textile, plastic coated or lined rubber textile, rubberized textile	**Intermediate packagings** **Bags** plastics textile, plastic coated or lined rubber textile, rubberized **Receptacles** plastics metal	**Outer packagings** **Drums** steel, removable head (1A2) plastics, removable head (1H2)
Additional requirements: 1. The intermediate packagings shall be filled with water saturated material such as an anti-freeze solution or wetted cushioning. 2. Outer packagings shall be filled with water saturated material such as an anti-freeze solution or wetted cushioning. Outer packagings shall be constructed and sealed to prevent evaporation of the wetting solution, except for UN 0224 when carried dry.		

P110(b)	PACKING INSTRUCTION	P110(b)
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Receptacles** metal wood rubber, conductive plastics, conductive **Bags** rubber, conductive plastics, conductive	**Intermediate packagings** **Dividing partitions** metal wood plastics fibreboard	**Outer packagings** **Boxes** natural wood, sift-proof wall (4C2) plywood (4D) reconstituted wood (4F)
Special packing provision: **PP42** For UN Nos. 0074, 0113, 0114, 0129, 0130, 0135 and 0224, the following conditions shall be met: (a) Inner packagings shall not contain more than 50 g of explosive substance (quantity corresponding to dry substance); (b) Compartments between dividing partitions shall not contain more than one inner packaging, firmly fitted; and (c) The outer packaging may be partitioned into up to 25 compartments.		

P111	PACKING INSTRUCTION	P111
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** paper, waterproofed plastics textile, rubberized **Sheets** plastics textile, rubberized	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibreboard (1G) plastics, removable head (1H2)
Special packing provision: **PP43** For UN 0159, inner packagings are not required when metal (1A2 or 1B2) or plastics (1H2) drums are used as outer packagings.		

P112(a)	PACKING INSTRUCTION (Solid wetted 1.1D)	P112(a)
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** paper, multiwall, water resistant plastics textile textile, rubberized woven plastics **Receptacles** metal plastics	**Intermediate packagings** **Bags** plastics textile, plastic coated or lined **Receptacles** metal plastics	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)
Additional requirement: Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging.		
Special packing provisions: **PP26** For UN Nos. 0004, 0076, 0078, 0154, 0219 and 0394, packagings shall be lead free. **PP45** For UN 0072 and UN 0226, intermediate packagings are not required.		

P112(b)	PACKING INSTRUCTION (Solid dry, other than powder 1.1D)	P112(b)

The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:

Inner packagings	Intermediate packagings	Outer packagings
Bags paper, kraft paper, multiwall, water resistant plastics textile textile, rubberized woven plastics	**Bags** (for UN 0150 only) plastics textile, plastic coated or lined	**Bags** woven plastics, sift-proof (5H2) woven plastics, water-resistant (5H3) plastics, film (5H4) textile, sift-proof (5L2) textile, water resistant (5L3) paper, multiwall, water resistant (5M2) **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)

Special packing provisions:

PP26 For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free.

PP46 For UN 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg.

PP47 For UN 0222 inner packagings are not required when the outer packaging is a bag.

P112(c)	PACKING INSTRUCTION (Solid dry powder 1.1D)	P112(c)

The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:

Inner packagings	Intermediate packagings	Outer packagings
Bags paper, multiwall, water resistant plastics woven plastics **Receptacles** fibreboard metal plastics wood	**Bags** paper, multiwall, water resistant with inner lining plastics **Receptacles** Metal Plastics	**Boxes** steel (4A) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) aluminium (4B) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plywood (1D) plastics, removable head (1H2)

Additional requirements:

1. Inner packagings are not required if drums are used as the outer packaging.
2. The packaging shall be sift-proof.

Special packing provision:

PP26 For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free.

PP46 For UN 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg.

PP48 For UN 0504, metal packagings shall not be used.

P113	PACKING INSTRUCTION	P113
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** paper plastics textile, rubberized **Receptacles** fibreboard metal plastics wood	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) aluminium (4B) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plywood (1D) plastics, removable head (1H2)
Additional requirement: The packaging shall be sift-proof.		
Special packing provisions: **PP49** For UN 0094 and UN 0305, no more than 50 g of substance shall be packed in an inner packaging. **PP50** For UN 0027, inner packagings are not necessary when drums are used as the outer packaging. **PP51** For UN 0028, paper kraft or waxed paper sheets may be used as inner packagings.		

P114(a)	PACKING INSTRUCTION (Solid wetted)	P114(a)

The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:

Inner packagings	Intermediate packagings	Outer packagings
Bags plastics textile woven plastics **Receptacles** metal plastics	**Bags** plastics textile, plastic coated or lined **Receptacles** metal plastics	**Boxes** steel (4A) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibre (1G) plastics, removable head (1H2)

Additional requirement:

Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging.

Special packing provisions:

PP26 For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free.

PP43 For UN 0342, inner packagings are not required when metal (1A2 or 1B2) or plastics (1H2) drums are used as outer packagings.

P114(b)	PACKING INSTRUCTION (Solid dry)	P114(b)

The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:

Inner packagings	Intermediate packagings	Outer packagings
Bags paper, kraft plastics textile, sift-proof woven plastics, sift-proof **Receptacles** fibreboard metal paper plastics woven plastics, sift-proof	Not necessary	**Boxes** natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibre (1G) plastics, removable head (1H2)

Special packing provisions:

PP26 For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free.

PP50 For UN 0160 and UN 0161, inner packagings are not required if drums are used as the outer packaging.

PP52 For UN 0160 and UN 0161, when metal drums (1A2 or 1B2) are used as the outer packaging, metal packagings shall be so constructed that the risk of explosion, by reason of increase internal pressure from internal or external causes is prevented.

P115	PACKING INSTRUCTION	P115

The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met.

Inner packagings	Intermediate packagings	Outer packagings
Receptacles plastics	**Bags** plastics in metal receptacles **Drums** metal	**Boxes** natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibre (1G) plastics, removable head (1H2)

Special packing provisions:

PP45 For UN 0144, intermediate packagings are not required.

PP53 For UN Nos. 0075, 0143, 0495 and 0497, when boxes are used as the outer packaging, inner packagings shall have taped screw cap closures and be not more than 5 litres capacity each. Inner packagings shall be surrounded with non-combustible absorbent cushioning materials. The amount of absorbent cushioning material shall be sufficient to absorb the liquid contents. Metal receptacles shall be cushioned from each other. Net mass of propellant is a limited to 30 kg for each package when outer packagings are boxes.

PP54 For UN Nos. 0075, 0143, 0495 and 0497, when drums are used as the outer packaging and when intermediate packagings are drums, they shall be surrounded with non-combustible cushioning material in a quantity sufficient to absorb the liquid contents. A composite packaging consisting of a plastic receptacle in a metal drum may be used instead of the inner and intermediate packagings. The net volume of propellant in each package shall not exceed 120 litres.

PP55 For UN 0144, absorbent cushioning material shall be inserted.

PP56 For UN 0144, metal receptacles may be used as inner packagings.

PP57 For UN Nos. 0075, 0143, 0495 and 0497, bags shall be used as intermediate packagings when boxes are used as outer packagings.

PP58 For UN Nos. 0075, 0143, 0495 and 0497, drums shall be used as intermediate packagings when drums are used as outer packagings.

PP59 For UN 0144, fibreboard boxes (4G) may be used as outer packagings.

PP60 For UN 0144, aluminium drums, removable head (1B2) shall not be used.

P116	PACKING INSTRUCTION	P116

The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met.

Inner packagings	Intermediate packagings	Outer packagings
Bags paper, water and oil resistant plastics textile, plastic coated or lined woven plastics, sift-proof **Receptacles** Fibreboard, water resistant Metal Plastics wood, sift-proof **Sheets** paper, water resistant paper, waxed plastics	Not necessary	**Bags** woven plastics (5H1) paper, multiwall, water resistant (5M2) plastics, film (5H4) textile, sift-proof (5L2) textile, water resistant (5L3) **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D) **Jerricans** steel, removable head (3A2) plastics, removable head (3H2)

Special packing provisions:

PP61 For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required if leakproof removable head drums are used as the outer packaging.

PP62 For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required when the explosive is contained in a material impervious to liquid.

PP63 For UN 0081, inner packagings are not required when contained in rigid plastics which is impervious to nitric esters.

PP64 For UN 0331, inner packagings are not required when bags (5H2), (5H3) or (5H4) are used as outer packagings.

PP65 For UN Nos. 0082, 0241, 0331 and 0332, bags (5H2 or 5H3) may be used as outer packagings.

PP66 For UN 0081, bags shall not be used as outer packagings.

P130	PACKING INSTRUCTION	P130
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met.		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Not necessary	Not necessary	**Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)

Special packing provision:

PP67 The following applies to UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 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, 0488 and 0502: Large and robust explosives 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 shall 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 devices.

P131	PACKING INSTRUCTION	P131
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** paper plastics **Receptacles** fibreboard metal plastics wood **Reels**	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)
Special packing provision: **PP68** For UN Nos. 0029, 0267 and 0455, bags and reels shall not be used as inner packagings.		

P132(a)	PACKING INSTRUCTION	P132(a)
(Articles consisting of closed metal, plastics or fibreboard casings that contain a detonating explosive, or consisting of plastics-bonded detonating explosives)		
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Not necessary	Not necessary	**Boxes** steel (4A) aluminium (4B) wood, natural, ordinary (4C1) wood, natural, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)

P132(b)	PACKING INSTRUCTION	P132(b)
(Articles without closed casings)		
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Receptacles fibreboard metal plastics **Sheets** paper plastics	Not necessary	**Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)

P133	PACKING INSTRUCTION	P133
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Receptacles** fibreboard metal plastics wood **Trays, fitted with dividing partitions** fibreboard plastics wood	**Intermediate packagings** **Receptacles** fibreboard metal plastics wood	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)
Additional requirement: Receptacles are only required as intermediate packagings when the inner packagings are trays.		
Special packing provision: **PP69** For UN Nos. 0043, 0212, 0225, 0268 and 0306, trays shall not be used as inner packagings.		

P134	PACKING INSTRUCTION	P134
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** water resistant **Receptacles** fibreboard metal plastics wood **Sheets** fibreboard, corrugated **Tubes** fibreboard	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) plastics, removable head (1H2) fibreboard (1G)

P135	PACKING INSTRUCTION	P135
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** paper plastics **Receptacles** fibreboard metal plastics wood **Sheets** paper plastics	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)

P136	PACKING INSTRUCTION	P136
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** plastics textile **Boxes** fibreboard plastics wood **Dividing portions in the outer packagings**	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)

P137	PACKING INSTRUCTION	P137
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** plastics **Boxes** fibreboard **Tubes** fibreboard metal plastics **Dividing partitions in the outer packagings**	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibre (1G) plastics, removable head (1H2)
Special packing provision: **PP70** For UN Nos. 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity shall face downwards and the package marked "THIS SIDE UP". When the shaped charges are packed in pairs, the conical cavities shall face inwards to minimize the jetting effect in the event of accidental initiation.		

P138	PACKING INSTRUCTION	P138
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** plastics	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) plastics, removable head (1H2) fibreboard (1G)
Additional requirement: If the ends of the articles are sealed, inner packagings are not necessary.		

P139	PACKING INSTRUCTION	P139
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Bags** plastics **Receptacles** fibreboard metal plastics wood **Reels** **Sheets** paper plastics	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibre (1G) plastics, removable head (1H2)
Special packing provisions: **PP71** For UN Nos. 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord shall be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of flexible detonating cord shall be fastened securely. **PP72** For UN 0065 and UN 0289, inner packagings are not required when they are in coils.		

P140	PACKING INSTRUCTION	P140
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Bags plastics **Reels** **Sheets** paper, kraft plastics	Not necessary	**Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plywood (1D) plastics, removable head (1H2)
Special packing provisions: **PP73** For UN 0105, no inner packagings are required if the ends are sealed. **PP74** For UN 0101, the packaging shall be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps. **PP75** For UN 0101, steel or aluminium boxes or drums shall not be used.		

P141	PACKING INSTRUCTION	P141
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
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** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)

P142	PACKING INSTRUCTION	P142
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
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** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) fibre (1G) plastics, removable head (1H2) plywood (1D)

P143	PACKING INSTRUCTION	P143
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Bags paper, kraft plastics textile textile, rubberized **Receptacles** fibreboard metal plastics **Trays, fitted with dividing partitions** plastics wood	Not necessary	**Boxes** steel (4A) aluminium (4B) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plywood (1D) fibre (1G) plastics, removable head (1H2)
Additional requirement: Instead of the above inner and outer packagings, composite packagings (6HH2) (plastic receptacle with outer solid box) may be used.		
Special packing provisions: **PP76** For UN Nos. 0271, 0272, 0415 and 0491, when metal packagings are used, metal packagings shall be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes is prevented.		

P144	PACKING INSTRUCTION	P144
The following packagings are authorized, provided the general packing provisions of **4.1.1**, **4.1.3** and special packing provisions of **4.1.5** are met:		
Inner packagings **Receptacles** fibreboard metal plastics **Dividing partitions in the outer packagings.**	**Intermediate packagings** Not necessary	**Outer packagings** **Boxes** steel (4A) aluminium (4B) natural wood, ordinary with metal liner (4C1) plywood (4D) with metal liner reconstituted wood (4F) with metal liner plastics, expanded (4H1) plastics, solid (4H2) **Drums** steel, removable head (1A2) aluminium, removable head (1B2) plastics, removable head (1H2)
Special packing provision: **PP 77** For UN Nos. 0248 and 0249, packagings shall be protected against the ingress of water. When water-activated contrivances are transported unpackaged, they shall be provided with at least two independent protective features which prevent the ingress of water.		

P200	PACKING INSTRUCTION	P200

For pressure receptacles, the general packing requirements of 4.1.6.1 shall be met. In addition, for MEGCs, the general requirements of 4.2.4 shall be met.

Cylinders, tubes, pressure drums, bundles of cylinders constructed as specified in 6.2 and MEGCs constructed as specified in 6.7.5 are authorised for the transport of a specific substance when specified in the following tables. For some substances the special packing provisions may prohibit a particular type of cylinder, tube, pressure drum or bundle of cylinders.

(1) Pressure receptacles containing toxic substances with an LC_{50} less than or equal to 200 ml/m^3 (ppm) as specified in the table shall not be equipped with any pressure relief device. Pressure relief devices shall be fitted on pressure receptacles used for the transport of UN 1013 carbon dioxide and UN 1070 nitrous oxide. Other pressure receptacles shall be fitted with a pressure relief device if specified by the competent 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, shall be specified by the competent authority of the country of use.

(2) The following three tables cover compressed gases (Table 1), liquefied and dissolved gases (Table 2) and substances not in Class 2 (Table 3). 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 pressure receptacles authorised for the substance, shown by the letter "X";

(d) the maximum test period for periodic inspection of the pressure receptacles;

(e) the minimum test pressure of the pressure receptacles;

(f) the maximum working pressure of the pressure receptacles for compressed gases (where no value is given, the working pressure shall 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 shall pressure receptacles be filled in excess of the limit permitted in the following requirements.

(a) For compressed gases, the working pressure shall be not more than two thirds of the test pressure of the pressure receptacles. Restrictions to this upper limit on working pressure are imposed by (4), special packing provision o. In no case shall the internal pressure at 65 °C exceed the test pressure.

(b) For high pressure liquefied gases, the filling ratio shall be such that the settled pressure at 65 °C does not exceed the test pressure of the pressure receptacles.

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 (4), special packing provision o applies.

For high pressure liquefied gases for which data is not provided in the table, the maximum filling ratio (FR) shall 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 shall 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 (filling factor) shall equal 0.95 times the density of the liquid phase at 50 °C; in addition, the liquid phase shall not fill the pressure receptacle at any temperature up to 60 °C. The test pressure of the pressure receptacle shall 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 shall be determined as follows:

$$FR = (0.0032 \times BP - 0.24) \times d_l$$

where FR = maximum filling ratio
BP = boiling point (in Kelvin)
d_l = density of the liquid at boiling point (in kg/l)

(d) For UN 1001, acetylene, dissolved, and UN 3374 acetylene, solvent free, see (4), special packing provision p.

(4) Keys for the column "Special packing provisions":

Material compatibility (for gases see ISO 11114-1:1997 and ISO 11114-2:2000)

a: Aluminium alloy pressure receptacles are not authorized.

b: Copper valves shall not be used.

c: Metal parts in contact with the contents shall not contain more than 65% copper.

d: When steel pressure receptacles are used, only those bearing the "H" mark shall be authorized.

Requirements for toxic substances with an LC_{50} less than or equal to 200 ml/m^3 (ppm)

k: Valve outlets shall be fitted with gas tight plugs or caps.

Each cylinder within a bundle shall be fitted with an individual valve that shall be closed during transport. After filling, the manifold shall be evacuated, purged and plugged.

The pressure receptacle(s) shall:

(i) have a test pressure greater than or equal to 200 bar and a minimum wall thickness of 3.5 mm for aluminium alloy or 2 mm for steel; or

(ii) have an outer packaging meeting the packing group I performance level.

Pressure receptacles shall not be fitted with a pressure relief device.

Cylinders and individual cylinders in a bundle shall be limited to a maximum water capacity of 85 litres.

Each valve shall have a taper threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle.

Each valve shall either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing.

Each pressure receptacle shall be tested for leakage after filling.

Gas specific provisions

l: UN 1040 ethylene oxide may also be packed in hermetically sealed glass 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 shall 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 total quantity in any outer packaging shall not exceed 2.5 kg.

m: Pressure receptacles shall be filled to a working pressure not exceeding 5 bar.

n: A pressure receptacle shall contain not more than 5 kg of the gas.

o: In no case shall 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 shall be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene shall not exceed the values prescribed in the approval or in ISO 3807-1:2000 or ISO 3807-2:2000, as applicable.

For UN 1001 acetylene, dissolved: cylinders shall contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000 or ISO 3807-2:2000, as applicable); cylinders fitted with pressure relief devices or manifolded together shall be transported vertically.

The test pressure of 52 bar applies only to cylinders conforming to ISO 3807-2:2000.

q: The valves of pressure receptacles for pyrophoric gases or flammable mixtures of gases containing more than 1% of pyrophoric compounds shall be fitted with gas-tight plugs or caps. When these pressure receptacles are manifolded in a bundle, each of the pressure receptacles shall be fitted with an individual valve that shall be closed during transport, and the manifold outlet valve shall be fitted with a gas-tight plug or cap.

s: Aluminium alloy pressure receptacles shall 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 pressure receptacles when the alloy of the pressure receptacle has been subjected to stress corrosion testing as specified in ISO 7866:1999.

v: The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the competent authority of the country of use.

Requirements for N.O.S. descriptions and for mixtures

z: The construction materials of the pressure receptacles and their accessories shall be compatible with the contents and shall not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio shall be calculated in accordance with the relevant requirements of (3).

Toxic substances with an LC_{50} less than or equal to 200 ml/m^3 shall not be transported in tubes, pressure drums or MEGCs and shall meet the requirements of special packing provision k.

For pressure receptacles containing pyrophoric gases or flammable mixtures of gases containing more than 1% pyrophoric compounds, the requirements of special packing provision q shall be met.

The necessary steps shall be taken to prevent dangerous reactions (i.e. polymerisation or decomposition) during transport. If necessary, stabilisation or addition of an inhibitor shall be required.

Mixtures containing UN 1911 diborane, shall be filled to a pressure such that, if complete decomposition of the diborane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded.

Table 1: COMPRESSED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Tubes	Pressure drums	Bundles of cylinders	MEGCs	Test period, years	Test pressure, bar[1]	Working pressure, bar[1]	Special packing provisions
1002	AIR, COMPRESSED	2.2			X	X	X	X	X	10			
1006	ARGON, COMPRESSED	2.2			X	X	X	X	X	10			
1014	CARBON DIOXIDE AND OXYGEN MIXTURE, COMPRESSED	2.2	5.1		X	X	X	X	X	10			
1016	CARBON MONOXIDE, COMPRESSED	2.3	2.1	3760	X	X	X	X	X	5			u
1023	COAL GAS, COMPRESSED	2.3	2.1		X	X	X	X	X	5			
1045	FLUORINE, COMPRESSED	2.3	5.1 8	185	X			X		5	200	30	a, k, n, o
1046	HELIUM, COMPRESSED	2.2			X	X	X	X	X	10			
1049	HYDROGEN, COMPRESSED	2.1			X	X	X	X	X	10			d
1056	KRYPTON, COMPRESSED	2.2			X	X	X	X	X	10			
1065	NEON, COMPRESSED	2.2			X	X	X	X	X	10			
1066	NITROGEN, COMPRESSED	2.2			X	X	X	X	X	10			
1071	OIL GAS, COMPRESSED	2.3	2.1		X	X	X	X	X	5			
1072	OXYGEN, COMPRESSED	2.2	5.1		X	X	X	X	X	10			s
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	2.3			X	X	X	X	X	5			z
1660	NITRIC OXIDE, COMPRESSED	2.3	5.1 8	115	X			X		5	200	50	k, o
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		X	X	X	X	X	5			z
1954	COMPRESSED GAS, FLAMMABLE, N.O.S	2.1			X	X	X	X	X	10			z
1955	COMPRESSED GAS, TOXIC, N.O.S.	2.3			X	X	X	X	X	5			z
1956	COMPRESSED GAS, N.O.S.	2.2			X	X	X	X	X	10			z
1957	DEUTERIUM, COMPRESSED	2.1			X	X	X	X	X	10			d
1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S	2.1			X	X	X	X	X	10			z
1971	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content	2.1			X	X	X	X	X	10			
1979	RARE GASES MIXTURE, COMPRESSED	2.2			X	X	X	X	X	10			

[1] *Where the entries are blank, the working pressure shall not exceed two thirds of the test pressure.*

Table 1: COMPRESSED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Tubes	Pressure drums	Bundles of cylinders	MEGCs	Test period, years	Test pressure, bar[1]	Working pressure, bar[1]	Special packing provisions
1980	RARE GASES AND OXYGEN MIXTURE, COMPRESSED	2.2			X	X	X	X	X	10			
1981	RARE GASES AND NITROGEN MIXTURE, COMPRESSED	2.2			X	X	X	X	X	10			
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	2.1			X	X	X	X	X	10			d
2190	OXYGEN DIFLUORIDE, COMPRESSED	2.3	5.1 8	2.6	X			X		5	200	30	a, k, n, o
2600	CARBON MONOXIDE AND HYDROGEN MIXTURE, COMPRESSED	2.3	2.1		X	X	X	X	X	5			d, u
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	2.2	5.1		X	X	X	X	X	10			z
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	5.1		X	X	X	X	X	5			z
3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	8		X	X	X	X	X	5			z
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	2.1 8		X	X	X	X	X	5			z
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	5.1 8		X	X	X	X	X	5			z

[1] *Where the entries are blank, the working pressure shall not exceed two thirds of the test pressure.*

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1001	ACETYLENE, DISSOLVED	2.1			X		X			10	60 52		c, p
1005	AMMONIA, ANHYDROUS	2.3	8	4000	X	X	X	X	X	5	33	0.53	b
1008	BORON TRIFLUORIDE	2.3	8	387*	X	X	X	X	X	5	225 300	0.715 0.86	
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2.2			X	X	X	X	X	10	42 120 250	1.13 1.44 1.60	
1010	BUTADIENES, STABILIZED (1,2-butadiene), or	2.1			X	X	X	X	X	10	10	0.59	
1010	BUTADIENES, STABILIZED (1,3-butadiene), or	2.1			X	X	X	X	X	10	10	0.55	
1010	BUTADIENES, STABILIZED (mixtures of 1,3-butadiene and hydrocarbons)	2.1			X	X	X	X	X	10	10	0.50	z
1011	BUTANE	2.1			X	X	X	X	X	10	10	0.51	v
1012	BUTYLENE (butylenes mixture) or	2.1			X	X	X	X	X	10	10	0.50	z
1012	BUTYLENE (1-butylene) or	2.1			X	X	X	X	X	10	10	0.53	
1012	BUTYLENE (cis-2-butylene) or	2.1			X	X	X	X	X	10	10	0.55	
1012	BUTYLENE (trans-2 butylene)	2.1			X	X	X	X	X	10	10	0.54	
1013	CARBON DIOXIDE	2.2			X	X	X	X	X	10	190 250	0.66 0.75	
1015	CARBON DIOXIDE AND NITROUS OXIDE MIXTURE	2.2			X	X	X	X	X	10	250	0.75	
1017	CHLORINE	2.3	8	293	X	X	X	X	X	5	22	1.25	a
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	2.2			X	X	X	X	X	10	29	1.03	
1020	CHLOROPENTAFLUORO-ETHANE (REFRIGERANT GAS R 115)	2.2			X	X	X	X	X	10	25	1.08	
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2.2			X	X	X	X	X	10	12	1.20	
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	2.2			X	X	X	X	X	10	100 120 190 250	0.83 0.90 1.04 1.10	
1026	CYANOGEN	2.3	2.1	350	X	X	X	X	X	5	100	0.70	u
1027	CYCLOPROPANE	2.1			X	X	X	X	X	10	20	0.53	
1028	DICHLORODIFLUORO-METHANE (REFRIGERANT GAS R 12)	2.2			X	X	X	X	X	10	18	1.15	
1029	DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)	2.2			X	X	X	X	X	10	10	1.23	

* *This LC_{50} value is under review.*

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2.1			X	X	X	X	X	10	18	0.79	
1032	DIMETHYLAMINE, ANHYDROUS	2.1			X	X	X	X	X	10	10	0.59	b
1033	DIMETHYL ETHER	2.1			X	X	X	X	X	10	18	0.58	
1035	ETHANE	2.1			X	X	X	X	X	10	95 120 300	0.25 0.29 0.39	
1036	ETHYLAMINE	2.1			X	X	X	X	X	10	10	0.61	b
1037	ETHYL CHLORIDE	2.1			X	X	X	X	X	10	10	0.80	a
1039	ETHYL METHYL ETHER	2.1			X	X	X	X	X	10	10	0.64	
1040	ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C	2.3	2.1	2900*	X	X	X	X	X	5	15	0.78	l
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% ethylene oxide but not more than 87%	2.1			X	X	X	X	X	10	190 250	0.66 0.75	
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	2.2			X	X	X			5			b, z
1048	HYDROGEN BROMIDE, ANHYDROUS	2.3	8	2860	X	X	X	X	X	5	60	1.54	a, d
1050	HYDROGEN CHLORIDE, ANHYDROUS	2.3	8	2810*	X	X	X	X	X	5	100 120 150 200	0.30 0.56 0.67 0.74	a, d a, d a, d a, d
1053	HYDROGEN SULPHIDE	2.3	2.1	712	X	X	X	X	X	5	55	0.67	d, u
1055	ISOBUTYLENE	2.1			X	X	X	X	X	10	10	0.52	
1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2.2			X	X	X	X	X	10	Test pressure = 1.5 x working pressure		
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED or METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED (Propadiene with 1% to 4% methylacetylene)	2.1 2.1			X X	X X	X X	X X	X X	10 10	22	0.52	c, z c
1061	METHYLAMINE, ANHYDROUS	2.1			X	X	X	X	X	10	13	0.58	b
1062	METHYL BROMIDE	2.3		850	X	X	X	X	X	5	10	1.51	a
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2.1			X	X	X	X	X	10	17	0.81	a
1064	METHYL MERCAPTAN	2.3	2.1	1350	X	X	X	X	X	5	10	0.78	d, u
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2.3	5.1 8	115	X		X			5	10	1.30	k

* *This LC_{50} value is under review.*

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1069	NITROSYL CHLORIDE	2.3	8	35	X		X			5	13	1.10	k
1070	NITROUS OXIDE	2.2	5.1		X	X	X	X	X	10	180 225 250	0.68 0.74 0.75	
1075	PETROLEUM GASES, LIQUEFIED	2.1			X	X	X	X	X	10			v, z
1076	PHOSGENE	2.3	8	5	X	X	X			5	20	1.23	k
1077	PROPYLENE	2.1			X	X	X	X	X	10	30	0.43	
1078	REFRIGERANT GAS, N.O.S.	2.2			X	X	X	X	X	10			z
1079	SULPHUR DIOXIDE	2.3	8	2520	X	X	X	X	X	5	14	1.23	
1080	SULPHUR HEXAFLUORIDE	2.2			X	X	X	X	X	10	70 140 160	1.04 1.33 1.37	
1081	TETRAFLUOROETHYLENE, STABILIZED	2.1			X	X	X	X	X	10	200		m, o
1082	TRIFLUOROCHLOROETHYLENE, STABILIZED	2.3	2.1	2000	X	X	X	X	X	5	19	1.13	u
1083	TRIMETHYLAMINE, ANHYDROUS	2.1			X	X	X	X	X	10	10	0.56	b
1085	VINYL BROMIDE, STABILIZED	2.1			X	X	X	X	X	10	10	1.37	a
1086	VINYL CHLORIDE, STABILIZED	2.1			X	X	X	X	X	10	12	0.81	a
1087	VINYL METHYL ETHER, STABILIZED	2.1			X	X	X	X	X	10	10	0.67	
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE	2.3		850	X	X	X	X	X	5	10	1.51	a
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2.3		*	X	X	X	X	X	5	17	0.81	a
1589	CYANOGEN CHLORIDE, STABILIZED	2.3	8	80	X		X			5	20	1.03	k
1741	BORON TRICHLORIDE	2.3	8	2541	X	X	X	X	X	5	10	1.19	
1749	CHLORINE TRIFLUORIDE	2.3	5.1 8	299	X	X	X	X	X	5	30	1.40	a
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2.2			X	X	X	X	X	10	22	1.11	
1859	SILICON TETRAFLUORIDE	2.3	8	450	X	X	X	X	X	5	200 300	0.74 1.10	
1860	VINYL FLUORIDE, STABILIZED	2.1			X	X	X	X	X	10	250	0.64	a
1911	DIBORANE	2.3	2.1	80	X		X			5	250	0.07	d, k, o
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2.1			X	X	X	X	X	10	17	0.81	a
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2.2			X	X	X	X	X	10	190 250	0.66 0.75	

* *This LC_{50} value is under review.*

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2.2			X	X	X	X	X	10	10	1.30	
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2.1			X	X	X	X	X	10	250	0.77	
1962	ETHYLENE	2.1			X	X	X	X	X	10	225 300	0.34 0.37	
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	2.1			X	X	X	X	X	10			v, z
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2.3			X	X	X	X	X	5			z
1968	INSECTICIDE GAS, N.O.S.	2.2			X	X	X	X	X	10			z
1969	ISOBUTANE	2.1			X	X	X	X	X	10	10	0.49	v
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUORO-ETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2.2			X	X	X	X	X	10	31	1.05	
1974	CHLORODIFLUOROBROMO-METHANE (REFRIGERANT GAS R 12B1)	2.2			X	X	X	X	X	10	10	1.61	
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	2.3	5.1 8	115	X	X	X			5			k, z
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	2.2			X	X	X	X	X	10	11	1.34	
1978	PROPANE	2.1			X	X	X	X	X	10	25	0.42	v
1982	TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)	2.2			X	X	X	X	X	10	200 300	0.62 0.94	
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	2.2			X	X	X	X	X	10	10	1.18	
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2.2			X	X	X	X	X	10	190 250	0.87 0.95	
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2.1			X	X	X	X	X	10	35	0.75	
2036	XENON	2.2			X	X	X	X	X	10	130	1.24	
2044	2,2-DIMETHYLPROPANE	2.1			X	X	X	X	X	10	10	0.53	
2073	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 40% ammonia with more than 40% but not more than 50% ammonia	2.2			 X X	 X X	 X X	 X X	 X X	 5 5	 10 12	 0.80 0.77	 b b

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
2188	ARSINE	2.3	2.1	20	X		X			5	42	1.10	d, k
2189	DICHLOROSILANE	2.3	2.1 8	314	X	X	X	X	X	5	10	0.90	
2191	SULPHURYL FLUORIDE	2.3		3020	X	X	X	X	X	5	50	1.10	u
2192	GERMANE	2.3	2.1	620*	X	X	X	X	X	5	250	1.02	d
2193	HEXAFLUOROETHANE (REFRIGERANT GAS R 116)	2.2			X	X	X	X	X	10	200	1.10	
2194	SELENIUM HEXAFLUORIDE	2.3	8	50	X		X			5	36	1.46	k
2195	TELLURIUM HEXAFLUORIDE	2.3	8	25	X		X			5	20	1.00	k
2196	TUNGSTEN HEXAFLUORIDE	2.3	8	160*	X		X			5	10	2.70	a, k
2197	HYDROGEN IODIDE, ANHYDROUS	2.3	8	2860	X	X	X	X	X	5	23	2.25	a, d
2198	PHOSPHORUS PENTAFLUORIDE	2.3	8	190*	X		X			5	200 300	0.90 1.34	k k
2199	PHOSPHINE	2.3	2.1	20	X		X			5	225 250	0.30 0.45	d, k d, k
2200	PROPADIENE, STABILIZED	2.1			X	X	X	X	X	10	22	0.50	
2202	HYDROGEN SELENIDE, ANHYDROUS	2.3	2.1	2	X		X			5	31	1.60	k
2203	SILANE	2.1			X	X	X	X	X	10	225 250	0.32 0.36	d, q d, q
2204	CARBONYL SULPHIDE	2.3	2.1	1700	X	X	X	X	X	5	26	0.84	u
2417	CARBONYL FLUORIDE	2.3	8	360	X	X	X	X	X	5	200 300	0.47 0.70	
2418	SULPHUR TETRAFLUORIDE	2.3	8	40	X		X			5	30	0.91	k
2419	BROMOTRIFLUOROETHYLENE	2.1			X	X	X	X	X	10	10	1.19	
2420	HEXAFLUOROACETONE	2.3	8	470	X	X	X	X	X	5	22	1.08	
2421	NITROGEN TRIOXIDE	2.3	5.1 8	57*	X		X			5			k
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2.2			X	X	X	X	X	10	12	1.34	
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2.2			X	X	X	X	X	10	25	1.09	
2451	NITROGEN TRIFLUORIDE	2.2	5.1		X	X	X	X	X	10	200 300	0.50 0.75	
2452	ETHYLACETYLENE, STABILIZED	2.1			X	X	X	X	X	10	10	0.57	c
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2.1			X	X	X	X	X	10	30	0.57	
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2.1			X	X	X	X	X	10	300	0.36	
2455	METHYL NITRITE	2.2											

* *This LC_{50} value is under review.*

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2.1			X	X	X	X	X	10	10	0.99	
2534	METHYLCHLOROSILANE	2.3	2.1 8	600	X	X	X	X	X	5			z
2548	CHLORINE PENTAFLUORIDE	2.3	5.1 8	122	X		X			5	13	1.49	a, k
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	2.2			X	X	X	X	X	10	31 42 100	0.11 0.20 0.66	
2601	CYCLOBUTANE	2.1			X	X	X	X	X	10	10	0.63	
2602	DICHLORODIFLUORO-METHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	2.2			X	X	X	X	X	10	22	1.01	
2676	STIBINE	2.3	2.1	20	X		X			5	20	1.20	k
2901	BROMINE CHLORIDE	2.3	5.1 8	290	X	X	X	X	X	5	10	1.50	a
3057	TRIFLUOROACETYL CHLORIDE	2.3	8	10*	X	X	X			5	17	1.17	k
3070	ETHYLENE OXIDE AND DICHLORODIFLUORO-METHANE MIXTURE with not more than 12,5% ethylene oxide	2.2			X	X	X	X	X	10	18	1.09	
3083	PERCHLORYL FLUORIDE	2.3	5.1	770	X	X	X	X	X	5	33	1.21	k, u
3153	PERFLUORO(METHYL VINYL ETHER)	2.1			X	X	X	X	X	10	20	0.75	
3154	PERFLUORO(ETHYL VINYL ETHER)	2.1			X	X	X	X	X	10	10	0.98	
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2.2	5.1		X	X	X	X	X	10			z
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	2.2			X	X	X	X	X	10	22	1.04	
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		X	X	X	X	X	5			z
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2.1			X	X	X	X	X	10			z
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2.3			X	X	X	X	X	5			z
3163	LIQUEFIED GAS, N.O.S.	2.2			X	X	X	X	X	10			z
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2.2			X	X	X	X	X	10	49 36	0.95 0.72	

* *This LC_{50} value is under review.*

Table 2: LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2.1			X	X	X	X	X	10	48	0.78	
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2.2			X	X	X	X	X	10	15	1.20	
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUORO-ETHANE MIXTURE with not more than 8.8% ethylene oxide	2.2			X	X	X	X	X	10	10	1.16	
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	2.2			X	X	X	X	X	10	26	1.02	
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	2.2			X	X	X	X	X	10	17	1.03	
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2.3	2.1	More than 2900	X	X	X	X	X	5	28	0.73	
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	5.1		X	X	X	X	X	5			z
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	8		X	X	X	X	X	5			z
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	2.1 8		X	X	X	X	X	5			z
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	5.1 8		X	X	X	X	X	5			z
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	2.3	8		X	X	X	X	X	5			b
3337	REFRIGERANT GAS R 404A	2.2			X	X	X	X	X	10	36	0.82	
3338	REFRIGERANT GAS R 407A	2.2			X	X	X	X	X	10	36	0.94	
3339	REFRIGERANT GAS R 407B	2.2			X	X	X	X	X	10	38	0.93	
3340	REFRIGERANT GAS R 407C	2.2			X	X	X	X	X	10	35	0.95	
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S	2.1			X	X	X	X	X	10			z
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		X	X	X	X	X	5			z
3374	ACETYLENE, SOLVENT FREE	2.1			X		X			5	60 52		c, p

Table 3: SUBSTANCES NOT IN CLASS 2

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	3	140	X		X			5	100	0.55	k
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	6.1	966*	X	X	X			5	10	0.84	
1745	BROMINE PENTAFLUORIDE	5.1	6.1 8	25*	X		X			5	10	**	k
1746	BROMINE TRIFLUORIDE	5.1	6.1 8	180	X		X			5	10	**	k
2495	IODINE PENTAFLUORIDE	5.1	6.1 8	120	X		X			5	10	**	k
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	3	6.1		X	X	X			5	10		z

* *This LC_{50} value is under review.*

** *A minimum ullage of 8% by volume is required.*

P201	PACKING INSTRUCTION	P201

This instruction applies to UN 3167, UN 3168 and UN 3169.

The following packagings are authorized:

(1) Compressed gas cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the competent authority.

(2) In addition, the following packagings are authorized provided that the general provisions of **4.1.1** and **4.1.3** are met:

(a) For non-toxic gases, combination packagings with hermetically sealed inner packagings of glass or metal with a maximum capacity of 5 litres per package which meet the packing group III performance level.

(b) For toxic gases, combination packagings with hermetically sealed inner packagings of glass or metal with a maximum capacity of 1 litre per package which meet the packing group III performance level.

P202	PACKING INSTRUCTION	P202

(Reserved)

P203	PACKING INSTRUCTION	P203

Cryogenic receptacles conforming to the construction, testing and filling requirements approved by the competent authority are authorized.

P300	PACKING INSTRUCTION	P300

This instruction applies to UN 3064.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

Combination packagings consisting of inner metal cans of not more than 1 litre capacity each and outer wooden boxes (4C1, 4C2, 4D or 4F) containing not more than 5 litres of solution.

Additional requirements:

1. Metal cans shall be completely surrounded with absorbent cushioning material.
2. Wooden boxes shall be completely lined with suitable material impervious to water and nitroglycerin.

P301	PACKING INSTRUCTION	P301

This instruction applies to UN 3165.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) Aluminium pressure vessel made from tubing and having welded heads.
Primary containment of the fuel within this vessel shall consist of a welded aluminium bladder having a maximum internal volume of 46 litres.
The outer vessel shall have a minimum design gauge pressure of 1,275 kPa and a minimum burst gauge pressure of 2,755 kPa.
Each vessel shall be leak checked during manufacture and before shipment and shall be found leakproof.
The complete inner unit shall 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 unit and package is 42 litres.

(2) Aluminium pressure vessel.
Primary containment of the fuel within this vessel shall consist of a welded vapour tight fuel compartment with an elastomeric bladder having a maximum internal volume of 46 litres.
The pressure vessel shall have a minimum design gauge pressure of 2,680 kPa and a minimum burst pressure of 5,170 kPa.
Each vessel shall be leak-checked during manufacture and before shipment and shall 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 unit and package is 42 litres.

P302	PACKING INSTRUCTION	P302
This instruction applies to UN 3269.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: Combination packagings which meet the packing group II or III performance level according to the criteria for class 3, applied to the base material. The base material and the activator (organic peroxide) shall be each separately packed in inner packagings. The components may be placed in the same outer packaging provided they will not interact dangerously in the event of a leakage. The activator shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 grams per inner packaging if solid.		

P400	PACKING INSTRUCTION	P400
The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met: (1) Steel cylinders, pressure drums and tubes having a minimum design pressure of 1000 kPa conforming to the provisions of packing instruction P200. Valves shall be protected with steel valve protection caps or collars or the cylinders, pressure drums or tubes shall be overpacked in strong wood, fibreboard or plastics boxes. Cylinders, pressure drums and tubes shall be secured to prevent movement in the box and shall be packaged and transported so that pressure relief devices remain in the vapour space during normal conditions of handling and transport. Filling shall not be greater than 90% of the capacity of the cylinder, pressure drum or tube. (2) Boxes (4A, 4B, 4C1, 4C2, 4D, 4F or 4G), drums (1A2, 1B2, 1N2, 1D or 1G) or jerricans (3A2 or 3B2) enclosing hermetically sealed metal cans with inner packagings of glass or metal, with a capacity of not more than 1 litre each, having threaded closures with gaskets. Inner packagings shall be cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents. Inner packagings shall not be filled to more than 90% of their capacity. Outer packagings shall have a maximum net mass of 125 kg. (3) Steel, aluminium or metal drums (1A2, 1B2 or 1N2), jerricans (3A2 or 3B2) or boxes (4A or 4B) with a maximum net mass of 150 kg each with hermetically sealed inner metal cans not more than 4 litre capacity each, with threaded closures fitted with gaskets. Inner packagings shall be cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents. Each layer of inner packagings shall be separated by a dividing partition in addition to cushioning material. Inner packagings shall not be filled to more than 90% of their capacity.		

P401	PACKING INSTRUCTION	P401

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) Steel cylinders, pressure drums and tubes having a minimum design pressure of 4 bar conforming to the provisions of packing instruction P200. Valves shall be protected with steel valve protection caps or collars or the cylinders, pressure drums or tubes shall be overpacked in strong wood, fibreboard or plastics boxes. Cylinders, pressure drums and tubes shall be secured to prevent movement in the box and shall be packaged and transported so that pressure relief devices remain in the vapour space during normal conditions of handling and transport. Filling shall not be greater than 90% of the capacity of the cylinder, pressure drum or tube.

	Inner packaging	**Outer packaging**
(2) Combination packagings with inner packagings of glass metal or plastics which have threaded closures surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.	1 *l*	30 kg maximum net mass

P402	PACKING INSTRUCTION	P402

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) Steel cylinders, pressure drums and tubes having a minimum design pressure of 4 bar conforming to the provisions of packing instruction P200. Valves shall be protected with steel valve protection caps or collars or the cylinders, pressure drums or tubes shall be overpacked in strong wood, fibreboard or plastics boxes. Cylinders, pressure drums or tubes shall be secured to prevent movement in the box and shall be packaged and transported so that pressure relief devices remain in the vapour space during normal conditions of handling and transport. Filling shall not be greater than 90% of the capacity of the cylinder, pressure drum or tube.

	Inner packaging maximum net mass	**Outer packaging maximum net mass**
(2) Combination packagings with inner packagings of glass, metal or plastics which have threaded closures surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.	10 kg (glass) 15 kg (metal or plastics)	125 kg 125 kg

(3) Steel drums (1A1) with a maximum capacity of 250 litres.

(4) Composite packagings consisting of plastics receptacle in a steel or aluminium drum (6HA1 or 6HB1) with a maximum capacity of 250 litres.

P403	PACKING INSTRUCTION	P403
The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:		
Combination packagings		
Inner packagings Glass 2 kg Plastic 15 kg Metal 20 kg Inner packagings shall have threaded closures	**Drums** steel (1A2) aluminium (1B2) other metal (1N2) plastics (1H2) plywood (1D) fibre (1G)	**Maximum net mass** 400 kg 400 kg 400 kg 400 kg 400 kg 400 kg
	Boxes steel (4A) aluminium (4B) natural wood (4C1) natural wood with sift proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)	 400 kg 400 kg 250 kg 250 kg 250 kg 125 kg 125 kg 60 kg 250 kg
	Jerricans steel (3A2) aluminium (3B2) plastics (3H2)	 120 kg 120 kg 120 kg
Single packagings		**Maximum net mass**
Drums steel(1A1, 1A2) aluminium (1B1, 1B2) metal other than steel or aluminium (1N1, 1N2) plastics (1H1, 1H2)		 250 kg 250 kg 250 kg 250 kg
Jerricans steel (3A1, 3A2) aluminium (3B1, 3B2) plastics (3H1, 3H2)		 120 kg 120 kg 120 kg
Composite packagings plastics receptacle in steel or aluminium drums (6HA1 or 6HB1) plastics receptacle in fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1) plastics receptacle in steel, aluminium, wood, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		 250 kg 75 kg 75 kg

P404	PACKING INSTRUCTION	P404

This instruction applies to pyrophoric solids: UN Nos.: 1383, 1854, 1855, 2005, 2008, 2441, 2545, 2546, 2846, 2881, 3052, 3200, 3203.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) Combination packagings

Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 4A, 4B, 4C1, 4C2, 4D, 4F or 4H2)

Inner packagings: Metal packagings with a maximum net mass of 15 kg each. Inner packagings shall be hermetically sealed and have threaded closures.

(2) Metal packagings: (1A1, 1A2, 1B1, 1N1, 1N2, 3A1, 3A2, 3B1 and 3B2)
Maximum gross mass: 150 kg

(3) Composite packagings: Plastics receptacle in a steel or aluminium drum (6HA1 or 6HB1)
Maximum gross mass: 150 kg

P405	PACKING INSTRUCTION	P405

This instruction applies to UN 1381.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) For UN1381, phosphorus wet:

(a) Combination packagings

Outer packagings: (4A, 4B, 4C1, 4C2, 4D or 4F)
Maximum net mass: 75 kg

Inner packagings:

(i) hermetically sealed metal cans, with a maximum net mass of 15 kg; or

(ii) glass inner packagings cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents with a maximum net mass of 2 kg; or

(b) Drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2); maximum net mass: 400 kg
Jerricans (3A1 or 3B1); maximum net mass: 120 kg.

These packagings shall be capable of passing the leakproofness test specified in 6.1.5.4 at the packing group II performance level.

(2) For UN1381, dry phosphorus:

(a) When fused, drums (1A2, 1B2 or 1N2) with a maximum net mass of 400 kg; or

(b) In projectiles or hard cased articles when transported without Class 1 components as specified by the competent authority.

P406	PACKING INSTRUCTION	P406

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) Combination packagings

outer packagings: (4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 1G, 1D, 1H2 or 3H2)

inner packagings: water-resistant packagings.

(2) Plastics, plywood or fibreboard drums (1H2, 1D or 1G) or boxes (4A, 4B, 4C1, 4D, 4F, 4C2 4G and 4H2) with a water resistant inner bag, plastics film lining or water resistant coating

(3) Metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2), plastics drums (1H1 or 1H2), metal jerricans (3A1, 3A2, 3B1 or 3B2), plastics jerricans (3H1 or 3H2), plastics receptacle in steel or aluminium drums (6HA1 or 6HB1), plastics receptacle in fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1), plastics receptacle in steel, aluminium, wood, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2).

Additional requirements:

1. Packagings shall be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.
2. Packagings shall be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar).
3. The type of packaging and maximum permitted quantity per packaging are limited by the provisions of 2.1.3.5.

Special packing provisions:

PP24 UN 2852, 3364, 3365, 3366, 3367, 3368 and 3369 shall not be transported in quantities of more than 500 g per package.

PP25 UN 1347 shall not be transported in quantities of more than 15 kg per package.

PP26 For UN Nos. 1310, 1320, 1321, 1322, 1344, 1347, 1348, 1349, 1517, 2907, 3317 and 3344 packagings shall be lead free.

PP78 UN 3370 shall not be transported in quantities of more than 11.5 kg per package.

PP80 For UN Nos. 2907 and 3344, packagings shall meet the packing group II performance level. Packagings meeting the test criteria of packing group I shall not be used.

P407	PACKING INSTRUCTION	P407

This instruction applies to UN Nos. 1331, 1944, 1945 and 2254.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

Combination packagings comprising securely closed inner packagings to prevent accidental ignition under normal conditions of transport. The maximum net mass of the outer packagings shall not exceed 45 kg except for fibreboard boxes which shall not exceed 30 kg.

Additional requirement:

Matches shall be tightly packed.

Special packing provision:

PP27 UN 1331, Strike-anywhere matches shall not be packed in the same outer packaging with any other dangerous goods other than safety matches or wax Vesta matches, which shall be packed in separate inner packagings. Inner packagings shall not contain more than 700 strike-anywhere matches.

P408	PACKING INSTRUCTION	P408

This instruction applies to UN 3292.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) For cells:

Outer packagings with 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. Packagings shall conform to the packing group II performance level.

(2) For batteries:

Batteries may be carried unpacked or in protective enclosures (e.g. in fully enclosed or wooden slatted crates). The terminals shall not support the weight of other batteries or materials packed with the batteries.

Additional requirement:

Batteries shall be protected against short circuit and shall be isolated in such a manner as to prevent short circuits.

P409	PACKING INSTRUCTION	P409

This instruction applies to UN Nos. 2956, 3242 and 3251.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) Fibre drum (1G) which may be fitted with a liner or coating; maximum net mass: 50 kg

(2) Combination packagings: Fibreboard box (4G) with a single inner plastic bag; maximum net mass 50 kg

(3) Combination packagings: Fibreboard box (4G) or fibre drum (1G) with inner plastic packagings each containing a maximum of 5 kg; maximum net mass: 25 kg

P410	PACKING INSTRUCTION	P410

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

Combination packagings

Inner packagings	Outer packagings	Maximum net mass	
		Packing group II	Packing group III
Glass 10 kg Plastics[1] 30 kg Metal 40 kg Paper[1, 2] 10 kg Fibre[1, 2] 10 kg [1] *Packagings shall be siftproof.* [2] *These inner packagings shall not be used when the substances being transported may become liquid during transport.*	**Drums**		
	steel (1A2)	400 kg	400 kg
	aluminium (1B2)	400 kg	400 kg
	other metal (1N2)	400 kg	400 kg
	plastics (1H2)	400 kg	400 kg
	plywood (1D)	400 kg	400 kg
	fibre (1G)[1]	400 kg	400 kg
	Boxes		
	steel (4A)	400 kg	400 kg
	aluminium (4B)	400 kg	400 kg
	natural wood (4C1)	400 kg	400 kg
	natural wood with sift proof walls (4C2)	400 kg	400 kg
	plywood (4D)	400 kg	400 kg
	reconstituted wood (4F)	400 kg	400 kg
	fibreboard (4G)[1]	400 kg	400 kg
	expanded plastics (4H1)	60 kg	60 kg
	solid plastics (4H2)	400 kg	400 kg
	Jerricans		
	steel (3A2)	120 kg	120 kg
	aluminium (3B2)	120 kg	120 kg
	plastics (3H2)	120 kg	120 kg
Single packagings			
Drums			
steel (1A1 or 1A2)		400 kg	400 kg
aluminium (1B1 or 1B2)		400 kg	400 kg
metal other than steel, or aluminium (1N1 or 1N2)		400 kg	400 kg
plastics (1H1 or 1H2)		400 kg	400 kg
Jerricans			
steel (3A1 or 3A2)		120 kg	120 kg
aluminium (3B1 or 3B2)		120 kg	120 kg
plastics (3H1 or 3H2)		120 kg	120 kg

P410	PACKING INSTRUCTION (cont'd)	P410
Single packagings (cont=d)	**Packing group II**	**Packing group III**
Boxes		
steel (4A)	400 kg	400 kg
aluminium (4B)	400 kg	400 kg
natural wood (4C1)[3]	400 kg	400 kg
plywood (4D)[3]	400 kg	400 kg
reconstituted wood (4F)[3]	400 kg	400 kg
natural wood with sift proof walls (4C2)[3]	400 kg	400 kg
fibreboard (4G)[3]	400 kg	400 kg
solid plastics (4H2)	400 kg	400 kg
Bags		
Bags (5H3, 5H4, 5L3, 5M2)[3, 4]	50 kg	50 kg
Composite packaging		
plastics receptacle in steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1, 6HD1, or 6HH1)	400 kg	400 kg
plastics receptacle in steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	75 kg	75 kg
glass receptacle in steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1 or 6PG1) or in steel, aluminium, wood, plywood or fibreboard box (6PA2, 6PB2, 6PC, 6PD2, or 6PG2) or in solid or expanded plastics packaging (6PH1 or 6PH2)	75 kg	75 kg

[3] *These packagings shall not be used when the substances being transported may become liquid during transport.*

[4] *These packagings shall only be used for packing group II substances when transported in a closed transport unit.*

Special packing provisions:

PP 39 For UN 1378, for metal packagings a venting device is required.

PP 40 For UN Nos. 1326, 1352, 1358, 1437 and 1871, and for UN 3182, packing group II, bags are not allowed.

P411	PACKING INSTRUCTION	P411
This instruction applies to UN 3270.		
The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met: (1) Fibreboard box with a maximum gross mass of 30 kg; (2) Other packagings, provided that explosion is not possible by reason of increased internal pressure. Maximum net mass shall not exceed 30 kg.		

P500	PACKING INSTRUCTION	P500
This instruction applies to UN 3356.		
The general provisions of **4.1.1** and **4.1.3** shall be met. Packagings shall conform to the packing group II performance level. The generator(s) shall be transported in a package which meets the following requirements when one generator in the package is actuated: (a) Other generators in the package will not be actuated; (b) Packaging material will not ignite; and (c) The outside surface temperature of the completed package shall not exceed 100°C.		

P501	PACKING INSTRUCTION	P501

This instruction applies to UN 2015.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

Combination packagings	**Inner packaging maximum capacity**	**Outer packaging maximum net mass**
(1) Boxes (4A, 4B, 4C1, 4C2, 4D, 4H2) or drums (1A2, 1B2, 1N2, 1H2, 1D) or jerricans (3A2, 3B2, 3N2, 3H2) with glass, plastics or metal inner packagings	5 *l*	125 kg
(2) Fibreboard box (4G) or fibre drum (1G), with plastics or metal inner packagings each in a plastics bag	2 *l*	50 kg

Single packagings	**Maximum capacity**
Drums	
steel (1A1)	250 *l*
aluminium (1B1)	
metal other than steel or aluminium (1N1)	
plastics (1H1)	
Jerricans	
steel (3A1)	60 *l*
aluminium (3B1)	
plastics (3H1)	
Composite packagings	
plastics receptacle in steel or aluminium drum (6HA1, 6HB1)	250 *l*
plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)	250 *l*
plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 *l*
glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood or fibreboard box (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)	60 *l*

Additional requirements:

1. Packagings shall have a minimum ullage of 10%.
2. Packagings shall be vented.

P502	PACKING INSTRUCTION	P502

The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:

Combination packagings		Maximum net mass
Inner packagings	**Drums**	
Glass 5 *l*	steel (1A2)	125 kg
Metal 5 *l*	aluminium (1B2)	125 kg
Plastic 5 *l*	metal other than steel or aluminium(1N2)	125 kg
	plastics (1H2)	125 kg
	plywood (1D)	125 kg
	fibre (1G)	125 kg
	Boxes	
	steel (4A)	125 kg
	aluminium (4B)	125 kg
	natural wood (4C1)	125 kg
	natural wood with sift proof walls (4C2)	125 kg
	plywood (4D)	125 kg
	reconstituted wood (4F)	125 kg
	fibreboard (4G)	125 kg
	expanded plastics (4H1)	60 kg
	solid plastics (4H2)	125 kg

Single packagings	Maximum capacity
Drums	
steel (1A1)	
aluminium (1B1)	250 *l*
plastics (1H1)	
Jerricans	
steels (3A1)	
aluminium (3B1)	
plastics (3H1)	
Composite packagings	
plastics receptacle in steel or aluminium drum (6HA1, 6HB1)	250 *l*
plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)	250 *l*
plastics receptacle in steel or aluminium crate or box or plastics receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 *l*
glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood, fibreboard or plywood box (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)	60 *l*

Special packing provision:

PP28 For UN 1873, only glass inner packagings and glass inner receptacles are authorized respectively for combination packagings and composite packagings.

P503	PACKING INSTRUCTION	P503
The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:		
Combination packagings		**Maximum net mass**
Inner packagings: Glass 5 kg Metal 5 kg Plastic 5 kg	**Drums** steel (1A2) aluminium (1B2) metal other than steel or aluminium (1N2) plastics (1H2) plywood (1D) fibre (1G)	 125 kg 125 kg 125 kg 125 kg 125 kg 125 kg
	Boxes steel (4A) aluminium (4B) natural wood (4C1) natural wood with sift proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)	 125 kg 125 kg 125 kg 125 kg 125 kg 125 kg 40 kg 60 kg 125 kg
Single packagings		
Metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) with a maximum net mass of 250 kg.		
Fibreboard (1G) or plywood drums (1D) fitted with inner liners with a maximum net mass of 200 kg.		

P504	PACKING INSTRUCTION	P504
The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:		
Combination packagings		**Maximum net mass**
(1)	Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H2) Inner packagings: Glass receptacles with a maximum capacity of 5 litres	75 kg
(2)	Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H2) Inner packagings: Plastic receptacles with a maximum capacity of 30 litres	75 kg 125 kg
(3)	Outer packagings: 1G, 4F or 4G Inner packagings: Metal receptacles with a maximum capacity of 40 litres	225 kg
(4)	Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 4A, 4B, 4C1, 4C2, 4D, 4H2) Inner packagings: Metal receptacles with a maximum capacity of 40 litres	
Single packagings		**Maximum capacity**
Drums		
steel, non-removable head (1A1)		250 *l*
aluminium, non-removable head (1B1)		250 *l*
metal other than steel or aluminium, non-removable head (1N1)		250 *l*
plastics, non-removable head (1H1)		250 *l*
Jerricans		
steel non-removable head (3A1)		60 *l*
aluminium non-removable head (3B1)		60 *l*
plastics non-removable head (3H1)		60 *l*
Composite packagings		
plastics receptacle in steel or aluminium drum (6HA1, 6HB1)		250 *l*
plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)		120 *l*
plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		60 l
glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood, fibreboard or plywood box (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)		60 *l*
Special packing provision: **PP29** For UN 2014, minimum ullage shall be 10%.		

P520	PACKING INSTRUCTION	P520

This instruction applies to organic peroxides of Division 5.2 and self-reactive substances of Division 4.1

The packagings listed below are authorized provided the general provision of **4.1.1** and **4.1.3** and special provisions of 4.1.7 are met.

The packing methods are designated OP1 to OP8. The packing methods appropriate for the individual currently assigned organic peroxides and self-reactive substances are listed in 2.4.2.3.2.3 and 2.5.3.2.4. The quantities specified for each packing method are the maximum quantities authorized per package. The following packagings are authorized:

(1) Combination packagings with outer packagings comprising boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2), drums (1A2, 1B2, 1G, 1H2 and 1D) jerricans (3A2, 3B2 and 3H2);

(2) Single packagings consisting of drums (1A1, 1A2, 1B1, 1B2, 1G, 1H1, 1H2 and 1D) and jerricans (3A1, 3A2, 3B1, 3B2, 3H1 and 3H2);

(3) Composite packagings with plastics inner receptacles (6HA1, 6HA2, 6HB1, 6HB2, 6HC, 6HD1, 6HD2, 6HG1, 6HG2, 6HH1 and 6HH2).

Maximum quantity per packaging/package 1/ for packing methods OP1 to OP8

Packing Method	OP1	OP2[1]	OP3	OP4[1]	OP5	OP6	OP7	OP8
Maximum Quantity								
Maximum mass (kg) for solids and for combination packagings (liquid and solid)	*0.5*	*0.5/10*	*5*	*5/25*	*25*	*50*	*50*	*200*[2]
Maximum contents in litres for liquids[3]	*0.5*	-	*5*	-	*30*	*60*	*60*	*225*[4]

[1] *If two values are given, the first applies to the maximum net mass per inner packaging and the second to the maximum net mass of the complete package.*

[2] *60 kg for jerricans/ 100 kg for boxes.*

[3] *Viscous liquids shall be treated as solids when they do not meet the criteria provided in the definition for Aliquids@ presented in 1.2.1.*

[4] *60 litres for jerricans.*

Additional requirements:

1. Metal packagings, including inner packagings of combination packagings and outer packagings of combination or composite packagings may only be used for packing methods OP7 and OP8;
2. In combination packagings, glass receptacles may only be used as inner packagings with a maximum content of 0.5 kg or 0.5 litre.
3. In combination packagings, cushioning materials shall not be readily combustible.
4. The packaging of an organic peroxide or self-reactive substance required to bear an AEXPLOSIVE@ subsidiary risk label shall also comply with the provisions given in 4.1.5.10 and 4.1.5.11.

Special packing provisions:

PP21 For certain self-reactive substances of types B or C, UN 3221, UN3222, UN3223, UN3224, UN3231, UN3232, UN3233 and UN3234 a smaller packaging than that allowed by packing methods OP5 or OP6 respectively shall be used (see 4.1.7 and 2.4.2.3.2.3).

PP22 UN 3241, 2-Bromo-2-nitropropane-1, 3-diol, shall be packed in accordance with packing method OP6.

P600	PACKING INSTRUCTION	P600
This instruction applies to UN Nos. 1700, 2016 and 2017.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H2) meeting the packing group II performance level. The articles shall 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. Maximum net mass: 75 kg		

P601	PACKING INSTRUCTION	P601

The following packagings are authorized provided the general provisions of **4.1.1** and **4.1.3** are met and the packagings are hermetically sealed:

(1) Combination packagings consisting of glass inner packagings not exceeding 1 litre in capacity packed with absorbent material sufficient to absorb the entire contents and inert cushioning material placed in metal receptacles which are individually packed in 1A2, 1B2, 1N2, 1H2, 1D, 1G 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 15 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport.

(2) Combination packagings consisting of metal inner packagings or additionally, for UN 1744 only, in polyvinylidene fluoride (PVDF) inner packagings, not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport.

(3) Combination packagings:

Outer packagings: Plastic or steel drums, removable head (1A2 or 1H2) tested in accordance with the test requirements in 6.1.5 as combination packagings as assembled for transport;

Inner packagings:

Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1), meeting the requirements of Chapter 6.1 for single packagings), subject to the following conditions:

(a) The hydraulic pressure test shall be conducted at a pressure of at least 3 bar (gauge pressure);

(b) The design and production leakproofness tests shall be conducted at a test pressure of 0.30 bar;

(c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides;

(d) Their capacity shall not exceed 125 litres; and

(e) Closures shall be of a screw cap type that are:

(i) physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport; and

(ii) provided with a cap seal.

(f) The outer and inner packagings shall be subjected periodically to a leakproofness test according to (b) at intervals of not more than two and a half years; and

(g) The outer and inner packagings shall bear in clearly legible and durable characters:

(i) the date (month, year) of the initial testing and the latest periodical test;

(ii) the name or authorized symbol of the party performing the tests and inspections.

(4) Cylinders, pressure drums and tubes with a minimum test pressure of 10 bar (gauge pressure) conforming to the provisions of P200. No cylinder, pressure drum or tube may be equipped with any pressure relief device. Cylinders, pressure drums and tubes shall have their valves protected.

P602	PACKING INSTRUCTION	P602

The following packagings are authorised provided the general provisions of **4.1.1** and **4.1.3** are met and the packagings are hermetically sealed:

(1) Combination packagings consisting of glass inner packagings packed with absorbent material sufficient to absorb the entire contents and inert cushioning material placed in metal receptacles which are individually packed in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 50 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport. Inner packagings shall not exceed 1 litre in capacity.

(2) Combination packagings consisting of metal inner packagings individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport. Inner packagings shall not exceed 5 litres in capacity.

(3) Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1), subject to the following conditions:

  (a) The hydraulic pressure test shall be conducted at a pressure of at least 3 bar (gauge pressure);

  (b) The design and production leakproofness tests shall be conducted at a test pressure of 0.30 bar; and

  (c) Closures shall be of a screw cap type that are:

    (i) physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport; and

    (ii) provided with a cap seal.

(4) Cylinders, pressure drums and tubes and gas receptacles with a minimum test pressure of 10 bar (gauge pressure) conforming to the provisions of P200. No cylinder, pressure drum or tube may be equipped with any pressure relief device. Cylinders, pressure drums and tubes shall have their valves protected.

P620	PACKING INSTRUCTION	P620

This instruction applies to UN Nos. 2814 and 2900.

The following packagings are authorized provided the special packing provisions of **4.1.8** are met:

Packagings meeting the requirements of Chapter 6.3 and approved accordingly consisting of:

(a) Inner packagings comprising:

(i) watertight primary receptacle(s);

(ii) a watertight secondary packaging;

(iii) 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 primary receptacles are placed in a single secondary packaging, they shall be individually wrapped so as to prevent contact between them;

(b) An outer packaging of adequate strength for its capacity, mass and intended use. The smallest external dimension shall be at least 100 mm.

Additional requirements:

1. Inner packagings containing infectious substances shall not be consolidated with inner packagings containing unrelated types of goods. Complete packages may be overpacked in accordance with the provisions of 1.2.1 and 5.1.2: such an overpack may contain dry ice.

2. Other than for exceptional consignments, e.g. whole organs which require special packaging, the following additional requirements shall apply:

(a) Lyophilized substances:

Primary receptacles shall be flame-sealed glass ampoules or rubber-stoppered glass vials fitted with metal seals;

(b) Liquid or solid substances:

(i) Substances consigned at ambient temperatures or at a higher temperature. Primary receptacles shall be of glass, metal or plastics. Positive means of ensuring a leakproof seal shall be provided, e.g. a heat seal, a skirted stopper or a metal crimp seal. If screw caps are used, they shall be reinforced with adhesive tape;

(ii) Substances consigned refrigerated or frozen. Ice, dry ice or other refrigerant shall be placed around the secondary packaging(s) or alternatively in an overpack with one or more complete packages marked in accordance with 6.3.1.1. Interior supports shall 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 shall be leakproof. If dry ice is used, the outer packaging or overpack shall permit the release of carbon dioxide gas. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used;

(iii) Substances consigned in liquid nitrogen. Plastics primary receptacles capable of withstanding very low temperature shall be used. The secondary packaging shall 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 shall also be fulfilled. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the liquid nitrogen.

3. Whatever the intended temperature of the consignment, the primary receptacle or the secondary packaging shall be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa and temperatures in the range -40 °C to +55 °C.

P621	PACKING INSTRUCTION	P621
This instruction applies to UN 3291.		
The following packagings are authorized provided the general provisions of **4.1.1** and **4.1.3** and the special provisions of **4.1.8** are met: (1) Rigid, leakproof packagings meeting the requirements of Chapter 6.1 for solids, at the packing group II performance level, provided there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids. (2) For packages containing larger quantities of liquid, rigid packagings meeting the requirements of Chapter 6.1 at the packing group II performance level for liquids.		
Additional requirement: Packagings intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and retain liquids under the performance test conditions in Chapter 6.1.		

P650	PACKING INSTRUCTION	P650

This packing instruction applies to UN 3373.

General provisions

Diagnostic specimens shall be packed in good quality packagings, which shall be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment 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 shall be constructed and closed so as to prevent any loss of contents when prepared for transport which might be caused under normal conditions of transport, by vibration, or by changes in temperature, humidity or pressure.

Primary receptacles shall 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 shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material or of the outer packaging.

For transport each package shall be clearly and durably marked with the words "DIAGNOSTIC SPECIMENS".

The completed package shall be capable of successfully passing the drop test in 6.3.2.5 as specified in 6.3.2.3 and 6.3.2.4 except that the height of the drop shall not be less than 1.2 m.

For Liquids

The primary receptacle(s) shall be leakproof and shall not contain more than 500 ml.

There shall be absorbent material placed between the primary receptacle and the secondary packaging; if several fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them. The absorbent material, such as cotton wool, shall be in sufficient quantity to absorb the entire contents of the primary receptacles and there shall be a secondary packaging which shall be leakproof.

The primary receptacle or the secondary packaging shall be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa (0.95 bar).

The outer packaging shall not contain more than 4 litres.

For Solids

The primary receptacle(s) shall be siftproof and shall not contain more than 500 g.

If several fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them and there shall be a secondary packaging which shall be leakproof.

The outer packaging shall not contain more than 4 kg.

Provided that diagnostic specimens are packed in accordance with this packing instruction, no other requirements of these regulations shall apply.

P800	PACKING INSTRUCTION	P800

This instruction applies to UN Nos. 2809 and 2803.

The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met:

(1) Cylinders in accordance with P200; or

(2) Steel flasks or bottles with threaded closures with a capacity not exceeding 2.5 l; or

(3) Combination packagings which conform to the following requirements:

(a) Inner packagings shall comprise glass, metal or rigid plastics intended to contain liquids with a maximum net mass of 15 kg each.

(b) The inner packagings shall be packed with sufficient cushioning material to prevent breakage.

(c) Either the inner packagings or the outer packagings shall have inner 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 the package irrespective of its position or orientation.

(d) The following outer packagings and maximum net masses are authorized:

Outer packaging:	**Maximum net mass**
Drums	
steel (1A2)	400 kg
other metal (1N2)	400 kg
plastics (1H2)	400 kg
plywood (1D)	400 kg
fibre (1G)	400 kg
Boxes	
steel (4A)	400 kg
natural wood (4C1)	250 kg
natural wood with sift proof walls (4C2)	250 kg
plywood (4D)	250 kg
reconstituted wood (4F)	125 kg
fibreboard (4G)	125 kg
expanded plastics (4H1)	60 kg
solid plastics (4H2)	125 kg

Special packing provision:

PP41 For UN 2803, when it is necessary to transport Gallium at low temperatures in order to maintain it in a completely solid state, the above packagings may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. If a refrigerant is used, all of the above materials used in the packaging of gallium shall be chemically and physically resistant to the refrigerant and shall have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging shall permit the release of carbon dioxide gas.

P801	PACKING INSTRUCTION	P801

This instruction applies to new and used batteries assigned to UN Nos. 2794, 2795 or 3028.

The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met:

(1) Rigid outer packagings;

(2) Wooden slatted crates;

(3) Pallets.

Used storage batteries may also be transported loose in stainless steel or plastics battery boxes capable of containing any free liquid.

Additional requirements:

1. Batteries shall be protected against short circuits.
2. Batteries stacked shall be adequately secured in tiers separated by a layer of non-conductive material.
3. Battery terminals shall not support the weight of other superimposed elements.
4. Batteries shall be packaged or secured to prevent inadvertent movement.

P802	PACKING INSTRUCTION	P802

The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met:

(1) Combination packagings
Outer packagings: 1A2, 1B2, 1N2, 1H2, 1D, 4A, 4B, 4C1, 4C2, 4D, 4F, or 4H2;
maximum net mass: 75 kg.
Inner packagings: glass or plastics; maximum capacity: 10 litres.

(2) Combination packagings
Outer packagings: 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2;
maximum net mass: 125 kg.
Inner packagings: metal; maximum capacity: 40 litres

(3) Composite packagings: Glass receptacle in steel, aluminium, plywood or solid plastics drum (6PA1, 6PB1, 6PD1, or 6PH2) or in a steel, aluminium, wood or plywood box (6PA2, 6PB2, 6PC or 6PD2); maximum capacity: 60 litres.

(4) Austenitic steel drums (1A1) with a maximum capacity of 250 litres.

(5) Cylinders, pressure drums and tubes conforming to the provisions of packing instruction P200.

Special Packing Provision:

PP79 For UN 1790 with not more than 85% hydrogen fluoride, see P001.

P803	PACKING INSTRUCTION	P803
This instruction applies to UN 2028.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: (1) Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); (2) Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H2); Maximum net mass: 75 kg. The articles shall 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.		

P900	PACKING INSTRUCTION	P900
This instruction applies to UN 2216.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: (1) Packagings according to P002; or (2) Bags (5H1, 5H2, 5H3, 5H4, 5L1, 5L2, 5L3, 5M1 or 5M2) with a maximum net mass of 50 kg. Fish meal may also be transported unpackaged when it is packed in closed transport units and the free air space has been restricted to a minimum.		

P901	PACKING INSTRUCTION	P901
This instruction applies to UN 3316.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: Packagings conforming to the performance level consistent with the packing group assigned to the kit as a whole (see 3.3.1, special provision 251). Maximum quantity of dangerous goods per outer packaging: 10 kg.		
Additional requirement: Dangerous goods in kits shall be packed in inner packagings which shall not exceed either 250 ml or 250 g and shall be protected from other materials in the kit.		

P902	PACKING INSTRUCTION	P902
This instruction applies to UN 3268.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: Packagings conforming to the packing group III performance level. The packagings shall be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of transport. The articles may also be transported unpackaged in dedicated handling devices, vehicles, containers or wagons when moved from where they are manufactured to an assembly plant.		
Additional requirement: Any pressure vessel shall be in accordance with the requirements of the competent authority for the substance(s) contained in the pressure vessel(s).		

P903	PACKING INSTRUCTION	P903
This instruction applies to UN Nos. 3090 and 3091.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: Packaging conforming to the packing group II performance level. When lithium cells and batteries are packed with equipment, they shall be packed in inner fibreboard packagings that meet the requirements for packing group II. When lithium cells and batteries included in Class 9 are contained in equipment, the equipment shall be packed in strong outer packagings in such a manner as to prevent accidental operation during transport.		
Additional requirement: Batteries shall be protected against short circuit.		

P904	PACKING INSTRUCTION	P904
This instruction applies to UN 3245.		
The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: (1) Packagings according to P001 or P002 conforming to the packing group III performance level. (2) Outer packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following: (a) An inner packaging comprising: (i) a watertight primary receptacle(s); (ii) a watertight secondary packaging which is leakproof; (iii) absorbent material in sufficient quantity to absorb the entire contents placed between the primary receptacle(s) and the secondary packaging; if several primary receptacles are placed in a single secondary packaging, they shall be individually wrapped so as to prevent contact between them. (b) An outer packaging of adequate strength for its capacity, mass and intended use, and with a minimum external dimension of 100mm.		

P905	PACKING INSTRUCTION	P905

This instruction applies to UN Nos. 3072 and 2990.

Any suitable packaging is authorized, provided the general provisions of **4.1.1** and **4.1.3** are met, except that packagings need not conform to the requirements of Part 6.

When the life saving appliances are constructed to incorporate or are contained in rigid outer weatherproof casings (such as for lifeboats), they may be transported unpackaged.

Additional requirements:

1. All dangerous substances and articles contained as equipment within the appliances shall be secured to prevent inadvertent movement and in addition:

   (a) Signal devices of Class 1 shall be packed in plastics or fibreboard inner packagings;

   (b) Gases (Division 2.2) shall be contained in cylinders as specified by the competent authority, which may be connected to the appliance;

   (c) Electric storage batteries (Class 8) and lithium batteries (Class 9) shall be disconnected or electrically isolated and secured to prevent any spillage of liquid; and

   (d) Small quantities of other dangerous substances (for example in Class 3 or Divisions 4.1 and 5.2) shall be packed in strong inner packagings.

2. Preparation for transport and packaging shall include provisions to prevent any accidental inflation of the appliance.

P906	PACKING INSTRUCTION	P906

This instruction applies to UN Nos. 2315, 3151 and 3152.

The following packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met:

(1) For liquids and solids containing or contaminated with PCBs: Packagings in accordance with P001 or P002, as appropriate.

(2) For transformers and condensers and other devices: Leakproof packagings which are capable of containing, in addition to the devices, at least 1.25 times the volume of the liquid PCBs present in them. There shall be sufficient absorbent material in the packagings to absorb at least 1.1 times the volume of liquid which is contained in the devices. In general, transformers and condensers shall be carried in leakproof metal packagings which are capable of holding, in addition to the transformers and condensers, at least 1.25 times the volume of the liquid present in them.

Notwithstanding the above, liquids and solids not packaged in accordance with P001 and P002 and unpackaged transformers and condensers may be transported in cargo transport units fitted with a leakproof metal tray to a height of at least 800mm, containing sufficient inert absorbent material to absorb at least 1.1 times the volume of any free liquid.

Additional requirement:

Adequate provisions shall be taken to seal the transformers and condensers to prevent leakage during normal conditions of transport.

P907	PACKING INSTRUCTION	P907

If the machinery or apparatus is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection, an outer packaging is not required. Dangerous goods in machinery or apparatus shall otherwise be packed in outer packagings constructed of suitable material 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.**

Receptacles containing dangerous goods shall conform to the general provisions in 4.1.1, except that 4.1.1.3, 4.1.1.4, 4.1.1.12 and 4.1.1.14 do not apply. For Division 2.2 gases, the inner cylinder or receptacle, its contents and filling density shall be to the satisfaction of the competent authority of the country in which the cylinder or receptacle is filled.

In addition, the manner in which receptacles are contained within the machinery or apparatus, shall be such that under normal conditions of transport, damage to receptacles containing the dangerous goods is unlikely; and in the event of damage to receptacles containing solid or liquid dangerous goods, no leakage of the dangerous goods from the machinery or apparatus is possible (a leakproof liner may be used to satisfy this requirement). Receptacles containing dangerous goods shall be so installed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the machinery or apparatus during normal conditions of transport. Cushioning material shall not react dangerously with the content of the receptacles. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material.

4.1.4.2 Packing instructions concerning the use of IBCs

IBC01	PACKING INSTRUCTION	IBC01
The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met: Metal (31A, 31B and 31N).		
Additional requirement: Only liquids with a vapour pressure less than or equal to 110 kPa at 50 °C, or 130 kPa at 55 °C, are authorized.		

IBC02	PACKING INSTRUCTION	IBC02
The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met: (1) Metal (31A, 31B and 31N); (2) Rigid plastics (31H1 and 31H2); (3) Composite (31HZ1).		
Additional requirement: Only liquids with a vapour pressure less than or equal to 110 kPa at 50 °C, or 130 kPa at 55 °C, are authorized.		
Special packing provisions: **B5** For UN Nos. 1791, 2014 and 3149, IBCs shall be provided with a device to allow venting during transport. The inlet to the venting device shall be sited in the vapour space of the IBC under maximum filling conditions during transport. **B7** For UN Nos. 1222 and 1865, IBCs with a capacity greater than 450 litres are not permitted due to the substance-s potential for explosion when transported in large volumes. **B8** The pure form of this substance shall not be transported in IBCs since it is known to have a vapour pressure of more than 110 kPa at 50 °C or 130 kP1 at 55 °C.		

IBC03	PACKING INSTRUCTION	IBC03

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met:

(1) Metal (31A, 31B and 31N);

(2) Rigid plastics (31H1 and 31H2);

(3) Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2).

Additional requirement:

Only liquids with a vapour pressure less than or equal to 110 kPa at 50 °C, or 130 kPa at 55 °C, are authorized, other than UN 2672 (See B 11).

Special packing provision:

B8 The pure form of this substance shall not be transported in IBCs since it is known to have a vapour pressure of more than 110 kPa at 50 °C or 130 kPa at 55 °C.

B11 UN 2672 ammonia solution in concentrations not exceeding 25% may be transported in rigid or composite plastics IBCs (31H1, 31H2 and 31HZ1).

IBC04	PACKING INSTRUCTION	IBC04

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met:

Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N).

Special packing provisions:

B1 For packing group I substances, IBCs shall be transported in closed transport units.

IBC05	PACKING INSTRUCTION	IBC05

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met:

(1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N);

(2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2);

(3) Composite (11HZ1, 21HZ1 and 31HZ1).

Special packing provision:

B1 For packing group I substances, IBCs shall be transported in closed transport units.

B2 For packing group II solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs shall be transported in closed transport units.

IBC06	PACKING INSTRUCTION	IBC06

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met:

(1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N);

(2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2);

(3) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1).

Additional requirement:

Composite IBCs 11HZ2, 21HZ2 and 31HZ2 shall not be used when the substances being transported may become liquid during transport.

Special packing provision:

B1 For packing group I substances, IBCs shall be transported in closed transport units.

B2 For packing group II solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs shall be transported in closed transport units.

B12 UN 2672 ammonia solution in concentrations not exceeding 25% may be transported in rigid or composite plastics IBCs (31H1, 31H2 and 31HZ1).

IBC07	PACKING INSTRUCTION	IBC07

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met:

(1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N);

(2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2);

(3) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2);

(4) Wooden (11C, 11D and 11F).

Additional requirement:

Liners of wooden IBCs shall be sift proof.

Special packing provision:

B1 For packing group I substances, IBCs shall be transported in closed transport units.

B2 For packing group II solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs shall be transported in closed transport units.

IBC08	PACKING INSTRUCTION	IBC08

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** are met:

(1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N);

(2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2);

(3) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2);

(4) Fibreboard (11G);

(5) Wooden (11C, 11D and 11F);

(6) Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).

Special packing provisions:

B2 For packing group II solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs shall be transported in closed transport units.

B3 Flexible IBCs shall be sift-proof and water resistant or shall be fitted with a sift-proof and water resistant liner.

B4 Flexible, fibreboard or wooden IBCs shall be sift-proof and water resistant or shall be fitted with a sift-proof and water resistant liner.

B6 For UN Nos. 1327, 1363, 1364, 1365, 1386, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC testing requirements of Chapter 6.5.

IBC99	PACKING INSTRUCTION	IBC99

Only IBCs which are approved by the competent authority may be used (see 4.1.3.7).

IBC100	PACKING INSTRUCTION	IBC100

This instruction applies to UN Nos. 0082, 0241, 0331 and 0332.

The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** and special provisions of **4.1.5** are met:

(1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N);

(2) Flexible (13H2, 13H3, 13H4, 13L2, 13L3, 13L4 and 13M2);

(3) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1,and 31H2);

(4) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2).

Additional requirements:

1. IBCs shall only be used for free flowing substances.
2. Flexible IBCs shall only be used for solids.

Special packing provisions:

B9 For UN 0082, this packing instruction may only be used when the substances are mixtures of ammonium nitrate or other inorganic nitrates with other combustible substances which are not explosive ingredients. Such explosives shall not contain nitroglycerin, similar liquid organic nitrates, or chlorates. Metal IBCs are not authorized.

B10 For UN 0241, this packing instruction may only be used for substances which consist of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizing substances some or all of which are in solution. The other constituents may include hydrocarbons or aluminium powder, but shall not include nitro-derivatives such as trinitrotoluene. Metal IBCs are not authorized.

IBC520	PACKING INSTRUCTION				IBC520
This instruction applies to organic peroxides and self-reactive substances of type F.					
The IBCs listed below are authorized for the formulations listed, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** and special provisions of **4.1.7.2** are met. For formulations not listed below, only IBCs which are approved by the competent authority may be used (see 4.1.7.2.2).					
UN No.	**Organic peroxide**	**Type of IBC**	**Maximum quantity (litres)**	**Control temper-ature**	**Emer-gency temper-ature**
3109	**ORGANIC PEROXIDE, TYPE F, LIQUID** tert-Butyl hydroperoxide, not more than 72% with water	31A	1250		
	tert-Butyl peroxyacetate, not more than 32% in diluent type A	31A 31HA1	1250 1000		
	tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than 32% in diluent type A	31A 31HA1	1250 1000		
	Cumyl hydroperoxide, not more than 90% in diluent type A	31HA1	1250		
	Dibenzoyl peroxide, not more than 42% as a stable dispersion	31H1	1000		
	Di-tert-butyl peroxide, not more than 52% in diluent type A	31A 31HA1	1250 1000		
	1,1-Di-(tert-butylperoxy) cyclohexane, not more than 42% in diluent type A	31H1	1000		
	Dilauroyl peroxide, not more than 42%, stable dispersion, in water	31HA1	1000		
	Isopropyl cumyl hydroperoxide, not more than 72% in diluent type A	31HA1	1250		
	p-Menthyl hydroperoxide, not more than 72% in diluent type A	31HA1	1250		
	Peroxyacetic acid, stabilized, not more than 17%	31H1 31HA1 31A	1500 1500 1500		

3119	**ORGANIC PEROXIDE, TYPE F, LIQUID, TEMPERATURE CONTROLLED**				
	tert-Butyl peroxy-2-ethylhexanoate, not more than 32% in diluent type B	31HA1 31A	1000 1250	+30 °C +30 °C	+35 °C +35 °C
	tert-Butyl peroxyneodecanoate, not more than 32% in diluent type A	31A	1250	0 °C	+10 °C
	tert-Butyl peroxyneodecanoate, not more than 42% stable dispersion, in water	31A	1250	- 5 °C	+5 °C
	tert-Butyl peroxypivalate, not more than 27% in diluent type B	31HA1 31A	1000 1250	+10 °C +10 °C	+15 °C +15 °C
	Cumyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	- 15 °C	- 5 °C
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, not more than 42%, stable dispersion, in water	31HA1	1000	+30 °C	+35 °C
	Dicetyl peroxydicarbonate, not more than 42%, stable dispersion, in water	31HA1	1000	+30 °C	+35 °C
	Di-(2-ethylhexyl) peroxydicarbonate, not more than 52%, stable dispersion, in water	31A	1250	- 20 °C	- 10 °C
	Dimyristyl peroxydicarbonate, not more than 42%, stable dispersion, in water	31HA1	1000	+15 °C	+20 °C
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 38% in diluent type A	31HA1 31A	1000 1250	+10 °C +10 °C	+15 °C +15 °C
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water	31A	1250	+10 °C	+15 °C
	1,1,3,3-Tetramethylbutyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	- 5 °C	+ 5 °C

Additional requirements:

1. IBCs shall be provided with a device to allow venting during transport. The inlet to the pressure-relief device shall be sited in the vapour space of the IBC under maximum filling conditions during transport.

2. To prevent explosive rupture of metal IBCs or composite IBCs with complete metal casing, the emergency-relief devices shall be designed to vent all the decomposition products and vapours evolved during self-accelerating decomposition or during a period of not less than one hour of complete fire-engulfment as calculated by the formula in 4.2.1.13.8. The control and emergency temperatures specified in this packing instruction are based on a non-insulated IBC. When consigning an organic peroxide in an IBC in accordance with this instruction, it is the responsibility of the consignor to ensure that:

   (a) the pressure and emergency relief devices installed on the IBC are designed to take appropriate account of the self-accelerating decomposition of the organic peroxide and of fire-engulfment; and

   (b) when applicable, the control and emergency temperatures indicated are appropriate, taking into account the design (e.g. insulation) of the IBC to be used.

IBC620	PACKING INSTRUCTION	IBC620
This instruction applies to UN 3291.		
The following IBCs are authorized, provided the general provisions of **4.1.1**, **4.1.2** and **4.1.3** and the special provisions of **4.1.8** are met: Rigid, leakproof IBCs conforming to the Packing Group II performance level.		
Additional requirements: 1. There shall be sufficient absorbent material to absorb the entire amount of liquid present in the IBC. 2. IBCs shall be capable of retaining liquids. 3. IBCs intended to contain sharp objects such as broken glass and needles shall be resistant to puncture.		

4.1.4.3 *Packing instructions concerning the use of large packagings*

LP01	**PACKING INSTRUCTION (LIQUIDS)**	**LP01**

The following large packagings are authorized provided the general provision of **4.1.1** and **4.1.3** are met:

Inner packagings	**Large outer packagings**	**Packing group I**	**Packing group II**	**Packing group III**
Glass 10 litre Plastics 30 litre Metal 40 litre	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)	Not allowed	Not allowed	Maximum capacity: 3 m^3

LP02	**PACKING INSTRUCTION (SOLIDS)**	**LP02**

The following large packagings are authorized provided the general provision of **4.1.1** and **4.1.3** are met:

Inner packagings	**Large outer packagings**	**Packing group I**	**Packing group II**	**Packing group III**
Glass 10 kg Plastics[2] 50 kg Metal 50 kg Paper[1, 2] 50 kg Fibre[1, 2] 50 kg	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)	Not allowed	Not allowed	Maximum capacity: 3 m^3

[1] *These packagings shall not be used when the substances being transported may become liquid during transport.*

[2] *Packagings shall be siftproof.*

LP99	**PACKING INSTRUCTION**	**LP99**

Only large packagings which are approved by the Competent Authority may be used (see 4.1.3.7).

LP101	PACKING INSTRUCTION	LP101
The following large packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** and special provisions of **4.1.5** are met:		
Inner packagings	**Intermediate packagings**	**Large packagings**
Not necessary	Not necessary	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)
Special packing provision: **L1** For UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 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, 0488 and 0502: Large and robust explosives 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 shall 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 devices.		

LP102	PACKING INSTRUCTION	LP102
The following large packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** and special provisions of **4.1.5** are met:		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Bags water resistant **Receptacles** Fibreboard Metal Plastics Wood **Sheets** fibreboard, corrugated **Tubes** Fibreboard	Not necessary	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)

LP621	PACKING INSTRUCTION	LP621
This instruction applies to UN 3291.		
The following large packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** and the special provisions of **4.1.8** are met: (1) For clinical waste placed in inner packagings: Rigid, leakproof large packagings conforming to the requirements of Chapter 6.6 for solids, at the packing group II performance level, provided there is sufficient absorbent material to absorb the entire amount of liquid present and the large packaging is capable of retaining liquids. (2) For packages containing larger quantities of liquid: Large rigid packagings conforming to the requirements of Chapter 6.6, at the packing group II performance level, for liquids.		
Additional requirement: Large packagings intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and retain liquids under the performance test conditions in Chapter 6.6.		

LP902	PACKING INSTRUCTION	LP902
This instruction applies to UN 3268.		
The following large packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** are met: Packagings conforming to the packing group III performance level. The packagings shall be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of transport. The articles may also be transported unpackaged in dedicated handling devices, vehicles, containers or wagons when moved from where they are manufactured to an assembly plant.		
Additional requirement: Any pressure vessel shall be in accordance with the requirements of the competent authority for the substance(s) contained in the pressure vessel(s).		

4.1.5 Special packing provisions for goods of Class 1

4.1.5.1 The general provisions of section 4.1.1 shall be met.

4.1.5.2 All packagings for Class 1 goods shall be so designed and constructed that:

(a) They will protect the explosives, prevent them 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.

4.1.5.3 All explosive substances and articles, as prepared for transport, shall have been classified in accordance with the procedures detailed in 2.1.3.

4.1.5.4 Class 1 goods shall be packed in accordance with the appropriate packing instruction shown in Column 8 of the Dangerous Goods List, as detailed in 4.1.4.

4.1.5.5 Packagings, including IBCs and large packagings shall conform to the requirements of Chapter 6.1, 6.5 or 6.6, respectively, and shall meet the test requirements of 6.1.5, 6.5.4 or 6.6.5, respectively, for Packing Group II, subject to 4.1.1.13, 6.1.2.4 and 6.5.1.4.4. Packagings other than metal packagings meeting the test criteria of Packing Group I may be used. To avoid unnecessary confinement, metal packagings of Packing Group I shall not de used.

4.1.5.6 The closure device of packagings containing liquid explosives shall ensure a double protection against leakage.

4.1.5.7 The closure device of metal drums shall include a suitable gasket; if a closure device includes a screw-thread, the ingress of explosive substances into the screw-thread shall be prevented.

4.1.5.8 Packagings for water soluble substances shall be water resistant. Packagings for desensitized or phlegmatized substances shall be closed to prevent changes in concentration during transport.

4.1.5.9 When the packaging includes a double envelope filled with water which may freeze during transport, a sufficient quantity of an anti-freeze agent shall be added to the water to prevent freezing. Anti-freeze that could create a fire hazard because of its inherent flammability shall not be used.

4.1.5.10 Nails, staples and other closure devices made of metal without protective covering shall not penetrate to the inside of the outer packaging unless the inner packaging adequately protects the explosives against contact with the metal.

4.1.5.11 Inner packagings, fittings and cushioning materials and the placing of explosive substances or articles in packages shall 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 shall be prevented from making contact with metal packagings. Articles containing explosive substances not enclosed in an outer casing shall 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.

4.1.5.12 Packagings shall 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.

4.1.5.13 The ingress of explosive substances into the recesses of seamed metal packagings shall be prevented.

4.1.5.14 Plastics packagings shall 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.

4.1.5.15 Large and robust explosives 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 shall 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 Regulations and such tests have been successfully undertaken, the competent authority may approve such articles to be transported under these Regulations.

4.1.5.16 Explosive substances shall 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.

4.1.5.17 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 shall be provided with an inner liner or coating (see 4.1.1.2).

4.1.5.18 Packing instruction P101 may be used for any explosive provided the package has been approved by a competent authority regardless of whether the packaging complies with the packing instruction assignment in the Dangerous Goods List.

4.1.6 Special packing provisions for Class 2

4.1.6.1 *General requirements*

4.1.6.1.1 This section provides general requirements applicable to the use of pressure receptacles for the transport of Class 2 gases and other dangerous goods in pressure receptacles (e.g. UN 1051 hydrogen cyanide, stabilized). Pressure receptacles shall 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).

4.1.6.1.2 Parts of pressure receptacles which are in direct contact with dangerous goods shall not be affected or weakened by those dangerous goods and shall not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). The provisions of ISO 11114-1:1997 and ISO 11114-2:2000 shall be met as applicable. Pressure receptacles for UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be filled with a porous material, uniformly distributed, of a type that conforms to the requirements and testing specified by the competent authority and which:

(a) is compatible with the pressure receptacle 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 mass.
In the case of UN 1001, the solvent shall be compatible with the pressure receptacles.

4.1.6.1.3 Pressure receptacles, including their closures, shall be selected to contain a gas or a mixture of gases according to the requirements of 6.2.1.2 and the requirements of the specific packing instructions of 4.1.4.1. This section also applies to pressure receptacles which are elements of MEGCs.

4.1.6.1.4 Refillable pressure receptacles shall 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 in accordance with ISO 11621:1997. In addition, a pressure receptacle that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary risk shall not be authorized for the transport of a Class 2 substance unless the necessary inspection and testing as specified in 6.2.1.5 have been performed.

Prior to filling, the filler shall perform an inspection of the pressure receptacle and ensure that the pressure receptacle is authorized for the gas to be transported and that the provisions of these regulations have been met. Valves shall be closed after filling and remain closed during transport. The consignor shall verify that the closures and equipment are not leaking.

4.1.6.1.5 Pressure receptacles shall be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance being filled. Reactive gases and gas mixtures shall be filled to a pressure such that if complete decomposition of the gas occurs, the working pressure of the pressure receptacle shall not be exceeded. Bundles of cylinders shall not be filled in excess of the lowest working pressure of any given cylinder in the bundle.

4.1.6.1.6 Pressure receptacles, including their closures, shall conform to the design, construction, inspection and testing requirements detailed in Chapter 6.2. When outer packagings are prescribed, the pressure receptacles shall be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in an outer packaging.

4.1.6.1.7 Valves shall be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the following methods:

(a) Valves are placed inside the neck of the pressure receptacle and protected by a threaded plug or cap;

(b) Valves are protected by caps. Caps shall possess vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;

(c) Valves are protected by shrouds or guards;

(d) Valves are designed and constructed in such a way that they are inherently able to withstand damage without leakage of product;

(e) Pressure receptacles are transported in frames, (e.g. bundles); or

(f) Pressure receptacles are transported in an outer packaging. The packaging as prepared for transport shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.

For pressure receptacles with valves as described in (b) and (c), the requirements of ISO11117:1998 shall be met; for unprotected valves as described in (d), the requirements of annex B of ISO 10297:1999 shall be met.

4.1.6.1.8 Non-refillable pressure receptacles shall:

(a) be transported in an outer packaging, such as a box, or crate, or in shrink-wrapped trays or stretch- wrapped trays;

(b) be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas;

(c) not be used for toxic gases with an LC_{50} less than or equal to 200 ml/m^3; and

(d) not be repaired after being put into service.

4.1.6.1.9 Refillable pressure receptacles shall be periodically inspected according to the provisions of packing instructions P200 or P203 as applicable. Pressure receptacles shall not be charged or filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

4.1.6.1.10 Repairs are only permitted as indicated in the periodic inspection standards specified in 6.2.2.4, consistent with the applicable design and construction standards. Pressure receptacles shall 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.

4.1.6.1.11 Pressure receptacles shall not be offered for filling:

(a) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;

(b) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; and

(c) unless the required certification, retest, and filling markings are legible.

4.1.6.1.12 Charged pressure receptacles shall not be offered for transport;

(a) when leaking;

(b) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;

(c) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; and

(d) unless the required certification, retest, and filling markings are legible.

4.1.7 Special packing provisions for organic peroxides (Division 5.2) and self-reactive substances of Division 4.1

4.1.7.1 *Use of packagings*

4.1.7.0.1 For organic peroxides, all receptacles shall be "effectively closed". Where significant internal pressure may develop in a package by the evolution of a gas, a vent may be fitted, provided the gas emitted will not cause danger, otherwise the degree of filling shall be limited. Any venting device shall be so constructed that liquid will not escape when the package is in an upright position and it shall be able to prevent ingress of impurities. The outer packaging, if any, shall be so designed as not to interfere with the operation of the venting device.

4.1.7.1.1 Packagings for organic peroxides and self-reactive substances shall meet the requirements of Chapter 6.1 or of Chapter 6.6 at the Packing Group II performance level. To avoid unnecessary confinement, metal packaging meeting the test criteria of Packing Group I shall not be used.

4.1.7.1.2 The packing methods for organic peroxides and self-reactive substances are listed in Packing Instruction P520 and are designated OP1 to OP8. The quantities specified for each packing method are the maximum quantities authorized per package.

4.1.7.1.3 The packing methods appropriate for the individual currently assigned organic peroxides and self-reactive substances are listed in 2.4.2.3.2.3 and 2.5.3.2.4.

4.1.7.1.4 For new organic peroxides, new self-reactive substances or new formulations of currently assigned organic peroxides or self-reactive substances, the following procedure shall be used to assign the appropriate packing method:

(a) ORGANIC PEROXIDE, TYPE B or SELF-REACTIVE SUBSTANCE, TYPE B:

Packing method OP5 shall be assigned, provided that the organic peroxide (or self-reactive substance) satisfies the criteria of 2.5.3.3.2(b) (resp. 2.4.2.3.3.2(b)) in a packaging authorized by the packing method. If the organic peroxide (or self-reactive substance) can only satisfy these criteria in a smaller packaging than those authorized by packing method OP5 (viz. one of the packagings listed for OP1 to OP4), then the corresponding packing method with the lower OP number is assigned;

(b) ORGANIC PEROXIDE, TYPE C or SELF-REACTIVE SUBSTANCE, TYPE C:

Packing method OP6 shall be assigned, provided that the organic peroxide (or self-reactive substance) satisfies the criteria of 2.5.3.3.2(c) (resp. 2.4.2.3.3.2(c)) in packaging authorized by the packing method. If the organic peroxide (or self-reactive substance) can only satisfy these criteria in a smaller packaging than those authorized by packing method OP6 then the corresponding packing method with the lower OP number is assigned;

(c) ORGANIC PEROXIDE, TYPE D or SELF-REACTIVE SUBSTANCE, TYPE D:

Packing method OP7 shall be assigned to this type of organic peroxide or self-reactive substance;

(d) ORGANIC PEROXIDE, TYPE E or SELF-REACTIVE SUBSTANCE, TYPE E:

Packing method OP8 shall be assigned to this type of organic peroxide or self-reactive substance;

(e) ORGANIC PEROXIDE, TYPE F or SELF-REACTIVE SUBSTANCE, TYPE F:

Packing method OP8 shall be assigned to this type of organic peroxide or self-reactive substance.

4.1.7.2 *Use of intermediate bulk containers*

4.1.7.2.1 The currently assigned organic peroxides specifically listed in 2.5.3.2.4 and indicated with the letter "N" in the "Packing Method" column of that table may be transported in IBCs in accordance with Packing Instruction IBC 520.

4.1.7.2.2 Other organic peroxides and self-reactive substances of type F may be transported in IBCs under conditions established by the competent authority of the country of origin when, on the basis of the appropriate tests, that competent authority is satisfied that such transport may be safely conducted. The tests undertaken shall include those necessary:

(a) To prove that the organic peroxide (or self-reactive substance) complies with the principles for classification given in 2.5.3.3.2(f), exit box F of Figure 2.5.1; (resp. 2.4.2.3.3.2 (f), exit box F of Figure 2.4.1);

(b) To prove the compatibility of all materials normally in contact with the substance during the transport;

(c) To determine, when applicable, the control and emergency temperatures associated with the transport of the product in the IBC concerned as derived from the SADT;

(d) To design, when applicable, pressure and emergency relief devices; and

(e) To determine if any special provisions are necessary for safe transport of the substance.

4.1.7.2.3 For self-reactive substances temperature control is required according to 2.4.2.3.4. For organic peroxides temperature control is required according to 2.5.3.4.1. Temperature control provisions are given in 7.1.4.3.1.

4.1.7.2.4 Emergencies to be taken into account are self-accelerating decomposition and fire engulfment. To prevent explosive rupture of metal IBCs with a complete metal casing, the emergency-relief devices shall be designed to vent all the decomposition products and vapours evolved during self-accelerating decomposition or during a period of not less than one hour of complete fire engulfment calculated by the equations given in 4.2.1.13.8.

4.1.8 Special packing provisions for infectious substances (Division 6.2)

4.1.8.1 Consignors of infectious substances shall 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.

4.1.8.2 The definitions in 1.2.1 and the general packing provisions of 4.1.1.1 to 4.1.1.14, except 4.1.1.10 to 4.1.1.12, apply to infectious substances packages. However, liquids shall be filled into packagings, including IBCs, which have an appropriate resistance to the internal pressure that may develop under normal conditions of transport.

4.1.8.3 For UN 2814 and 2900, an itemized list of contents shall be enclosed between the secondary packaging and the outer packaging.

4.1.8.4 Before an empty packaging is returned to the consignor, or sent elsewhere, it shall be thoroughly disinfected or sterilized and any label or marking indicating that it had contained an infectious substance shall be removed or obliterated.

4.1.8.5 The provisions of this section do not apply to UN 3373 diagnostic specimens (see packing instruction P650.

4.1.9 Special packing provisions for Class 7

4.1.9.1 *General*

4.1.9.1.1 Radioactive material, packagings and packages shall meet the requirements of Chapter 6.4. The quantity of radioactive material in a package shall not exceed the limits specified in 2.7.7.1.

4.1.9.1.2 The non-fixed contamination on the external surfaces of any package shall be kept as low as practicable and, under routine conditions of transport, shall 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.

4.1.9.1.3 A package shall not contain any other items except such articles and documents as are necessary for the use of the radioactive material. This requirement shall 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.

4.1.9.1.4 Except as provided in 7.1.7.5.5, the level of non-fixed contamination on the external and internal surfaces of overpacks, freight containers, tanks and intermediate bulk containers shall not exceed the limits specified in 4.1.9.1.2.

4.1.9.1.5 Radioactive material with a subsidiary risk shall be transported in packagings, IBCs or tanks fully complying with the requirements of the relevant chapters of Part 6 as appropriate, as well as applicable requirements of chapters 4.1 or 4.2 for that subsidiary risk.

4.1.9.2 *Requirements and controls for transport of LSA material and SCO*

4.1.9.2.1 The quantity of LSA material or SCO in a single Industrial package Type 1 (Type IP-1), Industrial package Type 2 (Type IP-2), Industrial package Type 3 (Type IP-3), or object or collection of objects, whichever is appropriate, shall be so restricted that the external radiation level at 3 m from the unshielded material or object or collection of objects does not exceed 10 mSv/h.

4.1.9.2.2 LSA material and SCO which is or contains fissile material shall meet the applicable requirements of 6.4.11.1, 7.1.7.4.1 and 7.1.7.4.2.

4.1.9.2.3 LSA material and SCO in groups LSA-I and SCO-I may be transported unpackaged under the following conditions:

(a) All unpackaged material other than ores containing only naturally occurring radionuclides shall be transported in such a manner that under routine conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding;

(b) Each conveyance shall be under exclusive use, except when only transporting SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than ten times the applicable level specified in 2.7.2; and

(c) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in 2.7.5(a)(i), measures shall be taken to ensure that the radioactive material is not released into the conveyance.

4.1.9.2.4 LSA material and SCO, except as otherwise specified in 4.1.9.2.3, shall be packaged in accordance with Table 4.1.9.2.4.

Industrial package requirements for LSA material and SCO

Radioactive contents	Industrial package type	
	Exclusive use	**Not under exclusive use**
LSA-I Solid[a] 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[a]	Type IP-1	Type IP-1
SCO-II	Type IP-2	Type IP-2

[a] Under the conditions specified in 4.1.9.2.3, LSA-I material and SCO-I may be transported unpackaged.

CHAPTER 4.2

USE OF PORTABLE TANKS AND MULTIPLE-ELEMENT GAS CONTAINERS (MEGCs)

4.2.1 General provisions for the use of portable tanks for the transport of substances of Classes 3 to 9

4.2.1.1 This section provides general requirements applicable to the use of portable tanks for the transport of substances of Classes 3, 4, 5, 6, 7, 8 and 9. In addition to these general requirements, portable tanks shall conform to the design, construction, inspection and testing requirements detailed in 6.7.2. Substances shall be transported in portable tanks conforming to the applicable portable tank instruction identified in Column 10 of the Dangerous Goods List and described in 4.2.5.2.6 (T1 to T23) and the portable tank special provisions assigned to each substance in Column 11 of the Dangerous Goods List.

4.2.1.2 During transport, portable tanks shall be adequately protected against damage to the shell and service equipment resulting from lateral and longitudinal impact and overturning. If the shell and service equipment are so constructed as to withstand impact or overturning it need not be protected in this way. Examples of such protection are given in 6.7.2.17.5.

4.2.1.3 Certain substances are chemically unstable. They are accepted for transport only when the necessary steps have been taken to prevent their dangerous decomposition, transformation or polymerization during transport. To this end, care shall in particular be taken to ensure that shells do not contain any substances liable to promote these reactions.

4.2.1.4 The temperature of the outer surface of the shell excluding openings and their closures or of the thermal insulation shall not exceed 70 °C during transport. When substances are transported at elevated temperatures in either liquid or solid state, the shell shall be thermally insulated to meet this condition.

4.2.1.5 Empty portable tanks not cleaned and not gas-free shall comply with the same requirements as portable tanks filled with the previous substance.

4.2.1.6 Substances shall not be transported in the same or adjoining compartments of shells when they may 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;

(d) The formation of unstable substances;

(e) Dangerous rise in pressure.

4.2.1.7 The design approval certificate, the test report and the certificate showing the results of the initial inspection and test for each portable tank issued by the competent authority or its authorized body shall be retained by the authority or body and the owner. Owners shall be able to provide this documentation upon the request of any competent authority.

4.2.1.8 Unless the name of the substance(s) being transported appears on the metal plate described in 6.7.2.20.2, a copy of the certificate specified in 6.7.2.18.1 shall be made available upon the request of a competent authority or its authorized body and readily provided by the consignor, consignee or agent, as appropriate.

4.2.1.9 ***Degree of Filling***

4.2.1.9.1 Prior to filling, the shipper shall ensure that the appropriate portable tank is used and that the portable tank is not loaded with substances which in contact with the materials of the shell, gaskets, service equipment and any protective linings, are likely to react dangerously with them to form dangerous products or appreciably weaken these materials. The shipper may need to consult the manufacturer of the substance in conjunction with the competent authority for guidance on the compatibility of the substance with the portable tank materials.

4.2.1.9.1.1 Portable tanks shall not be filled above the extent provided in 4.2.1.9.2 to 4.2.1.9.6. The applicability of 4.2.1.9.2, 4.2.1.9.3 or 4.2.1.9.5.1 to individual substances is specified in the applicable portable tank instructions or special provisions in 4.2.5.2.6 or 4.2.5.3 and Columns 10 or 11 of the Dangerous Goods List.

4.2.1.9.2 The maximum degree of filling (in %) for general use is determined by the formula:

$$Degree\,of\ filling = \frac{97}{1+\alpha\,(t_r - t_f)}$$

4.2.1.9.3 The maximum degree of filling (in %) for liquids of Division 6.1 and Class 8, in packing groups I and II, and liquids with an absolute vapour pressure of more than 175 kPa (1.75 bar) at 65 1C, is determined by the formula:

$$Degree\,of\ filling = \frac{95}{1+\alpha\,(t_r - t_f)}$$

4.2.1.9.4 In these formulae, α is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (t_f) and the maximum mean bulk temperature during transport (t_r) (both in °C). For liquids transported under ambient conditions α could be calculated by the formula:

$$\alpha = \frac{d_{15} - d_{50}}{35\,d_{50}}$$

in which d_{15} and d_{50} are the densities of the liquid at 15 °C and 50 °C, respectively.

4.2.1.9.4.1 The maximum mean bulk temperature (t_r) shall be taken as 50 °C except that, for journeys under temperate or extreme climatic conditions, the competent authorities concerned may agree to a lower or require a higher temperature, as appropriate.

4.2.1.9.5 The requirements of 4.2.1.9.2 to 4.2.1.9.4.1 do not apply to portable tanks which contain substances maintained at a temperature above 50 °C during transport (e.g. by means of a heating device). For portable tanks equipped with a heating device, a temperature regulator shall be used to ensure the maximum degree of filling is not more than 95% full at any time during transport.

4.2.1.9.5.1 The maximum degree of filling (in %) for liquids transported under elevated temperature conditions is determined by the formula:

$$Degree\ of\ \ filling = 95\ \frac{d_r}{d_f}$$

in which d_f and d_r are the densities of the liquid at the mean temperature of the liquid during filling and the maximum mean bulk temperature during transport respectively.

4.2.1.9.6 Portable tanks shall not be offered for transport:

(a) With a degree of filling, for liquids having a viscosity less than 2,680 mm^2/s at 20 °C or maximum temperature of the substance during transport in the case of the heated substance, of more than 20% but less than 80% unless the shells of portable tanks are divided, by partitions or surge plates, into sections of not more than 7,500 litres capacity;

(b) With residue of substances previously transported adhering to the outside of the shell or service equipment;

(c) When leaking or damaged to such an extent that the integrity of the portable tank or its lifting or securing arrangements may be affected; and

(d) Unless the service equipment has been examined and found to be in good working order.

4.2.1.9.7 Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.7.3.13.4 need not be provided with a means of closing off the forklift pockets.

4.2.1.10 ***Additional provisions applicable to the transport of Class 3 substances in portable tanks***

4.2.1.10.1 All portable tanks intended for the transport of flammable liquids shall be closed and be fitted with relief devices in accordance with 6.7.2.8 to 6.7.2.15.

4.2.1.10.1.1 For portable tanks intended for use only on land, the pertinent regulations governing transport by land may allow open venting systems.

4.2.1.11 ***Additional provisions applicable to the transport of Class 4 substances (other than Division 4.1 self-reactive substances) in portable tanks***

[reserved]

NOTE: *For Division 4.1 self-reactive substances, see 4.2.1.13.1.*

4.2.1.12 ***Additional provisions applicable to the transport of Division 5.1 substances in portable tanks***

[reserved]

4.2.1.13 ***Additional provisions applicable to the transport of Division 5.2 substances and Division 4.1 self-reactive substances in portable tanks***

4.2.1.13.1 Each substance shall have been tested and a report submitted to the competent authority of the country of origin for approval. Notification thereof shall be sent to the competent authority of the country of destination. The notification shall contain relevant transport information and the report with test results. The tests undertaken shall include those necessary:

(a) To prove the compatibility of all materials normally in contact with the substance during transport;

(b) To provide data for the design of the pressure and emergency relief devices taking into account the design characteristics of the portable tank.

Any additional provision necessary for safe transport of the substance shall be clearly described in the report.

4.2.1.13.2 The following provisions apply to portable tanks intended for the transport of Type F organic peroxides or Type F self-reactive substances with a Self-Accelerating Decomposition Temperature (SADT) of 55 °C or more. In case of conflict these provisions prevail over those specified in section 6.7.2. Emergencies to be taken into account are self-accelerating decomposition of the substance and fire-engulfment as described in 4.2.1.13.8.

4.2.1.13.3 The additional provisions for transport of organic peroxides or self-reactive substances with an SADT less than 55 °C in portable tanks shall be specified by the competent authority of the country of origin. Notification thereof shall be sent to the competent authority of the country of destination.

4.2.1.13.4 The portable tank shall be designed for a test pressure of at least 0.4 MPa (4 bar).

4.2.1.13.5 Portable tanks shall be fitted with temperature sensing devices.

4.2.1.13.6 Portable tanks shall be fitted with pressure-relief devices and emergency-relief devices. Vacuum-relief devices may also be used. Pressure-relief devices shall operate at pressures determined according to both the properties of the substance and the construction characteristics of the portable tank. Fusible elements are not allowed in the shell.

4.2.1.13.7 The pressure-relief devices shall consist of spring-loaded valves fitted to prevent significant build-up within the portable tank of the decomposition products and vapours released at a temperature of 50 °C. The capacity and start-to-discharge pressure of the relief valves shall be based on the results of the tests specified in 4.2.1.13.1. The start-to-discharge pressure shall, however, in no case be such that liquid would escape from the valve(s) if the portable tank were overturned.

4.2.1.13.8 The emergency-relief devices may be of the spring-loaded or frangible types, or a combination of the two, designed to vent all the decomposition products and vapours evolved during a period of not less than one hour of complete fire-engulfment as calculated by the following formula:

$$q = 70961\, F\, A^{0.82}$$

where:

q	=	heat absorption (W)
A	=	wetted area [m^2]
F	=	insulation factor
F	=	1 for non-insulated shells, or
F	=	$\frac{U(923-T)}{47032}$ for insulated shells

where:

K	=	heat conductivity of insulation layer	[$W \cdot m^{-1} \cdot K^{-1}$]
L	=	thickness of insulation layer	[m]
U	=	K/L = heat transfer coefficient of the insulation	[$W \cdot m^{-2} \cdot K^{-1}$]
T	=	temperature of substance at relieving conditions	[K]

The start-to-discharge pressure of the emergency-relief device(s) shall be higher than that specified in 4.2.1.13.7 and based on the results of the tests referred to in 4.2.1.13.1. The emergency-relief devices shall be dimensioned in such a way that the maximum pressure in the portable tank never exceeds the test pressure of the tank.

NOTE: *An example of a method to determine the size of emergency-relief devices is given in Appendix 5 of the Manual of Tests and Criteria.*

4.2.1.13.9 For insulated portable tanks the capacity and setting of emergency-relief device(s) shall be determined assuming a loss of insulation from 1% of the surface area.

4.2.1.13.10 Vacuum-relief devices and spring-loaded valves shall be provided with flame arresters. Due attention shall be paid to the reduction of the relief capacity caused by the flame arrester.

4.2.1.13.11 Service equipment such as valves and external piping shall be so arranged that no substance remains in them after filling the portable tank.

4.2.1.13.12 Portable tanks may be either insulated or protected by a sun-shield. If the SADT of the substance in the portable tank is 55 °C or less, or the portable tank is constructed of aluminium, the portable tank shall be completely insulated. The outer surface shall be finished in white or bright metal.

4.2.1.13.13 The degree of filling shall not exceed 90% at 15 °C.

4.2.1.13.14 The marking as required in 6.7.2.20.2 shall include the UN number and the technical name with the approved concentration of the substance concerned.

4.2.1.13.15 Organic peroxides and self-reactive substances specifically listed in portable tank instruction T23 in 4.2.5.2.6 may be transported in portable tanks.

4.2.1.14 ***Additional provisions applicable to the transport of Division 6.1 substances in portable tanks***

[reserved]

4.2.1.15 ***Additional provisions applicable to the transport of Class 7 substances in portable tanks***

4.2.1.15.1 Portable tanks used for the transport of radioactive material shall not be used for the transport of other goods.

4.2.1.15.2 The degree of filling for portable tanks shall not exceed 90% or, alternatively, any other value approved by the competent authority.

4.2.1.16 ***Additional provisions applicable to the transport of Class 8 substances in portable tanks***

4.2.1.16.1 Pressure-relief devices of portable tanks used for the transport of Class 8 substances shall be inspected at intervals not exceeding one year.

4.2.1.17 ***Additional provisions applicable to the transport of Class 9 substances in portable tanks***

[reserved]

4.2.2 General provisions for the use of portable tanks for the transport of non-refrigerated liquefied gases

4.2.2.1 This section provides general requirements applicable to the use of portable tanks for the transport of non-refrigerated liquefied gases.

4.2.2.2 Portable tanks shall conform to the design, construction, inspection and testing requirements detailed in 6.7.3. Non-refrigerated liquefied gases shall be transported in portable tanks conforming to portable tank instruction T50 as described in 4.2.5.2.6 and any portable tank special provisions assigned to specific non-refrigerated liquefied gases in Column 11 of the Dangerous Goods List and described in 4.2.5.3.

4.2.2.3 During transport, portable tanks shall be adequately protected against damage to the shell and service equipment resulting from lateral and longitudinal impact and overturning. If the shell and service equipment are so constructed as to withstand impact or overturning it need not be protected in this way. Examples of such protection are given in 6.7.3.13.5.

4.2.2.4 Certain non-refrigerated liquefied gases are chemically unstable. They are accepted for transport only when the necessary steps have been taken to prevent their dangerous decomposition, transformation or polymerization during transport. To this end, care shall in particular be taken to ensure that portable tanks do not contain any non-refrigerated liquefied gases liable to promote these reactions.

4.2.2.5 Unless the name of the gas(es) being transported appears on the metal plate described in 6.7.3.16.2, a copy of the certificate specified in 6.7.3.14.1 shall be made available upon a competent authority request and readily provided by the consignor, consignee or agent, as appropriate.

4.2.2.6 Empty portable tanks not cleaned and not gas-free shall comply with the same requirements as portable tanks filled with the previous non-refrigerated liquefied gas.

4.2.2.7 ***Filling***

4.2.2.7.1 Prior to filling the shipper shall ensure that the portable tank is approved for the non-refrigerated liquefied gas to be transported and that the portable tank is not loaded with non-refrigerated liquefied gases which in contact with the materials of the shell, gaskets and service equipment, are likely to react dangerously with them to form dangerous products or appreciably weaken these materials. During filling, the temperature of the non-refrigerated liquefied gas shall fall within the limits of the design temperature range.

4.2.2.7.2 The maximum mass of non-refrigerated liquefied gas per litre of shell capacity (kg/l) shall not exceed the density of the non-refrigerated liquefied gas at 50 °C multiplied by 0.95. Furthermore, the shell shall not be liquid-full at 60 °C.

4.2.2.7.3 Portable tanks shall not be filled above their maximum permissible gross mass and the maximum permissible load mass specified for each gas to be transported.

4.2.2.8 Portable tanks shall not be offered for transport:

(a) In an ullage condition liable to produce an unacceptable hydraulic force due to surge within the portable tank;

(b) When leaking;

(c) When damaged to such an extent that the integrity of the tank or its lifting or securing arrangements may be affected; and

(d) Unless the service equipment has been examined and found to be in good working order.

4.2.2.9 Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.7.4.12.4 need not be provided with a means of closing off the forklift pockets.

4.2.3 General provisions for the use of portable tanks for the transport of refrigerated liquefied gases

4.2.3.1 This section provides general requirements applicable to the use of portable tanks for the transport of refrigerated liquefied gases.

4.2.3.2 Portable tanks shall conform to the design, construction, inspection and testing requirements detailed in 6.7.4. Refrigerated liquefied gases shall be transported in portable tanks conforming to portable tank instruction T75 as described in 4.2.5.2.6 and the portable tank special provisions assigned to each substance in Column 11 of the Dangerous Goods List and described in 4.2.5.3.

4.2.3.3 During transport, portable tanks shall be adequately protected against damage to the shell and service equipment resulting from lateral and longitudinal impact and overturning. If the shell and service equipment are so constructed as to withstand impact or overturning it need not be protected in this way. Examples of such protection are provided in 6.7.4.12.5.

4.2.3.4 Unless the name of the gas(es) being transported appears on the metal plate described in 6.7.4.15.2, a copy of the certificate specified in 6.7.4.13.1 shall be made available upon a competent authority request and readily provided by the consignor, consignee or agent, as appropriate.

4.2.3.5 Empty portable tanks not cleaned and not gas-free shall comply with the same requirements as portable tanks filled with the previous substance.

4.2.3.6 *Filling*

4.2.3.6.1 Prior to filling the shipper shall ensure that the portable tank is approved for the refrigerated liquefied gas to be transported and that the portable tank is not loaded with refrigerated liquefied gases which in contact with the materials of the shell, gaskets and service equipment, are likely to react dangerously with them to form dangerous products or appreciably weaken these materials. During filling, the temperature of the refrigerated liquefied gas shall be within the limits of the design temperature range.

4.2.3.6.2 In estimating the initial degree of filling the necessary holding time for the intended journey including any delays which might be encountered shall be taken into consideration. The initial degree of filling of the shell, except as provided for in 4.2.3.6.3 and 4.2.3.6.4, shall be such that if the contents, except helium, were to be raised to a temperature at which the vapour pressure is equal to the maximum allowable working pressure (MAWP) the volume occupied by liquid would not exceed 98%.

4.2.3.6.3 Shells intended for the transport of helium can be filled up to but not above the inlet of the pressure-relief device.

4.2.3.6.4 A higher initial degree of filling may be allowed, subject to approval by the competent authority, when the intended duration of transport is considerably shorter than the holding time.

4.2.3.7 ***Actual holding time***

4.2.3.7.1 The actual holding time shall be calculated for each journey in accordance with a procedure recognized by the competent authority, on the basis of the following:

(a) The reference holding time for the refrigerated liquefied gas to be transported (see 6.7.4.2.8.1) (as indicated on the plate referred to in 6.7.4.15.1);

(b) The actual filling density;

(c) The actual filling pressure;

(d) The lowest set pressure of the pressure limiting device(s).

4.2.3.7.2 The actual holding time shall be marked either on the portable tank itself or on a metal plate firmly secured to the portable tank, in accordance with 6.7.4.15.2.

4.2.3.8 Portable tanks shall not be offered for transport:

(a) In an ullage condition liable to produce an unacceptable hydraulic force due to surge within the shell;

(b) When leaking;

(c) When damaged to such an extent that the integrity of the portable tank or its lifting or securing arrangements may be affected;

(d) Unless the service equipment has been examined and found to be in good working order;

(e) Unless the actual holding time for the refrigerated liquefied gas being transported has been determined in accordance with 4.2.3.7 and the portable tank is marked in accordance with 6.7.4.15.2; and

(f) Unless the duration of transport, after taking into consideration any delays which might be encountered, does not exceed the actual holding time.

4.2.3.9 Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.7.4.12.4 need not be provided with a means of closing off the forklift pockets.

4.2.4 General provisions for the use of multiple-element gas containers (MEGCs)

4.2.4.1 This section provides general requirements applicable to the use of multiple-element gas containers (MEGCs) for the transport of non-refrigerated gases.

4.2.4.2 MEGCs shall conform to the design, construction, inspection and testing requirements detailed in 6.7.5. The elements of MEGCs shall be periodically inspected according to the provisions set out in P200 and in 6.2.1.5.

4.2.4.3 During transport, MEGCs shall be protected against damage to the elements and service equipment resulting from lateral and longitudinal impact and overturning. If the elements and service equipment are so constructed as to withstand impact or overturning, they need not be protected in this way. Examples of such protection are given in 6.7.5.10.4.

4.2.4.4 The periodic testing and inspection requirements for MEGCs are specified in 6.7.5.12. MEGCs or their elements shall not be charged or filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

4.2.4.5 *Filling*

4.2.4.5.1 Prior to filling, the MEGC shall be inspected to ensure that it is authorized for the gas to be transported and that the applicable provisions of these regulations have been met.

4.2.4.5.2 Elements of MEGCs shall be filled according to the working pressures, filling ratios and filling provisions specified in packing instruction P200 for the specific gas being filled into each element. In no case shall a MEGC or group of elements be filled as a unit in excess of the lowest working pressure of any given element.

4.2.4.5.3 MEGCs shall not be filled above their maximum permissible gross mass.

4.2.4.5.4 Isolation valves shall be closed after filling and remain closed during transport. Toxic gases of division 2.3 shall only be transported in multiple-element gas containers where each element is equipped with an isolation valve.

4.2.4.5.5 The opening(s) for filling shall be closed by caps or plugs. The leakproofness of the closures and equipment shall be verified by the shipper after filling.

4.2.4.5.6 MEGCs shall not be offered for filling:

(a) when damaged to such an extent that the integrity of the pressure receptacles or its structural or service equipment may be affected;

(b) unless the pressure receptacles and its structural and service equipment has been examined and found to be in good working order; and

(c) unless the required certification, retest, and filling markings are legible.

4.2.4.6 Charged MEGCs shall not be offered for transport;

(a) when leaking;

(b) when damaged to such an extent that the integrity of the pressure receptacles or its structural or service equipment may be affected;

(c) unless the pressure receptacles and its structural and service equipment has been examined and found to be in good working order; and

(d) unless the required certification, retest, and filling markings are legible.

4.2.4.7 Empty MEGCs that have not been cleaned and purged shall comply with the same requirements as MEGCs filled with the previous substance.

4.2.5 Portable tank instructions and special provisions

4.2.5.1 *General*

4.2.5.1.1 This section includes the portable tank instructions and special provisions applicable to dangerous goods authorized to be transported in portable tanks. Each portable tank instruction is identified by an alpha-numeric designation (e.g. T1). Column 10 of the Dangerous Goods List in Chapter 3.2 indicates the portable tank instruction that shall be used for each substance permitted for transport in a portable tank. When no portable tank instruction appears in Column 10 for a specific dangerous goods entry then transport of the substance in portable tanks is not permitted unless a competent authority approval is granted as detailed in 6.7.1.3. Portable tank special provisions are assigned to specific dangerous goods in Column 11 of the Dangerous Goods List in Chapter 3.2. Each portable tank special provision is identified by an alpha-numeric designation (e.g. TP1). A listing of the portable tank special provisions is provided in 4.2.5.3.

4.2.5.2 *Portable tank instructions*

4.2.5.2.1 Portable tank instructions apply to dangerous goods of Classes 2 to 9. Portable tank instructions provide specific information relevant to portable tanks provisions applicable to specific substances. These provisions shall be met in addition to the general provisions of this Chapter and the general requirements of Chapter 6.7.

4.2.5.2.2 For substances of Classes 3 to 9, the portable tank instructions indicate the applicable minimum test pressure, the minimum shell thickness (in reference steel), bottom opening requirements and pressure relief requirements. In T23, self-reactive substances of Division 4.1 and Division 5.2 organic peroxides permitted to be transported in portable tanks are listed along with the applicable control and emergency temperatures.

4.2.5.2.3 Non-refrigerated liquefied gases are assigned to portable tank instruction T50. T50 provides the maximum allowable working pressures, bottom opening requirements, pressure relief requirements and degree of filling requirements for non-refrigerated liquefied gases permitted for transport in portable tanks.

4.2.5.2.4 Refrigerated liquefied gases are assigned to portable tank instruction T75.

4.2.5.2.5 Determination of the appropriate portable tank instructions

When a specific portable tank instruction is specified in Column 10 for a specific dangerous goods entry additional portable tanks which possess higher test pressures, greater shell thicknesses, more stringent bottom opening and pressure-relief device arrangements may be used. The following guidelines apply to determining the appropriate portable tanks which may be used for transport of particular substances:

	Portable tank instructions also permitted
T1	T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T2	T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T3	T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T4	T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T5	T10, T14, T19, T20, T22
T6	T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T7	T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T8	T9, T10, T13, T14, T19, T20, T21, T22
T9	T10, T13, T14, T19, T20, T21, T22
T10	T14, T19, T20, T22
T11	T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T12	T14, T16, T18, T19, T20, T22
T13	T14, T19, T20, T21, T22
T14	T19, T20, T22
T15	T16, T17, T18, T19, T20, T21, T22
T16	T18, T19, T20, T22
T17	T18, T19, T20, T21, T22
T18	T19, T20, T22
T19	T20, T22
T20	T22
T21	T22
T22	None
T23	None

4.2.5.2.6 *Portable tank instructions*

T1 - T22	**PORTABLE TANK INSTRUCTIONS**	**T1 -T22**

These portable tank instructions apply to liquid and solid substances of Classes 3 to 9. The general provisions of section 4.2.1 and the requirements of section 6.7.2 shall be met.

Portable tank instruction	**Minimum test pressure (bar)**	**Minimum shell thickness (in mm-reference steel) (see 6.7.2.4)**	**Pressure-relief requirements (see 6.7.2.8)**	**Bottom opening requirements (see 6.7.2.6)**
T1	1.5	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T2	1.5	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T3	2.65	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T4	2.65	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T5	2.65	See 6.7.2.4.2	See 6.7.2.8.3	Not Allowed
T6	4	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T7	4	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T8	4	See 6.7.2.4.2	Normal	Not allowed
T9	4	6mm	Normal	Not allowed
T10	4	6mm	See 6.7.2.8.3	Not allowed
T11	6	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T12	6	See 6.7.2.4.2	See 6.7.2.8.3	See 6.7.2.6.3
T13	6	6mm	Normal	Not allowed
T14	6	6mm	See 6.7.2.8.3	Not allowed
T15	10	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T16	10	See 6.7.2.4.2	See 6.7.2.8.3	See 6.7.2.6.3
T17	10	6mm	Normal	See 6.7.2.6.3
T18	10	6mm	See 6.7.2.8.3	See 6.7.2.6.3
T19	10	6mm	See 6.7.2.8.3	Not allowed
T20	10	8mm	See 6.7.2.8.3	Not allowed
T21	10	10mm	Normal	Not allowed
T22	10	10mm	See 6.7.2.8.3	Not allowed

T23	PORTABLE TANK INSTRUCTION							T23
This portable tank instruction applies to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2. The general provisions of section 4.2.1 and the requirements of section 6.7.2 shall be met. The provisions specific to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 in 4.2.1.13 shall also be met.								
UN No.	**Substance**	**Minimum test pressure (bar)**	**Minimum shell thickness (mm-reference steel)**	**Bottom opening requir-ements**	**Pressure-relief requir-ements**	**Degree of filling**	**Control temper-ature**	**Emer-gency temper-ature**
3109	ORGANIC PEROXIDE, TYPE F, LIQUID tert-Butyl hydroperoxide*, not more than 72% with water Cumyl hydroperoxide, not more than 90% in diluent type A Di-tert-butyl peroxide, not more than 32% in diluent type A Isopropyl cumyl hydroperoxide, not more than 72% in diluent type A p-Menthyl hydroperoxide, not more than 72% in diluent type A Pinanyl hydro peroxide, not more than 50% in diluent type A	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13		
3110	ORGANIC PEROXIDE TYPE F, SOLID Dicumyl peroxide**	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13		

* *Provided that steps have been taken to achieve the safety equivalence of 65% tert-Butyl hydroperoxide and 35% water.*

** *Maximum quantity per portable tank 2,000 kg.*

T23 **PORTABLE TANK INSTRUCTION (cont'd)** **T23**

This portable tank instruction applies to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2. The general provisions of section 4.2.1 and the requirements of section 6.7.2 shall be met. The provisions specific to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 in 4.2.1.13 shall also be met.

UN No.	Substance	Minimum test pressure (bar)	Minimum shell thickness (mm-reference steel)	Bottom opening requir-ements	Pressure-relief requir-ements	Degree of filling	Control temper-ature	Emer-gency temper-ature
3119	ORGANIC PEROXIDE, TYPE F, LIQUID, TEMPERATURE CONTROLLED	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13	*	*
	tert-Butyl peroxyacetate, not more than 32% in diluent type B						+30 °C	+35 °C
	tert-Butyl peroxy-2-ethylhexanoate, not more than 32% in diluent type B**						+15 °C	+20 °C
	tert-Butyl peroxypivalate, not more than 27% in diluent type B						+5 °C	+10 °C
	tert-Butyl peroxy-3,5,5-trimethyl-hexanoate, not more than 32% in diluent type B						+35 °C	+40 °C
	Di-(3,5,5-trimethyl-hexanoyl) peroxide, not more than 38% in diluent type A						0 °C	+5 °C
	Peroxyacetic acid, distilled, type F, stabilized**						+30 °C	+35 °C
3120	ORGANIC PEROXIDE, TYPE F, SOLID, TEMPERATURE CONTROLLED	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13	*	*
3229	SELF-REACTIVE LIQUID TYPE F	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13		
3230	SELF-REACTIVE SOLID TYPE F	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2	See 4.2.1.13.13		

* *As approved by the competent authority.*

** *Formulation derived from distillation of peroxyacetic acid originating from peroxyacetic acid in concentration of not more than 41% with water, total active oxygen (peroxyacetic acid+H_2O_2) ≤ 9.5%, which fulfils the criteria of 2.5.3.3.2 (f).*

T23	PORTABLE TANK INSTRUCTION (cont'd)							T23
This portable tank instruction applies to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2. The general provisions of section 4.2.1 and the requirements of section 6.7.2 shall be met. The provisions specific to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 in 4.2.1.13 shall also be met.								
UN No.	**Substance**	**Minimum test pressure (bar)**	**Minimum shell thickness (mm-reference steel)**	**Bottom opening requir-ements**	**Pressure-relief requir-ements**	**Degree of filling**	**Control temper-ature**	**Emer-gency temper-ature**
					4.2.1.13.6 4.2.1.13.7 4.2.1.13.8			
3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13	*	*
3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2 4.2.1.13.6 4.2.1.13.7 4.2.1.13.8	See 4.2.1.13.13	*	*

T50	PORTABLE TANK INSTRUCTION				T50
This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.					
UN No.	**Non-refrigerated liquefied gases**	**Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated**	**Openings below liquid level**	**Pressure-relief requirements (see 6.7.3.7)**	**Maximum filling ratio**
1005	Ammonia, anhydrous	29.0 25.7 22.0 19.7	Allowed	See 6.7.3.7.3	0.53
1009	Bromotrifluoromethane (Refrigerant gas R 13B1)	38.0 34.0 30.0 27.5	Allowed	Normal	1.13
1010	Butadienes, stabilized	7.5 7.0 7.0 7.0	Allowed	Normal	0.55
1011	Butane	7.0 7.0 7.0 7.0	Allowed	Normal	0.51
1012	Butylene	8.0 7.0 7.0 7.0	Allowed	Normal	0.53

* *As approved by the competent authority.*

T50	PORTABLE TANK INSTRUCTION (cont'd)				T50
This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.					
UN No.	**Non-refrigerated liquefied gases**	**Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated**	**Openings below liquid level**	**Pressure-relief requirements (see 6.7.3.7)**	**Maximum filling ratio**
1017	Chlorine	19.0 17.0 15.0 13.5	Not Allowed	See 6.7.3.7.3	1.25
1018	Chlorodifluoromethane (Refrigerant gas R 22)	26.0 24.0 21.0 19.0	Allowed	Normal	1.03
1020	Chloropentafluoroethane (Refrigerant gas R 115)	23.0 20.0 18.0 16.0	Allowed	Normal	1.06
1021	1-Chloro-1,2,2,2-tetrafluoroethane (Refrigerant gas R 124)	10.3 9.8 7.9 7.0	Allowed	Normal	1.20
1027	Cyclopropane	18.0 16.0 14.5 13.0	Allowed	Normal	0.53
1028	Dichlorodifluoromethane (Refrigerant gas R 12)	16.0 15.0 13.0 11.5	Allowed	Normal	1.15
1029	Dichlorofluoromethane (Refrigerant gas R 21)	7.0 7.0 7.0 7.0	Allowed	Normal	1.23
1030	1,1-Difluoroethane (Refrigerant gas R 152a)	16.0 14.0 12.4 11.0	Allowed	Normal	0.79
1032	Dimethylamine, anhydrous	7.0 7.0 7.0 7.0	Allowed	Normal	0.59
1033	Dimethyl ether	15.5 13.8 12.0 10.6	Allowed	Normal	0.58
1036	Ethylamine	7.0 7.0 7.0 7.0	Allowed	Normal	0.61
1037	Ethyl chloride	7.0 7.0 7.0 7.0	Allowed	Normal	0.80

T50	PORTABLE TANK INSTRUCTION (cont'd)				T50
This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.					
UN No.	**Non-refrigerated liquefied gases**	**Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated**	**Openings below liquid level**	**Pressure-relief requirements (see 6.7.3.7)**	**Maximum filling ratio**
1040	Ethylene oxide with nitrogen up to a total pressure of 1MPa (10 bar) at 50 °C	- - - 10.0	Not Allowed	See 6.7.3.7.3	0.78
1041	Ethylene oxide and carbon dioxide mixture with more than 9% but not more than 87% ethylene oxide	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7
1055	Isobutylene	8.1 7.0 7.0 7.0	Allowed	Normal	0.52
1060	Methyllacetylene and propadiene mixture, stabilized	28.0 24.5 22.0 20.0	Allowed	Normal	0.43
1061	Methylamine, anhydrous	10.8 9.6 7.8 7.0	Allowed	Normal	0.58
1062	Methyl bromide	7.0 7.0 7.0 7.0	Not Allowed	See 6.7.3.7.3	1.51
1063	Methyl chloride (Refrigerant gas R 40)	14.5 12.7 11.3 10.0	Allowed	Normal	0.81
1064	Methyl mercaptan	7.0 7.0 7.0 7.0	Not Allowed	See 6.7.3.7.3	0.78
1067	Dinitrogen tetroxide	7.0 7.0 7.0 7.0	Not Allowed	See 6.7.3.7.3	1.30
1075	Petroleum gas, liquefied	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7
1077	Propylene	28.0 24.5 22.0 20.0	Allowed	Normal	0.43
1078	Refrigerant gas, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7
1079	Sulphur dioxide	11.6 10.3 8.5 7.6	Not Allowed	See 6.7.3.7.3	1.23

This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.

UN No.	Non-refrigerated liquefied gases	Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated	Openings below liquid level	Pressure-relief requirements (see 6.7.3.7)	Maximum filling ratio
1082	Trifluorochloroethylene, stabilized (Refrigerant gas R 1113)	17.0 15.0 13.1 11.6	Not Allowed	See 6.7.3.7.3	1.13
1083	Trimethylamine, anhydrous	7.0 7.0 7.0 7.0	Allowed	Normal	0.56
1085	Vinyl bromide, stabilized	7.0 7.0 7.0 7.0	Allowed	Normal	1.37
1086	Vinyl chloride, stabilized	10.6 9.3 8.0 7.0	Allowed	Normal	0.81
1087	Vinyl methyl ether, stabilized	7.0 7.0 7.0 7.0	Allowed	Normal	0.67
1581	Chloropicrin and methyl bromide mixture	7.0 7.0 7.0 7.0	Not Allowed	See 6.7.3.7.3	1.51
1582	Chloropicrin and methyl chloride mixture	19.2 16.9 15.1 13.1	Not Allowed	See 6.7.3.7.3	0.81
1858	Hexafluoropropylene (Refrigerant gas R 1216)	19.2 16.9 15.1 13.1	Allowed	Normal	1.11
1912	Methyl chloride and methylene chloride mixture	15.2 13.0 11.6 10.1	Allowed	Normal	0.81
1958	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Refrigerant gas R 114)	7.0 7.0 7.0 7.0	Allowed	Normal	1.30
1965	Hydrocarbon gas, mixture liquefied, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7
1969	Isobutane	8.5 7.5 7.0 7.0	Allowed	Normal	0.49

This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.

UN No.	Non-refrigerated liquefied gases	Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated	Openings below liquid level	Pressure-relief requirements (see 6.7.3.7)	Maximum filling ratio
1973	Chlorodifluoromethane and chloropentafluoroethane mixture with fixed boiling point, with approximately 49% chlorodifluoromethane (Refrigerant gas R 502)	28.3 25.3 22.8 20.3	Allowed	Normal	1.05
1974	Chlorodifluorobromomethane (Refrigerant gas R 12B1)	7.4 7.0 7.0 7.0	Allowed	Normal	1.61
1976	Octafluorocyclobutane (Refrigerant gas RC 318)	8.8 7.8 7.0 7.0	Allowed	Normal	1.34
1978	Propane	22.5 20.4 18.0 16.5	Allowed	Normal	0.42
1983	1-Chloro-2,2,2-trifluoroethane (Refrigerant gas R 133a)	7.0 7.0 7.0 7.0	Allowed	Normal	1.18
2035	1,1,1-Trifluoroethane (Refrigerant gas R 143a)	31.0 27.5 24.2 21.8	Allowed	Normal	0.76
2424	Octafluoropropane (Refrigerant gas R 218)	23.1 20.8 18.6 16.6	Allowed	Normal	1.07
2517	1-Chloro-1,1-difluoroethane (Refrigerant gas R 142b)	8.9 7.8 7.0 7.0	Allowed	Normal	0.99
2602	Dichlorodifluoromethane and difluoroethane azeotropic mixture with approximately 74% dichlorodifluoromethane (Refrigerant gas R 500)	20.0 18.0 16.0 14.5	Allowed	Normal	1.01
3057	Trifluoroacetyl chloride	14.6 12.9 11.3 9.9	Not allowed	6.7.3.7.3	1.17
3070	Ethylene oxide and dichlorodifluoromethane mixture with not more than 12.5% ethylene oxide	14.0 12.0 11.0 9.0	Allowed	6.7.3.7.3	1.09

T50	PORTABLE TANK INSTRUCTION (cont'd)				T50
This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.					
UN No.	**Non-refrigerated liquefied gases**	**Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated**	**Openings below liquid level**	**Pressure-relief requirements (see 6.7.3.7)**	**Maximum filling ratio**
3153	Perfluoro (methyl vinyl ether)	14.3 13.4 11.2 10.2	Allowed	Normal	1.14
3159	1,1,1,2-Tetrafluoroethane (Refrigerant gas R 134a)	17.7 15.7 13.8 12.1	Allowed	Normal	1.04
3161	Liquefied gas, flammable, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7
3163	Liquefied gas, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7
3220	Pentafluoroethane (Refrigerant gas R 125)	34.4 30.8 27.5 24.5	Allowed	Normal	0.95
3252	Difluoromethane (Refrigerant gas R 32)	43.0 39.0 34.4 30.5	Allowed	Normal	0.78
3296	Heptafluoropropane (Refrigerant gas R 227)	16.0 14.0 12.5 11.0	Allowed	Normal	1.20
3297	Ethylene oxide and chlorotetrafluoroethane mixture, with not more than 8.8% ethylene oxide	8.1 7.0 7.0 7.0	Allowed	Normal	1.16
3298	Ethylene oxide and pentafluoroethane mixture, with not more than 7.9% ethylene oxide	25.9 23.4 20.9 18.6	Allowed	Normal	1.02
3299	Ethylene oxide and tetrafluoroethane mixture, with not more than 5.6% ethylene oxide	16.7 14.7 12.9 11.2	Allowed	Normal	1.03
3318	Ammonia solution, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	See 4.2.2.7
3337	Refrigerant gas R 404A	31.6 28.3 25.3 22.5	Allowed	Normal	0.82

T50	PORTABLE TANK INSTRUCTION (cont'd)				T50
This portable tank instruction applies to non-refrigerated liquefied gases. The general provisions of section 4.2.2 and the requirements of section 6.7.3 shall be met.					
UN No.	**Non-refrigerated liquefied gases**	**Max. allowable working pressure (bar) Small; Bare; Sunshield; Insulated**	**Openings below liquid level**	**Pressure-relief requirements (see 6.7.3.7)**	**Maximum filling ratio**
3338	Refrigerant gas R 407A	31.3 28.1 25.1 22.4	Allowed	Normal	0.94
3339	Refrigerant gas R 407B	33.0 29.6 26.5 23.6	Allowed	Normal	0.93
3340	Refrigerant gas R 407C	29.9 26.8 23.9 21.3	Allowed	Normal	0.95

T75	PORTABLE TANK INSTRUCTION	T75
This portable tank instruction applies to refrigerated liquefied gases. The general provisions of section 4.2.3 and the requirements of section 6.7.4 shall be met.		

4.2.5.3 *Portable tank special provisions*

Portable tank special provisions are assigned to certain substances to indicate provisions which are in addition to or in lieu of those provided by the portable tank instructions or the requirements in Chapter 6.7. Portable tank special provisions are identified by an alphanumeric designation beginning with the letters "TP" (tank provision) and are assigned to specific substances in Column 11 of the Dangerous Goods List in Chapter 3.2. The following is a list of the portable tank special provisions:

TP1 - The degree of filling prescribed in 4.2.1.9.2 shall not be exceeded

$$Degree\ of\ \ filling = \frac{97}{1+\alpha(tr-tf)}$$

TP2 - The degree of filling prescribed in 4.2.1.9.3 shall not be exceeded

$$Degree\ of\ \ filling = \frac{95}{1+\alpha(tr-tf)}$$

TP3 - For liquids transported under elevated temperature conditions the degree of filling prescribed in 4.2.1.9.5.1 shall not be exceeded

$$Degree\ of\ \ filling = 95\frac{dr}{df}$$

TP4 - The degree of filling shall not exceed 90% or, alternatively, any other value approved by the competent authority (see 4.2.1.15.2).

TP5 - Reserved.

TP6 - To prevent the tank bursting in any event, including fire engulfment, it shall be provided with pressure-relief devices which are adequate in relation to the capacity of the tank and to the nature of the substance transported. The device shall also be compatible with the substance.

TP7 - Air shall be eliminated from the vapour space by nitrogen or other means.

TP8 - The test pressure for the portable tank may be reduced to 1.5 bar when the flash point of the substances transported is greater than 0 °C.

TP9 - A substance under this description shall only be transported in a portable tank under an approval granted by the competent authority.

TP10 - A lead lining, not less than 5 mm thick, which shall be tested annually, or another suitable lining material approved by the competent authority is required.

TP12 - This substance is highly corrosive to steel.

TP13 - Self-contained breathing apparatus shall be provided when this substance is transported.

TP16 - The tank shall be fitted with a special device to prevent under-pressure and excess pressure during normal transport conditions. This device shall be approved by the competent authority. Pressure-relief requirements are as indicated in 6.7.2.8.3 to prevent crystallization of the product in the pressure-relief valve.

TP17 - Only inorganic non-combustible materials shall be used for thermal insulation of the tank.

TP18 - Temperature shall be maintained between 18 °C and 40 °C. Portable tanks containing solidified methacrylic acid shall not be reheated during transport.

TP19 - The calculated shell thickness shall be increased by 3 mm. Shell thickness shall be verified ultrasonically at intervals midway between periodic hydraulic tests.

TP20 - This substance shall only be transported in insulated tanks under a nitrogen blanket.

TP21 - The shell thickness shall be not less than 8 mm. Tanks shall be hydraulically tested and internally inspected at intervals not exceeding 2.5 years.

TP22 - Lubricant for joints or other devices shall be oxygen compatible.

TP23 - Transport permitted under special conditions prescribed by the competent authorities.

TP24 - The portable tank may be fitted with a device located under maximum filling conditions in the vapour space of the shell to prevent the build up of excess pressure due to the slow decomposition of the substance transported. This device shall also prevent an unacceptable amount of leakage of liquid in the case of overturning or entry of foreign matter into the tank. This device shall be approved by the competent authority or its authorized body.

TP25 - Sulphur trioxide 99.95% pure and above may be transported in tanks without an inhibitor provided that it is maintained at a temperature equal to or above 32.5 °C.

TP26 - When transported under heated conditions, the heating device shall be fitted outside the shell. For UN 3176 this requirement only applies when the substance reacts dangerously with water.

TP27 - A portable tank having a minimum test pressure of 4 bar may be used if it is shown that a test pressure of 4 bar or less is acceptable according to the test pressure definition in 6.7.2.1.

TP28 - A portable tank having a minimum test pressure of 2.65 bar may be used if it is shown that a test pressure of 2.65 bar or less is acceptable according to the test pressure definition in 6.7.2.1.

TP29 - A portable tank having a minimum test pressure of 1.5 bar may be used if it is shown that a test pressure of 1.5 bar or less is acceptable according to the test pressure definition in 6.7.2.1.

TP30 - This substance shall be transported in insulated tanks.

TP31 - This substance may only be transported in tanks in the solid state.

PART 5

CONSIGNMENT PROCEDURES

CHAPTER 5.1

GENERAL PROVISIONS

5.1.1 Application and general provisions

5.1.1.1 This Part sets forth the provisions for dangerous goods consignments relative to authorization of consignments and advance notifications, marking, labelling, documentation (by manual, electronic data processing (EDP) or electronic data interchange (EDI) techniques) and placarding.

5.1.1.2 Except as otherwise provided in these Regulations, no person may offer dangerous goods for transport unless those goods are properly marked, labelled, placarded, described and certified on a transport document, and otherwise in a condition for transport as required by this Part.

5.1.2 Use of overpacks

5.1.2.1 An overpack shall be marked with the proper shipping name and the UN Number and labelled, as required for packages by Chapter 5.2, for each item of dangerous goods contained in the overpack unless markings and labels representative of all dangerous goods in the overpack are visible.

5.1.2.2 Each package of dangerous goods contained in the overpack shall comply with all applicable provisions of these Regulations. The intended function of each package shall not be impaired by the overpack.

5.1.3 Empty packagings

5.1.3.1 Other than for Class 7, a packaging which previously contained dangerous goods shall 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.

5.1.3.2 Tanks and intermediate bulk containers used for the transport of radioactive material shall not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm^2 for all other alpha emitters.

5.1.4 Mixed packing

When two or more dangerous goods are packed within the same outer packaging, the package shall be labelled and marked as required for each substance. Secondary risk labels need not be applied if the hazard is already represented by a primary risk label.

5.1.5 General provisions for Class 7

5.1.5.1 *Requirements before shipments*

5.1.5.1.1 First shipment of a package

Before the first shipment of any package, the following requirements shall be fulfilled:

(a) If the design pressure of the containment system exceeds 35 kPa (gauge), it shall be ensured that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;

(b) For each Type B(U), Type B(M) and Type C package and for each package containing fissile material, it shall 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 packages containing fissile material, where, in order to comply with the requirements of 6.4.11.1, neutron poisons are specifically included as components of the package, checks shall be performed to confirm the presence and distribution of those neutron poisons.

5.1.5.1.2 Each shipment

Before each shipment of any package, the following requirements shall be fulfilled:

(a) For any package it shall be ensured that all the requirements specified in the relevant provisions of these Regulations have been satisfied;

(b) It shall be ensured that lifting attachments which do not meet the requirements of 6.4.2.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6.4.2.3;

(c) For each Type B(U), Type B(M) and Type C package and for each package containing fissile material, it shall be ensured that all the requirements specified in the approval certificates have been satisfied;

(d) Each Type B(U), Type B(M) and Type C package shall 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;

(e) For each Type B(U), Type B(M) and Type C package, it shall 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 6.4.8.7 and 6.4.10.3 were made;

(f) For each special form radioactive material, it shall be ensured that all the requirements specified in the special form approval certificate and the relevant provisions of these Regulations have been satisfied;

(g) For packages containing fissile material the measurement specified in 6.4.11.4(b)and the tests to demonstrate closure of each package as specified in 6.4.11.7 shall be performed where applicable;

(h) For each low dispersible radioactive material, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.

5.1.5.2 ***Approval of shipments and notification***

5.1.5.2.1 *General*

In addition to the approval for package designs described in Chapter 6.4 , multilateral shipment approval is also required in certain circumstances (5.1.5.2.2 and 5.1.5.2.3). In some circumstances it is also necessary to notify competent authorities of a shipment (5.1.5.2.4).

5.1.5.2.2 *Shipment approvals*

Multilateral approval shall be required for:

(a) The shipment of Type B(M) packages not conforming with the requirements of 6.4.7.5 or designed to allow controlled intermittent venting;

(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;

(c) The shipment of packages containing fissile materials if the sum of the criticality safety indexes of the packages exceeds 50; and

(d) Radiation protection programmes for shipments by special use vessels according to 7.2.3.2.2;

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 5.1.5.3.1).

5.1.5.2.3 *Shipment approval by special arrangement*

Provisions may be approved by a competent authority under which a consignment, which does not satisfy all of the applicable requirements of these Regulations may be transported under special arrangement (see 1.1.2.4).

5.1.5.2.4 *Notifications*

Notification to competent authorities is required as follows:

(a) Before the first shipment of any package requiring competent authority approval, the consignor shall ensure that copies of each applicable competent authority certificate applying to that package design have been submitted to the competent authority of each country through or into which the consignment is to be transported. The consignor 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 consignor shall notify the competent authority of each country through or into which the consignment is to be transported. This notification shall be in the hands of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance;

(c) The consignor is not required to send a separate notification if the required information has been included in the application for shipment approval;

(d) The consignment notification shall 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 routing;

(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 (see 1.2.2.1). For fissile material, the mass of fissile material in units of grams (g), or multiples thereof, may be used in place of activity.

5.1.5.3 ***Certificates issued by Competent Authority***

5.1.5.3.1 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) packages containing 0.1 kg or more of uranium hexafluoride;

(iv) all packages containing fissile material unless excepted by 6.4.11.2;

(v) type B(U) packages and Type B(M) packages;

(vi) type C packages;

(b) Special arrangements;

(c) Certain shipments (see 5.1.5.2.2).

The certificates shall confirm that the applicable requirements are met, and for design approvals shall attribute to the design an identification mark.

The package design and shipment approval certificates may be combined into a single certificate.

Certificates and applications for these certificates shall be in accordance with the requirements in 6.4.23.

5.1.5.3.2 The consignor shall be in possession of a copy of each applicable certificate. The consignor shall 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.

5.1.5.3.3 For package designs where a competent authority issued certificate is not required, the consignor shall, 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.

CHAPTER 5.2

MARKING AND LABELLING

5.2.1 Marking

5.2.1.1 Unless provided otherwise in these Regulations, the proper shipping name for the dangerous goods as determined in accordance with 3.1.2 and the corresponding UN Number preceded by the letters "UN", shall be displayed on each package. In the case of unpackaged articles the marking shall be displayed on the article, on its cradle or on its handling, storage or launching device. For goods of Division 1.4, Compatibility Group S, the division and compatibility group letter shall also be marked unless the label for 1.4S is displayed. A typical package marking is:

Corrosive liquid, acidic, organic, n.o.s. (Caprylyl chloride) UN 3265.

5.2.1.2 All package markings required by 5.2.1.1:

(a) Shall be readily visible and legible;

(b) Shall be able to withstand open weather exposure without a substantial reduction in effectiveness;

(c) Shall be displayed on a background of contrasting colour on the external surface of the package; and

(d) Shall not be located with other package markings that could substantially reduce their effectiveness.

5.2.1.3 Salvage packagings shall additionally be marked with the word "SALVAGE".

5.2.1.4 Intermediate bulk containers of more than 450 litres capacity shall be marked on two opposing sides.

5.2.1.5 *Special marking provisions for Class 7*

5.2.1.5.1 Each package shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, or both.

5.2.1.5.2 For each package, other than excepted packages, the United Nations number preceded by the letters AUN@ and the proper shipping name shall be legibly and durably marked on the outside of the packaging. In the case of excepted packages only the United Nations number, preceded by the letters "UN", is required.

5.2.1.5.3 Each package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging.

5.2.1.5.4 Each package which conforms to:

(a) an Industrial package Type 1, an Industrial package Type 2 or an Industrial package Type 3 design shall 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 shall be legibly and durably marked on the outside of the packaging with "TYPE A";

(c) an Industrial package Type 2, an Industrial package Type 3 or a Type A package design shall 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 the name of the manufacturers, or other identification of the packaging specified by the competent authority.

5.2.1.5.5 Each package which conforms to a design approved by the competent authority shall be legibly and durably marked on the outside of the packaging with:

(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;

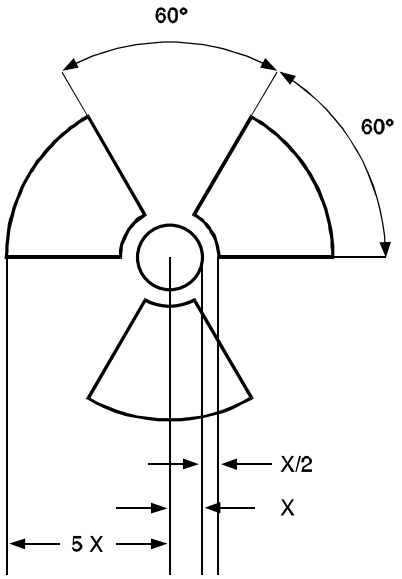
(c) in the case of a Type B(U) or Type B(M) package design, with "TYPE B(U)" or "TYPE B(M)"; and

(d) in the case of a Type C package design, with "TYPE C".

5.2.1.5.6 Each package which conforms to a Type B(U), Type B(M) or Type C package design shall 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 shown in the figure below:

Figure 5.2.1

Basic trefoil symbol with proportions
based on a central circle of radius X.
The minimum allowable size
of X shall be 4 mm.



5.2.1.5.7 Where LSA-I or SCO-I material is contained in receptacles or wrapping materials and is transported under exclusive use as permitted by 4.1.9.2.3, the outer surface of these receptacles or wrapping materials may bear the marking 'RADIOACTIVE LSA-I' or 'RADIOACTIVE SCO-I', as appropriate.

5.2.2 Labelling

5.2.2.1 *Labelling provisions*

NOTE: *These provisions relate essentially to danger labels. However, additional markings or symbols indicating precautions to be taken in handling or storing a package (e.g. a symbol representing an umbrella indicating that a package shall be kept dry) may be displayed on a package if appropriate.*

5.2.2.1.1 Labels identifying primary and subsidiary risks shall conform to models Nos. 1 to 9 illustrated in 5.2.2.2.2. The "EXPLOSIVE" subsidiary risk label is model No. 1.

5.2.2.1.2 Where articles or substances are specifically listed in the Dangerous Goods List, a danger class label shall be affixed for the hazard shown in Column 3 of the List and a subsidiary risk label shall be affixed for any risk indicated by a class or division number in the Column 4 of the List, unless qualified by a special provision. In certain cases the need for using a subsidiary risk label may also be indicated by a special provision indicated in Column 6 of the List.

5.2.2.1.3 Except as provided in 5.2.2.1.3.1, if a substance which meets the definition of more than one class is not specifically listed by name in the Dangerous Goods List in Chapter 3.2, the provisions in Chapter 2.0 shall be used to determine the primary risk class of the goods. In addition to the label required for that primary risk class, subsidiary risk labels shall also be applied as specified in the Dangerous Goods List.

5.2.2.1.3.1 Packages containing substances of Class 8 need not bear subsidiary risk label model No. 6.1 if the toxicity arises solely from the destructive effect on tissue. Packages containing substances of Division 4.2 need not bear subsidiary risk label model No. 4.1.

5.2.2.1.4 *Labels for Class 2 gases with subsidiary risk(s)*

Division	**Subsidiary risk(s) shown in Chapter 2**	**Primary risk label**	**Subsidiary risk label(s)**
2.1	None	2.1	None
2.2	None	2.2	None
	5.1	2.2	5.1
	None	2.3	None
2.3	2.1	2.3	2.1
	5.1	2.3	5.1
	5.1, 8	2.3	5.1, 8
	8	2.3	8
	2.1, 8	2.3	2.1, 8

5.2.2.1.5 Three separate labels have been provided for Class 2, one for flammable gases of Division 2.1 (red), one for non-flammable, non-toxic gases of Division 2.2 (green) and one for toxic gases of Division 2.3 (white). Where the Dangerous Goods List indicates that a Class 2 gas possesses single or multiple subsidiary risks, labels shall be used in accordance with the table in 5.2.2.1.4.

5.2.2.1.6 Each label shall:

(a) Be located on the same surface of the package near the proper shipping name marking, if the package dimensions are adequate;

(b) Be so placed on the packaging that they are not covered or obscured by any part or attachment to the packaging or any other label or marking; and

(c) When primary and subsidiary risk labels are required, be displayed next to each other.

Where a package is of such an irregular shape or small size that a label cannot be satisfactorily affixed, the label may be attached to the package by a securely affixed tag or other suitable means.

5.2.2.1.7 Intermediate bulk containers of more than 450 litres capacity shall be labelled on two opposing sides.

5.2.2.1.8 Labels shall be affixed on a surface of contrasting colour.

5.2.2.1.9 *Special provisions for the labelling of self-reactive substances*

An “EXPLOSIVE” subsidiary risk label (Model No. 1) shall be applied for type B self-reactive substances, unless the competent authority has permitted this label to be dispensed with for a specific packaging because test data have proved that the self-reactive substance in such a packaging does not exhibit explosive behaviour.

5.2.2.1.10 *Special provisions for the labelling of organic peroxides*

The Division 5.2 label (model No. 5.2) shall be affixed to packages containing organic peroxides classified as types B, C, D, E or F. This label also implies that the product may be flammable and hence no "FLAMMABLE LIQUID", subsidiary risk label (model No. 3) is required. In addition, the following subsidiary risk labels shall be applied:

(a) An "EXPLOSIVE" subsidiary risk label (model No. 1) for organic peroxides type B, unless the competent authority has permitted this label to be dispensed with for a specific packaging because test data have proved that the organic peroxide in such a packaging does not exhibit explosive behaviour;

(b) A "CORROSIVE" subsidiary risk label (model No. 8) is required when Packing Group I or II criteria of Class 8 are met.

5.2.2.1.11 *Special provisions for the labelling of infectious substances packages*

In addition to the primary risk label (model No. 6.2), infectious substances packages shall bear any other label required by the nature of the contents.

5.2.2.1.12 *Special provisions for the labelling of radioactive material*

5.2.2.1.12.1 Except as provided for large freight containers and tanks in accordance with 5.3.1.1.5.1, each package, overpack and freight container containing radioactive material shall bear at least two labels which conform to the models Nos. 7A, 7B, and 7C as appropriate according to the category (see 2.7.8.4) of that package, overpack or freight container. Labels shall be affixed to two opposite sides on the outside of the package or on the outside of all four sides of the freight container. Each overpack containing radioactive material shall 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 6.4.11.2 shall bear labels which conform to model No. 7E; such labels, where applicable shall be affixed

adjacent to the labels for radioactive material. Labels shall not cover the markings specified in 5.2. Any labels which do not relate to the contents shall be removed or covered.

5.2.2.1.12.2 Each label conforming to models numbers 7A, 7B, and 7C shall be completed with the following information:

(a) Contents:

(i) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2.7.7.2.1, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides shall be listed to the extent the space on the line permits. The group of LSA or SCO shall be shown following the name(s) of the radionuclide(s). The terms "LSA-II","LSA-III", "SCO-I" and "SCO-II" shall be used for this purpose.

(ii) for LSA-I material, the term "LSA-I" is all that is necessary; the name of the radionuclide is not necessary;

(b) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix (see 1.2.2.1). For fissile material, the mass of fissile material in units of grams (g), or multiples thereof, may be used in place of activity;

(c) For overpacks and freight containers the "contents" and "activity" entries on the label shall bear the information required in 5.2.2.1.12.2(a) and 5.2.2.1.12.2(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";

(d) Transport index: See 2.7.6.1.1 and 2.7.6.1.2. (No transport index entry is required for category I-WHITE.).

5.2.2.1.12.3 Each label conforming to the model No. 7E shall be completed with the criticality safety index (CSI) as stated in the certificate of approval for special arrangement or the certificate of approval for the package design issued by the competent authority.

5.2.2.1.12.4 For overpacks and freight containers, the criticality safety index (CSI) on the label shall bear the information required in 5.2.2.1.12.3 totalled together for the fissile contents of the overpack or freight container.

5.2.2.2 *Provisions for labels*

5.2.2.2.1 Labels shall satisfy the provisions of this section and conform, in terms of colour, symbols and general format, to the specimen labels shown in 5.2.2.2.2.

5.2.2.2.1.1 Labels shall be in the form of a square set at an angle of 45° (diamond-shaped) with minimum dimensions of 100 mm by 100 mm, except in the case of packages of such dimensions that they can only bear smaller labels and as provided in 5.2.2.2.1.2. They have a line of the same colour as the symbol, 5 mm inside the edge and running parallel with it.

5.2.2.2.1.2 Cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for transport, bear labels representative of those specified in this section, which have been reduced in size, according to ISO 7225:1994, for display on the non-cylindrical part (shoulder) of such cylinders.

5.2.2.2.1.3 Labels are divided into halves. With the exception of Divisions 1.4, 1.5 and 1.6, the upper half of the label is reserved for the pictorial symbol and the lower half for texts and the class or division number and the compatibility group letter as appropriate.

5.2.2.2.1.4 Except for Divisions 1.4, 1.5 and 1.6, labels for Class 1 show in the lower half the division number and compatibility group letter for the substance or article. Labels for Divisions 1.4, 1.5 and 1.6 show in the upper half the division number and in the lower half the compatibility group letter. For Division 1.4, Compatibility Group S, no label is generally required. However, in cases where a label is considered necessary for such goods, it shall be based on model No. 1.4.

5.2.2.2.1.5 On labels other than those for material of Class 7, the insertion of any text (other than the class or division number) in the space below the symbol shall be confined to particulars indicating the nature of the risk and precautions to be taken in handling.

5.2.2.2.1.6 The symbols, text and numbers shall be shown in black on all labels except for:

(a) the Class 8 label, where the text (if any) and class number shall appear in white;

(b) labels with entirely green, red or blue backgrounds where they may be shown in white; and

(c) 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.

5.2.2.2.1.7 All labels shall be able to withstand open weather exposure without a substantial reduction in effectiveness.

5.2.2.2.2 *Specimen labels*

CLASS 1
Explosive substances or articles

(No.1)
Divisions 1.1, 1.2 and 1.3
Symbol (exploding bomb): black; Background: orange; Figure '1' in bottom corner

(No.1.4)
Division 1.4

(No.1.5)
Division 1.5

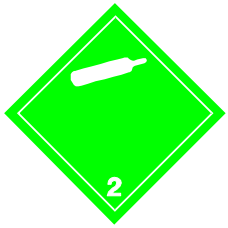
(No.1.6)
Division 1.6

Background: orange; Figures: black; Numerals shall be about 30 mm in height
and be about 5 mm thick (for a label measuring 100 mm x 100 mm); Figure '1' in bottom corner

** Place for division - to be left blank if explosive is the subsidiary risk
* Place for compatibility group to be left blank if explosive is the subsidiary risk

CLASS 2
Gases

(No.2.1)
Division 2.1
Flammable gases
Symbol (flame): black or white;
(except as provided for in 5.2.2.2.1.6 c))
Background: red; Figure '2' in bottom corner



(No.2.2)
Division 2.2
Non flammable, non-toxic gases
Symbol (gas cylinder): black or white;
Background: green; Figure '2' in bottom corner

(No.2.3)
Division 2.3
Toxic gases
Symbol (skull and crossbones): black;
Background: white; Figure '2' in bottom corner

CLASS 3
Flammable liquids

(No.3)
Symbol (flame): black or white;
Background: red; Figure '3' in bottom corner

CLASS 4

(No.4.1)
Division 4.1
Flammable solids
Symbol (flame): black;
Background: white with seven vertical red stripes;
Figure '4' in bottom corner

(No.4.2)
Division 4.2
Substances liable to spontaneous combustion
Symbol (flame): black;
Background: upper half white, lower half red;
Figure '4' in bottom corner

(No.4.3)
Division 4.3
Substances which in contact with water emit flammable gases
Symbol (flame): black or white;
Background: blue;
Figure '4' in bottom corner

CLASS 5

(No. 5.1)
Division 5.1
Oxidizing substances

(No. 5.2)
Division 5.2
Organic peroxides

Symbol (flame over circle): black; Background: yellow;
Figures '5.1' in bottom corner Figures '5.2' in bottom corner

CLASS 6

(No. 6.1)
Division 6.1
Toxic substances
Symbol (skull and crossbones): black;
Background: white; Figure '6' in bottom corner

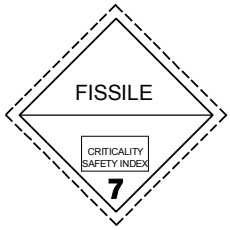
(No.6.2)
Division 6.2
Infectious substances
The lower half of the label may bear the inscriptions: 'INFECTIOUS SUBSTANCE' and 'In the case of damage or leakage immediately notify Public Health Authority';
Symbol (three crescents superimposed on a circle) and inscriptions: black;
Background: white; Figure '6' in bottom corner

CLASS 7
Radioactive material

(No. 7A)
Category I - White
Symbol (trefoil): black;
Background: white;
Text (mandatory): black in lower half of label:
'RADIOACTIVE'
'Contents .....'
'Activity .....'
One red bar shall
follow the word 'Radioactive';
Figure '7' in bottom corner.

(No. 7B)
Category II - Yellow
Symbol (trefoil): black;
Background: upper half yellow with white border, lower half white;
Text (mandatory): black in lower half of label:
'RADIOACTIVE'
'Contents .....'
'Activity .....'
In a black outlined box: 'Transport Index';
Two red vertical bars shall
follow the word 'Radioactive';
Figure '7' in bottom corner.

(No. 7C)
Category III - Yellow
Three red vertical bars shall
follow the word 'Radioactive';



(No. 7E)
Class 7 fissile material
Background: white;
Text (mandatory): black in upper half of label: 'FISSILE';
In a black outlined box in the lower half of the label:
'CRITICALITY SAFETY INDEX'
Figure '7' in bottom corner.

CLASS 8
Corrosive substances

(No. 8)
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 '8' in bottom corner

CLASS 9
Miscellaneous dangerous substances and articles

(No. 9)
Symbol (seven vertical stripes in upper half): black;
Background: white;
Figure '9' underlined in bottom corner

CHAPTER 5.3

PLACARDING AND MARKING OF TRANSPORT UNITS

5.3.1 Placarding

5.3.1.1 *Placarding provisions*

5.3.1.1.1 *Definition*

For the purposes of this Chapter:

Transport units comprise road transport tank and freight vehicles, railway transport tank and freight wagons, and multimodal freight containers and portable tanks.

5.3.1.1.2 Placards shall be affixed to the exterior surface of transport units to provide a warning that the contents of the unit are dangerous goods and present risks. Placards shall correspond to the primary risk of the goods contained in the transport unit except that:

(a) Placards are not required on transport units carrying any quantity of explosives of Division 1.4, Compatibility Group S, dangerous goods packed in limited quantities, or excepted packages of radioactive material (Class 7); and

(b) Placards indicating the highest risk only need be affixed on transport units carrying substances and articles of more than one division in Class 1.

5.3.1.1.3 Placards shall be displayed for those subsidiary risks of substances or articles specified in Column 4 of the Dangerous Goods List. However, transport units containing goods of more than one class need not bear a subsidiary risk placard if the hazard represented by that placard is already indicated by a primary risk placard.

5.3.1.1.4 Transport units carrying dangerous goods or the residue of dangerous goods in unpurged tanks shall display placards clearly visible on at least two opposing sides of the units and in any case in such a position as may be seen by all those involved in the loading or unloading process. Where the transport unit has a multiple compartment tank which is carrying two or more dangerous goods and/or the residues of dangerous goods, appropriate placards shall be displayed along each side at the position of the relevant compartments.

5.3.1.1.5 *Special provisions for Class 7*

5.3.1.1.5.1 Large freight containers carrying packages other than excepted packages, and tanks shall bear four placards which conform with the model 7D given in Figure 5.3.1. The placards shall be affixed in a vertical orientation to each side wall and each end wall of the large freight container or tank. Any placards which do not relate to the contents shall be removed. Instead of using both labels and placards, it is permitted as an alternative to use enlarged labels only, as shown in label model Nos. 7A, B and C, and where appropriate 7 E, with dimensions as required for the placard in Figure 5.3.1.

5.3.1.1.5.2 Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels shown in 5.2.2.2.2.1 as models No. 7A, 7B, 7C or 7E, or carrying consignments under exclusive use, shall display the placard shown in Figure 5.3.1 (Model 7D) on each of:

(a) the two external lateral walls in the case of a rail vehicle;

(b) the two external lateral walls and the external rear wall in the case of a road vehicle.

In the case of a vehicle without sides the placards may be affixed directly on the cargo-carrying unit provided that they are readily visible; in the case of physically large tanks or freight containers, the placards on the tanks or freight containers shall suffice. In the case of vehicles which have insufficient area to allow the fixing of larger placards, the dimensions of the placard as described in Figure 5.3.1 may be reduced to 100 mm. Any placards which do not relate to the contents shall be removed.

5.3.1.2 ***Specifications for placards***

5.3.1.2.1 Except as provided in 5.3.1.2.2 for the Class 7 placard, a placard shall:

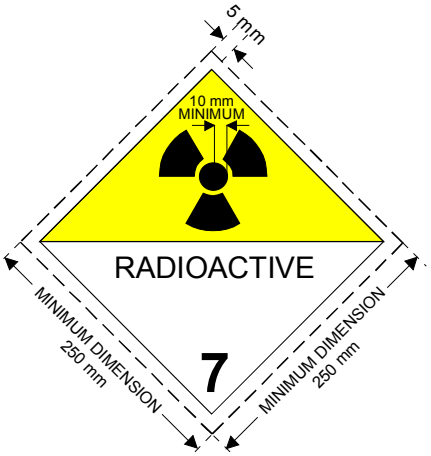
(a) Be not less than 250 mm by 250 mm, with a line of the same colour as the symbol running 12.5 mm inside the edge and parallel with it;

(b) Correspond to the label for the class of the dangerous goods in question with respect to colour and symbol; and

(c) Display the number of the class or division (and for goods in Class 1, the compatibility group letter) of the dangerous goods in question in the manner prescribed in 5.2.2.2 for the corresponding label, in digits not less than 25 mm high.

5.3.1.2.2 For Class 7, the placard shall have minimum overall dimensions of 250 mm by 250 mm (except as permitted by 5.3.1.1.5.2) with a black line running 5 mm inside the edge and parallel with it, and shall be otherwise as shown in Figure 5.3.1 below. When different dimensions are used, the relative proportions shall be maintained. The number A7" shall not be less than 25 mm high. The background colour of the upper half of the placard shall be yellow and of the lower half white, the colour of the trefoil and the printing shall be black. The use of the word ARADIOACTIVE@ in the bottom half is optional to allow the use of this placard to display the appropriate United Nations number for the consignment.

Figure 5.3.1
Placard for radioactive material of Class 7



(No. 7D)
Symbol (trefoil): black; Background: upper half yellow with white border, lower half white;
The lower half shall show the word RADIOACTIVE or alternatively, when required (see 5.3.2.1), the appropriate UN number; and the figure "7" in the bottom corner

5.3.2 Marking

5.3.2.1 *Display of UN numbers*

5.3.2.1.1 Except for goods of Class 1, the UN number shall be displayed as required by this section on consignments of:

(a) Solids, liquids or gases transported in tank transport units including on each component of a multicompartment tank transport unit;

(b) Packaged dangerous goods of a single commodity which constitute a full load for the transport unit;

(c) Unpackaged LSA-1 or SCO-1 material of Class 7 in or on a vehicle, or in a freight container, or in a tank; and

(d) Packaged radioactive material with a single UN number under exclusive use in or on a vehicle, or in a freight container.

5.3.2.1.2 The UN number for the goods shall be displayed in black digits not less than 65 mm high, either:

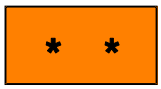
(a) Against a white background in the lower half of each placard (see Figures 5.3.1 and 5.3.2); or

(b) On an orange rectangular panel not less than 120 mm high and 300 mm wide, with a 10 mm black border, to be placed immediately adjacent to each placard (see Figure 5.3.3).

5.3.2.1.3 *Examples of display of UN numbers*

Figure 5.3.2

Figure 5.3.3



* location of class or division number
** location of UN number

5.3.2.2 Elevated temperature substances

Transport units containing a substance that is transported or offered for transport in a liquid state at a temperature equal to or exceeding 100 °C, in a solid state at a temperature equal to or exceeding 240 °C shall bear on each side and on each end the mark shown in Figure 5.3.4. The triangular shaped mark shall have sides of at least 250 mm and shall be shown in red.

Figure 5.3.4
Mark for carriage at elevated temperature

CHAPTER 5.4

DOCUMENTATION

Introductory note

NOTE: *These Regulations do not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an aid to paper documentation.*

5.4.1 Dangerous goods transport documentation

5.4.1.1 *General*

Except as otherwise provided, the consignor who offers dangerous goods for transport shall describe the dangerous goods on a transport document and provide additional information and documentation as specified in these Regulations.

5.4.1.2 *Form of the transport document*

5.4.1.2.1 A dangerous goods transport document may be in any form, provided it contains all of the information required by these Regulations.

5.4.1.2.2 If both dangerous and non-dangerous goods are listed in one document, the dangerous goods shall be listed first, or otherwise be emphasised.

5.4.1.2.3 *Continuation page*

A dangerous goods transport document may consist of more than one page, provided pages are consecutively numbered.

5.4.1.2.4 The information on a dangerous goods transport document shall be easy to identify, legible and durable.

5.4.1.2.5 *Example of a dangerous goods transport document*

The form shown in Figure 5.4.1 at the end of this Chapter is an example of a dangerous goods transport document[1].

[1] *For standardized formats, see also the relevant recommendations of the UN/ECE Working Party on Facilitation of International Trade Procedures, in particular Recommendation No. 1 (United Nations Lay-out Key for Trade Documents) (ECE/TRADE/137, edition 96.1), Recommendation No. 11 (Documentary Aspects of the International Transport of Dangerous Goods) (ECE/TRADE/204, edition 96.1) and Recommendation No. 22 (Lay-out Key for standard Consignment Instructions) (ECE/TRADE/168, edition 96.1). Refer to the Trade Data Elements Directory, Volume III, Trade Facilitation Recommendations (ECE/TRADE/200)(United Nations publication sales No. E.96.II.E.13).*

5.4.1.3 ***Consignor, consignee and date***

The name and address of the consignor and the consignee of the dangerous goods shall be included on the dangerous goods transport document. The date the dangerous goods transport document or an electronic copy of it was prepared or given to the initial carrier shall be included.

5.4.1.4 ***Information required on the dangerous goods transport document***

5.4.1.4.1 *Dangerous goods description*

The dangerous goods transport document shall contain the following information for each dangerous substance, material or article offered for transport:

(a) The UN number preceded by the letters "UN";

(b) The proper shipping name, as determined according to 3.1.2;

(c) The class or, when assigned, the Division of the goods, including for Class 1, the compatibility group letter. Any assigned subsidiary hazard class or division number(s) shall be entered following the numerical hazard class or Division and shall be enclosed in parenthesis. The words "Class" or "Division" may be included preceding the primary or subsidiary hazard class or Division numbers;

(d) Where assigned, the packing group for the substance or article which may be preceded by "PG" (e.g."PG II").

5.4.1.4.2 *Sequence of the dangerous goods description*

The dangerous goods description specified in 5.4.1.4.1 shall be shown either in sequence (a), (b), (c), (d), or in sequence (b), (c), (a), (d), with no information interspersed, except as provided in these Regulations. Examples of such permitted dangerous goods descriptions are:

"UN 1098 ALLYL ALCOHOL 6.1 (3) I" or
"ALLYL ALCOHOL, 6.1 (3), UN 1098, I"

NOTE*: In addition to the requirements of these Regulations, other elements of information may be required by the competent authority or for certain modes of transport (e.g. flash point for sea transport). Unless permitted or required by these Regulations, additional information shall be placed after the dangerous goods description.*

5.4.1.4.3 *Information which supplements the proper shipping name in the dangerous goods description*

The proper shipping name in the dangerous goods description shall be supplemented as follows:

(a) *Technical names for "n.o.s." and other generic descriptions*: Proper shipping names that are assigned special provision 274 in Column 6 of the Dangerous Goods List shall be supplemented with their technical or chemical group names as described in 3.1.2.8;

(b) *Empty uncleaned packagings and tanks*: Empty means of containment (including packagings, IBCs, portable tanks, tank-vehicles and tank-wagons) which contain the residue of dangerous goods of classes other than Class 7 shall be described as such by, for example, placing the words "**EMPTY UNCLEANED**" or "**RESIDUE LAST CONTAINED**" before or after the proper shipping name;

(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 shall be preceded by the word **"WASTE"**, unless this is already a part of the proper shipping name;

(d) *Elevated temperature substances*: If the proper shipping name of a substance which is transported or offered for transport in a liquid state at a temperature equal to or exceeding 100 °C, or in a solid state at a temperature equal to or exceeding 240 °C, does not convey the elevated temperature condition (for example, by using the term **"MOLTEN"** or **"ELEVATED TEMPERATURE"** as part of the shipping name), the word **"HOT"** shall immediately precede the proper shipping name.

5.4.1.5 *Information required in addition to the dangerous goods description*

In addition to the dangerous goods description the following information shall be included after the dangerous goods description on the dangerous goods transport document.

5.4.1.5.1 *Total quantity of dangerous goods*

Except for empty uncleaned packagings, the total quantity of dangerous goods covered by the description (by volume or mass as appropriate) of each item of dangerous goods bearing a different proper shipping name, UN number or packing group shall be included. For Class 1 dangerous goods, the quantity shall be the net explosive mass. For dangerous goods transported in salvage packagings, an estimate of the quantity of dangerous goods shall be given. The number and kind (e.g. drum, box, etc.) of packagings shall also be indicated. Abbreviations may be used to specify the unit of measurement for the total quantity.

5.4.1.5.2 *Limited quantities*

When dangerous goods are transported according to the exceptions for dangerous goods packed in limited quantities provided for in Column 7 of the Dangerous Goods List and Chapter 3.4, the words "**limited quantity**" or "**LTD QTY**" shall be included.

5.4.1.5.3 *Salvage packagings*

For dangerous goods transported in salvage packagings, the words "**SALVAGE PACKAGE**" shall be included.

5.4.1.5.4 *Substances stabilized by temperature control*

If the word "STABILIZED" is part of the proper shipping name (see also 3.1.2.6), when stabilization is by means of temperature control, the control and emergency temperatures (see 7.1.4.3.1) shall be indicated in the transport document, as follows:

"Control temperature: .... °C Emergency temperature: **.... °C".**

5.4.1.5.5 *Self-reactive substances and organic peroxides*

For self-reactive substances of Division 4.1 and for organic peroxides which require temperature control during transport, the control and emergency temperatures (see 7.1.4.3.1) shall be indicated on the dangerous goods transport document, as follows:

"Control temperature: .... ° C Emergency temperature: .... °C".

5.4.1.5.5.1 When for certain self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 the competent authority has permitted the "EXPLOSIVE" subsidiary risk label (model No. 1) to be dispensed with for the specific package, a statement to this effect shall be included.

5.4.1.5.5.2 When organic peroxides and self-reactive substances are transported under conditions where approval is required (for organic peroxides, see 2.5.3.2.5, 4.1.7.2.2, 4.2.1.13.1 and 4.2.1.13.3; for self-reactive substances, see 2.4.2.3.2.4 and 4.1.7.2.2), a statement to this effect shall 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 shall be attached to the dangerous goods transport document.

5.4.1.5.5.3 When a sample of an organic peroxide (see 2.5.3.2.5.1) or a self-reactive substance (see 2.4.2.3.2.4(b)) is transported, a statement to this effect shall be included in the dangerous goods transport document.

5.4.1.5.6 *Infectious substances*

The full address of the consignee shall be shown on the document, together with the name of a responsible person and his telephone number.

5.4.1.5.7 *Radioactive material*

5.4.1.5.7.1 The following information shall 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;

(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;

(c) The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see 1.2.2.1). For fissile material, the mass of fissile material in units of grams (g), or appropriate multiples thereof, may be used in place of activity;

(d) The category of the package, i.e. I-WHITE, II-YELLOW, III-YELLOW;

(e) The transport index (categories II-YELLOW and III-YELLOW only);

(f) For consignments including fissile material other than consignments excepted under 6.4.11.2, the criticality safety index;

(g) The identification mark for each competent authority approval certificate (special form radioactive material, low dispersible radioactive material, special arrangement, package design, or shipment) applicable to the consignment;

(h) For consignments of 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 in the consignment. If packages are to be removed from the overpack or freight container at a point of intermediate unloading, appropriate transport documents shall 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.

5.4.1.5.7.2 The transport document shall include a statement regarding actions, if any, that are required to be taken by the carrier. The statement shall be in the languages deemed necessary by the carrier or the authorities concerned, and shall include at least the following points:

(a) Supplementary requirements for loading, stowage, transport, handling and unloading of the package, overpack or freight container including any special stowage provisions for the safe dissipation of heat (see 7.1.7.3.2), or a statement that no such requirements are necessary;

(b) Restrictions on the mode of transport or conveyance and any necessary routing instructions;

(c) Emergency arrangements appropriate to the consignment.

5.4.1.5.7.3 The applicable competent authority certificates need not necessarily accompany the consignment. The consignor shall make them available to the carrier(s) before loading and unloading.

5.4.1.6 *Certification*

5.4.1.6.1 The dangerous goods transport document shall 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. 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."

The certification shall be signed and dated by the consignor. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.

5.4.1.6.2 If the dangerous goods documentation is presented to the carrier by means of electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques, the signature(s) may be replaced by the name(s) (in capitals) of the person authorized to sign.

5.4.2 Container/vehicle packing certificate

5.4.2.1 When dangerous goods are packed or loaded into any container[2] or vehicle which will be transported by sea, those responsible for packing of the container or vehicle shall provide a "container/vehicle packing certificate" specifying the container/vehicle identification number(s) and certifying that the operation has been carried out in accordance with the following conditions:

---

[2] *Container means an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or more modes of transport, without intermediate reloading; designed to be secured and/or readily handled, having fittings for these purposes, and approved in accordance with the International Convention for Safe Containers (CSC), 1972, as amended. The term "container" includes neither vehicle nor packaging. However, a container that is transported on a chassis is included.*

(a) The container/vehicle was clean, dry and apparently fit to receive the goods;

(b) Packages, which need to be segregated in accordance with applicable segregation requirements, have not been packed together onto or in the container/vehicle;

(c) All packages have been externally inspected for damage, and only sound packages have been loaded;

(d) All goods have been properly loaded and, where necessary, adequately braced with securing material to suit the mode(s) of transport for the intended journey;

(e) Goods loaded in bulk have been evenly distributed within the container/vehicle;

(f) For consignments including goods of Class 1 other than Division 1.4, the container/vehicle is structurally serviceable in accordance with 7.1.3.2.1;

(g) The container/vehicle and packages are properly marked, labelled and placarded, as appropriate;

(h) When solid carbon dioxide (CO_2-dry ice) is used for cooling purposes, the container/vehicle is externally marked or labelled in a conspicuous place, such as, at the door end, with the words: "DANGEROUS CO_2 (DRY ICE) INSIDE. VENTILATE THOROUGHLY BEFORE ENTERING"; and

(i) A dangerous goods transport document, as indicated in 5.4.1.1, has been received for each dangerous goods consignment loaded in the container/vehicle.

NOTE: *The container/vehicle packing certificate is not required for tanks.*

5.4.2.2 The information required in the dangerous goods transport document and the container/vehicle packing certificate may be incorporated into a single document, if not, these documents shall be attached one to the other. If the information is incorporated into a single document, the document shall include a signed declaration such as "It is declared that the packing of the goods into the container/vehicle has been carried out in accordance with the applicable provisions". This declaration shall be dated and the person signing this declaration shall be identified on the document.

5.4.3 Emergency response information

For consignments for which a dangerous goods transport document is required by these Regulations, appropriate information shall be immediately available at all times for use in emergency response to accidents and incidents involving dangerous goods in transport. The information shall be available away from the packages containing the dangerous goods and immediately accessible in the event of an accident or incident. Methods of compliance include:

(a) Appropriate entries in the transport document; or

(b) Provision of a separate document such as a safety data sheet; or

(c) Provision of a separate document, such as the International Civil Aviation Organization (ICAO) "Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods" or the International Maritime Organization (IMO) "Emergency Procedures for Ships Carrying Dangerous Goods" and "Medical First Aid Guide in Accidents Involving Dangerous Goods", for use in conjunction with the transport document.

Figure 5.4.1

MULTIMODAL DANGEROUS GOODS FORM

1. Shipper / Consignor /Sender		2. Transport document number	
		3. Page 1 of Pages	4. Shipper's reference
			5. Freight Forwarder's reference
6. Consignee		7. Carrier (to be completed by the carrier)	
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labeled /placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.	
8. This shipment is within the limitations prescribed for: (Delete non-applicable) PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY		9. Additional handling information	
10. Vessel / flight no. and date	11. Port / place of loading		
12. Port / place of discharge	13. Destination		

14. Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

15. Container identification No./ vehicle registration No.	16. Seal number (s)	17. Container/vehicle size & type	18. Tare (kg)	19. Total gross mass (including tare) (kg)

CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/loaded into the container/vehicle identified above in accordance with the applicable provisions ** MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/LOADING	21.RECEIVING ORGANISATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition unless stated hereon: RECEIVING ORGANISATION REMARKS:	
20. Name of company	Haulier's name	22. Name of company (OF SHIPPER PREPARING THIS NOTE)
Name / Status of declarant	Vehicle reg. no.	Name / Status of declarant
Place and date	Signature and date	Place and date
Signature of declarant	DRIVER'S SIGNATURE	Signature of declarant

* FOR DANGEROUS GOODS: you must specify: proper shipping name, hazard class, UN No., packing group (where assigned) and any other element of information required under applicable national and international regulations

** For the purposes of these Model Regulations, see 5.4.2.1

MULTIMODAL DANGEROUS GOODS FORM

Continuation Sheet

1. Shipper / Consignor /Sender	2. Transport document number	
	3. Page 1 of Pages	4. Shipper's reference
		5. Freight Forwarder's reference

14. Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS BLACK HATCHINGS

(Reserved)

CHAPTER 5.5

SPECIAL PROVISIONS

5.5.1 Special provisions applicable to the consignment of infectious substances

5.5.1.1 Unless an infectious substance cannot be consigned by any other means, live vertebrate or invertebrate animals shall not be used to consign such a substance. Infected animals shall be consigned in accordance with conditions specified by the competent authority.

5.5.1.2 The transport of infectious substances requires co-ordinated action by the consignor, the carrier and the consignee to ensure safety and arrival on time and in proper condition. To this end, the following measures shall be taken.

(a) *Advance arrangements between consignor, carrier and consignee*. Dispatch of infectious substances shall not take place before advance arrangements have been made between consignor, carrier and consignee or before the consignee has confirmed with his competent authorities that the substances can legally be imported and that no delay will be incurred in the delivery of the consignment to its destination;

(b) *Preparation of dispatch documents*. In order to secure transmission without hindrance it is necessary to prepare all dispatch documents, including the transport document (see Chapter 5.4), in strict accordance with rules governing the acceptance of the goods to be dispatched;

(c) *Routing*. Whatever the mode used, transport shall be by the quickest possible routing. If transhipment is necessary, precautions shall be taken to ensure special care, expeditious handling and monitoring of the substances in transit;

(d) *Timely notification of all transport data by consignor to consignee*. The consignor shall notify the consignee in advance of transport details, such as: means of transport, flight or train number(s), transport document number and date and hour of expected arrival at the point of destination, so that the consignment can be collected promptly. The most rapid means of communication shall be used for this notification.

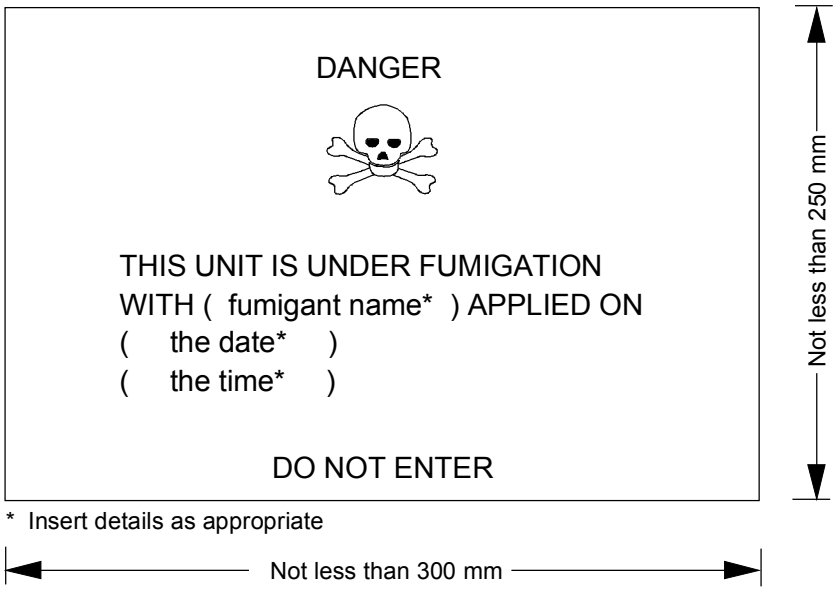
5.5.2 Documentation and identification of fumigated units

5.5.2.1 Transport documents associated with the transport of units that have been fumigated shall show the date of fumigation and the type and amount of the fumigant used. In addition, instructions for disposal of any residual fumigant including fumigation devices (if used) shall be provided.

5.5.2.2 A warning sign as specified in 5.5.2.3 shall be placed on each fumigated unit in a location where it will be easily seen by persons attempting to enter the interior of the unit. When the fumigated unit has been ventilated to remove harmful concentrations of fumigant gas, the warning sign shall be removed.

5.5.2.3 The fumigation warning sign shall be rectangular and shall not be less than 300 mm wide and 250 mm high. The markings shall be black print on a white background with lettering not less than 25 mm high. An illustration of this sign is given in Figure 5.5.1.

Figure 5.5.1: Fumigation warning sign



PART 6

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS, INTERMEDIATE BULK CONTAINERS (IBCs), LARGE PACKAGINGS AND PORTABLE TANKS

CHAPTER 6.1

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS (OTHER THAN FOR DIVISION 6.2 SUBSTANCES)

6.1.1 General

6.1.1.1 The requirements of this Chapter do not apply to:

(a) Packages containing radioactive material, which shall comply with the Regulations of the International Atomic Energy Agency (IAEA), except that:

(i) Radioactive material possessing other dangerous properties (subsidiary risks) shall also comply with special provision 172; and

(ii) Low specific activity (LSA) material and surface contaminated objects (SCO) may be carried in certain packagings defined in these Regulations provided that the supplementary provisions set out in the IAEA Regulations are also met;

(b) Pressure receptacles;

(c) Packages whose net mass exceeds 400 kg;

(d) Packagings with a capacity exceeding 450 litres.

6.1.1.2 The requirements for packagings in 6.1.4 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 6.1.4, provided that they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in 6.1.1.3 and 6.1.5. Methods of testing other than those described in these Regulations are acceptable, provided they are equivalent.

6.1.1.3 Every packaging intended to contain liquids shall successfully undergo a suitable leakproofness test, and be capable of meeting the appropriate test level indicated in 6.1.5.4.3:

(a) Before it is first used for transport;

(b) After remanufacturing or reconditioning, before it is re-used for transport.

For this test, packagings need not have their own closures fitted.

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.

6.1.1.4 Packagings shall be manufactured, reconditioned 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.

6.1.1.5 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of 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.

6.1.2 Code for designating types of packagings

6.1.2.1 The code consists of:

(a) An Arabic numeral indicating the kind of packaging, e.g. drum, jerrican, etc., followed by;

(b) A capital letter(s) in Latin characters indicating the nature of the material, e.g. steel, wood, etc., followed where necessary by;

(c) An Arabic numeral indicating the category of packaging within the kind to which the packaging belongs.

6.1.2.2 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.

6.1.2.3 In the case of combination packagings, only the code number for the outer packaging is used.

6.1.2.4 The letters 'T' or 'V' or 'W' may follow the packaging code. The letter 'T' signifies a salvage packaging conforming to the requirements of 6.1.5.1.11. The letter 'V' signifies a special packaging conforming to the requirements of 6.1.5.1.7. 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 6.1.4 and is considered equivalent under the requirements of 6.1.1.2.

6.1.2.5 The following numerals shall be used for the kinds of packaging:

1. Drum
2. Wooden barrel
3. Jerrican
4. Box
5. Bag
6. Composite packaging

6.1.2.6 The following capital letters shall 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. Plastics material
L. Textile
M. Paper, multiwall
N. Metal (other than steel or aluminium)
P. Glass, porcelain or stoneware

6.1.2.7 The following table indicates the codes to be used for designating types of packagings depending on the kind of packagings, the material used for their construction and their category; it also refers to the paragraphs to be consulted for the appropriate requirements:

Kind	Material	Category	Code	Paragraph
1. Drums	A. Steel	non-removable head	1A1	6.1.4.1
		removable head	1A2	
	B. Aluminium	non-removable head	1B1	6.1.4.2
		removable head	B2	
	D. Plywood		1D	6.1.4.5
	G. Fibre		1G	6.1.4.7
	H. Plastics	non-removable head	1H1	6.1.4.8
		removable head	1H2	
	N. Metal, other than steel or aluminium	non-removable head	N1	6.1.4.3
		removable head	N2	
2. Barrels	C. Wooden	bung type	2C1	6.1.4.6
		removable head	2C2	
3. Jerricans	A. Steel	non-removable head	3A1	6.1.4.4
		removable head	3A2	
	B. Aluminium	non-removable head	3B1	6.1.4.4
		removable head	3B2	
	H. Plastics	non-removable head	3H1	6.1.4.8
		removable head	3H2	
4. Boxes	A. Steel		4A	6.1.4.14
	B. Aluminium		4B	6.1.4.14
	C. Natural wood	ordinary	4C1	6.1.4.9
		with sift-proof walls	4C2	
	D. Plywood		4D	6.1.4.10
	F. Reconstituted wood		4F	6.1.4.11
	G. Fibreboard		4G	6.1.4.12
	H. Plastics	expanded	4H1	6.1.4.13
		solid	4H2	
5. Bags	H. Woven plastics	without inner liner or coating	5H1	6.1.4.16
		sift-proof	5H2	
		water resistant	5H3	
	H. Plastics film		5H4	6.1.4.17

Kind	Material	Category	Code	Paragraph
5. Bags (cont'd)	L. Textile	without inner liner or coating	5L1	6.1.4.15
		sift proof	5L2	
		water resistant	5L3	
	M. Paper	multiwall	5M1	6.1.4.18
		multiwall, water resistant	5M2	
6. Composite packagings	H. Plastics receptacle	in steel drum	6HA1	6.1.4.19
		in steel crate or box	6HA2	6.1.4.19
		in aluminium drum	6HB1	6.1.4.19
		in aluminium crate or box	6HB2	6.1.4.19
		in wooden box	6HC	6.1.4.19
		in plywood drum	6HD1	6.1.4.19
		in plywood box	6HD2	6.1.4.19
		in fibre drum	6HG1	6.1.4.19
		in fibreboard box	6HG2	6.1.4.19
		in plastics drum	6HH1	6.1.4.19
		in solid plastics box	6HH2	6.1.4.19
	P. Glass, porcelain or stoneware receptacle	in steel drum	6PA1	6.1.4.20
		in steel crate or box	6PA2	6.1.4.20
		in aluminium drum	6PB1	6.1.4.20
		in aluminium crate or box	6PB2	6.1.4.20
		in wooden box	6PC	6.1.4.20
		in plywood drum	6PD1	6.1.4.20
		in wickerwork hamper	6PD2	6.1.4.20
		in fibre drum	6PG1	6.1.4.20
		in fibreboard box	6PG2	6.1.4.20
		in expanded plastics packaging	6PH1	6.1.4.20
		in solid plastics packaging	6PH2	6.1.4.20

6.1.3 Marking

NOTE 1*: The marking indicates that the packaging which bears it corresponds to a successfully tested design type and that it complies with the requirements of this Chapter which are related to the manufacture, but not to the use, of the packaging. In itself, therefore, the mark does not necessarily confirm that the packaging may be used for any substance: generally the type of packaging (e.g. steel drum), its maximum capacity and/or mass, and any special requirements are specified for each substance in Part 3 of these Regulations.*

NOTE 2*: The marking is intended to be of assistance to packaging manufacturers, reconditioners, packaging users, carriers and regulatory authorities. In relation to the use of a new packaging, the original marking is a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.*

NOTE 3*: The marking does 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, to test reports or to a register of successfully tested packagings. For example, a packaging having an X or Y marking 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 6.1.5 as appropriate, i.e. packing group I packaging tested for products of relative density 1.2 could be used as a packing group II packaging for products of relative density 1.8 or a packing group III packaging of relative density 2.7, provided of course that all the performance criteria can still be met with the higher relative density product.*

6.1.3.1 Each packaging intended for use according to these Regulations shall bear markings 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 markings or a duplicate thereof shall appear on the top or on a side of the packaging. Letters, numerals and symbols shall be at least 12 mm high, except for packagings of 30 litres or 30 kg capacity or less, when they shall be at least 6 mm in height and for packagings of 5 litres or 5 kg or less when they shall be of an appropriate size.

The marking shall show:

(a) The United Nations packaging symbol 

This shall not be used for any purpose other than certifying that a packaging complies with the relevant regulations in this Chapter. For embossed metal packagings the capital letters "UN" may be applied as the symbol;

(b) The code designating the type of packaging according to 6.1.2;

(c) A code in two parts:

(i) 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;

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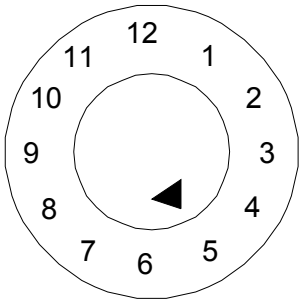
* *Relative density (d) is considered to be synonymous with Specific Gravity (SG) and is used throughout this text.*

(ii) the relative density, rounded off to the first decimal, for which the design type has been tested for packagings without inner packagings intended to contain liquids; this may be omitted when the relative density does not exceed 1.2. For packagings intended to contain solids or inner packagings, the maximum gross mass in kilograms;

(d) Either the letter "S" denoting that the packaging is intended for the transport of solids or inner packagings or, for packagings (other than combination 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;

(e) The last two digits of the year during which the packaging was manufactured. Packagings of types lH and 3H shall 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 marking. An appropriate method is:



(f) The State authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;

(g) The name of the manufacturer or other identification of the packaging specified by the competent authority.

6.1.3.2 In addition to the durable markings prescribed in 6.1.3.1, every new metal drum of a capacity greater than 100 litres shall bear the marks described in 6.1.3.1 (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 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 shall be marked on the bottom in permanent form (e.g. embossed), for example '1.0-1.2-1.0' or '0.9-1.0-1.0'. Nominal thicknesses of metal shall be determined according to the appropriate ISO standard, for example ISO 3574:1986 for steel. The marks indicated in 6.1.3.1 (f) and (g) shall not be applied in a permanent form (e.g. embossed) except as provided in 6.1.3.5.

6.1.3.3 Every packaging other than those referred to in 6.1.3.2 liable to undergo a reconditioning process shall bear the marks indicted in 6.1.3.1 (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 litres, these permanent marks may replace the corresponding durable markings prescribed in 6.1.3.1.

6.1.3.4 For remanufactured metal drums, if there is no change to the packaging type and no replacement or removal of integral structural components, the required markings need not be permanent (e.g. embossed). Every other remanufactured metal drum shall bear the markings in 6.1.3.1 (a) to (e) in a permanent form (e.g. embossed) on the top head or side.

6.1.3.5 Metal drums made from materials (e.g. stainless steel) designed to be reused repeatedly may bear the markings indicated in 6.1.3.1 (f) and (g) in a permanent form (e.g. embossed).

6.1.3.6 Marking shall be applied in the sequence shown in 6.1.3.1; each element of the marking required in these sub-paragraphs and when appropriate, (h) to (j) of 6.1.3.7, shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable. For examples, see 6.1.3.9.

Any additional markings authorized by a competent authority shall still enable the parts of the mark to be correctly identified with reference to 6.1.3.1.

6.1.3.7 After reconditioning a packaging, the reconditioner shall apply to it, in sequence, a durable marking showing:

(h) The State in which the reconditioning was carried out, indicated by the distinguishing sign for motor vehicles in international traffic;

(i) The name of the reconditioner or other identification of the packaging specified by the competent authority;

(j) The year of reconditioning; the letter "R"; and, for every packaging successfully passing the leakproofness test in 6.1.1.3, the additional letter "L".

6.1.3.8 When, after reconditioning, the markings required by 6.1.3.1 (a) to (d) no longer appear on the top head or the side of a metal drum, the reconditioner also shall apply them in a durable form followed by 6.1.3.7 (h), (i) and (j). These markings shall not identify a greater performance capability than that for which the original design type had been tested and marked.

6.1.3.9 ***Examples of markings for NEW packagings*:**

	4G/Yl45/S/83 NL/VL823	as in 6.1.3.l (a), (b), (c), (d) and (e) as in 6.1.3.l (f) and (g)	For a new fibreboard box
	lAl/Y1.4/l50/83 NL/VL824	as in 6.1.3.1 (a), (b), (c), (d) and (e) as in 6.1.3.1 (f) and (g)	For a new steel drum to contain liquids
	1A2/Y150/S/83 NL/VL825	as in 6.1.3.1 (a), (b), (c), (d) and (e) as in 6.1.3.1 (f) and (g)	For a new steel drum to contain solids, or inner packagings
	4HW/Y136/S/83 NL/VL826	as in 6.1.3.1 (a), (b), (c), (d) and (e) as in 6.1.3.1 (f) and (g)	For a new plastics box of equivalent specification
	1A2/Y/100/91 USA/MM5	as in 6.1.3.1 (a), (b), (c), (d) and (e) as in 6.1.3.1 (f) and (g)	For a remanufactured steel drum to contain liquids

6.1.3.10 ***Examples of markings for RECONDITIONED packagings***

	lA1/Y1.4/150/83 NL/RB/85 RL	as in 6.1.3.l (a), (b), (c), (d) and (e) as in 6.1.3.7 (h), (i) and (j)
	1A2/Y150/S/83 USA/RB/85 R	as in 6.1.3.1 (a), (b), (c), (d), and (e) as in 6.1.3.7 (h), (i) and (j)

6.1.3.11 ***Example of marking for SALVAGE packagings:***

1A2T/Y300/S/94	as in 6.1.3.1 (a), (b), (c), (d) and (e)
USA/abc	as in 6.1.3.1 (f) and (g)

NOTE*: The markings, for which examples are given in 6.1.3.9, 6.1.3.10 and 6.1.3.11, may be applied in a single line or in multiple lines provided the correct sequence is respected.*

6.1.4 Requirements for packagings

6.1.4.1 ***Steel drums***

1A1 non-removable head
1A2 removable head

6.1.4.1.1 Body and heads shall 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.

6.1.4.1.2 Body seams shall be welded on drums intended to contain more than 40 litres of liquid. Body seams shall be mechanically seamed or welded on drums intended to contain solids or 40 litres or less of liquids.

6.1.4.1.3 Chimes shall be mechanically seamed or welded. Separate reinforcing rings may be applied.

6.1.4.1.4 The body of a drum of a capacity greater than 60 litres shall, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

6.1.4.1.5 Openings for filling, emptying and venting in the bodies or heads of non-removable head (1A1) drums shall 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 shall 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 shall be used with closures, unless the closure is inherently leakproof.

6.1.4.1.6 Closure devices for removable head drums shall 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 shall be used with all removable heads.

6.1.4.1.7 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 shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of transport.

6.1.4.1.8 Maximum capacity of drum: 450 litres

6.1.4.1.9 Maximum net mass: 400 kg

6.1.4.2 ***Aluminium drums***

1B1 non-removable head
1B2 removable head

6.1.4.2.1 Body and heads shall be constructed of aluminium at least 99% pure or of an aluminium base alloy. Material shall be of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.

6.1.4.2.2 All seams shall be welded. Chime seams, if any, shall be reinforced by the application of separate reinforcing rings.

6.1.4.2.3 The body of a drum of a capacity greater than 60 litres shall, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

6.1.4.2.4 Openings for filling, emptying and venting in the bodies or heads of non-removable head (1B1) drums shall 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 shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.

6.1.4.2.5 Closure devices for removable head drums shall 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 shall be used with all removable heads.

6.1.4.2.6 Maximum capacity of drum: 450 litres

6.1.4.2.7 Maximum net mass: 400 kg

6.1.4.3 ***Drums of metal other than steel or aluminium***

1N1 non-removable head
1N2 removable head

6.1.4.3.1 The body and heads shall be constructed of a metal or of a metal alloy other than steel or aluminium. Material shall be of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.

6.1.4.3.2 Chime seams, if any, shall be reinforced by the application of separate reinforcing rings. All seams, if any, shall be joined (welded, soldered, etc.) in accordance with the technical state of the art for the used metal or metal alloy.

6.1.4.3.3 The body of a drum of a capacity greater than 60 litres shall, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

6.1.4.3.4 Openings for filling, emptying and venting in the bodies or heads of non-removable head (1N1) drums shall 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 shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be joined in place (welded, solded, etc.) in accordance with the technical state of the art for the used metal or metal alloy so that the seam join is leakproof. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.

6.1.4.3.5 Closure devices for removable head drums shall 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 shall be used with all removable heads.

6.1.4.3.6 Maximum capacity of drum: 450 litres

6.1.4.3.7 Maximum net mass: 400 kg

6.1.4.4 ***Steel or aluminium jerricans***

3A1 steel, non-removable head
3A2 steel, removable head
3B1 aluminium, non-removable head
3B2 aluminium, removable head

6.1.4.4.1 Body and heads shall be constructed of steel sheet, of aluminium at least 99% pure or of an aluminium base alloy. Material shall be of a suitable type and of adequate thickness in relation to the capacity of the jerrican and to its intended use.

6.1.4.4.2 Chimes of steel jerricans shall be mechanically seamed or welded. Body seams of steel jerricans intended to contain more than 40 litres of liquid shall be welded. Body seams of steel jerricans intended to contain 40 litres or less shall be mechanically seamed or welded. For aluminium jerricans, all seams shall be welded. Chime seams, if any, shall be reinforced by the application of a separate reinforcing ring.

6.1.4.4.3 Openings in jerricans (3A1 and 3B1) shall not exceed 7 cm in diameter. Jerricans with larger openings are considered to be of the removable head type (3A2 and 3B2). Closures shall be so designed that they will remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.

6.1.4.4.4 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 shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of transport.

6.1.4.4.5 Maximum capacity of jerrican: 60 litres

6.1.4.4.6 Maximum net mass: 120 kg

6.1.4.5 ***Plywood drums***

1D

6.1.4.5.1 The wood used shall 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 shall be of a quality equivalent to the plywood.

6.1.4.5.2 At least two-ply plywood shall be used for the body and at least three-ply plywood for the heads; the plies shall be firmly glued together by a water resistant adhesive with their grain crosswise.

6.1.4.5.3 The body and heads of the drum and their joins shall be of a design appropriate to the capacity of the drum and to its intended use.

6.1.4.5.4 In order to prevent sifting of the contents, lids shall be lined with kraft paper or some other equivalent material which shall be securely fastened to the lid and extend to the outside along its full circumference.

6.1.4.5.5 Maximum capacity of drum: 250 litres

6.1.4.5.6 Maximum net mass: 400 kg

6.1.4.6 ***Wooden barrels***

2C1 bung type
2C2 removable head

6.1.4.6.1 The wood used shall be of good quality, straight grained, well-seasoned and free from knots, bark, rotten wood, sapwood or other defects likely to lessen the effectiveness of the barrel for the purpose intended.

6.1.4.6.2 The body and heads shall be of a design appropriate to the capacity of the barrel and to its intended use.

6.1.4.6.3 Staves and heads shall be sawn or cleft with the grain so that no annual ring extends over more than half the thickness of a stave or head.

6.1.4.6.4 Barrel hoops shall be of steel or iron of good quality. The hoops of 2C2 barrels may be of a suitable hardwood.

6.1.4.6.5 Wooden barrels 2C1: the diameter of the bunghole shall not exceed half the width of the stave in which it is placed.

6.1.4.6.6 Wooden barrels 2C2: heads shall fit tightly into the crozes.

6.1.4.6.7 Maximum capacity of barrel: 250 litres

6.1.4.6.8 Maximum net mass: 400 kg

6.1.4.7 ***Fibre drums***

1G

6.1.4.7.1 The body of the drum shall 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, plastics material, etc.

6.1.4.7.2 Heads shall be of natural wood, fibreboard, metal, plywood, plastics or other suitable material and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastics material, etc.

6.1.4.7.3 The body and heads of the drum and their joins shall be of a design appropriate to the capacity of the drum and to its intended use.

6.1.4.7.4 The assembled packaging shall be sufficiently water resistant so as not to delaminate under normal conditions of transport.

6.1.4.7.5 Maximum capacity of drum: 450 litres

6.1.4.7.6 Maximum net mass: 400 kg

6.1.4.8 ***Plastics drums and jerricans***

1H1 drums, non-removable head
1H2 drums, removable head
3H1 jerricans, non-removable head
3H2 jerricans, removable head

6.1.4.8.1 The packaging shall be manufactured from suitable plastics material and be of adequate strength in relation to its capacity and intended use. Except for recycled plastics material as defined in 1.2.1, no used material other than production residues or regrind from the same manufacturing process may be used. The packaging shall be adequately resistant to ageing and to degradation caused either by the substance contained or by ultra-violet radiation.

6.1.4.8.2 Unless otherwise approved by the competent authority, the period of use for the transport of dangerous substances shall not exceed five years from the date of manufacture of the packaging except where a shorter period of use is prescribed because of the nature of the substance to be transported. Packagings manufactured with such recycled plastics material shall be marked "REC" near the marks prescribed in 6.1.3.1.

6.1.4.8.3 If protection against ultra-violet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall 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% by mass or if the pigment content does not exceed 3% by mass; the content of inhibitors of ultra-violet radiation is not limited.

6.1.4.8.4 Additives serving purposes other than protection against ultra-violet radiation may be included in the composition of the plastics 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.

6.1.4.8.5 The wall thickness at every point of the packaging shall be appropriate to its capacity and intended use, taking into account the stresses to which each point is liable to be exposed.

6.1.4.8.6 Openings for filling, emptying and venting in the bodies or heads of non-removable head drums (1H1) and jerricans (3H1) shall 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 shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

6.1.4.8.7 Closure devices for removable head drums and jerricans shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Gaskets shall 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.

6.1.4.8.8 Maximum capacity of drums and jerricans: 1H1, 1H2: 450 litres
3H1, 3H2: 60 litres

6.1.4.8.9 Maximum net mass: 1H1, 1H2: 400 kg
3H1, 3H2: 120 kg

6.1.4.9 ***Boxes of natural wood***

4C1 ordinary
4C2 with sift-proof walls

6.1.4.9.1 The wood used shall 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 shall 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.

6.1.4.9.2 Fastenings shall be resistant to vibration experienced under normal conditions of transport. End grain nailing shall be avoided whenever practicable. Joins which are likely to be highly stressed shall be made using clenched or annular ring nails or equivalent fastenings.

6.1.4.9.3 Box 4C2: each part shall 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.

6.1.4.9.4 Maximum net mass: 400 kg

6.1.4.10 ***Plywood boxes***

4D

6.1.4.10.1 Plywood used shall be at least 3-ply. It shall 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 shall be appropriate to the capacity and intended use of the box. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used together with plywood in the construction of boxes. Boxes shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.

6.1.4.10.2 Maximum net mass: 400 kg

6.1.4.11 ***Reconstituted wood boxes***

4F

6.1.4.11.1 The walls of boxes shall 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 shall be appropriate to the capacity of the boxes and to their intended use.

6.1.4.11.2 Other parts of the boxes may be made of other suitable material.

6.1.4.11.3 Boxes shall be securely assembled by means of suitable devices.

6.1.4.11.4 Maximum net mass: 400 kg

6.1.4.12 ***Fibreboard boxes***

4G

6.1.4.12.1 Strong and good quality solid or double-faced corrugated fibreboard (single or multiwall) shall be used, appropriate to the capacity of the box and to its intended use. The water resistance of the outer surface shall 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:l991. It shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting of corrugated fibreboard shall be firmly glued to the facings.

6.1.4.12.2 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.

6.1.4.12.3 Manufacturing joins in the body of boxes shall be taped, lapped and glued, or lapped and stitched with metal staples. Lapped joins shall have an appropriate overlap.

6.1.4.12.4 Where closing is effected by gluing or taping, a water resistant adhesive shall be used.

6.1.4.12.5 Boxes shall be designed so as to provide a good fit to the contents.

6.1.4.12.6 Maximum net mass: 400 kg

6.1.4.13 ***Plastics boxes***

4H1 expanded plastics boxes
4H2 solid plastics boxes

6.1.4.13.1 The box shall be manufactured from suitable plastics material and be of adequate strength in relation to its capacity and intended use. The box shall be adequately resistant to ageing and to degradation caused either by the substance contained or by ultra-violet radiation.

6.1.4.13.2 An expanded plastics box shall comprise two parts made of a moulded expanded plastics 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 shall be designed so that the inner packagings fit snugly. The closure cap for any inner packaging shall not be in contact with the inside of the top section of this box.

6.1.4.13.3 For dispatch, an expanded plastics box shall be closed with a self-adhesive tape having sufficient tensile strength to prevent the box from opening. The adhesive tape shall be weather resistant and its adhesive compatible with the expanded plastics material of the box. Other closing devices at least equally effective may be used.

6.1.4.13.4 For solid plastics boxes, protection against ultra-violet radiation, if required, shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall 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, retesting may be waived if the carbon black content does not exceed 2% by mass or if the pigment content does not exceed 3% by mass; the content of inhibitors of ultra-violet radiation is not limited.

6.1.4.13.5 Additives serving purposes other than protection against ultra-violet radiation may be included in the composition of the plastics material provided that they do not adversely affect the chemical or physical properties of the material of the box. In such circumstances, retesting may be waived.

6.1.4.13.6 Solid plastics boxes shall have closure devices made of a suitable material of adequate strength and so designed as to prevent the box from unintentional opening.

6.1.4.13.7 Maximum net mass 4H1: 60 kg
4H2: 400 kg

6.1.4.14 ***Steel or aluminium boxes***

4A steel
4B aluminium

6.1.4.14.1 The strength of the metal and the construction of the box shall be appropriate to the capacity of the box and to its intended use.

6.1.4.14.2 Boxes shall be lined with fibreboard or felt packing pieces or shall have an inner liner or coating of suitable material, as required. If a double seamed metal liner is used, steps shall be taken to prevent the ingress of substances, particularly explosives, into the recesses of the seams.

6.1.4.14.3 Closures may be of any suitable type; they shall remain secured under normal conditions of transport.

6.1.4.14.4 Maximum net mass: 400 kg

6.1.4.15 ***Textile bags***

5L1 without inner liner or coating
5L2 sift-proof
5L3 water resistant

6.1.4.15.1 The textiles used shall be of good quality. The strength of the fabric and the construction of the bag shall be appropriate to the capacity of the bag and to its intended use.

6.1.4.15.2 Bags, sift-proof, 5L2: the bag shall be made sift-proof, for example by the use of:

(a) Paper bonded to the inner surface of the bag by a water resistant adhesive such as bitumen; or

(b) Plastics film bonded to the inner surface of the bag; or

(c) One or more inner liners made of paper or plastics material.

6.1.4.15.3 Bags, water resistant, 5L3: to prevent the entry of moisture the bag shall be made waterproof, for example by the use of:

(a) Separate inner liners of water resistant paper (e.g. waxed kraft paper, tarred paper or plastics-coated kraft paper); or

(b) Plastics film bonded to the inner surface of the bag; or

(c) One or more inner liners made of plastics material.

6.1.4.15.4 Maximum net mass: 50 kg

6.1.4.16 ***Woven plastics bags***

5H1 without inner liner or coating
5H2 sift-proof
5H3 water resistant

6.1.4.16.1 Bags shall be made from stretched tapes or monofilaments of a suitable plastics material. The strength of the material used and the construction of the bag shall be appropriate to the capacity of the bag and to its intended use.

6.1.4.16.2 If the fabric is woven flat, the bags shall be made by sewing or some other method ensuring closure of the bottom and one side. If the fabric is tubular, the bag shall be closed by sewing, weaving or some other equally strong method of closure.

6.1.4.16.3 Bags, sift-proof, 5H2: the bag shall be made sift-proof, for example by means of:

(a) Paper or a plastics film bonded to the inner surface of the bag; or

(b) One or more separate inner liners made of paper or plastics material.

6.1.4.16.4 Bags, water resistant, 5H3: to prevent the entry of moisture, the bag shall be made waterproof, for example by means of:

(a) Separate inner liners of water resistant paper (e.g. waxed kraft paper, double-tarred kraft paper or plastics-coated kraft paper); or

(b) Plastics film bonded to the inner or outer surface of the bag; or

(c) One or more inner plastics liners.

6.1.4.16.5 Maximum net mass: 50 kg

6.1.4.17 ***Plastics film bags***

5H4

6.1.4.17.1 Bags shall be made of a suitable plastics material. The strength of the material used and the construction of the bag shall be appropriate to the capacity of the bag and to its intended use. Joins and closures shall withstand pressures and impacts liable to occur under normal conditions of transport.

6.1.4.17.2 Maximum net mass: 50 kg

6.1.4.18 ***Paper bags***

5M1 multiwall
5M2 multiwall, water resistant

6.1.4.18.1 Bags shall 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 with adhesive bonding to the outer ply. The strength of the paper and the construction of the bags shall be appropriate to the capacity of the bag and to its intended use. Joins and closures shall be sift-proof.

6.1.4.18.2 Bags 5M2: to prevent the entry of moisture, a bag of four plies or more shall 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 shall 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, plastics-coated kraft paper, plastics film bonded to the inner surface of the bag, or one or more inner plastics liners, shall also be placed next to the substance. Joins and closures shall be waterproof.

6.1.4.18.3 Maximum net mass: 50 kg

6.1.4.19 ***Composite packagings (plastics material)***

6HA1	plastics receptacle with outer steel drum
6HA2	plastics receptacle with outer steel crate or box
6HB1	plastics receptacle with outer aluminium drum
6HB2	plastics receptacle with outer aluminium crate or box
6HC	plastics receptacle with outer wooden box
6HD1	plastics receptacle with outer plywood drum
6HD2	plastics receptacle with outer plywood box
6HG1	plastics receptacle with outer fibre drum
6HG2	plastics receptacle with outer fibreboard box
6HH1	plastics receptacle with outer plastics drum
6HH2	plastics receptacle with outer solid plastics box

6.1.4.19.1 *Inner receptacle*

6.1.4.19.1.1 The requirements of 6.1.4.8.1 and 6.1.4.8.4 to 6.1.4.8.7 apply to inner plastics receptacles.

6.1.4.19.1.2 The inner plastics receptacle shall fit snugly inside the outer packaging, which shall be free of any projection that might abrade the plastics material.

6.1.4.19.1.3 Maximum capacity of inner receptacle:

6HA1, 6HB1, 6HD1, 6HG1, 6HH1:	250 litres
6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2:	60 litres

6.1.4.19.1.4 Maximum net mass:

6HA1, 6HB1, 6HD1, 6HG1, 6HH1:	400 kg
6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2:	75 kg

6.1.4.19.2 *Outer packaging*

6.1.4.19.2.1 Plastics receptacle with outer steel or aluminium drum 6HA1 or 6HB1; the relevant requirements of 6.1.4.1 or 6.1.4.2, as appropriate, apply to the construction of the outer packaging.

6.1.4.19.2.2 Plastics receptacle with outer steel or aluminium crate or box 6HA2 or 6HB2; the relevant requirements of 6.1.4.14 apply to the construction of the outer packaging.

6.1.4.19.2.3 Plastics receptacle with outer wooden box 6HC; the relevant requirements of 6.1.4.9 apply to the construction of the outer packaging.

6.1.4.19.2.4 Plastics receptacle with outer plywood drum 6HD1; the relevant requirements of 6.1.4.5 apply to the construction of the outer packaging.

6.1.4.19.2.5 Plastics receptacle with outer plywood box 6HD2; the relevant requirements of 6.1.4.10 apply to the construction of the outer packaging.

6.1.4.19.2.6 Plastics receptacle with outer fibre drum 6HG1; the requirements of 6.1.4.7.1 to 6.1.4.7.4 apply to the construction of the outer packaging.

6.1.4.19.2.7 Plastics receptacle with outer fibreboard box 6HG2; the relevant requirements of 6.1.4.12 apply to the construction of the outer packaging.

6.1.4.19.2.8 Plastics receptacle with outer plastics drum 6HH1; the requirements of 6.1.4.8.1 and 6.1.4.8.3 to 6.1.4.7.7 apply to the construction of the outer packaging.

6.1.4.19.2.9 Plastics receptacles with outer solid plastics box (including corrugated plastics material) 6HH2; the requirements of 6.1.4.13.1 and 6.1.4.13.4 to 6.1.4.13.6 apply to the construction of the outer packaging.

6.1.4.20 ***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
6PD2 receptacle with outer wickerwork hamper
6PG1 receptacle with outer fibre drum
6PG2 receptacle with outer fibreboard box
6PH1 receptacle with outer expanded plastics packaging
6PH2 receptacle with outer solid plastics packaging

6.1.4.20.1 *Inner receptacle*

6.1.4.20.1.1 Receptacles shall be of a suitable form (cylindrical or pear-shaped) and be made of good quality material free from any defect that could impair their strength. The walls shall be sufficiently thick at every point.

6.1.4.20.1.2 Screw-threaded plastics closures, ground glass stoppers or closures at least equally effective shall be used as closures for receptacles. Any part of the closure likely to come into contact with the contents of the receptacle shall be resistant to those contents. Care shall be taken to ensure that the closures are so fitted as to be leakproof and are suitably secured to prevent any loosening during transport. If vented closures are necessary, they shall comply with 4.1.1.8.

6.1.4.20.1.3 The receptacle shall be firmly secured in the outer packaging by means of cushioning and/or absorbent materials.

6.1.4.20.1.4 Maximum capacity of receptacle: 60 litres

6.1.4.20.1.5 Maximum net mass: 75 kg

6.1.4.20.2 *Outer packaging*

6.1.4.20.2.1 Receptacle with outer steel drum 6PA1; the relevant requirements of 6.1.4.1 apply to the construction of the outer packaging. The removable lid required for this type of packaging may nevertheless be in the form of a cap.

6.1.4.20.2.2 Receptacle with outer steel crate or box 6PA2; the relevant requirements of 6.1.4.14 apply to the construction of the outer packaging. For cylindrical receptacles the outer packaging shall, when upright, rise above the receptacle and its closure. If the crate surrounds a pear-shaped receptacle and is of matching shape, the outer packaging shall be fitted with a protective cover (cap).

6.1.4.20.2.3 Receptacle with outer aluminium drum 6PB1; the relevant requirements of 6.1.4.2 apply to the construction of the outer packaging.

6.1.4.20.2.4 Receptacle with outer aluminium crate or box 6PB2; the relevant requirements of 6.1.4.14 apply to the construction of the outer packaging.

6.1.4.20.2.5 Receptacle with outer wooden box 6PC; the relevant requirements of 6.1.4.9 apply to the construction of the outer packaging.

6.1.4.20.2.6 Receptacle with outer plywood drum 6PD1; the relevant requirements of 6.1.4.5 apply to the construction of the outer packaging.

6.1.4.20.2.7 Receptacle with outer wickerwork hamper 6PD2. The wickerwork hamper shall be properly made with material of good quality. It shall be fitted with a protective cover (cap) so as to prevent damage to the receptacle.

6.1.4.20.2.8 Receptacle with outer fibre drum 6PG1; the relevant requirements of 6.1.4.7.1 to 6.1.4.7.4 apply to the construction of the outer packaging.

6.1.4.20.2.9 Receptacle with outer fibreboard box 6PG2; the relevant requirements of 6.1.4.12 apply to the construction of the outer packaging.

6.1.4.20.2.10 Receptacle with outer expanded plastics or solid plastics packaging (6PH1 or 6PH2); the materials of both outer packagings shall meet the relevant requirements of 6.1.4.13. Solid plastics packaging shall be manufactured from high density polyethylene or some other comparable plastics material. The removable lid for this type of packaging may nevertheless be in the form of a cap.

6.1.5 Test requirements for packagings

6.1.5.1 *Performance and frequency of tests*

6.1.5.1.1 The design type of each packaging shall be tested as provided in 6.1.5 in accordance with procedures established by the competent authority.

6.1.5.1.2 Tests shall be successfully performed on each packaging design type before such packaging is 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.

6.1.5.1.3 Tests shall be repeated on production samples at intervals established by the competent authority. For such tests on paper or fibreboard packagings, preparation at ambient conditions is considered equivalent to the requirements of 6.1.5.2.3.

6.1.5.1.4 Tests shall also be repeated after each modification which alters the design, material or manner of construction of a packaging.

6.1.5.1.5 The competent authority may permit the selective testing of packagings that differ only in minor respects from a tested type, e.g. smaller sizes 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).

6.1.5.1.6 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:

(i) The inner packagings are of similar design to the tested inner packagings (e.g. shape - round, rectangular, etc.);

(ii) 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;

(iii) The inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);

(iv) Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and

(v) Inner packagings are oriented within the outer packaging in the same manner as in the tested package.

(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.

6.1.5.1.7 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 shall have been successfully tested in accordance with 6.1.5.3 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 shall 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 shall 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 shall 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 shall be used to take up void spaces;

(d) The outer packaging shall have passed successfully the stacking test in 6.1.5.6 while empty. The total mass of identical packages shall be based on the combined mass of inner packagings used for the drop test in (a) above;

(e) Inner packagings containing liquids shall 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 shall be provided in the form of a leakproof liner, plastics bag or other equally efficient means of containment. For packagings containing liquids, the absorbent material required in (e) above shall be placed inside the means of containing the liquid contents;

(g) For air transport, packagings shall comply with 4.1.1.4.1;

(h) Packagings shall be marked in accordance with 6.1.3 as having been tested to Packing Group I performance for combination packagings. The marked gross mass in kilograms shall 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 package mark shall also contain a letter "V" as described in 6.1.2.4.

6.1.5.1.8 The competent authority may at any time require proof, by tests in accordance with this section, that serially-produced packagings meet the requirements of the design type tests.

6.1.5.1.9 If an inner treatment or coating is required for safety reasons, it shall retain its protective properties even after the tests.

6.1.5.1.10 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.

6.1.5.1.11 *Salvage packagings*

Salvage packagings (see 1.2.1) shall be tested and marked in accordance with the provisions 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 shall be water, and the packagings shall be filled to not less than 98% 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. Alternatively, in performing the drop test, the drop height may be varied in accordance with 6.1.5.3.4 (b);

(b) Packagings shall, in addition, have been successfully subjected to the leakproofness test at 30 kPa, with the results of this test reflected in the test report required by 6.1.5.8; and

(c) Packagings shall be marked with the letter 'T' as described in 6.1.2.4.

6.1.5.2 *Preparation of packagings for testing*

6.1.5.2.1 Tests shall 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 shall be filled to not less than 98% of their maximum capacity for liquids or 95% for solids. For 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 packagings 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 shall 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 affected.

6.1.5.2.2 In the drop tests for liquids, when another substance is used, it shall 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 in 6.1.5.3.4.

6.1.5.2.3 Paper or fibreboard packagings shall 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 shall be chosen. The preferred atmosphere is 23 ± 2 °C and 50% ± 2% r.h. The two other options are 20 ± 2 °C and 65% ± 2% r.h. or 27 ± 2 °C and 65% ± 2% r.h.

***NOTE**: Average values shall fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ± 5% relative humidity without significant impairment of test reproducibility.*

6.1.5.2.4 Bung-type barrels made of natural wood shall be left filled with water for at least 24 hours before the tests.

6.1.5.2.5 Additional steps shall be taken to ascertain that the plastics material used in the manufacture of plastics drums, plastics jerricans and composite packagings (plastics material) intended to contain liquids complies with the requirements in 6.1.1.2, 6.1.4.8.1 and 6.1.4.8.4. 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 shall be submitted to the applicable tests listed in 6.1.5.3, 6.1.5.4, 6.1.5.5 and 6.1.5.6. For substances which may cause stress-cracking or weakening in plastics 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 plastics material in question, shall be subjected to a superimposed load equivalent to the total mass of identical packages which might be stacked on it during transport. The minimum height of the stack including the test sample shall be 3 metres.

6.1.5.3 *Drop test*

6.1.5.3.1 *Number of test samples (per design type and manufacturer) and drop orientation*

For other than flat drops the centre of gravity shall be vertically over the point of impact.

Where more than one orientation is possible for a given drop test, the orientation most likely to result in failure of the packaging shall be used.

Packaging	No. of test samples	Drop orientation
Steel drums Aluminum drums Metal drums, other than steel or aluminum drums Steel jerricans Aluminum jerricans Plywood drums Wooden barrels Fibre drums Plastics 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 shall 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 shall 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 Plastics boxes Steel or aluminum 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 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
Bags – single-ply without a side seam, or multi-ply	Three (three drops per bag)	*First drop*: flat on a wide face *Second drop*: on an end of the bag

6.1.5.3.2 *Special preparation of test samples for the drop test*

The temperature of the test sample and its contents shall be reduced to -18 °C or lower for the following packagings:

(a) Plastics drums (see 6.1.4.8);

(b) Plastics jerricans (see 6.1.4.8);

(c) Plastics boxes other than expanded plastics boxes (see 6.1.4.13);

(d) Composite packagings (plastics material) (see 6.1.4.19); and

(e) Combination packagings with plastics inner packagings, other than plastics bags intended to contain solids or articles.

Where test samples are prepared in this way, the conditioning in 6.1.5.2.3 may be waived. Test liquids shall be kept in the liquid state by the addition of anti-freeze if necessary.

6.1.5.3.3 *Target*

The target shall be a rigid, non-resilient, flat and horizontal surface.

6.1.5.3.4 *Drop height*

For solids and liquids, if the test is performed with the solid or liquid to be carried 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 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 shall 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 $\times$1.5 (m)	d $\times$ 1.0 (m)	d $\times$ 0.67 (m)

6.1.5.3.5 *Criteria for passing the test*:

6.1.5.3.5.1 Each packaging containing liquid shall 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.

6.1.5.3.5.2 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 plastics bag), even if the closure is no longer sift-proof.

6.1.5.3.5.3 The packaging or outer packaging of a composite or combination packaging shall not exhibit any damage liable to affect safety during transport. There shall be no leakage of the filling substance from the inner receptacle or inner packaging(s).

6.1.5.3.5.4 Neither the outermost ply of a bag nor an outer packaging may exhibit any damage liable to affect safety during transport.

6.1.5.3.5.5 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.

6.1.5.3.5.6 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.

6.1.5.4 ***Leakproofness test***

The leakproofness test shall 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.

6.1.5.4.1 *Number of test samples*: three test samples per design type and manufacturer.

6.1.5.4.2 *Special preparation of test samples for the test*: either vented closures shall be replaced by similar non-vented closures or the vent shall be sealed.

6.1.5.4.3 *Test method and pressure to be applied*: the packagings including their closures shall be restrained under water for 5 minutes while an internal air pressure is applied, the method of restraint shall not affect the results of the test.

The air pressure (gauge) to be applied shall 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.

6.1.5.4.4 *Criterion for passing the test*: there shall be no leakage.

6.1.5.5 ***Internal pressure (hydraulic) test***

6.1.5.5.1 *Packagings to be tested*: the internal pressure (hydraulic) test shall be carried out on all design types of metal, plastics and composite packagings intended to contain liquids. This test is not required for inner packagings of combination packagings.

6.1.5.5.2 *Number of test samples*: three test samples per design type and manufacturer.

6.1.5.5.3 *Special preparation of packagings for testing*: either vented closures shall be replaced by similar non-vented closures or the vent shall be sealed.

6.1.5.5.4 *Test method and pressure to be applied*: metal packagings and composite packagings (glass, porcelain or stoneware) including their closures shall be subjected to the test pressure for 5 minutes. Plastics packagings and composite packagings (plastics material) including their closures shall be subjected to the test pressure for 30 minutes. This pressure is the one to be included in the marking required by 6.1.3.1 (d). The manner in which the packagings are supported shall not invalidate the test. The test pressure shall be applied continuously and evenly; it shall be kept constant throughout the test period. The hydraulic pressure (gauge) applied, as determined by any one of the following methods, shall 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 shall be determined on the basis of a maximum degree of filling in accordance with 4.1.1.4 and a filling temperature of l5 °C;

(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;

(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.

6.1.5.5.5 In addition, packagings intended to contain liquids of Packing Group I shall 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.

6.1.5.5.6 The special requirements for air transport, including minimum test pressures, may not be covered in 6.1.5.5.4.

6.1.5.5.7 *Criterion for passing the test*: no packaging may leak.

6.1.5.6 ***Stacking test***

All design types of packagings other than bags are subject to a stacking test.

6.1.5.6.1 *Number of test samples*: three test samples per design type and manufacturer.

6.1.5.6.2 *Test method*: the test sample shall 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 sample are liquids with relative density different from that of the liquid to be transported, the force shall be calculated in relation to the latter. The minimum height of the stack including the test sample shall be 3 meters. The duration of the test shall be 24 hours except that plastics drums, jerricans, and composite packagings 6HH1 and 6HH2 intended for liquids shall be subjected to the stacking test for a period of 28 days at a temperature of not less than 40 °C.

6.1.5.6.3 *Criterion for passing the test*: no test sample may leak. In composite packagings or combination packagings, there shall be no leakage of the filling substance from the inner receptacle or inner packaging. No test sample may show any deterioration which could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages. Plastics packagings shall be cooled to ambient temperature before the assessment.

6.1.5.7 ***Cooperage test for bung type wooden barrels***

6.1.5.7.1 *Number of samples*: one barrel.

6.1.5.7.2 *Method of testing*: remove all hoops above the bilge of an empty barrel at least two days old.

6.1.5.7.3 *Criterion for passing the test*: the diameter of the cross-section of the upper part of the barrel shall not increase by more than 10%.

6.1.5.8 *Test Report*

6.1.5.8.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the packaging:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. A unique test report identification;
4. Date of the test report;
5. Manufacturer of the packaging;
6. 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);
7. Maximum capacity;
8. Characteristics of test contents, e.g. viscosity and relative density for liquids and particle size for solids;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

6.1.5.8.2 The test report shall contain statements that the packaging prepared as 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 shall be available to the competent authority.

CHAPTER 6.2

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PRESSURE RECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)

6.2.1 General requirements

***NOTE**: For aerosol dispensers and small receptacles containing gas (gas cartridges) see 6.2.4.*

6.2.1.1 *Design and construction*

6.2.1.1.1 Pressure receptacles and their closures shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions to which they will be subjected during normal conditions of transport.

6.2.1.1.2 In recognition of scientific and technological advances, and recognizing that pressure receptacles other than those that are marked with a UN certification marking may be used on a national or regional basis, pressure receptacles conforming to requirements other than those specified in these regulations may be used if approved by the competent authorities in the countries of transport and use.

6.2.1.1.3 Any additional thickness used for the purpose of providing a corrosion allowance shall not be taken into consideration in calculating the thickness of the walls. In no case shall the minimum wall thickness be less than that specified in the design and construction technical standards.

6.2.1.1.4 For welded pressure receptacles, only metals of weldable quality shall be used.

6.2.1.1.5 The following requirements apply to the construction of closed cryogenic pressure receptacles for refrigerated liquefied gases:

(a) The mechanical properties of the metal used shall be established for each pressure receptacle at the initial inspection, including the impact strength and the bending coefficient;

(b) The pressure receptacles shall be thermally insulated. The thermal insulation shall be protected against impact by means of continuous sheathing. If the space between the pressure receptacle and the sheathing is evacuated of air (vacuum-insulation), the protective sheathing shall be designed to withstand without permanent deformation an external pressure of at least 100 kPa (1 bar). If the sheathing is so closed as to be gas-tight (e.g. in the case of vacuum-insulation), a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the pressure receptacle or its fittings. The device shall prevent moisture from penetrating into the insulation.

6.2.1.1.6 The test pressure of cylinders, tubes, pressure drums and bundles of cylinders shall be in accordance with packing instruction P200. The test pressure for closed cryogenic receptacles shall be in accordance with packing instruction P203.

6.2.1.1.7 Pressure receptacles assembled in bundles shall be structurally supported and held together as a unit. Pressure receptacles shall be secured in a manner that prevents movement in relation to the structural assembly and movement that would result in the concentration of harmful local stresses. Manifolds shall be designed such that they are protected from impact. For Division 2.3 liquefied gases, means shall be provided to ensure that each pressure receptacle can be separately charged and that no interchange of pressure receptacle contents can occur during transport.

6.2.1.2 ***Materials***

6.2.1.2.1 Construction materials of pressure receptacles and their closures which are in direct contact with dangerous goods shall not be affected or weakened by the dangerous goods intended and shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods.

6.2.1.2.2 Pressure receptacles and their closures shall 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 pressure receptacle. The materials shall be resistant to brittle fracture and to stress corrosion cracking as indicated in the design and construction technical standards.

6.2.1.3 ***Service equipment***

6.2.1.3.1 Except for pressure relief devices, valves, piping, fittings and other equipment subjected to pressure, shall be designed and constructed to withstand at least 1.5 times the test pressure of the pressure receptacles.

6.2.1.3.2 Service equipment shall be configured or designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and transport. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the valves and the piping from shearing or releasing the pressure receptacle contents. The filling and discharge valves and any protective caps shall be capable of being secured against unintended opening. Valves shall be protected as specified in 4.1.6.1.7.

6.2.1.3.3 Pressure receptacles which are not capable of being handled manually or rolled, shall be fitted with devices (skids, rings, straps) ensuring that they can be safely handled by mechanical means and so arranged as not to impair the strength of, nor cause undue stresses, in the pressure receptacle.

6.2.1.3.4 Individual pressure receptacles shall be equipped with approved pressure relief devices as required in P200(1) or as specified by the country of use. When fitted, pressure relief devices on manifolded horizontal pressure receptacles filled with flammable gas shall be arranged to discharge freely to the open air in such a manner as to prevent any impingement of escaping gas upon the pressure receptacles under normal conditions of transport.

[6.2.1.3.5 Reserved for Cryogenic receptacles]

6.2.1.3.6 Pressure receptacles whose filling is measured by volume shall be provided with a level indicator.

6.2.1.4 ***Initial inspection and test***

6.2.1.4.1 New pressure receptacles shall be subjected to testing and inspection during and after manufacture in accordance with the applicable design standards including the following:

On an adequate sample of pressure receptacles:

(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, and inspection of the external and internal conditions of the pressure receptacles;

(d) Inspection of the neck threads;

(e) Verification of the conformance with the design standard;

For all pressure receptacles:

(f) A hydraulic pressure test. Pressure receptacles shall withstand the test pressure without expansion greater than that allowed in the design specification;

***NOTE**: With the agreement of the inspection body, 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 pressure receptacles unserviceable.

(h) An inspection of the markings on the pressure receptacles;

(i) In addition, pressure receptacles intended for the transport of UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be inspected to ensure proper installation and condition of the porous material and the quantity of solvent.

6.2.1.5 ***Periodic inspection and test***

6.2.1.5.1 Refillable pressure receptacles, other than cryogenic receptacles, shall be subjected to periodic inspections and tests under the supervision of an inspection body, in accordance with the following:

(a) Check of the external conditions of the pressure receptacle and verification of the equipment and the external markings;

(b) Check of the internal conditions of the pressure receptacle (e.g. by weighing, internal inspection, checks of wall thickness);

(c) Checking of the neck threads;

(d) A hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests.

***NOTE 1**: With the agreement of the inspection body, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

***NOTE 2**: With the agreement of the competent authority, the hydraulic pressure test of cylinders and tubes may be replaced by an equivalent method based on acoustic emission or ultrasound.*

6.2.1.5.2 For pressure receptacles intended for the transport of UN 1001 acetylene, dissolved, UN 3374 acetylene, solvent free, only the external condition (corrosion, deformation) and the condition of the porous mass (loosening, settlement) shall be required to be examined.

6.2.1.5.3 Closed cryogenic pressure receptacles shall be inspected to verify external conditions, condition and operation of pressure relief devices and the legibility and adequacy of the markings. The thermal insulation need not be removed.

6.2.1.6 *Approval of pressure receptacles*

6.2.1.6.1 The conformity of pressure receptacles shall be assessed at time of manufacture as required by the competent authority. Pressure receptacles shall be inspected, tested and approved by an inspection body. The technical documentation shall include full specifications on design and construction, and full documentation on the manufacturing and testing.

6.2.1.6.2 Quality assurance systems shall conform to the requirements of the competent authority.

6.2.1.7 *Requirements for manufacturers*

6.2.1.7.1 The manufacturer shall be technically able and shall possess all resources required for the satisfactory manufacture of pressure 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.

6.2.1.7.2 The proficiency test of a manufacturer shall in all instances be carried out by an inspection body approved by the competent authority of the country of approval.

6.2.1.8 *Requirements for inspection bodies*

6.2.1.8.1 Inspection bodies shall be independent from manufacturing enterprises and competent to perform the tests, inspections and approvals required.

6.2.2 Requirements for UN certified pressure receptacles

In addition to the general requirements of section 6.2.1, UN certified pressure receptacles shall comply with the requirements of this section, including the standards, as applicable.

***NOTE**: With the agreement of the competent authority, more recently published versions of the standards, if available, may be used.*

6.2.2.1 *Design, construction and initial inspection and test*

6.2.2.1.1 The following standards apply for the design, construction, and initial inspection and test of UN certified cylinders:

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 1100 Mpa *NOTE: The note concerning the F factor in section 7.3 of this standard shall not be applied for UN certified cylinders.*
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 1100 MPa
ISO 9809-3:2000	Gas cylinders – Refillable seamless steel gas cylinders - Design, construction and testing - Part 3: Normalized steel cylinders

ISO 7866:1999	Gas cylinders – Refillable seamless aluminum alloy gas cylinders – Design, construction and testing *NOTE: The note concerning the F factor in section 7.2 of this standard shall not be applied for UN certified cylinders. Aluminum alloy 6351A – T6 or equivalent shall not be authorized.*
ISO 11118:1999	Gas cylinders – Non-refillable metallic gas cylinders - Specification and test methods

6.2.2.1.2 The following standards apply for the design, construction, and initial inspection and test of UN certified tubes:

ISO 11120:1999	Gas cylinders – Refillable seamless steel tubes for compressed gas transport, of water capacity between 150 *l* and 3000 *l* – Design, construction and testing *NOTE: The note concerning the F factor in section 7.1 of this standard shall not be applied for UN certified tubes*

6.2.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN certified acetylene cylinders:

For the cylinder shell:

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 1100 MPa *NOTE: The note concerning the F factor in section 7.3 of this standard shall not be applied for UN certified cylinders.*
ISO 9809-3:2000	Gas cylinders – Refillable seamless steel gas cylinders - Design, construction and testing – Part 3: Normalized steel cylinders
ISO 7866:1999	Gas cylinders – Refillable seamless aluminum alloy gas cylinders – Design, construction and testing *NOTE: The note concerning the F factor in section 7.2 of this standard shall not be applied for UN certified cylinders. Aluminum alloy 6351A – T6 or equivalent shall not be authorized.*
ISO 11118:1999	Gas cylinders – Non-refillable metallic gas cylinders - Specification and test methods

For the porous mass in the cylinder:

ISO 3807-1:2000	Cylinders for acetylene – Basic requirements - Part 1: Cylinders without fusible plugs
ISO 3807-2:2000	Cylinders for acetylene – Basic requirements - Part 2: Cylinders with fusible plugs

6.2.2.2 ***Materials***

In addition to the material requirements specified in the pressure receptacle design and construction standards, and any restrictions specified in the applicable packing instruction for the gas(es) to be transported (e.g. packing instruction P200), the following standards apply to material compatibility:

ISO 11114-1:1997	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials
ISO 11114-2:2000	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials

6.2.2.3 ***Service equipment***

The following standards apply to closures and their protection:

ISO 11117:1998	Gas cylinders - Valve protection caps and valve guards for industrial and medical gas cylinders- Design, construction and tests
ISO 10297:1999	Gas cylinders –Refillable gas cylinder valves - Specification and type testing

6.2.2.4 ***Periodic inspection and test***

The following standards apply to the periodic inspection and testing of UN certified cylinders:

ISO 6406:1992	Periodic inspection and testing of seamless steel gas cylinders
ISO 10461:1993	Seamless aluminum - alloy gas cylinders - Periodic inspection and testing
ISO 10462:1994	Cylinders for dissolved acetylene – Periodic inspection and maintenance

6.2.2.5 ***Conformity assessment system and approval of pressure receptacles***

6.2.2.5.1 *Definitions*

For the purposes of this section:

Conformity assessment system means a system for competent authority approval of a manufacturer, by pressure receptacle design type approval, approval of manufacturer's quality system and approval of inspection bodies;

Design type means a pressure receptacle design as specified by a particular pressure receptacle standard;

Verify means confirm by examination or provision of objective evidence that specified requirements have been fulfilled;

6.2.2.5.2 *General requirements*

Competent Authority

6.2.2.5.2.1 The competent authority that approves the pressure receptacle shall approve the conformity assessment system for the purpose of ensuring that pressure receptacles conform to the requirements of these regulations. In instances where the competent authority that approves a pressure receptacle is not the

competent authority in the country of manufacture, the marks of the approval country and the country of manufacture shall be indicated in the pressure receptacle marking (see 6.2.2.6 and 6.2.2.7).

The competent authority of the country of approval shall supply, upon request, evidence demonstrating compliance to this conformity assessment system to its counterpart in a country of use.

6.2.2.5.2.2 The competent authority may delegate its functions in this conformity assessment system in whole or in part.

6.2.2.5.2.3 The competent authority shall ensure that a current list of approved inspection bodies and their identity marks and approved manufacturers and their identity marks is available.

Inspection body

6.2.2.5.2.4 The inspection body shall be approved by the competent authority as an inspector of pressure receptacles and shall:

(a) have a staff with an organisational 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 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 pressure receptacle standard and these regulations are performed; and

(h) maintain an effective and appropriate report and record system in accordance with 6.2.2.5.6.

6.2.2.5.2.5 The inspection body shall perform design type approval, pressure receptacle production testing and inspection, and certification to verify conformity with the relevant pressure receptacle standard (see 6.2.2.5.4 and 6.2.2.5.5).

Manufacturer

6.2.2.5.2.6 The manufacturer shall:

(a) operate a documented quality system in accordance with 6.2.2.5.3;

(b) apply for design type approvals in accordance with 6.2.2.5.4;

(c) select an inspection body from the list of approved inspection bodies maintained by the competent authority in the country of approval; and

(d) maintain records in accordance with 6.2.2.5.6.

Testing laboratory

6.2.2.5.2.7 The testing laboratory shall have:

(a) staff with an organisational structure, sufficient in number, competence, and skill; and

(b) suitable and adequate facilities and equipment to perform the tests required by the manufacturing standard to the satisfaction of the inspection body.

6.2.2.5.3 *Manufacturer's quality system*

6.2.2.5.3.1 The quality system shall contain all the elements, requirements, and provisions adopted by the manufacturer. It shall be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The contents shall in particular include adequate descriptions of:

(a) the organisational structure, responsibilities, and power of the management with regard to design and product quality;

(b) the design control and design verification techniques, processes, and systematic actions that will be used when designing the pressure receptacles;

(c) the relevant pressure 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 6.2.2.5.3.2;

(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 pressure receptacles, purchased components, in - process and final materials; and

(i) training programmes for relevant personnel.

6.2.2.5.3.2 Audit of the quality system

The quality system shall be initially assessed to determine whether it meets the requirements in 6.2.2.5.3.1 to the satisfaction of the competent authority.

The manufacturer shall be notified of the results of the audit. The notification shall contain the conclusions of the audit and any corrective actions required.

Periodic audits shall be carried out, to the satisfaction of the competent authority, to ensure that the manufacturer maintains and applies the quality system. Reports of the periodic audits shall be provided to the manufacturer.

6.2.2.5.3.3 Maintenance of the quality system

The manufacturer shall maintain the quality system as approved in order that it remains adequate and efficient.The manufacturer shall notify the competent authority that approved the quality system, of any intended changes. The proposed changes shall be evaluated in order to determine whether the amended quality system will still satisfy the requirements in 6.2.2.5.3.1.

6.2.2.5.4 *Approval process*

Initial design type approval

6.2.2.5.4.1 The initial design type approval shall consist of approval of the manufacturer's quality system and approval of the pressure receptacle design to be produced. An application for an initial design type approval shall encompass the requirements of 6.2.2.5.4.2 to 6.2.2.5.4.6 and 6.2.2.5.4.9.

6.2.2.5.4.2 A manufacturer desiring to produce pressure receptacles in accordance with a pressure receptacle standard and these regulations shall apply for, obtain, and retain a Design Type Approval Certificate issued by the competent authority in the country of approval for at least one pressure receptacle design type in accordance with the procedure given in 6.2.2.5.4.9. This written approval shall, on request, be submitted to the competent authority of the country of use.

6.2.2.5.4.3 An application shall be made for each manufacturing facility and shall include:

(a) the name and registered address of the manufacturer and in addition, if the application is submitted by an authorised 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 pressure receptacle and the relevant pressure receptacle standard;

(e) details of any refusal of approval of a similar application by any other competent authority;

(f) the identity of the inspection body for design type approval;

(g) documentation on the manufacturing facility as specified under 6.2.2.5.3.1; and

(h) the technical documentation required for design type approval, which shall enable verification of the conformity of the pressure receptacles with the requirements of the relevant pressure receptacle design standard. The technical documentation shall cover the design and method of manufacture and shall contain, as far as is relevant for assessment, at least the following:

(i) pressure receptacle design standard, design and manufacturing drawings, showing components and subassemblies, if any;

(ii) descriptions and explanations necessary for the understanding of the drawings and intended use of the pressure 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 6.2.2.5.4.9.

6.2.2.5.4.4 An initial audit in accordance with 6.2.2.5.3.2 shall be performed to the satisfaction of the competent authority.

6.2.2.5.4.5 If the manufacturer is denied approval, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.4.6 Following approval, changes to the information submitted under 6.2.2.5.4.2 relating to the initial approval shall be provided to the competent authority.

Subsequent design type approvals

6.2.2.5.4.7 An application for a subsequent design type approval shall encompass the requirements of 6.2.2.5.4.8 and 6.2.2.5.4.9, provided a manufacturer is in the possession of an initial design type approval. In such a case, the manufacturer's quality system according to 6.2.2.5.3 shall have been approved during the initial design type approval and shall be applicable for the new design.

6.2.2.5.4.8 The application shall include:

(a) the name and address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;

(b) details of any refusal of approval of a similar application by any other competent authority;

(c) evidence that initial design type approval has been granted; and

(d) the technical documentation, as described in 6.2.2.5.4.3 (h).

Procedure for design type approval

6.2.2.5.4.9 The inspection body shall:

(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 6.2.2.5.5;

(c) select pressure receptacles from a prototype production lot and supervise the tests of these pressure receptacles as required for design type approval;

(d) perform or have performed the examinations and tests specified in the pressure 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.

After prototype testing has been carried out with satisfactory results and all applicable requirements of 6.2.2.5.4 have been satisfied, a Design Type Approval Certificate shall be issued, which shall 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 the manufacturer is denied a design type certification, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.4.10 Modifications to approved design types

The manufacturer shall inform the issuing competent authority of modifications to the approved design type as specified in the pressure receptacle standard. A subsequent design type approval shall be requested where such modifications constitute a new design according to the relevant pressure receptacle standard. This additional approval shall be given in the form of an amendment to the original Design Type Approval Certificate.

6.2.2.5.4.11 Upon request, the competent authority shall communicate to any other competent authority, information concerning design type approval, modifications of approvals and withdrawn approvals.

6.2.2.5.5 *Production inspection and certification*

An inspection body, or its delegate, shall carry out the inspection and certification of each pressure receptacle. 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.

Where it can be demonstrated to the satisfaction of the inspection body that the manufacturer has trained competent inspectors, independent of the manufacturing operations, inspection may be performed by those inspectors. In such a case, the manufacturer shall maintain training records of the inspectors.

The inspection body shall verify that the inspections by the manufacturer, and tests performed on those pressure receptacles, fully conform to the standard and the requirements of these regulations. 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.

The manufacturer shall, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the pressure receptacle certification marking shall be considered a declaration that the pressure receptacle complies with the applicable pressure receptacle standards and the requirements of this conformity assessment system and these regulations. The inspection body shall affix or delegate the manufacturer to affix the pressure receptacle certification marking and the registered mark of the inspection body to each approved pressure receptacle.

A certificate of compliance, signed by the inspection body and the manufacturer, shall be issued before the pressure receptacles are filled.

6.2.2.5.6 *Records*

Design type approval and certificate of compliance records shall be retained by the manufacturer and the inspection body for not less than 20 years.

6.2.2.6 ***Marking of UN certified refillable pressure receptacles***

UN certified refillable pressure receptacles shall be marked clearly and legibly with certification and gas or pressure receptacle specific marks. These marks shall be permanently affixed (e.g. stamped, engraved, or etched) on the pressure receptacle. The marks shall be on the shoulder, top end or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g. welded collar). Except for the "UN" mark, the minimum size of the marks shall be 5 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the "UN" mark shall be 10 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 5 mm for pressure receptacles with a diameter less than 140 mm.

6.2.2.6.1 The following certification marks shall be applied:

(a) The UN packaging symbol

This symbol shall only be marked on pressure receptacles which conform to the requirements of these regulations for UN certified pressure receptacles.

(b) The technical standard (e.g. ISO 9809-1) used for design, manufacture and testing;

(c) The character(s) identifying the country of approval as indicated by the distinguishing signs of motor vehicles in international traffic;

(d) The identity mark or stamp of the inspection body that is registered with the competent 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. "/").

6.2.2.6.2 The following operational marks shall be applied:

(f) The test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR";

(g) The empty mass of the pressure receptacle including all permanently attached integral parts (e.g. neck ring, foot ring, etc.) in kilograms, followed by the letters "KG". This mass shall not include the mass of valve, valve cap or valve guard, any coating, or porous mass for acetylene. The empty mass shall be expressed to three significant figures rounded up to the last digit. For cylinders of less than 1 kg, the mass shall be expressed to two significant figures rounded up to the last digit;

(h) The minimum guaranteed wall thickness of the pressure receptacle in millimetres followed by the letters "MM". This mark is not required for pressure receptacles with a water capacity less than or equal to 1 litre or for composite cylinders;

(i) In the case of pressure receptacles intended for the transport of compressed gases, UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, the working pressure in bar, preceded by the letters "PW";

(j) In the case of liquefied gases, the water capacity in litres expressed to three significant digits 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 UN 1001 acetylene, dissolved, the total of the mass of the empty receptacle, the fittings and accessories not removed during filling, the porous material, the solvent and the saturation gas expressed to two significant figures rounded down to the last digit followed by the letters "KG";

(l) In the case of UN 3374 acetylene, solvent free, the total of the mass of the empty receptacle, the fittings and accessories not removed during filling and the porous material expressed to two significant figures rounded down to the last digit followed by the letters "KG";

6.2.2.6.3 The following manufacturing marks shall be applied:

(m) Identification of the cylinder thread (e.g. 25E);

(n) The manufacturer's mark registered by the competent authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing signs of motor vehicles in international traffic. The country mark and the manufacturer's mark shall be separated by a space or slash;

(o) The serial number assigned by the manufacturer.

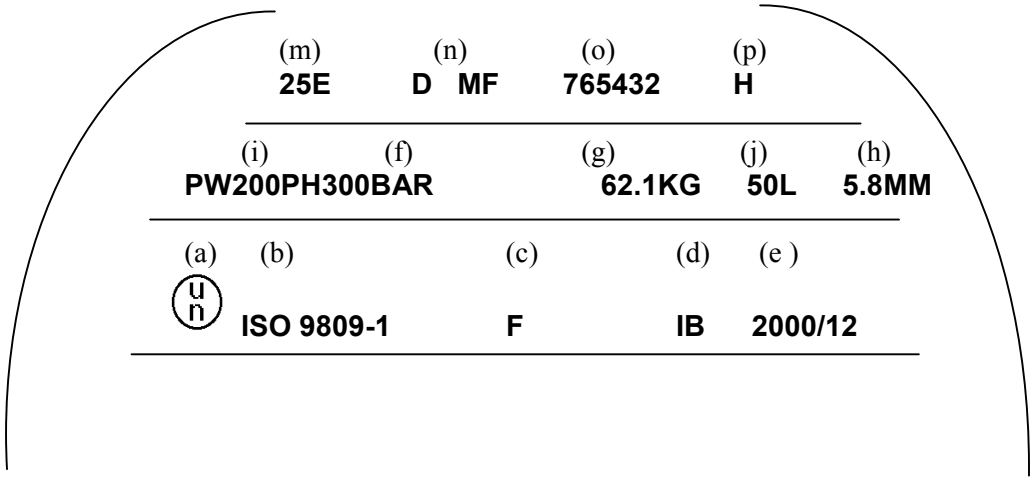
(p) In the case of steel pressure receptacles and composite pressure receptacles with steel liner intended for the transport of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see 1SO 11114-1:1997);

6.2.2.6.4 The above marks shall be placed in three groups as shown in the example below.

- Manufacturing marks shall be the top grouping and shall appear consecutively in the sequence given in 6.2.2.6.3.

- The middle grouping shall include the test pressure (f) which shall be immediately preceded by the working pressure (i) when the latter is required.

- Certification marks shall be the bottom grouping and shall appear in the sequence given in 6.2.2.6.1.



6.2.2.6.5 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 shall not conflict with required marks.

6.2.2.6.6 In addition to the preceding marks, each refillable pressure receptacle shall be marked indicating the date (year and month) of the last periodic inspection and the registered mark of the inspection body authorized by the competent authority of the country of use.

6.2.2.7 ***Marking of UN certified non-refillable pressure receptacles***

UN certified non-refillable pressure receptacles shall be marked clearly and legibly with certification and gas or pressure receptacle specific marks. These marks shall be permanently affixed (e.g. stencilled, stamped, engraved, or etched) on the pressure receptacle. Except when stencilled, the marks shall be on the shoulder, top end or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g. welded collar). Except for the "UN" mark and the "DO NOT REFILL" mark, the minimum size of the marks shall be 5 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the "UN" mark shall be 10 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the "DO NOT REFILL" mark shall be 5 mm.

6.2.2.7.1 The marks listed in 6.2.2.6.1 to 6.2.2.6.3 shall 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.

6.2.2.7.2 The requirements of 6.2.2.6.4 shall apply.

NOTE*: Non-refillable pressure receptacles may, on account of their size, substitute this marking by a label (see 5.2.2.2.1.2).*

6.2.2.7.3 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 shall not conflict with required marks.

6.2.3 Requirements for non-UN certified pressure receptacles

6.2.3.1 Pressure receptacles not designed, constructed, inspected, tested and approved according to the requirements of 6.2.2 shall be designed, constructed, inspected, tested and approved in accordance with the provisions of a technical code recognised by the competent authority and the general requirements of 6.2.1.

6.2.3.2 Pressure receptacles designed, constructed, inspected, tested and approved under the provisions of this section shall not be marked with the UN packaging symbol.

6.2.3.3 For metallic cylinders, tubes, pressure drums and bundles of cylinders, the construction shall be such that the minimum burst ratio (burst pressure divided by test pressure) is:

1.50 for refillable pressure receptacles,
2.00 for non-refillable pressure receptacles.

6.2.3.4 Marking shall be in accordance with the requirements of the competent authority of the country of use.

6.2.4 Requirements for aerosol dispensers and small receptacles containing gas (gas cartridges)

6.2.4.1 Each receptacle shall be subjected to a test performed in a hot water bath; the temperature of the bath and the duration of the test shall 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% of the capacity of the receptacle at 50 °C). If the contents are sensitive to heat or if the receptacles are made of plastics material which softens at this test temperature, the temperature of the bath shall be set at between 20 °C and 30 °C but, in addition, one receptacle in 2000 shall be tested at the higher temperature.

6.2.4.2 No leakage or permanent deformation of a receptacle may occur, except that a plastics receptacle may be deformed through softening provided that it does not leak.

CHAPTER 6.3

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS FOR DIVISION 6.2 SUBSTANCES

6.3.1 General

6.3.1.1 A packaging that meets the requirements of this section and of 6.3.2 shall be marked with:

(a) The United Nations packaging symbol;

(b) The code designating the type of packaging according to the requirements of 6.1.2;

(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 for motor vehicles in international traffic;

(f) The name of the manufacturer or other identification of the packaging specified by the competent authority;

(g) For packagings meeting the requirements of 6.3.2.9, the letter "U", inserted immediately following the marking required in (b) above.

Each element of the marking applied in accordance with (a) to (g) shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

6.3.1.2 ***Example of marking:***

4G/CLASS 6.2/92 as in 6.3.1.1 (a), (b), (c) and (d)
S/SP-9989-ERIKSSON as in 6.3.1.1 (e), (f)

6.3.1.3 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of 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.

6.3.2 Test requirements for packagings

6.3.2.1 Other than for packagings for live animals and organisms, samples of each packaging shall be prepared for testing as described in 6.3.2.2 and then subjected to the tests in 6.3.2.4 to 6.3.2.6. If the nature of the packaging makes it necessary, equivalent preparation and tests are permitted, provided that these may be demonstrated to be at least as effective.

6.3.2.2 Samples of each packaging shall be prepared as for transport except that a liquid or solid infectious substance shall be replaced by water or, where conditioning at -18 °C is specified, by water/antifreeze. Each primary receptacle shall be filled to 98% capacity.

6.3.2.3 ***Tests required***

Material of					Tests required				
outer packaging			inner packaging		Refer to 6.3.2.5				Refer to 6.3.2.6
Fibre-board	Plastics	Other	Plastics	Other	(a)	(b)	(c)	(d)	
x			x			x	x		x
x				x		x		when dry	x
	x		x				x	ice is used	x
	x			x			x		x
		x	x				x		x
		x		x	x				x

6.3.2.4 Packagings prepared as for transport shall be subjected to the tests in 6.3.2.3, which - for test purposes - categorizes packagings according to their material characteristics. For outer packagings, the headings in the table 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. If a primary receptacle and a secondary packaging of an inner packaging are made of different materials, the material of the primary receptacle determines the appropriate test. In instances where a primary receptacle is made of two materials, the material most liable to damage determines the appropriate test.

6.3.2.5 (a) Samples shall be subjected to free-fall drops on to a rigid, non-resilient, flat, horizontal surface from a height of 9 m. Where the samples are in the shape of a box, five shall be dropped in sequence:

(i) flat on to the base;
(ii) flat on to the top;
(iii) flat on to the longest side;
(iv) flat on to the shortest side;
(v) on to a corner;

Where the samples are in the shape of a drum, three shall be dropped in sequence:

(vi) diagonally on to the top chime, with the centre of gravity directly above the point of impact;
(vii) diagonally on to the base chime;
(viii) flat on to the side;

Following the appropriate drop sequence, there may be no leakage from the primary receptacle(s) which shall remain protected by absorbent material in the secondary packaging;

NOTE*: While the sample shall be released in the required orientation, it is accepted that for aerodynamic reasons the impact may not take place in that orientation.*

(b) The sample shall be subjected to a water spray that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour. It shall then be subjected to the test described in (a);

(c) The sample shall be conditioned in an atmosphere of -18 °C or less for a period of at least 24 hours and within 15 minutes of removal from that atmosphere be subjected to the test described in (a). Where the sample contains dry ice, the conditioning period may be reduced to 4 hours;

(d) Where the packaging is intended to contain dry ice, a test additional to that specified in (a) or (b) or (c) shall be carried out. One sample shall be stored so that all the dry ice dissipates and then be subjected to the test described in (a).

6.3.2.6 Packagings with a gross mass of 7 kg or less shall be subjected to the tests described in (a) below and packagings with a gross mass exceeding 7 kg to the tests in (b) below.

(a) Samples shall be placed on a level hard surface. A cylindrical steel rod with a mass of at least 7 kg, a diameter not exceeding 38 mm and the impact end edges a radius not exceeding 6 mm, shall be dropped in a vertical free fall from a height of 1 m, measured from the impact end to the impact surface of the sample. One sample shall be placed on its base. A second sample shall be placed in an orientation perpendicular to that used for the first. In each instance the steel rod shall 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);

(b) Samples shall be dropped on to the end of a cylindrical steel rod. The rod shall be set vertically in a level hard surface. It shall have a diameter of 38 mm and the edges of the upper end a radius not exceeding 6 mm. The rod shall protrude from the surface a distance at least equal to that between the primary receptacle(s) and the outer surface of the outer packaging with a minimum of 200 mm. One sample shall be dropped in a vertical free fall from a height of 1 m, measured from the top of the steel rod. A second sample shall be dropped from the same height in an orientation perpendicular to that used for the first. In each instance the packaging shall be so orientated that the steel rod would penetrate the primary receptacle(s). Following each impact, there shall be no leakage from the primary receptacle(s).

6.3.2.7 The competent 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).

6.3.2.8 Provided an equivalent level of performance is maintained, the following variations in the primary receptacles placed within a secondary packaging are allowed without further testing of the completed package:

(a) Primary receptacles of equivalent or smaller size as compared to the tested primary receptacles may be used provided:

(i) The primary receptacles are of similar design to the tested primary receptacle (e.g. shape: round, rectangular, etc.);

(ii) The material of construction of the primary receptacle (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested primary receptacle;

(iii) The primary receptacles have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);

(iv) Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the primary receptacles; and

(v) Primary receptacles are oriented within the secondary packaging in the same manner as in the tested package;

(b) A lesser number of the tested primary receptacles, or of the alternative types of primary receptacles 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 primary receptacles.

6.3.2.9 Inner receptacles of any type may be assembled within an intermediate (secondary) packaging and transported without testing in the outer packaging under the following conditions:

(a) The intermediate/outer packaging combination shall have been successfully tested in accordance with 6.3.2.3 with fragile (e.g., glass) inner receptacles;

(b) The total combined gross mass of inner receptacles shall not exceed one half the gross mass of inner receptacles used for the drop test in (a) above;

(c) The thickness of cushioning between inner receptacles and between inner receptacles and the outside of the intermediate packaging shall not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single inner receptacle was used in the original test, the thickness of cushioning between inner receptacles shall not be less than the thickness of cushioning between the outside of the intermediate packaging and the inner receptacle in the original test. When either fewer or smaller inner receptacles are used (as compared to the inner receptacles used in the drop test), sufficient additional cushioning material shall be used to take up the void;

(d) The outer packaging shall have successfully passed the stacking test in 6.1.5.6 while empty. The total mass of identical packages shall be based on the combined mass of inner receptacles used in the drop test in (a) above;

(e) For inner receptacles containing liquids, an adequate quantity of absorbent material to absorb the entire liquid content of the inner receptacles shall be present;

(f) If the outer packaging is intended to contain inner receptacles for liquids and is not leakproof, or is intended to contain inner receptacles for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage shall be provided in the form of a leakproof liner, plastics bag or other equally effective means of containment;

(g) In addition to the markings prescribed in 6.3.1.1(a) to (f), packagings shall be marked in accordance with 6.3.1.1 (g).

6.3.3 Test Report

6.3.3.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the packaging:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. A unique test report identification;
4. Date of the test report;
5. Manufacturer of the packaging;
6. 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);
7. Maximum capacity;
8. Characteristics of test contents, e.g. viscosity and relative density for liquids and particle size for solids;

9. Test descriptions and results;

10. The test report shall be signed with the name and status of the signatory.

6.3.3.2 The test report shall contain statements that the packaging prepared as 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 shall be available to the competent authority.

CHAPTER 6.4

REQUIREMENTS FOR THE CONSTRUCTION, TESTING AND APPROVAL OF PACKAGES AND MATERIAL FOR CLASS 7

6.4.1 [reserved]

6.4.2 General requirements

6.4.2.1 The package shall be so designed in relation to its mass, volume and shape that it can be easily and safely transported. In addition, the package shall be so designed that it can be properly secured in or on the conveyance during transport.

6.4.2.2 The design shall 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 Regulations would not be impaired. The design shall take account of appropriate safety factors to cover snatch lifting.

6.4.2.3 Attachments and any other features on the outer surface of the package which could be used to lift it shall be designed either to support its mass in accordance with the requirements of 6.4.2.2 or shall be removable or otherwise rendered incapable of being used during transport.

6.4.2.4 As far as practicable, the packaging shall be so designed and finished that the external surfaces are free from protruding features and can be easily decontaminated.

6.4.2.5 As far as practicable, the outer layer of the package shall be so designed as to prevent the collection and the retention of water.

6.4.2.6 Any features added to the package at the time of transport which are not part of the package shall not reduce its safety.

6.4.2.7 The package shall 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 shall be so designed as to prevent them from becoming loose or being released unintentionally, even after repeated use.

6.4.2.8 The materials of the packaging and any components or structures shall be physically and chemically compatible with each other and with the radioactive contents. Account shall be taken of their behaviour under irradiation.

6.4.2.9 All valves through which the radioactive contents could otherwise escape shall be protected against unauthorized operation.

6.4.2.10 The design of the package shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.

6.4.2.11 For radioactive material having other dangerous properties the package design shall take into account those properties; see 2.0.3.1, 2.0.3.2 and 4.1.9.1.5.

6.4.2.12 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of 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.

6.4.3 Additional requirements for packages transported by air

6.4.3.1 For packages to be transported by air, the temperature of the accessible surfaces shall not exceed 50 °C at an ambient temperature of 38 °C with no account taken for insolation.

6.4.3.2 Packages to be transported by air shall be so designed that, if they were exposed to ambient temperatures ranging from -40 °C to +55 °C, the integrity of containment would not be impaired.

6.4.3.3 Packages containing radioactive material transported by air shall have a containment system able to withstand without leakage a reduction in ambient pressure to 5 kPa.

6.4.4 Requirements for excepted packages

An excepted package shall be designed to meet the requirements specified in 6.4.2 and in addition, the requirements of 6.4.3 if carried by air.

6.4.5 Requirements for Industrial packages

6.4.5.1 Industrial packages Types 1, 2, and 3 (Types IP-1, IP-2, and IP-3) shall meet the requirements specified in 6.4.2 and 6.4.7.2, and, if appropriate, the additional requirements for packages transported by air specified in 6.4.3.

6.4.5.2 An Industrial package Type 2 (Type IP-2) shall, if it were subjected to the tests specified in 6.4.15.4 and 6.4.15.5, prevent:

(a) loss or dispersal of the radioactive contents; and

(b) loss of shielding integrity which would result in more than a 20% increase in the radiation level at any external surface of the package.

6.4.5.3 An Industrial package Type 3 (Type IP-3) shall meet all the requirements specified in 6.4.7.2 to 6.4.7.15.

6.4.5.4 *Alternative requirements for Industrial packages Types 2 and 3 (Types IP-2 and IP-3)*

6.4.5.4.1 Packages may be used as Industrial package Type 2 (Type IP-2) provided that:

(a) They satisfy the requirements of 6.4.5.1;

(b) They are designed to conform to the standards prescribed in the Chapter 6.1 or other requirements at least equivalent to those standards; and

(c) When subjected to the tests required for Packing Group I or II in Chapter 6.1, they would prevent:

(i) loss or dispersal of the radioactive contents; and

(ii) loss of shielding integrity which would result in more than a 20% increase in the radiation level at any external surface of the package.

6.4.5.4.2 Portable tanks may also be used as Industrial package Types 2 or 3 (Types IP-2 or IP-3), provided that:

(a) They satisfy the requirements of 6.4.5.1;

(b) They are designed to conform to the standards prescribed in Chapter 6.7 of these Regulations, or other requirements at least equivalent to those standards, and are capable of withstanding a test pressure of 265 kPa; and

(c) They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing a loss of shielding integrity which would result in more than a 20% increase in the radiation level at any external surface of the portable tanks.

6.4.5.4.3 Tanks, other than portable tanks, may also be used as Industrial package Types 2 or 3 (Types IP-2 or IP-3) for transporting LSA-I and LSA-II liquids and gases as prescribed in Table 4.1.9.2.4, provided that they conform to standards at least equivalent to those prescribed in 6.4.5.4.2.

6.4.5.4.4 Freight containers may also be used as Industrial package Types 2 or 3 (Types IP-2 or IP-3), provided that:

(a) The radioactive contents are restricted to solid materials;

(b) They satisfy the requirements of 6.4.5.1; and

(c) They are designed to conform to ISO 1496-1:1990: "Series 1 Freight Containers - Specifications and Testing - Part 1: General Cargo Containers" excluding dimensions and ratings. They shall be designed such that if subjected to the tests prescribed in that document and the accelerations occurring during routine conditions of transport they would prevent:

(i) loss or dispersal of the radioactive contents; and

(ii) loss of shielding integrity which would result in more than a 20% increase in the radiation level at any external surface of the freight containers.

6.4.5.4.5 Metal intermediate bulk containers may also be used as Industrial package Type 2 or 3 (Type IP-2 or IP-3) provided that:

(a) They satisfy the requirements of 6.4.5.1; and

(b) They are designed to conform to the standards and tests prescribed in Chapter 6.5 of these Regulations for Packing Group I or II, but with the drop test conducted in the most damaging orientation, they would prevent:

(i) loss or dispersal of the radioactive contents; and

(ii) loss of shielding integrity which would result in more than a 20% increase in the radiation level at any external surface of the intermediate bulk container.

6.4.6 Requirements for packages containing uranium hexafluoride

6.4.6.1 Except as allowed in 6.4.6.4, uranium hexafluoride shall be packaged and transported in accordance with the provisions of ISO 7195:1993 "Packaging of uranium hexafluoride (UF_6) for transport", and the requirements of 6.4.6.2 and 6.4.6.3. The package shall also meet the requirements prescribed elsewhere in these Regulations which pertain to the radioactive and fissile properties of the material.

6.4.6.2 Each package designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it would meet the following requirements:

(a) Withstand without leakage and without unacceptable stress, as specified in ISO 7195:1993, the structural test as specified in 6.4.21;

(b) Withstand without loss or dispersal of the uranium hexafluoride the test specified in 6.4.15.4; and

(c) Withstand without rupture of the containment system the test specified in 6.4.17.3.

6.4.6.3 Packages designed to contain 0.1 kg or more of uranium hexafluoride shall not be provided with pressure relief devices.

6.4.6.4 Subject to the approval of the competent authority, packages designed to contain 0.1 kg or more of uranium hexafluoride may be transported if:

(a) The packages are designed to requirements other than those given in ISO 7195:1993 and 6.4.6.2 and 6.4.6.3 but, notwithstanding, the requirements of 6.4.6.2 and 6.4.6.3 are met as far as practicable;

(b) The packages are designed to withstand without leakage and without unacceptable stress a test pressure less than 2.76 MPa as specified in 6.4.21; and

(c) For packages designed to contain 9000 kg or more of uranium hexafluoride, the packages do not meet the requirement of 6.4.6.2(c).

6.4.7 Requirements for Type A packages

6.4.7.1 Type A packages shall be designed to meet the general requirements of 6.4.2, the requirements of 6.4.3 if transported by air, and of 6.4.7.2 to 6.4.7.17:

6.4.7.2 The smallest overall external dimension of the package shall not be less than 10 cm.

6.4.7.3 The outside of the package shall 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.

6.4.7.4 Any tie-down attachments on the package shall be so designed that, under normal and accident conditions of transport, the forces in those attachments shall not impair the ability of the package to meet the requirements of these Regulations.

6.4.7.5 The design of the package shall take into account temperatures ranging from -40 °C to +70 °C for the components of the packaging. Attention shall be given to freezing temperatures for liquids and to the potential degradation of packaging materials within the given temperature range.

6.4.7.6 The design and manufacturing techniques shall be in accordance with national or international standards, or other requirements, acceptable to the competent authority.

6.4.7.7 The design shall 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.

6.4.7.8 Special form radioactive material may be considered as a component of the containment system.

6.4.7.9 If the containment system forms a separate unit of the package, it shall be capable of being securely closed by a positive fastening device which is independent of any other part of the packaging.

6.4.7.10 The design of any component of the containment system shall take into account, where applicable, the radiolytic decomposition of liquids and other vulnerable materials and the generation of gas by chemical reaction and radiolysis.

6.4.7.11 The containment system shall retain its radioactive contents under a reduction of ambient pressure to 60 kPa.

6.4.7.12 All valves, other than pressure relief valves, shall be provided with an enclosure to retain any leakage from the valve.

6.4.7.13 A radiation shield which encloses a component of the package specified as a part of the containment system shall be so designed 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 shall be capable of being securely closed by a positive fastening device which is independent of any other packaging structure.

6.4.7.14 A package shall be so designed that if it were subjected to the tests specified in 6.4.15, it would prevent:

(a) Loss or dispersal of the radioactive contents; and

(b) Loss of shielding integrity which would result in more than a 20% increase in the radiation level at any external surface of the package.

6.4.7.15 The design of a package intended for liquid radioactive material shall make provision for ullage to accommodate variations in the temperature of the contents, dynamic effects and filling dynamics.

Type A packages to contain liquids

6.4.7.16 A Type A package designed to contain liquids shall, in addition:

(a) Be adequate to meet the conditions specified in 6.4.7.14 above if the package is subjected to the tests specified in 6.4.16; and

(b) Either

(i) be provided with sufficient absorbent material to absorb twice the volume of the liquid contents. Such absorbent material shall 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 ensure retention of the liquid contents, within the secondary outer containment components, even if the primary inner components leak.

Type A packages to contain gas

6.4.7.17 A package designed for gases shall prevent loss or dispersal of the radioactive contents if the package were subjected to the tests specified in 6.4.16. A Type A package designed for tritium gas or for noble gases shall be excepted from this requirement.

6.4.8 Requirements for Type B(U) packages

6.4.8.1 Type B(U) packages shall be designed to meet the requirements specified in 6.4.2, the requirements of 6.4.3 if carried by air, and of 6.4.7.2 to 6.4.7.15, except as specified in 6.4.7.14 (a), and, in addition, the requirements specified in 6.4.8.2 to 6.4.8.15.

6.4.8.2 A package shall be so designed that, under the ambient conditions specified in 6.4.8.4 and 6.4.8.5 heat generated within the package by the radioactive contents shall not, under normal conditions of transport, as demonstrated by the tests in 6.4.15, 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 shall be paid to the effects of heat, which may:

(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; or

(b) Lessen the efficiency of the packaging through differential thermal expansion or cracking or melting of the radiation shielding material; or

(c) In combination with moisture, accelerate corrosion.

6.4.8.3 Except as required in 6.4.3.1 for a package transported by air, a package shall be so designed that, under the ambient condition specified in 6.4.8.4, the temperature of the accessible surfaces of a package shall not exceed 50 °C, unless the package is transported under exclusive use.

6.4.8.4 The ambient temperature shall be assumed to be 38 °C.

6.4.8.5 The solar insolation conditions shall be assumed to be as specified in Table 6.4.8.5.

Table 6.4.8.5: Insolation data

Form and location of surface	Insolation for 12 hours per day (W/m^2)
Flat surfaces transported horizontally:	
-- base	none
-- other surfaces	800
Flat surfaces not transported horizontally:	
-- each surface	200[a]
Curved surfaces	400[a]

[a] *Alternatively, a sine function may be used, with an absorption coefficient adopted and the effects of possible reflection from neighbouring objects neglected.*

6.4.8.6 A package which includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in 6.4.17.3 shall be so designed that such protection will remain effective if the package is subjected to the tests specified in 6.4.15 and 6.4.17.2 (a) and (b) or 6.4.17.2 (b) and (c), as appropriate. Any such protection on the exterior of the package shall not be rendered ineffective by ripping, cutting, skidding, abrasion or rough handling.

6.4.8.7 A package shall be so designed that, if it were subjected to:

(a) the tests specified in 6.4.15, it would restrict the loss of radioactive contents to not more than 10^{-6} A_2 per hour; and

(b) the tests specified in paras 6.4.17.1, 6.4.17.2 (b), 6.4.17.3, and 6.4.17.4 and the tests in:

(i) 6.4.17.2 (c), when the package has a mass not greater than 500 kg, an overall density not greater than 1000 kg/m^3 based on the external dimensions, and radioactive contents greater than 1000 A_2 not as special form radioactive material, or

(ii) 6.4.17.2 (a), for all other packages, it would meet the following requirements:

- retain sufficient shielding to ensure that the radiation level 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 2.7.7.2.4 to 2.7.7.2.6 shall 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 shall take into account the external contamination limits of 4.1.9.1.2.

6.4.8.8 A package for radioactive contents with activity greater than 10^5 A_2 shall be so designed that if it were subjected to the enhanced water immersion test specified in 6.4.18, there would be no rupture of the containment system.

6.4.8.9 Compliance with the permitted activity release limits shall depend neither upon filters nor upon a mechanical cooling system.

6.4.8.10 A package shall 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 6.4.15 and 6.4.17.

6.4.8.11 A package shall be so designed that if it were at the maximum normal operating pressure and it were subjected to the tests specified in 6.4.15 and 6.4.17, 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.

6.4.8.12 A package shall not have a maximum normal operating pressure in excess of a gauge pressure of 700 kPa.

6.4.8.13 Except as required in 6.4.3.1 for a package transported by air, the maximum temperature of any surface readily accessible during transport of a package shall not exceed 85 °C in the absence of insolation under the ambient conditions specified in 6.4.8.4. The package shall be carried under exclusive use, as specified in 6.4.8.3, if this maximum temperature exceeds 50 °C. 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.

6.4.8.14 A package containing low dispersible radioactive material shall be so designed that any features added to the low dispersible radioactive material that are not part of it, or any internal components of the packaging shall not adversely affect the performance of the low dispersible radioactive material.

6.4.8.15 A package shall be designed for an ambient temperature range from -40 °C to +38 °C.

6.4.9 Requirements for Type B(M) packages

6.4.9.1 Type B(M) packages shall meet the requirements for Type B(U) packages specified in 6.4.8.1, except that for packages to be transported solely within a specified country or solely between specified countries, conditions other than those given in 6.4.7.5, 6.4.8.4, 6.4.8.5, and 6.4.8.8 to 6.4.8.15 above may be assumed with the approval of the competent authorities of these countries. Notwithstanding, the requirements for Type B(U) packages specified in 6.4.8.8 to 6.4.8.15 shall be met as far as practicable.

6.4.9.2 Intermittent venting of Type B(M) packages may be permitted during transport, provided that the operational controls for venting are acceptable to the relevant competent authorities.

6.4.10 Requirements for Type C packages

6.4.10.1 Type C packages shall be designed to meet the requirements specified in 6.4.2 and 6.4.3, and of 6.4.7.2 to 6.4.7.15, except as specified in 6.4.7.14 (a), and of the requirements specified in 6.4.8.2 to 6.4.8.5, 6.4.8.9 to 6.4.8.15, and, in addition, of 6.4.10.2 to 6.4.10.4.

6.4.10.2 A package shall be capable of meeting the assessment criteria prescribed for tests in 6.4.8.7 (b) and 6.4.8.11 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 shall 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.

6.4.10.3 A package shall be so designed that, if it were at the maximum normal operating pressure and subjected to:

(a) The tests specified in 6.4.15, it would restrict the loss of radioactive contents to not more than 10^{-6} A_2 per hour; and

(b) The test sequences in 6.4.20.1, it would meet the following requirements:

(i) retain sufficient shielding to ensure that the radiation level 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 1 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 2.7.7.2.4 to 2.7.7.2.6 shall 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 shall take into account the external contamination limits of 4.1.9.1.2.

6.4.10.4 A package shall be so designed that there will be no rupture of the containment system following performance of the enhanced water immersion test specified in 6.4.18.

6.4.11 Requirements for packages containing fissile material

6.4.11.1 Fissile material shall be transported so as to;

(a) Maintain subcriticality during normal and accident conditions of transport; in particular, the following contingencies shall 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 6.4.7.2 for fissile material contained in packages;
(ii) prescribed elsewhere in these Regulations which pertain to the radioactive properties of the material; and
(iii) specified in 6.4.11.3 to 6.4.11.12, unless excepted by 6.4.11.2.

6.4.11.2 Fissile material meeting one of the provisions (a) to (d) of this paragraph is excepted from the requirement to be transported in packages that comply with 6.4.11.3 to 6.4.11.12 as well as the other requirements of these Regulations that apply to fissile material. Only one type of exception is allowed per consignment.

(a) A mass limit per consignment such that:

$$\frac{mass\,of\,uraniun\text{-}235(g)}{X} + \frac{mass\,of\,other\,fissile\,material\,(g)}{Y} < 1$$

where X and Y are the mass limits defined in Table 6.4.11.2, provided that either:

(i) each individual package contains not more than 15 g of fissile material; for unpackaged material, this quantity limitation shall apply to the consignment being carried in or on the conveyance, or
(ii) the fissile material is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5% by mass, or
(iii) there is not more than 5 g of fissile material in any 10-litre volume of material.

Neither beryllium nor deuterium shall be present in quantities exceeding 0.1% of the fissile material mass;

(b) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile material is distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement;

(c) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;

(d) Packages containing, individually, a total plutonium mass not more than 1 kg, of which not more than 20% by mass may consist of plutonium-239, plutonium-241 or any combination of those radionuclides.

Table 6.4.11.2: Consignment mass limits for exceptions from the requirements for packages containing fissile material

Fissile material	Fissile material mass (g) mixed with substances having an average hydrogen density less than or equal to water	Fissile material mass (g) mixed with substances having an average hydrogen density greater than water
Uranium-235(X)	400	290
Other fissile material (Y)	250	180

6.4.11.3 Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of 6.4.11.7 to 6.4.11.12 shall 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.

6.4.11.4 For irradiated nuclear fuel the assessments of 6.4.11.7 to 6.4.11.12 shall 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 shall be performed to confirm the conservatism of the isotopic composition.

6.4.11.5 The packaging, after being subjected to the tests specified in 6.4.15, must prevent the entry of a 10 cm cube.

6.4.11.6 The package shall 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.

6.4.11.7 For a package in isolation, it shall 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 shall include the following:

(a) Multiple high standard water barriers, each of which would remain watertight if the package were subject to the tests prescribed in 6.4.11.12 (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:

(i) packages where, following the tests prescribed in 6.4.11.12 (b), there is no physical contact between the valve and any other component of the packaging other than at its original point of attachment and where, in addition, following the test prescribed in 6.4.17.3 the valves 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.

6.4.11.8 It shall be assumed that the confinement system shall be 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 6.4.11.12 (b), close reflection of the package by at least 20 cm of water may be assumed in 6.4.11.9 (c).

6.4.11.9 The package shall be subcritical under the conditions of 6.4.11.7 and 6.4.11.8 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 6.4.11.11 (b);

(c) The tests specified in 6.4.11.12 (b).

6.4.11.10 For packages to be transported by air:

(a) The package shall be subcritical under conditions consistent with the tests prescribed in 6.4.20.1 assuming reflection by at least 20 cm of water but no water inleakage; and

(b) Allowance shall not be made for special features of 6.4.11.7 unless, following the tests specified in 6.4.20.1 and, subsequently, 6.4.19.3, leakage of water into or out of the void spaces is prevented.

6.4.11.11 A number "N" shall be derived, such that five times "N" shall be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication consistent with the following:

(a) There shall not be anything between the packages, and the package arrangement shall be reflected on all sides by at least 20 cm of water; and

(b) The state of the packages shall be their assessed or demonstrated condition if they had been subjected to the tests specified in 6.4.15.

6.4.11.12 A number "N" shall be derived, such that two times "N" shall 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 6.4.15 followed by whichever of the following is the more limiting:

(i) the tests specified in 6.4.17.2 (b) and, either 6.4.17.2 (c) for packages having a mass not greater than 500 kg and an overall density not greater than 1000 kg/m^3 based on the external dimensions, or 6.4.17.2 (a) for all other packages; followed by the test specified in 6.4.17.3 and completed by the tests specified in 6.4.19.1 to 6.4.19.3; or

(ii) the test specified in 6.4.17.4; and

(c) Where any part of the fissile material escapes from the containment system following the tests specified in 6.4.11.12 (b), it shall be assumed that fissile material escapes from each package in the array and all of the fissile material shall be arranged in the configuration and moderation that results in the maximum neutron multiplication with close reflection by at least 20 cm of water.

6.4.12 Test procedures and demonstration of compliance

6.4.12.1 Demonstration of compliance with the performance standards required in 2.7.3.3, 2.7.3.4, 2.7.4.1, 2.7.4.2, 2.7.10.1, 2.7.10.2 and 6.4.2 to 6.4.11 must be accomplished by any of the methods listed below or by a combination thereof.

(a) Performance of tests with specimens representing LSA-III material, or 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 shall simulate as closely as practicable the expected range of radioactive contents and the specimen or packaging to be tested shall 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, shall be taken into account;

(d) Calculation, or reasoned argument, when the calculation procedures and parameters are generally agreed to be reliable or conservative.

6.4.12.2 After the specimen, prototype or sample has been subjected to the tests, appropriate methods of assessment shall be used to assure that the requirements for the test procedures have been fulfilled in compliance with the performance and acceptance standards prescribed in 2.7.3.3, 2.7.3.4, 2.7.4.1, 2.7.4.2, 2.7.10.1, 2.7.10.2 and 6.4.2 to 6.4.11.

6.4.12.3 All specimens shall 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 shall be clearly specified. The external features of the specimen shall be clearly identified so that reference may be made simply and clearly to any part of such specimen.

6.4.13 Testing the integrity of the containment system and shielding and evaluating criticality safety

After each of the applicable tests specified in 6.4.15 to 6.4.21:

(a) Faults and damage shall be identified and recorded;

(b) It shall be determined whether the integrity of the containment system and shielding has been retained to the extent required in 6.4.2 to 6.4.11 for the package under test; and

(c) For packages containing fissile material, it shall be determined whether the assumptions and conditions used in the assessments required by 6.4.11.1 to 6.4.11.12 for one or more packages are valid.

6.4.14 Target for drop tests

The target for the drop tests specified in 2.7.4.5 (a), 6.4.15.4, 6.4.16 (a), 6.4.17.2, 6.4.20.2, and 6.4.20.4 shall 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.

6.4.15 Test for demonstrating ability to withstand normal conditions of transport

6.4.15.1 The tests are: the water spray test, the free drop test, the stacking test and the penetration test. Specimens of the package shall 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 6.4.15.2 are fulfilled.

6.4.15.2 The time interval between the conclusion of the water spray test and the succeeding test shall 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 shall be taken to be two hours if the water spray is applied from four directions simultaneously. No time interval shall elapse, however, if the water spray is applied from each of the four directions consecutively.

6.4.15.3 Water spray test: The specimen shall be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour.

6.4.15.4 Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested.

(a) The height of drop measured from the lowest point of the specimen to the upper surface of the target shall be not less than the distance specified in Table 6.4.15.4 for the applicable mass. The target shall be as defined in 6.4.14;

(b) For rectangular fibreboard or wood packages not exceeding a mass of 50 kg, a separate specimen shall 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 shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.

Table 6.4.15.4: Free drop distance for testing packages to normal conditions of transport

Package Mass (kg)				Free drop distance (m)
	Package mass	<	5000	1.2
5000 ≤	Package mass	<	10000	0.9
10000 ≤	Package mass	<	15000	0.6
15000 ≤	Package mass			0.3

6.4.15.5 Stacking test: Unless the shape of the packaging effectively prevents stacking, the specimen shall be subjected, for a period of 24 h, to a compressive load equal to the greater of the following:

(a) The equivalent of 5 times the mass of the actual package; and

(b) The equivalent of 13 kPa multiplied by the vertically projected area of the package.

The load shall be applied uniformly to two opposite sides of the specimen, one of which shall be the base on which the package would typically rest.

6.4.15.6 Penetration test: The specimen shall 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 shall 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 shall not be significantly deformed by the test performance;

(b) The height of drop of the bar measured from its lower end to the intended point of impact on the upper surface of the specimen shall be 1 m.

6.4.16 Additional tests for Type A packages designed for liquids and gases

A specimen or separate specimens shall 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 shall be subjected to the more severe test.

(a) Free drop test: The specimen shall 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 shall be 9 m. The target shall be as defined in 6.4.14;

(b) Penetration test: The specimen shall be subjected to the test specified in 6.4.15.6 except that the height of drop shall be increased to 1.7 m from the 1 m specified in 6.4.15.6 (b).

6.4.17 Tests for demonstrating ability to withstand accident conditions in transport

6.4.17.1 The specimen shall be subjected to the cumulative effects of the tests specified in 6.4.17.2 and 6.4.17.3, in that order. Following these tests, either this specimen or a separate specimen shall be subjected to the effect(s) of the water immersion test(s) as specified in 6.4.17.4 and, if applicable, 6.4.18.

6.4.17.2 Mechanical test: The mechanical test consists of three different drop tests. Each specimen shall be subjected to the applicable drops as specified in 6.4.8.7 or 6.4.11.12. The order in which the specimen is subjected to the drops shall be such that, on completion of the mechanical test, the specimen shall have suffered such damage as will lead to the maximum damage in the thermal test which follows.

(a) For drop I, the specimen shall 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 shall be 9 m. The target shall be as defined in 6.4.14;

(b) For drop II, the specimen shall drop so as to suffer the maximum damage onto a bar rigidly mounted perpendicularly on the target. The height of the drop measured from the intended point of impact of the specimen to the upper surface of the bar shall be 1 m. The bar shall be of solid mild steel of circular 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 shall be used. The upper end of the bar shall be flat and horizontal with its edges rounded off to a radius of not more than 6 mm. The target on which the bar is mounted shall be as described in 6.4.14;

(c) For drop III, the specimen shall 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 shall consist of a solid mild steel plate 1 m by 1 m and shall fall in a horizontal attitude. The height of the drop shall be measured from the underside of the plate to the highest point of the specimen. The target on which the specimen rests shall be as defined in 6.4.14.

6.4.17.3 Thermal test: The specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38 °C, subject to the solar insolation conditions specified in Table 6.4.8.5 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, providing due account is taken of them in the subsequent assessment of package response.

The thermal test shall 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 absorbtivity 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 6.4.8.5 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 everywhere decreasing and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, providing due account is taken of them in the subsequent assessment of package response.

During and following the test the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.

6.4.17.4 Water immersion test: The specimen shall 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 shall be considered to meet these conditions.

6.4.18 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 shall 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 shall be considered to meet these conditions.

6.4.19 Water leakage test for package containing fissile material

6.4.19.1 Packages for which water in-leakage or out-leakage to the extent which results in greatest reactivity has been assumed for purposes of assessment under 6.4.11.7 to 6.4.11.12 shall be excepted from the test.

6.4.19.2 Before the specimen is subjected to the water leakage test specified below, it shall be subjected to the tests in 6.4.17.2 (b), and either 6.4.17.2 (a) or (c) as required by 6.4.11.12, and the test specified in 6.4.17.3.

6.4.19.3 The specimen shall 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.

6.4.20 Tests for Type C packages

6.4.20.1 Specimens shall be subjected to the effects of each of the following test sequences in the orders specified:

(a) The tests specified in 6.4.17.2 (a), 6.4.17.2 (c), 6.4.20.2 and 6.4.20.3; and

(b) The test specified in 6.4.20.4.

Separate specimens are allowed to be used for each of the sequences (a) and (b).

6.4.20.2 Puncture/tearing test: The specimen shall be subjected to the damaging effects of a solid probe made of mild steel. The orientation of the probe to the surface of the specimen shall be as to cause maximum damage at the conclusion of the test sequence specified in 6.4.20.1 (a).

(a) The specimen, representing a package having a mass less than 250 kg, shall be placed on a target and subjected to a probe having a mass of 250 kg falling from a height of 3 m above the intended impact point. For this test the probe shall be a 20 cm diameter cylindrical bar with the striking end forming a frustum of a right circular cone with the following dimensions: 30 cm height and 2.5 cm in diameter at the top. The target on which the specimen is placed shall be as specified in 6.4.14;

(b) For packages having a mass of 250 kg or more, the base of the probe shall 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 shall be 3 m. For this test the probe shall have the same properties and dimensions as specified in (a) above, except that the length and mass of the probe shall be such as to incur maximum damage to the specimen. The target on which the base of the probe is placed shall be as specified in 6.4.14.

6.4.20.3 Enhanced thermal test: The conditions for this test shall be as specified in 6.4.17.3, except that the exposure to the thermal environment shall be for a period of 60 minutes.

6.4.20.4 Impact test: The specimen shall 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 shall be as defined in 6.4.14.

6.4.21 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 shall be tested hydraulically at an internal pressure of at least 1.4 MPa but, when the test pressure is less than 2.8 MPa, the design shall require multilateral approval. For retesting packagings, any other equivalent non-destructive testing may be applied subject to multilateral approval.

6.4.22 Approvals of package designs and materials

6.4.22.1 The approval of designs for packages containing 0.1 kg or more of uranium hexafluoride requires that:

(a) After 31 December 2000, each design that meets the requirements of 6.4.6.4 shall require multilateral approval;

(b) After 31 December 2003, each design that meets the requirements of 6.4.6.1 to 6.4.6.3 shall require unilateral approval by the competent authority of the country of origin of the design;

6.4.22.2 Each Type B(U) and Type C package design shall require unilateral approval, except that:

(a) A package design for fissile material, which is also subject to 6.4.22.4, 6.4.23.7, and 5.1.5.3.1 shall require multilateral approval; and

(b) A Type B(U) package design for low dispersible radioactive material shall require multilateral approval.

6.4.22.3 Each Type B(M) package design, including those for fissile material which are also subject to 6.4.22.4, 6.4.23.7, and 5.1.5.3.1 and those for low dispersible radioactive material, shall require multilateral approval.

6.4.22.4 Each package design for fissile material which is not excepted according to 6.4.11.2 from the requirements that apply specifically to packages containing fissile material shall require multilateral approval.

6.4.22.5 The design for special form radioactive material shall require unilateral approval. The design for low dispersible radioactive material shall require multilateral approval (see also 6.4.23.8).

6.4.23 Applications and approvals for radioactive material transport

6.4.23.1 ***[reserved]***

6.4.23.2 An application for shipment approval shall include:

(a) The period of time, related to the shipment, for which the approval is sought;

(b) The actual radioactive contents, the expected modes of transport, the type of conveyance, and the probable or proposed route; and

(c) The details of how the precautions and administrative or operational controls, referred to in the package design approval certificates issued under 5.1.5.3.1, are to be put into effect.

6.4.23.3 An application for approval of shipments under special arrangement shall include all the information necessary to satisfy the competent authority that the overall level of safety in transport is at least equivalent to that which would be provided if all the applicable requirements of these Regulations had been met.

The application shall also include:

(a) A statement of the respects in which, and of the reasons why, the consignment cannot be made in full accordance with the applicable requirements; and

(b) A statement of any special precautions or special administrative or operational controls which are to be employed during transport to compensate for the failure to meet the applicable requirements.

6.4.23.4 An application for approval of Type B(u) or Type C package design shall include:

(a) A detailed description of the proposed radioactive contents with reference to their physical and chemical states and the nature of the radiation emitted;

(b) A detailed statement of the design, including complete engineering drawings and schedules of materials and methods of manufacture;

(c) A statement of the tests which have been done and their results, or evidence based on calculative methods or other evidence that the design is adequate to meet the applicable requirements;

(d) The proposed operating and maintenance instructions for the use of the packaging;

(e) If the package is designed to have a maximum normal operating pressure in excess of 100 kPa gauge, a specification of the materials of manufacture of the containment system, the samples to be taken, and the tests to be made;

(f) Where the proposed radioactive contents are irradiated fuel, a statement and a justification of any assumption in the safety analysis relating to the characteristics of the fuel and a description of any pre-shipment measurement as required by 6.4.11.4 (b);

(g) Any special stowage provisions necessary to ensure the safe dissipation of heat from the package considering the various modes of transport to be used and type of conveyance or freight container;

(h) A reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the package; and

(i) A specification of the applicable quality assurance programme as required by 1.1.2.3.1.

6.4.23.5 An application for approval of a Type B(M) package design shall include, in addition to the general information required for package approval in 6.4.23.4 for Type B(U) packages:

(a) A list of the requirements specified in 6.4.7.5, 6.4.8.4, 6.4.8.5 and 6.4.8.8-6.4.8.15 with which the package does not conform;

(b) Any proposed supplementary operational controls to be applied during transport not regularly provided for in these Regulations, but which are necessary to ensure the safety of the package or to compensate for the deficiencies listed in (a) above;

(c) A statement relative to any restrictions on the mode of transport and to any special loading, carriage, unloading or handling procedures; and

(d) The range of ambient conditions (temperature, solar radiation) which are expected to be encountered during transport and which have been taken into account in the design.

6.4.23.6 The application for approval of designs for packages containing 0.1 kg or more of uranium hexafluoride shall include all information necessary to satisfy the competent authority that the design meets the applicable requirements 6.4.6.1, and a specification of the applicable quality assurance programme as required in 1.1.2.3.1.

6.4.23.7 An application for a fissile package approval shall include all information necessary to satisfy the competent authority that the design meets the applicable requirements of 6.4.11.1, and a specification of the applicable quality assurance programme as required by 1.1.2.3.1.

6.4.23.8 An application for approval of design for special form radioactive material and design for low dispersible radioactive material shall include:

(a) A detailed description of the radioactive material or, if a capsule, the contents; particular reference shall be made to both physical and chemical states;

(b) A detailed statement of the design of any capsule to be used;

(c) A statement of the tests which have been done and their results, or evidence based on calculative methods to show that the radioactive material is capable of meeting the performance standards, or other evidence that the special form radioactive material or low dispersible radioactive material meets the applicable requirements of these Regulations;

(d) A specification of the applicable quality assurance programme as required in 1.1.2.3.1; and

(e) Any proposed pre-shipment actions for use in the consignment of special form radioactive material or low dispersible radioactive material.

6.4.23.9 Each approval certificate issued by a competent authority shall be assigned an identification mark. The mark shall be of the following generalized type:

VRI/Number/Type Code

(a) Except as provided in 6.4.23.10 (b), VRI represents the international vehicle registration identification code of the country issuing the certificate[1];

(b) The number shall be assigned by the competent authority, and shall be unique and specific with regard to the particular design or shipment. The shipment approval identification mark shall be clearly related to the design approval identification mark;

[1] *See Vienna Convention on Road Traffic (1968).*

(c) The following type codes shall be used in the order listed to indicate the types of approval certificates issued:

AF	Type A package design for fissile material
B(U)	Type B(U) package design (B(U)F if for fissile material)
B(M)	Type B(M) package design (B(M)F if for fissile material)
C	Type C package design (CF if for fissile material)
IF	Industrial package design for fissile material
S	Special form radioactive material
LD	Low dispersible radioactive material
T	Shipment
X	Special arrangement

In the case of package designs for non-fissile or fissile excepted uranium hexafluoride, where none of the above codes apply, then the following type codes shall be used:

H(U)	Unilateral approval
H(M)	Multilateral approval;

(d) For package design and special form radioactive material approval certificates, other than those issued under transitional packaging the provisions of 6.24.2-6.24.4, and for low dispersible radioactive material approval certificates, the symbols "-96" shall be added to the type code.

6.4.23.10 These type codes shall be applied as follows:

(a) Each certificate and each package shall bear the appropriate identification mark, comprising the symbols prescribed in 6.4.23.9 (a), (b), (c) and (d) above, except that, for packages, only the applicable design type codes including, if applicable, the symbols "-96", shall appear following the second stroke, that is, the "T" or "X" shall not appear in the identification marking on the package. Where the design approval and shipment approval are combined, the applicable type codes do not need to be repeated. For example:

A/132/B(M)F-96:	A Type B(M) package design approved for fissile material, requiring multilateral approval, for which the competent authority of Austria has assigned the design number 132 (to be marked on both the package and on the package design approval certificate);
A/132/B(M)F-96T:	The shipment approval issued for a package bearing the identification mark elaborated above (to be marked on the certificate only);
A/137/X:	A special arrangement approval issued by the competent authority of Austria, to which the number 137 has been assigned (to be marked on the certificate only);
A/139/IF-96:	An Industrial package design for fissile material approved by the competent authority of Austria, to which package design number 139 has been assigned (to be marked on both the package and on the package design approval certificate); and
A/145/H(U)-96:	A package design for fissile excepted uranium hexafluoride approved by the competent authority of Austria, to which package design number 145 has been assigned (to be marked on both the package and on the package design approval certificate);

(b) Where multilateral approval is effected by validation according to 6.4.23.16, only the identification mark issued by the country of origin of the design or shipment shall be used. Where multilateral approval is effected by issue of certificates by successive countries, each certificate shall bear the appropriate identification mark and the package whose design was so approved shall bear all appropriate identification marks.

For example:

A/132/B(M)F-96
CH/28/B(M)F-96

would be the identification mark of a package which was originally approved by Austria and was subsequently approved, by separate certificate, by Switzerland. Additional identification marks would be tabulated in a similar manner on the package;

(c) The revision of a certificate shall be indicated by a parenthetical expression following the identification mark on the certificate. For example, A/132/B(M)F-96(Rev.2) would indicate revision 2 of the Austrian package design approval certificate; or A/132/B(M)F-96(Rev.0) would indicate the original issuance of the Austrian package design approval certificate. For original issuances, the parenthetical entry is optional and other words such as 'original issuance' may also be used in place of 'Rev.0'. Certificate revision numbers may only be issued by the country issuing the original approval certificate;

(d) Additional symbols (as may be necessitated by national requirements) may be added in brackets to the end of the identification mark; for example, A/132/B(M)F to 96(SP503);

(e) It is not necessary to alter the identification mark on the packaging each time that a revision to the design certificate is made. Such re-marking shall be required only in those cases where the revision to the package design certificate involves a change in the letter type codes for the package design following the second stroke.

6.4.23.11 Each approval certificate issued by a competent authority for special form radioactive material or low dispersible radioactive material shall include the following information:

(a) Type of certificate;

(b) The competent authority identification mark;

(c) The issue date and an expiry date;

(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the special form radioactive material or low dispersible radioactive material is approved;

(e) The identification of the special form radioactive material or low dispersible radioactive material;

(f) A description of the special form radioactive material or low dispersible radioactive material;

(g) Design specifications for the special form radioactive material or low dispersible radioactive material which may include references to drawings;

(h) A specification of the radioactive contents which includes the activities involved and which may include the physical and chemical form;

(i) A specification of the applicable quality assurance programme as required in 1.1.2.3.1;

(j) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;

(k) If deemed appropriate by the competent authority, reference to the identity of the applicant;

(l) Signature and identification of the certifying official.

6.4.23.12 Each approval certificate issued by a competent authority for a special arrangement shall include the following information:

(a) Type of certificate;

(b) The competent authority identification mark;

(c) The issue date and an expiry date;

(d) Mode(s) of transport;

(e) Any restrictions on the modes of transport, type of conveyance, freight container, and any necessary routing instructions;

(f) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the special arrangement is approved;

(g) The following statement:

"This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.";

(h) References to certificates for alternative radioactive contents, other competent authority validation, or additional technical data or information, as deemed appropriate by the competent authority;

(i) Description of the packaging by a reference to the drawings or a specification of the design. If deemed appropriate by the competent authority, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the package shall also be provided, accompanied by a brief description of the packaging, including materials of manufacture, gross mass, general outside dimensions and appearance;

(j) A specification of the authorized radioactive contents, including any restrictions on the radioactive contents which might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for fissile material), and whether special form radioactive material or low dispersible radioactive material, if applicable;

(k) Additionally, for packages containing fissile material:

(i) a detailed description of the authorized radioactive contents;

(ii) the value of the criticality safety index;

(iii) reference to the documentation that demonstrates the criticality safety of the contents;

(iv) any special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;

(v) any allowance (based on 6.4.11.4 (b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and

(vi) the ambient temperature range for which the special arrangement has been approved;

(l) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat;

(m) If deemed appropriate by the competent authority, reasons for the special arrangement;

(n) Description of the compensatory measures to be applied as a result of the shipment being under special arrangement;

(o) Reference to information provided by the applicant relating to the use of the packaging or specific actions to be taken prior to the shipment;

(p) A statement regarding the ambient conditions assumed for purposes of design if these are not in accordance with those specified in 6.4.8.4, 6.4.8.5, and 6.4.8.15, as applicable;

(q) Any emergency arrangements deemed necessary by the competent authority;

(r) A specification of the applicable quality assurance programme as required in 1.1.2.3.1;

(s) If deemed appropriate by the competent authority, reference to the identity of the applicant and to the identity of the carrier;

(t) Signature and identification of the certifying official.

6.4.23.13 Each approval certificate for a shipment issued by a competent authority shall include the following information:

(a) Type of certificate;

(b) The competent authority identification mark(s);

(c) The issue date and an expiry date;

(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the shipment is approved;

(e) Any restrictions on the modes of transport, type of conveyance, freight container, and any necessary routeing instructions;

(f) The following statement:

"This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.";

(g) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat or maintenance of criticality safety;

(h) Reference to information provided by the applicant relating to specific actions to be taken prior to the shipment;

(i) Reference to the applicable design approval certificate(s);

(j) A specification of the actual radioactive contents, including any restrictions on the radioactive contents which might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), amounts in grams (for fissile material), and whether special form radioactive material or low dispersible radioactive material, if applicable;

(k) Any emergency arrangements deemed necessary by the competent authority;

(l) A specification of the applicable quality assurance programme as required in 1.1.2.3.1;

(m) If deemed appropriate by the competent authority, reference to the identity of the applicant;

(n) Signature and identification of the certifying official.

6.4.23.14 Each approval certificate of the design of a package issued by a competent authority shall include the following information:

(a) Type of certificate;

(b) The competent authority identification mark;

(c) The issue date and an expiry date;

(d) Any restriction on the modes of transport, if appropriate;

(e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the design is approved;

(f) The following statement:

"This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.";

(g) References to certificates for alternative radioactive contents, other competent authority validation, or additional technical data or information, as deemed appropriate by the competent authority;

(h) A statement authorizing shipment where shipment approval is required under 5.1.5.2.2, if deemed appropriate;

(i) Identification of the packaging;

(j) Description of the packaging by a reference to the drawings or specification of the design. If deemed appropriate by the competent authority, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the package should also be provided, accompanied by a brief description of the packaging, including materials of manufacture, gross mass, general outside dimensions and appearance;

(k) Specification of the design by reference to the drawings;

(l) A specification of the authorized radioactive content, including any restrictions on the radioactive contents which might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for fissile material), and whether special form radioactive material or low dispersible radioactive material, if applicable;

(m) Additionally, for packages containing fissile material:

(i) a detailed description of the authorized radioactive contents;

(ii) the value of the criticality safety index;

(iii) reference to the documentation that demonstrates the criticality safety of the contents;

(iv) any special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;

(v) any allowance (based on 6.4.11.4 (b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and

(vi) the ambient temperature range for which the package design has been approved;

(n) For Type B(M) packages, a statement specifying those prescriptions of 6.4.7.5, 6.4.8.4, 6.4.8.5 and 6.4.8.8 to 6.4.8.15 with which the package does not conform and any amplifying information which may be useful to other competent authorities;

(o) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat;

(p) Reference to information provided by the applicant relating to the use of the packaging or specific actions to be taken prior to shipment;

(q) A statement regarding the ambient conditions assumed for purposes of design if these are not in accordance with those specified in 6.4.8.4, 6.4.8.5 and 6.4.8.15, as applicable;

(r) A specification of the applicable quality assurance programme as required in 1.1.2.3.1;

(s) Any emergency arrangements deemed necessary by the competent authority;

(t) If deemed appropriate by the competent authority, reference to the identity of the applicant;

(u) Signature and identification of the certifying official.

6.4.23.15 The competent authority shall be informed of the serial number of each packaging manufactured to a design approved by them. The competent authority shall maintain a register of such serial numbers.

6.4.23.16 Multilateral approval may be by validation of the original certificate issued by the competent authority of the country of origin of the design or shipment. Such validation may take the form of an endorsement on the original certificate or the issuance of a separate endorsement, annex, supplement, etc., by the competent authority of the country through or into which the shipment is made.

6.4.24 Transitional measures for Class 7

Packages not requiring competent authority approval of design under the 1985 and 1985 (as amended 1990) editions of IAEA Safety Series No. 6

6.4.24.1 Excepted packages, Industrial packages Type IP-1, Type IP-2 and Type IP-3 and Type A packages that did not require approval of design by the competent authority and which meet the requirements of the 1985 or 1985 (As Amended 1990) Editions of IAEA Regulations for the Safe Transport of Radioactive Material (IAEA Safety Series No. 6) may continue to be used subject to the mandatory programme of quality assurance in accordance with the requirements of 1.1.2.3.1 and the activity limits and material restrictions of 2.7.7.

Any packaging modified, unless to improve safety, or manufactured after 31 December 2003, shall meet the requirements of these Regulations in full. Packages prepared for transport not later than 31 December 2003 under the 1985 or 1985 (As amended 1990) Editions of IAEA Safety Series No. 6 may continue in transport. Packages prepared for transport after this date shall meet the requirements of these Regulations in full.

Packages approved under the 1973, 1973 (as amended), 1985 and 1985 (as amended 1990) editions of IAEA Safety Series No. 6

6.4.24.2 Packagings manufactured to a package design approved by the competent authority under the provisions of the 1973 or 1973 (As Amended) Editions of IAEA Safety Series No. 6 may continue to be used, subject to: multilateral approval of package design, the mandatory programme of quality assurance in accordance with the applicable requirements of 1.1.2.3.1; the activity limits and material restrictions of 2.7.7; and, for a package containing fissile material and transported by air, the requirement of 6.4.11.10. No new manufacture of such packaging shall be permitted to commence. Changes in the design of the packaging or in the nature or quantity of the authorized radioactive contents which, as determined by the competent authority, would significantly affect safety shall require that the requirements of these Regulations be met in full. A serial number according to the provision of 5.2.1.5.5 shall be assigned to and marked on the outside of each packaging.

6.4.24.3 Packagings manufactured to a package design approved by the competent authority under the provisions of the 1985 or 1985 (As Amended 1990) Editions of IAEA Safety Series No. 6 may continue to be used until 31 December 2003, subject to: the mandatory programme of quality assurance in accordance with the requirements of 1.1.2.3.1; the activity limits and material restrictions of 2.7.7; and, for a package containing fissile material and transported by air, the requirement of 6.4.11.10. After this date use may continue subject, additionally, to multilateral approval of package design. Changes in the design of the packaging or in the nature or quantity of the authorized radioactive contents which, as determined by the competent authority, would significantly affect safety shall require that the requirements of these Regulations be met in full. All packagings for which manufacture begins after 31 December 2006 shall meet the requirements of these Regulations in full.

Special form radioactive material approved under the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) Editions of these Regulations editions of IAEA Safety Series No. 6

6.4.24.4 Special form radioactive material manufactured to a design which had received unilateral approval by the competent authority under the 1973, 1973 (As Amended), 1985 or 1985 (As Amended 1990) Editions of IAEA Safety Series No. 6 may continue to be used when in compliance with the mandatory programme of quality assurance in accordance with the applicable requirements of 1.1.2.3.1. All special form radioactive material manufactured after 31 December 2003 shall meet the requirements of these Regulations in full.

CHAPTER 6.5

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF INTERMEDIATE BULK CONTAINERS

6.5.1 General requirements applicable to all types of IBCs

6.5.1.1 *Scope*

6.5.1.1.1 The requirements of this Chapter apply to IBCs intended for the transport of certain dangerous goods. The provisions set out general requirements for multimodal transport and do not establish special requirements that may be required for a particular mode.

6.5.1.1.2 Exceptionally, IBCs and their service equipment not conforming strictly to the requirements herein, but having acceptable alternatives, may be considered by the competent authority for approval. In addition, in order to take into account progress in science and technology, the use of alternative arrangements which offer at least equivalent safety in use in respect of compatibility with the properties of the substances carried and equivalent or superior resistance to impact, loading and fire, may be considered by the competent authority.

6.5.1.1.3 The construction, equipment, testing, marking and operation of IBCs shall be subject to acceptance by the competent authority of the country in which the IBCs are approved.

6.5.1.1.4 Manufacturers and subsequent distributors of IBCs shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that IBCs as presented for transport are capable of passing the applicable performance tests of this Chapter.

6.5.1.2 *Definitions*

Body (for all categories of IBCs other than composite IBCs) means the receptacle proper, including openings and their closures, but does not include service equipment;

Handling device (for flexible IBCs) means any sling, loop, eye or frame attached to the body of the IBC or formed from a continuation of the IBC body material;

Maximum permissible gross mass means the mass of the IBC and any service or structural equipment together with the maximum net mass;

Plastics, when used in connection with inner receptacles for composite IBCs, is taken to include other polymeric materials such as rubber, etc.;

Protected (for metal IBCs) means being provided with additional protection against impact, the protection taking the form of, for example, a multi-layer (sandwich) or double wall construction or a frame with a metal lattice-work casing;

Service equipment means filling and discharge devices and, according to the category of IBC, pressure-relief or venting, safety, heating and heat-insulating devices and measuring instruments;

Structural equipment (for all categories of IBCs other than flexible IBCs) means the reinforcing, fastening, handling, protective or stabilizing members of the body, including the base pallet for composite IBCs with plastics inner receptacle, fibreboard and wooden IBCs;

Woven plastics (for flexible IBCs) means a material made from stretched tapes or monofilaments of a suitable plastics material.

6.5.1.3 *Categories of IBCs*

6.5.1.3.1 *Metal IBCs* consist of a metal body together with appropriate service and structural equipment.

6.5.1.3.2 *Flexible IBCs* consist of a body constituted of film, woven fabric or any other flexible material or combinations thereof, and if necessary an inner coating or liner, together with any appropriate service equipment and handling devices.

6.5.1.3.3 *Rigid plastics IBCs* consist of a rigid plastics body, which may have structural equipment together with appropriate service equipment.

6.5.1.3.4 *Composite IBCs* consist of structural equipment in the form of a rigid outer casing enclosing a plastics inner receptacle together with any service or other structural equipment. They are so constructed that the inner receptacle and outer casing once assembled, form and are used as, an integrated single unit to be filled, stored, transported or emptied as such.

6.5.1.3.5 *Fibreboard IBCs* consist of a fibreboard body with or without separate top and bottom caps, if necessary an inner liner (but no inner packagings), appropriate service and structural equipment.

6.5.1.3.6 *Wooden IBCs* consist of a rigid or collapsible wooden body together with an inner liner (but no inner packagings) and appropriate service and structural equipment.

6.5.1.4 *Designatory code system for IBCs*

6.5.1.4.1 The code shall consist of two Arabic numerals as specified in (a); followed by a capital letter(s) specified in (b); followed, when specified in an individual section, by an Arabic numeral indicating the category of IBC.

(a)

Type	For solids filled or discharged		For liquids
	by gravity	under pressure of more than 10 kPa (0.1 bar)	
Rigid	11	21	31
Flexible	13	-	-

(b)
A. Steel (all types and surface treatments)
B. Aluminium
C. Natural wood
D. Plywood
F. Reconstituted wood
G. Fibreboard
H. Plastics material
L. Textile
M. Paper, multiwall
N. Metal (other than steel or aluminium).

6.5.1.4.2 For composite IBCs, two capital letters in Latin characters shall be used in sequence in the second position of the code. The first shall indicate the material of the inner receptacle of the IBC and the second that of the outer packaging of the IBC.

6.5.1.4.3 The following types and codes of IBC are assigned:

Material	Category	Code	Paragraph
Metal			
A. Steel	for solids, filled or discharged by gravity	11A	6.5.3.1
	for solids, filled or discharged under pressure	21A	
	for liquids	31A	
B. Aluminium	for solids, filled or discharged by gravity	11B	
	for solids, filled or discharged under pressure	21B	
	for liquids	31B	
N. Other than steel or aluminium	for solids, filled or discharged by gravity	11N	
	for solids, filled or discharged under pressure	21N	
	for liquids	31N	
Flexible			
H. Plastics	woven plastics without coating or liner	13H1	6.5.3.2
	woven plastics, coated	13H2	
	woven plastics with liner	13H3	
	woven plastics, coated and with liner	13H4	
	plastics film	13H5	
L. Textile	without coating or liner	13L1	
	coated	13L2	
	with liner	13L3	
	coated and with liner	13L4	
M. Paper	multiwall	13M1	
	multiwall, water resistant	13M2	
H. Rigid Plastics	for solids, filled or discharged by gravity, fitted with structural equipment	11H1	6.5.3.3
	for solids, filled or discharged by gravity, freestanding	11H2	
	for solids, filled or discharged under pressure, fitted with structural equipment	21H1	
	for solids, filled or discharged under pressure, freestanding	21H2	
	for liquids, fitted with structural equipment	31H1	
	for liquids, freestanding	31H2	
HZ. Composite with plastic inner receptacle*	for solids, filled or discharged by gravity, with rigid plastics receptacle	11HZ1	6.5.3.4
	for solids, filled or discharged by gravity, with flexible plastics receptacle	11HZ2	
	for solids, filled or discharged under pressure, with rigid plastics receptacle	21HZ1	
	for solids, filled or discharged under pressure, with flexible plastics receptacle	21HZ2	
	for liquids, with rigid plastics receptacle	31HZ1	
	for liquids, with flexible plastics receptacle	31HZ2	
G. Fibreboard	for solids, filled or discharged by gravity	11G	6.5.3.5
Wooden			
C. Natural wood	for solids, filled or discharged by gravity with inner liner	11C	6.5.3.6
D. Plywood	for solids, filled or discharged by gravity, with inner liner	11D	
F. Reconstituted wood	for solids, filled or discharged by gravity, with inner liner	11F	

* *The code shall be completed by replacing the letter Z with a capital letter in accordance with 6.5.1.4.1 (b) to indicate the nature of the material used for the outer casing.*

6.5.1.4.4 The letter "W" may follow the IBC code. The letter "W" signifies that the IBC, although of the same type indicated by the code, is manufactured to a specification different from those in section 6.5.3 and is considered equivalent in accordance with the requirements in 6.5.1.1.2.

6.5.1.5 ***Construction requirements***

6.5.1.5.1 IBCs shall be resistant to or adequately protected from deterioration due to the external environment.

6.5.1.5.2 IBCs shall be so constructed and closed that none of the contents can escape under normal conditions of transport including the effect of vibration, or by changes in temperature, humidity or pressure.

6.5.1.5.3 IBCs and their closures shall be constructed of materials compatible with their contents, or be protected internally, so that they are not liable:

(a) To be attacked by the contents so as to make their use dangerous;

(b) To cause the contents to react or decompose, or form harmful or dangerous compounds with the IBCs.

6.5.1.5.4 Gaskets, where used, shall be made of materials not subject to attack by the contents of the IBCs.

6.5.1.5.5 All service equipment shall be so positioned or protected as to minimize the risk of escape of the contents owing to damage during handling and transport.

6.5.1.5.6 IBCs, their attachments and their service and structural equipment shall be designed to withstand, without loss of contents, the internal pressure of the contents and the stresses of normal handling and transport. IBCs intended for stacking shall be designed for stacking. Any lifting or securing features of IBCs shall be of sufficient strength to withstand the normal conditions of handling and transport without gross distortion or failure and shall be so positioned that no undue stress is caused in any part of the IBC.

6.5.1.5.7 Where an IBC consists of a body within a framework it shall be so constructed that:

(a) The body does not chafe or rub against the framework so as to cause material damage to the body;

(b) The body is retained within the framework at all times;

(c) The items of equipment are fixed in such a way that they cannot be damaged if the connections between body and frame allow relative expansion or movement.

6.5.1.5.8 Where a bottom discharge valve is fitted, it shall be capable of being made secure in the closed position and the whole discharge system shall be suitably protected from damage. Valves having lever closures shall be able to be secured against accidental opening and the open or closed position shall be readily apparent. For IBCs containing liquids, a secondary means of sealing the discharge aperture shall also be provided, e.g. by a blank flange or equivalent device.

6.5.1.5.9 Each IBC shall be capable of passing the relevant performance tests.

6.5.1.6 ***Testing, certification and inspection***

6.5.1.6.1 *Quality assurance*: the IBCs shall be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured IBC meets the requirements of this Chapter.

6.5.1.6.2 *Test requirements*: IBCs shall be subject to design type tests and, if applicable, to initial and periodic tests in accordance with 6.5.4.14.

6.5.1.6.3 *Certification*: in respect of each design type of IBC a certificate and mark (as in 6.5.2) shall be issued attesting that the design type including its equipment meets the test requirements.

6.5.1.6.4 *Inspection*: every metal, rigid plastics and composite IBCs shall be inspected to the satisfaction of the competent authority:

(a) Before it is put into service, and thereafter at intervals not exceeding five years, with regard to:

(i) conformity to design type including marking;
(ii) internal and external condition;
(iii) proper functioning of service equipment;

Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC;

(b) At intervals of not more than two and a half years, with regard to:

(i) external condition;
(ii) proper functioning of service equipment;

Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC.

A report of each inspection shall be kept by the owner of the IBC at least until the next inspection. The report shall include the results of the inspection and shall identify the party performing the inspection (see also the marking requirements in 6.5.2.2.1).

6.5.1.6.5 When an IBC is impaired as a result of impact (e.g. accident) or any other cause, it shall be repaired or otherwise maintained (see definition of *"Routine maintenance of IBCs"* in 1.2.1), so as to conform to the design type. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs that are impaired shall be replaced.

6.5.1.6.6 *Repaired IBCs*

6.5.1.6.6.1 In addition to any other testing and inspection requirements in these Regulations, an IBC shall be subjected to the full testing and inspection requirements set out in 6.5.4.14.3 and 6.5.1.6.4 (a), and the required reports shall be prepared, whenever it is repaired.

6.5.1.6.6.2 The Party performing the tests and inspections after the repair shall durably marking the IBC near the manufacturer's UN design type marking to show:

(a) the State in which the repair was carried out;

(b) the name or authorized symbol of the party performing the repair; and

(c) the date (month and year) of the tests and inspections.

6.5.1.6.6.3 Test and inspections performed in accordance with 6.5.1.6.6.1 may be considered to satisfy the requirements for the two and a half and five-year periodic tests and inspections.

6.5.1.6.7 The competent authority may at any time require proof, by tests in accordance with this Chapter, that IBCs meet the requirements of the design type tests.

6.5.2 Marking

6.5.2.1 ***Primary marking***

6.5.2.1.1 Each IBC manufactured and intended for use according to these Regulations shall bear markings which are durable, legible and placed in a location so as to be readily visible. Letters, numerals and symbols shall be at least 12 mm high and shall show:

(a) The United Nations packaging symbol: 

For metal IBCs on which the marking is stamped or embossed, the capital letters 'UN' may be applied instead of the symbol;

(b) The code designating the type of IBC according to 6.5.1.4;

(c) A capital letter designating the packing group(s) for which the design type has been approved:

(i) X for Packing groups I, II and III (IBCs for solids only);
(ii) Y for Packing groups II and III;
(iii) 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 for motor vehicles in international traffic;

(f) The name or symbol of the manufacturer and other identification of the IBC as specified by the competent authority;

(g) The stacking test load in kg. For IBCs not designed for stacking, the figure "0" shall be shown;

(h) The maximum permissible gross mass in kg.

Marking shall be applied in the sequence shown in (a) to (h); each element of the marking required in these subparagraphs and when appropriate, 6.5.2.2, shall be clearly separated, e.g. by a slash or space and presented in a way that ensures that all of the parts of the mark may be easily identified.

Examples of markings for various types of IBC in accordance with (a) to (h) above:

11A/Y/02 89
NL/Mulder 007
5500/1500

For a metal IBC for solids discharged for instance by gravity and made from steel/for Packing Groups II and III/ manufactured in February 1989/authorized by the Netherlands/manufactured by Mulder and of a design type to which the competent authority has allocated serial number 007/the stacking test load in kg/the maximum permissible gross mass in kg.

13H3/Z/03 89
F/Meunier 1713
0/1500

For a flexible IBC for solids discharged for instance by gravity and made from woven plastics with a liner/not designed to be stacked.

31H1/Y/04 89
GB/9099
10800/1200

For a rigid plastics IBC for liquids made from plastics with structural equipment withstanding the stack load.

31HA1/Y/05 19
D/Muller 1683
10800/1200

For a composite IBC for liquids with a rigid plastics inner receptacle and a steel outer casing.

11C/X/01 93
S/Aurigny 9876
3000/910

For a wooden IBC for solids with an inner liner and authorized for Packing Group I solids.

6.5.2.2 ***Additional marking***

6.5.2.2.1 Each IBC shall bear the markings required in 6.5.2.1 and, in addition, the following information which may appear on a corrosion-resistant plate permanently attached in a place readily accessible for inspection:

Additional marking	**Category of IBC**				
	Metal	Rigid Plastics	Composite	Fibreboard	Wooden
Capacity in litres* at 20 °C	X	X	X		
Tare mass in kg*	X	X	X	X	X
Test (gauge) pressure, in kPa or bar*, if applicable		X	X		
Maximum filling/discharge pressure in kPa or bar*, if applicable	X	X	X		
Body material and its minimum thickness in mm	X				
Date of last leakproofness test, if applicable (month and year)	X	X	X		
Date of last inspection (month and year)	X	X	X		
Serial number of the manufacturer	X				

* *The unit used shall be indicated.*

6.5.2.2.2 In addition to the markings required in 6.5.2.1, flexible IBCs may bear a pictogram indicating recommended lifting methods.

6.5.2.2.3 The inner receptacle of composite IBCs shall be marked with at least the following information:

(a) The name or symbol of the manufacturer and other identification of the IBC as specified by the competent authority as in 6.5.2.1.1 (f);

(b) The date of manufacture, as in 6.5.2.1.1 (d);

(c) The distinguishing sign of the State authorizing the allocation of the mark, as in 6.5.2.1.1 (e).

6.5.2.2.4 Where a composite IBC is designed in such a manner that the outer casing is intended to be dismantled for transport when empty (such as for return of the IBC for reuse to the original consignor), each of the parts intended to be detached when so dismantled shall be marked with the month and year of manufacture and the name or symbol of the manufacturer and other identification of the IBC as specified by the competent authority (6.5.2.1.1(f)).

6.5.2.3 Conformity to design type. The marking indicates that IBCs correspond to a successfully tested design type and that the requirements referred to in the certificate have been met.

6.5.3 *Specific requirements for IBCs*

6.5.3.1 *Specific requirements for metal IBCs*

6.5.3.1.1 These requirements apply to metal IBCs intended for the transport of solids and liquids. There are three categories of metal IBCs:

(a) Those for solids which are filled or discharged by gravity (11A, 11B, 11N);

(b) Those for solids which are filled or discharged at a gauge pressure greater than 10 kPa (0.1 bar) (21A, 21B, 21N); and

(c) Those for liquids (31A, 31B, 31N).

6.5.3.1.2 Bodies shall be made of suitable ductile metal in which the weldability has been fully demonstrated. Welds shall be skilfully made and afford complete safety. Low-temperature performance shall be taken into account when appropriate.

6.5.3.1.3 Care shall be taken to avoid damage by galvanic action due to the juxtaposition of dissimilar metals.

6.5.3.1.4 Aluminium IBCs intended for the carriage of flammable liquids shall have no movable parts, such as covers, closures, etc., made of unprotected steel liable to rust, which might cause a dangerous reaction by coming into frictional or percussive contact with the aluminium.

6.5.3.1.5 Metal IBCs shall be made of metals which meet the following requirements:

(a) For steel the elongation at fracture, in %, shall not be less than $\frac{10000}{Rm}$ with an absolute minimum of 20%;

where Rm = guaranteed minimum tensile strength of the steel to be used, in N/mm^2;

(b) For aluminium the elongation at fracture, in %, shall not be less than $\frac{10000}{6Rm}$ with an absolute minimum of 8%.

Specimens used to determine the elongation at fracture shall be taken transversely to the direction of rolling and be so secured that:

$$L_0 = 5d \quad \text{or}$$
$$L_0 = 5.65\sqrt{A}$$

where: L_0 = gauge length of the specimen before the test
d = diameter
A = cross-sectional area of test specimen.

6.5.3.1.6 *Minimum wall thickness*:

(a) For a reference steel having a product of Rm x A_o = 10 000, the wall thickness shall not be less than:

Capacity (C) in litres	**Wall thickness (T) in mm**			
	Types 11A, 11B, 11N		**Types 21A, 21B, 21N, 31A, 31B, 31N**	
	Unprotected	**Protected**	**Unprotected**	**Protected**
C ≤ 1000	2.0	1.5	2.5	2.0
1000 < C ≤ 2000	T=C/2000 + 1.5	T=C/2000 + 1.0	T=C/2000 + 2.0	T=C/2000 + 1.5
2000 < C ≤ 3000	T=C/2000 + 1.5	T=C/2000 + 1.0	T=C/1000 + 1.0	T=C/2000 + 1.5

where: A_0 = minimum elongation (as a percentage) of the reference steel to be used on fracture under tensile stress (see 6.5.3.1.5);

(b) For metals other than the reference steel described in (a), the minimum wall thickness is given by the following equivalence formula:

$$e_1 = \frac{21.4 \times e_0}{\sqrt[3]{Rm_1 \ A_1}}$$

where: e_1 = required equivalent wall thickness of the metal to be used (in mm);

e_0 = required minimum wall thickness for the reference steel (in mm);

Rm_1 = guaranteed minimum tensile strength of the metal to be used (in N/mm^2) (see (c));

A_1 = minimum elongation (as a percentage) of the metal to be used on fracture under tensile stress (see 6.5.3.1.5);

However, in no case shall the wall thickness be less than 1.5 mm.

(c) For purposes of the calculation described in (b), the guaranteed minimum tensile strength of the metal to be used (Rm_1) shall be the minimum value according to national or international material standards. However, for austenitic steels, the specified minimum value for Rm according to the material standards may be increased by up to 15% when a greater value is attested in the material inspection certificate. When no material standard exists for the material in question, the value of Rm shall be the minimum value attested in the material inspection certificate.

6.5.3.1.7 Pressure relief requirements: IBCs for liquids shall be capable of releasing a sufficient amount of vapour in the event of fire engulfment to ensure that no rupture of the body will occur. This can be achieved by conventional pressure-relief devices or by other constructional means. The start-to-discharge pressure shall not be higher than 65 kPa (0.65 bar) and no lower than the total gauge pressure experienced in the IBC (i.e. the vapour pressure of the filling substance plus the partial pressure of the air or other inert gases, minus 100 kPa (1 bar)) at 55 °C, determined on the basis of a maximum degree of filling as defined in 4.1.1.4. The required relief devices shall be fitted in the vapour space.

6.5.3.2 ***Specific requirements for flexible IBCs***

6.5.3.2.1 These requirements apply to flexible IBCs of the following types:

13H1	woven plastics without coating or liner
13H2	woven plastics, coated
13H3	woven plastics with liner
13H4	woven plastics, coated and with liner
13H5	plastics film
13L1	textile without coating or liner
13L2	textile, coated
13L3	textile with liner
13L4	textile, coated and with liner
13M1	paper, multiwall
13M2	paper, multiwall, water resistant

Flexible IBCs are intended for the transport of solids only.

6.5.3.2.2 Bodies shall be manufactured from suitable materials. The strength of the material and the construction of the flexible IBC shall be appropriate to its capacity and its intended use.

6.5.3.2.3 All materials used in the construction of flexible IBCs of types 13M1 and 13M2 shall, after complete immersion in water for not less than 24 hours, retain at least 85% of the tensile strength as measured originally on the material conditioned to equilibrium at 67% relative humidity or less.

6.5.3.2.4 Seams shall be formed by stitching, heat sealing, gluing or any equivalent method. All stitched seam-ends shall be secured.

6.5.3.2.5 Flexible IBCs shall provide adequate resistance to ageing and to degradation caused by ultraviolet radiation or the climatic conditions, or by the substance contained, thereby rendering them appropriate to their intended use.

6.5.3.2.6 For flexible plastics IBCs where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the body. 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 changes in the carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

6.5.3.2.7 Additives may be incorporated into the material of the body to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.5.3.2.8 No material recovered from used receptacles shall be used in the manufacture of IBC bodies. Production residues or scrap from the same manufacturing process may, however, be used. Component parts such as fittings and pallet bases may also be used provided such components have not in any way been damaged in previous use.

6.5.3.2.9 When filled, the ratio of height to width shall be not more than 2:1.

6.5.3.2.10 The liner shall be made of a suitable material. The strength of the material used and the construction of the liner shall be appropriate to the capacity of the IBC and the intended use. Joins and closures shall be sift proof and capable of withstanding pressures and impacts liable to occur under normal conditions of handling and transport.

6.5.3.3 ***Specific requirements for rigid plastics IBCs***

6.5.3.3.1 These requirements apply to rigid plastics IBCs for the transport of solids or liquids. Rigid plastics IBCs are of the following types:

11H1	fitted with structural equipment designed to withstand the whole load when IBCs are stacked, for solids which are filled or discharged by gravity
11H2	freestanding, for solids which are filled or discharged by gravity
21H1	fitted with structural equipment designed to withstand the whole load when IBCs are stacked, for solids which are filled or discharged under pressure
21H2	freestanding, for solids which are filled or discharged under pressure
31H1	fitted with structural equipment designed to withstand the whole load when IBCs are stacked, for liquids
31H2	freestanding, for liquids.

6.5.3.3.2 The body shall be manufactured from suitable plastics material of known specifications and be of adequate strength in relation to its capacity and its intended use. The material shall be adequately resistant to ageing and to degradation caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Any permeation of the substance contained shall not constitute a danger under normal conditions of transport.

6.5.3.3.3 Where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the body. 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 changes in the carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

6.5.3.3.4 Additives may be incorporated in the material of the body to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.5.3.3.5 No used material other than production residues or regrind from the same manufacturing process may be used in the manufacture of rigid plastics IBCs.

6.5.3.4 ***Specific requirements for composite IBCs with plastics inner receptacles***

6.5.3.4.1 These requirements apply to composite IBCs for the transport of solids and liquids of the following types:

11HZ1	composite IBCs with a rigid plastics inner receptacle, for solids filled or discharged by gravity
11HZ2	composite IBCs with a flexible plastics inner receptacle, for solids filled or discharged by gravity
21HZ1	composite IBCs with a rigid plastics inner receptacle, for solids filled or discharged under pressure
21HZ2	composite IBCs with a flexible plastics inner receptacle, for solids filled or discharged under pressure
31HZ1	composite IBCs with a rigid plastics inner receptacle, for liquids
31HZ2	composite IBCs with a flexible plastics inner receptacle, for liquids.

This code shall be completed by replacing the letter Z by a capital letter in accordance with 6.5.1.4.1 (b) to indicate the nature of the material used for the outer casing.

6.5.3.4.2 The inner receptacle is not intended to perform a containment function without its outer casing. A "rigid" inner receptacle is a receptacle which retains its general shape when empty without closures in place and without benefit of the outer casing. Any inner receptacle that is not "rigid" is considered to be "flexible".

6.5.3.4.3 The outer casing normally consists of rigid material formed so as to protect the inner receptacle from physical damage during handling and transport but is not intended to perform the containment function. It includes the base pallet where appropriate.

6.5.3.4.4 A composite IBC with a fully enclosing outer casing shall be so designed that the integrity of the inner container may be readily assessed following the leakproofness and hydraulic tests.

6.5.3.4.5 IBCs of type 31HZ2 shall be limited to a capacity of not more than 1250 litres.

6.5.3.4.6 The inner receptacle shall be manufactured from suitable plastics material of known specifications and be of adequate strength in relation to its capacity and its intended use. The material shall be adequately resistant to ageing and to degradation caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Any permeation of the substance contained shall not constitute a danger under normal conditions of transport.

6.5.3.4.7 Where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the inner receptacle. 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 changes in carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

6.5.3.4.8 Additives may be incorporated in the material of the inner receptacle to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.5.3.4.9 No used material other than production residues or regrind from the same manufacturing process may be used in the manufacture of inner receptacles.

6.5.3.4.10 The inner receptacle of IBCs type 31HZ2 shall consist of at least three plies of film.

6.5.3.4.11 The strength of the material and the construction of the outer casing shall be appropriate to the capacity of the composite IBC and its intended use.

6.5.3.4.12 The outer casing shall be free of any projection that might damage the inner receptacle.

6.5.3.4.13 Outer casings of steel or aluminium shall be constructed of a suitable metal of adequate thickness.

6.5.3.4.14 Outer casings of natural wood shall be of well-seasoned wood, commercially dry and free from defects that would materially lessen the strength of any part of the casing. The tops and bottoms may be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type.

6.5.3.4.15 Outer casings of plywood shall be made of well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the casing. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of casings. Casings shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.

6.5.3.4.16 The walls of outer casings of reconstituted wood shall be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type. Other parts of the casings may be made of other suitable material.

6.5.3.4.17 For fibreboard outer casings, strong and good quality solid or double-faced corrugated fibreboard (single or multiwall) shall be used appropriate to the capacity of the casing and to its intended use. The water resistance of the outer surface shall be such that the increase in mass, as determined in a test carried out over 30 minutes by the Cobb method of determining water absorption, is not greater than 155 g/m^2 - see ISO 535:1991. It shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting of corrugated fibreboard shall be firmly glued to the facings.

6.5.3.4.18 The ends of fibreboard outer casings may have a wooden frame or be entirely of wood. Reinforcements of wooden battens may be used.

6.5.3.4.19 Manufacturing joins in the fibreboard outer casing shall be taped, lapped and glued, or lapped and stitched with metal staples. Lapped joins shall have an appropriate overlap. Where closing is effected by gluing or taping, a water resistant adhesive shall be used.

6.5.3.4.20 Where the outer casing is of plastics material, the relevant requirements of 6.5.3.4.6 to 6.5.3.4.9 apply.

6.5.3.4.21 The outer casing of a 31HZ2 shall enclose the inner receptacle on all sides.

6.5.3.4.22 Any integral pallet base forming part of an IBC or any detachable pallet shall be suitable for mechanical handling with the IBC filled to its maximum permissible gross mass.

6.5.3.4.23 The pallet or integral base shall be designed so as to avoid any protrusion of the base of the IBC that might be liable to damage in handling.

6.5.3.4.24 The outer casing shall be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the IBC.

6.5.3.4.25 Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the inner receptacle.

6.5.3.4.26 Where IBCs are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner. Such IBCs shall be designed so that the load is not supported by the inner receptacle.

6.5.3.5 *Specific requirements for fibreboard IBCs*

6.5.3.5.1 These requirements apply to fibreboard IBCs for the transport of solids which are filled or discharged by gravity. Fibreboard IBCs are of the following type: 11G.

6.5.3.5.2 Fibreboard IBCs shall not incorporate top lifting devices.

6.5.3.5.3 The body shall be made of strong and good quality solid or double-faced corrugated fibreboard (single or multiwall), appropriate to the capacity of the IBC and to its intended use. The water resistance of the outer surface shall 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 shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting or corrugated fibreboard shall be firmly glued to the facings.

6.5.3.5.4 The walls, including top and bottom, shall have a minimum puncture resistance of 15 J measured according to ISO 3036:1975.

6.5.3.5.5 Manufacturing joins in the body of IBCs shall be made with an appropriate overlap and shall be taped, glued, stitched with metal staples or fastened by other means at least equally effective. Where joins are effected by gluing or taping, a water resistant adhesive shall be used. Metal staples shall pass completely through all pieces to be fastened and be formed or protected so that any inner liner cannot be abraded or punctured by them.

6.5.3.5.6 The liner shall be made of a suitable material. The strength of the material used and the construction of the liner shall be appropriate to the capacity of the IBC and the intended use. Joins and closures shall be sift-proof and capable of withstanding pressures and impacts liable to occur under normal conditions of handling and transport.

6.5.3.5.7 Any integral pallet base forming part of an IBC or any detachable pallet shall be suitable for mechanical handling with the IBC filled to its maximum permissible gross mass.

6.5.3.5.8 The pallet or integral base shall be designed so as to avoid any protrusion of the base of the IBC that might be liable to damage in handling.

6.5.3.5.9 The body shall be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the IBC.

6.5.3.5.10 Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.

6.5.3.5.11 Where IBCs are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner.

6.5.3.6 *Specific requirements for wooden IBCs*

6.5.3.6.1 These requirements apply to wooden IBCs for the transport of solids which are filled or discharged by gravity. Wooden IBCs are of the following types:

11C natural wood with inner liner
11D plywood with inner liner
11F reconstituted wood with inner liner.

6.5.3.6.2 Wooden IBCs shall not incorporate top lifting devices.

6.5.3.6.3 The strength of the materials used and the method of construction of the body shall be appropriate to the capacity and intended use of the IBC.

6.5.3.6.4 Natural wood shall be well-seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the IBC. Each part of the IBC shall consist of one piece or be equivalent thereto. Parts are considered equivalent to one piece when a suitable method of glued assembly is used as for instance Lindermann joint, tongue and groove joint, ship lap or rabbet joint; or butt joint with at least two corrugated metal fasteners at each joint, or when other methods at least equally effective are used.

6.5.3.6.5 Bodies of plywood shall be at least 3-ply. It shall be made of well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the body. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of the body.

6.5.3.6.6 Bodies of reconstituted wood shall be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type.

6.5.3.6.7 IBCs shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.

6.5.3.6.8 The liner shall be made of a suitable material. The strength of the material used and the construction of the liner shall be appropriate to the capacity of the IBC and the intended use. Joins and closures shall be sift-proof and capable of withstanding pressures and impacts liable to occur under normal conditions of handling and transport.

6.5.3.6.9 Any integral pallet base forming part of an IBC or any detachable pallet shall be suitable for mechanical handling with the IBC filled to its maximum permissible gross mass.

6.5.3.6.10 The pallet or integral base shall be designed so as to avoid any protrusion of the base of the IBC that might be liable to damage in handling.

6.5.3.6.11 The body shall be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the IBC.

6.5.3.6.12 Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.

6.5.3.6.13 Where IBCs are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner.

6.5.4 Test requirements for IBCs

6.5.4.1 *Performance and frequency of tests*

6.5.4.1.1 Tests shall be successfully performed on each IBC design type before such an IBC is used. An IBC design type is defined by the design, size, material and thickness, manner of construction and means of filling and discharging but may include various surface treatments. It also includes IBCs which differ from the design type only in their lesser external dimensions.

6.5.4.1.2 Tests shall be carried out on IBCs prepared for transport. IBCs shall be filled as indicated in the relevant sections. The substances to be transported in the IBCs may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used it shall 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 affected.

6.5.4.1.3 In the drop tests for liquids, when another substance is used, its relative density and viscosity shall be similar to those of the substance to be carried. Water may also be used for the liquid drop test under the following conditions:

(a) Where the substances to be carried have a relative density not exceeding 1.2, the drop heights shall be those shown on the table in 6.5.4.9.4;

(b) Where the substances to be carried have a relative density exceeding 1.2, the drop heights shall 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

6.5.4.2 *Design type tests*

6.5.4.2.1 One IBC of each design type, size, wall thickness and manner of construction shall be submitted to the tests listed in the order shown in 6.5.4.3.5 and as set out in 6.5.4.5 to 6.5.4.12. These design type tests shall be carried out as required by the competent authority.

6.5.4.2.2 The competent authority may permit the selective testing of IBCs which differ only in minor respects from a tested type, e.g. with small reductions in external dimensions.

6.5.4.2.3 If detachable pallets are used in the tests, the test report issued in accordance with 6.5.4.13 shall include a technical description of the pallets used.

6.5.4.3 *Preparation of IBCs for testing*

6.5.4.3.1 Paper and fibreboard IBCs and composite IBCs with fibreboard outer casings shall 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 shall be chosen. The preferred atmosphere is 23 ± 2 °C and 50% ± 2% r.h. The two other options are 20 ± 2 °C and 65% ± 2% r.h.; or 27 ± 2 °C and 65% ± 2% r.h.

***NOTE**: Average values shall fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ± 5% relative humidity without significant impairment of test reproducibility.*

6.5.4.3.2 Additional steps shall be taken to ascertain that the plastics material used in the manufacture of rigid plastics IBCs (types 31H1 and 31H2) and composite IBCs (types 31HZ1 and 31HZ2) complies respectively with the requirements in 6.5.3.3.2 to 6.5.3.3.4 and 6.5.3.4.6 to 6.5.3.4.9.

6.5.4.3.3 This may be done, for example, by submitting sample IBCs 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 or with substances which are known to have at least as severe a stress-cracking, weakening or molecular degradation influence on the plastics materials in question, and after which the samples shall be submitted to the applicable tests listed on the table in 6.5.4.3.5.

6.5.4.3.4 Where the behaviour of the plastics material has been established by other means, the above compatibility test may be dispensed with.

6.5.4.3.5 *Design type tests required and sequential order*

Type of IBC	Bottom lift	Top lift [a]	Stacking[b]	Leak-proofness	Hydraulic pressure	Drop	Tear	Topple	Righting[c]
Metal: 11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B, 31N	1st[a] 1st[a]	2nd 2nd	3rd 3rd	- 4th	- 5th	4th[e] 6th[e]	- -	- -	- -
Flexible[d]	-	x[c]	x	-	-	X	x	x	x
Rigid plastics: 11H1, 11H2, 21H1, 21H2, 31H1, 31H2	1st[a] 1st[a]	2nd 2nd	3rd 3rd	- 4th	- 5th	4th 6th	- -	- -	- -
Composite: 11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1, 31HZ2	1st[a] 1st[a]	2nd 2nd	3rd 3rd	- 4th	- 5th	4th[e] 6th[e]	- -	- -	- -
Fibreboard	1st	-	2nd	-	-	3rd	-	-	-
Wooden	1st	-	2nd	-	-	3rd	-	-	-

[a] *When IBCs are designed for this method of handling.*

[b] *When IBCs are designed to be stacked.*

[c] *When IBCs are designated to be lifted from the top or the side.*

[d] *Required test indicated by x; an IBC which has passed one test may be used for other tests, in any order.*

[e] *Another IBC of the same design may be used for the drop test.*

6.5.4.4 *Bottom lift test*

6.5.4.4.1 *Applicability*

For all fibreboard and wooden IBCs, and for all types of IBC which are fitted with means of lifting from the base, as a design type test.

6.5.4.4.2 *Preparation of the IBC for test*

The IBC shall be filled. A load shall be added and evenly distributed. The mass of the filled IBC and the load shall be 1.25 times the maximum permissible gross mass.

6.5.4.4.3 *Method of testing*

The IBC shall be raised and lowered twice by a lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the side of entry (unless the points of entry are fixed). The forks shall penetrate to three quarters of the direction of entry. The test shall be repeated from each possible direction of entry.

6.5.4.4.4 *Criteria for passing the test*

No permanent deformation which renders the IBC, including the base pallet, if any, unsafe for transport and no loss of contents.

6.5.4.5 ***Top lift test***

6.5.4.5.1 *Applicability*

For all types of IBC which are designed to be lifted from the top and for flexible IBCs designed to be lifted from the top or the side, as a design type test.

6.5.4.5.2 *Preparation of the IBC for test*

Metal, rigid plastics and composite IBCs shall be filled. A load shall be added and evenly distributed. The mass of the filled IBC and the load shall be twice the maximum permissible gross mass.

Flexible IBCs shall be filled to six times their maximum design load, the load being evenly distributed.

6.5.4.5.3 *Methods of testing*

Metal and flexible IBCs shall be lifted in the manner for which they are designed until clear of the floor and maintained in that position for a period of five minutes.

Rigid plastics and composite IBCs shall be lifted:

(a) By each pair of diagonally opposite lifting devices, so that the hoisting forces are applied vertically, for a period of five minutes; and

(b) By each pair of diagonally opposite lifting devices, so that the hoisting forces are applied toward the centre at 45° to the vertical, for a period of five minutes.

6.5.4.5.4 Other methods of top lift testing and preparation at least equally effective may be used for flexible IBCs.

6.5.4.5.5 *Criteria for passing the test*

(a) Metal, rigid plastics and composite IBCs: no permanent deformation which renders the IBC, including the base pallet, if any, unsafe for transport and no loss of contents;

(b) Flexible IBCs: no damage to the IBC or its lifting devices which renders the IBC unsafe for transport or handling;

6.5.4.6 ***Stacking test***

6.5.4.6.1 *Applicability*

For all types of IBC which are designed to be stacked on each other, as a design type test.

6.5.4.6.2 *Preparation of the IBC for test*

The IBC shall be filled to its maximum permissible gross mass. If the specific gravity of the product being used for testing makes this impracticable, the IBC shall be additionally loaded so that it is tested at its maximum permissible gross mass, the load being evenly distributed.

6.5.4.6.3 *Methods of testing*

(a) The IBC shall be placed on its base on level hard ground and subjected to a uniformly distributed superimposed test load (see 6.5.4.6.4). IBCs shall be subjected to the test load for a period of at least:

(i) 5 minutes, for metal IBCs;

(ii) 28 days at 40 °C, for rigid plastics IBCs of types 11H2, 21H2 and 31H2 and for composite IBCs with outer casings of plastics material which bear the stacking load (i.e., types 11HH1, 11HH2, 21HH1, 21HH2, 31HH1 and 31HH2);

(iii) 24 hours, for all other types of IBCs;

(b) The load shall be applied by one of the following methods:

(i) one or more IBCs of the same type filled to the maximum permissible gross mass stacked on the test IBC;

(ii) appropriate weights loaded onto either a flat plate or a reproduction of the base of the IBC, which is stacked on the test IBC.

6.5.4.6.4 *Calculation of superimposed test load*

The load to be placed on the IBC shall be 1.8 times the combined maximum permissible gross mass of the number of similar IBCs that may be stacked on top of the IBC during transport.

6.5.4.6.5 *Criteria for passing the test*

(a) All types of IBCs other than flexible IBCs: no permanent deformation which renders the IBC including the base pallet, if any, unsafe for transport and no loss of contents;

(b) Flexible IBCs: no deterioration of the body which renders the IBC unsafe for transport and no loss of contents.

6.5.4.7 ***Leakproofness test***

6.5.4.7.1 *Applicability*

For those types of IBCs used for liquids or for solids filled or discharged under pressure, as a design type test and periodic test.

6.5.4.7.2 *Preparation of the IBC for test*

The test shall be carried out before the fitting of any thermal insulation equipment. Vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

6.5.4.7.3 *Method of testing and pressure to be applied*

The test shall be carried out for a period of at least 10 minutes using air at a gauge pressure of not less than 20 kPa (0.2 bar). The air tightness of the IBC shall be determined by a suitable method such as by air-pressure differential test or by immersing the IBC in water or, for metal IBCs, by coating the seams and joints with a soap solution. In the latter case a correction factor shall be applied for the hydrostatic pressure. Other methods at least equally effective may be used.

6.5.4.7.4 *Criterion for passing the test*

No leakage of air.

6.5.4.8 *Hydraulic pressure test*

6.5.4.8.1 *Applicability*

For those types of IBCs used for liquids or for solids filled or discharged under pressure, as a design type test.

6.5.4.8.2 *Preparation of the IBC for test*

The test shall be carried out before the fitting of any thermal insulation equipment. Pressure-relief devices shall be removed and their apertures plugged, or shall be rendered inoperative.

6.5.4.8.3 *Method of testing*

The test shall be carried out for a period of at least 10 minutes applying a hydraulic pressure not less than that indicated in 6.5.4.8.4. The IBCs shall not be mechanically restrained during the test.

6.5.4.8.4 *Pressures to be applied*

6.5.4.8.4.1 Metal IBCs:

(a) For IBCs of types 21A, 21B and 21N, for Packing Group I solids, a 250 kPa (2.5 bar) gauge pressure;

(b) For IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, for Packing Groups II or III substances, a 200 kPa (2 bar) gauge pressure;

(c) In addition, for IBCs of types 31A, 31B and 31N, a 65 kPa (0.65 bar) gauge pressure. This test shall be performed before the 200 kPa test.

6.5.4.8.4.2 Rigid plastics and composite IBCs:

(a) For IBCs of types 21H1, 2lH2, 21HZ1 and 21HZ2: 75 kPa (0.75 bar) (gauge);

(b) For IBCs of types 31H1, 31H2, 31HZ1 and 31HZ2: whichever is the greater of two values, the first as determined by one of the following methods:

(i) the total gauge pressure measured in the IBC (i.e. the vapour pressure of the filling substance 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 shall be determined on the basis of a maximum degree of filling in accordance with 4.1.1.4 and a filling temperature of 15 °C;

(ii) 1.75 times the vapour pressure at 50 °C of the substance to be transported minus 100 kPa, but with a minimum test pressure of 100 kPa;

(iii) 1.5 times the vapour pressure at 55 °C of the substance to be transported minus 100 kPa, but with a minimum test pressure of 100 kPa;

and the second as determined by the following method:

(iv) twice the static pressure of the substance to be transported, with a minimum of twice the static pressure of water.

6.5.4.8.5 *Criteria for passing the test(s)*

(a) For IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, when subjected to the test pressure specified in 6.5.4.8.4.1 (a) or (b): no leakage;

(b) For IBCs of types 31A, 31B and 31N, when subjected to the test pressure specified in 6.5.4.8.4.1 (c): neither permanent deformation which would render the IBC unsafe for transport, nor leakage;

(c) For rigid plastics and composite IBCs: no permanent deformation which would render the IBC unsafe for transport and no leakage.

6.5.4.9 ***Drop test***

6.5.4.9.1 *Applicability*

For all types of IBCs, as a design type test.

6.5.4.9.2 *Preparation of the IBC for test*

(a) Metal IBCs: the IBC shall be filled to not less than 95% of its capacity for solids or 98% for liquids in accordance with the design type. Pressure-relief devices shall be removed and their apertures plugged, or shall be rendered inoperative;

(b) Flexible IBCs: the IBC shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed;

(c) Rigid plastics and composite IBCs: the IBC shall be filled to not less than 95% of its capacity for solids or 98% for liquids in accordance with the design type. Arrangements provided for pressure-relief may be removed and plugged or rendered inoperative. Testing of IBCs shall be carried out when the temperature of the test sample and its contents has been reduced to minus 18 °C or lower. Where test samples of composite IBCs are prepared in this way the conditioning specified in 6.5.4.3.1 may be waived. Test liquids shall be kept in the liquid state, if necessary by the addition of anti-freeze. This conditioning may be disregarded if the materials in question are of sufficient ductility and tensile strength at low temperatures;

(d) Fibreboard and wooden IBCs: The IBC shall be filled to not less than 95% of its capacity in accordance with the design type.

6.5.4.9.3 *Method of testing*

The IBC shall be dropped on its base onto a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner as to ensure that the point of impact is that part of the base of the IBC considered to be the most vulnerable. IBCs of 0.45 m^3 or less capacity shall also be dropped:

(a) Metal IBCs: on the most vulnerable part other than the part of the base tested in the first drop;

(b) Flexible IBCs: on the most vulnerable side;

(c) Rigid plastics, composite, fibreboard and wooden IBCs: flat on a side, flat on the top and on a corner.

The same or different IBCs may be used for each drop.

6.5.4.9.4 *Drop height*

Packing Group I	Packing Group II	Packing Group III
1.8 m	1.2 m	0.8 m

6.5.4.9.5 *Criteria for passing the test(s)*

(a) Metal IBCs: no loss of contents;

(b) Flexible IBCs: no loss of contents. A slight discharge, e.g. from closures or stitch holes, upon impact shall not be considered to be a failure of the IBC provided that no further leakage occurs after the IBC has been raised clear of the ground;

(c) Rigid plastics, composite, fibreboard and wooden IBCs: no loss of contents. A slight discharge from a closure upon impact shall not be considered to be a failure of the IBC provided that no further leakage occurs.

6.5.4.10 *Tear test*

6.5.4.10.1 Applicability

For all types of flexible IBCs, as a design type test.

6.5.4.10.2 *Preparation of the IBC for test*

The IBC shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed.

6.5.4.10.3 *Method of testing*

Once the IBC is placed on the ground, a 100 mm knife score, completely penetrating the wall of a wide face, is made at a 45° angle to the principal axis of the IBC, halfway between the bottom surface and the top level of the contents. The IBC shall then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum permissible gross mass. The load shall be applied for at least five minutes. An IBC which is designed to be lifted from the top or the side shall then, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of five minutes.

6.5.4.10.4 *Criterion for passing the test*

The cut shall not propagate more than 25% of its original length.

6.5.4.11 *Topple test*

6.5.4.11.1 *Applicability*

For all types of flexible IBCs, as a design type test.

6.5.4.11.2 *Preparation of the IBC for test*

The IBC shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed.

6.5.4.11.3 *Method of testing*

The IBC shall be caused to topple on to any part of its top on to a rigid, non-resilient, smooth, flat and horizontal surface.

6.5.4.11.4 *Topple height*

Packing group I	Packing group II	Packing group III
1.8 m	1.2 m	0.8 m

6.5.4.11.5 *Criterion for passing the test*

No loss of contents. A slight discharge, e.g. from closures or stitch holes, upon impact shall not be considered to be a failure of the IBC provided that no further leakage occurs.

6.5.4.12 *Righting test*

6.5.4.12.1 *Applicability*

For all flexible IBCs designed to be lifted from the top or side, as a design type test.

6.5.4.12.2 *Preparation of the IBC for test*

The IBC shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed.

6.5.4.12.3 *Method of testing*

The IBC, lying on its side, shall be lifted at a speed of at least 0.1 m/s to upright position, clear of the floor, by one lifting device or by two lifting devices when four are provided.

6.5.4.12.4 *Criterion for passing the test*

No damage to the IBC or its lifting devices which renders the IBC unsafe for transport or handling.

6.5.4.13 *Test report*

6.5.4.13.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the IBC:

1. Name and address of the test facility
2. Name and address of applicant (where appropriate)
3. A unique test report identification
4. Date of the test report
5. Manufacturer of the IBC
6. Description of the IBC 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)
7. Maximum capacity
8. Characteristics of test contents, e.g. viscosity and relative density for liquids and particle size for solids
9. Test descriptions and results
10. The test report shall be signed with the name and status of the signatory

6.5.4.13.2 The test report shall contain statements that the IBC prepared as 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 shall be available to the competent authority.

6.5.4.14 *Testing of metal, rigid plastics and composite IBCs*

6.5.4.14.1 These tests shall be carried out as required by the competent authority.

6.5.4.14.2 Each IBC shall correspond in all respects to its design type.

6.5.4.14.3 Each metal, rigid plastics and composite IBC for liquids, or for solids which are filled or discharged under pressure, shall be subjected to the leakproofness test, as an initial test (i.e., before the IBC is first used for transport), after repair and at intervals of not more than two and a half years.

6.5.4.14.4 The results of tests and the identity of the party performing the tests shall be recorded in test reports to be kept by the owner of the IBC at least until the date of the next test.

CHAPTER 6.6

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF LARGE PACKAGINGS

6.6.1 General

6.6.1.1 The requirements of this Chapter do not apply to:

- Class 2, except articles including aerosols;
- Class 6.2, except clinical waste of UN 3291;
- Class 7 packages containing radioactive material.

6.6.1.2 Large packagings shall be manufactured and tested under a quality assurance programme which satisfies the competent authority in order to ensure that each manufactured packaging meets the requirements of this Chapter.

6.6.1.3 The specific requirements for large packagings in 6.6.4 are based on large packagings currently used. In order to take into account progress in science and technology, there is no objection to the use of large packagings having specifications different from those in 6.6.4 provided they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in 6.6.5. Methods of testing other than those described in these Regulations are acceptable provided they are equivalent.

6.6.1.4 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of 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.

6.6.2 Code for designating types of large packagings

6.6.2.1 The code used for large packagings consists of:

(a) Two Arabic numerals:

50 for rigid large packagings; or
51 for flexible large packagings; and

(b) Capital letters in Latin characters indicating the nature of the material, e.g. wood, steel etc. The capital letters used shall be those shown in 6.1.2.6.

6.6.2.2 The letter "W" may follow the Large Packaging code. The letter "W" signifies that the large packaging, although of the same type indicated by the code, is manufactured to a specification different from those in 6.6.4 and is considered equivalent in accordance with the requirements in 6.6.1.3.

6.6.3 Marking

6.6.3.1 *Primary marking*. Each large packaging manufactured and intended for the use according to these Regulations shall bear durable and legible markings showing:

(a) The United Nations packaging symbol 

;

For metal large packagings on which the marking is stamped or embossed, the capital letters "UN" may be applied instead of the symbol;

(b) The code "50" designating a large rigid packaging or "51" for flexible large packagings, followed by the material type in accordance with 6.5.1.4.1 (b);

(c) A capital letter designating the packing group(s) for which the design type has been approved:

X for packing groups I, II and III
Y for packing groups II and III
Z for packing group III only;

(d) The month and year (last two digits) of manufacture;

(e) The State authorising the allocation of the mark; indicated by the distinguishing sign for motor vehicles in international traffic;

(f) The name or symbol of the manufacturer and other identification of the large packagings as specified by the competent authority;

(g) The stacking test load in kg. For large packagings not designed for stacking the figure "0" shall be shown;

(h) The maximum permissible gross mass in kilograms.

The primary marking required above shall be applied in the sequence of the sub-paragraphs.

Each element of the making applied in accordance with (a) to (h) shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

6.6.3.2 ***Examples of the marking*:**

u n	50 A/X/05 2500/1000	96/N/PQRS	For a large steel packaging suitable for stacking; stacking load: 2500 kg; maximum gross mass: 1000 kg.
u n	50 H/Y04 0/800	95/D/ABCD 987	For a large plastics packaging not suitable for stacking; maximum gross mass: 800 kg.
u n	51H/Z/0697/S/1999 0/500		For a large flexible packaging not suitable for stacking; maximum gross mass: 500 kg.

6.6.4 Specific requirements for large packagings

6.6.4.1 *Specific requirements for metal large packagings*

50A steel
50B aluminium
50N metal (other than steel or aluminium)

6.6.4.1.1 The large packaging shall be made of suitable ductile metal in which the weldability has been fully demonstrated. Welds shall be skilfully made and afford complete safety. Low-temperature performance shall be taken into account when appropriate.

6.6.4.1.2 Care shall be taken to avoid damage by galvanic action due to the juxtaposition of dissimilar metals.

6.6.4.2 *Specific requirements for flexible material large packagings*

51H flexible plastics
51M flexible paper

6.6.4.2.1 The large packaging shall be manufactured from suitable materials. The strength of the material and the construction of the flexible large packagings shall be appropriate to its capacity and its intended use.

6.6.4.2.2 All materials used in the construction of flexible large packagings of types 51M shall, after complete immersion in water for not less than 24 hours, retain at least 85% of the tensile strength as measured originally on the material conditioned to equilibrium at 67% relative humidity or less.

6.6.4.2.3 Seams shall be formed by stitching, heat sealing, gluing or any equivalent method. All stitched seam-ends shall be secured.

6.6.4.2.4 Flexible large packagings shall provide adequate resistance to ageing and to degradation caused by ultraviolet radiation or the climatic conditions, or by the substance contained, thereby rendering them appropriate to their intended use.

6.6.4.2.5 For plastics flexible large packagings where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the large packaging. 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 changes in the carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

6.6.4.2.6 Additives may be incorporated into the material of the large packaging to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.6.4.2.7 When filled, the ratio of height to width shall be not more than 2:1.

6.6.4.3 ***Specific requirements for plastics large packagings***

50H rigid plastics

6.6.4.3.1 The large packaging shall be manufactured from suitable plastics material of known specifications and be of adequate strength in relation to its capacity and its intended use. The material shall be adequately resistant to ageing and to degradation caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Any permeation of the substance contained shall not constitute a danger under normal conditions of transport.

6.6.4.3.2 Where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the outer packaging. 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 changes in the carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

6.6.4.3.3 Additives may be incorporated in the material of the large packaging to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.6.4.4 ***Specific requirements for fibreboard large packagings***

50G rigid fibreboard

6.6.4.4.1 Strong and good quality solid or double-faced corrugated fibreboard (single or multiwall) shall be used, appropriate to the capacity of the large packagings and to their intended use. The water resistance of the outer surface shall 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 shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting or corrugated fibreboard shall be firmly glued to the facings.

6.6.4.4.2 The walls, including top and bottom, shall have a minimum puncture resistance of 15 J measured according to ISO 3036:1975.

6.6.4.4.3 Manufacturing joins in the outer packaging of large packagings shall be made with an appropriate overlap and shall be taped, glued, stitched with metal staples or fastened by other means at least equally effective. Where joins are effected by gluing or taping, a water resistant adhesive shall be used. Metal staples shall pass completely through all pieces to be fastened and be formed or protected so that any inner liner cannot be abraded or punctured by them.

6.6.4.4.4 Any integral pallet base forming part of a large packaging or any detachable pallet shall be suitable for mechanical handling with the large packaging filled to its maximum permissible gross mass.

6.6.4.4.5 The pallet or integral base shall be designed so as to avoid any protrusion of the base of the large packaging that might be liable to damage in handling.

6.6.4.4.6 The body shall be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the large packaging.

6.6.4.4.7 Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.

6.6.4.4.8 Where large packagings are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner.

6.6.4.5 ***Specific requirements for wooden large packagings***

50C natural wood
50D plywood
50F reconstituted wood

6.6.4.5.1 The strength of the materials used and the method of construction shall be appropriate to the capacity and intended use of the large packagings.

6.6.4.5.2 Natural wood shall be well-seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the large packagings. Each part of the large packagings shall consist of one piece or be equivalent thereto. Parts are considered equivalent to one piece when a suitable method of glued assembly is used as for instance Lindermann joint, tongue and groove joint, ship lap or rabbet joint; or butt joint with at least two corrugated metal fasteners at each joint, or when other methods at least equally effective are used.

6.6.4.5.3 Large packagings of plywood shall be at least 3-ply. They shall be made of well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the large packaging. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of the large packaging.

6.6.4.5.4 Large packagings of reconstituted wood shall be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type.

6.6.4.5.5 Large packagings shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.

6.6.4.5.6 Any integral pallet base forming part of a large packaging or any detachable pallet shall be suitable for mechanical handling with the large packaging filled to its maximum permissible gross mass.

6.6.4.5.7 The pallet or integral base shall be designed so as to avoid any protrusion of the base of the large packaging that might be liable to damage in handling.

6.6.4.5.8 The body shall be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the large packaging.

6.6.4.5.9 Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.

6.6.4.5.10 Where large packagings are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner.

6.6.5 Test requirements for large packagings

6.6.5.1 *Performance and frequency of test*

6.6.5.1.1 The design type of each large packaging shall be tested as provided in 6.6.5.3 in accordance with procedures established by the competent authority.

6.6.5.1.2 Tests shall be successfully performed on each large packaging design type before such a packaging is used. A large 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 large packagings which differ from the design type only in their lesser design height.

6.6.5.1.3 Tests shall be repeated on production samples at intervals established by the competent authority. For such tests on fibreboard large packagings, preparation at ambient conditions is considered equivalent to the provisions of 6.6.5.2.3.

6.6.5.1.4 Tests shall also be repeated after each modification which alters the design, material or manner of construction of large packagings.

6.6.5.1.5 The competent authority may permit the selective testing of large 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 large packagings which are produced with small reductions in external dimension(s).

6.6.5.1.6 Where a large packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this large 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:

(i) The inner packagings are of similar design to the tested inner packagings (e.g. shape - round, rectangular, etc);

(ii) 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;

(iii) The inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc);

(iv) Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and

(v) Inner packagings are oriented within the large packagings in the same manner as in the tested package;

(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.

6.6.5.1.7 The competent authority may at any time require proof, by tests in accordance with this section, that serially-produced large packagings meet the requirements of the design type tests.

6.6.5.1.8 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.

6.6.5.2 ***Preparation for testing***

6.6.5.2.1 Tests shall be carried out on large packagings prepared as for transport including the inner packagings or articles used. Inner packagings shall be filled to not less than 98% of their maximum capacity for liquids or 95% for solids. For large packagings where the inner packagings are designed to carry liquids and solids, separate testing is required for both liquid and solid contents. The substances in the inner packagings or the articles to be transported in the large packagings may be replaced by other material or articles except where this would invalidate the results of the tests. When other inner packagings or articles are used they shall have the same physical characteristics (mass, etc) as the inner packagings or articles 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 affected.

6.6.5.2.2 Large packagings made of plastics materials and large packagings containing inner packagings of plastic materials - other than bags intended to contain solids or articles - shall be drop tested when the temperature of the test sample and its contents has been reduced to -18°C or lower. This conditioning may be disregarded if the materials in question are of sufficient ductility and tensile strength at low temperatures. Where test sample are prepared in this way, the conditioning in 6.6.5.2.3 may be waived. Test liquids shall be kept in the liquid state by the addition of anti-freeze if necessary.

6.6.5.2.3 Large packagings of fibreboard shall 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 shall be chosen.

The preferred atmosphere is 23 ± 2°C and 50% ± 2% r.h. The two other options are: 20 ± 2°C and 65% ± 2% r.h.; or 27 ± 2°C and 65% ± 2% r.h.

NOTE*: Average values shall fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ± 5% relative humidity without significant impairment of test reproducibility.*

6.6.5.3 ***Test requirements***

6.6.5.3.1 *Bottom lift test*

6.6.5.3.1.1 Applicability

For all types of large packagings which are fitted with means of lifting from the base, as a design type test.

6.6.5.3.1.2 Preparation of large packaging for test

The large packaging shall be loaded to 1.25 times its maximum permissible gross mass, the load being evenly distributed.

6.6.5.3.1.3 Method of testing

The large packaging shall be raised and lowered twice by a lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the side of entry (unless the points of entry are fixed). The forks shall penetrate to three quarters of the direction of entry. The test shall be repeated from each possible direction of entry.

6.6.5.3.1.4 Criteria for passing the test

No permanent deformation which renders the large packaging unsafe for transport and no loss of contents.

6.6.5.3.2 *Top lift test*

6.6.5.3.2.1 Applicability

For types of large packagings which are intended to be lifted from the top and fitted with means of lifting, as a design type test.

6.6.5.3.2.2 Preparation of large packaging for test

The large packaging shall be loaded to twice its maximum permissible gross mass. A flexible large packaging shall be loaded to six times its maximum permissible gross mass, the load being evenly distributed.

6.6.5.3.2.3 Method of testing

The large packaging shall be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes.

6.6.5.3.2.4 Criteria for passing the test

No permanent deformation which renders the large packagings unsafe for transport and no loss of contents.

6.6.5.3.3 *Stacking test*

6.6.5.3.3.1 Applicability

For all types of large packagings which are designed to be stacked on each other, as a design type test.

6.6.5.3.3.2 Preparation of large packaging for test

The large packaging shall be filled to its maximum permissible gross mass.

6.6.5.3.3.3 Method of testing

The large packaging shall be placed on its base on level hard ground and subjected to a uniformly distributed superimposed test load (see 6.6.5.3.3.4) for a period of at least five minutes: for large packagings of wood, fibreboard and plastics materials the period shall be 24 h.

6.6.5.3.3.4 Calculation of superimposed test load

The load to be placed on the large packaging shall be 1.8 times the combined maximum permissible gross mass of the number of similar large packaging that may be stacked on top of the large packaging during transport.

6.6.5.3.3.5 Criteria for passing the test

No permanent deformation which renders the large packaging unsafe for transport and no loss of contents.

6.6.5.3.4 *Drop test*

6.6.5.3.4.1 Applicability

For all types of large packagings as a design type test.

6.6.5.3.4.2 Preparation of large packaging for testing

The large packaging shall be filled in accordance with 6.6.5.2.1.

6.6.5.3.4.3 Method of testing

The large packaging shall be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner as to ensure that the point of impact is that part of the base of the large packaging considered to be the most vulnerable.

6.6.5.3.4.4 Drop height

Packing group I	Packing group II	Packing group III
1.8 m	1.2 m	0.8 m

***NOTE**: Packagings for substances and articles of Class 1, self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 shall be tested at the Packing Group II performance level.*

6.6.5.3.4.5 Criteria for passing the test

6.6.5.3.4.5.1 The large packaging shall not exhibit any damage liable to affect safety during transport. There shall be no leakage of the filling substance from inner packaging(s) or article(s).

6.6.5.3.4.5.2 No rupture is permitted in large packagings for articles of Class 1 which would permit the spillage of loose explosive substances or articles from the large packaging.

6.6.5.3.4.5.3 Where a large packaging undergoes a drop test, the sample passes the test if the entire contents are retained even if the closure is no longer sift-proof.

6.6.5.4 *Certification and test report*

6.6.5.4.1 In respect of each design type of large packaging a certificate and mark (as in 6.6.3) shall be issued attesting that the design type including its equipment meets the test requirements.

6.6.5.4.2 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the large packaging:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. A unique test report identification;
4. Date of the test report;
5. Manufacturer of the large packaging;
6. Description of the large packaging design type (e.g. dimensions, materials, closures, thickness, etc) and/or photograph(s);
7. Maximum capacity/maximum permissible gross mass;

8. Characteristics of test contents, e.g. types and descriptions of inner packagings or articles used;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

6.6.5.4.3 The test report shall contain statements that the large packaging prepared as for transport was tested in accordance with the appropriate provisions of this Chapter and that the use of other packaging methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

CHAPTER 6.7

REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF PORTABLE TANKS AND MULTIPLE-ELEMENT GAS CONTAINERS (MEGCs)

6.7.1 Application and general requirements

6.7.1.1 The requirements of this Chapter apply to portable tanks intended for the transport of dangerous goods of Classes 2, 3, 4, 5, 6, 7, 8 and 9, and to MEGCs intended for the transport of non-refrigerated gases of Class 2, by all modes of transport. In addition to the requirements of this Chapter, unless otherwise specified, the applicable requirements of the International Convention for Safe Containers (CSC) 1972, as amended, shall be fulfilled by any multimodal portable tank or MEGC which meets the definition of a "container" within the terms of that Convention. Additional requirements may apply to offshore portable tanks or MEGCs that are handled in open seas.

6.7.1.2 In recognition of scientific and technological advances, the technical requirements of this Chapter may be varied by alternative arrangements. These alternative arrangements shall offer a level of safety not less than that given by the requirements of this Chapter with respect to the compatibility with substances transported and the ability of the portable tank or MEGC to withstand impact, loading and fire conditions. For international transport, alternative arrangement portable tanks or MEGCs shall be approved by the applicable competent authorities.

6.7.1.3 When a substance is not assigned a portable tank instruction (T1 to T23, T50 or T75) in Column 10 of the Dangerous Goods List in Chapter 3.2, interim approval for transport may be issued by the competent authority of the country of origin. The approval shall be included in the documentation of the consignment and contain as a minimum the information normally provided in the portable tank instructions and the conditions under which the substance shall be transported. Appropriate measures shall be initiated by the competent authority to include the assignment in the Dangerous Goods List.

6.7.2 Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of substances of Classes 3 to 9

6.7.2.1 *Definitions*

For the purposes of this section:

Design pressure means the pressure to be used in calculations required by a recognized pressure vessel code. The design pressure shall be not less than the highest of the following pressures:

(a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(b) The sum of:

(i) the absolute vacour pressure (in bar) of the substance at 65 °C (at highest temperature during filling, discharge or transport for elevated temperature substances transported above 65 °C), minus 1 bar; and

(ii) the partial pressure (in bar) of air or other gases in the ullage space being determined by a maximum ullage temperature of 65 °C and a liquid expansion due to an increase in mean bulk temperature of $t_r - t_f$ (t_f = filling temperature usually 15 °C; t_r = 50 °C maximum mean bulk temperature); and

(iii) a head pressure determined on the basis of the dynamic forces specified in 6.7.2.2.12, but not less than 0.35 bar; or

(c) Two thirds of the minimum test pressure specified in the applicable portable tank instruction in 4.2.5.2.6;

Design temperature range for the shell shall be -40 °C to 50 °C for substances transported under ambient conditions. For substances handled under elevated temperature conditions the design temperature shall be not less than the maximum temperature of the substance during filling, discharge or transport. More severe design temperatures shall be considered for portable tanks subjected to severe climatic conditions;

Leakproofness test means a test using gas subjecting the shell and its service equipment to an effective internal pressure of not less than 25% of the MAWP;

Maximum allowable working pressure (MAWP) means a pressure that shall be not less than the highest of the following pressures measured at the top of the shell while in operating position:

(a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(b) The maximum effective gauge pressure to which the shell is designed which shall be not less than the sum of:

(i) the absolute vapour pressure (in bar) of the substance at 65 °C (at the highest temperature during filling, discharge or transport for elevated temperature substances transported above 65 °C), minus 1 bar; and

(ii) the partial pressure (in bar) of air or other gases in the ullage space being determined by a maximum ullage temperature of 65 °C and a liquid expansion due to an increase in mean bulk temperature of $t_r - t_f$ (t_f = filling temperature, usually 15 °C; t_r = 50 °C, maximum mean bulk temperature);

Maximum permissible gross mass (MPGM) means the sum of the tare mass of the portable tank and the heaviest load authorized for transport;

Mild steel means a steel with a guaranteed minimum tensile strength of 360 N/mm^2 to 440 N/mm^2 and a guaranteed minimum elongation at fracture conforming to 6.7.2.3.3.3;

Portable tank means a multimodal tank having a capacity of more than 450 litres used for the transport of substances of Classes 3 to 9. The portable tank includes a shell fitted with service equipment and structural equipment necessary for the transport of dangerous substances. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be loaded onto a transport vehicle or ship and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Road tank-vehicles, rail tank-wagons, non-metallic tanks and intermediate bulk containers (IBCs) are not considered to fall within the definition for portable tanks;

Reference steel means a steel with a tensile strength of 370 N/mm^2 and an elongation at fracture of 27%;

Service equipment means measuring instruments and filling, discharge, venting, safety, heating, cooling and insulating devices;

Shell means the part of the portable tank which retains the substance intended for transport (tank proper), including openings and their closures, but does not include service equipment or external structural equipment;

Structural equipment means the reinforcing, fastening, protective and stabilizing members external to the shell;
Test pressure means the maximum gauge pressure at the top of the shell during the hydraulic pressure test equal to not less than 1.5 times the design pressure. The minimum test pressure for portable tanks intended for specific substances is specified in the applicable portable tank instruction in 4.2.5.2.6.

6.7.2.2 *General design and construction requirements*

6.7.2.2.1 Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code recognized by the competent authority. Shells shall be made of metallic materials suitable for forming. The materials shall in principle conform to national or international material standards. For welded shells only a material whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford complete safety. When the manufacturing process or the materials make it necessary, the shells shall be suitably heat-treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material, the design temperature range shall be taken into account with respect to risk of brittle fracture, to stress corrosion cracking and to resistance to impact. When fine grain steel is used, the guaranteed value of the yield strength shall be not more than 460 N/mm^2 and the guaranteed value of the upper limit of the tensile strength shall be not more than 725 N/mm^2 according to the material specification. Aluminium may only be used as a construction material when indicated in a portable tank special provision assigned to a specific substance in Column 11 of the Dangerous Goods List or when approved by the competent authority. When aluminium is authorized, it shall be insulated to prevent significant loss of physical properties when subjected to a heat load of 110 kW/m^2 for a period of not less than 30 minutes. The insulation shall remain effective at all temperatures less than 649 °C and shall be jacketed with a material with a melting point of not less than 700 °C. Portable tank materials shall be suitable for the external environment in which they may be transported.

6.7.2.2.2 Portable tank shells, fittings, and pipework shall be constructed from materials which are:

(a) Substantially immune to attack by the substance(s) intended to be transported; or

(b) Properly passivated or neutralized by chemical reaction; or

(c) Lined with corrosion-resistant material directly bonded to the shell or attached by equivalent means.

6.7.2.2.3 Gaskets shall be made of materials not subject to attack by the substance(s) intended to be transported.

6.7.2.2.4 When shells are lined, the lining shall be substantially immune to attack by the substance(s) intended to be transported, homogeneous, non porous, free from perforations, sufficiently elastic and compatible with the thermal expansion characteristics of the shell. The lining of every shell, shell fittings and piping shall be continuous, and shall extend around the face of any flange. Where external fittings are welded to the tank, the lining shall be continuous through the fitting and around the face of external flanges.

6.7.2.2.5 Joints and seams in the lining shall be made by fusing the material together or by other equally effective means.

6.7.2.2.6 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.2.2.7 The materials of the portable tank, including any devices, gaskets, linings and accessories, shall not adversely affect the substance(s) intended to be transported in the portable tank.

6.7.2.2.8 Portable tanks shall be designed and constructed with supports to provide a secure base during transport and with suitable lifting and tie-down attachments.

6.7.2.2.9 Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and transport. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank, have been taken into account.

6.7.2.2.9.1 For portable tanks that are intended for use offshore, the dynamic stresses imposed by handling in open seas shall be taken into account.

6.7.2.2.10 A shell which is to be equipped with a vacuum-relief device shall be designed to withstand, without permanent deformation, an external pressure of not less than 0.21 bar above the internal pressure. The vacuum-relief device shall be set to relieve at a vacuum setting not greater than minus 0.21 bar unless the shell is designed for a higher external over pressure, in which case the vacuum-relief pressure of the device to be fitted shall be not greater than the tank design vacuum pressure. A shell used for the transport of solid substances of packing groups II or III only, which do not liquefy during transport, may be designed for a lower external pressure, subject to competent authority approval. In this case, the vacuum-relief device shall be set to relieve at this lower pressure. A shell that is not to be fitted with a vacuum-relief device shall be designed to withstand, without permanent deformation, an external pressure of not less than 0.4 bar above the internal pressure.

6.7.2.2.11 Vacuum-relief devices used on portable tanks intended for the transport of substances meeting the flash point criteria of Class 3, including elevated temperature substances transported at or above their flash point, shall prevent the immediate passage of flame into the shell, or the portable tank shall have a shell capable of withstanding, without leakage an internal explosion resulting from the passage of flame into the shell.

6.7.2.2.12 Portable tanks and their fastenings shall, under the maximum permissible load, be capable of absorbing the following separately applied static forces:

(a) In the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)*;

(b) Horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)*;

(c) Vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)*; and

(d) Vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)*.

6.7.2.2.13 Under each of the forces in 6.7.2.2.12, the safety factor to be observed shall be as follows:

(a) For metals having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or

* *For calculation purposes* $g = 9.81\ m/s^2$.

(b) For metals with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.

6.7.2.2.14 The values of yield strength or proof strength shall be the values according to national or international material standards. When austenitic steels are used, the specified minimum values of yield strength or proof strength according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, the value of yield strength or proof strength used shall be approved by the competent authority.

6.7.2.2.15 Portable tanks shall be capable of being electrically earthed when intended for the transport of substances meeting the flash point criteria of Class 3 including elevated temperature substances transported at or above their flash point. Measures shall be taken to prevent dangerous electrostatic discharge.

6.7.2.2.16 When required for certain substances by the applicable portable tank instruction indicated in Column 10 of the Dangerous Goods List and described in 4.2.5.2.6, or by a portable tank special provision indicated in Column 11 and described in 4.2.5.3 of the Dangerous Goods List, portable tanks shall be provided with additional protection, which may take the form of additional shell thickness or a higher test pressure, the additional shell thickness or higher test pressure being determined in the light of the inherent risks associated with the transport of the substances concerned.

6.7.2.2.17 Thermal insulation directly in contact with the shell intended for substances transported at elevated temperature shall have an ignition temperature at least 50 °C higher than the maximum design temperature of the tank.

6.7.2.3 ***Design criteria***

6.7.2.3.1 Shells shall be of a design capable of being stress-analysed mathematically or experimentally by resistance strain gauges, or by other methods approved by the competent authority.

6.7.2.3.2 Shells shall be designed and constructed to withstand a hydraulic test pressure not less than 1.5 times the design pressure. Specific requirements are laid down for certain substances in the applicable portable tank instruction indicated in Column 10 of the Dangerous Goods List and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column 11 of the Dangerous Goods List and described in 4.2.5.3. Attention is drawn to the minimum shell thickness requirements for these tanks specified in 6.7.2.4.1 to 6.7.2.4.10.

6.7.2.3.3 For metals exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels) the primary membrane stress σ (sigma) in the shell shall not exceed 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure, where:

Re = yield strength in N/mm^2, or 0.2% proof strength or, for austenitic steels, 1% proof strength;

Rm = minimum tensile strength in N/mm^2.

6.7.2.3.3.1 The values of Re and Rm to be used shall be the specified minimum values according to national or international material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, the values of Re and Rm used shall be approved by the competent authority or its authorized body.

6.7.2.3.3.2 Steels which have a Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio shall be the values specified in the material inspection certificate.

6.7.2.3.3.3 Steels used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels. Aluminium and aluminium alloys used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/6Rm with an absolute minimum of 12%.

6.7.2.3.3.4 For the purpose of determining actual values for materials, it shall be noted that for sheet metal, the axis of the tensile test specimen shall be at right angles (transversely) to the direction of rolling. The permanent elongation at fracture shall be measured on test specimens of rectangular cross sections in accordance with ISO 6892:1998 using a 50 mm gauge length.

6.7.2.4 ***Minimum shell thickness***

6.7.2.4.1 The minimum shell thickness shall be the greater thickness based on:

(a) The minimum thickness determined in accordance with the requirements of 6.7.2.4.2 to 6.7.2.4.10;

(b) The minimum thickness determined in accordance with the recognized pressure vessel code including the requirements in 6.7.2.3; and

(c) The minimum thickness specified in the applicable portable tank instruction indicated in Column 10 of the Dangerous Goods List and described in 4.2.5.2.6, or by a portable tank special provision indicated in Column 11 of the Dangerous Goods List and described in 4.2.5.3.

6.7.2.4.2 The cylindrical portions, ends (heads) and manhole covers of shells not more than 1.80 m in diameter shall be not less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells more than 1.80 m in diameter shall be not less than 6 mm thick in the reference steel or of equivalent thickness in the metal to be used, except that for powdered or granular solid substances of Packing Group II or III the minimum thickness requirement may be reduced to not less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used.

6.7.2.4.3 When additional protection against shell damage is provided, portable tanks with test pressures less than 2.65 bar, may have the minimum shell thickness reduced, in proportion to the protection provided, as approved by the competent authority. However, shells not more than 1.80 m in diameter shall be not less than 3 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells more than 1.80 m in diameter shall be not less than 4 mm thick in the reference steel or of equivalent thickness in the metal to be used.

6.7.2.4.4 The cylindrical portions, ends (heads) and manhole covers of all shells shall be not less than 3 mm thick regardless of the material of construction.

6.7.2.4.5 The additional protection referred to in 6.7.2.4.3 may be provided by overall external structural protection, such as suitable "sandwich" construction with the outer sheathing (jacket) secured to the shell, double wall construction or by enclosing the shell in a complete framework with longitudinal and transverse structural members.

6.7.2.4.6 The equivalent thickness of a metal other than the thickness prescribed for the reference steel in 6.7.2.4.3 shall be determined using the following formula:

$$e_1 = \frac{21.4 e_0}{\sqrt[3]{Rm_1 \, x \, A_1}}$$

where:

e_1 = required equivalent thickness (in mm) of the metal to be used;

e_0 = minimum thickness (in mm) of the reference steel specified in the applicable portable tank instruction indicated in Column 10 of the Dangerous Goods List and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column 11 of the Dangerous Goods List and described in 4.2.5.3;

Rm_1 = guaranteed minimum tensile strength (in N/mm^2) of the metal to be used (see 6.7.2.3.3);

A_1 = guaranteed minimum elongation at fracture (in %) of the metal to be used according to national or international standards.

6.7.2.4.7 When in the applicable portable tank instruction in 4.2.5.2.6, a minimum thickness of 8 mm or 10 mm is specified, it shall be noted that these thicknesses are based on the properties of the reference steel and a shell diameter of 1.80 m. When a metal other than mild steel (see 6.7.2.1) is used or the shell has a diameter of more than 1.80 m, the thickness shall be determined using the following formula:

$$e_1 = \frac{21.4 e_0 d_1}{1.8 \sqrt[3]{Rm_1 \, x \, A_1}}$$

where:

e_1 = required equivalent thickness (in mm) of the metal to be used;

e_0 = minimum thickness (in mm) of the reference steel specified in the applicable portable tank instruction indicated in Column 10 of the Dangerous Goods List and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column 11 of the Dangerous Goods List and described in 4.2.5.3;

d_1 = diameter of the shell (in m), but not less than 1.80 m;

Rm_1 = guaranteed minimum tensile strength (in N/mm^2) of the metal to be used (see 6.7.2.3.3);

A_1 = guaranteed minimum elongation at fracture (in %) of the metal to be used according to national or international standards.

6.7.2.4.8 In no case shall the wall thickness be less than that prescribed in 6.7.2.4.2, 6.7.2.4.3 and 6.7.2.4.4. All parts of the shell shall have a minimum thickness as determined by 6.7.2.4.2 to 6.7.2.4.4. This thickness shall be exclusive of any corrosion allowance.

6.7.2.4.9 When mild steel is used (see 6.7.2.1), calculation using the formula in 6.7.2.4.6 is not required.

6.7.2.4.10 There shall be no sudden change of plate thickness at the attachment of the ends (heads) to the cylindrical portion of the shell.

6.7.2.5 ***Service equipment***

6.7.2.5.1 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during handling and transport. When the connection between the frame and the shell allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external forces (for example using shear sections). The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

6.7.2.5.2 All openings in the shell, intended for filling or discharging the portable tank shall be fitted with a manually operated stop-valve located as close to the shell as reasonably practicable. Other openings, except for openings leading to venting or pressure-relief devices, shall be equipped with either a stop-valve or another suitable means of closure located as close to the shell as reasonably practicable.

6.7.2.5.3 All portable tanks shall be fitted with a manhole or other inspection openings of a suitable size to allow for internal inspection and adequate access for maintenance and repair of the interior. Compartmented portable tanks shall have a manhole or other inspection openings for each compartment.

6.7.2.5.4 As far as reasonably practicable, external fittings shall be grouped together. For insulated portable tanks, top fittings shall be surrounded by a spill collection reservoir with suitable drains.

6.7.2.5.5 Each connection to a portable tank shall be clearly marked to indicate its function.

6.7.2.5.6 Each stop-valve or other means of closure shall be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperatures expected during transport. All stop-valves with screwed spindles shall close by a clockwise motion of the handwheel. For other stop-valves the position (open and closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed to prevent unintentional opening.

6.7.2.5.7 No moving parts, such as covers, components of closures, etc., shall be made of unprotected corrodible steel when they are liable to come into frictional or percussive contact with aluminium portable tanks intended for the transport of substances meeting the flash point criteria of Class 3 including elevated temperature substances transported at or above their flash point.

6.7.2.5.8 Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration. All piping shall be of a suitable metallic material. Welded pipe joints shall be used wherever possible.

6.7.2.5.9 Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The joints shall not decrease the strength of the tubing as may happen when cutting threads.

6.7.2.5.10 The burst pressure of all piping and pipe fittings shall be not less than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure-relief devices).

6.7.2.5.11 Ductile metals shall be used in the construction of valves and accessories.

6.7.2.5.12 The heating system shall be designed or controlled so that a substance cannot reach a temperature at which the pressure in the tank exceeds its MAWP or causes other hazards (e.g. dangerous thermal decomposition).

6.7.2.5.13 The heating system shall be designed or controlled so that power for internal heating elements shall not be available unless the heating elements are completely submerged. The temperature at the surface of the heating elements for internal heating equipment, or the temperature at the shell for external heating equipment shall, in no case, exceed 80% of the autoignition temperature (in °C) of the substance transported.

6.7.2.5.14 If an electrical heating system is installed inside the tank, it shall be equipped with an earth leakage circuit breaker with a releasing current of less than 100 mA.

6.7.2.5.15 Electrical switch cabinets mounted to tanks shall not have a direct connection to the tank interior and shall provide protection of at least the equivalent of type IP56 according to IEC 144 or IEC 529.

6.7.2.6 ***Bottom openings***

6.7.2.6.1 Certain substances shall not be transported in portable tanks with bottom openings. When the applicable portable tank instruction identified in Column 10 of the Dangerous Goods List and described in 4.2.4.2.6 indicates that bottom openings are prohibited there shall be no openings below the liquid level of the shell when it is filled to its maximum permissible filling limit. When an existing opening is closed it shall be accomplished by internally and externally welding one plate to the shell.

6.7.2.6.2 Bottom discharge outlets for portable tanks carrying certain solid, crystallizable or highly viscous substances shall be equipped with not less than two serially fitted and mutually independent shut-off devices. The design of the equipment shall be to the satisfaction of the competent authority or its authorized body and shall include:

(a) An external stop-valve fitted as close to the shell as reasonably practicable; and

(b) A liquid tight closure at the end of the discharge pipe, which may be a bolted blank flange or a screw cap.

6.7.2.6.3 Every bottom discharge outlet, except as provided in 6.7.2.6.2, shall be equipped with three serially fitted and mutually independent shut-off devices. The design of the equipment shall be to the satisfaction of the competent authority or its authorized body and include:

(a) A self-closing internal stop-valve, that is a stop-valve within the shell or within a welded flange or its companion flange, such that:

(i) The control devices for the operation of the valve are designed so as to prevent any unintended opening through impact or other inadvertent act;

(ii) The valve may be operable from above or below;

(iii) If possible, the setting of the valve (open or closed) shall be capable of being verified from the ground;

(iv) Except for portable tanks having a capacity of not more than 1,000 litres, it shall be possible to close the valve from an accessible position of the portable tank that is remote from the valve itself; and

(v) The valve shall continue to be effective in the event of damage to the external device for controlling the operation of the valve;

(b) An external stop-valve fitted as close to the shell as reasonably practicable; and

(c) A liquid tight closure at the end of the discharge pipe, which may be a bolted blank flange or a screw cap.

6.7.2.6.4 For a lined shell, the internal stop-valve required by 6.7.2.6.3 (a) may be replaced by an additional external stop-valve. The manufacturer shall satisfy the requirements of the competent authority or its authorized body.

6.7.2.7 *Safety relief devices*

6.7.2.7.1 All portable tanks shall be fitted with at least one pressure-relief device. All relief devices shall be designed, constructed and marked to the satisfaction of the competent authority or its authorized body.

6.7.2.8 *Pressure-relief devices*

6.7.2.8.1 Every portable tank with a capacity not less than 1,900 litres and every independent compartment of a portable tank with a similar capacity, shall be provided with one or more pressure-relief devices of the spring-loaded type and may in addition have a frangible disc or fusible element in parallel with the spring-loaded devices except when prohibited by reference to 6.7.2.8.3 in the applicable portable tank instruction in 4.2.4.2.6. The pressure-relief devices shall have sufficient capacity to prevent rupture of the shell due to over pressurization or vacuum resulting from filling, discharging, or from heating of the contents.

6.7.2.8.2 Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of liquid and the development of any dangerous excess pressure.

6.7.2.8.3 When required for certain substances by the applicable portable tank instruction identified in Column 10 of the Dangerous Goods List and described in 4.2.4.2.6, portable tanks shall have a pressure-relief device approved by the competent authority. Unless a portable tank in dedicated service is fitted with an approved relief device constructed of materials compatible with the load, the relief device shall comprise a frangible disc preceding a spring-loaded pressure-relief device. When a frangible disc is inserted in series with the required pressure-relief device, the space between the frangible disc and the pressure-relief device shall be provided with a pressure gauge or suitable tell-tale indicator for the detection of disc rupture, pinholing, or leakage which could cause a malfunction of the pressure-relief system. The frangible disc shall rupture at a nominal pressure 10% above the start to discharge pressure of the relief device.

6.7.2.8.4 Every portable tank with a capacity less than 1,900 litres shall be fitted with a pressure-relief device which may be a frangible disc when this disc complies with the requirements of 6.7.2.11.1. When no spring-loaded pressure-relief device is used, the frangible disc shall be set to rupture at a nominal pressure equal to the test pressure.

6.7.2.8.5 When the shell is fitted for pressure discharge, the inlet line shall be provided with a suitable pressure-relief device set to operate at a pressure not higher than the MAWP of the shell, and a stop-valve shall be fitted as close to the shell as reasonably practicable.

6.7.2.9 *Setting of pressure-relief devices*

6.7.2.9.1 It shall be noted that the pressure-relief devices shall operate only in conditions of excessive rise in temperature, since the shell shall not be subject to undue fluctuations of pressure during normal conditions of transport (see 6.7.2.12.2).

6.7.2.9.2 The required pressure-relief device shall be set to start-to-discharge at a nominal pressure of five-sixths of the test pressure for shells having a test pressure of not more than 4.5 bar and 110% of two-thirds of the test pressure for shells having a test pressure of more than 4.5 bar. After discharge the device shall close at a pressure not more than 10% below the pressure at which the discharge starts. The device shall remain closed at all lower pressures. This requirement does not prevent the use of vacuum-relief or combination pressure-relief and vacuum-relief devices.

6.7.2.10 *Fusible elements*

6.7.2.10.1 Fusible elements shall operate at a temperature between 110 °C and 149 °C on condition that the pressure in the shell at the fusing temperature will be not more than the test pressure. They shall be placed at the top of the shell with their inlets in the vapour space and in no case shall they be shielded from external heat. Fusible elements shall not be utilized on portable tanks with a test pressure which exceeds 2.65 bar. Fusible elements used on portable tanks intended for the transport of elevated temperature substances shall be designed to operate at a temperature higher than the maximum temperature that will be experienced during transport and shall be to the satisfaction of the competent authority or its authorized body.

6.7.2.11 *Frangible discs*

6.7.2.11.1 Except as specified in 6.7.2.8.3, frangible discs shall be set to rupture at a nominal pressure equal to the test pressure throughout the design temperature range. Particular attention shall be given to the requirements of 6.7.2.5.1 and 6.7.2.8.3 if frangible discs are used.

6.7.2.11.2 Frangible discs shall be appropriate for the vacuum pressures which may be produced in the portable tank.

6.7.2.12 *Capacity of pressure-relief devices*

6.7.2.12.1 The spring-loaded pressure-relief device required by 6.7.2.8.1 shall have a minimum cross sectional flow area equivalent to an orifice of 31.75 mm diameter. Vacuum-relief devices, when used, shall have a cross sectional flow area not less than 284 mm^2.

6.7.2.12.2 The combined delivery capacity of the relief devices in condition of complete fire engulfment of the portable tank shall be sufficient to limit the pressure in the shell to 20% above the start-to-discharge pressure of the pressure limiting device. Emergency pressure-relief devices may be used to achieve the full relief capacity prescribed. These devices may be fusible, spring loaded or frangible disc components, or a combination of spring-loaded and frangible disc devices. The total required capacity of the relief devices may be determined using the formula in 6.7.2.12.2.1 or the table in 6.7.2.12.2.3.

6.7.2.12.2.1 To determine the total required capacity of the relief devices, which shall be regarded as being the sum of the individual capacities of all the contributing devices, the following formula shall be used:

$$Q = 12.4 \frac{FA^{0.82}}{LC} \sqrt{\frac{ZT}{M}}$$

where:

Q = minimum required rate of discharge in cubic metres of air per second (m^3/s) at standard conditions: 1 bar and 0 °C (273 K);

F = is a coefficient with the following value:

for uninsulated shells ***F*** = 1;

for insulated shells ***F*** = U(649 - t)/13.6 but in no case is less than 0.25 where:

U = thermal conductance of the insulation, in $kW \cdot m^{-2} \cdot K^{-1}$, at 38 °C

t = actual temperature of the substance during filling (in °C); when this temperature is unknown, let t = 15 °C:

The value of ***F*** given above for insulated shells may be taken provided that the insulation is in conformance with 6.7.2.12.2.4;

A = total external surface area of shell in square metres;

Z = the gas compressibility factor in the accumulating condition (when this factor is unknown, let Z equal 1.0);

T = absolute temperature in Kelvin (°C + 273) above the pressure-relief devices in the accumulating condition;

L = the latent heat of vaporization of the liquid, in kJ/kg, in the accumulating condition;

M = molecular mass of the discharged gas;

C = a constant which is derived from one of the following formulae as a function of the ratio *k* of specific heats:

$$k = \frac{c_p}{c_v}$$

where:

c_p is the specific heat at constant pressure; and
c_v is the specific heat at constant volume.

When $k > 1$:

$$C = \sqrt{k\left(\frac{2}{k+1}\right)^{\frac{k+1}{k-1}}}$$

When $k = 1$ or k is unknown:

$$C = \frac{1}{\sqrt{e}} = 0.607$$

where e is the mathematical constant 2.7183

C may also be taken from the following table:

k	C	k	C	k	C
1.00	0.607	1.26	0.660	1.52	0.704
1.02	0.611	1.28	0.664	1.54	0.707
1.04	0.615	1.30	0.667	1.56	0.710
1.06	0.620	1.32	0.671	1.58	0.713
1.08	0.624	1.34	0.674	1.60	0.716
1.10	0.628	1.36	0.678	1.62	0.719
1.12	0.633	1.38	0.681	1.64	0.722
1.14	0.637	1.40	0.685	1.66	0.725
1.16	0.641	1.42	0.688	1.68	0.728
1.18	0.645	1.44	0.691	1.70	0.731
1.20	0.649	1.46	0.695	2.00	0.770
1.22	0.652	1.48	0.698	2.20	0.793
1.24	0.656	1.50	0.701		

6.7.2.12.2.2 As an alternative to the formula above, shells designed for the transport of liquids may have their relief devices sized in accordance with the table in 6.7.2.12.2.3. This table assumes an insulation value of F = 1 and shall be adjusted accordingly when the shell is insulated. Other values used in determining this table are:

M	=	86.7	*T*	=	394 K
L	=	334.94 kJ/kg	*C*	=	0.607
Z	=	1			

6.7.2.12.2.3 *Minimum required rate of discharge, Q, in cubic metres of air per second at 1 bar and 0 °C (273 K)*

A **Exposed area** **(square metres)**	**Q** **(Cubic metres of** **air per second)**	**A** **Exposed area** **(square metres)**	**Q** **(Cubic metres of** **air per second)**
2	0.230	37.5	2.539
3	0.320	40	2.677
4	0.405	42.5	2.814
5	0.487	45	2.949
6	0.565	47.5	3.082
7	0.641	50	3.215
8	0.715	52.5	3.346
9	0.788	55	3.476
10	0.859	57.5	3.605
12	0.998	60	3.733
14	1.132	62.5	3.860
16	1.263	65	3.987
18	1.391	67.5	4.112
20	1.517	70	4.236
22.5	1.670	75	4.483
25	1.821	80	4.726
27.5	1.969	85	4.967
30	2.115	90	5.206
32.5	2.258	95	5.442
35	2.400	100	5.676

6.7.2.12.2.4 Insulation systems, used for the purpose of reducing venting capacity, shall be approved by the competent authority or its authorized body. In all cases, insulation systems approved for this purpose shall:

(a) Remain effective at all temperatures up to 649 °C; and

(b) Be jacketed with a material having a melting point of 700 °C or greater.

6.7.2.13 ***Marking of pressure-relief devices***

6.7.2.13.1 Every pressure-relief device shall be clearly and permanently marked with the following:

(a) The pressure (in bar or kPa) or temperature (in °C) at which it is set to discharge;

(b) The allowable tolerance at the discharge pressure for spring-loaded devices;

(c) The reference temperature corresponding to the rated pressure for frangible discs;

(d) The allowable temperature tolerance for fusible elements; and

(e) The rated flow capacity of the device in standard cubic meters of air per second (m^3/s);

When practicable, the following information shall also be shown:

(f) The manufacturer=s name and relevant catalogue number.

6.7.2.13.2 The rated flow capacity marked on the pressure-relief devices shall be determined according to ISO 4126-1:1991.

6.7.2.14 ***Connections to pressure-relief devices***

6.7.2.14.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the safety device. No stop-valve shall be installed between the shell and the pressure-relief devices except where duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that at least one of the duplicate devices is always in use. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the shell to that device. Vents or pipes from the pressure-relief device outlets, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving devices.

6.7.2.15 ***Siting of pressure-relief devices***

6.7.2.15.1 Each pressure-relief device inlet shall be situated on top of the shell in a position as near the longitudinal and transverse centre of the shell as reasonably practicable. All pressure-relief device inlets shall under maximum filling conditions be situated in the vapour space of the shell and the devices shall be so arranged as to ensure the escaping vapour is discharged unrestrictedly. For flammable substances, the escaping vapour shall be directed away from the shell in such a manner that it cannot impinge upon the shell. Protective devices which deflect the flow of vapour are permissible provided the required relief-device capacity is not reduced.

6.7.2.15.2 Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the portable tank overturning.

6.7.2.16 *Gauging devices*

6.7.2.16.1 Glass level-gauges and gauges made of other fragile material, which are in direct communication with the contents of the tank shall not be used.

6.7.2.17 *Portable tank supports, frameworks, lifting and tie-down attachments*

6.7.2.17.1 Portable tanks shall be designed and constructed with a support structure to provide a secure base during transport. The forces specified in 6.7.2.2.12 and the safety factor specified in 6.7.2.2.13 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.2.17.2 The combined stresses caused by portable tank mountings (e.g. cradles, framework, etc.) and portable tank lifting and tie-down attachments shall not cause excessive stress in any portion of the shell. Permanent lifting and tie-down attachments shall be fitted to all portable tanks. Preferably they shall be fitted to the portable tank supports but may be secured to reinforcing plates located on the shell at the points of support.

6.7.2.17.3 In the design of supports and frameworks the effects of environmental corrosion shall be taken into account.

6.7.2.17.4 Forklift pockets shall be capable of being closed off. The means of closing forklift pockets shall be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have closed off forklift pockets provided that:

(a) The shell including all the fittings are well protected from being hit by the forklift blades; and

(b) The distance between the centres of the forklift pockets is at least half of the maximum length of the portable tank.

6.7.2.17.5 When portable tanks are not protected during transport, according to 4.2.1.2, the shells and service equipment shall be protected against damage to the shell and service equipment resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include:

(a) Protection against lateral impact which may consist of longitudinal bars protecting the shell on both sides at the level of the median line;

(b) Protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;

(c) Protection against rear impact which may consist of a bumper or frame;

(d) Protection of the shell against damage from impact or overturning by use of an ISO frame in accordance with ISO 1496-3:1995.

6.7.2.18 *Design approval*

6.7.2.18.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. This certificate shall attest that a portable tank has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter and where appropriate, the provisions for substances provided in Chapter 4.2 and in the Dangerous Goods List in Chapter 3.2. When a series of portable tanks are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the substances or group of substances allowed to be transported, the materials of construction of the shell and lining (when applicable) and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, i.e. the distinguishing sign for use in international traffic as prescribed by the Convention on Road Traffic, Vienna 1968, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.2.18.2 The prototype test report for the design approval shall include at least the following:

(a) The results of the applicable framework test specified in ISO 1496-3:1995;

(b) The results of the initial inspection and test in 6.7.2.19.3; and

(c) The results of the impact test in 6.7.2.19.1, when applicable.

6.7.2.19 *Inspection and testing*

6.7.2.19.1 For portable tanks meeting the definition of container in the CSC, a prototype representing each design shall be subjected to an impact test. The prototype portable tank shall be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the MPGM of the fully loaded portable tank at a duration typical of the mechanical shocks experienced in rail transport. The following is a listing of standards describing methods acceptable for performing the impact test:

Association of American Railroads,
Manual of Standards and Recommended Practices,
Specifications for Acceptability of Tank Containers (AAR.600), 1992

Canadian Standards Association (CSA),
Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods (B620-1987)

Deutsche Bahn AG
Zentralbereich Technik, Minden
Portable tanks, longitudinal dynamic impact test

Société Nationale des Chemins de Fer Français
C.N.E.S.T. 002-1966.
Tank containers, longitudinal external stresses and dynamic impact tests

Spoornet, South Africa
Engineering Development Centre (EDC)
Testing of ISO Tank Containers
Method EDC/TES/023/000/1991-06

6.7.2.19.2 The shell and items of equipment of each portable tank shall be inspected and tested before being put into service for the first time (initial inspection and test) and thereafter at not more than five-year intervals (5 year periodic inspection and test) with an intermediate periodic inspection and test (2.5 year periodic inspection and test) midway between the 5 year periodic inspections and tests. The 2.5 year inspection and test may be performed within 3 months of the specified date. An exceptional inspection and test shall be performed regardless of the date of the last periodic inspection and test when necessary according to 6.7.2.19.7.

6.7.2.19.3 The initial inspection and test of a portable tank shall include a check of the design characteristics, an internal and external examination of the portable tank and its fittings with due regard to the substances to be transported, and a pressure test. Before the portable tank is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the shell and its fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.2.19.4 The 5-year periodic inspection and test shall include an internal and external examination and, as a general rule, a hydraulic pressure test. For tanks only used for the transport of solid substances, other than toxic or corrosive substances that do not liquefy during transport, the hydraulic pressure test may be replaced by a suitable pressure test at 1.5 times the MAWP, subject to competent authority approval. Sheathing, thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. When the shell and equipment have been pressure-tested separately, they shall also be subjected to a leakproofness test together after assembly.

6.7.2.19.5 The intermediate 2.5 year periodic inspection and test shall at least include an internal and external examination of the portable tank and its fittings with due regard to the substances intended to be transported, a leakproofness test and a test of the satisfactory operation of all service equipment. Sheathing, thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. For portable tanks dedicated to the transport of a single substance, the 2.5 year internal examination may be waived or substituted by other test methods or inspection procedures specified by the competent authority or its authorized body.

6.7.2.19.6 A portable tank may not be filled and offered for transport after the date of expiry of the last 5 year or 2.5 year periodic inspection and test as required by 6.7.2.19.2. However a portable tank filled prior to the date of expiry of the last periodic inspection and test may be transported for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a portable tank may be transported after the date of expiry of the last periodic test and inspection:

(a) After emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; and

(b) Unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the transport document.

6.7.2.19.7 The exceptional inspection and test is necessary when the portable tank shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the portable tank. It shall include at least the 2.5 year inspection and test according to 6.7.2.19.5.

6.7.2.19.8 The internal and external examinations shall ensure that:

(a) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for transport;

(b) The piping, valves, heating/cooling system, and gaskets are inspected for corroded areas, defects, or any other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or transport;

(c) Devices for tightening manhole covers are operative and there is no leakage at manhole covers or gaskets;

(d) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;

(e) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;

(f) Linings, if any, are inspected in accordance with criteria outlined by the lining manufacturer;

(g) Required markings on the portable tank are legible and in accordance with the applicable requirements; and

(h) The framework, supports and arrangements for lifting the portable tank are in a satisfactory condition.

6.7.2.19.9 The inspections and tests in 6.7.2.19.1, 6.7.2.19.3, 6.7.2.19.4, 6.7.2.19.5 and 6.7.2.19.7 shall be performed or witnessed by an expert approved by the competent authority or its authorized body. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the portable tank. While under pressure, the portable tank shall be inspected for any leaks in the shell, piping or equipment.

6.7.2.19.10 In all cases when cutting, burning or welding operations on the shell have been effected, that work shall be to the approval of the competent authority or its authorized body taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure shall be performed after the work is completed.

6.7.2.19.11 When evidence of any unsafe condition is discovered, the portable tank shall not be returned to service until it has been corrected and the test is repeated and passed.

6.7.2.20 ***Marking***

6.7.2.20.1 Every portable tank shall be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum at least the following information shall be marked on the plate by stamping or by any other similar method.

Country of manufacture

U N	Approval Country	Approval Number	For Alternative Arrangements (see 6.7.1.2): "AA"

Manufacturer's name or mark

Manufacturer's serial number

Authorized body for the design approval

Owner's registration number

Year of manufacture

Pressure vessel code to which the shell is designed

Test pressure _____ bar/kPa gauge*

MAWP _____ bar/kPa gauge*

External design pressure** _____ bar/kPa gauge*

Design temperature range _____ °C to _____ °C

Water capacity at 20 °C _____ litres

Water capacity of each compartment at 20 °C _____ litres

Initial pressure test date and witness identification

MAWP for heating/cooling system _____ bar/kPa gauge*

Shell material(s) and material standard reference(s)

Equivalent thickness in reference steel _____ mm

Lining material (when applicable)

Date and type of most recent periodic test(s)

Month _____ Year _____ Test pressure _____ bar/kPa gauge*

Stamp of expert who performed or witnessed the most recent test

6.7.2.20.2 The following information shall be marked either on the portable tank itself or on a metal plate firmly secured to the portable tank:

Name of the operator

Maximum permissible gross mass (MPGM) _____ kg

Unladen (tare) mass _____ kg

NOTE: *For the identification of the substances being transported, see also Part 5.*

6.7.2.20.3 If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" shall be marked on the identification plate.

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* The unit used shall be marked.

** See 6.7.2.2.10.

6.7.3 Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of non-refrigerated liquefied gases

6.7.3.1 *Definitions*

For the purposes of this section:

Design pressure means the pressure to be used in calculations required by a recognized pressure vessel code. The design pressure shall be not less than the highest of the following pressures:

(a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(b) The sum of:

(i) the maximum effective gauge pressure to which the shell is designed as defined in (b) of the MAWP definition (see above); and

(ii) a head pressure determined on the basis of the dynamic forces specified in 6.7.3.2.9, but not less than 0.35 bar;

Design reference temperature means the temperature at which the vapour pressure of the contents is determined for the purpose of calculating the MAWP. The design reference temperature shall be less than the critical temperature of the non-refrigerated liquefied gas intended to be transported to ensure that the gas at all times is liquefied. This value for each portable tank type is as follows:

(a) Shell with a diameter of 1.5 metres or less: 65 °C;

(b) Shell with a diameter of more than 1.5 metres:

(i) without insulation or sun shield: 60 °C;

(ii) with sun shield (see 6.7.3.2.12): 55 °C; and

(iii) with insulation (see 6.7.3.2.12): 50 °C;

Design temperature range for the shell shall be -40 °C to 50 °C for non-refrigerated liquefied gases transported under ambient conditions. More severe design temperatures shall be considered for portable tanks subjected to severe climatic conditions;

Filling density means the average mass of non-refrigerated liquefied gas per litre of shell capacity (kg/l). The filling density is given in portable tank instruction T50 in 4.2.5.2.6;

Leakproofness test means a test using gas subjecting the shell and its service equipment to an effective internal pressure of not less than 25% of the MAWP;

Maximum allowable working pressure (MAWP) means a pressure that shall be not less than the highest of the following pressures measured at the top of the shell while in operating position, but in no case less than 7 bar:

(a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(b) The maximum effective gauge pressure to which the shell is designed, which shall be:

(i) for a non-refrigerated liquefied gas listed in the portable tank instruction T50 in 4.2.4.2.6, the MAWP (in bar) given in T50 portable tank instruction for that gas;

(ii) for other non-refrigerated liquefied gases, not less than the sum of:

- the absolute vapour pressure (in bar) of the non-refrigerated liquefied gas at the design reference temperature minus 1 bar; and
- the partial pressure (in bar) of air or other gases in the ullage space being determined by the design reference temperature and the liquid phase expansion due to an increase of the mean bulk temperature of t_r-t_f (t_f = filling temperature, usually 15 °C, t_r = 50 °C maximum mean bulk temperature);

Maximum permissible gross mass (MPGM) means the sum of the tare mass of the portable tank and the heaviest load authorized for transport;

Mild steel means a steel with a guaranteed minimum tensile strength of 360 N/mm^2 to 440 N/mm^2 and a guaranteed minimum elongation at fracture conforming to 6.7.3.3.3.3;

Portable tank means a multimodal tank having a capacity of more than 450 litres used for the transport of non-refrigerated liquefied gases of Class 2. The portable tank includes a shell fitted with service equipment and structural equipment necessary for the transport of gases. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be loaded onto a transport vehicle or ship and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Road tank-vehicles, rail tank-wagons, non-metallic tanks, intermediate bulk containers (IBCs), gas cylinders and large receptacles are not considered to fall within the definition for portable tanks;

Reference steel means a steel with a tensile strength of 370 N/mm^2 and an elongation at fracture of 27%;

Service equipment means measuring instruments and filling, discharge, venting, safety and insulating devices;

Shell means the part of the portable tank which retains the non-refrigerated liquefied gas intended for transport (tank proper), including openings and their closures, but does not include service equipment or external structural equipment;

Structural equipment means the reinforcing, fastening, protective and stabilizing members external to the shell;

Test pressure means the maximum gauge pressure at the top of the shell during the pressure test.

6.7.3.2 *General design and construction requirements*

6.7.3.2.1 Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code recognized by the competent authority. Shells shall be made of steel suitable for forming. The materials shall in principle conform to national or international material standards. For welded shells, only a material whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford complete safety. When the manufacturing process or the materials make it necessary, the shells shall be suitability heat-treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material the design temperature range shall be taken into account with respect to risk of brittle fracture, to stress corrosion cracking and to resistance to impact. When fine grain steel is used, the guaranteed value of the yield strength shall be not more than 460 N/mm^2 and the guaranteed value of the upper limit of the tensile strength shall be not more than 725 N/mm^2 according to the material specification. Portable tank materials shall be suitable for the external environment in which they may be transported.

6.7.3.2.2 Portable tank shells, fittings and pipework shall be constructed of materials which are:

(a) Substantially immune to attack by the non-refrigerated liquefied gas(es) intended to be transported; or

(b) Properly passivated or neutralized by chemical reaction.

6.7.3.2.3 Gaskets shall be made of materials compatible with the non-refrigerated liquefied gas(es) intended to be transported.

6.7.3.2.4 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.3.2.5 The materials of the portable tank, including any devices, gaskets, and accessories, shall not adversely affect the non-refrigerated liquefied gas(es) intended for transport in the portable tank.

6.7.3.2.6 Portable tanks shall be designed and constructed with supports to provide a secure base during transport and with suitable lifting and tie-down attachments.

6.7.3.2.7 Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and transport. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank, have been taken into account.

6.7.3.2.8 Shells shall be designed to withstand an external pressure of at least 0.4 bar gauge above the internal pressure without permanent deformation. When the shell is to be subjected to a significant vacuum before filling or during discharge it shall be designed to withstand an external pressure of at least 0.9 bar gauge above the internal pressure and shall be proven at that pressure.

6.7.3.2.9 Portable tanks and their fastenings shall, under the maximum permissible load, be capable of absorbing the following separately applied static forces:

(a) In the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)*;

(b) Horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)*;

(c) Vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)*; and

(d) Vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)*.

6.7.3.2.10 Under each of the forces in 6.7.3.2.9, the safety factor to be observed shall be as follows:

(a) For steels having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or

(b) For steels with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.

* *For calculation purposes g = 9.81 m/s^2.*

6.7.3.2.11 The values of yield strength or proof strength shall be the values according to national or international material standards. When austenitic steels are used, the specified minimum values of yield strength and proof strength according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the steel in question, the value of yield strength or proof strength used shall be approved by the competent authority.

6.7.3.2.12 When the shells intended for the transport of non-refrigerated liquefied gases are equipped with thermal insulation, the thermal insulation systems shall satisfy the following requirements:

(a) It shall consist of a shield covering not less than the upper third but not more than the upper half of the surface of the shell and separated from the shell by an air space about 40 mm across; or

(b) It shall consist of a complete cladding of adequate thickness of insulating materials protected so as to prevent the ingress of moisture and damage under normal conditions of transport and so as to provide a thermal conductance of not more than 0.67 ($W \cdot m^{-2} \cdot K^{-1}$);

(c) When the protective covering is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas tightness of the shell or of its items of equipment;

(d) The thermal insulation shall not inhibit access to the fittings and discharge devices.

6.7.3.2.13 Portable tanks intended for the transport of flammable non-refrigerated liquefied gases shall be capable of being electrically earthed.

6.7.3.3 ***Design criteria***

6.7.3.3.1 Shells shall be of a circular cross-section.

6.7.3.3.2 Shells shall be designed and constructed to withstand a test pressure not less than 1.3 times the design pressure. The shell design shall take into account the minimum MAWP values provided in portable tank instruction T50 in 4.2.5.2.6 for each non-refrigerated liquefied gas intended for transport. Attention is drawn to the minimum shell thickness requirements for these shells specified in 6.7.3.4.

6.7.3.3.3 For steels exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels) the primary membrane stress in the shell shall not exceed 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure, where:

Re = yield strength in N/mm^2, or 0.2% proof strength or, for austenitic steels, 1% proof strength;

Rm = minimum tensile strength in N/mm^2.

6.7.3.3.3.1 The values of Re and Rm to be used shall be the specified minimum values according to national or international material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the steel in question, the values of Re and Rm used shall be approved by the competent authority or its authorized body.

6.7.3.3.3.2 Steels which have an Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio shall be the values specified in the material inspection certificate.

6.7.3.3.3.3 Steels used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels.

6.7.3.3.3.4 For the purpose of determining actual values for materials, it shall be noted that for sheet metal, the axis of the tensile test specimen shall be at right angles (transversely) to the direction of rolling. The permanent elongation at fracture shall be measured on test specimens of rectangular cross sections in accordance with ISO 6892:1998 using a 50 mm gauge length.

6.7.3.4 ***Minimum shell thickness***

6.7.3.4.1 The minimum shell thickness shall be the greater thickness based on:

(a) The minimum thickness determined in accordance with the requirements in 6.7.3.4; and

(b) The minimum thickness determined in accordance with the recognized pressure vessel code including the requirements in 6.7.3.3.

6.7.3.4.2 The cylindrical portions, ends (heads) and manhole covers of shells of not more than 1.80 m in diameter shall be not less than 5 mm thick in the reference steel or of equivalent thickness in the steel to be used. Shells of more than 1.80 m in diameter shall be not less than 6 mm thick in the reference steel or of equivalent thickness in the steel to be used.

6.7.3.4.3 The cylindrical portions, ends (heads) and manhole covers of all shells shall be not less than 4 mm thick regardless of the material of construction.

6.7.3.4.4 The equivalent thickness of a steel other than the thickness prescribed for the reference steel in 6.7.3.4.2 shall be determined using the following formula:

$$e_1 = \frac{21.4 e_0}{\sqrt[3]{Rm_1 \; x \; A_1}}$$

where:

e_1 = required equivalent thickness (in mm) of the steel to be used;

e_0 = minimum thickness (in mm) for the reference steel specified in 6.7.3.4.2;

Rm_1 = guaranteed minimum tensile strength (in N/mm^2) of the steel to be used (see 6.7.3.3.3);

A_1 = guaranteed minimum elongation at fracture (in %) of the steel to be used according to national or international standards.

6.7.3.4.5 In no case shall the wall thickness be less than that prescribed in 6.7.3.4.1 to 6.7.3.4.3. All parts of the shell shall have a minimum thickness as determined by 6.7.3.4.1 to 6.7.3.4.3. This thickness shall be exclusive of any corrosion allowance.

6.7.3.4.6 When mild steel is used (see 6.7.3.1), calculation using the formula in 6.7.3.4.4 is not required.

6.7.3.4.7 There shall be no sudden change of plate thickness at the attachment of the ends (heads) to the cylindrical portion of the shell.

6.7.3.5 *Service equipment*

6.7.3.5.1 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during handling and transport. When the connection between the frame and the shell allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external forces (for example using shear sections). The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

6.7.3.5.2 All openings with a diameter of more than 1.5 mm in shells of portable tanks, except openings for pressure-relief devices, inspection openings and closed bleed holes, shall be fitted with at least three mutually independent shut-off devices in series, the first being an internal stop-valve, excess flow valve or equivalent device, the second being an external stop-valve and the third being a blank flange or equivalent device.

6.7.3.5.2.1 When a portable tank is fitted with an excess flow valve the excess flow valve shall be so fitted that its seating is inside the shell or inside a welded flange or, when fitted externally, its mountings shall be designed so that in the event of impact its effectiveness shall be maintained. The excess flow valves shall be selected and fitted so as to close automatically when the rated flow specified by the manufacturer is reached. Connections and accessories leading to or from such a valve shall have a capacity for a flow more than the rated flow of the excess flow valve.

6.7.3.5.3 For filling and discharge openings the first shut-off device shall be an internal stop-valve and the second shall be a stop-valve placed in an accessible position on each discharge and filling pipe.

6.7.3.5.4 For filling and discharge bottom openings of portable tanks intended for the transport of flammable and/or toxic non-refrigerated liquefied gases the internal stop-valve shall be a quick closing safety device which closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. Except for portable tanks having a capacity of not more than 1 000 litres, it shall be possible to operate this device by remote control.

6.7.3.5.5 In addition to filling, discharge and gas pressure equalizing orifices, shells may have openings in which gauges, thermometers and manometers can be fitted. Connections for such instruments shall be made by suitable welded nozzles or pockets and not be screwed connections through the shell.

6.7.3.5.6 All portable tanks shall be fitted with manholes or other inspection openings of suitable size to allow for internal inspection and adequate access for maintenance and repair of the interior.

6.7.3.5.7 External fittings shall be grouped together so far as reasonably practicable.

6.7.3.5.8 Each connection on a portable tank shall be clearly marked to indicate its function.

6.7.3.5.9 Each stop-valve or other means of closure shall be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperatures expected during transport. All stop-valves with a screwed spindle shall close by a clockwise motion of the handwheel. For other stop-valves the position (open and closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed to prevent unintentional opening.

6.7.3.5.10 Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration. All piping shall be of suitable metallic material. Welded pipe joints shall be used wherever possible.

6.7.3.5.11 Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The joints shall not decrease the strength of tubing as may happen when cutting threads.

6.7.3.5.12 The burst pressure of all piping and pipe fittings shall be not less than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure-relief devices).

6.7.3.5.13 Ductile metals shall be used in the construction of valves and accessories.

6.7.3.6 *Bottom openings*

6.7.3.6.1 Certain non-refrigerated liquefied gases shall not be transported in portable tanks with bottom openings. When portable tank instruction T50 in 4.2.5.2.6 indicates that bottom openings are not allowed, there shall be no openings below the liquid level of the shell when it is filled to its maximum permissible filling limit.

6.7.3.7 *Pressure-relief devices*

6.7.3.7.1 Portable tanks shall be provided with one or more spring-loaded pressure-relief devices. The pressure-relief devices shall open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. These devices shall, after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts and shall remain closed at all lower pressures. The pressure-relief devices shall be of a type that will resist dynamic forces including liquid surge. Frangible discs not in series with a spring-loaded pressure-relief device are not permitted.

6.7.3.7.2 Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

6.7.3.7.3 Portable tanks intended for the transport of certain non-refrigerated liquefied gases identified in portable tank instruction T50 in 4.2.5.2.6 shall have a pressure-relief device approved by the competent authority. Unless a portable tank in dedicated service is fitted with an approved relief device constructed of materials compatible with the load, such device shall comprise a frangible disc preceding a spring-loaded device. The space between the frangible disc and the device shall be provided with a pressure gauge or a suitable tell-tale indicator. This arrangement permits the detection of disc rupture, pinholing or leakage which could cause a malfunction of the pressure-relief device. The frangible discs shall rupture at a nominal pressure 10% above the start-to-discharge pressure of the relief device.

6.7.3.7.4 In the case of multi-purpose portable tanks, the pressure-relief devices shall open at a pressure indicated in 6.7.3.7.1 for the gas having the highest maximum allowable pressure of the gases allowed to be transported in the portable tank.

6.7.3.8 *Capacity of relief devices*

6.7.3.8.1 The combined delivery capacity of the relief devices shall be sufficient that, in the event of total fire engulfment, the pressure (including accumulation) inside the shell does not exceed 120% of the MAWP. Spring-loaded relief devices shall be used to achieve the full relief capacity prescribed. In the case of multi-purpose tanks, the combined delivery capacity of the pressure-relief devices shall be taken for the gas which requires the highest delivery capacity of the gases allowed to be transported in portable tanks.

6.7.3.8.1.1 To determine the total required capacity of the relief devices, which shall be regarded as being the sum of the individual capacities of the several devices, the following formula* shall be used:

$$Q = 12.4 \frac{FA^{0.82}}{LC} \sqrt{\frac{ZT}{M}}$$

where:

Q = minimum required rate of discharge in cubic metres of air per second (m^3/s) at standard conditions: 1 bar and 0 °C (273 K);

F = is a coefficient with the following value:
for uninsulated shells ***F*** = 1;
for insulated shells ***F*** = U(649-t)/13.6 but in no case is less than 0.25 where:
U = thermal conductance of the insulation, in $kW \cdot m^{-2} \cdot K^{-1}$, at 38 °C,
t = actual temperature of the non-refrigerated liquefied gas during filling(°C); when this temperature is unknown, let ***t*** = 15 °C:

The value of ***F*** given above for insulated shells may be taken provided that the insulation is in conformance with 6.7.3.8.1.2;

A = total external surface area of shell in square metres;

Z = the gas compressibility factor in the accumulating condition (when this factor is unknown, let ***Z*** equal 1.0);

T = absolute temperature in Kelvin (°C + 273) above the pressure-relief devices in the accumulating condition;

L = the latent heat of vaporization of the liquid, in kJ/kg, in the accumulating condition;

M = molecular mass of the discharged gas;

C = a constant which is derived from one of the following formulae as a function of the ratio k of specific heats.

$$k = \frac{c_p}{c_v}$$

where

c_p is the specific heat at constant pressure; and
c_v is the specific heat at constant volume.

* *This formula applies only to non-refrigerated liquefied gases which have critical temperatures well above the temperature at the accumulating condition. For gases which have critical temperatures near or below the temperature at the accumulating condition, the calculation of the pressure-relief device delivery capacity shall consider further thermodynamic properties of the gas (see for example CGA S-1.2-1995).*

when k > 1:

$$C = \sqrt{k\left(\frac{2}{k+1}\right)^{\frac{k+1}{k-1}}}$$

when k = 1 or k is unknown

$$C = \frac{1}{\sqrt{e}} = 0.607$$

where *e* is the mathematical constant 2.7183

C may also be taken from the following table:

k	C	k	C	k	C
1.00	0.607	1.26	0.660	1.52	0.704
1.02	0.611	1.28	0.664	1.54	0.707
1.04	0.615	1.30	0.667	1.56	0.710
1.06	0.620	1.32	0.671	1.58	0.713
1.08	0.624	1.34	0.674	1.60	0.716
1.10	0.628	1.36	0.678	1.62	0.719
1.12	0.633	1.38	0.681	1.64	0.722
1.14	0.637	1.40	0.685	1.66	0.725
1.16	0.641	1.42	0.688	1.68	0.728
1.18	0.645	1.44	0.691	1.70	0.731
1.20	0.649	1.46	0.695	2.00	0.770
1.22	0.652	1.48	0.698	2.20	0.793
1.24	0.656	1.50	0.701		

6.7.3.8.1.2 Insulation systems, used for the purpose of reducing the venting capacity, shall be approved by the competent authority or its authorized body. In all cases, insulation systems approved for this purpose shall:

(a) Remain effective at all temperatures up to 649 °C; and

(b) Be jacketed with a material having a melting point of 700 °C or greater.

6.7.3.9 ***Marking of pressure-relief devices***

6.7.3.9.1 Every pressure-relief device shall be plainly and permanently marked with the following:

(a) The pressure (in bar or kPa) at which it is set to discharge;

(b) The allowable tolerance at the discharge pressure for spring-loaded devices;

(c) The reference temperature corresponding to the rated pressure for frangible discs; and

(d) The rated flow capacity of the device in standard cubic metres of air per second (m^3/s).

When practicable, the following information shall also be shown:

(e) The manufacturer-s name and relevant catalogue number.

6.7.3.9.2 The rated flow capacity marked on the pressure-relief devices shall be determined according to ISO 4126-1:1991.

6.7.3.10 ***Connections to pressure-relief devices***

6.7.3.10.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the safety device. No stop-valve shall be installed between the shell and the pressure-relief devices except when duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that at least one of the duplicate devices is always operable and capable of meeting the requirements of 6.7.3.8. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the shell to that device. Vents from the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving device.

6.7.3.11 ***Siting of pressure-relief devices***

6.7.3.11.1 Each pressure-relief device inlet shall be situated on top of the shell in a position as near the longitudinal and transverse centre of the shell as reasonably practicable. All pressure relief device inlets shall under maximum filling conditions be situated in the vapour space of the shell and the devices shall be so arranged as to ensure that the escaping vapour is discharged unrestrictedly. For flammable non-refrigerated liquefied gases, the escaping vapour shall be directed away from the shell in such a manner that it cannot impinge upon the shell. Protective devices which deflect the flow of vapour are permissible provided the required relief-device capacity is not reduced.

6.7.3.11.2 Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the portable tank overturning.

6.7.3.12 ***Gauging devices***

6.7.3.12.1 Unless a portable tank is intended to be filled by weight it shall be equipped with one or more gauging devices. Glass level-gauges and gauges made of other fragile material, which are in direct communication with the contents of the shell shall not be used.

6.7.3.13 ***Portable tank supports, frameworks, lifting and tie-down attachments***

6.7.3.13.1 Portable tanks shall be designed and constructed with a support structure to provide a secure base during transport. The forces specified in 6.7.3.2.9 and the safety factor specified in 6.7.3.2.10 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.3.13.2 The combined stresses caused by portable tank mountings (e.g. cradles, frameworks, etc.) and portable tank lifting and tie-down attachments shall not cause excessive stress in any portion of the shell. Permanent lifting and tie-down attachments shall be fitted to all portable tanks. Preferably they shall be fitted to the portable tank supports but may be secured to reinforcing plates located on the shell at the points of support.

6.7.3.13.3 In the design of supports and frameworks the effects of environmental corrosion shall be taken into account.

6.7.3.13.4 Forklift pockets shall be capable of being closed off. The means of closing forklift pockets shall be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have closed off forklift pockets provided that:

(a) The shell and all the fittings are well protected from being hit by the forklift blades; and

(b) The distance between the centres of the forklift pockets is at least half of the maximum length of the portable tank.

6.7.3.13.5 When portable tanks are not protected during transport, according to 4.2.2.3, the shells and service equipment shall be protected against damage to the shell and service equipment resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include:

(a) Protection against lateral impact which may consist of longitudinal bars protecting the shell on both sides at the level of the median line;

(b) Protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;

(c) Protection against rear impact which may consist of a bumper or frame;

(d) Protection of the shell against damage from impact or overturning by use of an ISO frame in accordance with ISO 1496-3:1995.

6.7.3.14 ***Design approval***

6.7.3.14.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. This certificate shall attest that a portable tank has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter and where appropriate the provisions for gases provided in portable tank instruction T50 in 4.2.5.2.6. When a series of portable tanks are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the gases allowed to be transported, the materials of construction of the shell and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, i.e. the distinguishing sign for use in international traffic, as prescribed by the Convention on Road Traffic, Vienna 1968, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.3.14.2 The prototype test report for the design approval shall include at least the following:

(a) The results of the applicable framework test specified in ISO 1496-3:1995;

(b) The results of the initial inspection and test in 6.7.3.15.3; and

(c) The results of the impact test in 6.7.3.15.1, when applicable.

6.7.3.15 ***Inspection and testing***

6.7.3.15.1 For portable tanks meeting the definition of container in the CSC, a prototype representing each design shall be subjected to an impact test. The prototype portable tank shall be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the MPGM of the fully loaded portable tank at a duration typical of the mechanical shocks experienced in rail transport. The following is a listing of standards describing methods acceptable for performing the impact test:

Association of American Railroads,
Manual of Standards and Recommended Practices,
Specifications for Acceptability of Tank Containers (AAR.600), 1992

Canadian Standards Association (CSA),
Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods
(B620-1987)

Deutsche Bahn AG
Zentralbereich Technik, Minden
Portable tanks, longitudinal dynamic impact test

Société Nationale des Chemins de Fer Français
C.N.E.S.T. 002-1966.
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6.7.3.15.2 The shell and items of equipment of each portable tank shall be inspected and tested before being put into service for the first time (initial inspection and test) and thereafter at not more than five-year intervals (5 year periodic inspection and test) with an intermediate periodic inspection and test (2.5 year periodic inspection and test) midway between the 5 year periodic inspections and tests. The 2.5 year inspection and test may be performed within 3 months of the specified date. An exceptional inspection and test shall be performed regardless of the last periodic inspection and test when necessary according to 6.7.3.15.7.

6.7.3.15.3 The initial inspection and test of a portable tank shall include a check of the design characteristics, an internal and external examination of the portable tank and its fittings with due regard to the non-refrigerated liquefied gases to be transported, and a pressure test referring to the test pressures according to 6.7.3.3.2. The pressure test may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its authorized body. Before the portable tank is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the shell and its fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test. All welds subject to full stress level in the shell shall be inspected during the initial test by radiographic, ultrasonic, or another suitable non-destructive test method. This does not apply to the jacket.

6.7.3.15.4 The 5 year periodic inspection and test shall include an internal and external examination and, as a general rule, a hydraulic pressure test. Sheathing, thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. When the shell and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.3.15.5 The intermediate 2.5 year periodic inspection and test shall at least include an internal and external examination of the portable tank and its fittings with due regard to the non-refrigerated liquefied gases intended to be transported, a leakproofness test and a test of the satisfactory operation of all service equipment. Sheathing thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. For portable tanks intended for the transport of a single non-refrigerated liquefied gas, the 2.5 year internal examination may be waived or substituted by other test methods or inspection procedures specified by the competent authority or its authorized body.

6.7.3.15.6 A portable tank may not be filled and offered for transport after the date of expiry of the last 5 year or 2.5 year periodic inspection and test as required by 6.7.3.15.2. However a portable tank filled prior to the date of expiry of the last periodic inspection and test may be transported for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a portable tank may be transported after the date of expiry of the last periodic test and inspection:

(a) After emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; and

(b) Unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the transport document.

6.7.3.15.7 The exceptional inspection and test is necessary when the portable tank shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the portable tank. It shall include at least the 2.5 year inspection and test according to 6.7.3.15.5.

6.7.3.15.8 The internal and external examinations shall ensure that:

(a) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for transport;

(b) The piping, valves, and gaskets are inspected for corroded areas, defects, or any other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or transport;

(c) Devices for tightening manhole covers are operative and there is no leakage at manhole covers or gaskets;

(d) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;

(e) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;

(f) Required markings on the portable tank are legible and in accordance with the applicable requirements; and

(g) The framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.

6.7.3.15.9 The inspections and tests in 6.7.3.15.1, 6.7.3.15.3, 6.7.3.15.4, 6.7.3.15.5 and 6.7.3.15.7 shall be performed or witnessed by an expert approved by the competent authority or its authorized body. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the portable tank. While under pressure, the portable tank shall be inspected for any leaks in the shell, piping or equipment.

6.7.3.15.10 In all cases when cutting, burning or welding operations on the shell have been effected, that work shall be to the approval of the competent authority or its authorized body taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure shall be performed after the work is completed.

6.7.3.15.11 When evidence of any unsafe condition is discovered, the portable tank shall not be returned to service until it has been corrected and the pressure test is repeated and passed.

6.7.3.16 ***Marking***

6.7.3.16.1 Every portable tank shall be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements, the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum at least the following information shall be marked on the plate by stamping or by any other similar method.

Country of manufacture

U	Approval	Approval	For Alternative Arrangements (see 6.7.1.2):
N	Country	Number	"AA"

Manufacturer's name or mark

Manufacturer's serial number

Authorized body for the design approval

Owner's registration number

Year of manufacture

Pressure vessel code to which the shell is designed

Test pressure _____ bar/kPa gauge*

MAWP_____ bar/kPa gauge*

External design pressure** _____ bar/kPa gauge*

Design temperature range _____ °C to _____ °C

Design reference temperature _____ °C

Water capacity at 20°C _____ litres

Initial pressure test date and witness identification

Shell material(s) and material standard reference(s)

Equivalent thickness in reference steel _____ mm

Date and type of most recent periodic test(s)

Month _____ Year _____ Test pressure _____ bar/kPa gauge*

Stamp of expert who performed or witnessed the most recent test

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* *The unit used shall be marked.*

** *See 6.7.3.2.8.*

6.7.3.16.2 The following information shall be marked either on the portable tank itself or on a metal plate firmly secured to the portable tank:

Name of the operator

Name of non-refrigerated liquefied gas(es) permitted for transport

Maximum permissible load mass for each non-refrigerated liquefied gas permitted _____ kg

Maximum permissible gross mass (MPGM) _____ kg

Unladen (tare) mass _____ kg

NOTE: *For the identification of the non-refrigerated liquefied gases being transported, see also Part 5.*

6.7.3.16.3 If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" shall be marked on the identification plate.

6.7.4 Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of refrigerated liquefied gases

6.7.4.1 *Definitions*

For the purposes of this section:

Holding time means the time that will elapse from the establishment of the initial filling condition until the pressure has risen due to heat influx to the lowest set pressure of the pressure limiting device(s);

Jacket means the outer insulation cover or cladding which may be part of the insulation system;

Leakproofness test means a test using gas subjecting the shell and its service equipment, to an effective internal pressure not less than 90% of the MAWP;

Maximum allowable working pressure (MAWP) means the maximum effective gauge pressure permissible at the top of the shell of a loaded portable tank in its operating position including the highest effective pressure during filling and discharge;

Maximum permissible gross mass (MPGM) means the sum of the tare mass of the portable tank and the heaviest load authorized for transport;

Minimum design temperature means the temperature which is used for the design and construction of the shell not higher than the lowest (coldest) temperature (service temperature) of the contents during normal conditions of filling, discharge and transport;

Portable tank means a thermally insulated multimodal tank having a capacity of more than 450 litres fitted with service equipment and structural equipment necessary for the transport of refrigerated liquefied gases. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the tank, and shall be capable of being lifted when full. It shall be designed primarily to be loaded onto a transport vehicle or ship and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Road tank-vehicles, rail tank-wagons, non-metallic tanks, intermediate bulk containers (IBCs), gas cylinders and large receptacles are not considered to fall within the definition for portable tanks;

Reference steel means a steel with a tensile strength of 370 N/mm^2 and an elongation at fracture of 27%;

Shell means the part of the portable tank which retains the refrigerated liquefied gas intended for transport, including openings and their closures, but does not include service equipment or external structural equipment;

Service equipment means measuring instruments and filling, discharge, venting, safety, pressurizing, cooling and thermal insulation devices;

Structural equipment means the reinforcing, fastening, protective and stabilizing members external to the shell;

Tank means a construction which normally consists of either:

(a) A jacket and one or more inner shells where the space between the shell(s) and the jacket is exhausted of air (vacuum insulation) and may incorporate a thermal insulation system; or

(b) A jacket and an inner shell with an intermediate layer of solid thermally insulating material (e.g. solid foam);

Test pressure means the maximum gauge pressure at the top of the shell during the pressure test.

6.7.4.2 ***General design and construction requirements***

6.7.4.2.1 Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code recognized by the competent authority. Shells and jackets shall be made of metallic materials suitable for forming. Jackets shall be made of steel. Non-metallic materials may be used for the attachments and supports between the shell and jacket, provided their material properties at the minimum design temperature are proven to be sufficient. The materials shall in principle conform to national or international material standards. For welded shells and jackets only materials whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford complete safety. When the manufacturing process or the materials make it necessary, the shell shall be suitably heat treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material, the minimum design temperature shall be taken into account with respect to risk of brittle fracture, to hydrogen embrittlement, to stress corrosion cracking and to resistance to impact. When fine grain steel is used, the guaranteed value of the yield strength shall be not more than 460 N/mm^2 and the guaranteed value of the upper limit of the tensile strength shall be not more than 725 N/mm^2 in accordance with the material specifications. Portable tank materials shall be suitable for the external environment in which they may be transported.

6.7.4.2.2 Any part of a portable tank, including fittings, gaskets and pipe-work, which can be expected normally to come into contact with the refrigerated liquefied gas transported shall be compatible with that refrigerated liquefied gas.

6.7.4.2.3 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.4.2.4 The thermal insulation system shall include a complete covering of the shell(s) with effective insulating materials. External insulation shall be protected by a jacket so as to prevent the ingress of moisture and other damage under normal transport conditions.

6.7.4.2.5 When a jacket is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulation space.

6.7.4.2.6 Portable tanks intended for the transport of refrigerated liquefied gases having a boiling point below minus 182 °C at atmospheric pressure shall not include materials which may react with oxygen or oxygen enriched atmospheres in a dangerous manner, when located in parts of the thermal insulation when there is a risk of contact with oxygen or with oxygen enriched fluid.

6.7.4.2.7 Insulating materials shall not deteriorate unduly in service.

6.7.4.2.8 A reference holding time shall be determined for each refrigerated liquefied gas intended for transport in a portable tank.

6.7.4.2.8.1 The reference holding time shall be determined by a method recognized by the competent authority on the basis of the following:

(a) The effectiveness of the insulation system, determined in accordance with 6.7.4.2.8.2;

(b) The lowest set pressure of the pressure limiting device(s);

(c) The initial filling conditions;

(d) An assumed ambient temperature of 30 °C;

(e) The physical properties of the individual refrigerated liquefied gas intended to be transported.

6.7.4.2.8.2 The effectiveness of the insulation system (heat influx in watts) shall be determined by type testing the portable tank in accordance with a procedure recognized by the competent authority. This test shall consist of either:

(a) A constant pressure test (for example at atmospheric pressure) when the loss of refrigerated liquefied gas is measured over a period of time; or

(b) A closed system test when the rise in pressure in the shell is measured over a period of time.

When performing the constant pressure test, variations in atmospheric pressure shall be taken into account. When performing either tests corrections shall be made for any variation of the ambient temperature from the assumed ambient temperature reference value of 30 °C.

NOTE: *For the determination of the actual holding time before each journey, refer to 4.2.3.7.*

6.7.4.2.9 The jacket of a vacuum-insulated double-wall tank shall have either an external design pressure not less than 100 kPa (1 bar) gauge pressure calculated in accordance with a recognized technical code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. Internal and external reinforcements may be included in calculating the ability of the jacket to resist the external pressure.

6.7.4.2.10 Portable tanks shall be designed and constructed with supports to provide a secure base during transport and with suitable lifting and tie-down attachments.

6.7.4.2.11 Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and transport. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank, have been taken into account.

6.7.4.2.12 Portable tanks and their fastenings under the maximum permissible load shall be capable of absorbing the following separately applied static forces:

(a) In the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)*;

(b) Horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)*;

(c) Vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)*; and

(d) Vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)*.

6.7.4.2.13 Under each of the forces in 6.7.4.2.12, the safety factor to be observed shall be as follows:

(a) For materials having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or

(b) For materials with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength or, for austenitic steels, the 1% proof strength.

6.7.4.2.14 The values of yield strength or proof strength shall be the values according to national or international material standards. When austenitic steels are used, the specified minimum values according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, or when non-metallic materials are used the values of yield strength or proof strength shall be approved by the competent authority.

6.7.4.2.15 Portable tanks intended for the transport of flammable refrigerated liquefied gases shall be capable of being electrically earthed.

6.7.4.3 ***Design criteria***

6.7.4.3.1 Shells shall be of a circular cross section.

6.7.4.3.2 Shells shall be designed and constructed to withstand a test pressure not less than 1.3 times the MAWP. For shells with vacuum insulation the test pressure shall not be less than 1.3 times the sum of the MAWP and 100 kPa (1 bar). In no case shall the test pressure be less than 300 kPa (3 bar) gauge pressure. Attention is drawn to the minimum shell thickness requirements, specified in 6.7.4.4.2 to 6.7.4.4.7.

6.7.4.3.3 For metals exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels) the primary membrane stress σ (sigma) in the shell shall not exceed 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure, where:

Re = yield strength in N/mm^2, or 0.2% proof strength or, for austenitic steels, 1% proof strength;

Rm = minimum tensile strength in N/mm^2.

* *For calculation purposes g = 9.81 m/s^2.*

6.7.4.3.3.1 The values of Re and Rm to be used shall be the specified minimum values according to national or international material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, the values of Re and Rm used shall be approved by the competent authority or its authorized body.

6.7.4.3.3.2 Steels which have a Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio shall be the values specified in the material inspection certificate.

6.7.4.3.3.3 Steels used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels. Aluminium and aluminium alloys used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/6Rm with an absolute minimum of 12%.

6.7.4.3.3.4 For the purpose of determining actual values for materials, it shall be noted that for sheet metal, the axis of the tensile test specimen shall be at right angles (transversely) to the direction of rolling. The permanent elongation at fracture shall be measured on test specimens of rectangular cross sections in accordance with ISO 6892:1998 using a 50 mm gauge length.

6.7.4.4 ***Minimum shell thickness***

6.7.4.4.1 The minimum shell thickness shall be the greater thickness based on:

(a) The minimum thickness determined in accordance with the requirements in 6.7.4.4.2 to 6.7.4.4.7; and

(b) The minimum thickness determined in accordance with the recognized pressure vessel code including the requirements in 6.7.4.3.

6.7.4.4.2 Shells of not more than 1.80 m in diameter shall be not less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells of more than 1.80 m in diameter shall be not less than 6 mm thick in the reference steel or of equivalent thickness in the metal to be used.

6.7.4.4.3 Shells of vacuum-insulated tanks of not more than 1.80 m in diameter shall be not less than 3 mm thick in the reference steel or of equivalent thickness in the metal to be used. Such shells of more than 1.80 m in diameter shall be not less than 4 mm thick in the reference steel or of equivalent thickness in the metal to be used.

6.7.4.4.4 For vacuum-insulated tanks, the aggregate thickness of the jacket and the shell shall correspond to the minimum thickness prescribed in 6.7.4.4.2, the thickness of the shell itself being not less than the minimum thickness prescribed in 6.7.4.4.3.

6.7.4.4.5 Shells shall be not less than 3 mm thick regardless of the material of construction.

6.7.4.4.6 The equivalent thickness of a metal other than the thickness prescribed for the reference steel in 6.7.4.4.2 and 6.7.4.4.3 shall be determined using the following formula:

$$e_1 = \frac{21.4\, x\, e_0}{\sqrt[3]{Rm_1\, x\, A_1}}$$

where:

e_1 = required equivalent thickness (in mm) of the metal to be used;

e_0 = minimum thickness (in mm) of the reference steel specified in 6.7.4.4.2 and 6.7.4.4.3;

Rm_1 = guaranteed minimum tensile strength (in N/mm^2) of the metal to be used (see 6.7.4.3.3);

A_1 = guaranteed minimum elongation at fracture (in %) of the metal to be used according to national or international standards.

6.7.4.4.7 In no case shall the wall thickness be less than that prescribed in 6.7.4.4.1 to 6.7.4.4.5. All parts of the shell shall have a minimum thickness as determined by 6.7.4.4.1 to 6.7.4.4.6. This thickness shall be exclusive of any corrosion allowance.

6.7.4.4.8 There shall be no sudden change of plate thickness at the attachment of the ends (heads) to the cylindrical portion of the shell.

6.7.4.5 *Service equipment*

6.7.4.5.1 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during handling and transport. When the connection between the frame and the tank or the jacket and the shell allows relative movement, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices), the stop-valve and its seating shall be protected against the danger of being wrenched off by external forces (for example using shear sections). The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

6.7.4.5.2 Each filling and discharge opening in portable tanks used for the transport of flammable refrigerated liquefied gases shall be fitted with at least three mutually independent shut-off devices in series, the first being a stop-valve situated as close as reasonably practicable to the jacket, the second being a stop-valve and the third being a blank flange or equivalent device. The shut-off device closest to the jacket shall be a quick closing device, which closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. This device shall also be possible to operate by remote control.

6.7.4.5.3 Each filling and discharge opening in portable tanks used for the transport of non-flammable refrigerated liquefied gases shall be fitted with at least two mutually independent shut-off devices in series, the first being a stop-valve situated as close as reasonably practicable to the jacket, the second a blank flange or equivalent device.

6.7.4.5.4 For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure relief shall be provided to prevent excess pressure build-up within the piping.

6.7.4.5.5 Vacuum insulated tanks need not have an opening for inspection.

6.7.4.5.6 External fittings shall be grouped together so far as reasonably practicable.

6.7.4.5.7 Each connection on a portable tank shall be clearly marked to indicate its function.

6.7.4.5.8 Each stop-valve or other means of closure shall be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperature expected during transport. All stop-valves with a screwed spindle shall be closed by a clockwise motion of the handwheel. In the case of other stop-valves the position (open and closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed to prevent unintentional opening.

6.7.4.5.9 When pressure-building units are used, the liquid and vapour connections to that unit shall be provided with a valve as close to the jacket as reasonably practicable to prevent the loss of contents in case of damage to the pressure-building unit.

6.7.4.5.10 Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration. All piping shall be of a suitable material. To prevent leakage due to fire, only steel piping and welded joints shall be used between the jacket and the connection to the first closure of any outlet. The method of attaching the closure to this connection shall be to the satisfaction of the competent authority or its authorized body. Elsewhere pipe joints shall be welded when necessary.

6.7.4.5.11 Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The joints shall not decrease the strength of the tubing as may happen when cutting threads.

6.7.4.5.12 The materials of construction of valves and accessories shall have satisfactory properties at the lowest operating temperature of the portable tank.

6.7.4.5.13 The burst pressure of all piping and pipe fittings shall be not less than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure-relief devices).

6.7.4.6 ***Pressure-relief devices***

6.7.4.6.1 Every shell shall be provided with not less than two independent spring-loaded pressure-relief devices. The pressure-relief devices shall open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. These devices shall, after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts and shall remain closed at all lower pressures. The pressure-relief devices shall be of the type that will resist dynamic forces including surge.

6.7.4.6.2 Shells for non-flammable refrigerated liquefied gases and hydrogen may in addition have frangible discs in parallel with the spring-loaded devices as specified in 6.7.4.7.2 and 6.7.4.7.3.

6.7.4.6.3 Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

6.7.4.6.4 Pressure-relief devices shall be approved by the competent authority or its authorized body.

6.7.4.7 ***Capacity and setting of pressure-relief devices***

6.7.4.7.1 In the case of the loss of vacuum in a vacuum-insulated tank or of loss of 20% of the insulation of a tank insulated with solid materials, the combined capacity of all pressure-relief devices installed shall be sufficient so that the pressure (including accumulation) inside the shell does not exceed 120% of the MAWP.

6.7.4.7.2 For non-flammable refrigerated liquefied gases (except oxygen) and hydrogen, this capacity may be achieved by the use of frangible discs in parallel with the required safety-relief devices. Frangible discs shall rupture at nominal pressure equal to the test pressure of the shell.

6.7.4.7.3 Under the circumstances described in 6.7.4.7.1 and 6.7.4.7.2 together with complete fire engulfment the combined capacity of all pressure-relief devices installed shall be sufficient to limit the pressure in the shell to the test pressure.

6.7.4.7.4 The required capacity of the relief devices shall be calculated in accordance with a well-established technical code recognized by the competent authority*.

6.7.4.8 ***Marking of pressure-relief devices***

6.7.4.8.1 Every pressure-relief device shall be plainly and permanently marked with the following:

(a) The pressure (in bar or kPa) at which it is set to discharge;

(b) The allowable tolerance at the discharge pressure for spring-loaded devices;

(c) The reference temperature corresponding to the rated pressure for frangible discs; and

(d) The rated flow capacity of the device in standard cubic meters of air per second (m^3/s).

When practicable, the following information shall also be shown:

(e) The manufacturer=s name and relevant catalogue number.

6.7.4.8.2 The rated flow capacity marked on the pressure-relief devices shall be determined according to ISO 4126-1:1991.

6.7.4.9 ***Connections to pressure-relief devices***

6.7.4.9.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the safety device. No stop-valve shall be installed between the shell and the pressure-relief devices except when duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that the requirements of 6.7.4.7 are always fulfilled. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the shell to that device. Pipework to vent the vapour or liquid from the outlet of the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving device.

6.7.4.10 ***Siting of pressure-relief devices***

6.7.4.10.1 Each pressure-relief device inlet shall be situated on top of the shell in a position as near the longitudinal and transverse centre of the shell as reasonably practicable. All pressure-relief device inlets shall under maximum filling conditions be situated in the vapour space of the shell and the devices shall be so arranged as to ensure that the escaping vapour is discharged unrestrictedly. For refrigerated liquefied gases, the escaping vapour shall be directed away from the tank and in such a manner that it cannot impinge upon the tank. Protective devices which deflect the flow of vapour are permissible provided the required relief-device capacity is not reduced.

6.7.4.10.2 Arrangements shall be made to prevent access to the devices by unauthorized persons and to protect the devices from damage caused by the portable tank overturning.

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* *See for example CGA Pamphlet S-1.2-1995.*

6.7.4.11 *Gauging devices*

6.7.4.11.1 Unless a portable tank is intended to be filled by weight, it shall be equipped with one or more gauging devices. Glass level-gauges and gauges made of other fragile material, which are in direct communication with the contents of the shell shall not be used.

6.7.4.11.2 A connection for a vacuum gauge shall be provided in the jacket of a vacuum-insulated portable tank.

6.7.4.12 *Portable tank supports, frameworks, lifting and tie-down attachments*

6.7.4.12.1 Portable tanks shall be designed and constructed with a support structure to provide a secure base during transport. The forces specified in 6.7.4.2.12 and the safety factor specified in 6.7.4.2.13 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.4.12.2 The combined stresses caused by portable tank mountings (e.g. cradles, frameworks, etc.) and portable tank lifting and tie-down attachments shall not cause excessive stress in any portion of the tank. Permanent lifting and tie-down attachments shall be fitted to all portable tanks. Preferably they shall be fitted to the portable tank supports but may be secured to reinforcing plates located on the tank at the points of support.

6.7.4.12.3 In the design of supports and frameworks the effects of environmental corrosion shall be taken into account.

6.7.4.12.4 Forklift pockets shall be capable of being closed off. The means of closing forklift pockets shall be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have closed off forklift pockets provided that:

(a) The tank and all the fittings are well protected from being hit by the forklift blades; and

(b) The distance between the centres of the forklift pockets is at least half of the maximum length of the portable tank.

6.7.4.12.5 When portable tanks are not protected during transport, according to 4.2.3.3, the shells and service equipment shall be protected against damage to the shell and service equipment resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include:

(a) Protection against lateral impact which may consist of longitudinal bars protecting the shell on both sides at the level of the median line;

(b) Protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;

(c) Protection against rear impact which may consist of a bumper or frame;

(d) Protection of the shell against damage from impact or overturning by use of an ISO frame in accordance with ISO 1496-3:1995;

(e) Protection of the portable tank from impact or overturning by a vacuum insulation jacket.

6.7.4.13 ***Design approval***

6.7.4.13.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. This certificate shall attest that a portable tank has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter. When a series of portable tanks is manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the refrigerated liquefied gases allowed to be transported, the materials of construction of the shell and jacket and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, i.e. the distinguishing sign for use in international traffic, as prescribed by the Convention on Road Traffic, Vienna 1968, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.4.13.2 The prototype test report for the design approval shall include at least the following:

(a) The results of the applicable frame-work test specified in ISO 1496-3:1995;

(b) The results of the initial inspection and test in 6.7.4.14.3; and

(c) The results of the impact test in 6.7.4.14.1, when applicable.

6.7.4.14 ***Inspection and testing***

6.7.4.14.1 For portable tanks meeting the definition of container in the CSC, a prototype representing each design shall be subjected to an impact test. The prototype portable tank shall be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the MPGM of the fully loaded portable tank at a duration typical of the mechanical shocks experienced in rail transport. The following is a listing of standards describing methods acceptable for performing the impact test:

Association of American Railroads,
Manual of Standards and Recommended Practices,
Specifications for Acceptability of Tank Containers (AAR.600), 1992

Canadian Standards Association (CSA),
Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods (B620-1987)

Deutsche Bahn AG
Zentralbereich Technik, Minden
Portable tanks, longitudinal dynamic impact test

Société Nationale des Chemins de Fer Français
C.N.E.S.T. 002-1966.
Tank containers, longitudinal external stresses and dynamic impact tests

Spoornet, South Africa
Engineering Development Centre (EDC)
Testing of ISO Tank Containers
Method EDC/EST/023/000/1991-06

6.7.4.14.2 The tank and items of equipment of each portable tank shall be inspected and tested before being put into service for the first time (initial inspection and test) and thereafter at not more than five-year intervals (5 year periodic inspection and test) with an intermediate periodic inspection and test (2.5 year periodic inspection and test) midway between the 5 year periodic inspections and tests. The 2.5 year inspection and test may be performed within 3 months of the specified date. An exceptional inspection and test shall be performed regardless of the last periodic inspection and test when necessary according to 6.7.4.14.7.

6.7.4.14.3 The initial inspection and test of a portable tank shall include a check of the design characteristics, an internal and external examination of the portable tank shell and its fittings with due regard to the refrigerated liquefied gases to be transported, and a pressure test referring to the test pressures according to 6.7.4.3.2. The pressure test may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its authorized body. Before the portable tank is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the shell and its fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test. All welds subject to full stress level shall be inspected during the initial test by radiographic, ultrasonic, or another suitable non-destructive test method. This does not apply to the jacket.

6.7.4.14.4 The 5 and 2.5 year periodic inspection and test shall include an external examination of the portable tank and its fittings with due regard to the refrigerated liquefied gases transported, a leakproofness test, a test of the satisfactory operation of all service equipment and a vacuum reading, when applicable. In the case of non-vacuum insulated tanks, the jacket and insulation shall be removed during a 2.5 year and a 5 year periodic inspection but only to the extent necessary for a reliable appraisal.

6.7.4.14.5 In addition, at the 5 year periodic inspection and test of non-vacuum insulated tanks the jacket and insulation shall be removed, but only to the extent necessary for a reliable appraisal.

6.7.4.14.6 A portable tank may not be filled and offered for transport after the date of expiry of the last 5 year or 2.5 year periodic inspection and test as required by 6.7.4.14.2. However a portable tank filled prior to the date of expiry of the last periodic inspection and test may be transported for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a portable tank may be transported after the date of expiry of the last periodic test and inspection:

(a) After emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; and

(b) Unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the transport document.

6.7.4.14.7 The exceptional inspection and test is necessary when the portable tank shows evidence of damaged or corroded areas, leakage, or any other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the portable tank. It shall include at least the 2.5 year inspection and test according to 6.7.4.14.4.

6.7.4.14.8 The internal examination during the initial inspection and test shall ensure that the shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, that might render the portable tank unsafe for transport.

6.7.4.14.9 The external examination shall ensure that:

(a) The external piping, valves, pressurizing/cooling systems when applicable and gaskets are inspected for corroded areas, defects, or any other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or transport;

(b) There is no leakage at any manhole covers or gaskets;

(c) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;

(d) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;

(e) Required markings on the portable tank are legible and in accordance with the applicable requirements; and

(f) The framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.

6.7.4.14.10 The inspections and tests in 6.7.4.14.1, 6.7.4.14.3, 6.7.4.14.4, 6.7.4.14.5 and 6.7.4.14.7 shall be performed or witnessed by an expert approved by the competent authority or its authorized body. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the portable tank. While under pressure, the portable tank shall be inspected for any leaks in the shell, piping or equipment.

6.7.4.14.11 In all cases when cutting, burning or welding operations on the shell of a portable tank have been effected, that work shall be to the approval of the competent authority or its authorized body taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure shall be performed after the work is completed.

6.7.4.14.12 When evidence of any unsafe condition is discovered, the portable tank shall not be returned to service until it has been corrected and the test is repeated and passed.

6.7.4.15 *Marking*

6.7.4.15.1 Every portable tank shall be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements, the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum at least the following information shall be marked on the plate by stamping or by any other similar method:

Country of manufacture

U	Approval	Approval	For Alternative Arrangements (see 6.7.1.2):
N	Country	Number	AAA@

Manufacturer's name or mark

Manufacturer's serial number

Authorized body for the design approval

Owner=s registration number

Year of manufacture

Pressure vessel code to which the tank is designed

Test pressure _____ bar/kPa gauge*

MAWP _____ bar/kPa gauge*

Minimum design temperature _____ °C

Water capacity at 20 °C _____ litres

Initial pressure test date and witness identification

Shell material(s) and material standard reference(s)

Equivalent thickness in reference steel _____ mm

Date and type of most recent periodic test(s)

Month _____ Year _____ Test pressure _____ bar/kPa gauge*

Stamp of expert who performed or witnessed the most recent test _____

The name, in full, of the gas(es) for whose transport the portable tank is approved

Either "thermally insulated" or "vacuum insulated" _____

effectiveness of the insulation system (heat influx) _____ Watts (W)

Reference holding time _____ days or hours and initial

Pressure _____ bar/kPa gauge* and degree of filling _____ in kg for each refrigerated liquefied gas permitted for transport.

6.7.4.15.2 The following information shall be durably marked either on the portable tank itself or on a metal plate firmly secured to the portable tank.

Name of the owner and the operator

Name of the refrigerated liquefied gas being transported (and minimum mean bulk temperature)

Maximum permissible gross mass (MPGM) _____ kg

Unladen (tare) mass _____ kg

Actual holding time for gas being transported _____ days (or hours)

NOTE: *For the identification of the refrigerated liquefied gas(es) being transported, see also Part 5.*

6.7.4.15.3 If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" shall be marked on the identification plate.

* *The unit used shall be marked.*

6.7.5 Requirements for the design, construction, inspection and testing of multiple-element gas containers (MEGCs) intended for the transport of non-refrigerated gases

6.7.5.1 *Definitions*

For the purposes of this section:

*Element*s are restricted to cylinders, tubes or bundles of cylinders;

Leakproofness test means a test using gas subjecting the elements and the service equipment of the MEGC to an effective internal pressure of not less than 20% of the test pressure;

Manifold means an assembly of piping and valves connecting the filling and/or discharge openings of the elements;

Maximum permissible gross mass (MPGM) means the sum of the tare mass of the MEGC and the heaviest load authorized for transport;

Service equipment means measuring instruments and filling, discharge, venting and safety devices;

Structural equipment means the reinforcing, fastening, protective and stabilizing members external to the elements.

6.7.5.2 *General design and construction requirements*

6.7.5.2.1 The MEGC shall be capable of being loaded and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the elements to provide structural integrity for handling and transport. MEGCs shall be designed and constructed with supports to provide a secure base during transport and with lifting and tie-down attachments which are adequate for lifting the MEGC including when loaded to its maximum permissible gross mass. The MEGC shall be designed to be loaded onto a transport unit or ship and shall be equipped with skids, mountings or accessories to facilitate mechanical handling.

6.7.5.2.2 MEGCs shall be designed, manufactured and equipped in such a way as to withstand all conditions to which they will be subjected during normal conditions of handling and transport. The design shall take into account the effects of dynamic loading and fatigue.

6.7.5.2.3 Elements of an MEGC shall be made of seamless steel and be constructed and tested according to Chapter 6.2. All of the elements in an MEGC shall be of the same design type.

6.7.5.2.4 Elements of MEGCs, fittings and pipework shall be:

(a) compatible with the substances intended to be transported (for gases see ISO 11114-1:1997 and ISO 11114-2:2000); or

(b) properly passivated or neutralized by chemical reaction.

6.7.5.2.5 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.5.2.6 The materials of the MEGC, including any devices, gaskets, and accessories, shall not adversely affect the gases intended for transport in the MEGC.

6.7.5.2.7 MEGCs shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and transport. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the multiple-element gas container, have been taken into account.

6.7.5.2.8 MEGCs and their fastenings shall, under the maximum permissible load, be capable of withstanding the following separately applied static forces:

(a) in the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)*;

(b) horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)*;

(c) vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)*; and

(d) vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)*.

6.7.5.2.9 Under the forces defined above, the stress at the most severely stressed point of the elements shall not exceed the values given in either the relevant standards of 6.2.2.1 or, if the elements are not designed, constructed and tested according to those standards, in the technical code or standard recognised or approved by the competent authority of the country of use (see 6.2.3.1).

6.7.5.2.10 Under each of the forces in 6.7.5.2.8, the safety factor for the framework and fastenings to be observed shall be as follows:

(a) for steels having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or

(b) for steels with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.

6.7.5.2.11 MEGCs intended for the transport of flammable gases shall be capable of being electrically earthed.

6.7.5.2.12 The elements shall be secured in a manner that prevents undesired movement in relation to the structure and the concentration of harmful localized stresses.

6.7.5.3 ***Service equipment***

6.7.5.3.1 Service equipment shall be configured or designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and transport. When the connection between the frame and the elements allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without damage to working parts. The manifolds, the discharge fittings (pipe sockets, shut-off devices), and the stop-valves shall be protected from being wrenched off by external forces. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the valves and the piping from shearing, or releasing the pressure receptacle contents. The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

* *For calculation purposes g = 9.81 m/s^2.*

6.7.5.3.2 Each element intended for the transport of gases of Division 2.3 shall be fitted with a valve. The manifold for liquefied gases of Division 2.3 shall be so designed that the elements can be filled separately and be kept isolated by a valve capable of being sealed. For the transport of gases of Division 2.1, the elements shall be isolated by a valve into assemblies of not more than 3000 litres.

6.7.5.3.3 For filling and discharge openings of the MEGC, two valves in series shall be placed in an accessible position on each discharge and filling pipe. One of the valves may be a non-return valve. The filling and discharge devices may be fitted to a manifold. For sections of piping which can be closed at both ends and where a liquid product can be trapped, a pressure-relief valve shall be provided to prevent excessive pressure build-up. The main isolation valves on an MEGC shall be clearly marked to indicate their directions of closure. Each stop-valve or other means of closure shall be designed and constructed to withstand a pressure equal to or greater than 1.5 times the test pressure of the MEGC. All stop-valves with screwed spindles shall close by a clockwise motion of the handwheel. For other stop-valves, the position (open or closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed and positioned to prevent unintentional opening. Ductile metals shall be used in the construction of valves or accessories.

6.7.5.3.4 Piping shall be designed, constructed and installed so as to avoid damage due to expansion and contraction, mechanical shock and vibration. Joints in tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The rated pressure of the service equipment and of the manifold shall be not less than two thirds of the test pressure of the elements.

6.7.5.4 *Pressure-relief devices*

6.7.5.4.1 One or more pressure relief devices shall be fitted on MEGCs used for the transport of UN 1013 carbon dioxide and UN 1070 nitrous oxide. Other MEGCs shall be fitted with pressure relief devices as specified by the competent authority for the country use.

6.7.5.4.2 When pressure relief devices are fitted, every element or group of elements of an MEGC that can be isolated shall then be fitted with one or more pressure relief devices. Pressure relief devices shall be of a type that will resist dynamic forces including liquid surge and shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

6.7.5.4.3 MEGCs used for the transport of certain non-refrigerated gases identified in instruction T50 in 4.2.5.2.6 may have a pressure-relief device as required by the competent authority of the country of use. Unless an MEGC in dedicated service is fitted with an approved pressure relief device constructed of materials compatible with the load, such a device shall comprise a frangible disc preceding a spring-loaded device. The space between the frangible disc and the spring-loaded device may be equipped with a pressure gauge or a suitable telltale indicator. This arrangement permits the detection of disc rupture, pinholing or leakage which could cause a malfunction of the pressure relief device. The frangible disc shall rupture at a nominal pressure 10% above the start-to-discharge pressure of the spring-loaded device.

6.7.5.4.4 In the case of multi-purpose MEGCs used for the transport of low-pressure liquefied gases, the pressure-relief devices shall open at a pressure as specified in 6.7.3.7.1 for the gas having the highest maximum allowable working pressure of the gases allowed to be transported in the MEGC.

6.7.5.5 *Capacity of pressure relief devices*

6.7.5.5.1 The combined delivery capacity of the pressure relief devices when fitted shall be sufficient that, in the event of total fire engulfment, the pressure (including accumulation) inside the elements does not exceed 120% of the set pressure of the pressure relief device. The formula provided in CGA S-1.2-1995 shall be used to determine the minimum total flow capacity for the system of pressure relief devices.CGA S-1.1-1994 may be used to determine the relief capacity of individual elements. Spring-loaded pressure relief devices may be used to achieve the full relief capacity prescribed in the case of low pressure liquefied gases. In the case of multi-purpose MEGCs, the combined delivery capacity of the pressure-relief devices shall be taken for the gas which requires the highest delivery capacity of the gases allowed to be transported in the MEGC.

6.7.5.5.2 To determine the total required capacity of the pressure relief devices installed on the elements for the transport of liquefied gases, the thermodynamic properties of the gas shall be considered (see, for example, CGA S-1.2-1995 for low pressure liquefied gases and CGA S-1.1-1994 for high pressure liquefied gases).

6.7.5.6 ***Marking of pressure-relief devices***

6.7.5.6.1 Spring loaded pressure relief devices shall be clearly and permanently marked with the following:

(a) the pressure (in bar or kPa) at which it is set to discharge;

(b) the allowable tolerance at the discharge pressure;

(c) the rated flow capacity of the device in standard cubic metres of air per second (m^3/s);

When practicable, the following information shall also be shown:

(d) the manufacturer's name and relevant catalogue number.

6.7.5.6.2 The rated flow capacity marked on frangible discs shall be determined according to CGA S-1.1-1994.

6.7.5.6.3 The rated flow capacity marked on spring loaded pressure relief devices for low pressure liquefied gases shall be determined according to ISO 4126-1:1991.

6.7.5.7 ***Connections to pressure-relief devices***

6.7.5.7.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the pressure relief device. No stop-valve shall be installed between the element and the pressure-relief devices, except when duplicate devices are provided for maintenance or other reasons, and the stop-valves serving the devices actually in use are locked open, or the stop-valves are interlocked so that at least one of the duplicate devices is always operable and capable of meeting the requirements of 6.7.5.5. There shall be no obstruction in an opening leading to or leaving from a vent or pressure-relief device which might restrict or cut-off the flow from the element to that device. The opening through all piping and fittings shall have at least the same flow area as the inlet of the pressure relief device to which it is connected. The nominal size of the discharge piping shall be at least as large as that of the pressure relief device outlet. Vents from the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum backpressure on the relieving device.

6.7.5.8 ***Siting of pressure-relief devices***

6.7.5.8.1 Each pressure relief device shall, under maximum filling conditions, be in communication with the vapour space of the elements for the transport of liquefied gases. The devices, when fitted, shall be so arranged as to ensure that the escaping vapour is discharged upwards and unrestrictedly as to prevent any impingement of escaping gas or liquid upon the MEGC, its elements or personnel. For flammable and oxidising gases, the escaping gas shall be directed away from the element in such a manner that it cannot impinge upon the other elements. Heat resistant protective devices which deflect the flow of gas are permissible provided the required pressure relief device capacity is not reduced.

6.7.5.8.2 Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the MEGC overturning.

6.7.5.9 *Gauging devices*

6.7.5.9.1 When a MEGC is intended to be filled by mass, it shall be equipped with one or more gauging devices. Level-gauges made of glass or other fragile material shall not be used.

6.7.5.10 *MEGC supports, frameworks, lifting and tie-down attachments*

6.7.5.10.1 MEGCs shall be designed and constructed with a support structure to provide a secure base during transport. The forces specified in 6.7.5.2.8 and the safety factor specified in 6.7.5.2.10 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.5.10.2 The combined stresses caused by element mountings (e.g. cradles, frameworks, etc.) and MEGC lifting and tie-down attachments shall not cause excessive stress in any element. Permanent lifting and tie-down attachments shall be fitted to all MEGCs. In no case shall mountings or attachments be welded onto the elements.

6.7.5.10.3 In the design of supports and frameworks, the effects of environmental corrosion shall be taken into account.

6.7.5.10.4 When MEGCs are not protected during transport, according to 4.2.5.3, the elements and service equipment shall be protected against damage resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the elements' contents upon impact or overturning of the MEGC on its fittings. Particular attention shall be paid to the protection of the manifold. Examples of protection include:

(a) protection against lateral impact which may consist of longitudinal bars;

(b) protection against overturning which may consist of reinforcement rings or bars fixed across the frame;

(c) protection against rear impact which may consist of a bumper or frame;

(d) protection of the elements and service equipment against damage from impact or overturning by use of an ISO frame in accordance with the relevant provisions of ISO 1496-3:1995.

6.7.5.11 *Design approval*

6.7.5.11.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a MEGC. This certificate shall attest that the MEGC has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter, the applicable provisions for gases of Chapter 4.1 and of packing instruction P200. When a series of MEGCs are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the materials of construction of the manifold, the standards to which the elements are made and an approval number. The approval number shall consist of the distinguishing sign or mark of the country granting the approval, i.e. the distinguishing sign for use in international traffic, as prescribed by the Convention on Road Traffic, Vienna 1968, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller MEGCs made of materials of the same type and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.5.11.2 The prototype test report for the design approval shall include at least the following:

(a) the results of the applicable framework test specified in ISO 1496-3:1995;

(b) the results of the initial inspection and test specified in 6.7.5.12.3;

(c) the results of the impact test specified in 6.7.5.12.1; and

(d) certification documents verifying that the cylinders and tubes comply with the applicable standards.

6.7.5.12 ***Inspection and testing***

6.7.5.12.1 For MEGCs meeting the definition of container in the CSC, a prototype representing each design shall be subjected to an impact test. The prototype MEGC shall be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the MPGM of the fully loaded MEGC at a duration typical of the mechanical shocks experienced in rail transport. The following is a listing of standards describing methods acceptable for performing the impact test:

Association of American Railroads,
Manual of Standards and Recommended Practices,
Specifications for Acceptability of Tank Containers (AAR.600), 1992

Canadian Standards Association (CSA),
Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods
(B620-1987)

Deutsche Bahn AG
Zentralbereich Technik, Minden
Transportable tanks, longitudinal dynamic impact test

Société Nationale des Chemins de Fer Français
C.N.E.S.T. 002-1966.
Tank containers, longitudinal external stresses and dynamic impact tests

Spoornet, South Africa
Engineering Development Centre (EDC)
Testing of ISO Tank Containers
Method EDC/TES/023/000/1991-06

6.7.5.12.2 The elements and items of equipment of each MEGC shall be inspected and tested before being put into service for the first time (initial inspection and test). Thereafter, MEGCs shall be inspected at no more than five-year intervals (5 year periodic inspection). An exceptional inspection and test shall be performed, regardless of the last periodic inspection and test, when necessary according to 6.7.5.12.5.

6.7.5.12.3 The initial inspection and test of an MEGC shall include a check of the design characteristics, an external examination of the MEGC and its fittings with due regard to the gases to be transported, and a pressure test performed at the test pressures according to packing instruction P200. The pressure test of the manifold may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its authorized body. Before the MEGC is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the elements and their fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.5.12.4 The 5-year periodic inspection shall include an external examination of the structure, the elements and the service equipment in accordance with 6.7.5.12.6. The elements and the piping shall be tested at the periodicity specified in packing instruction P200 and in accordance with the provisions described in 6.2.1.5. When the elements and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.5.12.5 An exceptional inspection and test is necessary when the MEGC shows evidence of damaged or corroded areas, leakage, or other conditions that indicate a deficiency that could affect the integrity of the MEGC. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the MEGC. It shall include at least the examinations required under 6.7.5.12.6.

6.7.5.12.6 The examinations shall ensure that:

(a) the elements are inspected externally for pitting, corrosion, abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the MEGC unsafe for transport;

(b) the piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including leakage, that might render the MEGC unsafe for filling, discharge or transport;

(c) missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;

(d) all emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;

(e) required markings on the MEGC are legible and in accordance with the applicable requirements; and

(f) the framework, the supports and the arrangements for lifting the MEGC are in satisfactory condition.

6.7.5.12.7 The inspections and tests in 6.7.5.12.1, 6.7.5.12.3, 6.7.5.12.4 and 6.7.5.12.5 shall be performed or witnessed by a body authorized by the competent authority. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the MEGC. While under pressure, the MEGC shall be inspected for any leaks in the elements, piping or equipment.

6.7.5.12.8 When evidence of any unsafe condition is discovered, the MEGC shall not be returned to service until it has been corrected and the applicable tests and verifications are passed.

6.7.5.13 *Marking*

6.7.5.13.1 Every MEGC shall be fitted with a corrosion resistant metal plate permanently attached to the MEGC in a conspicuous place readily accessible for inspection. The elements shall be marked in accordance with 6.2. At least the following information shall be marked on the plate by stamping or by any other similar method:

Country of manufacture

U	Approval	Approval	For Alternative Arrangements (see 6.7.1.2):
N	Country	Number	"AA"

Manufacturer's name or mark

Manufacturer's serial number

Authorized body for the design approval

Year of manufacture

Test pressure: _____ bar gauge

Design temperature range _____ °C to _____ °C

Number of elements _____

Total water capacity _____litres

Initial pressure test date and identification of the authorised body

Date and type of most recent periodic tests

Year _____ Month _____

Stamp of the authorised body who performed or witnessed the most recent test

NOTE: *No metal plate may be fixed to the elements.*

6.7.5.13.2 The following information shall be marked on a metal plate firmly secured to the MEGC:

Name of the operator
Maximum permissible load mass _____ kg
Working pressure at 15°C: _____ bar gauge
Maximum permissible gross mass (MPGM) _____ kg
Unladen (tare) mass _____ kg

PART 7

PROVISIONS CONCERNING TRANSPORT OPERATIONS

Introductory note

NOTE: *In general, development of the detailed provisions of this Part would be left to national, modal or regional authorities. For the purposes of these regulations, Chapter 7.1 contains operational provisions that are applicable to all modes of transport. An additional chapter is provided, but generally reserved, for additional provisions applicable to the individual modes of transport that may be added by national, modal or regional authorities.*

CHAPTER 7.1

PROVISIONS CONCERNING TRANSPORT OPERATIONS BY ALL MODES OF TRANSPORT

7.1.1 Application and general provisions

7.1.1.1 This Chapter contains provisions applicable to dangerous goods transport operations by all modes of transport.

7.1.1.2 Dangerous goods shall not be accepted for transport, or transported, unless those goods have been properly classified, packaged, marked, labelled, placarded, described and certified on a transport document, and are otherwise in a condition for transport as required by these Regulations.

7.1.1.3 Packages containing dangerous goods shall be secured by suitable means in the transport unit in a manner that will prevent any movement during the journey which would change the orientation of the packages or cause them to be damaged.

7.1.1.4 During loading and unloading, packagings containing dangerous goods shall be protected from being damaged. Particular attention shall be paid to the handling of packages during their preparation for transport, to the type of transport unit on which they are to be carried and to the method of loading or unloading, so that accidental damage is not caused through dragging or mishandling of the packages.

7.1.1.5 During transport, IBCs and large packagings shall be securely fixed or packed into the transport unit so as to prevent undesired lateral or longitudinal movement or impact and so as to provide adequate external support.

NOTE: *Additional operational requirements for the transport of packagings and IBCs are provided in the special packing provisions for packagings and IBCs (see Chapter 4.1).*

7.1.2 Segregation of dangerous goods

7.1.2.1 Incompatible goods shall be segregated from one another during transport. For the purposes of segregation, two substances or articles are considered mutually incompatible when their stowing together may result in undue hazards in the case of leakage, spillage, or any other accident. In this regard, detailed segregation requirements for substances and articles of Class 1 are provided in 7.1.3.1 and 7.1.3.2.

7.1.2.2 The extent of the hazard arising from possible reactions between incompatible dangerous goods may vary and the segregation arrangements required shall also vary as appropriate. In some instances such segregation may be obtained by requiring certain distances between incompatible dangerous goods. Intervening spaces between such dangerous goods may be filled with cargo compatible with the dangerous substances or articles in question.

7.1.2.3 The provisions of these Regulations are general in nature. The segregation provisions for each particular mode of transport shall be based on the following principles:

(a) Incompatible dangerous goods shall be segregated from one another so as to effectively minimize hazards in the event of accidental leakage or spillage or any other accident;

(b) Whenever dangerous goods are stowed together, the most stringent segregation provisions for any of the goods shall be applied;

(c) For packages required to bear a subsidiary risk label, the segregation appropriate to the subsidiary hazard shall be applied when it is more stringent than that required by the primary hazard.

7.1.2.4 An overpack shall not contain dangerous goods which react dangerously with one another.

7.1.3 Special provisions applicable to the transport of explosives

7.1.3.1 *Separation of goods of Class 1 of different compatibility groups*

NOTE: *The safety of explosive substances and articles would be enhanced by transporting each kind separately, but considerations of practicability and economics preclude such an ideal. In practice, a proper balance of the interest of safety against the other relevant factors necessitates a degree of mixing in the transport of explosive substances and articles of several kinds.*

7.1.3.1.1 The extent to which goods of Class 1 may be loaded together in transport is determined by the "compatibility" of the explosives. Goods of Class 1 are considered to be "compatible" if they can be transported together without significantly increasing either the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident.

7.1.3.1.2 Goods in Compatibility Groups A to K and N may be transported in accordance with the following provisions:

(a) Packages bearing the same compatibility group letter and the same division number may be transported together;

(b) Goods of the same compatibility group but different divisions may be transported together provided that the whole is treated as belonging to the division having the smaller number. However, when goods of Division 1.5, Compatibility Group D, are transported together with goods of Division 1.2, Compatibility Group D, the total of the consignment shall be treated as Division 1.1, Compatibility Group D, for the purposes of transport;

(c) Packages bearing different compatibility group letters shall not in general be transported together (regardless of the division number) except in the case of compatibility group letters C, D, E and S as explained in 7.1.3.1.3 and 7.1.3.1.4.

NOTE: *Other combinations of Compatibility Groups A to K and N may be permitted under provisions applicable to the individual mode of transport.*

7.1.3.1.3 Goods in Compatibility Groups C, D and E are permitted to be carried together in the same unit load or transport unit provided the over-all classification code is determined in accordance with the classification procedures in 2.1.3. The appropriate division is determined in accordance with 7.1.3.1.2 (b). Any combination of articles in Compatibility Groups C, D and E is assigned to Compatibility Group E. Any combination of substances in Compatibility Groups C and D shall be assigned to the most appropriate of the compatibility groups shown in 2.1.2.1.1, taking cognizance of the predominant characteristics of the combined load.

7.1.3.1.4 Goods in Compatibility Group S may be transported with goods in all compatibility groups other than A and L.

7.1.3.1.5 Goods in Compatibility Group L shall not be transported with goods in other compatibility groups. Furthermore, goods in Compatibility Group L may only be transported with the same type of goods within Compatibility Group L.

7.1.3.1.6 Goods of Compatibility Group N shall not in general (see 7.1.3.1.2 (b)) be transported with goods in other compatibility groups except S. However, if these goods are transported together with goods of Compatibility Groups C, D and E the goods of Compatibility Group N shall be considered as goods having Compatibility Group D (see also 7.1.3.1.3).

7.1.3.2 ***Mixed transport of goods of Class 1 with dangerous goods of other classes in freight containers, vehicles or wagons***

7.1.3.2.1 Except where otherwise specially provided for in these Regulations, goods of Class 1 shall not be transported together in freight containers, vehicles or wagons with dangerous goods of other classes.

7.1.3.2.2 Goods in Division 1.4, compatibility group S, may be transported together with dangerous goods of other classes.

7.1.3.2.3 Blasting explosives (except UN 0083 Explosive, blasting, type C) may be transported together with ammonium nitrate and inorganic nitrates of Class 5.1 (UN Nos. 1942 and 2067) provided the aggregate is treated as blasting explosives under Class 1 for the purposes of placarding, segregation, stowage and maximum permissible load.

7.1.3.2.4 Life-saving appliances (UN Nos. 3072 and 2990) containing Class 1 goods as equipment may be transported together with the same dangerous goods as contained in the appliances.

7.1.3.2.5 Air bag inflators, or air bag modules, or seat-belt pretensioners, of Division 1.4, compatibility group G, (UN 0503) may be transported with air bag inflators or air- bag modules or seat-belt pretensioners of Class 9 (UN 3268).

7.1.3.2.6 Freight containers, vehicles and wagons shall not be offered for the transport of explosive substances and articles of Class 1, unless the freight container, vehicle or wagon is structurally serviceable as witnessed by a current International Convention for Safe Containers (CSC) approval plate (applicable to freight containers only) and a detailed visual examination as follows:

(a) Prior to loading a freight container, vehicle or wagon with explosives, it shall be checked to ensure it is free of any residue of previous cargo and to ensure it is structurally serviceable and the interior floor and walls are free from protrusions;

(b) *Structurally serviceable* means that the freight container, vehicle or wagon is free from major defects in its structural components, e.g. top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a freight container. Major defects are dents or bends in structural members greater than 19 mm in depth, regardless of length; cracks or breaks in structural members; more than one splice or an improper splice (e.g. a lapped splice) in top or bottom end rails, or door headers or more than two splices in any one top or bottom side rail or any splice in a door sill or corner post; door hinges and hardware that are seized, twisted, broken, missing or otherwise inoperative, gaskets and seals that do not seal; or for freight containers, any distortion of the over-all configuration great enough to prevent proper alignment of handling equipment, mounting and securing on chassis, vehicle or wagon, or insertion into ships' cells;

(c) In addition, deterioration in any component of the container, vehicle or wagon, regardless of the material of construction, such as rusted-out metal in sidewalls or disintegrated fibreglass is unacceptable. Normal wear, however, including oxidization (rust), slight dents and scratches and other damage that do not affect serviceability or the weather-tight integrity of the units is acceptable.

7.1.3.2.7 For free-flowing powdery substances of 1.1C, 1.1D, 1.1G, 1.3C and 1.3G and fireworks of 1.1G, 1.2G and 1.3G, the floor of a freight container shall have a non-metallic surface or covering.

7.1.4 Special provisions applicable to the carriage of self-reactive substances of Division 4.1 and organic peroxides of Division 5.2

7.1.4.1 Where a number of packages are assembled in a freight container, closed road vehicle or unit load, the total quantity of substance, the type and number of packages and the stacking arrangement shall not create an explosion hazard.

7.1.4.2 All self-reactive substances and organic peroxides shall be protected from direct sunlight and all sources of heat, and placed in adequately ventilated areas.

7.1.4.3 Certain self-reactive substances when required by 2.4.2.3.4, and certain organic peroxides when required by 2.5.3.4.1, may only be transported under conditions where the temperature is controlled. In addition, if a self-reactive substance or organic peroxide which is not normally required to be transported under temperature control is transported under conditions where the temperature may exceed 55 °C, it may require temperature control. The requirements of 7.1.4.3.1 and 7.1.4.3.2 apply to the transport of such substances.

7.1.4.3.1 *Temperature control provisions*

7.1.4.3.1.1 The "control temperature" is 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. In the event of loss of temperature control, it may be necessary to implement emergency procedures. The "emergency temperature" is the temperature at which such procedures shall be implemented.

7.1.4.3.1.2 Derivation of control and emergency temperatures

Type of receptacle	SADT[1]	Control temperature	Emergency temperature
Single packagings and IBCs	20 °C or less over 20 °C to 35 °C over 35 °C	20 °C below SADT 15 °C below SADT 10 °C below SADT	10 °C below SADT 10 °C below SADT 5 °C below SADT
Portable tanks	< 50 °C	10 °C below SADT	5 °C below SADT

[1] *i.e. the SADT of the substance as packaged for transport.*

7.1.4.3.1.3 The control and emergency temperatures are derived using the table in 7.1.4.3.1.2 from the self-accelerating decomposition temperature (SADT) which is defined as the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used in transport. An SADT shall be determined in order to decide if a substance shall be subjected to temperature control during transport. Provisions for the determination of the SADT are given in 2.4.2.3.4 and 2.5.3.4.2 for self-reactive substances and organic peroxides, respectively.

7.1.4.3.1.4 Control and emergency temperatures, where appropriate, are provided for currently assigned self-reactive substances in 2.4.2.3.2.3 and for currently assigned organic peroxide formulations in 2.5.3.2.4. The actual transport temperature may be lower than the control temperature but shall be selected so as to avoid dangerous separation of phases.

7.1.4.3.2 *Transport under temperature control*

NOTE: *Since the circumstances to be taken into account differ for the various modes of transport, only general guidance is provided.*

7.1.4.3.2.1 Maintenance of the prescribed temperature is an essential feature of the safe transport of many self-reactive substances and organic peroxides. In general, there shall be:

(a) Thorough inspection of the transport unit prior to loading;

(b) Instructions to the carrier about the operation of the refrigeration system;

(c) Procedures to be followed in the event of loss of control;

(d) Regular monitoring of operating temperatures; and

(e) Provision of a back-up refrigeration system or spare parts.

7.1.4.3.2.2 Any control and temperature sensing devices in the refrigeration system shall be readily accessible and all electrical connections weather-proof. The temperature of air space within the transport unit shall be measured by two independent sensors and the output shall be recorded so that temperature changes are readily detectable. The temperature shall be checked every four to six hours and logged. When substances having a control temperature of less than +25 °C are carried, the transport unit shall be equipped with visible and audible alarms, powered independently of the refrigeration system, set to operate at or below the control temperature.

7.1.4.3.2.3 If during transport the control temperature is exceeded, an alert procedure shall be initiated involving any necessary repairs to the refrigeration equipment or an increase in the cooling capacity (e.g. by adding liquid or solid refrigerants). The temperature shall also be checked frequently and preparations made for implementation of the emergency procedures. If the emergency temperature is reached, the emergency procedures shall be initiated.

7.1.4.3.2.4 The suitability of a particular means of temperature control for transport depends on a number of factors. Factors to be considered include:

(a) The control temperature(s) of the substance(s) to be transported;

(b) The difference between the control temperature and the anticipated ambient temperature conditions;

(c) The effectiveness of the thermal insulation;

(d) The duration of transport; and

(e) Allowance of a safety margin for delays.

7.1.4.3.2.5 Suitable methods for preventing the control temperature being exceeded are, in order of increasing control capability:

(a) Thermal insulation; provided that the initial temperature of the organic peroxide(s) is sufficiently below the control temperature;

(b) Thermal insulation with coolant system; provided that:

(i) An adequate quantity of coolant (e.g. liquid nitrogen or solid carbon dioxide), allowing a reasonable margin for delay, is carried;

(ii) Liquid oxygen or air is not used as coolant;

(iii) There is a uniform cooling effect even when most of the coolant has been consumed; and

(iv) The need to ventilate the unit before entering is clearly indicated by a warning on the door(s) of the unit;

(c) Single mechanical refrigeration; provided that for organic peroxides with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings are used within the cooling compartment to prevent ignition of flammable vapours from the organic peroxides;

(d) Combined mechanical refrigeration system with coolant system; provided that:

(i) The two systems are independent of one another;

(ii) The provisions in (b) and (c) are complied with;

(e) Dual mechanical refrigeration system; provided that:

(i) Apart from the integral power supply unit, the two systems are independent of one another;

(ii) Each system alone is capable of maintaining adequate temperature control; and

(iii) For organic peroxides with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings are used within the cooling compartment to prevent ignition of flammable vapours from the organic peroxides.

7.1.5 Special provisions applicable to the transport of substances stabilized by temperature control (other than self-reactive substances and organic peroxides)

7.1.5.1 These provisions apply to the transport of substances for which:

(a) the proper shipping name contains the word "STABILIZED"; and

(b) the SADT (see 7.1.4.3.1.3) as presented for transport in the package, IBC or tank is 50 °C or lower.

When chemical inhibition is not used to stabilize a reactive substance which may generate dangerous amounts of heat and gas, or vapour, under normal transport conditions, these substances need to be transported under temperature control. These provisions do not apply to substances which are stabilized by the addition of chemical inhibitors such that the SADT is greater than 50 °C.

NOTE: *Some substances which are transported under temperature control are prohibited from transport by certain modes.*

7.1.5.2 The provisions in 7.1.4.3.1.1 to 7.1.4.3.1.3 and 7.1.4.3.2 apply to substances meeting criteria (a) and (b) in 7.1.5.1.

7.1.5.3 The actual transport temperature may be lower than the control temperature (see 7.1.4.3.1.1) but shall be selected so as to avoid dangerous separation of phases.

7.1.5.4 When these substances are transported in IBCs or portable tanks, the provisions for a SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED shall apply. For transport in IBCs, see the special provisions in 4.1.7.2 and the "Additional requirements" in packing instruction IBC520; for transport in portable tanks, see the additional provisions in 4.2.1.13.

7.1.5.5 If a substance the proper shipping name of which contains the word "STABILIZED" and which is not normally required to be transported under temperature control is transported under conditions where the temperature may exceed 55 °C, it may require temperature control.

7.1.6 Special provisions applicable to the transport of Division 6.1 (toxic) and Division 6.2 (infectious) substances

7.1.6.1 *Division 6.1 (toxic) substances*

7.1.6.1.1 *Segregation from foodstuffs*

Substances marked as or known to be toxic (Packing Groups I, II and III) shall not be carried in the same railway wagon, lorry, hold of a ship, compartment of an aircraft or other transport unit with substances marked as or known to be foodstuffs, feeds or other edible substances intended for consumption by humans or animals. Relaxation of this position may be allowed for substances of Packing Groups II and III provided the competent authority is satisfied that the packing and segregation are adequate to prevent the contamination of foodstuffs, feeds or other edible substances intended for consumption by humans or animals.

7.1.6.1.2 *Decontamination of transport units*

A railway wagon, lorry, cargo space of a ship, compartment of an aircraft or other transport unit which has been used to carry substances marked as or known to be toxic (Packing Groups I, II and III) shall, before re-use, be inspected for contamination. A railway wagon, lorry, hold of a ship, compartment of an aircraft or other transport unit which has been contaminated shall not be returned to service until such contamination has been removed.

7.1.6.2 *Division 6.2 (infectious) substances*

7.1.6.2.1 *Responsibility of carrier*

Carriers and their staff shall fully understand all applicable regulations for the packing, labelling, transport and documentation of consignments of infectious substances. The carrier shall accept and expedite the transport of consignments conforming to the rules in force. If the carrier finds any error in the labelling or documentation, he shall immediately notify the consignor or consignee so that the appropriate corrective measures may be taken.

7.1.6.2.2 *Action to be taken in the event of damage or leakage*

Any person responsible for the carriage of packages containing infectious substances who becomes aware of damage to or leakage from such packages shall:

(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; and

(d) Notify the consignor and/or the consignee.

7.1.7 Special provisions applicable to the transport of radioactive material

7.1.7.1 *Segregation*

7.1.7.1.1 Radioactive material shall be segregated sufficiently from workers and from members of the public. The following values for dose shall be used for the purpose of calculating segregation distances or radiation levels:

(a) For workers in regularly occupied working areas a dose of 5 mSv in a year;

(b) For members of the public, in areas where the public has regular access, a dose of 1 mSv in a year to the critical group.

7.1.7.1.2 Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such packages or overpacks.

7.1.7.1.3 Radioactive material shall be sufficiently segregated from undeveloped photographic film. The basis for determining segregation distances for this purpose shall be that the radiation exposure of undeveloped photographic film due to the transport of radioactive material be limited to 0.1 mSv per consignment of such film.

7.1.7.2 *Activity limits*

The total activity in a single hold or compartment of an inland water craft, or in another conveyance, for carriage of LSA material or SCO in Type IP-1, Type IP-2, Type IP-3 or unpackaged, shall not exceed the limits shown in Table 7.1.7.2.

Table 7.1.7.2: Conveyance activity limits for LSA material and SCO in industrial packages or unpackaged

Nature of material	Activity limit for conveyances other than by inland waterway	Activity limit for a hold or compartment of an inland water craft
LSA-I	No limit	No limit
LSA-II and LSA-III non-combustible solids	No limit	100 A_2
LSA-II and LSA-III combustible solids, and all liquids and gases	100 A_2	10 A_2
SCO	100 A_2	10 A_2

7.1.7.3 ***Stowage during transport and storage in transit***

7.1.7.3.1 Consignments shall be securely stowed.

7.1.7.3.2 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 approval certificate.

7.1.7.3.3 Loading of freight containers and accumulation of packages, overpacks and freight containers shall be controlled as follows:

(a) Except under the condition of exclusive use, the total number of packages, overpacks and freight containers aboard a single conveyance shall be so limited that the total sum of the transport indexes aboard the conveyance does not exceed the values shown in Table 7.1.7.3.3. For consignments of LSA-I material there shall be no limit on the sum of the transport indexes;

(b) Where a consignment is transported under exclusive use, there shall be no limit on the sum of the transport indexes aboard a single conveyance;

(c) The radiation level under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the conveyance;

(d) The total sum of the criticality safety indexes in a freight container and aboard a conveyance shall not exceed the values shown in Table 7.1.7.4.2.

Table 7.1.7.3.3: TI limits for freight containers and conveyances not under exclusive use

Type of freight container or conveyance	Limit on total sum of transport indexes in a freight container or aboard a conveyance
Freight container -- Small	50
Freight container -- Large	50
Vehicle	50
Aircraft	50
Passenger	200
Cargo	
Inland waterway vessel	50
Seagoing vessel[a]	
(1) Hold, compartment or defined deck area:	50
Packages, overpacks, small freight containers	200
Large freight containers	
(2) Total vessel:	
Packages, overpacks, small freight containers	200
Large freight containers	no limit

[a] *Packages or overpacks carried in or on a vehicle which are in accordance with the provisions of 7.2.3.1.3 may be transported by vessels provided that they are no removed from the vehicle at any time while on board the vessel.*

7.1.7.3.4 Any package or overpack having either a transport index greater than 10, or any consignment having a criticality safety index greater than 50, shall be transported only under exclusive use.

7.1.7.4 *Segregation of packages containing fissile material during transport and storage in transit*

7.1.7.4.1 The number of packages, overpacks and freight containers containing fissile material stored in transit in any one storage area shall be so limited that the total sum of the criticality safety indexes in any group of such packages, overpacks or freight containers does not exceed 50. Groups of such packages, overpacks and freight containers shall be stored so as to maintain a spacing of at least 6 m from other groups of such packages, overpacks or freight containers.

7.1.7.4.2 Where the total sum of the criticality safety indexes on board a conveyance or in a freight container exceeds 50, as permitted in Table 7.1.7.4.2, storage shall 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.

Table 7.1.7.4.2:CSI limits for freight containers and conveyances containing fissile material

Type of freight container or conveyance	Limit on total sum of criticality safety indexes in a freight container or aboard a conveyance	
	Not under exclusive use	**Under exclusive use**
Freight container -- Small	50	n.a.
Freight container -- Large	50	100
Vehicle	50	100
Aircraft		
Passenger	50	n.a.
Cargo	50	100
Inland waterway vessel	50	100
Seagoing vessel[a]		
(1) Hold, compartment or defined deck area:		
Packages, overpacks, small freight containers	50	100
Large freight containers	50	100
(2) Total vessel:		
Packages, overpacks, small freight containers	200[b]	200[c]
Large freight containers	No limit[b]	No limit[c]

[a] *Packages of overpacks carried in or on a vehicle which are in accordance with the provisions of 7.2.3.1.2 may be transported by vessels provided that they are not removed from the vehicle at any time while on board the vessel. In that case the entries under the heading "under exclusive use" apply.*

[b] *The consignment shall be so handled and stowed that the total sum of CSIs in any group does not exceed 50, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m.*

[c] *The consignment shall be so handled and stowed that the total sum of CSI-s in any group does not exceed 100, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m. For transport under exclusive use, the intervening space between groups may be occupied by other compatible cargo.*

7.1.7.5 *Damaged or leaking packages, contaminated packagings*

7.1.7.5.1 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 shall be restricted and a qualified person shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package. The scope of the assessment shall include the package, the conveyance, the adjacent loading and unloading areas, and, if necessary, all other material which has been carried in the conveyance. When necessary, additional steps for the protection of persons property and the environment, in accordance with provisions established by the relevant competent authority, shall be taken to overcome and minimize the consequences of such leakage or damage.

7.1.7.5.2 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 shall not be forwarded until repaired or reconditioned and decontaminated.

7.1.7.5.3 A conveyance and equipment used regularly for the transport of radioactive material shall be periodically checked to determine the level of contamination. The frequency of such checks shall be related to the likelihood of contamination and the extent to which radioactive material is transported.

7.1.7.5.4 Except as provided in 7.1.7.5.5, any conveyance, or equipment or part thereof which has become contaminated above the limits specified in 4.1.9.1.2 in the course of the transport of radioactive material, or which shows a radiation level in excess of 5 μSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless the non-fixed contamination does not exceed the limits specified in 4.1.9.1.2, and the radiation level resulting from the fixed contamination on surfaces after decontamination is less than 5 μSv/h at the surface.

7.1.7.5.5 An overpack, freight container, tank, intermediate bulk container or conveyance dedicated to the transport of radioactive material under exclusive use shall be excepted from the requirements of 4.1.9.1.4 and 7.1.7.5.4 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

7.1.7.6 *Other requirements*

7.1.7.6.1 Where a consignment is undeliverable, the consignment shall be placed in a safe location and the appropriate competent authority shall be informed as soon as possible and a request made for instructions on further action.

CHAPTER 7.2

MODAL PROVISIONS

7.2.1 Application and general provisions

7.2.1.1 This Chapter requires provisions applicable to dangerous goods transport operations by individual modes of transport. These provisions are in addition to those applicable to all modes of transport as provided in Chapter 7.1.

[reserved]

7.2.2 Special provisions applicable to the transport of portable tanks on vehicles

Portable tanks may only be transported on vehicles whose fastenings are capable, in conditions of maximum permissible loading of the portable tanks, of absorbing the forces specified in 6.7.2.2.12, 6.7.3.2.9 or 6.7.4.2.12, as appropriate.

[balance of chapter reserved]

7.2.3 Special provisions applicable to the transport of radioactive material

7.2.3.1 *Transport by rail and by road*

7.2.3.1.1 Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels shown in 5.2.2.2.2.1 as models No. 7A, 7B, 7C or 7E or carrying consignments under exclusive use, shall display the placard shown in Figure 5.3.1 (Model 7D) on each of:

(a) The two external lateral walls in the case of a rail vehicle;

(b) The two external lateral walls and the external rear wall in the case of a road vehicle.

In the case of a vehicle without sides the placards may be affixed directly on the cargo-carrying unit provided that they are readily visible; in the case of physically large tanks or freight containers, the placards on the tanks or freight containers shall suffice. In the case of vehicles which have insufficient area to allow the fixing of larger placards, the dimensions of the placard as described in Figure 5.3.1 may be reduced to 100 mm. Any placards which do not relate to the contents shall be removed.

7.2.3.1.2 For consignments under exclusive use, the radiation level shall not exceed:

(a) 10 mSv/h at any point on the external surface of any package or overpack, and may only exceed 2 mSv/h provided that:

(i) The vehicle is equipped with an enclosure which, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure, and

(ii) Provisions are made to secure the package or overpack so that its position within the vehicle enclosure remains fixed during routine conditions of transport, and

(iii) There is no loading or unloading during the shipment;

(b) 2 mSv/h at any point on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle; and

(c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle, or, if the load is transported in an open vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.

7.2.3.1.3 In the case of road vehicles, no persons other than the driver and assistants shall be permitted in vehicles carrying packages, overpacks or freight containers bearing category II-YELLOW or III-YELLOW labels.

7.2.3.2 ***Transport by vessels***

7.2.3.2.1 Packages or overpacks having a surface radiation level greater than 2 mSv/h, unless being carried in or on a vehicle under exclusive use in accordance with Table 7.1.6.3.3, footnote (a), shall not be transported by vessel except under special arrangement.

7.2.3.2.2 The transport of consignments by means of a special use vessel which, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in 7.1.6.3.3 provided that the following conditions are met:

(a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call;

(b) Stowage arrangements shall be predetermined for the whole voyage including any consignments to be loaded at ports of call en route; and

(c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.

7.2.3.3 ***Transport by air***

7.2.3.3.1 Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.

7.2.3.3.2 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 shall not be transported by air.

7.2.3.3.3 Packages or overpacks having a surface radiation level greater than 2 mSv/h shall not be transported by air except by special arrangement.

APPENDICES

APPENDIX A

LIST OF GENERIC AND N.O.S. PROPER SHIPPING NAMES

Substances or articles not mentioned specifically by name in the Dangerous Goods List in Chapter 3.2 must be classified in accordance with 3.1.1.2. Thus the name in the Dangerous Goods List which most appropriately describes the substance or article shall be used as the Proper Shipping Name. The main generic entries and all the N.O.S. entries given in the Dangerous Goods List are listed below. This proper shipping name shall be supplemented by the technical name when special provision 274 has been assigned to the entry in Column 6 of the Dangerous Goods List.

In this list generic and N.O.S. names are grouped according to their hazard class or division. Within each hazard class or division the names have been placed into three groups 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.

THE MOST SPECIFIC APPLICABLE NAME MUST ALWAYS BE USED.

APPENDIX A: LIST OF GENERIC OR N.O.S. PROPER SHIPPING NAMES

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 1
1		0190	SAMPLES, EXPLOSIVE, other than initiating explosive
			DIVISION 1.1
1.1A		0473	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1B		0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.1C		0462	ARTICLES, EXPLOSIVE, N.O.S.
1.1C		0474	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1C		0497	PROPELLANT, LIQUID
1.1C		0498	PROPELLANT, SOLID
1.1D		0463	ARTICLES, EXPLOSIVE, N.O.S.
1.1D		0475	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1E		0464	ARTICLES, EXPLOSIVE, N.O.S.
1.1F		0465	ARTICLES, EXPLOSIVE, N.O.S.
1.1G		0476	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1L		0354	ARTICLES, EXPLOSIVE, N.O.S.
1.1L		0357	SUBSTANCES, EXPLOSIVE, N.O.S.
			DIVISION 1.2
1.2B		0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
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.
1.2K	6.1	0020	AMMUNITION, TOXIC with burster, expelling charge or propelling charge
1.2L		0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge
1.2L		0355	ARTICLES, EXPLOSIVE, N.O.S.
1.2L		0358	SUBSTANCES, EXPLOSIVE, N.O.S.
			DIVISION 1.3
1.3C		0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.
1.3C		0470	ARTICLES, EXPLOSIVE, N.O.S.
1.3C		0477	SUBSTANCES, EXPLOSIVE, N.O.S.
1.3C		0495	PROPELLANT, LIQUID
1.3C		0499	PROPELLANT, SOLID
1.3G		0478	SUBSTANCES, EXPLOSIVE, N.O.S.
1.3K	6.1	0021	AMMUNITION, TOXIC with burster, expelling charge or propelling charge
1.3L		0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge
1.3L		0356	ARTICLES, EXPLOSIVE, N.O.S.
1.3L		0359	SUBSTANCES, EXPLOSIVE, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			DIVISION 1.4
1.4B		0350	ARTICLES, EXPLOSIVE, N.O.S.
1.4B		0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.4C		0351	ARTICLES, EXPLOSIVE, N.O.S.
1.4C		0479	SUBSTANCES, EXPLOSIVE, N.O.S.
1.4C		0501	PROPELLANT, SOLID
1.4D		0352	ARTICLES, EXPLOSIVE, N.O.S.
1.4D		0480	SUBSTANCES, 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.
1.4G		0485	SUBSTANCES, EXPLOSIVE, N.O.S.
1.4S		0349	ARTICLES, EXPLOSIVE, N.O.S.
1.4S		0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.4S		0481	SUBSTANCES, EXPLOSIVE, N.O.S.
			DIVISION 1.5
1.5D		0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S.
			DIVISION 1.6
1.6N		0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)
			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		1954	COMPRESSED GAS, FLAMMABLE, N.O.S.
2.1		3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.
2.1		3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid
2.1		3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			DIVISION 2.2
			Specific entries
		1078	REFRIGERANT GAS, N.O.S.
		1968	INSECTICIDE GAS, N.O.S.
			General entries
		1956	COMPRESSED GAS, N.O.S.
		3163	LIQUEFIED GAS, N.O.S.
		3158	GAS, REFRIGERATED LIQUID, N.O.S.
	5.1	3156	COMPRESSED GAS, OXIDIZING, N.O.S.
	5.1	3157	LIQUEFIED GAS, OXIDIZING, N.O.S.
	5.1	3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.
			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		1955	COMPRESSED GAS, TOXIC, N.O.S.
2.3		3162	LIQUEFIED GAS, TOXIC, N.O.S.
2.3		3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC. N.O.S., not refrigerated liquid
2.3	2.1	1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.
2.3	2.1	3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.
2.3	2.1	3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid
2.3	2.1 + 8	3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
2.3	2.1 + 8	3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
2.3	5.1	3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.
2.3	5.1	3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.
2.3	5.1 + 8	3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.
2.3	5.1 + 8	3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.
2.3	8	3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.
2.3	8	3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 3
			Specific entries
3		1224	KETONES, LIQUID, N.O.S.
3		1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.
3		1987	ALCOHOLS, N.O.S.
3		1989	ALDEHYDES, N.O.S.
3		2319	TERPENE HYDROCARBONS, N.O.S.
3		3271	ETHERS, N.O.S.
3		3272	ESTERS, N.O.S.
3		3295	HYDROCARBONS, LIQUID, N.O.S.
3		3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.
3		3343	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass
3		3357	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass
3	6.1	1228	MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or MERCAPTAN MIXTURE, LIQUID,FLAMMABLE, TOXIC, N.O.S.
3	6.1	1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.
3	6.1	1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.
3	6.1	2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.
3	6.1	3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.
3	6.1	3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.
3	8	2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.
3	8	2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.
3	8	3274	ALCOHOLATES SOLUTION, N.O.S., in alcohol
			Pesticides
3	6.1	2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point < 23 °C
3	6.1	2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point < 23 °C
3	6.1	2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point < 23 °C
3	6.1	2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point < 23 °C
3	6.1	2772	THIOCARBAMATE 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	2778	MERCURY BASED 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	2782	BIPYRIDILIUM 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	3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash point < 23 °C

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			Pesticides (cont'd)
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
			General entries
3		1993	FLAMMABLE LIQUID, N.O.S.
3		3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S., with flash point above 60.5 °C, at or above its flash point
3	6.1	1992	FLAMMABLE LIQUID, TOXIC, N.O.S.
3	6.1 + 8	3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.
3	8	2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 4
			DIVISION 4.1
			Specific entries
4.1		1353	FIBRES or FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.
4.1		3089	METAL POWDER, FLAMMABLE, N.O.S.
4.1		3182	METAL HYDRIDE, FLAMMABLE, N.O.S.
4.1		3221	SELF-REACTIVE LIQUID TYPE B
4.1		3222	SELF-REACTIVE SOLID TYPE B
4.1		3223	SELF-REACTIVE LIQUID TYPE C
4.1		3224	SELF-REACTIVE SOLID TYPE C
4.1		3225	SELF-REACTIVE LIQUID TYPE D
4.1		3226	SELF-REACTIVE SOLID TYPE D
4.1		3227	SELF-REACTIVE LIQUID TYPE E
4.1		3228	SELF-REACTIVE SOLID TYPE E
4.1		3229	SELF-REACTIVE LIQUID TYPE F
4.1		3230	SELF-REACTIVE SOLID TYPE F
4.1		3231	SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED
4.1		3232	SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED
4.1		3233	SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED
4.1		3234	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED
4.1		3235	SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED
4.1		3236	SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED
4.1		3237	SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED
4.1		3238	SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED
4.1		3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED
4.1		3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED
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
			General entries
4.1		1325	FLAMMABLE SOLID, ORGANIC, N.O.S.
4.1		3175	SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.
4.1		3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.
4.1		3178	FLAMMABLE SOLID, INORGANIC, N.O.S.
4.1		3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.
4.1	5.1	3097	FLAMMABLE SOLID, OXIDIZING, N.O.S.
4.1	6.1	2926	FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.
4.1	6.1	3179	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.
4.1	8	2925	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.
4.1	8	3180	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			DIVISION 4.2
			Specific entries
4.2		1373	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S., with oil
4.2		1378	METAL CATALYST, WETTED with a visible excess of liquid
4.2		1383	PYROPHORIC METAL, N.O.S. or PYROPHORIC ALLOY, N.O.S.
4.2		2006	PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.
4.2		2881	METAL CATALYST, DRY
4.2		3189	METAL POWDER, SELF-HEATING, N.O.S.
4.2		3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.
4.2		3313	ORGANIC PIGMENTS, SELF-HEATING
4.2		3342	XANTHATES
4.2	4.3	2003	METAL ALKYLS, WATER-REACTIVE, N.O.S. or METAL ARYLS, WATER-REACTIVE, N.O.S.
4.2	4.3	3049	METAL ALKYL HALIDES, WATER-REACTIVE, N.O.S. or METAL ARYL HALIDES, WATER-REACTIVE, N.O.S.
4.2	4.3	3050	METAL ALKYL HYDRIDES, WATER-REACTIVE, N.O.S. or METAL ARYL HYDRIDES, WATER-REACTIVE, N.O.S.
4.2	8	3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.
			General entries
4.2		2845	PYROPHORIC LIQUID, ORGANIC, N.O.S.
4.2		2846	PYROPHORIC SOLID, ORGANIC, N.O.S.
4.2		3088	SELF-HEATING SOLID, ORGANIC, N.O.S.
4.2		3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.
4.2		3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.
4.2		3190	SELF-HEATING SOLID, INORGANIC, N.O.S.
4.2		3194	PYROPHORIC LIQUID, INORGANIC, N.O.S.
4.2		3200	PYROPHORIC SOLID, INORGANIC, N.O.S.
4.2	4.3	3203	PYROPHORIC ORGANOMETALLIC COMPOUND, WATER-REACTIVE, N.O.S.
4.2	5.1	3127	SELF-HEATING SOLID, OXIDIZING, N.O.S.
4.2	6.1	3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.
4.2	6.1	3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.
4.2	6.1	3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.
4.2	6.1	3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.
4.2	8	3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.
4.2	8	3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.
4.2	8	3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.
4.2	8	3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.

	Subsidiary Risk	UN Number	Proper Shipping Name
			DIVISION 4.3
			Specific entries
4.3		1389	ALKALI METAL AMALGAM
4.3		1390	ALKALI METAL AMIDES
4.3		1391	ALKALI METAL DISPERSION or ALKALI EARTH METAL DISPERSION
4.3		1392	ALKALINE EARTH METAL AMALGAM
4.3		1393	ALKALINE EARTH METAL ALLOY, N.O.S.
4.3		1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.
4.3		1421	ALKALI METAL ALLOY, LIQUID, N.O.S.
4.3		3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.
4.3	3 + 8	2988	CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.
4.3	4.2	3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.
4.3	4.1	3372	ORGANOMETALLIC COMPOUND, SOLID, WATER-REACTIVE, FLAMMABLE, N.O.S.
			General entries
4.3		3148	WATER-REACTIVE LIQUID, N.O.S.
4.3		2813	WATER-REACTIVE SOLID, N.O.S.
4.3	3	3207	ORGANOMETALLIC COMPOUND or COMPOUND SOLUTION or COMPOUND DISPERSION, WATER-REACTIVE, FLAMMABLE, N.O.S.
4.3	4.1	3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.
4.3	4.2	3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.
4.3	5.1	3133	WATER-REACTIVE SOLID, OXIDIZING, N.O.S.
4.3	6.1	3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.
4.3	6.1	3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.
4.3	8	3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.
4.3	8	3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 5
			DIVISION 5.1
			Specific entries
5.1		1450	BROMATES, INORGANIC, N.O.S.
5.1		1461	CHLORATES, INORGANIC, N.O.S.
5.1		1462	CHLORITES, INORGANIC, N.O.S.
5.1		1477	NITRATES, INORGANIC, N.O.S.
5.1		1481	PERCHLORATES, INORGANIC, N.O.S.
5.1		1482	PERMANGANATES, INORGANIC, N.O.S.
5.1		1483	PEROXIDES, INORGANIC, N.O.S.
5.1		2072	AMMONIUM NITRATE FERTILIZER, N.O.S.
5.1		2627	NITRITES, INORGANIC, N.O.S.
5.1		3210	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
5.1		3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
5.1		3212	HYPOCHLORITES, INORGANIC, N.O.S.
5.1		3213	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
5.1		3214	PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
5.1		3215	PERSULPHATES, INORGANIC, N.O.S.
5.1		3216	PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
5.1		3218	NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
5.1		3219	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.
			General entries
5.1		1479	OXIDIZING SOLID, N.O.S.
5.1		3139	OXIDIZING LIQUID, 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	4.3	3121	OXIDIZING SOLID, WATER-REACTIVE, N.O.S.
5.1	6.1	3087	OXIDIZING SOLID, TOXIC, N.O.S.
5.1	6.1	3099	OXIDIZING LIQUID, TOXIC, N.O.S.
5.1	8	3085	OXIDIZING SOLID, CORROSIVE, N.O.S.
5.1	8	3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.

Class or Division	Subsidiary Risk	UN Number	Proper Shipping Name
			DIVISION 5.2
			Specific entries
5.2		3101	ORGANIC PEROXIDE TYPE B, LIQUID
5.2		3102	ORGANIC PEROXIDE TYPE B, SOLID
5.2		3103	ORGANIC PEROXIDE TYPE C, LIQUID
5.2		3104	ORGANIC PEROXIDE TYPE C, SOLID
5.2		3105	ORGANIC PEROXIDE TYPE D, LIQUID
5.2		3106	ORGANIC PEROXIDE TYPE D, SOLID
5.2		3107	ORGANIC PEROXIDE TYPE E, LIQUID
5.2		3108	ORGANIC PEROXIDE TYPE E, SOLID
5.2		3109	ORGANIC PEROXIDE TYPE F, LIQUID
5.2		3110	ORGANIC PEROXIDE TYPE F, SOLID
5.2		3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED
5.2		3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED
5.2		3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED
5.2		3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED
5.2		3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED
5.2		3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED
5.2		3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED
5.2		3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED
5.2		3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED
5.2		3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED

	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 6
			DIVISION 6.1
			Specific entries
6.1		1544	ALKALOIDS, SOLID, N.O.S. or ALKALOID SALTS, SOLID, 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		1583	CHLOROPICRIN MIXTURE, N.O.S.
6.1		1588	CYANIDES, INORGANIC, SOLID, N.O.S.
6.1		1601	DISINFECTANT, SOLID, TOXIC, N.O.S.
6.1		1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.
6.1		1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.
6.1		1693	TEAR GAS SUBSTANCE, LIQUID or SOLID, N.O.S.
6.1		1707	THALLIUM COMPOUND, N.O.S.
6.1		1851	MEDICINE, LIQUID, TOXIC, N.O.S.
6.1		1935	CYANIDE SOLUTION, N.O.S.
6.1		2024	MERCURY COMPOUND, LIQUID, N.O.S.
6.1		2025	MERCURY COMPOUND, SOLID, N.O.S.
6.1		2026	PHENYLMERCURIC COMPOUND, N.O.S.
6.1		2206	ISOCYANATES, TOXIC, N.O.S. or ISOCYANATE SOLUTION, TOXIC, N.O.S.
6.1		2291	LEAD COMPOUND, SOLUBLE, N.O.S.
6.1		2570	CADMIUM COMPOUND
6.1		2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.
6.1		2856	FLUOROSILICATES, N.O.S.
6.1		3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.
6.1		3141	ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.
6.1		3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.
6.1		3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.
6.1		3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.
6.1		3146	ORGANOTIN COMPOUND, SOLID, N.O.S.
6.1		3249	MEDICINE, SOLID, TOXIC, N.O.S.
6.1		3276	NITRILES, TOXIC, N.O.S.
6.1		3278	ORGANOPHOSPHORUS COMPOUND, TOXIC, N.O.S.
6.1		3280	ORGANOARSENIC COMPOUND, N.O.S.
6.1		3281	METAL CARBONYLS, N.O.S.
6.1		3282	ORGANOMETALLIC COMPOUND, TOXIC, N.O.S.
6.1		3283	SELENIUM COMPOUND, N.O.S.
6.1		3284	TELLURIUM COMPOUND, N.O.S.

	Subsidiary Risk	UN Number	Proper Shipping Name
			Specific entries (cont'd)
6.1		3285	VANADIUM COMPOUND, N.O.S.
6.1	3	3071	MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.
6.1	3	3080	ISOCYANATES, TOXIC, FLAMMABLE, N.O.S. or ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.
6.1	3	3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.
6.1	3	3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.
6.1	3 + 8	2742	CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
6.1	3 + 8	3362	CLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
6.1	8	3277	CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.
6.1	8	3361	CLOROSILANES, TOXIC, CORROSIVE, N.O.S.
			Pesticides
			(a) Solid
6.1		2588	PESTICIDE, SOLID, TOXIC, N.O.S.
6.1		2757	CARBAMATE PESTICIDE, SOLID, TOXIC
6.1		2759	ARSENICAL PESTICIDE, SOLID, TOXIC
6.1		2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC
6.1		2763	TRIAZINE PESTICIDE, SOLID, TOXIC
6.1		2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC
6.1		2775	COPPER BASED PESTICIDE, SOLID, TOXIC
6.1		2777	MERCURY BASED PESTICIDE, SOLID, TOXIC
6.1		2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC
6.1		2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC
6.1		2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC
6.1		2786	ORGANOTIN PESTICIDE, SOLID, TOXIC
6.1		3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC
6.1		3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC
6.1		3349	PYRETHROID PESTICIDE, SOLID, TOXIC
			(b) Liquid
6.1		2902	PESTICIDE, LIQUID, TOXIC, N.O.S.
6.1		2992	CARBAMATE PESTICIDE, LIQUID, TOXIC
6.1		2994	ARSENICAL PESTICIDE, LIQUID, TOXIC
6.1		2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC
6.1		2998	TRIAZINE PESTICIDE, LIQUID, TOXIC
6.1		3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC
6.1		3010	COPPER BASED PESTICIDE, LIQUID, TOXIC
6.1		3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC

	Subsidiary Risk	UN Number	Proper Shipping Name
			(b) Liquid (cont-d)
6.1		3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC
6.1		3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC
6.1		3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC
6.1		3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC
6.1		3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC
6.1		3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC
6.1		3352	PYRETHROID PESTICIDE, LIQUID, TOXIC
6.1	3	2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash point ≥ 23 °C
6.1	3	2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C
6.1	3	3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash point ≥ 23 °C

	Subsidiary Risk	UN Number	Proper Shipping Name
			General entries
6.1		2810	TOXIC LIQUID, ORGANIC, N.O.S.
6.1		2811	TOXIC SOLID, ORGANIC, N.O.S.
6.1		3172	TOXINS, EXTRACTED FROM LIVING SOURCES, N.O.S.
6.1		3243	SOLIDS CONTAINING TOXIC LIQUID, N.O.S.
6.1		3287	TOXIC LIQUID, INORGANIC, N.O.S.
6.1		3288	TOXIC SOLID, INORGANIC, N.O.S.
6.1		3315	CHEMICAL SAMPLE, TOXIC
6.1	3	2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.
6.1	4.1	2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
6.1	4.2	3124	TOXIC SOLID, SELF-HEATING, N.O.S.
6.1	4.3	3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.
6.1	4.3	3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.
6.1	5.1	3122	TOXIC LIQUID, OXIDIZING, N.O.S.
6.1	5.1	3086	TOXIC SOLID, OXIDIZING, N.O.S.
6.1	8	2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.
6.1	8	2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.
6.1	8	3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.
6.1	8	3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.
			DIVISION 6.2
			Specific entries
6.2		3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.
			General entries
6.2		2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS
6.2		2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only

	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 7
			General entries
7		2908	RADIOACTIVE MATERIAL, EXPECTED 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 or SCO-II), 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

	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 8
			Specific entries
8		1719	CAUSTIC ALKALI LIQUID, N.O.S.
8		1740	HYDROGENDIFLUORIDES, N.O.S.
8		1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.
8		2430	ALKYLPHENOLS, SOLID, N.O.S.(including C_2-C_{12} homologues)
8		2693	BISULPHITES, AQUEOUS SOLUTION, N.O.S.
8		2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.
8		2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.
8		2837	BISULPHATES, AQUEOUS SOLUTION
8		2987	CHLOROSILANES, CORROSIVE, N.O.S.
8		3145	ALKYLPHENOLS, LIQUID, N.O.S.(including C_2-C_{12} homologues)
8		3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.
8		3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.
8	3	2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.
8	3	2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.
			General entries
8		1759	CORROSIVE SOLID, N.O.S.
8		1760	CORROSIVE LIQUID, N.O.S.
8		3244	SOLIDS CONTAINING CORROSIVE LIQUID, 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		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	4.1	2921	CORROSIVE SOLID, FLAMMABLE, N.O.S.
8	4.2	3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.
8	4.2	3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.
8	4.3	3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.
8	4.3	3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.
8	5.1	3084	CORROSIVE SOLID, OXIDIZING, N.O.S.
8	5.1	3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.
8	6.1	2922	CORROSIVE LIQUID, TOXIC, N.O.S.
8	6.1	2923	CORROSIVE SOLID, TOXIC, N.O.S.

	Subsidiary Risk	UN Number	Proper Shipping Name
			CLASS 9
			General entries
9		3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
9		3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
9		3257	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash point (including molten metals, molten salts, etc.)
9		3258	ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C
9		3334	AVIATION REGULATED LIQUID, N.O.S.
9		3335	AVIATION REGULATED SOLID, N.O.S.

APPENDIX B

GLOSSARY OF TERMS

Caution: The explanations in this Glossary are for information only and are not to be used for purposes of hazard classification.

AIR BAG INFLATORS, PYROTECHNIC or AIR BAG MODULES, PYROTECHNIC or SEAT-BELT PRETENSIONERS, PYROTECHNIC

Articles which contain pyrotechnic substances and are used as life-saving vehicle airbags or seat belts.

Ammunition

Generic term related mainly to articles of military application consisting of all kind 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.

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.

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.

AMMUNITION, PROOF

Ammunition containing pyrotechnic substances, used to test the performance or strength of new ammunition, weapon component or assemblies.

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.

***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.

***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.

ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)

Articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation (under normal conditions of transport) and which have passed Test Series 7.

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.

***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.

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.

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.

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.

***BURSTERS*, explosive**

Articles consisting of a small charge of explosive used to open projectiles, or other ammunition in order to disperse their contents.

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.

CARTRIDGES, FLASH

Articles consisting of a casing, a primer and flash powder, all assembled in one piece ready for firing.

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 shall 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 Glossary under AMMUNITION, INCENDIARY etc.

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.

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.

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, or linear or rotary motion, or activate diaphragms, valves or switches or project fastening devices or extinguishing agents.

CARTRIDGES, SIGNAL

Articles designed to fire coloured flares or other signals from signal pistols, etc.

CARTRIDGES, SMALL ARMS

Ammunition consisting of a cartridge case fitted with a centre or rim fire primer and containing both a propelling charge and a solid projectile. 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 description. The term excludes: CARTRIDGES, SMALL ARMS, BLANK listed separately in the Dangerous Goods List; and some small arms cartridges which are listed under CARTRIDGES FOR WEAPONS, INERT PROJECTILE.

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.

CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER

Articles consisting of cartridge cases made partly or entirely from nitrocellulose.

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, plastics, metal or other material. The term excludes the following articles which are listed separately: bombs, mines, etc.

CHARGES, DEPTH

Articles consisting of a charge of detonating explosive contained in a drum or projectile. They are designed to detonate under water.

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.

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.

CHARGES, PROPELLING FOR CANNON

Articles consisting of a propellant charge in any physical form, with or without a casing, for use in a cannon.

***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.

CHARGES, SHAPED, FLEXIBLE, LINEAR

Articles consisting of a V-shaped core of a detonating explosive clad by a flexible metal sheath.

CHARGES, SUPPLEMENTARY, EXPLOSIVE

Articles consisting of a small removable booster used in the cavity of a projectile between the fuze and the bursting charge.

COMPONENTS, EXPLOSIVE TRAIN, N.O.S.

Articles containing an explosive designed to transmit the detonation or deflagration within an explosive train.

***CONTRIVANCES, WATER-ACTIVATED* with burster, expelling charge or propelling charge**

Articles whose functioning depends upon physico-chemical reaction of their contents with water.

***CORD, DETONATING,* flexible**

Article consisting of a core of detonating explosive enclosed in spun fabric, with plastics or other covering unless the spun fabric is sift-proof.

***CORD (FUSE), DETONATING,* metal clad**

Article 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.

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.

CUTTERS, CABLE, EXPLOSIVE

Articles consisting of a knife-edged device which is driven by a small charge of deflagrating explosive into an anvil.

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".

Detonators

Articles consisting of a small metal or plastics 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.

Entire load* and *total contents

The phrases "entire load" and "total contents" mean such a substantial proportion that the practical hazard shall 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 "explosion of the total contents" is used in testing a single article or package or a small stack of articles or packages.

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.

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 shall be in powdery, gelatinous or elastic form.

The term includes dynamite gelatine, blasting and gelatine dynamites.

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 shall not contain nitroglycerin, similar liquid organic nitrates, or chlorates.

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 shall not contain nitroglycerin or similar liquid organic nitrates.

EXPLOSIVE, BLASTING, TYPE D

Substances consisting of a mixture of organic nitrated compounds and combustible materials such as hydrocarbons and aluminium powder. Such explosives shall not contain nitroglycerin, similar liquid organic nitrates, chlorates or ammonium nitrate. The term generally includes plastic explosives.

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.

Explosive, deflagrating

A substance, e.g. 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 DETONATING SUBSTANCE (EIDS)

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.

Explosive, primary

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

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.

FIREWORKS

Pyrotechnic articles designed for entertainment.

Flares

Articles containing pyrotechnic substances which are designed for use to illuminate, identify, signal or warn. The term includes:

FLARES, AERIAL;
FLARES, SURFACE.

FLASH POWDER

Pyrotechnic substance which, when ignited, produces an intense light.

***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.

Fuse/Fuze (English text only)

Although these two words have a common origin (French fusée, fusil) and are sometimes considered to be different spellings, 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.

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.

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.

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.

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.

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, NON-DETONATING; FUZES, IGNITING; LIGHTERS, FUSE; PRIMERS, CAP TYPE; PRIMERS, TUBULAR.

***Ignition*, means of**

A general term used in connection with the method employed to ignite a deflagrating train of explosive or pyrotechnic substances (for example: 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 (for example: 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 very 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 shall be regarded as Compatibility Group B; an article with its own means of initiation, without two effective protective features, would be Compatibility Group F. On the other hand 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 shall have been approved by the competent 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.

***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.

LIGHTERS, FUSE

Articles of various design actuated by friction, percussion or electricity and used to ignite safety fuse.

Mass explosion

Explosion which affects almost the entire load virtually instantaneously.

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".

OXYGEN GENERATORS, CHEMICAL

Oxygen generators, chemical, are devices 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.

POWDER CAKE (POWDER PASTE), WETTED

Substance consisting of nitrocellulose impregnated with not more than 60% of nitroglycerin or other liquid organic nitrates or a mixture of these.

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".

PRIMERS, CAP TYPE

Articles consisting of a metal or plastics 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.

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.

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.

PROPELLANTS

Deflagrating explosive used for propulsion or for reducing the drag of projectiles.

PROPELLANTS, LIQUID

Substances consisting of a deflagrating liquid explosive, used for propulsion.

PROPELLANTS, SOLID

Substances consisting of a deflagrating solid explosive, used for propulsion.

RELEASE DEVICES, EXPLOSIVE

Articles consisting of a small charge of explosive with means of initiation. They sever rods or links to release equipment quickly.

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.

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.

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.

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.

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.

SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S.

Substances which present a mass explosion hazard but which are so insensitive that there is very little probability of initiation, or of transition from burning to detonation (under normal conditions of transport) and which have passed Test Series 5.

TORPEDOES

Articles containing an explosive or non-explosive propulsion system and designed to be propelled through water. They may 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.

TRACERS FOR AMMUNITION

Sealed articles containing pyrotechnic substances, designed to reveal the trajectory of a projectile.

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.

ALPHABETICAL INDEX OF

SUBSTANCES
AND ARTICLES

NOTES TO THE INDEX

1. This index is an alphabetical list of the substances and articles which are listed in numerical order in the Dangerous Goods List in Chapter 3.2.

2. For the purpose of determining the alphabetical order the following information has been ignored even when it forms part of the proper shipping name: numbers; Greek letters; the abbreviations "sec" and "tert"; and the letters "N" (nitrogen), "n" (normal), "o" (ortho) "m" (meta), "p" (para) and "N.O.S." (not otherwise specified).

3. The name of a substance or article in block capital letters indicates a proper shipping name.

4. The name of a substance or article in block capital letters followed by the word "see" indicates an alternative proper shipping name or part of a proper shipping name (except for PCBs).

5. An entry in lower case letters followed by the word "see" indicates that the entry is not a proper shipping name; it is a synonym.

6. Where an entry is partly in block capital letters and partly in lower case letters, the latter part is considered not to be part of the proper shipping name.

7. A proper shipping name may be used in the singular or plural, as appropriate, for the purposes of documentation and package marking.

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AMMONIUM HYDROGEN-DIFLUORIDE SOLUTION	8	2817
AMMONIUM HYDROGEN SULPHATE	8	2506
Ammonium hydrosulphide solution (treat as ammonium sulphide solution), see	8	2683
AMMONIUM METAVANADATE	6.1	2859
AMMONIUM NITRATE BASED FERTILIZER	5.1 9	2067 2071
AMMONIUM NITRATE EMULSION, intermediate for blasting explosives	5.1	3375
Ammonium nitrate explosive, see	1.1D 1.5D	0082 0331
AMMONIUM NITRATE FERTILIZER, which is more liable to explode than ammonium nitrate with 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	1.1D	0223
AMMONIUM NITRATE GEL, intermediate for blasting explosives	5.1	3375
AMMONIUM NITRATE, LIQUID (hot concentrated solution)	5.1	2426
AMMONIUM NITRATE SUSPENSION, intermediate for blasting explosives	5.1	3375
AMMONIUM NITRATE with more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	1.1D	0222
AMMONIUM NITRATE, with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substance	5.1	1942
AMMONIUM PERCHLORATE	1.1D 5.1	0402 1442
Ammonium permanganate, see	5.1	1482
AMMONIUM PERSULPHATE	5.1	1444
AMMONIUM PICRATE dry or wetted with less than 10% water, by mass	1.1D	0004
AMMONIUM PICRATE, WETTED with not less than 10% water, by mass	4.1	1310
AMMONIUM POLYSULPHIDE SOLUTION	8	2818
AMMONIUM POLYVANADATE	6.1	2861
Ammonium silicofluoride, see	6.1	2854
AMMONIUM SULPHIDE SOLUTION	8	2683
Ammunition, blank, see	1.1C 1.2C 1.3C 1.4C 1.4S	0326 0413 0327 0338 0014
Ammunition, fixed) see Ammunition, semi-fixed) Ammunition, separate loading,)	1.1E 1.1F 1.2E 1.2F 1.4E 1.4F	00006 00005 0321 0007 0412 0348

Name and description	Class	UN No.
AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1.2G 1.3G 1.4G	0171 0254 0297
AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge	1.3J	0247
AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1.2G 1.3G 1.4G	0009 0010 0300
Ammunition, incendiary (water-activated contrivances) with burster, expelling charge or propelling charge, see	1.2L 1.3L	0248 0249
AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1.2H 1.3H	0243 0244
Ammunition, industrial, see	1.2C 1.3C 1.3C 1.4C 1.4C 1.4S	0381 0275 0277 0276 0278 0323
Ammunition, lachrymatory, see	1.2G 1.3G 1.4G 6.1	0018 0019 0301 2017
AMMUNITION, PRACTICE	1.3G 1.4G	0488 0362
AMMUNITION, PROOF	1.4G	0363
AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1.2G 1.3G 1.4G	0015 0016 0303
Ammunition, smoke (water-activated contrivances), white phosphorus with burster, expelling charge or propelling charge, see	1.2L	0248
Ammunition, smoke (water-activated contrivances), without white phosphorus or phosphides with burster, expelling charge or propelling charge, see	1.3L	0249
AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1.2H 1.3H	0245 0246
Ammunition, sporting, see	1.2C 1.3C 1.4C 1.4S	00328 0417 0339 0012
AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	2017
AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1.2G 1.3G 1.4G	0018 0019 0301
AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1.2K 1.3K	0020 0021
Ammunition, toxic (water-activated contrivances) with burster, expelling charge or propelling charge, see	1.2L 1.3L	0248 0249
AMMUNITION, TOXIC, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	2016
Amorces (caps, toy), see	1.1G 1.4G 1.4S	0333 0336 0337
Amosite, see	9	2212
AMYL ACETATES	3	1104
AMYL ACID PHOSPHATE	8	2819
Amyl aldehyde, see	3	2058
AMYLAMINE	3	1106
AMYL BUTYRATES	3	2620
AMYL CHLORIDE	3	1107
n-AMYLENE, see	3	1108
AMYL FORMATES	3	1109
AMYL MERCAPTAN	3	1111
n-AMYL METHYL KETONE	3	1110
AMYL NITRATE	3	1112
AMYL NITRITE	3	1113
AMYLTRICHLOROSILANE	8	1728
Anaesthetic ether, see	3	1155

Name and description	Class	UN No.
ANILINE	6.1	1547
Aniline chloride, see	6.1	1548
ANILINE HYDROCHLORIDE	6.1	1548
Aniline oil, see	6.1	1547
Aniline salt, see	6.1	1548
ANISIDINES	6.1	2431
ANISOLE	3	2222
ANISOYL CHLORIDE	8	1729
Anthophyllite, see	9	2590
Antimonous chloride, see	8	1733
ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	6.1	3141
ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.	6.1	1549
Antimony hydride, see	2.3	2676
ANTIMONY LACTATE	6.1	1550
Antimony (III) lactate, see	6.1	1550
ANTIMONY PENTACHLORIDE, LIQUID	8	1730
ANTIMONY PENTACHLORIDE SOLUTION	8	1731
ANTIMONY PENTAFLUORIDE	8	1732
Antimony perchloride, liquid, see	8	1730
ANTIMONY POTASSIUM TARTRATE	6.1	1551
ANTIMONY POWDER	6.1	2871
ANTIMONY TRICHLORIDE	8	1733
A.n.t.u., see	6.1	1651
ARGON, COMPRESSED	2.2	1006
ARGON, REFRIGERATED LIQUID	2.2	1951
Arsenates, n.o.s., see	6.1	1556
	6.1	1557
ARSENIC	6.1	1558
ARSENIC ACID, LIQUID	6.1	1553
ARSENIC ACID, SOLID	6.1	1554
ARSENICAL DUST	6.1	1562
Arsenical flue dust, see	6.1	1562
ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2760
ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	2994
ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	2993
ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	2759
ARSENIC BROMIDE	6.1	1555
Arsenic (III) bromide, see	6.1	1555
Arsenice chloride, see	6.1	1560
ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	1556
ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.	6.1	1557
Arsenic (III) oxide, see	6.1	1561
Arsenic (V) oxide, see	6.1	1559
ARSENIC PENTOXIDE	6.1	1559
Arsenic sulphides, see	6.1	1556
	6.1	1557
ARSENIC TRICHLORIDE	6.1	1560
ARSENIC TRIOXIDE	6.1	1561
Arsenious chloride, see	6.1	1560
Arsenites, n.o.s., see	6.1	1556
	6.1	1557
Arsenous chloride, see	6.1	1560
ARSINE	2	2188

Name and description	Class	UN No.
ARTICLES, EEI, see	1.6N	0486
ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE	1.6N	0486
ARTICLES, EXPLOSIVE, N.O.S.	1.1C	0462
	1.1D	0463
	1.1E	0464
	1.1F	0465
	1.1L	0354
	1.1L	0356
	1.2C	0466
	1.2D	0467
	1.2E	0468
	1.2F	0469
	1.2L	0355
	1.3C	0470
	1.3L	0356
	1.4B	0350
	1.4C	0351
	1.4D	0352
	1.4E	0471
	1.4F	0472
	1.4G	0353
	1.4S	0349
ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)	2.2	3164
ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas)	2.2	3164
ARTICLES, PYROPHORIC	1.2L	0380
ARTICLES, PYROTECHNIC for technical purposes	1.1G	0428
	1.2G	0429
	1.3G	0430
	1.4G	0431
	1.4S	0432
ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	8	2584
ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	8	2586
ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	8	2583
ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	8	2585
Asbestos, blue or brown, see	9	2212
Asbestos, white, see	9	2590
AVIATION REGULATED LIQUID, N.O.S.	9	3334
AVIATION REGULATED SOLID, N.O.S.	9	3335
AZODICARBONAMIDE	4.1	3242
Bag charges, see	1.1C	0279
	1.2C	0414
	1.3C	0242
Ballistite, see	1.1C	0160
	1.3C	0161
Bangalore torpedoes, see	1.1D	0137
	1.1F	0136
	1.2D	0138
	1.2F	0294
BARIUM	4.3	1400
BARIUM ALLOYS, PYROPHORIC	4.2	1854
BARIUM AZIDE, dry or wetted with less than 50% water, by mass	1.1A	0224
BARIUM AZIDE, WETTED with not less than 50% water, by mass	4.1	1571
Barium binoxide, see	5.1	1449
BARIUM BROMATE	5.1	2719
BARIUM CHLORATE	5.1	1445
BARIUM COMPOUND, N.O.S.	6.1	1564
BARIUM CYANIDE	6.1	1565
Barium dioxide, see	5.1	1449
BARIUM HYPOCHLORITE with more than 22% available chlorine	5.1	2741
BARIUM NITRATE	5.1	1446
BARIUM OXIDE	6.1	1884
BARIUM PERCHLORATE	5.1	1447
BARIUM PERMANGANATE	5.1	1448
BARIUM PEROXIDE	5.1	1449
Barium selenate, see	6.1	2630

Name and description	Class	UN No.
Barium selenite, see	6.1	2630
Barium superoxide, see	5.1	1449
BATTERIES, CONTAINING SODIUM	4.3	3292
BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8	3028
BATTERIES, WET, FILLED WITH ACID, electric storage	8	2794
BATTERIES, WET, FILLED WITH ALKALI, electric storage	8	2795
BATTERIES, WET, NON-SPILLABLE, electric storage	8	2800
BATTERY FLUID, ACID	8	2796
BATTERY FLUID, ALKALI	8	2797
Battery, lithium, see	9	3090
	9	3091
BATTERY-POWERED EQUIPMENT	9	3171
BATTERY-POWERED VEHICLE	9	3171
BENZALDEHYDE	9	1990
BENZENE	3	1114
1,4-Benzenediol, see	6.1	2662
BENZENESULPHONYL CHLORIDE	8	2225
Benzenethiol, see	6.1	2337
BENZIDINE	6.1	1885
Benzol, see	3	1114
Benzolene, see	3	1268
BENZONITRILE	6.1	2224
BENZOQUINONE	6.1	2587
Benzosulphochloride, see	8	2225
BENZOTRICHLORIDE	8	2226
BENZOTRIFLUORIDE	3	2338
BENZOYL CHLORIDE	8	1736
BENZYL BROMIDE	6.1	1737
BENZYL CHLORIDE	6.1	1738
Benzyl chlorocarbonate, see	8	1739
BENZYL CHLOROFORMATE	8	1739
Benzyl cyanide, see	6.1	2470
BENZYLDIMETHYLAMINE	8	2619
BENZYLIDENE CHLORIDE	6.1	1886
BENZYL IODIDE	6.1	2653
BERYLLIUM COMPOUND, N.O.S.	6.1	1566
BERYLLIUM NITRATE	5.1	2464
BERYLLIUM POWDER	6.1	1567
BHUSA	4.1	1327
BICYCLO(2,2,1)HEPTA-2,5-DIENE, STABILIZED	3	2251
Bifluorides, n.o.s., see	8	1740
(BIO) MEDICAL WASTE, N.O.S.	6.2	3291

Name and description	Class	UN No.
BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2782
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	3016
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3015
BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	2781
BISULPHATES, AQUEOUS SOLUTION	8	2837
BISULPHITES, AQUEOUS SOLUTION, N.O.S.	8	2693
BLACK POWDER, COMPRESSED	1.1D	0028
BLACK POWDER, granular or as a meal	1.1D	0027
BLACK POWDER, IN PELLETS	1.1D	0028
Blasting cap assemblies, see	1.1B 1.4B	0360 0361
Blasting caps, electric, see	1.1B 1.4B 1.4S	0030 0255 0456
Blasting caps, non electric, see	1.1B 1.4B 1.4S	0029 0267 0455
Blau gas, see	2.3	2600
Bleaching powder, see	5.1	2208
BLUE ASBESTOS (crocidolite)	9	2212
BOMBS with bursting charge	1.1D 1.1F 1.2D 1.2F	0033 0034 0035 0291
Bombs, illuminating, see	1.3G	0254
BOMBS, PHOTO-FLASH	1.1D 1.1F 1.2G 1.3G	0038 0037 0039 0299
BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	8	2028
Bombs, target identification, see	1.2G 1.3G 1.4G	0171 0254 0297
BOMBS WITH FLAMMABLE LIQUID with bursting charge	1.1J 1.2J	0399 0400
BOOSTERS without detonator	1.1D 1.2D	0042 0283
BOOSTERS WITH DETONATOR	1.1B 1.2B	0225 0268
Borate and chlorate mixture, see	5.1	1458
BORNEOL	4.1	1312
BORON TRIBROMIDE	8	2692
BORON TRICHLORIDE	2.3	1741
BORON TRIFLUORIDE	2.3	1008
BORON TRIFLUORIDE ACETIC ACID COMPLEX	8	1742
BORON TRIFLUORIDE DIETHYL ETHERATE	8	2604
BORON TRIFLUORIDE DIHYDRATE	8	2851
BORON TRIFLUORIDE DIMETHYL ETHERATE	4.3	2965
BORON TRIFLUORIDE PROPIONIC ACID COMPLEX	8	1743
BROMATES, INORGANIC, N.O.S.	5.1	1450
BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S	5.1	3213
BROMINE	8	1744
BROMINE CHLORIDE	2	2901
BROMINE PENTAFLUORIDE	5.1	1745
BROMINE SOLUTION	8	1744
BROMINE TRIFLUORIDE	5.1	1746
BROMOACETIC ACID	8	1938

Name and description	Class	UN No.
BROMOACETONE	6.1	1569
omega-Bromoacetone, see	6.4	2645
BROMOACETYL BROMIDE	8	2513
BROMOBENZENE	3	2514
BROMOBENZYL CYANIDES, LIQUID	6.1	1694
BROMOBENZYL CYANIDES, SOLID	6.1	1694
1-BROMOBUTANE	3	1126
2-BROMOBUTANE	3	2339
BROMOCHLOROMETHANE	6.1	1887
1-BROMO-3-CHLOROPROPANE	6.1	2688
1-Bromo-2,3-epoxypropane, see	6.1	2558
Bromoethane, see	6.1	1891
2-BROMOETHYL ETHYL ETHER	3	2340
BROMOFORM	6.1	2515
Bromomethane, see	2	1062
1-BROMO-3-METHYLBUTANE	3	2341
BROMOMETHYLPROPANES	3	2342
2-BROMO-2-NITROPROPANE-1,3-DIOL	4.1	3241
2-BROMOPENTANE	3	2343
BROMOPROPANES	3	2344
3-BROMOPROPYNE	3	2345
BROMOTRIFLUORO-ETHYLENE	2	2419
BROMOTRIFLUORO-METHANE	2	1009
BROWN ASBESTOS (amosite, mysorite)	9	2212
BRUCINE	6.1	1570
BURSTERS, explosive	1	0043
BUTADIENES, STABILIZED	2.1	1010
BUTANE	2.1	1011
BUTANEDIONE	3	2346
Butane-1-thiol, see	3	2347
1-Butanol, see	3	1120
Butan-2-ol, see	3	1120
BUTANOLS	3	1120
Butanol, secondary, see	3	1120
Butanol, tertiary, see	3	1120
Butanone, see	3	1193
2-Butenal, see	6.1	1143
Butene, see	2	1012
Bute-1-ene-3-one, see	3	1251
1,2-Buteneoxide, see	3	3022
2-Buten-1-ol, see	3	2614
BUTYL ACETATES	3	1123
Butyl acetate, secondary, see	3	1123
BUTYL ACID PHOSPHATE	8	1718
BUTYL ACRYLATES, STABILIZED	3	2348
Butyl alcohols, see	3	1120
n-BUTYLAMINE	3	1125
N-BUTYLANILINE	6.1	2738
sec-Butyl benzene, see	3	2709
BUTYLBENZENES	3	2709
n-Butyl bromide, see	3	1126
n-Butyl chloride, see	3	1127
n-BUTYL CHLOROFORMATE	6.1	2743
tert-BUTYLCYCLOHEXYL CHLOROFORMATE	6.1	2747
BUTYLENE	2	1012
1,2-BUTYLENE OXIDE, STABILIZED	3	3022

Name and description	Class	UN No.
Butyl ethers, see	3	1149
Butyl ethyl ether, see	3	1179
n-BUTYL FORMATE	3	1128
tert-BUTYL HYPOCHLORITE	4.2	3255
N,n-BUTYLIMIDAZOLE	6.1	2690
N,n-Butyliminazole, see	6.1	2690
n-BUTYL ISOCYANATE	6.1	2485
tert-BUTYL ISOCYANATE	6.1	2484
Butyl lithium, see	4.2	2445
BUTYL MERCAPTAN	3	2347
n-BUTYL METHACRYLATE, STABILIZED	3	2227
BUTYL METHYL ETHER	3	2350
BUTYL NITRITES	3	2351
Butylphenols, liquid, see	8	3145
Butylphenols, solid, see	8	2430
BUTYL PROPIONATES	3	1914
p-tert-Butyltoluene, see	6.1	2667
BUTYLTOLUENES	6.1	2667
BUTYLTRICHLOROSILANE	8	1747
5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE	4.1	2956
BUTYL VINYL ETHER, STABILIZED	3	2352
But-1-yne, see	2	2452
1,4-BUTYNEDIOL	6.1	2716
2-Butyne-1,4-diol, see	6.1	2716
BUTYRALDEHYDE	3	1129
BUTYRALDOXIME	3	2840
BUTYRIC ACID	8	2820
BUTYRIC ANHYDRIDE	8	2739
Butyrone, see	3	2710
BUTYRONITRILE	3	2411
Butyroyl chloride, see	3	2353
BUTYRYL CHLORIDE	3	2353
Cable cutters, explosive, see	1.4S	0070
CACODYLIC ACID	6.1	1572
CADMIUM COMPOUND	6.1	2570
CAESIUM	4.3	1407
CAESIUM HYDROXIDE	8	2682
CAESIUM HYDROXIDE SOLUTION	8	2681
CAESIUM NITRATE	5.1	1451
Caffeine, see	6.1	1544
Cajeputene, see	3	2052
CALCIUM	4.3	1401
CALCIUM ALLOYS, PYROPHORIC	4.2	1855
CALCIUM ARSENATE	6.1	1573
CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURE, SOLID	6.1	1574
Calcium bisulphite solution, see	8	2693
CALCIUM CARBIDE	4.3	1402
CALCIUM CHLORATE	5.1	1452
CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1	2429
CALCIUM CHLORITE	5.1	1453
CALCIUM CYANAMIDE with more than 0.1% calcium carbide	4.3	1403
CALCIUM CYANIDE	6.1	1575
CALCIUM DITHIONITE	4.2	1923
CALCIUM HYDRIDE	4.3	1404

Name and description	Class	UN No.
CALCIUM HYDROSULPHITE, see	4.2	1923
CALCIUM HYPOCHLORITE, DRY	5.1	1748
CALCIUM HYPOCHLORITE, HYDRATED with not less than 5.5% but not more than 16% water	5.1	2880
CALCIUM HYPOCHLORITE, HYDRATED MIXTURE with not less than 5.5% but not more than 16% water	5.1	2880
CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1	1748
CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 10% but not more than 39% available chlorine	5.1	2208
CALCIUM MANGANESE SILICON	4.3	2844
CALCIUM NITRATE	5.1	1454
CALCIUM OXIDE	8	1910
CALCIUM PERCHLORATE	5.1	1455
CALCIUM PERMANGANATE	5.1	1456
CALCIUM PEROXIDE	5.1	1457
CALCIUM PHOSPHIDE	4.3	1360
CALCIUM, PYROPHORIC	4.2	1855
CALCIUM RESINATE	4.1	1313
CALCIUM RESINATE, FUSED	4.1	1314
Calcium selenate, see	6.1	2630
CALCIUM SILICIDE	4.3	1405
Calcium silicon, see	4.3	1405
Calcium superoxide, see	5.1	1457
Camphanone, see	4.1	2717
CAMPHOR OIL	3	1130
CAMPHOR, synthetic	4.1	2717
CAPROIC ACID	8	2829
CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2758
CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	2992
CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	2991
CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	2757
Carbolic acid, see	6.1 6.1 6.1	1671 2312 2821
CARBON, animal or vegetable origin	4.2	1361
CARBON, ACTIVATED	4.2	1362
Carbon bisulphide, see	3	1131
Carbon black (animal or vegetable origin), see	4.2	1361
CARBON DIOXIDE	2	1013
Carbon dioxide and ethylene oxide mixture, see	2 2 2	1041 1952 3300
CARBON DIOXIDE AND NITROUS OXIDE MIXTURE	2	1015
CARBON DIOXIDE AND OXYGEN MIXTURE, COMPRESSED	2	1014
CARBON DIOXIDE, REFRIGERATED LIQUID	2	2187
CARBON DIOXIDE, SOLID	9	1845
CARBON DISULPHIDE	3	1131
Carbonic anhydride, see	2 9 2	1013 1845 2187
CARBON MONOXIDE, COMPRESSED	2	1016

Name and description	Class	UN No.
CARBON MONOXIDE AND HYDROGEN MIXTURE, COMPRESSED	2	2600
Carbon oxysulphide, see	2.3	2204
CARBON TETRABROMIDE	6.1	2516
CARBON TETRACHLORIDE	6.1	1846
Carbonyl chloride, see	2	1076
CARBONYL FLUORIDE	2	2417
CARBONYL SULPHIDE	2	2204
Cartridge cases, empty, primed, see	1.4C	0379
	1.4S	0055
Cartridges, actuating, for fire extinguisher or apparatus valve, see	1.2C	0381
	1.3C	0275
	1.4C	0276
	1.4S	0323
Cartridges, explosive, see	1.1D	0048
CARTRIDGES, FLASH	1.1G	0049
	1.3G	0050
CARTRIDGES FOR WEAPONS with bursting charge	1.1E	0006
	1.1F	0005
	1.2E	0321
	1.2F	0007
	1.4E	0412
	1.4F	0348
CARTRIDGES FOR WEAPONS, BLANK	1.1C	0326
	1.2C	0413
	1.3C	0327
	1.4C	0338
	1.4S	0014
CARTRIDGES FOR WEAPONS, INERT PROJECTILE	1.2C	0328
	1.3C	0417
	1.4C	339
	1.4S	0012
Cartridges, illuminating, see	1.2G	0171
	1.3G	0254
	1.4G	0297
CARTRIDGES, OIL WELL	1.3C	0277
	1.4C	0278
CARTRIDGES, POWER DEVICE	1.2C	0381
	1.3C	0275
	1.4C	0276
	1.4S	0323
CARTRIDGES, SIGNAL	1.3G	0054
	1.4G	0312
	1.4S	0405
CARTRIDGES, SMALL ARMS	1.3C	0417
	1.4C	0339
	1.4S	0012
CARTRIDGES, SMALL ARMS, BLANK	1.3C	0327
	1.4C	0338
	1.4S	0014
Cartridges, starter, jet engine, see	1.2C	0381
	1.3C	0275
	1.4C	0276
	1.4S	0323
CASES, CARTRIDGE, EMPTY, WITH PRIMER	1.4C	0379
	1.4S	0055
CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1.3C	0447
	1.4C	0446
Casinghead gasoline, see	3	1203
CASTOR BEANS	9	2969
CASTOR FLAKE	9	2969
CASTOR MEAL	9	2969
CASTOR POMACE	9	2969
CAUSTIC ALKALI LIQUID, N.O.S.	8	1719
Caustic potash, see	8	1814
Caustic soda, see	8	1824
Caustic soda liquor, see	8	1824
CELLS, CONTAINING SODIUM	4.3	3292
CELLULOID in block, rods, rolls, sheets, tubes, etc., except scrap	4.1	2000
CELLULOID, SCRAP	4.2	2002
Cement, see	3	1133

Name and description	Class	UN No.
CERIUM, slabs, ingots or rods	4.1	1333
CERIUM, turnings or gritty powder	4.3	3078
Cer mishmetall, see	4.1	1323
Charcoal, activated, see	4.1	1362
Charcoal, non-activated, see	4.2	1361
CHARGES, BURSTING, PLASTICS BONDED	1.1D 1.2D 1.4D 1.4S	0457 0458 0459 0460
CHARGES, DEMOLITION	1.1D	0048
CHARGES, DEPTH	1.1D	0056
Charges, expelling, explosive, for fire extinguishers, see	1.2C 1.3C 1.4C 1.4S	0381 0275 0276 0323
CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1.1D 1.2D 1.4D 1.4S	0442 0443 0444 0445
CHARGES, PROPELLING	1.1C 1.2C 1.3C 1.4C	0271 0415 0272 0491
CHARGES, PROPELLING, FOR CANNON	1.1C 1.2C 1.3C	0279 0414 0242
CHARGES, SHAPED, FLEXIBLE, LINEAR	1.1D 1.4D	0288 0237
CHARGES, SHAPED, without detonator	1.1D 1.2D 1.4D 1.4S	0059 0439 0440 0441
CHARGES, SUPPLEMENTARY, EXPLOSIVE	1.1D	0060
CHEMICAL KIT	9	3316
CHEMICAL SAMPLE, TOXIC, liquid or solid	6.1	3315
Chile saltpetre, see	5.1	1498
CHLORAL, ANHYDROUS, STABILIZED	6.1	2075
CHLORATE AND BORATE MIXTURE	5.1	1458
CHLORATE AND MAGNESIUM CHLORIDE MIXTURE	5.1	1459
CHLORATES, INORGANIC, N.O.S.	5.1	1461
CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	3210
CHLORIC ACID, AQUEOUS SOLUTION with not more than 10% chloric acid	5.1	2626
CHLORINE	2	1017
CHLORINE PENTAFLUORIDE	2	2548
CHLORINE TRIFLUORIDE	2	1749
CHLORITES, INORGANIC, N.O.S.	5.1	1462
CHLORITE SOLUTION	8	1908
Chloroacetaldehyde, see	6.1	2232
CHLOROACETIC ACID, MOLTEN	6.1	3250
CHLOROACETIC ACID, SOLID	6.1	1751
CHLOROACETIC ACID SOLUTION	6.1	1750
CHLOROACETONE, STABILIZED	6.1	1695
CHLOROACETONITRILE	6.1	2668
CHLOROACETOPHENONE	6.1	1697
CHLOROACETYL CHLORIDE	6.1	1752
CHLOROANILINES, LIQUID	6.1	2019
CHLOROANILINES, SOLID	6.1	2018
CHLOROANISIDINES	6.1	2233
CHLOROBENZENE	3	1134
CHLOROBENZOTRIFLUORIDES	3	2234
CHLOROBENZYL CHLORIDES	6.1	2235

Name and description	Class	UN No.
1-Chloro-3-bromopropane, see	6.1	2688
1-Chlorobutane, see	3	1127
2-Chlorobutane, see	3	1127
CHLOROBUTANES	3	1127
CHLOROCRESOLS, liquid	6.1	2669
CHLOROCRESOLS, solid	6.1	2669
CHLORODIFLUOROBROMO-METHANE	2	1974
1-CHLORO-1,1-DIFLUOROETHANE	2	2517
CHLORODIFLUOROMETHANE	2	1018
CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane	2	1973
3-Chloro-1,2-dihydroxypropane, see	6.1	2689
Chlorodimethyl ether, see	6.1	1239
CHLORODINITROBENZENES, LIQUID	6.1	1577
CHLORODINITROBENZENES, SOLID	6.1	1577
2-CHLOROETHANAL	6.1	2232
Chloroethane, see	2	1037
Chloroethane nitrile, see	6.1	2668
2-Chloroethanol, see	6.1	1135
CHLOROFORM	6.1	1888
CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	6.1	3277
CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	2742
Chloromethane, see	2	1063
1-Chloro-3-methylbutane, see	3	1107
2-Chloro-2-methylbutane, see	3	1107
CHLOROMETHYL CHLOROFORMATE	6.1	2745
Chloromethyl cyanide, see	6.1	2668
CHLOROMETHYL ETHYL ETHER	3	2354
Chloromethyl methyl ether, see	6.1	1239
3-CHLORO-4-METHYL-PHENYL ISOCYANATE	6.1	2236
3-Chloro-2-methylprop-1-ene, see	3	2554
CHLORONITROANILINES	6.1	2237
CHLORONITROBENZENES	6.1	1578
CHLORONITROTOLUENES, LIQUID	6.1	2433
CHLORONITROTOLUENES, SOLID	6.1	2433
CHLOROPENTAFLUOROETHANE	2	1020
CHLOROPHENOLATES, LIQUID	8	2904
CHLOROPHENOLATES, SOLID	8	2905
CHLOROPHENOLS, LIQUID	6.1	2021
CHLOROPHENOLS, SOLID	6.1	2020
CHLOROPHENYL-TRICHLOROSILANE	8	1753
CHLOROPICRIN	6.1	1580
CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2	1582
CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	2	1581
CHLOROPICRIN MIXTURE, N.O.S.	6.1	1583
CHLOROPLATINIC ACID, SOLID	8	2507
CHLOROPRENE, STABILIZED	3	1991
1-CHLOROPROPANE	3	1278
2-CHLOROPROPANE	3	2356
3-Chloro-propanediol-1,2, see	6.1	2689
3-CHLOROPROPANOL-1	6.1	2849
2-CHLOROPROPENE	3	2456

Name and description	Class	UN No.
3-Chloropropene, see	3	1100
3-Chloroprop-1-ene, see	3	1100
2-CHLOROPROPIONIC ACID, SOLID	8	2511
2-CHLOROPROPIONIC ACID, SOLUTION	8	2511
2-CHLOROPYRIDINE	6.1	2822
CHLOROSILANES, CORROSIVE, N.O.S.	8	2987
CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	8	2986
CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	2985
CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	3361
CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	3362
CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	4.3	2988
CHLOROSULPHONIC ACID (with or without sulphur trioxide)	8	1754
1-CHLORO-1,2,2,2-TETRAFLUOROETHANE	2.2	1021
CHLOROTOLUENES	3	2238
4-CHLORO-o-TOLUIDINE HYDROCHLORIDE	6.1	1579
CHLOROTOLUIDINES	6.1	2239
1-CHLORO-2,2,2-TRIFLUORO-ETHANE	2.2	1983
Chlorotrifluoroethylene, see	2.3	1082
CHLOROTRIFLUOROMETHANE	2.2	1022
CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane	2.2	2599
Chromic acid, solid, see	5.1	1463
CHROMIC ACID SOLUTION	8	1755
Chromic anhydride, solid, see	5.1	1463
CHROMIC FLUORIDE, SOLID	8	1756
CHROMIC FLUORIDE SOLUTION	8	1757
Chromic nitrate, see	5.1	2720
Chromium (VI) dichloride dioxide, see	8	1758
Chromium (III) fluoride, solid, see	8	1756
CHROMIUM NITRATE	5.1	2720
Chromium (III) nitrate, see	5.1	2720
CHROMIUM OXYCHLORIDE	8	1758
CHROMIUM TRIOXIDE, ANHYDROUS	5.1	1463
CHROMOSULPHURIC ACID	8	2240
Chryosotile, see	9	2590
Cinene, see	3	2052
Cinnamene, see	3	2055
Cinnamol, see	3	2055
CLINICAL WASTE, UNSPECIFIED, N.O.S.	6.2	3291
COAL GAS, COMPRESSED	2	1023
COAL TAR DISTILLATES, FLAMMABLE	3	1136
Coal tar naphtha, see	3	1268
Coal tar oil, see	3	1136
COATING SOLUTION (includes surface treatment or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	3	1139
COBALT NAPHTHENATES, POWDER	4.1	2001

Name and description	Class	UN No.
COBALT RESINATE, PRECIPITATED	4.1	1318
Cocculus, see	6.1	3172
Collodion cottons, see	1.1D	0340
	1.1D	0341
	1.3C	0342
	3	2059
	4.1	2555
	4.1	2556
	4.1	2557
COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1.1B	0461
	1.2B	0382
	1.4B	0383
	1.4S	0384
Composition B, see	1.1D	0118
COMPRESSED GAS, N.O.S.	2.2	1956
COMPRESSED GAS, FLAMMABLE, N.O.S.	2.1	1954
COMPRESSED GAS, OXIDIZING, N.O.S.	2.2	3156
COMPRESSED GAS, TOXIC, N.O.S.	2	1955
COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	2	3304
COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	2	1953
COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	3305
COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	2	3303
COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	3306
CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1.2L	0248
	1.3L	0249
COPPER ACETOARSENITE	6.1	1585
COPPER ARSENITE	6.1	1586
Copper (II) arsenite, see	6.1	1586
COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2776
COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	3010
COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3009
COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	2775
COPPER CHLORATE	5.1	2721
Copper (II) chlorate, see	5.1	2721
COPPER CHLORIDE	8	2802
COPPER CYANIDE	6.1	1587
Copper selenate, see	6.1	2630
Copper selenite, see	6.1	2630
COPRA	4.2	1363
CORD, DETONATING, flexible	1.1D	0065
	1.4D	0289
CORD, DETONATING, metal clad	1.1D	0102
	1.2D	0290
CORD, DETONATING, MILD EFFECT, metal clad	1.4D	0104
CORD, IGNITER	1.4G	0066
Cordite, see	1.1C	0160
	1.3C	0161
CORROSIVE LIQUID, N.O.S.	8	1760
CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	3264
CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	3265
CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	3266
CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	3267

Name and description	Class	UN No.
CORROSIVE LIQUID, FLAMMABLE, N.O.S.	8	2920
CORROSIVE LIQUID, OXIDIZING, N.O.S.	8	3093
CORROSIVE LIQUID, SELF-HEATING, N.O.S.	8	3301
CORROSIVE LIQUID, TOXIC, N.O.S.	8	2922
CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	8	3094
CORROSIVE SOLID, N.O.S.	8	1759
CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	3260
CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	3261
CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	3262
CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	3263
CORROSIVE SOLID, FLAMMABLE, N.O.S.	8	2921
CORROSIVE SOLID, OXIDIZING, N.O.S.	8	3084
CORROSIVE SOLID, SELF-HEATING, N.O.S.	8	3095
CORROSIVE SOLID, TOXIC, N.O.S.	8	2923
CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	8	3096
COTTON WASTE, OILY	4.2	1364
COTTON, WET	4.2	1365
COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	3024
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	3026
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3025
COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	3027
Creosote, see	6.1	2810
Creosote salts, see	4.1	1334
CRESOLS, LIQUID	6.1	2076
CRESOLS, SOLID	6.1	2076
CRESYLIC ACID	6.1	2022
Crocidolite, see	9	2212
CROTONALDEHYDE, STABILIZED	6.1	1143
CROTONIC ACID	8	2823
Crotonic aldehyde, stabilized, see	6.1	1143
CROTONYLENE	3	1144
Crude naphtha, see	3	1268
Cumene, see	3	1918
Cupric chlorate, see	5.1	2721
CUPRIETHYLENEDIAMINE SOLUTION	8	1761
CUTTERS, CABLE, EXPLOSIVE	1.4S	0070
CYANIDE SOLUTION, N.O.S.	6.1	1935
CYANIDES, INORGANIC, SOLID, N.O.S.	6.1	1588
Cyanides, organic, flammable, toxic, n.o.s., see	3	3273
Cyanides, organic, toxic, n.o.s., see	6.1	3276
Cyanides, organic, toxic, flammable, n.o.s., see	6.1	3275
Cyanoacetonitrile, see	6.1	2647
CYANOGEN	2.3	1026
CYANOGEN BROMIDE	6.1	1889
CYANOGEN CHLORIDE, STABILIZED	2.3	1589
CYANURIC CHLORIDE	8	2670
CYCLOBUTANE	2.1	2601

Name and description	Class	UN No.
CYCLOBUTYL CHLOROFORMATE	6.1	2744
1,5,9-CYCLODODECATRIENE	6.1	2518
CYCLOHEPTANE	3	2241
CYCLOHEPTATRIENE	3	2603
1,3,5-Cycloheptatriene, see	3	2603
CYCLOHEPTENE	3	2242
1,4-Cyclohexadienedione, see	6.1	2587
CYCLOHEXANE	3	1145
Cyclehexanethiol, see	3	3054
CYCLOHEXANONE	3	1915
CYCLOHEXENE	3	2256
CYCLOHEXENYLTRI-CHLOROSILANE	8	1762
CYCLOHEXYL ACETATE	3	2243
CYCLOHEXYLAMINE	8	2357
CYCLOHEXYL ISOCYANATE	6.1	2488
CYCLOHEXYL MERCAPTAN	3	3054
CYCLOHEXYLTRICHLOROSILANE	8	1763
CYCLONITE, see	1.1D	0072
	1.1D	0391
	1.1D	0483
CYCLOOCTADIENE PHOSPHINES, see	4.2	2940
CYCLOOCTADIENES	3	2520
CYCLOOCTATETRAENE	3	2358
CYCLOPENTANE	3	1146
CYCLOPENTANOL	3	2244
CYCLOPENTANONE	3	2245
CYCLOPENTENE	3	2246
CYCLOPROPANE	2	1027
CYCLOTETRAMETHYLENE-TETRANITRAMINE, DESENSITIZED	1.1D	0484
CYCLOTETRAMETHYLENE-TETRANITRAMINE, WETTED with not less than 15% water, by mass	1.1D	0226
CYCLOTRIMETHYLENE TRINITRAMINE AND CYCLOTETRAMETHYLENE-TETRANITRAMINE MIXTURE, DESENSITIZED with not less than 10% phlegmatizer, by mass	1.1D	0391
CYCLOTRIMETHYLENETRI-NITRAMINE AND CYCLOTETRAMETHYLENE-TETRANITRAMINE MIXTURE, WETTED with not less than 15% water, by mass	1.1D	0391
CYCLOTRIMETHYLENE-TRINITRAMINE, DESENSITIZED	1.1D	0483
CYCLOTRIMETHYLENE-TRINITRAMINE, WETTED with not less than 15% water, by mass	1.1D	0072
CYMENES	3	2046
Cymol, see	3	2046
DANGEROUS GOODS IN APPARATUS	9	3363
DANGEROUS GOODS IN MACHINERY	9	3363
Deanol, see	8	2051
DECABORANE	4.1	1868
DECAHYDRONAPHTHA-LENE	3	1147
Decalin, see	3	1147
n-DECANE	3	2247
DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.	1.3C	0132
Depth charge, see	1.1D	0056
Detonating relays, see	1.1B	0029
	1.1B	0360
	1.4B	0267
	1.4B	0361
	1.4S	0455
	1.4S	0500

Name and description	Class	UN No.
DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1.1B 1.4B 1.4S	0360 0361 0500
DETONATORS FOR AMMUNITION	1.1B 1.2B 1.4B 1.4S	0073 0364 0365 0366
DETONATORS, ELECTRIC for blasting	1.1B 1.4B 1.4S	0030 0255 0456
DETONATORS, NON-ELECTRIC for blasting	1.1B 1.4B 1.4S	0029 0267 0455
DEUTERIUM, COMPRESSED	2.1	1957
DEVICES, SMALL, HYDROCARBON GAS POWERED with release device	2.1	3150
DIACETONE ALCOHOL	3	1148
DIAGNOSTIC SPECIMENS	6.2	3373
DIALLYLAMINE	3	2359
DIALLYL ETHER	3	2360
4,4'-DIAMINODIPHENYLMETHANE	6.1	2651
1,2-Diaminoethane, see	8	1604
Diaminopropylamine, see	8	2269
DI-n-AMYLAMINE	3	2841
DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1.1A	0074
Dibenzopyridine, see	6.1	2713
DIBENZYLDICHLOROSILANE	8	2434
DIBORANE	2.3	1911
1,2-DIBROMOBUTAN-3-ONE	6.1	2648
DIBROMOCHLOROPROPANES	6.1	2872
1,2-Dibromo-3-chloropropane, see	6.1	2872
DIBROMODIFLUOROMETHANE	9	1941
DIBROMOMETHANE	6.1	2664
DI-n-BUTYLAMINE	8	2248
DIBUTYLAMINOETHANOL	6.1	2873
2-Dibutylaminoethanol, see	6.1	2873
N,N-Di-n-butylaminoethanol, see	6.1	2873
DIBUTYL ETHERS	3	1149
DICHLOROACETIC ACID	8	1764
1,3-DICHLOROACETONE	6.1	2649
DICHLOROACETYL CHLORIDE	8	1765
DICHLOROANILINES, LIQUID	6.1	1590
DICHLOROANILINES, SOLID	6.1	1590
o-DICHLOROBENZENE	6.1	1591
2,2'-DICHLORODIETHYL ETHER	6.1	1916
DICHLORODIFLUOROMETHANE	2.2	1028
DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane	2.2	2602
Dichlorodifluoromethane and ethylene oxide mixture, see	2.2	3070
DICHLORODIMETHYL ETHER, SYMMETRICAL	6.1	2249
1,1-DICHLOROETHANE	3	2362
1,2-Dichloroethane, see	3	1184
1,2-DICHLOROETHYLENE	3	1150
Di(2-chloroethyl) ether, see	6.1	1916
DICHLOROFLUOROMETHANE	2.2	1029
alpha-Dichlorohydrin, see	6.1	2750
DICHLOROISOCYANURIC ACID, DRY	5.1	2465
DICHLOROISOCYANURIC ACID SALTS	5.1	2465
DICHLOROISOPROPYL ETHER	6.1	2490
DICHLOROMETHANE	6.1	1593
1,1-DICHLORO-1-NITROETHANE	6.1	2650

Name and description	Class	UN No.
DICHLOROPENTANES	3	1152
Dichlorophenol, see	6.1	2020
	6.1	2021
DICHLOROPHENYL ISOCYANATES	6.1	2250
DICHLOROPHENYLTRICHLORO-SILANE	8	1766
1,2-DICHLOROPROPANE	3	1279
1,3-DICHLOROPROPANOL-2	6.1	2750
1,3-Dichloro-2-propanone, see	6.1	2649
DICHLOROPROPENES	3	2047
DICHLOROSILANE	2.3	2189
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE	2.2	1958
Dichloro-s-triazine-2,4,6-trione, see	5.1	2465
1,4-Dicyanobutane, see	6.1	2205
Dicycloheptadiene, see	3	2251
DICYCLOHEXYLAMINE	8	2565
Dicyclohexylamine nitrite, see	4.1	2687
DICYCLOHEXYLAMMONIUM NITRITE	4.1	2687
DICYCLOPENTADIENE	3	2048
1,2-DI-(DIMETHYLAMINO) ETHANE	3	2372
DIDYMIUM NITRATE	5.1	1465
DIESEL FUEL	3	1202
1,1-Diethoxyethane, see	3	1088
1,2-Diethoxyethane, see	3	1153
DIETHOXYMETHANE	3	2373
3,3-DIETHOXYPROPENE	3	2374
DIETHYLAMINE	3	1154
2-DIETHYLAMINOETHANOL	8	2686
3-DIETHYLAMINOPROPYLAMINE	3	2684
N,N-DIETHYLANILINE	6.1	2432
DIETHYLBENZENE	3	2049
Diethylcarbinol, see	3	1105
DIETHYL CARBONATE	3	2366
DIETHYLDICHLOROSILANE	8	1767
Diethylenediamine, see	8	2579
DIETHYLENEGLYCOL DINITRATE, DESENSITIZED with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass	1.1D	0075
DIETHYLENETRIAMINE	8	2079
N,N-Diethylethanolamine, see	3	2686
DIETHYL ETHER	3	1155
N,N-DIETHYLETHYLENEDIAMINE	8	2685
Di-(2-ethylhexyl) phosphoric acid, see	8	1902
DIETHYL KETONE	3	1156
DIETHYL SULPHATE	6.1	1594
DIETHYL SULPHIDE	3	2375
DIETHYLTHIOPHOSPHORYL CHLORIDE	8	2751
DIETHYLZINC	4.2	1366
2,4-Difluoroaniline, see	6.1	2941
Difluorochloroethane, see	2.1	2517
1,1-DIFLUOROETHANE	2.1	1030
1,1-DIFLUOROETHYLENE	2.1	1959
DIFLUOROMETHANE	2.1	3252
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 23% difluoromethane and 25% pentafluoroethane, see	2.2	3340
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane, see	2.2	3338

Name and description	Class	UN No.
Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane, see	2.2	3339
DIFLUOROPHOSPHORIC ACID, ANHYDROUS	8	1768
2,3-DIHYDROPYRAN	3	2376
p-Dihydroxybenzene, see	6.1	2662
DIISOBUTYLAMINE	3	2361
DIISOBUTYLENE, ISOMERIC COMPOUNDS	3	2050
alpha-Diisobutylene, see	3	2050
beta-Diisobutylene, see	3	2050
DIISOBUTYL KETONE	3	1157
DIISOOCTYL ACID PHOSPHATE	8	1902
DIISOPROPYLAMINE	3	1158
DIISOPROPYL ETHER	3	1159
DIKETENE, STABILIZED	6.1	2521
1,1-DIMETHOXYETHANE	3	2377
1,2-DIMETHOXYETHANE	3	2252
Dimethoxystrychnine, see	6.1	1570
DIMETHYLAMINE, ANHYDROUS	2.1	1032
DIMETHYLAMINE AQUEOUS SOLUTION	3	1160
2-DIMETHYLAMINO-ACETONITRILE	3	2378
2-DIMETHYLAMINOETHANOL	8	2051
2-DIMETHYLAMINOETHYL ACRYLATE	6.1	3302
2-DIMETHYLAMINOETHYL METHACRYLATE	6.1	2522
N,N-DIMETHYLANILINE	6.1	2253
Dimethylarsenic acid, see	6.1	1572
N,N-Dimethylbenzylamine, see	8	2619
2,3-DIMETHYLBUTANE	3	2457
1,3-DIMETHYLBUTYLAMINE	3	2379
DIMETHYLCARBAMOYL CHLORIDE	8	2262
DIMETHYL CARBONATE	3	1161
DIMETHYLCYCLOHEXANES	3	2263
N,N-DIMETHYLCYCLO-HEXYLAMINE	8	2264
DIMETHYLDICHLOROSILANE	3	1162
DIMETHYLDIETHOXYSILANE	3	2380
DIMETHYLDIOXANES	3	2707
DIMETHYL DISULPHIDE	3	2381
Dimethylethanolamine, see	8	2051
DIMETHYL ETHER	2.1	1033
N,N-DIMETHYLFORMAMIDE	3	2265
DIMETHYLHYDRAZINE, SYMMETRICAL	6.1	2382
DIMETHYLHYDRAZINE, UNSYMMETRICAL	6.1	1163
1,1-Dimethylhydrazine, see	6.1	1163
N,N-Dimethyl-4-nitrosoaniline, see	4.2	1369
2,2-DIMETHYLPROPANE	2	2044
DIMETHYL-N-PROPYLAMINE	3	2266
DIMETHYL SULPHATE	6.1	1595
DIMETHYL SULPHIDE	3	1164
DIMETHYL THIOPHOSPHORYL CHLORIDE	6.1	2267
DIMETHYLZINC	4.2	1370
DINGU, see	1	0489
DINITROANILINES	6.1	1596
DINITROBENZENES, LIQUID	6.1	1597
DINITROBENZENES, SOLID	6.1	1597

Name and description	Class	UN No.
Dinitrochlorobenzene, see	6.1	1577
DINITRO-o-CRESOL	6.1	1598
DINITROGEN TETROXIDE	2	1067
DINITROGLYCOLURIL	1.1D	0489
DINITROPHENOL, dry or wetted with less than 15% water, by mass	1.1D	0076
DINITROPHENOL SOLUTION	6.1	1599
DINITROPHENOL, WETTED with not less than 15% water, by mass	4.1	1320
DINITROPHENOLATES, alkali metals, dry or wetted with less than 15% water, by mass	1.3C	0077
DINITROPHENOLATES, WETTED with not less than 15% water, by mass	4.1	1321
DINITRORESORCINOL, dry or wetted with less than 15% water, by mass	1.1D	0078
DINITRORESORCINOL, WETTED with not less than 15% water, by mass	4.1	1322
DINITROSOBENZENE	1.3C	0406
Dinitrotoluene mixed with sodium chlorate, see	1.1D	0083
DINITROTOLUENES, LIQUID	6.1	2038
DINITROTOLUENES, MOLTEN	6.1	1600
DINITROTOLUENES, SOLID	6.1	2038
DIOXANE	6.1	1165
DIOXOLANE	3	1166
DIPENTENE	3	2052
DIPHENYLAMINE CHLOROARSINE	6.1	1698
DIPHENYLCHLOROARSINE, LIQUID	6.1	1699
DIPHENYLCHLOROARSINE, SOLID	6.1	1699
DIPHENYLDICHLOROSILANE	8	1769
DIPHENYLMETHYL BROMIDE	8	1770
DIPICRYLAMINE, see	1.1D	0079
DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass	1.1D	0401
DIPICRYL SULPHIDE, WETTED with not less than 10% water, by mass	4.1	2852
DIPROPYLAMINE	3	2383
Dipropylene triamine, see	8	2269
DI-n-PROPYL ETHER	3	2384
DIPROPYL KETONE	3	2710
DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	1903
DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	3142
DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	1601
DISODIUM TRIOXOSILICATE	8	3253
DIVINYL ETHER, STABILIZED	3	1167
DODECYLTRICHLOROSILANE	8	1771
DRY ICE, see	9	1845
DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	2801
DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	1602
DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	3147

Name and description	Class	UN No.
DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	3143
Dynamite, see	1.1D	0081
Electric storage batteries, see	8	2794
	8	2795
	8	2800
	8	3028
Electrolyte (acid or alkaline) for batteries, see	8	2796
	8	2797
ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metals, molten salts, etc.)	9	3257
ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 61 °C, at or above its flash-point	3	3256
ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	9	3258
ENGINE, INTERNAL COMBUSTION	9	3166
Engines, rocket, see	1.2L	0322
	1.3L	0250
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	3082
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9	3077
EPIBROMOHYDRIN	6.1	2558
EPICHLOROHYDRIN	6.1	2023
1,2-Epoxybutane, stabilized, see	3	3022
Epoxyethane, see	2.3	1040
1,2-EPOXY-3-ETHOXYPROPANE	3	2752
2,3-Epoxy-1-propanal, see	3	2622
2,3-Epoxypropyl ethyl ether, see	3	2752
ESTERS, N.O.S.	3	3272
ETHANE	2.1	1035
ETHANE, REFRIGERATED LIQUID	2.1	1961
Ethanethiol, see	3	2363
ETHANOL	3	1170
ETHANOL SOLUTION	3	1170
ETHANOLAMINE	8	2491
ETHANOLAMINE SOLUTION	8	2491
Ether, see	3	1155
ETHERS, N.O.S.	3	3271
2-Ethoxyethanol, see	3	1171
2-Ethoxyethyl acetate, see	3	1172
Ethoxy propane-1, see	3	2615
ETHYL ACETATE	3	1173
ETHYLACETYLENE, STABILIZED	2.1	2452
ETHYL ACRYLATE, STABILIZED	3	1917
ETHYL ALCOHOL, see	3	1170
ETHYL ALCOHOL SOLUTION, see	3	1170
ETHYLAMINE	2.1	1036
ETHYLAMINE, AQUEOUS SOLUTION with not less than 50% but not more than 70% ethylamine	3	2270
ETHYL AMYL KETONE	3	2271
N-ETHYLANILINE	6.1	2272
2-ETHYLANILINE	6.1	2273
ETHYLBENZENE	3	1175
N-ETHYL-N-BENZYLANILINE	6.1	2274
N-ETHYLBENZYLTOLUIDINES, LIQUID	6.1	2753
N-ETHYLBENZYLTOLUIDINES, SOLID	6.1	2753
ETHYL BORATE	3	1176
ETHYL BROMIDE	6.1	1891
ETHYL BROMOACETATE	6.1	1603
2-ETHYLBUTANOL	3	2275
2-ETHYLBUTYL ACETATE	3	1177

Name and description	Class	UN No.
2-Ethylbutyl acetate, see	3	1177
ETHYL BUTYL ETHER	3	1179
2-ETHYLBUTYRALDEHYDE	3	1178
ETHYL BUTYRATE	3	1180
ETHYL CHLORIDE	2.1	1037
ETHYL CHLOROACETATE	6.1	1181
Ethyl chlorocarbonate, see	6.1	1182
ETHYL CHLOROFORMATE	6.1	1182
ETHYL 2-CHLOROPROPIONATE	3	2935
Ethyl-alpha-chloropropionate, see	3	2935
ETHYL CHLOROTHIOFORMATE	8	2826
ETHYL CROTONATE	3	1862
ETHYLDICHLOROARSINE	6.1	1892
ETHYLDICHLOROSILANE	4.3	1183
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	2.1	3138
ETHYLENE CHLOROHYDRIN	6.1	1135
ETHYLENE	2.1	1962
ETHYLENEDIAMINE	8	1604
ETHYLENE DIBROMIDE	6.1	1605
Ethylene dibromide and methyl bromide, liquid mixture, see	6.1	1647
ETHYLENE DICHLORIDE	3	1184
ETHYLENE GLYCOL DIETHYL ETHER	3	1153
ETHYLENE GLYCOL MONOETHYL ETHER	3	1171
ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	3	1172
ETHYLENE GLYCOL MONOMETHYL ETHER	3	1188
ETHYLENE GLYCOL MONOMETHYL ETHER ACETATE	3	1189
ETHYLENEIMINE, STABILIZED	6.1	1185
ETHYLENE OXIDE	2.3	1040
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2.3	3300
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	2.1	1041
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2.2	1952
ETHYLENE OXIDE AND CHLOROTETRAFLUORO-ETHANE MIXTURE with not more than 8.8% ethylene oxide	2.2	3297
ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12.5% ethylene oxide	2.2	3070
ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	2.2	3298
ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	3	2983
ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	2.2	3299
ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C	2.3	1040
ETHYLENE, REFRIGERATED LIQUID	2.1	1038
ETHYL ETHER, see	3	1155
ETHYL FLUORIDE	2.1	2453
ETHYL FORMATE	3	1190
2-ETHYLHEXYLAMINE	3	2276

Name and description	Class	UN No.
2-ETHYLHEXYL CHLOROFORMATE	6.1	2748
Ethylidene chloride, see	3	2362
ETHYL ISOBUTYRATE	3	2385
ETHYL ISOCYANATE	3	2481
ETHYL LACTATE	3	1192
ETHYL MERCAPTAN	3	2363
ETHYL METHACRYLATE, STABILIZED	3	2277
ETHYL METHYL ETHER	2.1	1039
ETHYL METHYL KETONE	3	1193
ETHYL NITRITE SOLUTION	3	1194
ETHYL ORTHOFORMATE	3	2524
ETHYL OXALATE	6.1	2525
ETHYLPHENYLDICHLOROSILANE	8	2435
1-ETHYLPIPERIDINE	3	2386
ETHYL PROPIONATE	3	1195
ETHYL PROPYL ETHER	3	2615
Ethyl silicate, see	3	1292
Ethyl sulphate, see	6.1	1594
N-ETHYLTOLUIDINES	6.1	2754
ETHYLTRICHLOROSILANE	3	1196
EXPLOSIVE, BLASTING, TYPE A	1.1D	0081
EXPLOSIVE, BLASTING, TYPE B	1.1D	0082
	1.5D	0331
EXPLOSIVE, BLASTING, TYPE C	1.1D	0083
EXPLOSIVE, BLASTING, TYPE D	1.1D	0084
EXPLOSIVE, BLASTING, TYPE E	1.1D	0241
	1.5D	0332
Explosives, emulsion, see	1.1D	0241
	1.5D	0332
Explosive, seismic, see	1.1D	0081
	1.1D	0082
	1.1D	0083
	1.5D	0331
Explosive, slurry, see	1.1D	0241
	1.5D	0332
Explosive, water gel, see	1.1D	0241
	1.5D	0332
EXTRACTS, AROMATIC, LIQUID	3	1169
EXTRACTS, FLAVOURING, LIQUID	3	1197
FABRICS, ANIMAL, N.O.S. with oil	4.2	1373
FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	4.1	1353
FABRICS, SYNTHETIC, N.O.S. with oil	4.2	1373
FABRICS, VEGETABLE, N.O.S. with oil	4.2	1373
FERRIC ARSENATE	6.1	1606
FERRIC ARSENITE	6.1	1607
FERRIC CHLORIDE, ANHYDROUS	8	1773
FERRIC CHLORIDE SOLUTION	8	2582
FERRIC NITRATE	5.1	1466
FERROCERIUM	4.1	1323
FERROSILICON with 30% or more but less than 90% silicon	4.3	1408
FERROUS ARSENATE	6.1	1608
FERROUS METAL BORINGS in a form liable to self-heating	4.2	2793
FERROUS METAL CUTTINGS in a form liable to self-heating	4.2	2793
FERROUS METAL SHAVINGS in a form liable to self-heating	4.2	2793
FERROUS METAL TURNINGS in a form liable to self-heating	4.2	2793
FERTILIZER AMMONIATING SOLUTION with free ammonia	2.2	1043
Fertilizer with ammonium nitrate, n.o.s., see	5.1	2072
FIBRES, ANIMAL burnt, wet or damp	4.2	1372

Name and description	Class	UN No.
FIBRES, ANIMAL, N.O.S. with oil	4.2	1373
FIBRES IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	4.1	1353
FIBRES, SYNTHETIC, N.O.S. with oil	4.2	1373
FIBRES, VEGETABLE burnt, wet or damp	4.2	1372
FIBRES, VEGETABLE, DRY	4.1	3360
FIBRES, VEGETABLE, N.O.S. with oil	4.2	1373
Films, nitrocellulose base, from which gelatin has been removed; film scrap, see	4.2	2002
FILMS, NITROCELLULOSE BASE, gelatin coated, except scrap	4.1	1324
FIRE EXTINGUISHER CHARGES, corrosive liquid	8	1774
Fire extinguisher charges, expelling, explosive, see	1.2C 1.3C 1.4C 1.4S	0381 0275 0276 0323
FIRE EXTINGUISHERS with compressed or liquefied gas	2.2	1044
FIRELIGHTERS, SOLID with flammable liquid	4.1	2623
FIREWORKS	1.1G 1.2G 1.3G 1.4G 1.4S	0333 0334 0335 0336 0337
FIRST AID KIT	9	3316
Fischer Tropsch gas, see	2.3	2600
Fish meal, stabilized	9	2216
FISH MEAL, UNSTABILIZED	4.2	1374
Fish scrap, stabilized, see	9	2216
FISH SCRAP, UNSTABILIZED, see	4.2	1374
Flammable gas in lighters, see	2.1	1057
FLAMMABLE LIQUID, N.O.S	3	1993
FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	2924
FLAMMABLE LIQUID, TOXIC, N.O.S.	3	1992
FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	3286
FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	4.1	3180
FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	4.1	2925
FLAMMABLE SOLID, INORGANIC, N.O.S.	4.1	3178
FLAMMABLE SOLID, ORGANIC, N.O.S.	4.1	1325
FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	3176
FLAMMABLE SOLID, OXIDIZING, N.O.S.	4.1	3097
FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	4.1	3179
FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	4.1	2926
FLARES, AERIAL	1.1G 1.2G 1.3G 1.4G 1.4S	0420 0421 0093 0403 0404
Flares, aeroplane, see	1.1G 1.2G 1.3G 1.4G 1.4S	0420 0421 0093 0403 0404
Flares, highway,) Flares, distress, small,) see Flares, railway or highway,)	1.4G 1.4S	0191 0373
FLARES, SURFACE	1.1G 1.2G 1.3G	0418 0419 0092
Flares, water-activated, see	1.2L 1.3L	0248 0249
FLASH POWDER	1.1G 1.3G	0094 0305

Name and description	Class	UN No.
Flue dusts, toxic, see	6.1	1562
Fluoric acid, see	8	1790
FLUORINE, COMPRESSED	2.3	1045
FLUOROACETIC ACID	6.1	2642
FLUOROANILINES	6.1	2941
2-Fluoroaniline, see	6.1	2941
4-Fluoroaniline, see	6.1	2941
o-Fluoroaniline, see	6.1	2941
p-Fluoroaniline, see	6.1	2941
FLUOROBENZENE	3	2387
FLUOROBORIC ACID	8	1775
Fluoroethane, see	2.1	2453
Fluoroform, see	2.2	1984
Fluoromethane, see	2.1	2454
FLUOROPHOSPHORIC ACID, ANHYDROUS	8	1776
FLUOROSILICATES, N.O.S.	6.1	2856
FLUOROSILICIC ACID	8	1778
FLUOROSULPHONIC ACID	8	1777
FLUOROTOLUENES	3	2388
FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	8	2209
FORMALDEHYDE SOLUTION, FLAMMABLE	3	1198
Formalin, see	3 8	1198 2209
Formamidine sulphinic acid, see	4.2	3341
FORMIC ACID	8	1779
Formic aldehyde, see	3 8	1198 2209
2-Formyl-3,4-dihydro-2H-pyran, see	3	2607
FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	1.1D	0099
FUEL, AVIATION, TURBINE ENGINE	3	1863
Fumaroyl dichloride, see	3	1780
FUMARYL CHLORIDE	8	1780
FUMIGATED UNIT	9	3359
FURALDEHYDES	6.1	1199
FURAN	3	2389
FURFURYL ALCOHOL	6.1	2874
FURFURYLAMINE	3	2526
Furyl carbinol, see	6.1	2874
FUSE, DETONATING, metal clad, see	1.1D 1.2D	0290 0102
FUSE, DETONATING, MILD EFFECT, metal clad, see	1.4D	0104
FUSE, IGNITER, tubular, metal clad	1.4G	0103
FUSE, NON-DETONATING	1.3G	0101
FUSEL OIL	3	1201
FUSE, SAFETY	1.4S	0105
Fuze, combination, percussion or time, see	1.1B 1.2B 1.3G 1.4B 1.4G 1.4S 1.4S	0106 0107 0257 0316 0317 0367 0368
FUZES, DETONATING	1.1B 1.2B 1.4B 1.4S	0106 0107 0257 0367
FUZES, DETONATING with protective features	1.1D 1.2D 1.4D	0408 0409 0410
FUZES, IGNITING	1.3G 1.4G 1.4S	0316 0317 0368
GALLIUM	8	2803

Name and description	Class	UN No.
GAS CARTRIDGES without a release device, non-refillable, see	2	2037
Gas drips, hydrocarbon, see	3	3295
GAS OIL	3	1202
GASOLINE	3	1203
Gasoline, casinghead, see	3	1203
GAS, REFRIGERATED LIQUID, N.O.S.	2.2	3158
GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	2.1	3312
GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	2.2	3311
GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid	2.1	3167
GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid	2.3	3169
GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid	2.3	3168
Gelatin, blasting, see	1.1D	0081
Gelatin, dynamites, see	1.1D	0081
GENETICALLY MODIFIED MICRO-ORGANISMS	9	3245
GERMANE	2.3	2192
Germanium hydride, see	2.3	2192
Glycer-1,3-dichlorohydrin, see	6.1	2750
GLYCEROL alpha-MONOCHLOROHYDRIN	6.1	2689
Glyceryl trinitrate, see	1.1D	0143
	1.1D	0144
	3	1204
	3	3064
GLYCIDALDEHYDE	3	2622
GRENADES, hand or rifle, with bursting charge	1.1D	0284
	1.1F	0292
	1.2D	0285
	1.2F	0293
Grenades, illuminating, see	1.2G	0171
	1.3G	0254
	1.4G	0297
GRENADES, PRACTICE, hand or rifle	1.2G	0372
	1.3G	0318
	1.4G	0452
	1.4S	0110
Grenades, smoke, see	1.2G	0015
	1.2H	0245
	1.3G	0016
	1.3H	0246
	1.4G	0303
GUANIDINE NITRATE	5.1	1467
GUANYLNITROSAMINO-GUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass	1.1A	0113
GUANYLNITROSAMINO-GUANYLTETRAZENE, WETTED with not less than 30% water, or mixture of alcohol and water, by mass	1.1A	0114
GUNPOWDER, COMPRESSED, see	1.1D	0028
GUNPOWDER, granular or as a meal, see	1.1D	0027
GUNPOWDER, IN PELLETS, see	1.1D	0028
Gutta percha solution, see	3	1287
HAFNIUM POWDER, DRY	4.2	2545
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	4.1	1326
HAY	4.1	1327
HEATING OIL, LIGHT	3	1202
Heavy hydrogen, see	2.1	1957
HELIUM, COMPRESSED	2.2	1046
HELIUM, REFRIGERATED LIQUID	2.2	1963
HEPTAFLUOROPROPANE	2.2	3296

Name and description	Class	UN No.
n-HEPTALDEHYDE	3	3056
n-Heptanal, see	3	3056
HEPTANES	3	1206
4-Heptanone, see	3	2710
n-HEPTENE	3	2278
HEXACHLOROACETONE	6.1	2661
HEXACHLOROBENZENE	6.1	2729
HEXACHLOROBUTADIENE	6.1	2279
Hexachloro-1,3-butadiene, see	6.1	2279
HEXACHLOROCYCLO-PENTADIENE	6.1	2646
HEXACHLOROPHENE	6.1	2875
Hexachloro-2-propanone, see	6.1	2661
HEXADECYLTRICHLOROSILANE	8	1781
HEXADIENE	3	2458
HEXAETHYL TETRAPHOSPHATE	6.1	1611
HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	2.3	1612
HEXAFLUOROACETONE	2.3	2420
HEXAFLUOROACETONE HYDRATE	6.1	2552
HEXAFLUOROETHANE (REGRIGERANT GAS R116)	2.2	2193
HEXAFLUOROPHOSPHORIC ACID	8	1782
HEXAFLUOROPROPYLENE	2.2	1858
Hexahydrocresol, see	3	2617
Hexahydromethyl phenol, see	3	2617
HEXALDEHYDE	3	1207
HEXAMETHYLENEDIAMINE, SOLID	8	2280
HEXAMETHYLENEDIAMINE SOLUTION	8	1783
HEXAMETHYLENE DIISOCYANATE	6.1	2281
HEXAMETHYLENEIMINE	3	2493
HEXAMETHYLENETETRAMINE	4.1	1328
Hexamine, see	4.1	1328
HEXANES	3	1208
HEXANITRODIPHENYLAMINE	1.1D	0079
HEXANITROSTILBENE	1.1D	0392
Hexanoic acid, see	8	2829
HEXANOLS	3	2282
1-HEXENE	3	2370
HEXAGON, see	1.1D 1.1D 1.1D	0072 0391 0483
HEXOLITE, dry or wetted with less than 15% water, by mass	1.1D	0118
HEXOTOL, see	1.1D	0118
HEXOTONAL	1.1D	0393
HEXOTONAL, cast, see	1.1D	0393
HEXYL, see	1.1D	0079
HEXYLTRICHLOROSILANE	8	1784
HMX, see	1.1D 1.1D 1.1D	0226 0391 0484
HYDRAZINE, ANHYDROUS	8	2029
HYDRAZINE, AQUEOUS SOLUTION with more than 37% hydrazine, by mass	8	2030
HYDRAZINE, AQUEOUS SOLUTION with not more than 37% hydrazine, by mass	6.1	3293
Hydrazine hydrate	8	2030
Hydrides, metal, water-reactive, n.o.s., see	4.3	1409
Hydriodic acid, anhydrous, see	2.3	2197

Name and description	Class	UN No.
HYDRIODIC ACID	8	1787
HYDROBROMIC ACID	8	1788
HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	2.1	1964
HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S. such as mixtures A, A01, A02, A0, A1, B1, B2, B or C	2.1	1965
HYDROCARBON GAS REFILLS FOR SMALL DEVICES with release device	2.1	3150
HYDROCARBONS, LIQUID, N.O.S.	3	3295
HYDROCHLORIC ACID	8	1789
HYDROCYANIC ACID, AQUEOUS SOLUTION with not more than 20% hydrogen cyanide	6.1	1613
HYDROFLUORIC ACID, with more than 60% hydrogen fluoride	8	1790
HYDROFLUORIC ACID, with not more than 60% hydrogen fluoride	8	1790
HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURE	8	1786
Hydrofluoroboric acid, see	8	1775
Hydrofluorosilicic acid, see	8	1778
HYDROGEN AND METHANE MIXTURE, COMPRESSED	2.1	2034
Hydrogen arsenide, see	2.3	2188
HYDROGEN BROMIDE, ANHYDROUS	2.3	1048
Hydrogen bromide solution, see	8	1788
HYDROGEN CHLORIDE, ANHYDROUS	2.3	1050
HYDROGEN CHLORIDE, REFRIGERATED LIQUID	2	2186
HYDROGEN, COMPRESSED	2.1	1049
HYDROGEN CYANIDE, AQUEOUS SOLUTION with not more than 20% hydrogen cyanide, see	6.1	1613
HYDROGEN CYANIDE, SOLUTION IN ALCOHOL with not more than 45% hydrogen cyanide	6.1	3294
HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	1051
HYDROGEN CYANIDE, STABILIZED, containing less than 3% water and absorbed in a porous inert material	6.1	1614
HYDROGENDIFLUORIDES, N.O.S.	8	1740
HYDROGEN FLUORIDE, ANHYDROUS	8	1052
Hydrogen fluoride solution, see	8	1790
HYDROGEN IODIDE, ANHYDROUS	2.3	2197
Hydrogen iodide solution, see	8	1787
HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	5.1	3149
HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	5.1	2984
HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	5.1	2014
HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 60% hydrogen	5.1	2015
HYDROGEN PEROXIDE, STABILIZED	5.1	2015
HYDROGEN, REFRIGERATED LIQUID	2.1	1966
HYDROGEN SELENIDE, ANHYDROUS	2.3	2202
Hydrogen silicide, see	2.1	2203
HYDROGEN SULPHIDE	2.3	1053
Hydroquinol, see	6.1	2662
HYDROQUINONE	6.1	2662

Name and description	Class	UN No.
Hydroselenic acid, see	2.3	2202
Hydrosilicofluoric acid, see	8	1778
3-Hydroxybutan-2-one, see	3	2621
HYDROXYLAMINE SULPHATE	8	2865
1-Hydroxy-3-methyl-2-penten-4-yne, see	8	2705
3-Hydroxyphenol, see	6.1	2876
HYPOCHLORITES, INORGANIC, N.O.S.	5.1	3212
HYPOCHLORITE SOLUTION	8	1791
IGNITERS	1.1G	0121
	1.2G	0314
	1.3G	0315
	1.4G	0325
	1.4S	0454
3,3'-IMINODIPROPYLAMINE	8	2269
Indiarubber, see	3	1287
INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only	6.2	2900
INFECTIOUS SUBSTANCE, AFFECTING HUMANS	6.2	2814
Ink, printer's, flammable, see	3	1210
INSECTICIDE GAS, N.O.S.	2.2	1968
INSECTICIDE GAS, FLAMMABLE, N.O.S.	2.1	3354
INSECTICIDE GAS, TOXIC, N.O.S.	2.3	1967
INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	3355
IODINE MONOCHLORIDE	8	1792
IODINE PENTAFLUORIDE	5.1	2495
2-IODOBUTANE	3	2390
Iodomethane, see	6.1	2644
IODOMETHYLPROPANES	3	2391
IODOPROPANES	3	2392
alpha-Iodotoluene, see	6.1	2653
I.p.d.i., see	6.1	2290
Iron chloride, anhydrous, see	8	1773
Iron (III) chloride, anhydrous, see	8	1773
Iron chloride solution, see	8	2582
IRON OXIDE, SPENT obtained from coal gas purification	4.2	1376
IRON PENTACARBONYL	6.1	1994
Iron perchloride, anhydrous, see	8	1773
Iron powder, pyrophoric, see	4.2	1383
Iron sesquichloride, anhydrous, see	8	1773
IRON SPONGE, SPENT obtained from coal gas purification	4.2	1376
Iron swarf, see	4.2	2793
ISOBUTANE	2.1	1969
ISOBUTANOL	3	1212
Isobutene, see	2.1	1055
ISOBUTYL ACETATE	3	1213
ISOBUTYL ACRYLATE, STABILIZED	3	2527
ISOBUTYL ALCOHOL, see	3	1212
ISOBUTYL ALDEHYDE, see	3	2045
ISOBUTYLAMINE	3	1214
ISOBUTYLENE	2	1055
ISOBUTYL FORMATE	3	2393
ISOBUTYL ISOBUTYRATE	3	2528
ISOBUTYL ISOCYANATE	3	2486
ISOBUTYL METHACRYLATE, STABILIZED	3	2283
ISOBUTYL PROPIONATE	3	2394
ISOBUTYRALDEHYDE	3	2045
ISOBUTYRIC ACID	3	2529
ISOBUTYRONITRILE	3	2284

Name and description	Class	UN No.
ISOBUTYRYL CHLORIDE	3	2395
ISOCYANATES, FLAMMABLE, TOXIC, N.O.S.	3	2478
ISOCYANATES, TOXIC, N.O.S.	6.1	2206
ISOCYANATES, TOXIC, FLAMMABLE, N.O.S.	6.1	3080
ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	3	2478
ISOCYANATE SOLUTION, TOXIC, N.O.S.	6.1	2206
ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	6.1	3080
ISOCYANATOBENZOTRI-FLUORIDES	6.1	2285
3-Isocyanatomethyl-3,5,5-tri-methylcyclohexyl isocyanate, see	6.1	2290
Isododecane, see	3	2286
ISOHEPTENE	3	2287
ISOHEXENE	3	2288
Isooctane, see	3	1262
ISOOCTENE	3	1216
Isopentane, see	3	1265
ISOPENTENES	3	2371
Isopentylamine, see	3	1106
Isopentyl nitrite, see	3	1113
ISOPHORONEDIAMINE	8	2289
ISOPHORONE DIISOCYANATE	6.1	2290
ISOPRENE, STABILIZED	3	1218
ISOPROPANOL	3	1219
ISOPROPENYL ACETATE	3	2403
ISOPROPENYLBENZENE	3	2303
ISOPROPYL ACETATE	3	1220
ISOPROPYL ACID PHOSPHATE	8	1793
ISOPROPYL ALCOHOL, see	3	1219
ISOPROPYLAMINE	3	1221
ISOPROPYLBENZENE	3	1918
ISOPROPYL BUTYRATE	3	2405
Isopropyl chloride, see	3	2356
ISOPROPYL CHLOROACETATE	3	2947
ISOPROPYL CHLOROFORMATE	6.1	2407
ISOPROPYL 2-CHLOROPROPIONATE	3	2934
Isopropyl-alpha-chloropropionate, see	3	2934
Isopropyl ether, see	3	1159
Isopropylethylene, see	3	2561
Isopropyl formate, see	3	1281
ISOPROPYL ISOBUTYRATE	3	2406
ISOPROPYL ISOCYANATE	3	2483
Isopropyl mercaptan, see	3	2402
ISOPROPYL NITRATE	3	1222
ISOPROPYL PROPIONATE	3	2409
Isolpropyltoluene, see	3	2046
Isopropyltoluol, see	3	2046
ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	4.1	2907
ISOSORBIDE-5-MONONITRATE	4.1	3251
Isovaleraldehyde, see	3	2058
JET PERFORATING GUNS, CHARGED, oil well, without detonator	1.1D 1.4D	0124 0494
Jet tappers, without detonator, see	1.1D	0059
KEROSENE	3	1223
KETONES, LIQUID, N.O.S.	3	1224
KRYPTON, COMPRESSED	2.2	1056

Name and description	Class	UN No.
KRYPTON, REFRIGERATED LIQUID	2.2	1970
Lacquer base or lacquer chips, nitrocellulose, dry, see	4.1	2557
Lacquer base or lacquer chips, plastic, wet with alcohol or solvent, see	3	1263
	3	2059
	4.1	2555
	4.1	2556
LEAD ACETATE	6.1	1616
Lead (II) acetate, see	6.1	1616
LEAD ARSENATES	6.1	1617
LEAD ARSENITES	6.1	1618
LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1.1A	0129
Lead chloride, solid, see	6.1	2291
LEAD COMPOUND, SOLUBLE, N.O.S.	6.1	2291
LEAD CYANIDE	6.1	1620
Lead (II) cyanide	6.1	1620
LEAD DIOXIDE	5.1	1872
LEAD NITRATE	5.1	1469
Lead (II) nitrate	5.1	1469
LEAD PERCHLORATE	5.1	1470
Lead (II) perchlorate	5.1	1470
Lead peroxide, see	5.1	1872
LEAD PHOSPHITE, DIBASIC	4.1	2989
LEAD STYPHNATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1.1A	0130
LEAD SULPHATE with more than 3% free acid	8	1794
Lead tetraethyl, see	6.1	1649
Lead tetramethyl, see	6.1	1649
LEAD TRINITRORESORCINATE, WETTED see	1.1A	0130
LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	9	3072
LIFE-SAVING APPLIANCES, SELF-INFLATING	9	2990
LIGHTER REFILLS containing flammable gas	2.1	1057
LIGHTERS containing flammable gas	2.1	1057
LIGHTERS, FUSE	1.4S	0131
Limonene, inactive, see	3	2052
LIQUEFIED GAS, N.O.S.	2.2	3163
LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2.2	1058
LIQUEFIED GAS, FLAMMABLE, N.O.S.	2.1	3161
LIQUEFIED GAS, OXIDIZING, N.O.S.	2.2	3157
LIQUEFIED GAS, TOXIC, N.O.S.	2.3	3162
LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	3308
LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	3160
LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	3309
LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	3307
LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	3310
Liquefied petroleum gas, see	2.1	1075
LITHIUM	4.3	1415
LITHIUM ALKYLS	4.2	2445
LITHIUM ALUMINIUM HYDRIDE	4.3	1410
LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	4.3	1411
LITHIUM BATTERIES	9	3090
LITHIUM BATTERIES CONTAINED IN EQUIPMENT	9	3091

Name and description	Class	UN No.
LITHIUM BATTERIES PACKED WITH EQUIPMENT	9	3091
LITHIUM BOROHYDRIDE	4.3	1413
LITHIUM FERROSILICON	4.3	2830
LITHIUM HYDRIDE	4.3	1414
LITHIUM HYDRIDE, FUSED SOLID	4.3	2805
LITHIUM HYDROXIDE	8	2680
LITHIUM HYDROXIDE SOLUTION	8	2679
LITHIUM HYPOCHLORITE, DRY	5.1	1471
LITHIUM HYPOCHLORITE MIXTURE	5.1	1471
Lithium in cartouches, see	4.3	1415
LITHIUM NITRATE	5.1	2722
LITHIUM NITRIDE	4.3	2806
LITHIUM PEROXIDE	5.1	1472
Lithium silicide, see	4.3	1417
LITHIUM SILICON	4.3	1417
L.n.g., see	2.1	1972
LONDON PURPLE	6.1	1621
L.p.g., see	2	1075
Lye, see	8	1823
Lythene, see	3	1268
MAGNESIUM in pellets, turnings or ribbons	4.1	1869
MAGNESIUM ALKYLS	4.2	3053
MAGNESIUM ALLOYS with more than 50% magnesium in pellets, turnings or ribbons	4.1	1869
MAGNESIUM ALLOYS POWDER	4.3	1418
MAGNESIUM ALUMINIUM PHOSPHIDE	4.3	1419
MAGNESIUM ARSENATE	6.1	1622
Magnesium bisulphite solution, see	8	2693
MAGNESIUM BROMATE	5.1	1473
MAGNESIUM CHLORATE	5.1	2723
Magnesium chloride and chlorate mixture, see	5.1	1459
MAGNESIUM DIAMIDE	4.2	2004
MAGNESIUM DIPHENYL	4.2	2005
MAGNESIUM FLUOROSILICATE	6.1	2853
MAGNESIUM GRANULES, COATED, particle size not less than 149 microns	4.3	2950
MAGNESIUM HYDRIDE	4.3	2010
MAGNESIUM NITRATE	5.1	1474
MAGNESIUM PERCHLORATE	5.1	1475
MAGNESIUM PEROXIDE	5.1	1476
MAGNESIUM PHOSPHIDE	4.3	2011
MAGNESIUM POWDER	4.3	1418
Magnesium scrap, see	4.1	1869
MAGNESIUM SILICIDE	4.3	2624
Magnesium silicofluoride, see	6.1	2853
Magnetized material	9	2807
MALEIC ANHYDRIDE	8	2215
MALEIC ANHYDRIDE, MOLTEN	8	2215
Malonic dinitrile, see	6.1	2647
Malonodinitrile, see	6.1	2647
MALONONITRILE	6.1	2647
MANEB	4.2	2210
MANEB PREPARATION with not less than 60% maneb	4.2	2210
MANEB PREPARATION, STABILIZED against self-heating	4.3	2968
MANEB, STABILIZED against self-heating	4.3	2968

Name and description	Class	UN No.
Manganese ethylene-di-dithiocarbamate, see	4.2	2210
Manganese ethylene-1,2-dithiocarbamate, see	4.2	2210
MANGANESE NITRATE	5.1	2724
Manganese (II) nitrate, see	5.1	2724
MANGANESE RESINATE	4.1	1330
Manganous nitrate, see	5.1	2724
MANNITOL HEXANITRATE, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1.1D	0133
MATCHES, FUSEE	4.1	2254
MATCHES, SAFETY (book, card or strike on box)	4.1	1944
MATCHES, "STRIKE ANYWHERE"	4.1	1331
MATCHES, WAX "VESTA"	4.1	1945
MEDICAL WASTE, N.O.S.	6.2	3291
MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	3248
MEDICINE, LIQUID, TOXIC, N.O.S.	6.1	1851
MEDICINE, SOLID, TOXIC, N.O.S.	6.1	3249
p-Mentha-1,8-diene, see	8	2052
MERCAPTANS, LIQUID, FLAMMABLE, N.O.S.	3	3336
MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	1228
MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S.	6.1	3071
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3	3336
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	1228
MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	6.1	3071
2-Mercaptoethanol, see	6.1	2966
2-Mercaptopropionic acid, see	6.1	2936
5-MERCAPTOTETRAZOL-1-ACETIC ACID	1.4C	0448
MERCURIC ARSENATE	6.1	1623
MERCURIC CHLORIDE	6.1	1624
MERCURIC NITRATE	6.1	1625
MERCURIC POTASSIUM CYANIDE	6.1	1626
Mercuric sulphate, see	6.1	1645
Mercurol, see	6.1	1639
Mercurous bisulphate, see	6.1	1645
MERCUROUS NITRATE	6.1	1627
Mercurous sulphate, see	6.1	1645
MERCURY	8	2809
MERCURY ACETATE	6.1	1629
MERCURY AMMONIUM CHLORIDE	6.1	1630
MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2778
MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	3012
MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3011
MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	2777
MERCURY BENZOATE	6.1	1631
Mercury bichloride, see	6.1	1624
MERCURY BROMIDES	6.1	1634
MERCURY COMPOUND, LIQUID, N.O.S.	6.1	2024
MERCURY COMPOUND, SOLID, N.O.S.	6.1	2025
MERCURY CYANIDE	6.1	1636

Name and description	Class	UN No.
MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1.1A	0135
MERCURY GLUCONATE	6.1	1637
MERCURY IODIDE	6.1	1638
MERCURY NUCLEATE	6.1	1639
MERCURY OLEATE	6.1	1640
MERCURY OXIDE	6.1	1641
MERCURY OXYCYANIDE, DESENSITIZED	6.1	1642
MERCURY POTASSIUM IODIDE	6.1	1643
MERCURY SALICYLATE	6.1	1644
MERCURY SULPHATE	6.1	1645
MERCURY THIOCYANATE	6.1	1646
Mesitylene, see	3	2325
MESITYL OXIDE	3	1229
METAL ALKYL HALIDES, WATER-REACTIVE, N.O.S.	4.2	3049
METAL ALKYL HYDRIDES, WATER-REACTIVE, N.O.S	4.2	3050
METAL ALKYLS, WATER-REACTIVE, N.O.S.	4.2	2003
METAL ARYL HALIDES, WATER-REACTIVE, N.O.S.	4.2	3049
METAL ARYL HYDRIDES, WATER-REACTIVE, N.O.S.	4.2	3050
METAL ARYLS, WATER-REACTIVE, N.O.S.	4.2	2003
METAL CARBONYLS, N.O.S., liquid	6.1	3281
METAL CARBONYLS, N.O.S., solid	6.1	3281
METAL CATALYST, DRY	4.2	2881
METAL CATALYST, WETTED with a visible excess of liquid	4.2	1378
METALDEHYDE	4.1	1332
METAL HYDRIDES, FLAMMABLE, N.O.S.	4.1	3182
METAL HYDRIDES, WATER-REACTIVE, N.O.S.	4.3	1409
METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	3208
METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	3209
METAL POWDER, FLAMMABLE, N.O.S.	4.1	3089
METAL POWDER, SELF-HEATING, N.O.S.	4.2	3189
METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	4.1	3181
METHACRYLALDEHYDE, STABILIZED	3	2396
METHACRYLIC ACID, STABILIZED	8	2531
METHACRYLONITRILE, STABILIZED	3	3079
METHALLYL ALCOHOL	3	2614
Methanal, see	3 8	1198 2209
Methane and hydrogen mixture, see	2.1	2034
METHANE, COMPRESSED	2.1	1971
METHANE, REFRIGERATED LIQUID	2.1	1972
METHANESULPHONYL CHLORIDE	6.1	3246
METHANOL	3	1230
2-Methoxyethyl acetate, see	3	1189
METHOXYMETHYL ISOCYANATE	3	2605
4-METHOXY-4-METHYLPENTAN-2-ONE	3	2293
1-Methoxy-2-nitrobenzene, see	6.1	2730
1-Methoxy-3-nitrobenzene, see	6.1	2730
1-Methoxy-4-nitrobenzene, see	6.1	2730

Name and description	Class	UN No.
1-METHOXY-2-PROPANOL	3	3092
METHYL ACETATE	3	1231
METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED	2.1	1060
beta-Methyl acrolein, see	6.1	1143
METHYL ACRYLATE, STABILIZED	3	1919
METHYLAL	3	1234
Methyl alcohol, see	3	1230
Methyl allyl alcohol, see	3	2614
METHYLALLYL CHLORIDE	3	2554
METHYLAMINE, ANHYDROUS	2.1	1061
METHYLAMINE, AQUEOUS SOLUTION	3	1235
METHYLAMYL ACETATE	3	1233
Methyl amyl alcohol, see	3	2053
Methyl amyl ketone, see	3	1110
N-METHYLANILINE	6.1	2294
Methylated spirit, see	3	1986
	3	1987
alpha-METHYLBENZYL ALCOHOL	6.1	2937
METHYL BROMIDE with not more than 2% chloropicrin	2.3	1062
Methyl bromide and chloropicrin mixture, see	2.3	1581
METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURE, LIQUID	6.1	1647
METHYL BROMOACETATE	6.1	2643
2-METHYLBUTANAL	3	3371
3-METHYLBUTAN-2-ONE	3	2397
2-METHYL-1-BUTENE	3	2459
2-METHYL-2-BUTENE	3	2460
3-METHYL-1-BUTENE	3	2561
N-METHYLBUTYLAMINE	3	2945
METHYL tert-BUTYL ETHER	3	2398
METHYL BUTYRATE	3	1237
METHYL CHLORIDE	2.1	1063
Methyl chloride and chloropicrin mixture, see	2.3	1582
METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2.1	1912
METHYL CHLOROACETATE	6.1	2295
Methyl chlorocarbonate, see	6.1	1238
Methyl chloroform, see	6.1	2831
METHYL CHLOROFORMATE	6.1	1238
METHYL CHLOROMETHYL ETHER	6.1	1239
METHYL 2-CHLOROPROPIONATE	3	2933
Methyl alpha-chloropropionate, see	3	2933
METHYLCHLOROSILANE	2.3	2534
Methyl cyanide, see	3	1648
METHYLCYCLOHEXANE	3	2296
METHYLCYCLOHEXANOLS, flammable	3	2617
METHYLCYCLOHEXANONE	3	2297
METHYLCYCLOPENTANE	3	2298
METHYL DICHLOROACETATE	6.1	2299
METHYLDICHLOROSILANE	4.3	1242
Methylene bromide, see	6.1	2664
Methylene chloride, see	6.1	1593
Methylene chloride and methyl chloride mixture, see	2.1	1912
Methylene cyanide, see	6.1	2647
p,p'-Methylene dianiline, see	6.1	2651
Methylene dibromide, see	6.1	2664

Name and description	Class	UN No.
2,2'-Methylene-di-(3,4,6-trichlorophenol), see	6.1	2875
Methyl ethyl ether, see	2.1	1039
METHYL ETHYL KETONE, see	3	1193
2-METHYL-5-ETHYLPYRIDINE	6.1	2300
METHYL FLUORIDE	2.1	2454
METHYL FORMATE	3	1243
2-METHYLFURAN	3	2301
Methyl glycol, see	3	1188
Methyl glycol acetate, see	3	1189
2-METHYL-2-HEPTANETHIOL	6.1	3023
5-METHYLHEXAN-2-ONE	3	2302
METHYLHYDRAZINE	6.1	1244
METHYL IODIDE	6.1	2644
METHYL ISOBUTYL CARBINOL	3	2053
METHYL ISOBUTYL KETONE	3	1245
METHYL ISOCYANATE	6.1	2480
METHYL ISOPROPENYL KETONE, STABILIZED	3	1246
METHYL ISOTHIOCYANATE	6.1	2477
METHYL ISOVALERATE	3	2400
METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	4.3	1928
METHYL MERCAPTAN	2.3	1064
Methyl mercaptopropionaldehyde, see	6.1	2785
METHYL METHACRYLATE MONOMER, STABILIZED	3	1247
4-METHYLMORPHOLINE	3	2535
N-METHYLMORPHOLINE, see	3	2535
METHYL NITRITE	2.2	2455
METHYL ORTHOSILICATE	6.1	2606
METHYLPENTADIENE	3	2461
Methylpentanes, see	3	1208
2-METHYLPENTAN-2-OL	3	2560
4-Methylpentan-2-ol, see	3	2053
3-Methyl-2-penten-4ynol, see	8	2705
METHYLPHENYLDICHLORO-SILANE	8	2437
2-Methyl-2-phenylpropane, see	3	2709
1-METHYLPIPERIDINE	3	2399
METHYL PROPIONATE	3	1248
Methylpropylbenzene, see	3	2046
METHYL PROPYL ETHER	3	2612
METHYL PROPYL KETONE	3	1249
Methyl pyridines, see	3	2313
Methylstyrene, inhibited, see	3	2618
alpha-Methylstyrene, see	3	2303
Methyl sulphate, see	6.1	1595
Methyl sulphide, see	3	1164
METHYLTETRAHYDROFURAN	3	2536
METHYL TRICHLOROACETATE	6.1	2533
METHYLTRICHLOROSILANE	3	1250
alpha-METHYLVALERALDEHYDE	3	2367
Methyl vinyl benzene, inhibited, see	3	2618
METHYL VINYL KETONE, STABILIZED	6.1	1251
M.i.b.c., see	3	2053
MINES with bursting charge	1.1D 1.1F 1.2D 1.2F	0137 0136 0138 0294
Mirbane oil, see	6.1	1662

Name and description	Class	UN No.
Missiles, guided, see	1.1E	0181
	1.1F	0180
	1.1J	0397
	1.2C	0436
	1.2E	0182
	1.2F	0295
	1.2J	0398
	1.3C	0183
	1.3C	0437
	1.4C	0438
MOLYBDENUM PENTACHLORIDE	8	2508
Monochloroacetic acid, see	6.1	1750
	6.1	1751
Monochlorobenzene, see	3	1134
Monochlorodifluoromethane, see	2.2	1018
Monochlorodifluoromethane and monochloropentafluoroethane mixture, see	2.2	1973
Monochlorodifluoromono-bromomethane, see	2.2	1974
Monochloropentafluoroethane and monochlorodifluoromethane mixture, see	2.2	1973
Monoethylamine, see	2.1	1036
MONONITROTOLUIDINES, see	6.1	2660
Monopropylamine, see	3	1277
MORPHOLINE	8	2054
MOTOR FUEL ANTI-KNOCK MIXTURE	6.1	1649
MOTOR SPIRIT	3	1203
Muriatic acid, see	8	1789
MUSK XYLENE, see	4.1	2956
Mysorite, see	9	2212
Naphta, see	3	1268
Naphta, petroleum, see	3	1268
Naphta, solvent, see	3	1268
NAPHTHALENE, CRUDE	4.1	1334
NAPHTHALENE, MOLTEN	4.1	2304
NAPHTHALENE, REFINED	4.1	1334
alpha-NAPHTHYLAMINE	6.1	2077
beta-NAPHTHYLAMINE	6.1	1650
NAPHTHYLTHIOUREA	6.1	1651
1-Naphthylthiourea, see	6.1	1651
NAPHTHYLUREA	6.1	1652
NATURAL GAS, COMPRESSED with high methane content	2.1	1971
NATURAL GAS, REFRIGERATED LIQUID with high methane content	2.1	1972
Natural gasoline, see	3	1203
Neohexane, see	3	1208
NEON, COMPRESSED	2.2	1065
NEON, REFRIGERATED LIQUID	2.2	1913
Neothyl, see	3	2612
NICKEL CARBONYL	6.1	1259
NICKEL CYANIDE	6.1	1653
Nickel (II) cyanide, see	6.1	1653
NICKEL NITRATE	5.1	2725
Nickel (II) nitrate, see	5.1	2725
NICKEL NITRITE	5.1	2726
Nickel (II) nitrite, see	5.1	2726
Nickelous nitrate, see	5.1	2725
Nickelous nitrite, see	5.1	2726
Nickel tetracarbonyl, see	6.1	1259
NICOTINE	6.1	1654
NICOTINE COMPOUND, LIQUID, N.O.S	6.1	3144
NICOTINE COMPOUND, SOLID, N.O.S	6.1	1655
NICOTINE HYDROCHLORIDE, liquid	6.1	1656
NICOTINE HYDROCHLORIDE, solid	6.1	1656

Name and description	Class	UN No.
NICOTINE HYDROCHLORIDE SOLUTION	6.1	1656
NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	3144
NICOTINE PREPARATION, SOLID, N.O.S.	6.1	1655
NICOTINE SALICYLATE	6.1	1657
NICOTINE SULPHATE, SOLID	6.1	1658
NICOTINE SULPHATE, SOLUTION	6.1	1658
NICOTINE TARTRATE	6.1	1659
NITRATES, INORGANIC, N.O.S.	5.1	1477
NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	3218
NITRATING ACID MIXTURE with more than 50% nitric acid	8	1796
NITRATING ACID MIXTURE with not more than 50% nitric acid	8	1796
NITRATING ACID MIXTURE, SPENT, with more than 50% nitric acid	8	1826
NITRATING ACID MIXTURE, SPENT, with not more than 50% nitric acid	8	1826
NITRIC ACID, other than red fuming, with more than 70% nitric acid	8	2031
NITRIC ACID, other than red fuming, with not more than 70% nitric acid	8	2031
NITRIC ACID, RED FUMING	8	2032
NITRIC OXIDE, COMPRESSED	2.3	1660
NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE	2.3	1975
NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE, see	2.3	1975
NITRILES, FLAMMABLE, TOXIC, N.O.S.	3	3273
NITRILES, TOXIC, N.O.S.	6.1	3276
NITRILES, TOXIC, FLAMMABLE, N.O.S.	6.1	3275
NITRITES, INORGANIC, N.O.S.	5.1	2627
NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	3219
NITROANILINES (o-, m-, p-)	6.1	1661
NITROANISOLES, LIQUID	6.1	2730
NITROANISOLES, SOLID	6.1	2730
NITROBENZENE	6.1	1662
Nitrobenzene bromide, see	6.1	2732
NITROBENZENESULPHONIC ACID	8	2305
Nitrobenzol, see	6.1	1662
5-NITROBENZOTRIAZOL	1.1D	0385
NITROBENZOTRIFLUORIDES, liquid	6.1	2306
NITROBENZOTRIFLUORIDES	6.1	2306
NITROBROMOBENZENES, LIQUID	6.1	2732
NITROBROMOBENZENES, SOLID	6.1	2732
NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass	1.1D	0340
NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass	1.1D	0341
NITROCELLULOSE MEMBRANE FILTERS, with not more than 12.6% nitrogen, by dry mass	4.1	3270
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH PLASTICIZER, WITH PIGMENT	4.1	2557
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH PLASTICIZER, WITHOUT PIGMENT	4.1	2557
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITHOUT PLASTICIZER, WITH PIGMENT	4.1	2557

Name and description	Class	UN No.
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITHOUT PLASTICIZER, WITHOUT PIGMENT	4.1	2557
NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass	1.3C	0343
NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	2059
NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass	1.3C	0342
NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	4.1	2556
NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	4.1	2555
Nitrochlorobenzenes, see	6.1	1578
3-NITRO-4-CHLOROBENZOTRI-FLUORIDE	6.1	2307
NITROCRESOLS	6.1	2446
NITROETHANE	3	2842
NITROGEN, COMPRESSED	2.2	1066
NITROGEN DIOXIDE, see	2.3	1067
Nitrogen mixture with rare gases, see	2.2	1981
NITROGEN, REFRIGERATED LIQUID	2.2	1977
NITROGEN TRIFLUORIDE	2.2	2451
NITROGEN TRIOXIDE	2.3	2421
NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	1.1D	0143
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3	3357
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3	3343
NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	4.1	3319
NITROGLYCERIN, SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3	3064
NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin	1.1D	0144
NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	3	1204
NITROGUANIDINE, dry or wetted with less than 20% water, by mass	1.1D	0282
NITROGUANIDINE, WETTED with not less than 20% water, by mass	4.1	1336
NITROHYDROCHLORIC ACID	8	1798
NITROMANNITE, WETTED, see	1.1D	0133
NITROMETHANE	3	1261
Nitromuriatic acid, see	8	1798
NITRONAPHTHALENE	4.1	2538
NITROPHENOLS (o-, m-, p-)	6.1	1663
4-NITROPHENYLHYDRAZINE, with not less than 30% water, by mass	4.1	3376
NITROPROPANES	3	2608
p-NITROSODIMETHYLANILINE	4.2	1369
NITROSTARCH, dry or wetted with less than 20% water, by mass	1.1d	0146
NITROSTARCH, WETTED with not less than 20% water, by mass	4.1	1337
NITROSYL CHLORIDE	2.3	1069
NITROSYLSULPHURIC ACID, LIQUID	8	2308

Name and description	Class	UN No.
NITROSYLSULPHURIC ACID, SOLID	8	2308
NITROTOLUENES, LIQUID	6.1	1664
NITROTOLUENES, SOLID	6.1	1664
NITROTOLUIDINES	6.1	2660
NITROTRIAZOLONE	1.1D	0490
NITRO UREA	1.1D	0147
NITROUS OXIDE	2.2	1070
NITROUS OXIDE, REFRIGERATED LIQUID	2.2	2201
NITROXYLENES, LIQUID	6.1	1665
NITROXYLENES, SOLID	6.1	1665
Non-activated carbon, see	4.2	1361
Non-activated charcoal, see	4.2	1361
NONANES	3	1920
NONYLTRICHLOROSILANE	8	1799
2,5-NORBORNADIENE, STABILIZED, see	3	2251
Normal propyl alcohol, see	3	1274
NTO, see	1.1D	0490
OCTADECYLTRICHLOROSILANE	8	1800
OCTADIENE	3	2309
OCTAFLUOROBUT-2-ENE	2.2	2422
OCTAFLUOROCYCLOBUTANE	2.2	1976
OCTAFLUOROPROPANE	2.2	2424
OCTANES	3	1262
OCTOGEN, see	1.1D 1.1D 1.1D	0226 0391 0484
OCTOL, dry or wetted with less than 15% water, by mass, see	1.1D	0266
OCTOLITE, dry or wetted with less than 15% water, by mass	1.1D	0266
OCTONAL	1.1D	0496
OCTYL ALDEHYDES	3	1191
tert-Octyl mercaptan, see	6.1	3023
OCTYLTRICHLOROSILANE	8	1801
Oenanthol, see	3	3056
OIL GAS, COMPRESSED	2.3	1071
Oleum, see	8	1831
ORGANIC PEROXIDE TYPE B, LIQUID	5.2	3101
ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	5.2	3111
ORGANIC PEROXIDE TYPE B, SOLID	5.2	3102
ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	5.2	3112
ORGANIC PEROXIDE TYPE C, LIQUID	5.2	3103
ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	5.2	3113
ORGANIC PEROXIDE TYPE C, SOLID	5.2	3104
ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	5.2	3114
ORGANIC PEROXIDE TYPE D, LIQUID	5.2	3105
ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	5.2	3115
ORGANIC PEROXIDE TYPE D, SOLID	5.2	3106
ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	5.2	3116
ORGANIC PEROXIDE TYPE E, LIQUID	5.2	3107

Name and description	Class	UN No.
ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	5.2	3117
ORGANIC PEROXIDE TYPE E, SOLID	5.2	3108
ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	5.2	3118
ORGANIC PEROXIDE TYPE F, LIQUID	5.2	3109
ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	5.2	3119
ORGANIC PEROXIDE TYPE F, SOLID	5.2	3110
ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	5.2	3120
Organic peroxides, see Table 11.3 for an alphabetical list of currently assigned organic peroxides and see	5.2	3101 to 3120
ORGANIC PIGMENTS, SELF-HEATING	4.2	3313
ORGANOARSENIC COMPOUND, N.O.S., liquid	6.1	3280
ORGANOARSENIC COMPOUND, N.O.S., solid	6.1	3280
ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2762
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	2996
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	2995
ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	2761
ORGANOMETALLIC COMPOUND DISPERSION, WATER-REACTIVE, FLAMMABLE, N.O.S.	4.3	3207
ORGANOMETALLIC COMPOUND SOLID, WATER-REACTIVE, FLAMMABLE, N.O.S.	4.3	3372
ORGANOMETALLIC COMPOUND SOLUTION, WATER-REACTIVE, FLAMMABLE, N.O.S.	4.3	3207
ORGANOMETALLIC COMPOUND, TOXIC, N.O.S., liquid	6.1	3282
ORGANOMETALLIC COMPOUND, TOXIC, N.O.S., solid	6.1	3282
ORGANOMETALLIC COMPOUND, WATER-REACTIVE, FLAMMABLE, N.O.S.	4.3	3207
ORGANOPHOSPHORUS COMPOUND, TOXIC, N.O.S., liquid	6.1	3278
ORGANOPHOSPHORUS COMPOUND, TOXIC, N.O.S., solid	6.1	3278
ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	6.1	3279
ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2784
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	3018
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3017
ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	2783
ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	2788
ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	3146
ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2787
ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	3020
ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3019

Name and description	Class	UN No.
ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	2786
Orthophospohoric acid, see	8	1805
OSMIUM TETROXIDE	6.1	2471
OXIDIZING LIQUID, N.O.S.	5.1	3139
OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	3098
OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	3099
OXIDIZING SOLID, N.O.S.	5.1	1479
OXIDIZING SOLID, CORROSIVE, N.O.S.	5.1	3085
OXIDIZING SOLID, FLAMMABLE, N.O.S.	5.1	3137
OXIDIZING SOLID, SELF-HEATING, N.O.S.	5.1	3100
OXIDIZING SOLID, TOXIC, N.O.S.	5.1	3087
OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	5.1	3121
Oxirane, see	2.3	1040
Oxygen and carbon dioxide mixture, see	2.2	1014
OXYGEN, COMPRESSED	2.2	1072
OXYGEN DIFLUORIDE, COMPRESSED	2.3	2190
OXYGEN GENERATOR, CHEMICAL	5.1	3356
Oxygen, mixture with rare gases, see	2.2	1980
OXYGEN, REFRIGERATED LIQUID	2	1073
1-Oxy-4-nitrobenzene, see	6.1	1663
PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3 8	1263 3066
PAINT RELATED MATERIAL (including paint thinning and reducing compound)	3 8	1263 3066
PAPER, UNSATURATED OIL TREATED, incompletely dried (including carbon paper)	4.2	1379
Paraffin, see	3	1223
PARAFORMALDEHYDE	4.1	2213
PARALDEHYDE	3	1264
PCBs, see	9	2315
PENTABORANE	4.2	1380
PENTACHLOROETHANE	6.1	1669
PENTACHLOROPHENOL	6.1	3155
PENTAERYTHRITE TETRANITRATE with not less than 7% wax, by mass	1.1D	0411
PENTAERYTHRITE TETRANITRATE, DESENSITIZED with not less than 15% phlegmatizer, by mass	1.1D	0150
PENTAERYTHRITE TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	4.1	3344
PENTAERYTHRITE TETRANITRATE, WETTED with not less than 25% water, by mass	1.1D	0150
PENTAERYTHRITOL TETRANITRATE, see	1.1D 1.1D	0150 0411
PENTAFLUOROETHANE	2.2	3220
Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane, see	2.2	3337
PENTAMETHYLHEPTANE	3	2286
Pentanal, see	3	2058
PENTANE-2,4-DIONE	3	2310
PENTANES, liquid	3	1265
n-Pentane, see	3	1265
PENTANOLS	3	1105
3-Pentanol, see	3	1105
1-PENTENE	3	1108

Name and description	Class	UN No.
1-PENTOL	8	2705
PENTOLITE, dry or wetted with less than 15% water, by mass	1.1D	0151
Pentyl nitrite, see	3	1113
PERCHLORATES, INORGANIC, N.O.S.	5.1	1481
PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	3211
PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass	5.1	1873
PERCHLORIC ACID with not more than 50% acid, by mass	8	1802
Perchlorobenzene, see	6.1	2729
Perchlorocyclopentadiene, see	6.1	2646
Perchloroethylene, see	6.1	1897
PERCHLOROMETHYL MERCAPTAN	6.1	1670
PERCHLORYL FLUORIDE	2.3	3083
Perfluoroacetylchloride, see	2.3	3057
PERFLUORO(ETHYL VINYL ETHER)	2.1	3154
PERFLUORO(METHYL VINYL ETHER)	2.1	3153
Perfluoropropane, see	2.2	2424
PERFUMERY PRODUCTS with flammable solvents	3	1266
PERMANGANATES, INORGANIC, N.O.S.	5.1	1482
PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	3214
PEROXIDES, INORGANIC, N.O.S.	5.1	1483
PERSULPHATES, INORGANIC, N.O.S.	5.1	3215
PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	3216
PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3	3021
PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	2902
PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	2903
PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	2588
Pesticide, toxic, under compressed gas, n.o.s, see	2	1950
PETN, see	1.1D 1.1D	0150 0411
PETN/TNT, see	1.1D	0151
PETROL	3	1203
PETROLEUM CRUDE OIL	3	1267
PETROLEUM DISTILLATES, N.O.S.	3	1268
Petroleum ether, see	3	1268
PETROLEUM GASES, LIQUEFIED	2.1	1075
Petroleum naphtha, see	3	1268
Petroleum oil, see	3	1268
PETROLEUM PRODUCTS, N.O.S.	3	1268
Petroleum raffinate, see	3	1268
Petroleum spirit, see	3	1268
PHENACYL BROMIDE	6.1	2645
PHENETIDINES	6.1	2311
PHENOLATES, LIQUID	8	2904
PHENOLATES, SOLID	8	2905
PHENOL, MOLTEN	6.1	2312
PHENOL, SOLID	6.1	1671
PHENOL SOLUTION	6.1	2821
PHENOLSULPHONIC ACID, LIQUID	8	1803

Name and description	Class	UN No.
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	3346
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	3348
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3347
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	3345
PHENYLACETONITRILE, LIQUID	6.1	2470
PHENYLACETYL CHLORIDE	8	2577
Phenylamine, see	6.1	1547
1-Phenylbutane, see	3	2709
2-Phenylbutane, see	3	2709
PHENYLCARBYLAMINE CHLORIDE	6.1	1672
PHENYL CHLOROFORMATE	6.1	2746
Phenyl cyanide, see	6.1	2224
PHENYLENEDIAMINES (o-, m-, p-)	6.1	1673
Phenylethylene, see	3	2055
PHENYLHYDRAZINE	6.1	2572
PHENYL ISOCYANATE	6.1	2487
Phenylisocyanodichloride, see	6.1	1672
PHENYL MERCAPTAN	6.1	2337
PHENYLMERCURIC ACETATE	6.1	1674
PHENYLMERCURIC COMPOUND, N.O.S.	6.1	2026
PHENYLMERCURIC HYDROXIDE	6.1	1894
PHENYLMERCURIC NITRATE	6.1	1895
PHENYLPHOSPHORUS DICHLORIDE	8	2798
PHENYLPHOSPHORUS THIODICHLORIDE	8	2799
2-Phenylpropene, see	3	2303
PHENYLTRICHLOROSILANE	8	1804
PHOSGENE	2.3	1076
9-PHOSPHABICYCLONONANES	4.2	2940
PHOSPHINE	2.3	2199
Phosphoretted hydrogen, see	2.3	2199
PHOSPHORIC ACID, LIQUID	8	1805
PHOSPHORIC ACID, SOLID	8	1805
Phosphoric acid, anhydrous, see	8	1807
PHOSPHOROUS ACID	8	2834
PHOSPHORUS, AMORPHOUS	4.1	1338
Phosphorus bromide, see	8	1808
Phosphorus chloride, see	6.1	1809
PHOSPHORUS HEPTASULPHIDE, free from yellow and white phosphorus	4.1	1339
PHOSPHORUS OXYBROMIDE	8	1939
PHOSPHORUS OXYBROMIDE, MOLTEN	8	2576
PHOSPHORUS OXYCHLORIDE	8	1810
PHOSPHORUS PENTABROMIDE	8	2691
PHOSPHORUS PENTACHLORIDE	8	1806
PHOSPHORUS PENTAFLUORIDE	2.3	2198
PHOSPHORUS PENTASULPHIDE, free from yellow and white phosphorus	4.3	1340
PHOSPHORUS PENTOXIDE	8	1807
PHOSPHORUS SESQUISULPHIDE, free from yellow and white phosphorus	4.1	1341
Phosphorus (V) sulphide, free from yellow and white phosphorus, see	4.3	1340
Phosphorus sulphochloride, see	8	1837
PHOSPHORUS TRIBROMIDE	8	1808

Name and description	Class	UN No.
PHOSPHORUS TRICHLORIDE	6.1	1809
PHOSPHORUS TRIOXIDE	8	2578
PHOSPHORUS TRISULPHIDE, free from yellow and white phosphorus	4.1	1343
PHOSPHORUS, WHITE, DRY	4.2	1381
PHOSPHORUS, WHITE IN SOLUTION	4.2	1381
PHOSPHORUS, WHITE, MOLTEN	4.2	2447
PHOSPHORUS, WHITE, UNDER WATER	4.2	1381
PHOSPHORUS, YELLOW, DRY	4.2	1381
PHOSPHORUS, YELLOW, IN SOLUTION	4.2	1381
PHOSPHORUS, YELLOW, UNDER WATER	4.2	1381
Phosphoryl chloride, see	8	1810
PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride	8	2214
PICOLINES	3	2313
PICRAMIDE, see	1.1D	0153
PICRIC ACID, see	1.1D	0154
PICRIC ACID, WETTED see	4.1	3364
PICRITE, see	1.1D	0282
PICRITE, WETTED, see	4.1	1336
Picrotoxin, see	6.1	3172
PICRYL CHLORIDE, see	1.1D	0155
PICRYLCHLORIDE, WETTED see	4.1	3365
alpha-PINENE	3	2368
PINE OIL	3	1272
PIPERAZINE	8	2579
PIPERIDINE	8	2401
Pivaloyl chloride, see	6.1	2438
Plastic explosives , see	1.1D	0084
PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	9	3314
PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	4.2	2006
POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	2733
POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	2735
POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	8	2734
POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	3259
POLYCHLORINATED BIPHENYLS	9	2315
POLYESTER RESIN KIT	3	3269
POLYHALOGENATED BIPHENYLS, LIQUID	9	3151
POLYHALOGENATED BIPHENYLS, SOLID	9	3152
POLYHALOGENATED TERPHENYLS, LIQUID	9	3151
POLYHALOGENATED TERPHENYLS, SOLID	9	3152
POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	9	2211
Polystyrene beads, expandable, see	9	2211
POTASSIUM	4.3	2257
POTASSIUM ARSENATE	6.1	1677
POTASSIUM ARSENITE	6.1	1678
Potassium bifluoride, see	8	1811
Potassium bisulphate, see	8	2509
Potassium bisulphite solution, see	8	2693
POTASSIUM BOROHYDRIDE	4.3	1870
POTASSIUM BROMATE	5.1	1484
POTASSIUM CHLORATE	5.1	1485

Name and description	Class	UN No.
POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1	2427
Potassium chlorate mixed with mineral oil, see	1.1D	0083
POTASSIUM CUPROCYANIDE	6.1	1679
POTASSIUM CYANIDE	6.1	1680
Potassium dicyanocuprate (I), see	6.1	1679
POTASSIUM DITHIONITE	4.2	1929
POTASSIUM FLUORIDE	6.1	1812
POTASSIUM FLUOROACETATE	6.1	2628
POTASSIUM FLUOROSILICATE	6.1	2655
Potassium hexafluorosilicate, see	6.1	2655
Potassium hydrate, see	8	1814
POTASSIUM HYDROGENDIFLUORIDE	8	1811
POTASSIUM HYDROGEN SULPHATE	8	2509
POTASSIUM HYDROSULPHITE, see	4.2	1929
Potassium hydroxide, liquid, see	8	1814
POTASSIUM HYDROXIDE, SOLID	8	1813
POTASSIUM HYDROXIDE SOLUTION	8	1814
POTASSIUM METAL ALLOYS	4.3	1420
POTASSIUM METAVANADATE	6.1	2864
POTASSIUM MONOXIDE	8	2033
POTASSIUM NITRATE	5.1	1486
Potassium nitrate and sodium nitrate mixture, see	5.1	1499
POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE	5.1	1487
POTASSIUM NITRITE	5.1	1488
POTASSIUM PERCHLORATE	5.1	1489
POTASSIUM PERMANGANATE	5.1	1490
POTASSIUM PEROXIDE	5.1	1491
POTASSIUM PERSULPHATE	5.1	1492
POTASSIUM PHOSPHIDE	4.3	2012
Potassium selenate, see	6.1	2630
Potassium selenite, see	6.1	2630
Potassium silicofluoride, see	6.1	2655
POTASSIUM SODIUM ALLOYS	4.3	1422
POTASSIUM SULPHIDE with less than 30% water of crystallization	4.2	1382
POTASSIUM SULPHIDE, ANHYDROUS	4.2	1382
POTASSIUM SULPHIDE, HYDRATED with not less than 30% water of crystallization	8	1847
POTASSIUM SUPEROXIDE	5.1	2466
Potassium tetracyanomercurate (II), see	6.1	1626
POWDER CAKE, WETTED with not less than 17% alcohol, by mass	1.1C	0433
POWDER CAKE, WETTED with not less than 25% water, by mass	1.3C	0159
POWDER PASTE, see	1.1C 1.3C	0433 0159
POWDER, SMOKELESS	1.1C 1.3C	0160 0161
Power devices, explosive, see	1.2C 1.3C 1.4C 1.4S	0381 0275 0276 0323
PRIMERS, CAP TYPE	1.1B 1.4B 1.4S	0377 0378 0044
Primers, small arms, see	1.4S	0044
PRIMERS, TUBULAR	1.3G 1.4G 1.4S	0319 0320 0376

Name and description	Class	UN No.
PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	3	1210
Projectiles, illuminating, seee	1.2G 1.3G 1.4G	0171 0254 0297
PROJECTILES, inert with tracer	1.3G 1.4G 1.4S	0424 0425 0345
PROJECTILES with burster or expelling charge	1.2D 1.2F 1.2G 1.4D 1.4F 1.4G	0346 0426 0434 0347 0427 0435
PROJECTILES with bursting charge	1.1D 1.1F 1.2D 1.2F 1.4D	0168 0167 0169 0324 0344
PROPADIENE, STABILIZED	2.1	2200
Propadiene and methyl acetylene mixture, stabilized, see	2.1	1060
PROPANE	2.1	1978
PROPANETHIOLS	3	2402
n-PROPANOL	3	1274
PROPELLANT, LIQUID	1.1C 1.3C	0497 0495
PROPELLANT, SOLID	1.1C 1.3C 1.4C	0498 0499 0501
Propellant with a single base,) Propellant with a double base,) see Propellant with a triple base,)	1.1C 1.3C	0160 0161
Propene, see	2.1	1077
PROPIONALDEHYDE	3	1275
PROPIONIC ACID	8	1848
PROPIONIC ANHYDRIDE	8	2496
PROPIONITRILE	3	2404
PROPIONYL CHLORIDE	3	1815
n-PROPYL ACETATE	3	1276
PROPYL ALCOHOL, NORMAL, see	3	1274
PROPYLAMINE	3	1277
n-PROPYLBENZENE	3	2364
Propyl chloride, see	3	1278
n-PROPYL CHLOROFORMATE	6.1	2740
PROPYLENE	2.1	1077
PROPYLENE CHLOROHYDRIN	6.1	2611
1,2-PROPYLENEDIAMINE	8	2258
Propylene dichloride, see	3	1279
PROPYLENEIMINE, STABILIZED	3	1921
PROPYLENE OXIDE	3	1280
PROPYLENE TETRAMER	3	2850
Propylene trimer, see	3	2057
PROPYL FORMATES	3	1281
n-PROPYL ISOCYANATE	6.1	2482
Propyl mercaptan, see	3	2402
n-PROPYL NITRATE	3	1865
PROPYLTRICHLOROSILANE	8	1816
Pyrazine hexahydride, see	8	2579
PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	3350
PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	3352
PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3351
PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	3349
PYRIDINE	3	1282
PYROPHORIC ALLOY, N.O.S.	4.2	1383

Name and description	Class	UN No.
PYROPHORIC LIQUID, INORGANIC, N.O.S.	4.2	3194
PYROPHORIC LIQUID, ORGANIC, N.O.S.	4.2	2845
PYROPHORIC METAL, N.O.S.	4.2	1383
PYROPHORIC ORGANOMETALLIC COMPOUND, WATER-REACTIVE, N.O.S., liquid	4.2	3203
PYROPHORIC ORGANO-METALLIC COMPOUND, WATER-REACTIVE, N.O.S., solid	4.2	3203
PYROPHORIC SOLID, INORGANIC, N.O.S.	4.2	3200
PYROPHORIC SOLID, ORGANIC, N.O.S.	4.2	2846
PYROSULPHURYL CHLORIDE	8	1817
Pyroxylin solution, see	3	2059
PYRROLIDINE	3	1922
Quinol, see	6.1	2662
QUINOLINE	6.1	2656
Quinone, see	6.1	2587
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM	7	2909
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING	7	2908
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES	7	2911
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL	7	2910
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non fissile or fissile-excepted	7	2912
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE	7	3324
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted	7	3321
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE	7	3325
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted	7	3322
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE	7	3326
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non fissile or fissile-excepted	7	2913
RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE	7	3331
RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non fissile or fissile-excepted	7	2919
RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form	7	3327
RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non fissile or fissile-excepted	7	2915
RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE	7	3333
RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted	7	3332
RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE	7	3329
RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non fissile or fissile-excepted	7	2917
RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE	7	3328

Name and description	Class	UN No.
RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non fissile or fissile-excepted	7	2916
RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE	7	3330
RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted	7	3323
RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE	7	2977
RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non fissile or fissile-excepted	7	2978
RAGS, OILY	4.2	1856
RARE GASES AND NITROGEN MIXTURE, COMPRESSED	2.2	1981
RARE GASES AND OXYGEN MIXTURE, COMPRESSED	2.2	1980
RARE GASES MIXTURE, COMPRESSED	2.2	1979
RDX, see	1.1D	0072
	1.1D	0391
	1.1D	0483
RECEPTACLES, SMALL, CONTAINING GAS without a release device, non-refillable	2	2037
Red phosphorus, see	4.1	1338
REFRIGERANT GAS, N.O.S.	2.2	1078
REFRIGERANT GAS R 12, see	2.2	1028
REFRIGERANT GAS R 12B1, see	2.2	1974
REFRIGERANT GAS R 13, see	2.2	1022
REFRIGERANT GAS R 13B1, see	2.2	1009
REFRIGERANT GAS R 14, see	2.2	1982
REFRIGERANT GAS R 21, see	2.2	1029
REFRIGERANT GAS R 22, see	2.2	1018
REFRIGERANT GAS R 23, see	2.2	1984
REFRIGERANT GAS R 32, see	2.1	3252
REFRIGERANT GAS R 40, see	2.1	1063
REFRIGERANT GAS R 41, see	2.1	2454
REFRIGERANT GAS R 114, see	2.2	1958
REFRIGERANT GAS R 115, see	2.2	1020
REFRIGERANT GAS R 116, see	2.2	2193
REFRIGERANT GAS R 124, see	2.2	1021
REFRIGERANT GAS R 125, see	2.2	3220
REFRIGERANT GAS R 133a, see	2.2	1983
REFRIGERANT GAS R 134a, see	2.2	3159
REFRIGERANT GAS R 142b, see	2.1	2517
REFRIGERANT GAS R 143a, see	2.1	2035
REFRIGERANT GASR 152a, see	2.1	1030
REFRIGERANT GAS R 161, see	2.1	2453
REFRIGERANT GAS R 218, see	2.2	2424
REFRIGERANT GAS R 227, see	2.2	3296
REFRIGERANT GAS R 404A	2.2	3337
REFRIGERANT GAS R 407A	2.2	3338
REFRIGERANT GAS R 407B	2.2	3339
REFRIGERANT GAS R 407C	2.2	3340
REFRIGERANT GAS R 500, see	2.2	2602
REFRIGERANT GAS R 502, see	2.2	1973
REFRIGERANT GAS R 503, see	2.2	2599
REFRIGERANT GAS R 1132a, see	2.2	1959
REFRIGERANT GAS R 1216, see	2.2	1858
REFRIGERANT GAS R 1318, see	2.2	2422
REFRIGERANT GAS RC 318, see	2.2	1976
REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas	2.1	3358

Name and description	Class	UN No.
REFRIGERATING MACHINES containing non-flammable, non-toxic, liquefied gas or ammonia solutions (UN 2672)	2.2	2857
REGULATED MEDICAL WASTE, N.O.S.	6.2	3291
RELEASE DEVICES, EXPLOSIVE	1.4S	0173
RESIN SOLUTION, flammable	3	1866
Resorcin, see	6.1	2876
RESORCINOL	6.1	2876
RIVETS, EXPLOSIVE	1.4S	0174
ROCKET MOTORS	1.1C	0280
	1.2C	0281
	1.3C	0186
ROCKET MOTORS, LIQUID FUELLED	1.2J	0395
	1.3J	0396
ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1.2L	0322
	1.3L	0250
ROCKETS with bursting charge	1.1E	0181
	1.1F	0180
	1.2E	0182
	1.2F	0295
ROCKETS with expelling charge	1.2C	0436
	13C	0437
	1.4C	0438
ROCKETS with inert head	1.3C	0183
	1.2C	0502
ROCKETS, LINE-THROWING	1.2G	0238
	1.3G	0240
	1.4G	0453
ROCKETS, LIQUID FUELLED with bursting charge	1.1J	0397
	1.2J	0398
ROSIN OIL	3	1286
RUBBER SCRAP, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	4.1	1345
RUBBER SHODDY, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	4.1	1345
RUBBER SOLUTION	3	1287
RUBIDIUM	4.3	1423
RUBIDIUM HYDROXIDE	8	2678
RUBIDIUM HYDROXIDE SOLUTION	8	2677
Saltpetre, see	5.1	1486
SAMPLES, EXPLOSIVE, other than initiating explosive		0190
Sand acid, see	8	1778
SEAT-BELT PRETENSIONERS	1.4G	0503
	9	3268
SEED CAKE with more than 1.5% oil and not more than 11% moisture	4.2	1386
SEED CAKE with not more than 1.5% oil and not more than 11% moisture	4.2	2217
Seed expellers, see	4.2	1386
	4.2	2217
SELENATES	6.1	2630
SELENIC ACID	8	1905
SELENITES	6.1	2630
SELENIUM COMPOUND, N.O.S.	6.1	3283
SELENIUM DISULPHIDE	6.1	2657
SELENIUM HEXAFLUORIDE	2.3	2194
SELENIUM OXYCHLORIDE	8	2879
SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	4.2	3188
SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	4.2	3185
SELF-HEATING LIQUID, INORGANIC, N.O.S.	4.2	3186
SELF-HEATING LIQUID, ORGANIC, N.O.S.	4.2	3183
SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	4.2	3187
SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	4.2	3184
SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	4.2	3192

Name and description	Class	UN No.
SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	4.2	3126
SELF-HEATING SOLID, INORGANIC, N.O.S.	4.2	3190
SELF-HEATING SOLID, ORGANIC, N.O.S.	4.2	3088
SELF-HEATING SOLID, OXIDIZING, N.O.S	4.2	3127
SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	4.2	3191
SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	4.2	3128
SELF-REACTIVE LIQUID TYPE B	4.1	3221
SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED	4.1	3231
SELF-REACTIVE LIQUID TYPE C	4.1	3223
SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED	4.1	3233
SELF-REACTIVE LIQUID TYPE D	4.1	3225
SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED	4.1	3235
SELF-REACTIVE LIQUID TYPE E	4.1	3227
SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED	4.1	3237
SELF-REACTIVE LIQUID TYPE F	4.1	3229
SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	4.1	3239
SELF-REACTIVE SOLID TYPE B	4.1	3222
SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED	4.1	3232
SELF-REACTIVE SOLID TYPE C	4.1	3224
SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	4.1	3234
SELF-REACTIVE SOLID TYPE D	4.1	3226
SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED	4.1	3236
SELF-REACTIVE SOLID TYPE E	4.1	3228
SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED	4.1	3238
SELF-REACTIVE SOLID TYPE F	4.1	3230
SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	4.1	3240
SHALE OIL	3	1288
Shaped charges, see	1.1D 1.2D 1.4D 1.4S	0059 0439 0440 0441
SIGNAL DEVICES, HAND	1.4G 1.4S	0191 0373
SIGNALS, DISTRESS, ship	1.1G 1.3G	0194 0195
Signals, distress, ship, water-activated, see	1.3L	0249
SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.1G 1.3G 1.4G 1.4S	0192 0193 0492 0493
SIGNALS, SMOKE	1.1G 1.2G 1.3G 1.4G	0196 0313 0487 0197
SILANE	2.1	2203
Silicofluoric acid, see	8	1778
Silicofluorides, n.o.s., see	6.1	2856
Silicon chloride, see	8	1818
SILICON POWDER, AMORPHOUS	4.1	1346
SILICON TETRACHLORIDE	8	1818
SILICON TETRAFLUORIDE	2.3	1859
SILVER ARSENITE	6.1	1683
SILVER CYANIDE	6.1	1684
SILVER NITRATE	5.1	1493
SILVER PICRATE, WETTED with not less than 30% water, by mass	4.1	1347

Name and description	Class	UN No.
SLUDGE ACID	8	1906
SODA LIME with more than 4% sodium hydroxide	8	1907
SODIUM	4.3	1428
Sodium aluminate, solid	8	2812
SODIUM ALUMINATE SOLUTION	8	1819
SODIUM ALUMINIUM HYDRIDE	4.3	2835
SODIUM AMMONIUM VANADATE	6.1	2863
SODIUM ARSANILATE	6.1	2473
SODIUM ARSENATE	6.1	1685
SODIUM ARSENITE, AQUEOUS SOLUTION	6.1	1686
SODIUM ARSENITE, SOLID	6.1	2027
SODIUM AZIDE	6.1	1687
Sodium bifluoride, see	8	2439
Sodium binoxide, see	5.1	1504
Sodium bisulphite solution, see	8	2693
SODIUM BOROHYDRIDE	4.3	1426
SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide, by mass	8	3320
SODIUM BROMATE	5.1	1494
SODIUM CACODYLATE	6.1	1688
SODIUM CHLORATE	5.1	1495
SODIUM CHLORATE, AQUEOUS SOLUTION	5.1	2428
Sodium chlorate mixed with dinitrotoluene, see	1.1D	0083
SODIUM CHLORITE	5.1	1496
SODIUM CHLOROACETATE	6.1	2659
SODIUM CUPROCYANIDE, SOLID	6.1	2316
SODIUM CUPROCYANIDE SOLUTION	6.1	2317
SODIUM CYANIDE	6.1	1689
Sodium dicyanocuprate (I), solid, see	6.1	2316
Sodium dicyanocuprate (I) solution, see	6.1	2317
Sodium dimethylarsenate, see	6.1	1688
SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass	1.3C	0234
SODIUM DINITRO-o-CRESOLATE, WETTED, with not less than 10% water, by mass	4.1	3369
SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 15% water, by mass	4.1	1348
Sodium dioxide, see	5.1	1504
SODIUM DITHIONITE	4.2	1384
SODIUM FLUORIDE	6.1	1690
SODIUM FLUOROACETATE	6.1	2629
SODIUM FLUOROSILICATE	6.1	2674
Sodium hexafluorosilicate, see	6.1	2674
Sodium hydrate, see	8	1824
SODIUM HYDRIDE	4.3	1427
Sodium hydrogen 4-amino-phenylarsenate, see	6.1	2473
SODIUM HYDROGENDIFLUORIDE	8	2439
SODIUM HYDROSULPHIDE with less than 25% water of crystallization	4.2	2318
SODIUM HYDROSULPHIDE with not less than 25% water of crystallization	8	2949
SODIUM HYDROSULPHITE, see	4.2	1384
SODIUM HYDROXIDE, SOLID	8	1823
SODIUM HYDROXIDE SOLUTION	8	1824
Sodium metasilicate pentahydrate, see	8	3253
SODIUM METHYLATE	4.2	1431

Name and description	Class	UN No.
SODIUM METHYLATE SOLUTION in alcohol	3	1289
SODIUM MONOXIDE	8	1825
SODIUM NITRATE	5.1	1498
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	5.1	1499
SODIUM NITRITE	5.1	1500
Sodium nitrite and potassium nitrate mixture, see	5.1	1487
SODIUM PENTACHLOROPHENATE	6.1	2567
SODIUM PERCHLORATE	5.1	1502
SODIUM PERMANGANATE	5.1	1503
SODIUM PEROXIDE	5.1	1504
SODIUM PEROXOBORATE, ANHYDROUS	5.1	3247
SODIUM PERSULPHATE	5.1	1505
SODIUM PHOSPHIDE	4.3	1432
SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1.3C	0235
SODIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1	1349
Sodium potassium alloys, see	4.3	1422
Sodium selenate, see	6.1	2630
Sodium selenite, see	6.1	2630
Sodium silicofluoride, see	6.1	2674
SODIUM SULPHIDE, ANHYDROUS	4.2	1385
SODIUM SULPHIDE with less than 30% water of crystallization	4.2	1385
SODIUM SULPHIDE, HYDRATED with not less than 30% water	8	1849
SODIUM SUPEROXIDE	5.1	2547
SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	8	3244
SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.	4.1	3175
SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	6.1	3243
Solvents, flammable, n.o.s., see	3	1993
Solvents, flammable, toxic, n.o.s., see	3	1992
SOUNDING DEVICES, EXPLOSIVE	1.1D 1.1F 1.2D 1.2F	0374 0296 0375 0204
Squibs, see	1.4G 1.4S	0325 0454
STANNIC CHLORIDE, ANHYDROUS	8	1827
STANNIC CHLORIDE PENTAHYDRATE	8	2440
STANNIC PHOSPHIDES	4.3	1433
Steel swarf, see	4.2	2793
STIBINE	2.3	2676
STRAW	4.1	1327
Strontium alloys, pyrophoric, see	4.2	1383
STRONTIUM ARSENITE	6.1	1691
STRONTIUM CHLORATE	5.1	1506
Strontium dioxide, see	5.1	1509
STRONTIUM NITRATE	5.1	1507
STRONTIUM PERCHLORATE	5.1	1508
STRONTIUM PEROXIDE	5.1	1509
STRONTIUM PHOSPHIDE	4.3	2013
STRYCHNINE	6.1	1692
STRYCHNINE SALTS	6.1	1692
STYPHNIC ACID, see	1.1D 1.1D	0219 0394
STYRENE MONOMER, STABILIZED	3	2055
SUBSTANCES, EVI, N.O.S., see	1.5D	0482

Name and description	Class	UN No.
SUBSTANCES, EXPLOSIVE, N.O.S.	1.1A	0473
	1.1C	0474
	1.1D	0475
	1.1G	0476
	1.1L	0357
	1.2L	0358
	1.3C	0477
	1.3G	0478
	1.3L	0359
	1.4C	0479
	1.4D	0480
	1.4G	0485
	1.4S	0481
SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE, N.O.S.	1.5D	0482
Substances liable to spontaneous combustion, n.o.s., see	4.2	2845
	4.2	2846
	4.2	3194
	4.2	3200
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2780
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	3014
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3013
SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	2779
SULPHAMIC ACID	8	2967
SULPHUR	4.1	1350
SULPHUR CHLORIDES	8	1828
Sulphur dichloride, see	8	1828
SULPHUR DIOXIDE	2.3	1079
Sulphuretted hydrogen, see	2.2	1053
SULPHUR HEXAFLUORIDE	2	1080
SULPHURIC ACID with more than 51% acid	8	1830
SULPHURIC ACID with not more than 51% acid	8	2796
SULPHURIC ACID, FUMING	8	1831
SULPHURIC ACID, SPENT	8	1832
Sulphuric and hydrofluoric acid mixture, see	8	1786
SULPHUR, MOLTEN	4.1	2448
Sulphur monochloride, see	8	1828
SULPHUROUS ACID	8	1833
SULPHUR TETRAFLUORIDE	2.3	2418
SULPHUR TRIOXIDE, STABILIZED	8	1829
SULPHURYL CHLORIDE	8	1834
SULPHURYL FLUORIDE	2.3	2191
Synthesis gas, see	2.3	2600
Talcum with tremolite and/or actinolite, see	9	2590
TARS, LIQUID, including road asphalt and oils, bitumen and cut backs	3	1999
Tartar emetic, see	6.1	1551
TEAR GAS CANDLES	6.1	1700
TEAR GAS SUBSTANCE, LIQUID, N.O.S.	6.1	1693
TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1	1693
TELLURIUM COMPOUND, N.O.S.	6.1	3284
TELLURIUM HEXAFLUORIDE	2.3	2195
TERPENE HYDROCARBONS, N.O.S.	3	2319
TERPINOLENE	3	2541
TETRABROMOETHANE	6.1	2504
1,1,2,2-TETRACHLOROETHANE	6.1	1702
TETRACHLOROETHYLENE	6.1	1897
TETRAETHYL DITHIOPYROPHOSPHATE	6.1	1704
TETRAETHYLENEPENTAMINE	8	2320
Tetraethyl lead, see	6.1	1649
TETRAETHYL SILICATE	3	1292

Name and description	Class	UN No.
Tetraethyoxysilane, see	3	1292
Tetrafluorodichloroethane, see	2.2	1958
1,1,1,2-TETRAFLUOROETHANE	2.2	3159
TETRAFLUOROETHYLENE, STABILIZED	2.1	1081
TETRAFLUOROMETHANE (REGRIGERANT GAS R14)	2.2	1982
1,2,3,6-TETRAHYDRO-BENZALDEHYDE	3	2498
TETRAHYDROFURAN	3	2056
TETRAHYDROFURFURYLAMINE	3	2943
Tetrahydro-1,4-oxazine, see	3	2054
TETRAHYDROPHTHALIC ANHYDRIDES with more than 0.05% of maleic anhydride	8	2698
1,2,3,6-TETRAHYDROPYRIDINE	3	2410
TETRAHYDROTHIOPHENE	3	2412
Tetramethoxysilane, see	6.1	2606
TETRAMETHYLAMMONIUM HYDROXIDE	8	1835
Tetramethylene, see	2	2601
Tetramethylene cyanide, see	6.1	2205
Tetramethyl lead, see	6.1	1649
TETRAMETHYLSILANE	3	2749
TETRANITROANILINE	1.1D	0207
TETRANITROMETHANE	5.1	1510
TETRAPROPYL ORTHOTITANATE	3	2413
TETRAZENE, WETTED see	1.1A	0114
TETRAZOL-1-ACETIC ACID	1.4C	0407
1H-TETRAZOLE	1.1D	0504
TETRYL, see	1.1D	0208
TEXTILE WASTE, WET	4.2	1857
THALLIUM CHLORATE	5.1	2573
Thallium (I) chlorate, see	5.1	2573
THALLIUM COMPOUND, N.O.S.	6.1	1707
THALLIUM NITRATE	6.1	2727
Thallium (I) nitrate, see	6.1	2727
Thallous chlorate, see	5.1	2573
4-THIAPENTANAL	6.1	2785
Thia-4-pentanal, see	6.1	2785
THIOACETIC ACID	3	2436
THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2772
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	3006
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	3005
THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	2771
THIOGLYCOL	6.1	2966
THIOGLYCOLIC ACID	8	1940
THIOLACTIC ACID	6.1	2936
THIONYL CHLORIDE	8	1836
THIOPHENE	3	2414
Thiophenol, see	6.1	2337
THIOPHOSGENE	6.1	2474
THIOPHOSPHORYL CHLORIDE	8	1837
THIOUREA DIOXIDE	4.2	3341
Tin (IV) chloride, anhydrous, see	8	1827
Tin (IV) chloride pentahydrate, see	8	2440
TINCTURES, MEDICINAL	3	1293
Tin tetrachloride, see	8	1827
TITANIUM DISULPHIDE	4.2	3174
TITANIUM HYDRIDE	4.1	1871

Name and description	Class	UN No.
TITANIUM POWDER, DRY	4.2	2546
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	4.1	1352
TITANIUM SPONGE GRANULES	4.1	2878
TITANIUM SPONGE POWDERS	4.1	2878
TITANIUM TETRACHLORIDE	8	1838
TITANIUM TRICHLORIDE MIXTURE	8	2869
TITANIUM TRICHLORIDE MIXTURE, PYROPHORIC	4.2	2441
TITANIUM TRICHLORIDE, PYROPHORIC	4.2	2441
TNT, see	1.1D	0209
	1.1D	0388
	1.1D	0389
TNT, WETTED, see	4.1	3366
TNT mixed with aluminium, see	1.1D	0390
Toe puffs, nitrocellulose base, see	4.1	1353
TOLUENE	3	1294
TOLUENE DIISOCYANATE	6.1	2078
TOLUIDINES, LIQUID	6.1	1708
TOLUIDINES, SOLID	6.1	1708
Toluol, see	3	1294
2,4-TOLUYLENEDIAMINE	6.1	1709
Toluylene diisocyanate, see	6.1	2078
Tolylene diisocyanate, see	6.1	2078
Tolylethylene, inhibited, see	3	2618
TORPEDOES with bursting charge	1.1D	0451
	1.1E	0329
	1.1F	0330
TORPEDOES, LIQUID FUELLED with inert head	1.3J	0450
TORPEDOES, LIQUID FUELLED with or without bursting charge	1.1J	0449
TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	6.1	3289
TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	2927
TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	2929
TOXIC LIQUID, INORGANIC, N.O.S.	6.1	3287
TOXIC LIQUID, ORGANIC, N.O.S.	6.1	2810
TOXIC LIQUID, OXIDIZING, N.O.S.	6.1	3122
TOXIC LIQUID, WATER-REACTIVE, N.O.S.	6.1	3123
TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	3290
TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	6.1	2928
TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	6.1	2930
TOXIC SOLID, INORGANIC, N.O.S.	6.1	3288
TOXIC SOLID, ORGANIC, N.O.S.	6.1	2811
TOXIC SOLID, OXIDIZING, N.O.S.	6.1	3086
TOXIC SOLID, SELF-HEATING, N.O.S.	6.1	3124
TOXIC SOLID, WATER-REACTIVE, N.O.S.	6.1	3125
TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	3172
TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	3172
TRACERS FOR AMMUNITION	1.3G	0212
	1.4G	0306
Tremolite, see	9	2590
TRIALLYLAMINE	3	2610
TRIALLYL BORATE	6.1	2609

Name and description	Class	UN No.
TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	2764
TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	2998
TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	2997
TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	2763
Tribromoborane, see	8	2692
TRIBUTYLAMINE	6.1	2542
TRIBUTYLPHOSPHANE	4.2	3254
Trichloroacetaldehyde, see	6.1	2075
TRICHLOROACETIC ACID	8	1839
TRICHLOROACETIC ACID SOLUTION	8	2564
Trichlororaceticaldehyde, see	6.1	2075
TRICHLOROACETYL CHLORIDE	8	2442
TRICHLOROBENZENES, LIQUID	6.1	2321
TRICHLOROBUTENE	6.1	2322
1,1,1-TRICHLOROETHANE	6.1	2831
TRICHLOROETHYLENE	6.1	1710
TRICHLOROISOCYANURIC ACID, DRY	5.1	2468
Trichloronitromethane, see	6.1	1580
TRICHLOROSILANE	4.3	1295
1,3,5-Trichloro-s-triazine-2,4,6-trione, see	5.1	2468
2,4,6-Trichloro-1,3,5- triazine, see	8	2670
TRICRESYL PHOSPHATE with more than 3% ortho isomer	6.1	2574
TRIETHYLAMINE	3	1296
Triethyl borate, see	3	1176
TRIETHYLENETETRAMINE	8	2259
Triethyl orthoformate, see	3	2524
TRIETHYL PHOSPHITE	3	2323
TRIFLUOROACETIC ACID	8	2699
TRIFLUOROACETYL CHLORIDE	2.3	3057
Trifluorobromomethane, see	2.2	1009
Trifluorochloroethane, see	2.2	1983
TRIFLUOROCHLOROETHYLENE, STABILIZED	2.3	1082
Trifluorochloromethane, see	2.2	1022
1,1,1-TRIFLUOROETHANE	2.1	2035
TRIFLUOROMETHANE	2.2	1984
TRIFLUOROMETHANE, REFRIGERATED LIQUID	2.2	3136
2-TRIFLUOROMETHYLANILINE	6.1	2942
3-TRIFLUOROMETHYLANILINE	6.1	2948
TRIISOBUTYLENE	3	2324
TRIISOPROPYL BORATE	3	2616
TRIMETHYLACETYL CHLORIDE	6.1	2438
TRIMETHYLAMINE, ANHYDROUS	2	1083
TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	1297
1,3,5-TRIMETHYLBENZENE	3	2325
TRIMETHYL BORATE	3	2416
TRIMETHYLCHLOROSILANE	3	1298
TRIMETHYLCYCLOHEXYLAMINE	8	2326
Trimethylene chlorobromide, see	6.1	2688
TRIMETHYLHEXA-METHYLENEDIAMINES	8	2327
TRIMETHYLHEXAMETHYLENE DIISOCYANATE	6.1	2328
2,4,4-Trimethylpentene-1, see	3	2050
2,4,4-Trimethylpentene-2, see	3	2050

Name and description	Class	UN No.
TRIMETHYL PHOSPHITE	3	2329
TRINITROANILINE	1.1D	0153
TRINITROANISOLE	1.1D	0213
TRINITROBENZENE, dry or wetted with less than 30% water, by mass	1.1D	0214
TRINITROBENZENE, WETTED, with not less than 10% water, by mass	4.1	3367
TRINITROBENZENE, WETTED with not less than 30% water, by mass	4.1	1354
TRINITROBENZENESULPHONIC ACID	1.1D	0386
TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass	1.1D	0215
TRINITROBENZOIC ACID, WETTED, with not less than 10% water by mass	4.1	3368
TRINITROBENZOIC ACID, WETTED with not less than 30% water, by mass	4.1	1355
TRINITROCHLOROBENZENE	1.1D	0155
TRINITROCHLOROBENZENE, WETTED, with not less than 10% water by mass	4.1	3365
TRINITRO-m-CRESOL	1.1D	0216
TRINITROFLUORENONE	1.1D	0387
TRINITRONAPHTHALENE	1.1D	0217
TRINITROPHENETOLE	1.1D	0218
TRINITROPHENOL, dry or wetted with less than 30% water, by mass	1.1D	0154
TRINITROPHENOL, WETTED, with not less than 10% water by mass	4.1	3364
TRINITROPHENOL, WETTED with not less than 30% water, by mass	4.1	1344
TRINITROPHENYLMETHYL-NITRAMINE	1.1D	0208
TRINITRORESORCINOL, dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	1.1D	0219
TRINITRORESORCINOL, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1.1D	0394
TRINITROTOLUENE, dry or wetted with less than 30% water, by mass	1.1D	0209
TRINITROTOLUENE AND HEXA-NITROSTILBENE MIXTURE	1.1D	0388
TRINITROTOLUENE AND TRINITROBENZENE MIXTURE	1.1D	0388
TRINITROTOLUENE MIXTURE CONTAINING TRINITRO-BENZENE AND HEXANITROSTILBENE	1.1D	0389
TRINITROTOLUENE, WETTED, with not less than 10% water by mass	4.1	3366
TRINITROTOLUENE, WETTED with not less than 30% water, by mass	4.1	1356
TRIPROPYLAMINE	3	2260
TRIPROPYLENE	3	2057
TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1	2501
TRITONAL	1.1D	0390
Tropilidene, see	3	2603
TUNGSTEN HEXAFLUORIDE	2.3	2196
TURPENTINE	3	1299
TURPENTINE SUBSTITUTE	3	1300
UNDECANE	3	2330
UREA HYDROGEN PEROXIDE	5.1	1511
UREA NITRATE, dry or wetted with less than 20% water, by mass	1.1D	0220
UREA NITRATE, WETTED with not less than 10% water, by mass	4.1	3370
UREA NITRATE, WETTED with not less than 20% water, by mass	4.1	1357
Valeral, see	3	2058
VALERALDEHYDE	3	2058
n-Valeraldehyde, see	3	2058

Name and description	Class	UN No.
Valeric aldehyde, see	3	2058
VALERYL CHLORIDE	8	2502
VANADIUM COMPOUND, N.O.S.	6.1	3285
Vanadium (IV) oxide sulphate, see	6.1	2931
Vanadium oxysulphate, see	6.1	2931
VANADIUM OXYTRICHLORIDE	8	2443
VANADIUM PENTOXIDE, non-fused form	6.1	2862
VANADIUM TETRACHLORIDE	8	2444
VANADIUM TRICHLORIDE	8	2475
VANADYL SULPHATE	6.1	2931
VEHICLE, FLAMMABLE GAS POWERED	9	3166
VEHICLE, FLAMMABLE LIQUID POWERED	9	3166
Villiaumite, see	6.1	1690
VINYL ACETATE, STABILIZED	3	1301
Vinylbenzene, see	3	2055
VINYL BROMIDE, STABILIZED	2.1	1085
VINYL BUTYRATE, STABILIZED	3	2838
VINYL CHLORIDE, STABILIZED	2.1	1086
VINYL CHLOROACETATE	6.1	2589
VINYL ETHYL ETHER, STABILIZED	3	1302
VINYL FLUORIDE, STABILIZED	2.1	1860
VINYLIDENE CHLORIDE, STABILIZED	3	1303
VINYL ISOBUTYL ETHER, STABILIZED	3	1304
VINYL METHYL ETHER, STABILIZED	2	1087
VINYLPYRIDINES, STABILIZED	6.1	3073
VINYLTOLUENES, STABILIZED	3	2618
VINYLTRICHLOROSILANE, STABILIZED	3	1305
Warheads for guided missiles, see	1.1D 1.1F 1.2D 1.4D 1.4F	0286 0369 0287 0370 0371
WARHEADS, ROCKET with burster or expelling charge	1.4D 1.4F	0370 0371
WARHEADS, ROCKET with bursting charge	1.1D 1.1F 1.2D	0286 0369 0287
WARHEADS, TORPEDO with bursting charge	1.1D	0221
Water gas, see	2.3	2600
WATER-REACTIVE LIQUID, N.O.S.	4.3	3148
WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	3129
WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	3130
WATER-REACTIVE SOLID, N.O.S.	4.3	2813
WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	3131
WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	3132
WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	4.3	3133
WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	3135
WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	3134
White arsenic, see	6.1	1561
WHITE ASBESTOS (chrysotile, actinolite, anthophyllite, tremolite)	9	2590
White spirit, see	3	1300
WOOD PRESERVATIVES, LIQUID	3	1306
WOOL WASTE, WET	4.2	1387
XANTHATES	4.2	3342
XENON	2.2	2036

Name and description	Class	UN No.
XENON, REFRIGERATED LIQUID	2.2	2591
XYLENES	3	1307
XYLENOLS	6.1	2261
XYLIDINES, LIQUID	6.1	1711
XYLIDINES, SOLID	6.1	1711
Xylols, see	3	1307
XYLYL BROMIDE	6.1	1701
ZINC AMMONIUM NITRITE	5.1	1512
ZINC ARSENATE	6.1	1712
ZINC ARSENATE AND ZINC ARSENITE MIXTURE	6.1	1712
ZINC ARSENITE	6.1	1712
ZINC ASHES	4.3	1435
Zinc bisulphite solution, see	8	2693
ZINC BROMATE	5.1	2469
ZINC CHLORATE	5.1	1513
ZINC CHLORIDE, ANHYDROUS	8	2331
ZINC CHLORIDE SOLUTION	8	1840
ZINC CYANIDE	6.1	1713
ZINC DITHIONITE	9	1931
ZINC DUST	4.3	1436
ZINC FLUOROSILICATE	6.1	2855
Zinc hexafluorosilicate, see	6.1	2855
ZINC HYDROSULPHITE, see	9	1931
ZINC NITRATE	5.1	1514
ZINC PERMANGANATE	5.1	1515
ZINC PEROXIDE	5.1	1516
ZINC PHOSPHIDE	4.3	1714
ZINC POWDER	4.3	1436
ZINC RESINATE	4.1	2714
Zinc selenate, see	4.1	2630
Zinc selenite, see	4.1	2630
Zinc silicofluoride, see	6.1	2855
ZIRCONIUM, DRY, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	4.1	2858
ZIRCONIUM, DRY, finished sheets, strip or coiled wire	4.2	2009
ZIRCONIUM HYDRIDE	4.1	1437
ZIRCONIUM NITRATE	5.1	2728
ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1.3C	0236
ZIRCONIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1	1517
ZIRCONIUM POWDER, DRY	4.2	2008
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	4.1	1358
ZIRCONIUM SCRAP	4.2	1932
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IN

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AND

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