

## ANNEX A

# GENERAL PROVISIONS AND PROVISIONS CONCERNING DANGEROUS SUBSTANCES AND ARTICLES (cont'd)

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## **PART 4**

### **Packing and tank provisions**



## CHAPTER 4.1

### USE OF PACKAGINGS, INCLUDING INTERMEDIATE BULK CONTAINERS (IBCs) AND LARGE PACKAGINGS

**NOTE:** *Packagings, including IBCs and large packagings, marked in accordance with 6.1.3, 6.2.2.7, 6.2.2.8, 6.2.2.9, 6.2.2.10, 6.3.4, 6.5.2 or 6.6.3 but which were approved in a country which is not Contracting Party to ADR may nevertheless be used for carriage under ADR.*

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#### 4.1.1 General provisions for the packing of dangerous goods in packagings, including IBCs and large packagings

**NOTE:** *For the packing of goods of Classes 2, 6.2 and 7, the general provisions of this section only apply as indicated in 4.1.8.2 (Class 6.2), 4.1.9.1.5 (Class 7) and in the applicable packing instructions of 4.1.4 (P201 and LP200 for Class 2 and P620, P621, IBC620 and LP621 for Class 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 carriage, including trans-shipment between cargo transport units and between cargo 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 might 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 packagings, IBCs and large packagings during carriage. These provisions apply, as appropriate, to new, reused, reconditioned or remanufactured packagings and to new, reused, repaired or remanufactured IBCs, and to new, reused or remanufactured 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;
- (b) shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods; and
- (c) shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of carriage.

Where necessary, they shall be provided with a suitable inner coating or treatment.

**NOTE:** *For chemical compatibility of plastics packagings, including IBCs, made from polyethylene see 4.1.1.21.*

4.1.1.3 Unless otherwise provided elsewhere in ADR, 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, 6.3.5, 6.5.6 or 6.6.5, as applicable. The packagings for which the test is not required are mentioned under 6.1.1.3.

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. For a filling temperature of 15 °C, the maximum degree of filling shall be determined as follows, unless otherwise provided, either:

(a)	Boiling point (initial boiling point) of the substance in °C	< 60	≥ 60 < 100	≥ 100 < 200	≥ 200 < 300	≥ 300
	Degree of filling as a percentage of the capacity of the packaging	90	92	94	96	98

or

$$(b) \quad \text{degree of filling} = \frac{98}{1 + \alpha (50 - t_f)} \% \text{ of the capacity of the packaging.}$$

In this formula  $\alpha$  represents the mean coefficient of cubic expansion of the liquid substance between 15 °C and 50 °C; that is to say, for a maximum rise in temperature of 35 °C,

$$\alpha \text{ is calculated according to the formula : } \alpha = \frac{d_{15} - d_{50}}{35 \times d_{50}}$$

$d_{15}$  and  $d_{50}$  being the relative densities<sup>1</sup> of the liquid at 15 °C and 50 °C and  $t_f$  the mean temperature of the liquid at the time of filling.

4.1.1.5 Inner packagings shall be packed in an outer packaging in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings containing liquids shall be packed with their closures upward and placed within outer packagings consistent with the orientation marks prescribed in 5.2.1.10. 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.

4.1.1.5.1 Where an outer packaging of a combination packaging or 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 outer packaging or 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 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.

4.1.1.5.2 Use of supplementary packagings within an outer packaging (e.g. an intermediate packaging or a receptacle inside a required inner packaging) additional to what is required by the packing instructions is authorized provided all relevant requirements are met, including those of 4.1.1.3, and, if appropriate, suitable cushioning is used to prevent movement within the 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:

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<sup>1</sup> Relative density ( $d$ ) is considered to be synonymous with specific gravity (SG) and will be used throughout this Chapter.

- (a) combustion or evolution of considerable heat;
- (b) evolution of flammable, asphyxiant, oxidizing or toxic gases;
- (c) the formation of corrosive substances; or
- (d) the formation of unstable substances.

**NOTE:** For mixed packing special provisions, see 4.1.10.

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 Where pressure may develop in a package by the emission of gas from the contents (as a result of temperature increase or other causes), the packaging or IBC may be fitted with a vent provided that the gas emitted will not cause danger on account of its toxicity, its flammability or the quantity released, for example.

A venting device shall be fitted if dangerous overpressure may develop due to normal decomposition of substances. The vent shall be so designed that, when the packaging or IBC is in the attitude in which it is intended to be carried, leakages of liquid and the penetration of foreign substances are prevented under normal conditions of carriage.

**NOTE:** Venting of the package is not permitted for air carriage.

4.1.1.8.1 Liquids may only be filled into inner packagings which have an appropriate resistance to internal pressure that may be developed under normal conditions of carriage.

4.1.1.9 New, remanufactured or reused packagings, including IBCs and large packagings, or reconditioned packagings and repaired or routinely maintained IBCs shall be capable of passing the tests prescribed in 6.1.5, 6.3.5, 6.5.6 or 6.6.5, as applicable. Before being filled and handed over for carriage, 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 or routinely maintained 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 carriage. 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.

IBCs intended for the carriage of liquids shall not be used to carry liquids having a vapour pressure of more than 110kPa (1.1 bar) at 50 °C or 130kPa (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	$V_{p55}$ (kPa)	$V_{p55} \times 1.5$ (kPa)	$(V_{p55} \times 1.5)$ 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 are subject to the same requirements as those for a filled packaging, unless adequate measures have been taken to nullify any hazard.

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**NOTE:** When such packagings are carried for disposal, recycling or recovery of their material, they may also be carried under UN 3509 provided the conditions of special provision 663 of Chapter 3.3 are met.

4.1.1.12 Every packaging as specified in Chapter 6.1 intended to contain liquids shall successfully undergo a suitable leakproofness test. This test is part of a quality assurance programme as stipulated in 6.1.1.4 which shows the capability of meeting the appropriate test level indicated in 6.1.5.4.3:

- (a) before it is first used for carriage;
- (b) after remanufacturing or reconditioning of any packaging, before it is re-used for carriage.

For this test the packaging need not have its closures fitted. The inner receptacle of a composite packaging may be tested without the outer packaging, provided the test results are not affected. This test is not required for:

- inner packagings of combination packagings or large packagings;
- inner receptacles of composite packagings (glass, porcelain or stoneware) marked with the symbol "RID/ADR" in accordance with 6.1.3.1 (a) (ii);
- light gauge metal packagings marked with the symbol "RID/ADR" in accordance with 6.1.3.1 (a) (ii).

4.1.1.13 Packagings, including IBCs, used for solids which may become liquid at temperatures likely to be encountered during carriage 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 sift-proof or shall be provided with a liner.

4.1.1.15 For plastics drums and jerricans, rigid plastics IBCs and composite IBCs with plastics inner receptacles, unless otherwise approved by the competent authority, the period of use permitted for the carriage of dangerous substances shall be five years from the date of manufacture of the receptacles, except where a shorter period of use is prescribed because of the nature of the substance to be carried.

4.1.1.16 Where ice is used as a coolant it shall not affect the integrity of the packaging.



4.1.1.17 ~~Packagings, including IBCs and large packagings, marked in accordance with 6.1.3, 6.2.2.7, 6.2.2.8, 6.3.1, 6.5.2 or 6.6.3 but which were approved in a State which is not a Contracting Party to ADR may nevertheless be used for carriage under ADR. (Deleted)~~

**4.1.1.18** *Explosives, self-reactive substances and organic peroxides*

Unless specific provision to the contrary is made in ADR, the packagings, including IBCs and large packagings, used for goods of Class 1, self-reactive substances of Class 4.1 and organic peroxides of Class 5.2 shall comply with the provisions for the medium danger group (packing group II).

**4.1.1.19** *Use of salvage packagings and large salvage packagings*

4.1.1.19.1 Damaged, defective, leaking or non-conforming packages, or dangerous goods that have spilled or leaked may be carried in salvage packagings mentioned in 6.1.5.1.11 and in large salvage packagings mentioned in 6.6.5.1.9. This does not prevent the use of a larger size packaging, an IBC of type 11A or a large packaging of appropriate type and performance level and under the conditions of 4.1.1.19.2 and 4.1.1.19.3.

4.1.1.19.2 Appropriate measures shall be taken to prevent excessive movement of the damaged or leaking packages within a salvage packaging or large salvage packaging. When the salvage packaging or large salvage packaging contains liquids, sufficient inert absorbent material shall be added to eliminate the presence of free liquid.

4.1.1.19.3 Appropriate measures shall be taken to ensure that there is no dangerous build up of pressure.

**4.1.1.20** *Use of salvage pressure receptacles*

4.1.1.20.1 In the case of damaged, defective, leaking or non-conforming pressure receptacles, salvage pressure receptacles according to 6.2.3.11 may be used.

*NOTE: A salvage pressure receptacle may be used as an overpack in accordance with 5.1.2. When used as an overpack, marks shall be in accordance with 5.1.2.1 instead of 5.2.1.3.*

4.1.1.20.2 Pressure receptacles shall be placed in salvage pressure receptacles of suitable size. The maximum size of the placed pressure receptacle is limited to a water capacity of 1 000 litres. More than one pressure receptacle may be placed in the same salvage pressure receptacle only if the contents are known and do not react dangerously with each other (see 4.1.1.6). In this case the total sum of water capacities of the placed pressure receptacles shall not exceed 1 000 litres. Appropriate measures shall be taken to prevent movement of the pressure receptacles within the salvage pressure receptacle e.g. by partitioning, securing or cushioning.

4.1.1.20.3 A pressure receptacle may only be placed in a salvage pressure receptacle if:

- (a) The salvage pressure receptacle is in accordance with 6.2.3.11 and a copy of the approval certificate is available;
- (b) Parts of the salvage pressure receptacle which are, or are likely to be in direct contact with the dangerous goods will not be affected or weakened by those dangerous goods and will not cause a dangerous effect (e.g. catalyzing reaction or reacting with the dangerous goods); and
- (c) The contents of the contained pressure receptacle(s) are limited in pressure and volume so that if totally discharged into the salvage pressure receptacle, the pressure in the salvage pressure receptacle at 65 °C will not exceed the test pressure of the salvage pressure receptacle (for gases, see packing instruction in P200 (3) in 4.1.4.1). The reduction of the useable water capacity of the salvage pressure receptacle, e.g. by any contained equipment and cushioning, shall be taken into account.

4.1.1.20.4 The proper shipping name, the UN number preceded by the letters "UN" and label(s) as required for packages in Chapter 5.2 applicable to the dangerous goods inside the contained pressure receptacle(s) shall be applied to the salvage pressure receptacle for carriage.

4.1.1.20.5 Salvage pressure receptacles shall be cleaned, purged and visually inspected internally and externally after each use. They shall be periodically inspected and tested in accordance with 6.2.3.5 at least once every five years.

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**4.1.1.21**      *Verification of the chemical compatibility of plastics packagings, including IBCs, by assimilation of filling substances to standard liquids*

4.1.1.21.1      *Scope*

For polyethylene packagings as specified in 6.1.5.2.6, and for polyethylene IBCs as specified in 6.5.6.3.5, the chemical compatibility with filling substances may be verified by assimilation to standard liquids following the procedures, as set out in 4.1.1.21.3 to 4.1.1.21.5 and using the list in table 4.1.1.21.6, provided that the particular design types have been tested with these standard liquids in accordance with 6.1.5 or 6.5.6, taking into account 6.1.6 and that the conditions in 4.1.1.21.2 are met. When assimilation in accordance with this sub-section is not possible, the chemical compatibility needs to be verified by design type testing in accordance with 6.1.5.2.5 or by laboratory tests in accordance with 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs, respectively.

**NOTE:**      *Irrespective of the provisions of this sub-section, the use of packagings, including IBCs, for a specific filling substance is subject to the limitations of Table A of Chapter 3.2, and the packing instructions in Chapter 4.1.*

4.1.1.21.2      *Conditions*

The relative densities of the filling substances shall not exceed that used to determine the height for the drop test performed successfully according to 6.1.5.3.5 or 6.5.6.9.4 and the mass for the stacking test performed successfully according to 6.1.5.6 or where necessary according to 6.5.6.6 with the assimilated standard liquid(s). The vapour pressures of the filling substances at 50 °C or 55 °C shall not exceed that used to determine the pressure for the internal pressure (hydraulic) test performed successfully according to 6.1.5.5.4 or 6.5.6.8.4.2 with the assimilated standard liquid(s). In case that filling substances are assimilated to a combination of standard liquids, the corresponding values of the filling substances shall not exceed the minimum values derived from the applied drop heights, stacking masses and internal test pressures.

*Example: UN 1736 Benzoyl chloride is assimilated to the combination of standard liquids "Mixture of hydrocarbons and wetting solution". It has a vapour pressure of 0.34 kPa at 50 °C and a relative density of approximately 1.2. Design type tests for plastics drums and jerricans were frequently performed at minimum required test levels. In practice this means that the stacking test is commonly performed with stacking loads considering only a relative density of 1.0 for the "Mixture of hydrocarbons" and a relative density of 1.2 for the "Wetting solution" (see definition of standard liquids in 6.1.6). As a consequence chemical compatibility of such tested design types would not be verified for benzoyl chloride by reason of the inadequate test level of the design type with the standard liquid "mixture of hydrocarbons". (Due to the fact that in the majority of cases the applied internal hydraulic test pressure is not less than 100 kPa, the vapour pressure of benzoyl chloride would be covered by such test level according to 4.1.1.10).*

All components of a filling substance, which may be a solution, mixture or preparation, such as wetting agents in detergents and disinfectants, irrespective whether dangerous or non-dangerous, shall be included in the assimilation procedure.

4.1.1.21.3      *Assimilation procedure*

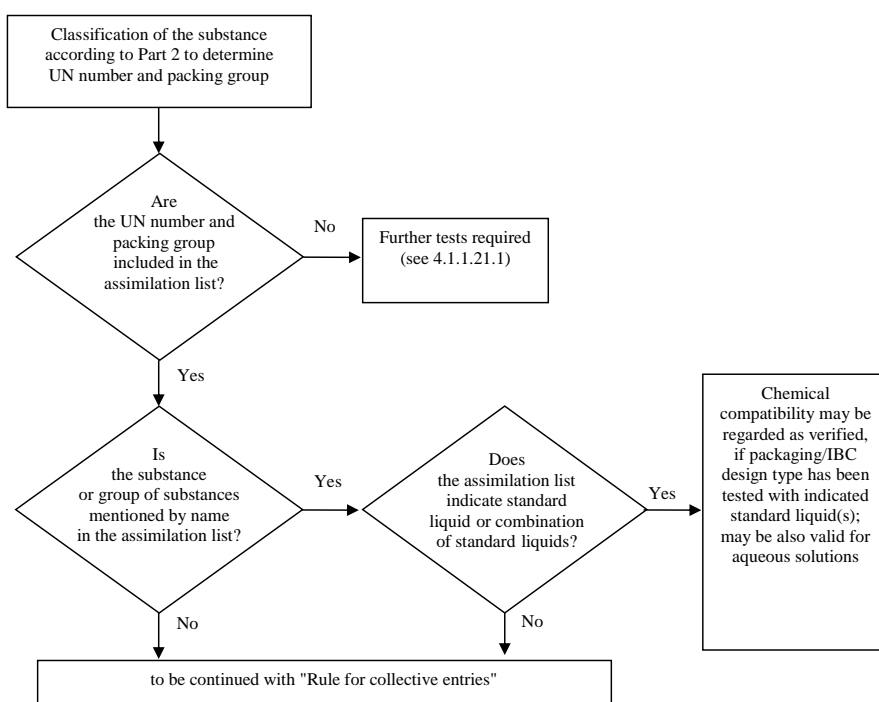
The following steps shall be taken to assign filling substances to listed substances or groups of substances in table 4.1.1.21.6 (see also scheme in Figure 4.1.1.21.1):

- (a) Classify the filling substance in accordance with the procedures and criteria of Part 2 (determination of the UN number and packing group);
- (b) If it is included there, go to the UN number in column (1) of table 4.1.1.21.6;
- (c) Select the line that corresponds in terms of packing group, concentration, flashpoint, the presence of non-dangerous components etc. by means of the information given in columns (2a), (2b) and (4), if there is more than one entry for this UN number.

If this is not possible, the chemical compatibility shall be verified in accordance with 6.1.5.2.5 or 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs (however, in the case of aqueous solutions, see 4.1.1.21.4);

- (d) If the UN number and packing group of the filling substance determined in accordance with (a) is not included in the assimilation list, the chemical compatibility shall be proved in accordance with 6.1.5.2.5 or 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs;
- (e) Apply the "Rule for collective entries", as described in 4.1.1.21.5, if this is indicated in column (5) of the selected line;
- (f) The chemical compatibility of the filling substance may be regarded as verified taking into account 4.1.1.21.1 and 4.1.1.21.2, if a standard liquid or a combination of standard liquids is assimilated in column (5) and the design type is approved for that/those standard liquid(s).

**Figure 4.1.1.21.1: Scheme for the assimilation of filling substances to standard liquids**



#### 4.1.1.21.4 *Aqueous solutions*

Aqueous solutions of substances and groups of substances assimilated to specific standard liquid(s) in accordance with 4.1.1.21.3 may also be assimilated to that (those) standard liquid(s) provided the following conditions are met:

- (a) the aqueous solution can be assigned to the same UN number as the listed substance in accordance with the criteria of 2.1.3.3, and
- (b) the aqueous solution is not specifically mentioned by name otherwise in the assimilation list in 4.1.1.21.6, and
- (c) no chemical reaction is taking place between the dangerous substance and the solvent water.

*Example: Aqueous solutions of UN 1120 tert-Butanol:*

- *Pure tert-Butanol itself is assigned to the standard liquid "acetic acid" in the assimilation list.*
- *Aqueous solutions of tert-Butanol can be classified under the entry UN 1120 BUTANOLS in accordance with 2.1.3.3, because the aqueous solution of tert-Butanol does not differ from the entries of the pure substances relating to the class, the packing group(s) and the physical state. Furthermore, the entry "1120 BUTANOLS" is not explicitly limited to the pure substances, and aqueous solutions of these substances are not specifically mentioned by name otherwise in Table A of chapter 3.2 as well as in the assimilation list.*
- *UN 1120 BUTANOLS do not react with water under normal conditions of carriage.*

*As a consequence, aqueous solutions of UN 1120 tert-Butanol may be assigned to the standard liquid "acetic acid".*

#### 4.1.1.21.5 *Rule for collective entries*

For the assimilation of filling substances for which "Rule for collective entries" is indicated in column (5), the following steps shall be taken and conditions be met (see also scheme in Figure 4.1.1.21.2):

- (a) Perform the assimilation procedure for each dangerous component of the solution, mixture or preparation in accordance with 4.1.1.21.3 taking into account the conditions in 4.1.1.21.2. In the case of generic entries, components may be neglected, that are known to have no damaging effect on high density polyethylene (e.g. solid pigments in UN 1263 PAINT or PAINT RELATED MATERIAL);
- (b) A solution, mixture or preparation cannot be assimilated to a standard liquid, if:
  - (i) the UN number and packing group of one or more of the dangerous components does not appear in the assimilation list; or
  - (ii) "Rule for collective entries" is indicated in column (5) of the assimilation list for one or more of the components; or
  - (iii) (with the exception of UN 2059 NITROCELLULOSE SOLUTION, FLAMMABLE) the classification code of one or more of its dangerous components differs from that of the solution, mixture or preparation.
- (c) If all dangerous components are listed in the assimilation list, and its classification codes are in accordance with the classification code of the solution, mixture or preparation itself, and all dangerous components are assimilated to the same standard liquid or combination of standard liquids in column (5), the chemical compatibility of the solution, mixture or preparation may be regarded as verified taking into account 4.1.1.21.1 and 4.1.1.21.2;
- (d) If all dangerous components are listed in the assimilation list and its classification codes are in accordance with the classification code of the solution, mixture or preparation itself, but different standard liquids are indicated in column (5), the chemical compatibility may only

be regarded as verified for the following combinations of standard liquids taking into account 4.1.1.21.1 and 4.1.1.21.2:

- (i) water/nitric acid 55%; with the exception of inorganic acids with the classification code C1, which are assigned to standard liquid "water";
  - (ii) water/wetting solution;
  - (iii) water/acetic acid;
  - (iv) water/mixture of hydrocarbons;
  - (v) water/n-butyl acetate – n-butyl acetate-saturated wetting solution;
- (e) In the scope of this rule, chemical compatibility is not regarded as verified for other combinations of standard liquids than those specified in (d) and for all cases specified in (b). In such cases the chemical compatibility shall be verified by other means (see 4.1.1.21.3 (d)).

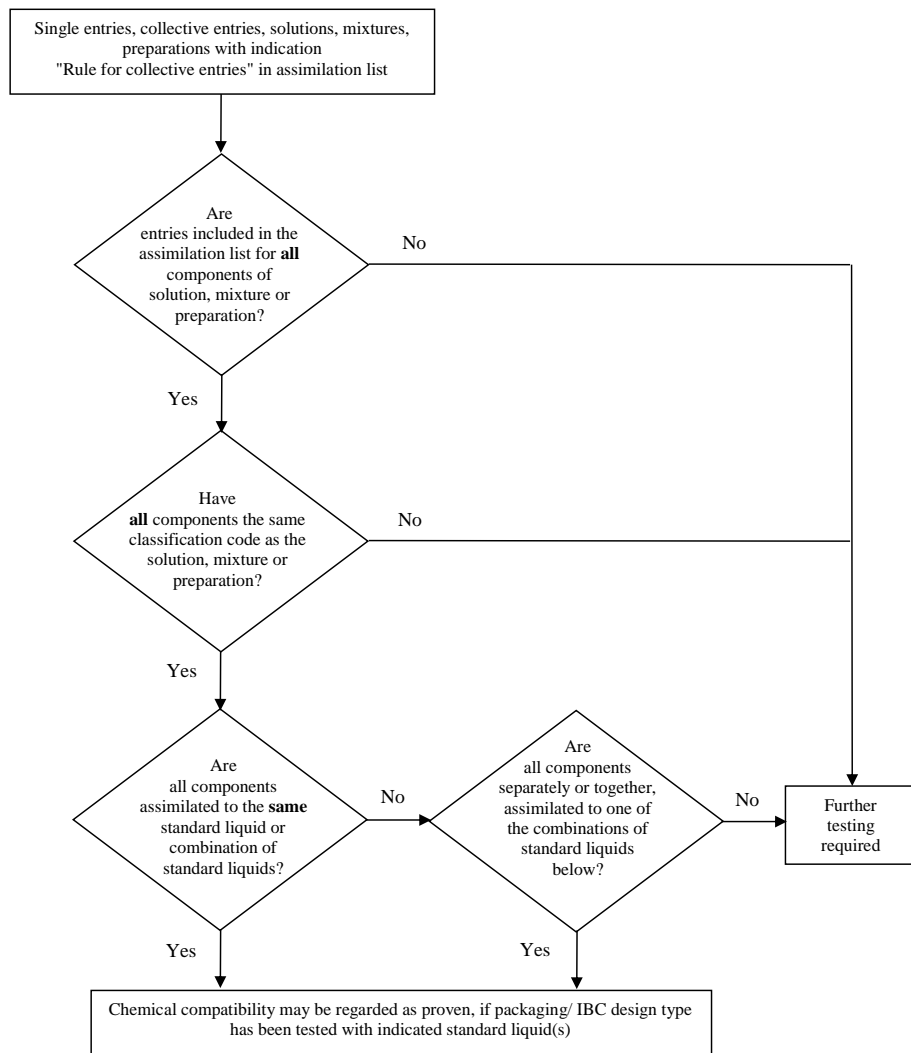
*Example 1: Mixture of UN 1940 THIOGLYCOLIC ACID (50%) and UN 2531 METHACRYLIC ACID, STABILIZED (50%); classification of the mixture: UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.*

- *Both the UN numbers of the components and the UN number of the mixture are included in the assimilation list;*
- *Both the components and the mixture have the same classification code: C3;*
- *UN 1940 THIOGLYCOLIC ACID is assimilated to standard liquid "acetic acid", and UN 2531 METHACRYLIC ACID, STABILIZED is assimilated to standard liquid "n-butyl acetate/n-butyl acetate-saturated wetting solution". According to paragraph (d) this is not an acceptable combination of standard liquids. The chemical compatibility of the mixture has to be verified by other means.*

*Example 2: Mixture of UN 1793 ISOPROPYL ACID PHOSPHATE (50%) and UN 1803 PHENOLSULPHONIC ACID, LIQUID (50%); classification of the mixture: UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.*

- *Both the UN numbers of the components and the UN number of the mixture are included in the assimilation list;*
- *Both the components and the mixture have the same classification code: C3;*
- *UN 1793 ISOPROPYL ACID PHOSPHATE is assimilated to standard liquid "wetting solution", and UN 1803 PHENOLSULPHONIC ACID, LIQUID is assimilated to standard liquid "water". According to paragraph (d) this is one of the acceptable combinations of standard liquids. As a consequence the chemical compatibility may be regarded as verified for this mixture, provided the packaging design type is approved for the standard liquids "wetting solution" and "water".*

Figure 4.1.1.21.2: Scheme "Rules for collective entries"



Acceptable combinations of standard liquids:

- water/nitric acid (55%), with the exception of inorganic acids of classification code C1 which are assigned to standard liquid "water";
- water/wetting solution;
- water/acetic acid;
- water/mixture of hydrocarbons;
- water/n-butyl acetate – n-butyl acetate saturated wetting solution

#### 4.1.1.21.6

##### *Assimilation list*

In the following table (assimilation list) dangerous substances are listed in the numerical order of their UN numbers. As a rule, each line deals with a dangerous substance, single entry or collective entry covered by a specific UN number. However, several consecutive lines may be used for the same UN number, if substances belonging to the same UN number have different names (e.g. individual isomers of a group of substances), different chemical properties, different physical properties and/or different transport conditions. In such cases the single entry or collective entry within the particular packing group is the last one of such consecutive lines.

Columns (1) to (4) of table 4.1.1.21.6, following a structure similar to that of Table A of Chapter 3.2, are used to identify the substance for the purpose of this sub-section. The last column indicates the standard liquid(s) to which the substance can be assimilated.

Explanatory notes for each column:

**Column (1) UN No.**

Contains the UN number:

- of the dangerous substance, if the substance has been assigned its own specific UN number, or
- of the collective entry to which dangerous substances not listed by name have been assigned in accordance with the criteria ("decision trees") of Part 2.

**Column (2a) Proper shipping name or technical name**

Contains the name of the substance, the name of the single entry, which may cover various isomers, or the name of the collective entry itself.

The indicated name can deviate from the applicable proper shipping name.

**Column (2b) Description**

Contains a descriptive text to clarify the scope of the entry in those cases when the classification, the transport conditions and/or the chemical compatibility of the substance may be variable.

**Column (3a) Class**

Contains the number of the class, whose heading covers the dangerous substance. This class number is assigned in accordance with the procedures and criteria of Part 2.

**Column (3b) Classification code**

Contains the classification code of the dangerous substance in accordance with the procedures and criteria of Part 2.

**Column (4) Packing group**

Contains the packing group number(s) (I, II or III) assigned to the dangerous substance in accordance with the procedures and criteria of Part 2. Certain substances are not assigned to packing groups.

**Column (5) Standard liquid**

This column indicates, as definite information, either a standard liquid or a combination of standard liquids to which the substance can be assimilated, or a reference to the rule for collective entries in 4.1.1.21.5.

Table 4.1.1.21.6: Assimilation list

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1090	Acetone		3	F1	II	Mixture of hydrocarbons <b>Remark:</b> applicable only, if it is proved that the permeability of the substance out of the package intended for carriage has an acceptable level
1093	Acrylonitrile, stabilized		3	FT1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1104	Amyl acetates	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1105	Pentanols	pure isomers and isomeric mixture	3	F1	II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1106	Amylamines	pure isomers and isomeric mixture	3	FC	II/III	Mixture of hydrocarbons <b>and</b> wetting solution
1109	Amyl formates	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1120	Butanols	pure isomers and isomeric mixture	3	F1	II/III	Acetic acid
1123	Butyl acetates	pure isomers and isomeric mixture	3	F1	II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1125	n-Butylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1128	n-Butyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1129	Butyraldehyde		3	F1	II	Mixture of hydrocarbons
1133	Adhesives	containing flammable liquid	3	F1	I/II/III	Rule for collective entries
1139	Coating solution	includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining	3	F1	I/II/III	Rule for collective entries
1145	Cyclohexane		3	F1	II	Mixture of hydrocarbons
1146	Cyclopentane		3	F1	II	Mixture of hydrocarbons
1153	Ethylene glycol diethyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
1154	Diethylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1158	Diisopropylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution



UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
1160	Dimethylamine aqueous solution		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1165	Dioxane		3	F1	II	Mixture of hydrocarbons
1169	Extracts, aromatic, liquid		3	F1	II/III	Rule for collective entries
1170	Ethanol or Ethanol solution	aqueous solution	3	F1	II/III	Acetic acid
1171	Ethylene glycol monoethyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
1172	Ethylene glycol monoethyl ether acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
1173	Ethyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1177	2-Ethylbutyl acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1178	2-Ethylbutyraldehyde		3	F1	II	Mixture of hydrocarbons
1180	Ethyl butyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1188	Ethylene glycol monomethyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
1189	Ethylene glycol monomethyl ether acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
1190	Ethyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1191	Octyl aldehydes	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
1192	Ethyl lactate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1195	Ethyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1197	Extracts, flavouring, liquid		3	F1	II/III	Rule for collective entries
1198	Formaldehyde solution, flammable	aqueous solution, flashpoint between 23 °C and 60 °C	3	FC	III	Acetic acid
1202	Diesel fuel	complying with <a href="#">EN 590:2013 + A1:2017</a> <a href="#">EN 590:2013 + AC:2014</a> or with a flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons

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UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1202	Gas oil	flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1202	Heating oil, light	extra light	3	F1	III	Mixture of hydrocarbons
1202	Heating oil, light	complying with EN 590:2013 + AC:2014 or with a flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1203	Motor spirit, or gasoline, or petrol		3	F1	II	Mixture of hydrocarbons
1206	Heptanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1207	Hexaldehyde	n-Hexaldehyde	3	F1	III	Mixture of hydrocarbons
1208	Hexanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1210	Printing ink or Printing ink related material	flammable, including printing ink thinning or reducing compound	3	F1	I/II/III	Rule for collective entries
1212	Isobutanol		3	F1	III	Acetic acid
1213	Isobutyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1214	Isobutylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1216	Isooctenes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1219	Isopropanol		3	F1	II	Acetic acid
1220	Isopropyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1221	Isopropylamine		3	FC	I	Mixture of hydrocarbons <b>and</b> wetting solution
1223	Kerosene		3	F1	III	Mixture of hydrocarbons
1224	3,3-Dimethyl-2-butanone		3	F1	II	Mixture of hydrocarbons
1224	Ketones, liquid, n.o.s.		3	F1	II/III	Rule for collective entries
1230	Methanol		3	FT1	II	Acetic acid
1231	Methyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1233	Methylamyl acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1235	Methylamine, aqueous solution		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1237	Methyl butyrate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1247	Methyl methacrylate monomer, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1248	Methyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

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UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
1262	<b>Octanes</b>	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1263	<b>Paint or Paint related material</b>	including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base or including paint thinning and reducing compound	3	F1	I/II/III	Rule for collective entries
1265	<b>Pentanes</b>	n-Pentane	3	F1	II	Mixture of hydrocarbons
1266	<b>Perfumery products</b>	with flammable solvents	3	F1	II/III	Rule for collective entries
1268	Coal tar naphtha	vapour pressure at 50 °C not more than 110 kPa	3	F1	II	Mixture of hydrocarbons
1268	<b>Petroleum distillates, n.o.s. or Petroleum products, n.o.s.</b>		3	F1	I/II/III	Rule for collective entries
1274	<b>n-Propanol</b>		3	F1	II/III	Acetic acid
1275	<b>Propionaldehyde</b>		3	F1	II	Mixture of hydrocarbons
1276	<b>n-Propyl acetate</b>		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1277	<b>Propylamine</b>	n-Propylamine	3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1281	<b>Propyl formates</b>	pure isomers and isomeric mixture	3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1282	<b>Pyridine</b>		3	F1	II	Mixture of hydrocarbons
1286	<b>Rosin oil</b>		3	F1	II/III	Rule for collective entries
1287	<b>Rubber solution</b>		3	F1	II/III	Rule for collective entries
1296	<b>Triethylamine</b>		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
1297	<b>Trimethylamine, aqueous solution</b>	not more than 50% trimethylamine, by mass	3	FC	I/II/III	Mixture of hydrocarbons <b>and</b> wetting solution
1301	<b>Vinyl acetate, stabilized</b>		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1306	<b>Wood preservatives, liquid</b>		3	F1	II/III	Rule for collective entries
1547	<b>Aniline</b>		6.1	T1	II	Acetic acid
1590	<b>Dichloroanilines, liquid</b>	pure isomers and isomeric mixture	6.1	T1	II	Acetic acid
1602	<b>Dye, liquid, toxic, n.o.s. or Dye intermediate, liquid, toxic, n.o.s.</b>		6.1	T1	I/II/III	Rule for collective entries
1604	<b>Ethylenediamine</b>		8	CF1	II	Mixture of hydrocarbons <b>and</b> wetting solution
1715	<b>Acetic anhydride</b>		8	CF1	II	Acetic acid

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
1717	Acetyl chloride		3	FC	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1718	Butyl acid phosphate		8	C3	III	Wetting solution
1719	Hydrogen sulphide	aqueous solution	8	C5	III	Acetic acid
1719	Caustic alkali liquid, n.o.s.	inorganic	8	C5	II/III	Rule for collective entries
1730	Antimony pentachloride, liquid	pure	8	C1	II	Water
1736	Benzoyl chloride		8	C3	II	Mixture of hydrocarbons <b>and</b> wetting solution
1750	Chloroacetic acid solution	aqueous solution	6.1	TC1	II	Acetic acid
1750	Chloroacetic acid solution	mixtures of mono- and dichloroacetic acid	6.1	TC1	II	Acetic acid
1752	Chloroacetyl chloride		6.1	TC1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1755	Chromic acid solution	aqueous solution with not more than 30% chromic acid	8	C1	II/III	Nitric acid
1760	Cyanamide	aqueous solution with not more than 50% cyanamide	8	C9	II	Water
1760	O,O-Diethyl- dithiophosphoric acid		8	C9	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1760	O,O-Diisopropyl- dithiophosphoric acid		8	C9	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1760	O,O-Di-n-propyl- dithiophosphoric acid		8	C9	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1760	Corrosive liquid, n.o.s.	flashpoint more than 60 °C	8	C9	I/II/III	Rule for collective entries
1761	Cupriethylenediamine solution	aqueous solution	8	CT1	II/III	Mixture of hydrocarbons <b>and</b> wetting solution
1764	Dichloroacetic acid		8	C3	II	Acetic acid
1775	Fluoroboric acid	aqueous solution with not more than 50% fluoroboric acid	8	C1	II	Water
1778	Fluorosilicic acid		8	C1	II	Water
1779	Formic acid	with more than 85% acid by mass	8	C3	II	Acetic acid
1783	Hexamethylenediamine solution	aqueous solution	8	C7	II/III	Mixture of hydrocarbons <b>and</b> wetting solution
1787	Hydriodic acid	aqueous solution	8	C1	II/III	Water
1788	Hydrobromic acid	aqueous solution	8	C1	II/III	Water
1789	Hydrochloric acid	not more than 38% aqueous solution	8	C1	II/III	Water
1790	Hydrofluoric acid	with not more than 60% hydrofluoric acid	8	CT1	II	Water the permissible period of use: not more than 2 years
1791	Hypochlorite solution	aqueous solution, containing wetting agents as customary in trade	8	C9	II/III	Nitric acid <b>and</b> wetting solution *

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1791	<b>Hypochlorite solution</b>	aqueous solution	8	C9	II/III	Nitric acid *
* For UN 1791: Test to be carried out only with vent. If the test is carried out with nitric acid as the standard liquid, an acid-resistant vent and gasket shall be used. If the test is carried out with hypochlorite solutions themselves, vents and gaskets of the same design type, resistant to hypochlorite (e.g. of silicone rubber) but not resistant to nitric acid, are also permitted.						
1793	<b>Isopropyl acid phosphate</b>		8	C3	III	Wetting solution
1802	<b>Perchloric acid</b>	aqueous solution with not more than 50% acid, by mass	8	CO1	II	Water
1803	<b>Phenolsulphonic acid, liquid</b>	isomeric mixture	8	C3	II	Water
1805	<b>Phosphoric acid, solution</b>		8	C1	III	Water
1814	<b>Potassium hydroxide solution</b>	aqueous solution	8	C5	II/III	Water
1824	<b>Sodium hydroxide solution</b>	aqueous solution	8	C5	II/III	Water
1830	<b>Sulphuric acid</b>	with more than 51% pure acid	8	C1	II	Water
1832	<b>Sulphuric acid, spent</b>	chemical stable	8	C1	II	Water
1833	<b>Sulphurous acid</b>		8	C1	II	Water
1835	<b>Tetramethylammonium hydroxide, solution</b>	aqueous solution, flashpoint more than 60 °C	8	C7	II	Water
1840	<b>Zinc chloride solution</b>	aqueous solution	8	C1	III	Water
1848	<b>Propionic acid</b>	with not less than 10% and less than 90% acid by mass	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1862	<b>Ethyl crotonate</b>		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1863	<b>Fuel, aviation, turbine engine</b>		3	F1	I/II/III	Mixture of hydrocarbons
1866	<b>Resin solution</b>	flammable	3	F1	I/II/III	Rule for collective entries
1902	<b>Diisooctyl acid phosphate</b>		8	C3	III	Wetting solution
1906	<b>Sludge acid</b>		8	C1	II	Nitric acid
1908	<b>Chlorite solution</b>	aqueous solution	8	C9	II/III	Acetic acid
1914	<b>Butyl propionates</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1915	<b>Cyclohexanone</b>		3	F1	III	Mixture of hydrocarbons
1917	<b>Ethyl acrylate, stabilized</b>		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1919	<b>Methyl acrylate, stabilized</b>		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1920	<b>Nonanes</b>	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
1935	<b>Cyanide solution, n.o.s.</b>	inorganic	6.1	T4	I/II/III	Water
1940	<b>Thioglycolic acid</b>		8	C3	II	Acetic acid
1986	<b>Alcohols, flammable, toxic, n.o.s.</b>		3	FT1	I/II/III	Rule for collective entries
1987	<b>Cyclohexanol</b>	technical pure	3	F1	III	Acetic acid
1987	<b>Alcohols, n.o.s.</b>		3	F1	II/III	Rule for collective entries
1988	<b>Aldehydes, flammable, toxic, n.o.s.</b>		3	FT1	I/II/III	Rule for collective entries

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1989	<b>Aldehydes, n.o.s.</b>		3	F1	I/II/III	Rule for collective entries
1992	2,6-cis-Dimethyl-morpholine		3	FT1	III	Mixture of hydrocarbons
1992	<b>Flammable liquid, toxic, n.o.s.</b>		3	FT1	I/II/III	Rule for collective entries
1993	Propionic acid vinyl ester		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1993	(1-Methoxy-2-propyl) acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1993	<b>Flammable liquid, n.o.s.</b>		3	F1	I/II/III	Rule for collective entries
2014	<b>Hydrogen peroxide, aqueous solution</b>	with not less than 20% but not more than 60% hydrogen peroxide, stabilized as necessary	5.1	OC1	II	Nitric acid
2022	<b>Cresylic acid</b>	liquid mixture containing cresols, xylenols and methyl phenols	6.1	TC1	II	Acetic acid
2030	<b>Hydrazine aqueous solution</b>	with not less than 37% but not more than 64% hydrazine, by mass	8	CT1	II	Water
2030	Hydrazine hydrate	aqueous solution with 64% hydrazine	8	CT1	II	Water
2031	<b>Nitric acid</b>	other than red fuming, with not more than 55% pure acid	8	CO1	II	Nitric acid
2045	<b>Isobutyraldehyde</b>		3	F1	II	Mixture of hydrocarbons
2050	<b>Diisobutylene isomeric compounds</b>		3	F1	II	Mixture of hydrocarbons
2053	<b>Methyl isobutyl carbinol</b>		3	F1	III	Acetic acid
2054	<b>Morpholine</b>		8	CF1	I	Mixture of hydrocarbons
2057	<b>Tripropylene</b>		3	F1	II/III	Mixture of hydrocarbons
2058	<b>Valeraldehyde</b>	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
2059	<b>Nitrocellulose solution, flammable</b>		3	D	I/II/III	Rule for collective entries: Deviating from the general procedure this rule may be applied to solvents of classification code F1
2075	<b>Chloral, anhydrous, stabilized</b>		6.1	T1	II	Wetting solution
2076	<b>Cresols, liquid</b>	pure isomers and isomeric mixture	6.1	TC1	II	Acetic acid
2078	<b>Toluene diisocyanate</b>	liquid	6.1	T1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2079	<b>Diethylenetriamine</b>		8	C7	II	Mixture of hydrocarbons
2209	<b>Formaldehyde solution</b>	aqueous solution with 37% Form-aldehyde, methanol content: 8-10%	8	C9	III	Acetic acid
2209	<b>Formaldehyde solution</b>	aqueous solution, with not less than 25% formaldehyde	8	C9	III	Water
2218	<b>Acrylic acid, stabilized</b>		8	CF1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
2227	n-Butyl methacrylate, stabilized		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2235	Chlorobenzyl chlorides, liquid	para-Chlorobenzyl chloride	6.1	T2	III	Mixture of hydrocarbons
2241	Cycloheptane		3	F1	II	Mixture of hydrocarbons
2242	Cycloheptene		3	F1	II	Mixture of hydrocarbons
2243	Cyclohexyl acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2244	Cyclopentanol		3	F1	III	Acetic acid
2245	Cyclopentanone		3	F1	III	Mixture of hydrocarbons
2247	n-Decane		3	F1	III	Mixture of hydrocarbons
2248	Di-n-butylamine		8	CF1	II	Mixture of hydrocarbons
2258	1,2-Propylenediamine		8	CF1	II	Mixture of hydrocarbons <b>and</b> wetting solution
2259	Triethylenetetramine		8	C7	II	Water
2260	Tripropylamine		3	FC	III	Mixture of hydrocarbons <b>and</b> wetting solution
2263	Dimethylcyclohexanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
2264	N,N-Dimethyl-cyclohexylamine		8	CF1	II	Mixture of hydrocarbons <b>and</b> wetting solution
2265	N,N-Dimethyl-formamide		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2266	Dimethyl-N-propylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
2269	3,3'-Imino-dipropylamine		8	C7	III	Mixture of hydrocarbons <b>and</b> wetting solution
2270	Ethylamine, aqueous solution	with not less than 50% but not more than 70% ethylamine, flashpoint below 23 °C, corrosive or slightly corrosive	3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
2275	2-Ethylbutanol		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2276	2-Ethylhexylamine		3	FC	III	Mixture of hydrocarbons <b>and</b> wetting solution
2277	Ethyl methacrylate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2278	n-Heptene		3	F1	II	Mixture of hydrocarbons
2282	Hexanols	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2283	Isobutyl methacrylate, stabilized		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
2286	<b>Pentamethylheptane</b>		3	F1	III	Mixture of hydrocarbons
2287	<b>Isoheptenes</b>		3	F1	II	Mixture of hydrocarbons
2288	<b>Isohexenes</b>		3	F1	II	Mixture of hydrocarbons
2289	<b>Isophoronediamine</b>		8	C7	III	Mixture of hydrocarbons <b>and</b> wetting solution
2293	<b>4-Methoxy-4-methylpentan-2-one</b>		3	F1	III	Mixture of hydrocarbons
2296	<b>Methylcyclohexane</b>		3	F1	II	Mixture of hydrocarbons
2297	<b>Methylcyclohexanone</b>	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
2298	<b>Methylcyclopentane</b>		3	F1	II	Mixture of hydrocarbons
2302	<b>5-Methylhexan-2-one</b>		3	F1	III	Mixture of hydrocarbons
2308	<b>Nitrosylsulphuric acid, liquid</b>		8	C1	II	Water
2309	<b>Octadienes</b>		3	F1	II	Mixture of hydrocarbons
2313	<b>Picolines</b>	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
2317	<b>Sodium cuprocyanide solution</b>	aqueous solution	6.1	T4	I	Water
2320	<b>Tetraethylenepentamine</b>		8	C7	III	Mixture of hydrocarbons <b>and</b> wetting solution
2324	<b>Triisobutylene</b>	mixture of C12-mono-olefines, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
2326	<b>Trimethylcyclohexylamine</b>		8	C7	III	Mixture of hydrocarbons <b>and</b> wetting solution
2327	<b>Trimethylhexamethylenediamines</b>	pure isomers and isomeric mixture	8	C7	III	Mixture of hydrocarbons <b>and</b> wetting solution
2330	<b>Undecane</b>		3	F1	III	Mixture of hydrocarbons
2336	<b>Allyl formate</b>		3	FT1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2348	<b>Butyl acrylates, stabilized</b>	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2357	<b>Cyclohexylamine</b>	flashpoint between 23 °C and 60 °C	8	CF1	II	Mixture of hydrocarbons <b>and</b> wetting solution
2361	<b>Diisobutylamine</b>		3	FC	III	Mixture of hydrocarbons <b>and</b> wetting solution
2366	<b>Diethyl carbonate</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2367	<b>alpha-Methylvaleraldehyde</b>		3	F1	II	Mixture of hydrocarbons
2370	<b>1-Hexene</b>		3	F1	II	Mixture of hydrocarbons
2372	<b>1,2-Di-(dimethylamino)ethane</b>		3	F1	II	Mixture of hydrocarbons <b>and</b> wetting solution



UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
2379	1,3-Dimethylbutylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
2383	Dipropylamine		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
2385	Ethyl isobutyrate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2393	Isobutyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2394	Isobutyl propionate	flashpoint between 23 °C and 60 °C	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2396	Methacrylaldehyde, stabilized		3	FT1	II	Mixture of hydrocarbons
2400	Methyl isovalerate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2401	Piperidine		8	CF1	I	Mixture of hydrocarbons <b>and</b> wetting solution
2403	Isopropenyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2405	Isopropyl butyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2406	Isopropyl isobutyrate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2409	Isopropyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2410	1,2,3,6-Tetrahydro-pyridine		3	F1	II	Mixture of hydrocarbons
2427	Potassium chlorate, aqueous solution		5.1	O1	II/III	Water
2428	Sodium chlorate, aqueous solution		5.1	O1	II/III	Water
2429	Calcium chlorate, aqueous solution		5.1	O1	II/III	Water
2436	Thioacetic acid		3	F1	II	Acetic acid
2457	2,3-Dimethylbutane		3	F1	II	Mixture of hydrocarbons
2491	Ethanolamine		8	C7	III	Wetting solution
2491	Ethanolamine solution	aqueous solution	8	C7	III	Wetting solution
2496	Propionic anhydride		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2524	Ethyl orthoformate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2526	Furfurylamine		3	FC	III	Mixture of hydrocarbons <b>and</b> wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2527	<b>Isobutyl acrylate, stabilized</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2528	<b>Isobutyl isobutyrate</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2529	<b>Isobutyric acid</b>		3	FC	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2531	<b>Methacrylic acid, stabilized</b>		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2542	<b>Tributylamine</b>		6.1	T1	II	Mixture of hydrocarbons
2560	<b>2-Methylpentan-2-ol</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2564	<b>Trichloroacetic acid solution</b>	aqueous solution	8	C3	II/III	Acetic acid
2565	<b>Dicyclohexylamine</b>		8	C7	III	Mixture of hydrocarbons <b>and</b> wetting solution
2571	Ethylsulphuric acid		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2571	<b>Alkylsulphuric acids</b>		8	C3	II	Rule for collective entries
2580	<b>Aluminium bromide solution</b>	aqueous solution	8	C1	III	Water
2581	<b>Aluminium chloride solution</b>	aqueous solution	8	C1	III	Water
2582	<b>Ferric chloride solution</b>	aqueous solution	8	C1	III	Water
2584	Methane sulphonic acid	with more than 5% free sulphuric acid	8	C1	II	Water
2584	<b>Alkylsulphonic acids, liquid</b>	with more than 5% free sulphuric acid	8	C1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2584	Benzene sulphonic acid	with more than 5% free sulphuric acid	8	C1	II	Water
2584	Toluene sulphonic acids	with more than 5% free sulphuric acid	8	C1	II	Water
2584	<b>Arylsulphonic acids, liquid</b>	with more than 5% free sulphuric acid	8	C1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2586	Methane sulfonic acid	with not more than 5% free sulphuric acid	8	C1	III	Water
2586	<b>Alkylsulphonic acids, liquid</b>	with not more than 5% free sulphuric acid	8	C1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2586	Benzene sulphonic acid	with not more than 5% free sulphuric acid	8	C1	III	Water
2586	Toluene sulphonic acids	with not more than 5% free sulphuric acid	8	C1	III	Water
2586	<b>Arylsulphonic acids, liquid</b>	with not more than 5% free sulphuric acid	8	C1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2610	<b>Triallylamine</b>		3	FC	III	Mixture of hydrocarbons <b>and</b> wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2614	Methylalcohol		3	F1	III	Acetic acid
2617	Methylcyclohexanols	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	Acetic acid
2619	Benzyl dimethylamine		8	CF1	II	Mixture of hydrocarbons <b>and</b> wetting solution
2620	Amyl butyrates	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2622	Glycidaldehyde	flashpoint below 23 °C	3	FT1	II	Mixture of hydrocarbons
2626	Chloric acid, aqueous solution	with not more than 10% chloric acid	5.1	O1	II	Nitric acid
2656	Quinoline	flashpoint more than 60 °C	6.1	T1	III	Water
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	C5	III	Water
2683	Ammonium sulphide solution	aqueous solution, flashpoint between 23 °C and 60 °C	8	CFT	II	Acetic acid
2684	3-Diethylamino-propylamine		3	FC	III	Mixture of hydrocarbons <b>and</b> wetting solution
2685	N,N-Diethylethylene-diamine		8	CF1	II	Mixture of hydrocarbons <b>and</b> wetting solution
2693	Bisulphites, aqueous solution, n.o.s.	inorganic	8	C1	III	Water
2707	Dimethyldioxanes	pure isomers and isomeric mixture	3	F1	II/III	Mixture of hydrocarbons
2733	Amines, flammable, corrosive, n.o.s. or Polyamines, flammable, corrosive, n.o.s.		3	FC	I/II/III	Mixture of hydrocarbons <b>and</b> wetting solution
2734	Di-sec-butylamine		8	CF1	II	Mixture of hydrocarbons
2734	Amines, liquid, corrosive, flammable, n.o.s. or Polyamines, liquid, corrosive, flammable, n.o.s.		8	CF1	I/II	Mixture of hydrocarbons <b>and</b> wetting solution
2735	Amines, liquid, corrosive, n.o.s. or Polyamines, liquid, corrosive, n.o.s.		8	C7	I/II/III	Mixture of hydrocarbons <b>and</b> wetting solution
2739	Butyric anhydride		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2789	Acetic acid, glacial or Acetic acid solution	aqueous solution, more than 80% acid, by mass	8	CF1	II	Acetic acid
2790	Acetic acid solution	aqueous solution, more than 10% but not more than 80% acid, by mass	8	C3	II/III	Acetic acid

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	2.2 (3b)	2.1.1.3 (4)	(5)
2796	<b>Sulphuric acid</b>	with not more than 51% pure acid	8	C1	II	Water
2797	<b>Battery fluid, alkali</b>	Potassium/Sodium hydroxide, aqueous solution	8	C5	II	Water
2810	2-Chloro-6-fluorobenzyl chloride	stabilized	6.1	T1	III	Mixture of hydrocarbons
2810	2-Phenylethanol		6.1	T1	III	Acetic acid
2810	Ethylene glycol monoethyl ether		6.1	T1	III	Acetic acid
2810	<b>Toxic liquid, organic, n.o.s.</b>		6.1	T1	I/II/III	Rule for collective entries
2815	<b>N-Aminoethylpiperazine</b>		8	CT1	III	Mixture of hydrocarbons <b>and</b> wetting solution
2818	<b>Ammonium polysulphide solution</b>	aqueous solution	8	CT1	II/III	Acetic acid
2819	<b>Amyl acid phosphate</b>		8	C3	III	Wetting solution
2820	<b>Butyric acid</b>	n-Butyric acid	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2821	<b>Phenol solution</b>	aqueous solution, toxic, non-alkaline	6.1	T1	II/III	Acetic acid
2829	<b>Caproic acid</b>	n-Caproic acid	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2837	<b>Bisulphates, aqueous solution</b>		8	C1	II/III	Water
2838	<b>Vinyl butyrate, stabilized</b>		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2841	<b>Di-n-amylamine</b>		3	FT1	III	Mixture of hydrocarbons <b>and</b> wetting solution
2850	<b>Propylene tetramer</b>	mixture of C12-monoolefines, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
2873	<b>Dibutylaminoethanol</b>	N,N-Di-n-butylaminoethanol	6.1	T1	III	Acetic acid
2874	<b>Furfuryl alcohol</b>		6.1	T1	III	Acetic acid
2920	O,O-Diethyl-dithiophosphoric acid	flashpoint between 23 °C and 60 °C	8	CF1	II	n-Butylacetate/ n-Butylacetate-saturated wetting solution
2920	O,O-Dimethyl-dithiophosphoric acid	flashpoint between 23 °C and 60 °C	8	CF1	II	Wetting solution
2920	Hydrogen bromide	33% solution in glacial acetic acid	8	CF1	II	Wetting solution
2920	Tetramethylammonium hydroxide	aqueous solution, flashpoint between 23 °C and 60 °C	8	CF1	II	Water
2920	<b>Corrosive liquid, flammable, n.o.s.</b>		8	CF1	I/II	Rule for collective entries
2922	Ammonium sulphide	aqueous solution, flashpoint more than 60 °C	8	CT1	II	Water
2922	Cresols	aqueous alkaline solution, mixture of sodium and potassium cresolate,	8	CT1	II	Acetic acid

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2922	Phenol	aqueous alkaline solution, mixture of sodium and potassium phenolate	8	CT1	II	Acetic acid
2922	Sodium hydrogen difluoride	aqueous solution	8	CT1	III	Water
2922	<b>Corrosive liquid, toxic, n.o.s.</b>		8	CT1	I/II/III	Rule for collective entries
2924	<b>Flammable liquid, corrosive, n.o.s.</b>	slightly corrosive	3	FC	I/II/III	Rule for collective entries
2927	<b>Toxic liquid, corrosive, organic, n.o.s.</b>		6.1	TC1	I/II	Rule for collective entries
2933	<b>Methyl 2-chloropropionate</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2934	<b>Isopropyl 2-chloropropionate</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2935	<b>Ethyl 2-chloropropionate</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2936	<b>Thiolactic acid</b>		6.1	T1	II	Acetic acid
2941	<b>Fluoroanilines</b>	pure isomers and isomeric mixture	6.1	T1	III	Acetic acid
2943	<b>Tetrahydrofurfurylamine</b>		3	F1	III	Mixture of hydrocarbons
2945	<b>N-Methylbutylamine</b>		3	FC	II	Mixture of hydrocarbons <b>and</b> wetting solution
2946	<b>2-Amino-5-diethylaminopentane</b>		6.1	T1	III	Mixture of hydrocarbons <b>and</b> wetting solution
2947	<b>Isopropyl chloroacetate</b>		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2984	<b>Hydrogen peroxide, aqueous solution</b>	with not less than 8% but less than 20% hydrogen peroxide, stabilized as necessary	5.1	O1	III	Nitric acid
3056	<b>n-Heptaldehyde</b>		3	F1	III	Mixture of hydrocarbons
3065	<b>Alcoholic beverages</b>	with more than 24% alcohol by volume	3	F1	II/III	Acetic acid
3066	<b>Paint or Paint related material</b>	including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base or including paint thinning and reducing compound	8	C9	II/III	Rule for collective entries
3079	<b>Methacrylonitrile, stabilized</b>		6.1	TF1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3082	sec-Alcohol C <sub>6</sub> -C <sub>17</sub> poly (3-6) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3082	Alcohol C <sub>12</sub> -C <sub>15</sub> poly (1-3) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
3082	Alcohol C <sub>13</sub> -C <sub>15</sub> poly (1-6) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
3082	Aviation turbine fuel JP-5	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Aviation turbine fuel JP-7	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Coal tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Coal tar naphtha	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Creosote produced of coal tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Creosote produced of wood tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Cresyl diphenyl phosphate		9	M6	III	Wetting solution
3082	Decyl acrylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
3082	Diisobutyl phthalate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
3082	Di-n-butyl phthalate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons
3082	Hydrocarbons	liquid, flashpoint more than 60 °C, environmentally hazardous	9	M6	III	Rule for collective entries
3082	Isodecyl diphenyl phosphate		9	M6	III	Wetting solution
3082	Methylnaphthalenes	isomeric mixture, liquid	9	M6	III	Mixture of hydrocarbons
3082	Triaryl phosphates	n.o.s.	9	M6	III	Wetting solution
3082	Tricresyl phosphate	with not more than 3% ortho-isomer	9	M6	III	Wetting solution
3082	Trixylenyl phosphate		9	M6	III	Wetting solution
3082	Zinc alkyl dithiophosphate	C3-C14	9	M6	III	Wetting solution
3082	Zinc aryl dithiophosphate	C7-C16	9	M6	III	Wetting solution
3082	<b>Environmentally hazardous substance, liquid, n.o.s.</b>		9	M6	III	Rule for collective entries
3099	<b>Oxidizing liquid, toxic, n.o.s.</b>		5.1	OT1	I/II/III	Rule for collective entries

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3101 3103 3105 3107 3109 3111 3113 3115 3117 3119	<b>Organic Peroxide, Type B, C, D, E or F, liquid</b> or <b>Organic Peroxide, Type B, C, D, E or F, liquid, temperature controlled</b>		5.2	P1		n-Butyl acetate/ n-butyl acetate-saturated wetting solution <b>and</b> mixture of hydrocarbons <b>and</b> nitric acid**
** For UN Nos. 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115, 3117, 3119 (tert-butyl hydroperoxide with more than 40% peroxide content and peroxyacetic acids are excluded): All organic peroxides in a technically pure form or in solution in solvents which, as far as their compatibility is concerned, are covered by the standard liquid "mixture of hydrocarbons" in this list. Compatibility of vents and gaskets with organic peroxides may be verified, also independently of the design type test, by laboratory tests with nitric acid.						
3145	Butylphenols	liquid, n.o.s.	8	C3	I/II/III	Acetic acid
3145	<b>Alkylphenols, liquid, n.o.s.</b>	including C2 to C12 homologues	8	C3	I/II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3149	<b>Hydrogen peroxide and peroxyacetic acid mixture, stabilized</b>	with UN 2790 acetic acid, UN 2796 sulphuric acid and/or UN 1805 phosphoric acid, water and not more than 5% peroxyacetic acid	5.1	OC1	II	Wetting solution <b>and</b> nitric acid
3210	<b>Chlorates, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	II/III	Water
3211	<b>Perchlorates, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	II/III	Water
3213	<b>Bromates, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	II/III	Water
3214	<b>Permanganates, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	II	Water
3216	<b>Persulphates, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	III	Wetting solution
3218	<b>Nitrates, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	II/III	Water
3219	<b>Nitrites, inorganic, aqueous solution, n.o.s.</b>		5.1	O1	II/III	Water
3264	Cupric chloride	aqueous solution, slightly corrosive	8	C1	III	Water
3264	Hydroxylamine sulphate	25% aqueous solution	8	C1	III	Water
3264	Phosphorous acid	aqueous solution	8	C1	III	Water
3264	<b>Corrosive liquid, acidic, inorganic, n.o.s.</b>	flashpoint more than 60 °C	8	C1	I/II/III	Rule for collective entries; not applicable to mixtures having components of UN Nos.: 1830, 1832, 1906 and 2308
3265	Methoxyacetic acid		8	C3	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Allyl succinic acid anhydride		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Dithioglycolic acid		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3265	Butyl phosphate	mixture of mono- and di-butyl phosphate	8	C3	III	Wetting solution
3265	Caprylic acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Isovaleric acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Pelargonic acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Pyruvic acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Valeric acid		8	C3	III	Acetic acid
3265	<b>Corrosive liquid, acidic, organic, n.o.s.</b>	flashpoint more than 60 °C	8	C3	I/II/III	Rule for collective entries
3266	Sodium hydrosulphide	aqueous solution	8	C5	II	Acetic acid
3266	Sodium sulphide	aqueous solution, slightly corrosive	8	C5	III	Acetic acid
3266	<b>Corrosive liquid, basic, inorganic, n.o.s.</b>	flashpoint more than 60 °C	8	C5	I/II/III	Rule for collective entries
3267	2,2'-(Butylimino)-bisethanol		8	C7	II	Mixture of hydrocarbons <b>and</b> wetting solution
3267	<b>Corrosive liquid, basic, organic, n.o.s.</b>	flashpoint more than 60 °C	8	C7	I/II/III	Rule for collective entries
3271	Ethylene glycol monobutyl ether	flashpoint 60 °C	3	F1	III	Acetic acid
3271	<b>Ether, n.o.s.</b>		3	F1	II/III	Rule for collective entries
3272	Acrylic acid tert-butyl ester		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Isobutyl propionate	flashpoint below 23 °C	3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Methyl valerate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Trimethyl ortho-formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Ethyl valerate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Isobutyl isovalerate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	n-Amyl propionate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	n-Butylbutyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Methyl lactate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	<b>Ester, n.o.s.</b>		3	F1	II/III	Rule for collective entries



UN No.	Proper shipping name or technical name	Description	Class	Classification Code	Packing group	Standard liquid
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3287	Sodium nitrite	40% aqueous solution	6.1	T4	III	Water
3287	<b>Toxic liquid, inorganic, n.o.s.</b>		6.1	T4	I/II/III	Rule for collective entries
3291	<b>Clinical waste, unspecified, n.o.s.</b>	liquid	6.2	I3	II	Water
3293	<b>Hydrazine, aqueous solution</b>	with not more than 37% hydrazine, by mass	6.1	T4	III	Water
3295	Heptenes	n.o.s	3	F1	II	Mixture of hydrocarbons
3295	Nonanes	flashpoint below 23 °C	3	F1	II	Mixture of hydrocarbons
3295	Decanes	n.o.s	3	F1	III	Mixture of hydrocarbons
3295	1,2,3-Trimethylbenzene		3	F1	III	Mixture of hydrocarbons
3295	<b>Hydrocarbons, liquid, n.o.s.</b>		3	F1	I/II/III	Rule for collective entries
3405	<b>Barium chlorate, solution</b>	aqueous solution	5.1	OT1	II/III	Water
3406	<b>Barium perchlorate, solution</b>	aqueous solution	5.1	OT1	II/III	Water
3408	<b>Lead perchlorate, solution</b>	aqueous solution	5.1	OT1	II/III	Water
3413	<b>Potassium cyanide, solution</b>	aqueous solution	6.1	T4	I/II/III	Water
3414	<b>Sodium cyanide, solution</b>	aqueous solution	6.1	T4	I/II/III	Water
3415	<b>Sodium fluoride, solution</b>	aqueous solution	6.1	T4	III	Water
3422	<b>Potassium fluoride, solution</b>	aqueous solution	6.1	T4	III	Water

#### 4.1.2 Additional general provisions for the use of IBCs

4.1.2.1 When IBCs are used for the carriage of liquids with a flash-point of 60 °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 Every metal, rigid plastics and composite IBC, shall be inspected and tested, as relevant, in accordance with 6.5.4.4 or 6.5.4.5:

- before it is put into service;
- thereafter at intervals not exceeding two and a half and five years, as appropriate;
- after the repair or remanufacture, before it is re-used for carriage.

An IBC shall not be filled and offered for carriage after the date of expiry of the last periodic test or inspection. However, an IBC filled prior to the date of expiry of the last periodic test or inspection may be carried 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 carried 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.

**NOTE:** For the particulars in the transport document, see 5.4.1.1.11.

4.1.2.3 IBCs of type 31HZ2 shall be filled to at least 80% of the volume of the outer casing.

4.1.2.4 Except for routine maintenance of metal, rigid plastics, composite and flexible 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 mark 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 Section 4.1.4. They are subdivided in three sub-sections depending on the type of packagings to which they apply:

Sub-section 4.1.4.1 for packagings other than IBCs and large packagings; these packing instructions are designated by an alphanumeric code starting with the letter "P" or "R" for packagings specific to RID and ADR;

Sub-section 4.1.4.2 for IBCs; these are designated by an alphanumeric code starting with the letters "IBCs";

Sub-section 4.1.4.3 for large packagings; these are designated by an alphanumeric code starting with the letters "LP".

Generally, packing instructions specify that the general provisions of 4.1.1, 4.1.2 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, or "RR" for special provisions specific to RID and ADR;

"B" for IBCs or "BB" for special packing provisions specific to RID and ADR;

"L" for large packagings or "LL" for special packing provisions specific to ADR.

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 shall not select a packaging without checking that the substance is compatible with the packaging material selected (e.g. glass receptacles are unsuitable for most fluorides). Where glass receptacles are permitted in the packing instructions porcelain, earthenware and stoneware packagings are also allowed.

4.1.3.2 Column (8) of Table A of Chapter 3.2 shows for each article or substance the packing instruction(s) that shall be used. Columns (9a) and (9b) indicate the special packing provisions and the mixed packing provisions (see 4.1.10) 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 carried are liable to become liquid during carriage:

##### Packagings

Drums:	1D and 1G
Boxes:	4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2
Bags:	5L1, 5L2, 5L3, 5H1, 5H2, 5H3, 5H4, 5M1 and 5M2
Composite packagings:	6HC, 6HD2, 6HG1, 6HG2, 6HD1, 6PC, 6PD1, 6PD2, 6PG1, 6PG2 and 6PHI

#### Large packagings

Flexible plastics: 51H (outer packaging)

#### IBCs

For substances of packing group I: All types of IBC

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

For the purposes of this paragraph, substances and mixtures of substances having a melting point equal to or less than 45 °C shall be treated as solids liable to become liquid during carriage.

4.1.3.5 Where the packing instructions in this Chapter authorize the use of a particular type of packaging (e.g. 4G; 1A2), packagings bearing the same packaging identification code followed by the letters "V", "U" or "W" marked in accordance with the requirements of Part 6 (e.g. 4GV, 4GU or 4GW; 1A2V, 1A2U or 1A2W) may also be used under the same conditions and limitations applicable to the use of that type of packaging according to the relevant packing instructions. For example, a combination packaging marked with the packaging code "4GV" may be used whenever a combination packaging marked "4G" is authorized, provided the requirements in the relevant packing instruction regarding types of inner packagings and quantity limitations are respected.

#### 4.1.3.6 *Pressure receptacles for liquids and solids*

4.1.3.6.1 Unless otherwise indicated in ADR, pressure receptacles conforming to:

- (a) the applicable requirements of Chapter 6.2; or
- (b) the national or international standards on the design, construction, testing, manufacturing and inspection, as applied by the country in which the pressure receptacles are manufactured, provided that the provisions of 4.1.3.6 are met, and that, for metallic cylinders, tubes, pressure drums, bundles of cylinders and salvage pressure receptacles, the construction is such that the minimum burst ratio (burst pressure divided by test pressure) is:
  - (i) 1.50 for refillable pressure receptacles;
  - (ii) 2.00 for non-refillable pressure receptacles,

are authorized for the carriage of any liquid or solid substance other than explosives, thermally unstable substances, organic peroxides, self-reactive substances, substances where significant pressure may develop by evolution of chemical reaction and radioactive material (unless permitted in 4.1.9).

This sub-section is not applicable to the substances mentioned in 4.1.4.1, packing instruction P200, table 3.

4.1.3.6.2 Every design type of pressure receptacle shall be approved by the competent authority of the country of manufacture or as indicated in Chapter 6.2.

4.1.3.6.3 Unless otherwise indicated, pressure receptacles having a minimum test pressure of 0.6 MPa shall be used.

4.1.3.6.4 Unless otherwise indicated, pressure receptacles may be provided with an emergency pressure relief device designed to avoid bursting in case of overfill or fire accidents.

Pressure receptacle valves shall be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or shall be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the methods as given in 4.1.6.8 (a) to (e).

- 4.1.3.6.5 The level of filling shall not exceed 95% of the capacity of the pressure receptacle at 50 °C. Sufficient ullage (outage) shall be left to ensure that the pressure receptacle will not be liquid full at a temperature of 55 °C.
- 4.1.3.6.6 Unless otherwise indicated pressure receptacles shall be subjected to a periodic inspection and test every 5 years. The periodic inspection shall include an external examination, an internal examination or alternative method as approved by the competent authority, a pressure test or equivalent effective non-destructive testing with the agreement of the competent authority including an inspection of all accessories (e.g. tightness of valves, emergency relief valves or fusible elements). Pressure receptacles shall not be filled after they become due for periodic inspection and test but may be carried after the expiry of the time limit. Pressure receptacle repairs shall meet the requirements of 4.1.6.11.
- 4.1.3.6.7 Prior to filling, the packer shall perform an inspection of the pressure receptacle and ensure that the pressure receptacle is authorized for the substances to be carried and that the requirements of ADR have been met. Shut-off valves shall be closed after filling and remain closed during carriage. The consignor shall verify that the closures and equipment are not leaking.
- 4.1.3.6.8 Refillable pressure receptacles shall not be filled with a substance different from that previously contained unless the necessary operations for change of service have been performed.
- 4.1.3.6.9 Marking of pressure receptacles for liquids and solids according to 4.1.3.6 (not conforming to the requirements of Chapter 6.2) shall be in accordance with the requirements of the competent authority of the country of manufacturing.
- 4.1.3.7 Packagings or IBCs not specifically authorized in the applicable packing instruction shall not be used for the carriage of a substance or article unless specifically allowed under a temporary derogation agreed between Contracting Parties in accordance with 1.5.1.
- 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 carried empty, uncleaned and unpackaged, the competent authority of the country of origin<sup>2</sup> may approve such carriage. 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 carriage including trans-shipment between cargo transport units and between cargo 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 carriage, 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 carriage;
  - (e) They shall be fixed in cradles or crates or other handling devices or to the cargo transport unit in such a way that they will not become loose during normal conditions of carriage.

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<sup>2</sup> *If the country of origin is not a contracting party to ADR, the competent authority of the first country contracting party to the ADR reached by the consignment.*

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 attached to the transport document.

*NOTE: A large and robust article may include flexible fuel containment systems, military equipment, machinery or equipment containing dangerous goods above the limited quantities according to 3.4.1.*

#### **4.1.4 List of packing instructions**

*NOTE: Although the following packing instructions use the same numbering system as used in the IMDG Code and the UN Model Regulations, readers should be aware that some of the details may be different in the case of ADR.*

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	
	<b>Drums</b>				
Glass 10 l	steel (1A1, 1A2)	250 kg	400 kg	400 kg	
Plastics 30 l	aluminium (1B1, 1B2)	250 kg	400 kg	400 kg	
Metal 40 l	other metal (1N1, 1N2)	250 kg	400 kg	400 kg	
	plastics (1H1, 1H2)	250 kg	400 kg	400 kg	
	plywood (1D)	150 kg	400 kg	400 kg	
	fibre (1G)	75 kg	400 kg	400 kg	
	<b>Boxes</b>				
	steel (4A)	250 kg	400 kg	400 kg	
	aluminium (4B)	250 kg	400 kg	400 kg	
	other metal (4N)	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	
	<b>Jerricans</b>				
	steel (3A1, 3A2)	120 kg	120 kg	120 kg	
	aluminium (3B1, 3B2)	120 kg	120 kg	120 kg	
	plastics (3H1, 3H2)	120 kg	120 kg	120 kg	
<b>Single packagings:</b>					
	<b>Drums</b>				
	steel, non-removable head (1A1)	250 l	450 l	450 l	
	steel, removable head (1A2)	250 l <sup>a</sup>	450 l	450 l	
	aluminium, non-removable head (1B1)	250 l	450 l	450 l	
	aluminium, removable head (1B2)	250 l <sup>a</sup>	450 l	450 l	
	metal other than steel or aluminium, non-removable head (1N1)	250 l	450 l	450 l	
	metal other than steel or aluminium, removable head (1N2)	250 l <sup>a</sup>	450 l	450 l	
	plastics, non-removable head (1H1)	250 l	450 l	450 l	
	plastics, removable head (1H2)	250 l <sup>a</sup>	450 l	450 l	
	<b>Jerricans</b>				
	steel, non-removable head (3A1)	60 l	60 l	60 l	
	steel, removable head (3A2)	60 l <sup>a</sup>	60 l	60 l	
	aluminium, non-removable head (3B1)	60 l	60 l	60 l	
	aluminium, removable head (3B2)	60 l <sup>a</sup>	60 l	60 l	
	plastics, non-removable head (3H1)	60 l	60 l	60 l	
	plastics, removable head (3H2)	60 l <sup>a</sup>	60 l	60 l	

<sup>a</sup> Only substances with a viscosity of more than 2 680 mm<sup>2</sup>/s are authorized.

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P001	PACKING INSTRUCTION (LIQUIDS) (cont'd)			P001
Single packagings (cont'd)	Maximum capacity/Net mass (see 4.1.3.3)			
Composite packagings	Packing group I	Packing group II	Packing group III	
plastics receptacle <del>with outer steel, aluminium or plastics drum with outer steel or aluminium drum</del> (6HA1, 6HB1, <del>6HH1</del> )	250 l	250 l	250 l	
plastics receptacle with outer fibre, <del>plastics</del> or plywood drum (6HG1, <del>6HH1</del> , 6HD1)	120 l	250 l	250 l	
plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 l	60 l	60 l	
glass receptacle with outer steel, aluminium, fibreboard, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or with outer steel or aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)	60 l	60 l	60 l	
<b>Pressure receptacles</b> , provided that the general provisions of 4.1.3.6 are met.				
<b>Additional requirement:</b> For substances of Class 3, packing group III, which give off small quantities of carbon dioxide or nitrogen, the packagings shall be vented.				
<b>Special packing provisions:</b>				
<p><b>PP1</b> For UN Nos. 1133, 1210, 1263 and 1866 and for adhesives, printing inks, printing ink related materials, paints, paint related materials and resin solutions which are assigned to UN 3082, metal or plastics packagings for substances of packing groups II and III in quantities of 5 litres or less per packaging are not required to meet the performance tests in Chapter 6.1 when carried:</p> <ul style="list-style-type: none"> <li>(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; or</li> <li>(b) as inner packagings of combination packagings with a maximum net mass of 40 kg.</li> </ul> <p><b>PP2</b> For UN 3065, wooden barrels with a maximum capacity of 250 litres and which do not meet the provisions of Chapter 6.1 may be used.</p> <p><b>PP4</b> For UN No. 1774, packagings shall meet the packing group II performance level.</p> <p><b>PP5</b> For UN No. 1204, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Cylinders, tubes and pressure drums shall not be used for these substances.</p> <p><b>PP6</b> (Deleted)</p> <p><b>PP10</b> For UN No. 1791, packing group II, the packaging shall be vented.</p> <p><b>PP31</b> For UN No. 1131, packagings shall be hermetically sealed.</p> <p><b>PP33</b> For UN No. 1308, packing groups I and II, only combination packagings with a maximum gross mass of 75 kg allowed.</p> <p><b>PP81</b> For UN No. 1790 with more than 60% but not more than 85% hydrogen fluoride and UN No. 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.</p> <p><b>PP93</b> For UN Nos. 3532 and 3534, packagings shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.</p>				
<b>Special packing provisions specific to RID and ADR:</b>				
<b>RR2</b> For UN No. 1261, removable head packagings are not permitted.				

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P002		PACKING INSTRUCTION (SOLIDS)			P002
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:					
<b>Combination packagings:</b>		<b>Maximum net mass (see 4.1.3.3)</b>			
Inner packagings	Outer packagings	Packing group I	Packing group II	Packing group III	
	<b>Drums</b>				
Glass 10 kg	steel (1A1, 1A2)	400 kg	400 kg	400 kg	
Plastics <sup>a</sup> 50 kg	aluminium (1B1, 1B2)	400 kg	400 kg	400 kg	
Metal 50 kg	other metal (1N1, 1N2)	400 kg	400 kg	400 kg	
Paper <sup>a, b, c</sup> 50 kg	plastics (1H1, 1H2)	400 kg	400 kg	400 kg	
Fibre <sup>a, b, c</sup> 50 kg	plywood (1D)	400 kg	400 kg	400 kg	
	fibre (1G)	400 kg	400 kg	400 kg	
	<b>Boxes</b>				
	steel (4A)	400 kg	400 kg	400 kg	
	aluminium (4B)	400 kg	400 kg	400 kg	
	other metal (4N)	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	
	<b>Jerricans</b>				
	steel (3A1, 3A2)	120 kg	120 kg	120 kg	
	aluminium (3B1, 3B2)	120 kg	120 kg	120 kg	
	plastics (3H1, 3H2)	120 kg	120 kg	120 kg	
<b>Single packagings:</b>					
	<b>Drums</b>				
	steel (1A1 or 1A2 <sup>d</sup> )	400 kg	400 kg	400 kg	
	aluminium (1B1 or 1B2 <sup>d</sup> )	400 kg	400 kg	400 kg	
	metal, other than steel or aluminium (1N1 or 1N2 <sup>d</sup> )	400 kg	400 kg	400 kg	
	plastics (1H1 or 1H2 <sup>d</sup> )	400 kg	400 kg	400 kg	
	fibre (1G) <sup>e</sup>	400 kg	400 kg	400 kg	
	plywood (1D) <sup>e</sup>	400 kg	400 kg	400 kg	
	<b>Jerricans</b>				
	steel (3A1 or 3A2 <sup>d</sup> )	120 kg	120 kg	120 kg	
	aluminium (3B1 or 3B2 <sup>d</sup> )	120 kg	120 kg	120 kg	
	plastics (3H1 or 3H2 <sup>d</sup> )	120 kg	120 kg	120 kg	
<sup>a</sup>	These inner packagings shall be sift-proof.				
<sup>b</sup>	These inner packagings shall not be used when the substances being carried may become liquid during carriage (see 4.1.3.4).				
<sup>c</sup>	These inner packagings shall not be used for substances of packing group I.				
<sup>d</sup>	These packagings shall not be used for substances of packing group I that may become liquid during carriage (see 4.1.3.4).				
<sup>e</sup>	These packagings shall not be used when substances being carried may become liquid during carriage (see 4.1.3.4).				

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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	
<b>Boxes</b>				
steel (4A) <sup>e</sup>	Not allowed	400 kg	400 kg	
aluminium (4B) <sup>e</sup>	Not allowed	400 kg	400 kg	
other metal (4N) <sup>e</sup>	Not allowed	400 kg	400 kg	
natural wood (4C1) <sup>e</sup>	Not allowed	400 kg	400 kg	
plywood (4D) <sup>e</sup>	Not allowed	400 kg	400 kg	
reconstituted wood (4F) <sup>e</sup>	Not allowed	400 kg	400 kg	
natural wood with sift-proof walls (4C2) <sup>e</sup>	Not allowed	400 kg	400 kg	
fibreboard (4G) <sup>e</sup>	Not allowed	400 kg	400 kg	
solid plastics (4H2) <sup>e</sup>	Not allowed	400 kg	400 kg	
<b>Bags</b>				
bags (5H3, 5H4, 5L3, 5M2) <sup>e</sup>	Not allowed	50 kg	50 kg	
<b>Composite packagings</b>				
plastics receptacle with outer steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1 <sup>e</sup> , 6HD1 <sup>e</sup> , or 6HH1)	400 kg	400 kg	400 kg	
plastics receptacle with outer steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2 <sup>e</sup> , 6HG2 <sup>e</sup> or 6HH2)	75 kg	75 kg	75 kg	
glass receptacle with outer steel, aluminium plywood or fibre drum (6PA1, 6PB1, 6PD1 <sup>e</sup> or 6PG1 <sup>e</sup> ) or with outer steel or aluminium crate or box or with outer wooden, or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PD2 <sup>e</sup> , or 6PG2 <sup>e</sup> ) or with outer solid plastics or expanded plastics packaging (6PH2 or 6PH1 <sup>e</sup> )	75 kg	75 kg	75 kg	
<b>Pressure receptacles</b> , provided that the general provisions of 4.1.3.6 are met.				
<sup>e</sup> <i>These packagings shall not be used when the substances being carried may become liquid during carriage (see 4.1.3.4).</i>				

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P002	PACKING INSTRUCTION (SOLIDS) (cont'd)	P002
<b>Special packing provisions:</b>		
<b>PP6</b> (Deleted)		
<b>PP7</b>	For UN No. 2000, celluloid may also be transported unpacked on pallets, wrapped in plastic film and secured by appropriate means, such as steel bands as a full load in closed vehicles or containers. Each pallet shall not exceed 1 000 kg.	
<b>PP8</b>	For UN No. 2002, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Cylinders, tubes and pressure drums shall not be used for these substances.	
<b>PP9</b>	For UN Nos. 3175, 3243 and 3244, packagings shall conform to a design type that has passed a leakproofness test at the packing group II performance level. For UN No. 3175, the leakproofness test is not required when the liquids are fully absorbed in solid material contained in sealed bags.	
<b>PP11</b>	For UN No. 1309, packing group III, and UN No. 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.	
<b>PP12</b>	For UN Nos. 1361, 2213 and UN No. 3077, 5H1, 5L1 and 5M1 bags are allowed when carried in closed vehicles or containers.	
<b>PP13</b>	For articles classified under UN No. 2870, only combination packagings meeting the packing group I performance level are authorized.	
<b>PP14</b>	For UN Nos. 2211, 2698 and 3314, packagings are not required to meet the performance tests in Chapter 6.1.	
<b>PP15</b>	For UN Nos. 1324 and 2623, packagings shall meet the packing group III performance level.	
<b>PP20</b>	For UN No. 2217, any sift-proof, tearproof receptacle may be used.	
<b>PP30</b>	For UN No. 2471, paper or fibre inner packagings are not permitted.	
<b>PP34</b>	For UN No. 2969 (as whole beans), 5H1, 5L1 and 5M1 bags are permitted.	
<b>PP37</b>	For UN Nos. 2590 and 2212, 5M1 bags are permitted. All bags of any type shall be carried in closed vehicles or containers or be placed in closed rigid overpacks.	
<b>PP38</b>	For UN No. 1309, packing group II, bags are permitted only in closed vehicles or containers.	
<b>PP84</b>	For UN No. 1057, rigid outer packagings meeting the packing group II performance level shall be used. The packagings shall be designed and constructed and arranged to prevent movement, inadvertent ignition of the devices or inadvertent release of flammable gas or liquid. <i>NOTE: For waste lighters collected separately see Chapter 3.3, special provision 654.</i>	
<b>PP92</b>	For UN Nos. 3531 and 3533, packagings shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.	
<b>Special packing provision specific to RID and ADR:</b>		
<b>RR5</b>	Notwithstanding special packing provision PP84, only the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.5 to 4.1.1.7 need be complied with if the gross mass of the package is not more than 10 kg. <i>NOTE: For waste lighters collected separately see Chapter 3.3, special provision 654.</i>	

P003	PACKING INSTRUCTION	P003
<p>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, and 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 carriage.</p>		
<p><b>Special packing provisions:</b></p>		
<p><b>PP16</b> For UN No. 2800, batteries shall be protected from short circuits and shall be securely packed in strong outer packagings.</p> <p><i>NOTE 1: Non-spillable 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.</i></p> <p><i>NOTE 2: For used batteries (UN 2800), see P801a.</i></p>		
<p><b>PP17</b> For UN No. 2037, packages shall not exceed 55 kg net mass for fibreboard packagings or 125 kg net mass for other packagings.</p>		
<p><b>PP19</b> For UN Nos. 1364 and 1365, carriage as bales is authorized.</p>		
<p><b>PP20</b> For UN Nos. 1363, 1386, 1408 and 2793 any sift-proof, tearproof receptacle may be used.</p>		
<p><b>PP32</b> UN Nos. 2857 and 3358 may be carried unpackaged, in crates or in appropriate overpacks.</p>		
<p><b>PP87</b> (Deleted)</p>		
<p><b>PP88</b> (Deleted)</p>		
<p><b>PP90</b> For UN No. 3506, sealed inner liners or bags of strong leakproof and puncture resistant material impervious to mercury which will prevent escape of the substance from the package irrespective of the position or the orientation of the package shall be used.</p>		
<p><b>PP91</b> For UN 1044, large fire extinguishers may also be carried unpackaged provided that the requirements of 4.1.3.8.1 (a) to (e) are met, the valves are protected by one of the methods in accordance with 4.1.6.8 (a) to (d) and other equipment mounted on the fire extinguisher is protected to prevent accidental activation. For the purpose of this special packing provision, "large fire extinguishers" means fire extinguishers as described in indents (c) to (e) of special provision 225 of Chapter 3.3.</p>		
<p><b>Special packing provisions specific to RID and ADR:</b></p>		
<p><b>RR6</b> For UN No. 2037 in the case of carriage by full load, metal articles may also be packed as follows: the articles shall be grouped together in units on trays and held in position with an appropriate plastics cover; these units shall be stacked and suitably secured on pallets.</p>		
<p><b>RR9</b> For UN 3509, packagings are not required to meet the requirements of 4.1.1.3.</p> <p>Packagings meeting the requirements of 6.1.4, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used.</p> <p>When the only residues contained are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible packagings may be used.</p> <p>When liquid residues are present, rigid packagings that provide a means of retention (e.g. absorbent material) shall be used.</p> <p>Before being filled and handed over for carriage, every packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging showing signs of reduced strength shall no longer be used (minor dents and scratches are not considered as reducing the strength of the packaging).</p> <p>Packagings intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.</p>		

P004	PACKING INSTRUCTION	P004
This instruction applies to UN Nos. 3473, 3476, 3477, 3478 and 3479.		
The following packagings are authorized:		
(1) For fuel cell cartridges, provided that the general provisions of <b>4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.6</b> and <b>4.1.3</b> are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group II performance level.		
(2) For fuel cell cartridges packed with equipment: strong outer packagings which meet the general provisions of <b>4.1.1.1, 4.1.1.2, 4.1.1.6</b> and <b>4.1.3</b> .  When fuel cell cartridges are packed with equipment, they shall be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging.  The equipment shall be secured against movement within the outer packaging.  For the purpose of this packing instruction, "equipment" means apparatus requiring the fuel cell cartridges with which it is packed for its operation.		
(3) For fuel cell cartridges contained in equipment: strong outer packagings which meet the general provisions of <b>4.1.1.1, 4.1.1.2, 4.1.1.6</b> and <b>4.1.3</b> .  Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be carried unpackaged. For fuel cell cartridges contained in equipment, the entire system shall be protected against short circuit and inadvertent operation.		

P005	PACKING INSTRUCTION	P005
This instruction applies to UN Nos. 3528, 3529 and 3530.		
If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required.		
Dangerous goods in engines or machinery shall otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1, or they shall be fixed in such a way that they will not become loose during normal conditions of carriage, e.g. in cradles or crates or other handling devices.		
In addition, the manner in which means of containment are contained within the engine or machinery, shall be such that under normal conditions of carriage, damage to the means of containment containing the dangerous goods is prevented; and in the event of damage to the means of containment containing liquid dangerous goods, no leakage of the dangerous goods from the engine or machinery is possible (a leakproof liner may be used to satisfy this requirement).		
Means of containment 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 engine or machinery during normal conditions of carriage. Cushioning material shall not react dangerously with the content of the means of containment. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material.		
<b>Additional requirement:</b>		
Other dangerous goods (e.g. batteries, fire extinguishers, compressed gas accumulators or safety devices) required for the functioning or safe operation of the engine or machinery shall be securely mounted in the engine or machine.		

P006	PACKING INSTRUCTION	P006
<u>This instruction applies to UN Nos. 3537 to 3548.</u>		
<u>(1) The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:</u>		
<u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u>		
<u>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u>		
<u>Jerricans (3A2, 3B2, 3H2)</u>		

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Packagings shall conform to the packing group II performance level.

(2) In addition, for robust articles the following packagings are authorized:

Strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging capacity and its intended use. The packagings shall meet the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.8 and 4.1.3 in order to achieve a level of protection that is at least equivalent to that provided by Chapter 6.1. Articles may be carried unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained.

(3) Additionally, the following conditions shall be met:

(a) Receptacles within articles containing liquids or solids shall be constructed of suitable materials and secured in the article in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the article itself or the outer packaging;

(b) Receptacles containing liquids with closures shall be packed with their closures correctly oriented. The receptacles shall in addition conform to the internal pressure test provisions of 6.1.5.5;

(c) Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials shall be properly secured. Any leakage of the contents shall not substantially impair the protective properties of the article or of the outer packaging;

(d) Receptacles within articles containing gases shall meet the requirements of Section 4.1.6 and Chapter 6.2 as appropriate or be capable of providing an equivalent level of protection as packing instructions P200 or P208;

(e) Where there is no receptacle within the article, the article shall fully enclose the dangerous substances and prevent their release under normal conditions of carriage.

(4) Articles shall be packed to prevent movement and inadvertent operation during normal conditions of carriage.

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P010 PACKING INSTRUCTION P010	
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:	
<b>Combination packagings</b>	
Inner packagings	Outer packagings
Glass 1 l Steel 40 l	<b>Drums</b> steel (1A1, 1A2) 400 kg plastics (1H1, 1H2) 400 kg plywood (1D) 400 kg fibre (1G) 400 kg <b>Boxes</b> steel (4A) 400 kg natural wood (4C1, 4C2) 400 kg plywood (4D) 400 kg reconstituted wood (4F) 400 kg fibreboard (4G) 400 kg expanded plastics (4H1) 60 kg solid plastics (4H2) 400 kg
<b>Single packagings</b>	<b>Maximum net mass (see 4.1.3.3)</b>
<b>Drums</b> steel, non-removable head (1A1)	450 l
<b>Jerricans</b> steel, non-removable head (3A1)	60 l
<b>Composite packagings</b> plastics receptacle in steel drums (6HA1)	250 l
<b>Steel pressure receptacles</b> , provided that the general provisions of 4.1.3.6 are met.	

P099 PACKING INSTRUCTION P099	
Only packagings which are approved for these goods by the competent authority may be used. A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.	

P101	PACKING INSTRUCTION	P101
<p>Only packagings which are approved by the competent authority of the country of origin may be used. If the country of origin is not a Contracting Party to the ADR, the packaging shall be approved by the competent authority of the first country Contracting Party to ADR reached by the consignment. The distinguishing sign used on vehicles in international road traffic<sup>a</sup> of the country for which the authority acts, shall be marked on the transport documents as follows:</p> <p><b>"Packaging approved by the competent authority of..."</b> (see 5.4.1.2.1 (e))</p>		

<sup>a</sup> Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

P110(a)	PACKING INSTRUCTION	P110(a)
(Reserved)		
<p><i>NOTE: This packing instruction in the UN Model Regulations is not admitted for carriage under ADR.</i></p>		

P110(b)	PACKING INSTRUCTION	P110(b)
<p>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:</p>		
<p><b>Inner packagings</b></p> <p><b>Receptacles</b> metal wood rubber, conductive plastics, conductive</p> <p><b>Bags</b> rubber, conductive plastics, conductive</p>	<p><b>Intermediate packagings</b></p> <p><b>Dividing partitions</b> metal wood plastics fibreboard</p>	<p><b>Outer packagings</b></p> <p><b>Boxes</b> natural wood, sift-proof wall (4C2) plywood (4D) reconstituted wood (4F)</p>
<p><b>Special packing provision:</b></p> <p><b>PP42</b> For UN Nos. 0074, 0113, 0114, 0129, 0130, 0135 and 0224, the following conditions shall be met:</p> <ul style="list-style-type: none"> <li>(a) Inner packagings shall not contain more than 50 g of explosive substance (quantity corresponding to dry substance);</li> <li>(b) Compartments between dividing partitions shall not contain more than one inner packaging, firmly fitted; and</li> <li>(c) The outer packaging may be partitioned into up to 25 compartments.</li> </ul>		

P111	PACKING INSTRUCTION	P111
<p>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:</p>		
<b>Inner packagings</b>	<b>Intermediate packagings</b>	<b>Outer packagings</b>

<p><b>Bags</b> paper, waterproofed plastics textile, rubberized</p> <p><b>Receptacles</b> wood</p> <p><b>Sheets</b> plastics textile, rubberized</p>	Not necessary	<p><b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2)</p> <p><b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)</p>
<p><b>Special packing provision:</b> <b>PP43</b> For UN 0159, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastics (1H1 or 1H2) drums are used as outer packagings.</p>		

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:			
<p><b>Inner packagings</b></p> <p><b>Bags</b> paper, multiwall, water resistant plastics textile textile, rubberized woven plastics</p> <p><b>Receptacles</b> metal plastics wood</p>	<p><b>Intermediate packagings</b></p> <p><b>Bags</b> plastics textile, plastic coated or lined</p> <p><b>Receptacles</b> metal plastics wood</p>	<p><b>Outer packagings</b></p> <p><b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2)</p> <p><b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)</p>	
<p><b>Additional requirement:</b> Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging.</p>			
<p><b>Special packing provisions:</b> <b>PP26</b> For UN Nos. 0004, 0076, 0078, 0154, 0219 and 0394, packagings shall be lead free. <b>PP45</b> For UN Nos. 0072 and 0226, intermediate packagings are not required.</p>			

P112(b)	<b>PACKING INSTRUCTION</b> <b>(Solid dry, other than powder 1.1D)</b>		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:			
<b>Inner packagings</b>  <b>Bags</b> paper, kraft paper, multiwall, water resistant plastics textile textile, rubberized woven plastics	<b>Intermediate packagings</b>  <b>Bags</b> (for UN No. 0150 only) plastics textile, plastic coated or lined	<b>Outer packagings</b>  <b>Bags</b> 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)  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)	
<b>Special packing provisions:</b>			
<b>PP26</b> For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free.			
<b>PP46</b> For UN Nos. 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg.			
<b>PP47</b> For UN No. 0222, inner packagings are not required when the outer packaging is a bag.			



P112(c)	<b>PACKING INSTRUCTION</b> (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:			
<b>Inner packagings</b>  <b>Bags</b> paper, multiwall, water resistant plastics woven plastics  <b>Receptacles</b> fibreboard metal plastics wood	<b>Intermediate packagings</b>  <b>Bags</b> paper, multiwall, water resistant with inner lining plastics  <b>Receptacles</b> metal plastics wood	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)	
<b>Additional requirements:</b> 1. Inner packagings are not required if drums are used as the outer packaging. 2. The packaging shall be sift-proof.			
<b>Special packing provisions:</b> <b>PP26</b> For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free. <b>PP46</b> For UN No. 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg. <b>PP48</b> For UN No. 0504, metal packagings shall not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.1.4, are not considered metal packagings.			

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:			
<b>Inner packagings</b>  <b>Bags</b> paper plastics textile, rubberized  <b>Receptacles</b> fibreboard metal plastics wood	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)	
<b>Additional requirement:</b>			
The packaging shall be sift-proof.			
<b>Special packing provisions:</b>			
<b>PP49</b> For UN Nos. 0094 and 0305, no more than 50 g of substance shall be packed in an inner packaging.			
<b>PP50</b> For UN No. 0027, inner packagings are not necessary when drums are used as outer packagings.			
<b>PP51</b> For UN No. 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:			
<b>Inner packagings</b>  <b>Bags</b> plastics textile woven plastics  <b>Receptacles</b> metal plastics wood	<b>Intermediate packagings</b>  <b>Bags</b> plastics textile, plastic coated or lined  <b>Receptacles</b> metal plastics  <b>Dividing partitions</b> wood	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) metal, other than steel or aluminium (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) Plywood (1D) fibre (1G) plastics (1H1, 1H2)	
<b>Additional requirement:</b> Intermediate packagings are not required if leakproof removable head drums are used as outer packagings.			
<b>Special packing provisions:</b> <b>PP26</b> For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free. <b>PP43</b> For UN 0342, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastics (1H1 or 1H2) drums are used as outer packagings.			

P114(b)	<b>PACKING INSTRUCTION</b> (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:			
<b>Inner packagings</b> <b>Bags</b> paper, kraft plastics textile, sift-proof woven plastics, sift-proof  <b>Receptacles</b> fibreboard metal paper plastics woven plastics, sift-proof wood	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b> <b>Boxes</b> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)	
<b>Special packing provisions:</b>			
<b>PP26</b> For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free.			
<b>PP48</b> For UN Nos. 0508 and 0509, metal packagings shall not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.1.4, are not considered metal packagings.			
<b>PP50</b> For UN Nos. 0160, 0161 and 0508, inner packagings are not necessary if drums are used as outer packagings.			
<b>PP52</b> For UN Nos. 0160 and 0161, when metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) are used as outer packagings, metal packagings shall be so constructed that the risk of explosion, by reason of increased internal pressure from internal or external causes is prevented.			

<b>P115 PACKING INSTRUCTION P115</b>		
The following packagings are authorized, provided the general packing provisions of <b>4.1.1</b> , <b>4.1.3</b> and special packing provisions of <b>4.1.5</b> are met:		
<b>Inner packagings</b>  <b>Receptacles</b> plastics wood	<b>Intermediate packagings</b>  <b>Bags</b> plastics in metal receptacles  <b>Drums</b> metal  <b>Receptacles</b> wood	<b>Outer packagings</b>  <b>Boxes</b> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Special packing provisions:</b>  <b>PP45</b> For UN No. 0144, intermediate packagings are not required.  <b>PP53</b> For UN Nos. 0075, 0143, 0495 and 0497, when boxes are used as outer packagings, 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 limited to 30 kg for each package when outer packagings are boxes.  <b>PP54</b> For UN Nos. 0075, 0143, 0495 and 0497, when drums are used as outer packagings 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 plastics 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.  <b>PP55</b> For UN No. 0144, absorbent cushioning material shall be inserted.  <b>PP56</b> For UN No. 0144, metal receptacles may be used as inner packagings.  <b>PP57</b> For UN Nos. 0075, 0143, 0495 and 0497, bags shall be used as intermediate packagings when boxes are used as outer packagings.  <b>PP58</b> For UN Nos. 0075, 0143, 0495 and 0497, drums shall be used as intermediate packagings when drums are used as outer packagings.  <b>PP59</b> For UN No. 0144, fibreboard boxes (4G) may be used as outer packagings.  <b>PP60</b> For UN No. 0144, aluminium drums (1B1 and 1B2) and metal, other than steel or aluminium, drums (1N1 and 1N2) 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:		
<p><b>Inner packagings</b></p> <p><b>Bags</b> paper, water and oil resistant plastics textile, plastic coated or lined woven plastics, sift-proof</p> <p><b>Receptacles</b> fibreboard, water resistant metal plastics wood, sift-proof</p> <p><b>Sheets</b> paper, water resistant paper, waxed plastics</p>	<p><b>Intermediate packagings</b></p> <p>Not necessary</p>	<p><b>Outer packagings</b></p> <p><b>Bags</b> woven plastics (5H1, 5H2, 5H3) paper, multiwall, water resistant (5M2) plastics, film (5H4) textile, sift-proof (5L2) textile, water resistant (5L3)</p> <p><b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)</p> <p><b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)</p> <p><b>Jerricans</b> steel (3A1, 3A2) plastics (3H1, 3H2)</p>
<p><b>Special packing provisions:</b></p> <p><b>PP61</b> For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required if leakproof removable head drums are used as outer packagings.</p> <p><b>PP62</b> For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required when the explosive is contained in a material impervious to liquid.</p> <p><b>PP63</b> For UN No. 0081, inner packagings are not required when contained in rigid plastic which is impervious to nitric esters.</p> <p><b>PP64</b> For UN No. 0331, inner packagings are not required when bags (5H2), (5H3) or (5H4) are used as outer packagings.</p> <p><b>PP65</b> <i>(Deleted)</i></p> <p><b>PP66</b> For UN No. 0081, bags shall not be used as outer packagings.</p>		

<b>P130 PACKING INSTRUCTION P130</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:		
<b>Inner packagings</b>  Not necessary	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Special packing provision:</b>		
<p><b>PP67</b> 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, 0502 and 0510:</p> <p>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 carriage. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for carriage unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices.</p>		

<b>P131 PACKING INSTRUCTION P131</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:		
<b>Inner packagings</b>  <b>Bags</b> paper plastics  <b>Receptacles</b> fibreboard metal plastics wood  <b>Reels</b>	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Special packing provision:</b> <b>PP68</b> For UN Nos. 0029, 0267 and 0455, bags and reels shall not be used as inner packagings.		

<b>P132(a) PACKING INSTRUCTION P132(a)</b> (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:		
<b>Inner packagings</b>  Not necessary	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) wood, natural, ordinary (4C1) wood, natural, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)



<b>P132(b) PACKING INSTRUCTION P132(b)</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:		
<b>Inner packagings</b>  <b>Receptacles</b> fibreboard metal plastics wood  <b>Sheets</b> paper plastics	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)

<b>P133 PACKING INSTRUCTION P133</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:		
<b>Inner packagings</b>  <b>Receptacles</b> fibreboard metal plastics wood  <b>Trays, fitted with dividing partitions</b> fibreboard plastics wood	<b>Intermediate packagings</b>  <b>Receptacles</b> fibreboard metal plastics wood	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)
<b>Additional requirement:</b> Receptacles are only required as intermediate packagings when the inner packagings are trays.		
<b>Special packing provision:</b> <b>PP69</b> For UN Nos. 0043, 0212, 0225, 0268 and 0306, trays shall not be used as inner packagings.		

<b>P134 PACKING INSTRUCTION P134</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:		
<b>Inner packagings</b>  <b>Bags</b> water resistant  <b>Receptacles</b> fibreboard metal plastics wood  <b>Sheets</b> fibreboard, corrugated  <b>Tubes</b> fibreboard	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)

<b>P135 PACKING INSTRUCTION P135</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:		
<b>Inner packagings</b>  <b>Bags</b> paper plastics  <b>Receptacles</b> fibreboard metal plastics wood  <b>Sheets</b> paper plastics	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)

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:		
<b>Inner packagings</b>  <b>Bags</b> plastics textile  Boxes fibreboard plastics wood  <b>Dividing partitions in the outer packagings</b>	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)

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:		
<b>Inner packagings</b>  <b>Bags</b> plastics  <b>Boxes</b> Fibreboard wood  <b>Tubes</b> fibreboard metal plastics  <b>Dividing partitions in the outer packagings</b>	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Special packing provision:</b> <b>PP70</b> For UN Nos. 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity shall face downwards and the package shall be marked in accordance with 5.2.1.10.1. 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:		
<b>Inner packagings</b>  <b>Bags</b> plastics	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Additional requirement:</b> 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:		
<b>Inner packagings</b>  <b>Bags</b> plastics  <b>Receptacles</b> fibreboard metal plastics wood  <b>Reels</b>  <b>Sheets</b> paper plastics	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Special packing provisions:</b> <b>PP71</b> 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. <b>PP72</b> For UN Nos. 0065 and 0289, inner packagings are not required when they are in coils.		

<b>P140 PACKING INSTRUCTION P140</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:		
<b>Inner packagings</b>  <b>Bags</b> Plastics  <b>Receptacles</b> wood  <b>Reels</b>  <b>Sheets</b> paper, kraft plastics	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Special packing provisions:</b> <b>PP73</b> For UN No. 0105, no inner packagings are required if the ends are sealed. <b>PP74</b> For UN No. 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. <b>PP75</b> For UN No. 0101, steel, aluminium or other metal boxes or drums shall not be used.		

<b>P141 PACKING INSTRUCTION P141</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:		
<b>Inner packagings</b>  <b>Receptacles</b> fibreboard metal plastics wood  <b>Trays, fitted with dividing partitions</b> plastics wood  <b>Dividing partitions in the outer packagings</b>	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)

<b>P142 PACKING INSTRUCTION P142</b>		
The following packagings are authorized, provided the general packing provisions of <b>4.1.1, 4.1.3</b> and special packing provisions of <b>4.1.5</b> are met:		
<b>Inner packagings</b>  <b>Bags</b> paper plastics  <b>Receptacles</b> fibreboard metal plastics wood  <b>Sheets</b> paper  <b>Trays, fitted with dividing partitions</b> plastics	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)

<b>P143 PACKING INSTRUCTION P143</b>		
The following packagings are authorized, provided the general packing provisions of <b>4.1.1, 4.1.3</b> and special packing provisions of <b>4.1.5</b> are met:		
<b>Inner packagings</b>  <b>Bags</b> paper, kraft plastics textile textile, rubberized  <b>Receptacles</b> fibreboard metal Plastics wood  <b>Trays, fitted with dividing partitions</b> plastics wood	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plywood (1D) fibre (1G) plastics (1H1, 1H2)
<b>Additional requirement:</b> Instead of the above inner and outer packagings, composite packagings (6HH2) (plastics receptacle with outer solid plastics box) may be used.		
<b>Special packing provision:</b> <b>PP76</b> 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.		

<b>P144 PACKING INSTRUCTION P144</b>		
The following packagings are authorized, provided the general packing provisions of <b>4.1.1</b> , <b>4.1.3</b> and special packing provisions of <b>4.1.5</b> are met:		
<b>Inner packagings</b>  <b>Receptacles</b> fibreboard metal Plastics wood  <b>Dividing partitions in the outer packagings</b>	<b>Intermediate packagings</b>  Not necessary	<b>Outer packagings</b>  <b>Boxes</b> steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary with metal liner (4C1) plywood (4D) with metal liner reconstituted wood (4F) with metal liner plastics, expanded (4H1) plastics, solid (4H2)  <b>Drums</b> steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plastics (1H1, 1H2)
<b>Special packing provision:</b> <b>PP77</b> 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****Type of packagings:** Cylinders, tubes, pressure drums and bundles of cylinders

Cylinders, tubes, pressure drums and bundles of cylinders are authorised provided the special packing provisions of 4.1.6, the provisions listed below under (1) to (9) and, when referred to in the column "Special packing provisions" of tables 1, 2 or 3, the relevant special packing provisions listed below under (10), are met.

**General**

- (1) Pressure receptacles shall be so closed and leakproof as to prevent escape of the gases;
- (2) Pressure receptacles containing toxic substances with an LC<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup> (ppm) as specified in the table shall not be equipped with any pressure relief device. Pressure relief devices shall be fitted on UN pressure receptacles used for the carriage of UN No. 1013 carbon dioxide and UN No. 1070 nitrous oxide;
- (3) 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 the classification code of the substance;
  - (b) the LC<sub>50</sub> 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;
 

*NOTE: For pressure receptacles which make use of composite materials, the maximum test period shall be 5 years. The test period may be extended to that specified in Tables 1 and 2 (i.e. up to 10 years), if approved by the competent authority or body designated by this authority which issued the type approval.*
  - (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.

**Test pressure, filling ratios and filling requirements**

- (4) The minimum test pressure required for is 1 MPa (10 bar);
- (5) 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 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, except where special packing provision "o" applies, provided that:

    - (i) the criterion of special packing provision "r" is met when applicable; or
    - (ii) the above criterion is met in all other cases.

For high pressure liquefied gases and gas mixtures for which relevant data are not available, 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 <sub>g</sub>	=	gas density (at 15 °C, 1 bar)(in kg/m <sup>3</sup> )
P <sub>h</sub>	=	minimum test pressure (in bar).

*(Cont'd on next page)*



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 =  $8.31451 \times 10^{-2}$  bar.l.mol<sup>-1</sup>.K<sup>-1</sup> (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 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 and gas mixtures for which relevant data are not available, the maximum filling ratio shall be determined as follows:

$$FR = (0.0032 \times BP - 0.24) \times d_1$$

where FR = maximum filling ratio  
 BP = boiling point (in Kelvin)  
 $d_1$  = density of the liquid at boiling point (in kg/l).

- (d) For UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free, see (10), special packing provision "p".
- (e) For liquefied gases charged with compressed gases, both components – the liquefied gas and the compressed gas – have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle.

The maximum mass of contents per litre of water capacity shall not exceed 0.95 times the density of the liquid phase at 50 °C; in addition, the liquid phase shall not completely fill the pressure receptacle at any temperature up to 60 °C.

When filled, the internal pressure at 65 °C shall not exceed the test pressure of the pressure receptacles. The vapour pressures and volumetric expansions of all substances in the pressure receptacles shall be considered. When experimental data is not available, the following steps shall be carried out:

- (i) Calculation of the vapour pressure of the liquefied gas and of the partial pressure of the compressed gas at 15 °C (filling temperature);
- (ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15 °C to 65 °C and calculation of the remaining volume for the gaseous phase;
- (iii) Calculation of the partial pressure of the compressed gas at 65 °C considering the volumetric expansion of the liquid phase;

**NOTE:** The compressibility factor of the compressed gas at 15 °C and 65 °C shall be considered.

- (iv) Calculation of the vapour pressure of the liquefied gas at 65 °C;
- (v) The total pressure is the sum of the vapour pressure of the liquefied gas and the partial pressure of the compressed gas at 65 °C;
- (vi) Consideration of the solubility of the compressed gas at 65 °C in the liquid phase;

The test pressure of the pressure receptacle shall not be less than the calculated total pressure minus 100 kPa (1bar).

If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (vi)) into account

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P200	PACKING INSTRUCTION (cont'd)	P200
(6)	Other test pressure and filling ratio may be used provided they satisfy the general requirements outlined in paragraphs (4) and (5) above;	
(7)	<p>(a) The filling of pressure receptacles may only be carried out by specially-equipped centres, with qualified staff using appropriate procedures.</p> <p>The procedures should include checks:</p> <ul style="list-style-type: none"> <li>– of the conformity of receptacles and accessories with ADR;</li> <li>– of their compatibility with the product to be carried;</li> <li>– of the absence of damage which might affect safety;</li> <li>– of compliance with the degree or pressure of filling, as appropriate;</li> <li>– of marks and identification.</li> </ul> <p>(b) LPG to be filled in cylinders shall be of high quality; this is deemed to be fulfilled if the LPG to be filled is in compliance with the limitations on corrosiveness as specified in ISO 9162:1989.</p>	
<b>Periodic inspections</b>		
(8)	Refillable pressure receptacles shall be subjected to periodic inspections in accordance with the requirements of 6.2.1.6 and 6.2.3.5 respectively.	
(9)	<p>If special provisions for certain substances do not appear in the tables below, periodic inspections shall be carried out:</p> <ul style="list-style-type: none"> <li>(a) Every 5 years in the case of pressure receptacles intended for the carriage of gases of classification codes 1T, 1TF, 1TO, 1TC, 1TFC, 1TOC, 2T, 2TO, 2TF, 2TC, 2TFC, 2TOC, 4A, 4F and 4TC;</li> <li>(b) Every 5 years in the case of pressure receptacles intended for the carriage of substances from other classes;</li> <li>(c) Every 10 years in the case of pressure receptacles intended for the carriage of gases of classification codes 1A, 1O, 1F, 2A, 2O and 2F.</li> </ul> <p>For pressure receptacles which make use of composite materials, the maximum test period shall be 5 years. The test period may be extended to that specified in Tables 1 and 2 (i.e. up to 10 years), if approved by the competent authority or body designated by this authority which issued the type approval.</p>	
<b>Special packing provisions</b>		
(10)	<b>Material compatibility</b>	
a:	Aluminium alloy pressure receptacles shall not be used.	
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 in accordance with 6.2.2.7.4 (p) are permitted.	

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**Requirements for toxic substances with an LC<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup> (ppm)**

- k: Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads that match those of the valve outlets and made of material not liable to attack by the contents of the pressure receptacle.

Each cylinder within a bundle shall be fitted with an individual valve that shall be closed during carriage. After filling, the manifold shall be evacuated, purged and plugged.

Bundles containing UN 1045 Fluorine, compressed, may be constructed with isolation valves on groups of cylinders not exceeding 150 litres total water capacity instead of isolation valves on every cylinder.

Cylinders and individual cylinders within a bundle shall 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. Individual cylinders not complying with this requirement shall be carried in a rigid outer packaging that will adequately protect the cylinder and its fittings and meeting the packing group I performance level. Pressure drums shall have a minimum wall thickness as specified by the competent authority.

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 be capable of withstanding the test pressure of the pressure receptacle and be connected directly to the pressure receptacle by either a taper thread or other means which meets the requirements of ISO 10692-2:2001.

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.

Carriage in capsules is not allowed.

Each pressure receptacle shall be tested for leakage after filling.

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*Gas specific provisions*

- l: UN No. 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 maximum net mass 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: Cylinders and individual cylinders in a bundle shall contain not more than 5 kg of the gas. When bundles containing UN 1045 Fluorine, compressed are divided into groups of cylinders in accordance with special packing provision "k" each group shall contain not more than 5 kg of the gas.
- o: In no case shall the working pressure or filling ratio shown in the tables be exceeded.
- p: For UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free: cylinders shall be filled with a homogeneous monolithic porous material; the working pressure and the quantity of acetylene shall not exceed the values prescribed in the approval or in ISO 3807-1:2000, ISO 3807-2:2000 or ISO 3807:2013, as applicable.

For UN No. 1001 acetylene, dissolved: cylinders shall contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000, ISO 3807-2:2000 or ISO 3807:2013 as applicable); cylinders fitted with pressure relief devices or manifolded together shall be carried vertically.

Alternatively, for UN No. 1001 acetylene, dissolved: cylinders which are not UN pressure receptacles may be filled with a non monolithic porous material; the working pressure, the quantity of acetylene and the quantity of solvent shall not exceed the values prescribed in the approval. The maximum test period for periodic inspection of the cylinders shall not exceed five years.

A test pressure of 52 bar shall be applied only to cylinders fitted with a fusible plug.

- q: Valve outlets 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 which shall be made of material not liable to attack by the contents of the pressure receptacle. 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 carriage, and the outlet of the manifold valve shall be fitted with a pressure retaining gas-tight plug or cap. Gas-tight plugs or caps shall have threads that match those of the valve outlets. Carriage in capsules is not allowed.
- r: The filling ratio of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the pressure receptacle.
- ra: This gas may also be packed in capsules under the following conditions:
- (a) The mass of gas shall not exceed 150 g per capsule;
  - (b) The capsules shall be free from faults liable to impair the strength;
  - (c) The leakproofness of the closure shall be ensured by an additional device (cap, crown, seal, binding, etc.) capable of preventing any leakage of the closure during carriage;
  - (d) The capsules shall be placed in an outer packaging of sufficient strength. A package shall not weigh more than 75 kg.

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P200	PACKING INSTRUCTION (cont'd)	P200
s:	<p>Aluminium alloy pressure receptacles shall be:</p> <ul style="list-style-type: none"> <li>- Equipped only with brass or stainless steel valves; and</li> <li>- Cleaned for hydrocarbons contamination and not contaminated with oil. UN pressure receptacles shall be cleaned in accordance with ISO 11621:1997.</li> </ul>	
ta:	<p>Other criteria may be used for filling of welded steel cylinders intended for the carriage of substances of UN No. 1965:</p> <ul style="list-style-type: none"> <li>(a) with the agreement of the competent authorities of the countries where the carriage is carried out; and</li> <li>(b) in compliance with the provisions of a national code or standard recognised by the competent authorities.</li> </ul> <p>When the criteria for filling are different from those in P200(5), the transport document shall include the statement "Carriage in accordance with packing instruction P200, special packing provision ta" and the indication of the reference temperature used for the calculation of the filling ratio.</p> <p><b>Periodic inspection</b></p>	
u:	<p>The interval between periodic tests may be extended to 10 years for aluminium alloy pressure receptacles. This derogation may only be applied to UN pressure receptacles when the alloy of the pressure receptacle has been subjected to stress corrosion testing as specified in ISO 7866:2012 + Cor 1: 2014.</p>	
ua:	<p>The interval between periodic tests may be extended to 15 years for aluminium alloy cylinders and bundles of such cylinders if the provisions of paragraph (13) of this packing instruction are applied. This shall not apply to cylinders made from aluminium alloy AA 6351. For mixtures, this provision "ua" may be applied provided all the individual gases in the mixture have been allocated "ua" in Table 1 or Table 2.</p>	
v:	<p>(1) The interval between inspections for steel cylinders, other than refillable welded steel cylinders for UN Nos. 1011, 1075, 1965, 1969 or 1978, may be extended to 15 years:</p> <ul style="list-style-type: none"> <li>(a) with the agreement of the competent authority (authorities) of the country (countries) where the periodic inspection and the carriage take place; and</li> <li>(b) in accordance with the requirements of a technical code or a standard recognised by the competent authority</li> </ul> <p>(2) For refillable welded steel cylinders for UN Nos. 1011, 1075, 1965, 1969 or 1978, the interval may be extended to 15 years, if the provisions of paragraph (12) of this packing instruction are applied.</p>	
va:	<p>For seamless steel cylinders which are equipped with residual pressure valves (RPVs) (see note below) that have been designed and tested in accordance with EN ISO 15996:2005 + A1:2007 <a href="#">pr EN ISO 15996:2017</a> and for bundles of seamless steel cylinders equipped with main valve(s) with a residual pressure device, tested in accordance with EN ISO 15996:2005 + A1:2007 <a href="#">pr EN ISO 15996:2017</a>, the interval between periodic tests may be extended to 15 years if the provisions of paragraph (13) of this packing instruction are applied. For mixtures, this provision "va" may be applied provided all the individual gases in the mixture have been allocated "va" in Table 1 or Table 2.</p> <p><b>NOTE:</b> "Residual Pressure Valve" (RPV) means a closure which incorporates a residual pressure device that prevents ingress of contaminants by maintaining a positive differential between the pressure within the cylinder and the valve outlet. In order to prevent back-flow of fluids into the cylinder from a higher pressure source a "Non-Return Valve" (NRV) function shall either be incorporated into the residual pressure device or be a discrete additional device in the cylinder valve, e.g. a regulator.</p>	

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**Requirements for N.O.S. entries 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 (5).
- Toxic substances with an  $LC_{50}$  less than or equal to  $200 \text{ ml/m}^3$  shall not be carried in tubes, pressure drums or MEGCs and shall meet the requirements of special packing provision "k". However, UN 1975 Nitric oxide and dinitrogen tetroxide mixture may be carried in pressure drums.
- 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 carriage. If necessary, stabilisation or addition of an inhibitor shall be required.
- Mixtures containing UN No. 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.
- Mixtures containing UN 2192 germane, other than mixtures of up to 35% germane in hydrogen or nitrogen or up to 28% germane in helium or argon, shall be filled to a pressure such that, if complete decomposition of the germane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded.

**Requirements for substances not in Class 2**

- ab: Pressure receptacles shall satisfy the following conditions:
- (i) The pressure test shall include an inspection of the inside of the pressure receptacles and check of accessories;
  - (ii) In addition resistance to corrosion shall be checked every two years by means of suitable instruments (e.g. ultrasound) and the condition of the accessories verified;
  - (iii) Wall thickness shall not be less than 3 mm.
- ac: Tests and inspections shall be carried out under the supervision of an expert approved by the competent authority.
- ad: Pressure receptacles shall satisfy the following conditions:
- (i) Pressure receptacles shall be designed for a design pressure of not less than 2.1 MPa (21 bar) (gauge pressure);
  - (ii) In addition to the marks for refillable receptacles, the pressure receptacles shall bear the following particulars in clearly legible and durable characters:
    - The UN number and the proper shipping name of the substance according to 3.1.2;
    - The maximum permitted mass when filled and the tare of the pressure receptacle, including accessories fitted during filling, or the gross mass.

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(11) The applicable requirements of this packing instruction are considered to have been complied with if the following standards, as relevant, are applied:

Applicable requirements	Reference	Title of document
(7)	EN 1919:2000	Transportable gas cylinders - Cylinders for gases (excluding acetylene and LPG) - Inspection at time of filling
(7)	EN 1920:2000	Transportable gas cylinders - Cylinders for compressed gases (excluding acetylene) - Inspection at time of filling
(7)	EN 13365:2002 +A1:2005	Transportable gas cylinders - Cylinder bundles for permanent and liquefied gases (excluding acetylene) - Inspection at the time of filling
(7)	EN ISO 24431:2016	Gas cylinders - Seamless, welded and composite cylinders for compressed and liquefied gases (excluding acetylene) - Inspection at time of filling
(7) (a)	ISO 10691:2004	Gas cylinders - Refillable welded steel cylinders for liquefied petroleum gas (LPG) - Procedures for checking before, during and after filling.
(7) (a)	ISO 11755:2005	Gas cylinders - Cylinder bundles for compressed and liquefied gases (excluding acetylene) - Inspection at time of filling
(7) (a)	ISO 24431:2006	Gas cylinders - Cylinders for compressed and liquefied gases (excluding acetylene) - Inspection at time of filling
(7) (a) and (10) p	ISO 11372:2011	Gas cylinders - Acetylene cylinders - Filling conditions and filling inspection <i>NOTE: The EN version of this ISO standard fulfils the requirements and may also be used.</i>
(07) (a) and (10) p	ISO 13088:2011	Gas cylinders - Acetylene cylinder bundles - Filling conditions and filling inspection <i>NOTE: The EN version of this ISO standard fulfils the requirements and may also be used.</i>
(7) and (10) ta (b)	EN 1439:2017 EN 1439:2008 (except 3.5 and Annex G)	LPG equipment and accessories - Procedures for checking LPG cylinders before, during and after filling
(7) and (10) ta (b)	EN 13952:2017	LPG equipment and accessories - Filling operations for LPG cylinders
(7) and (10) ta (b)	EN 14794:2005	LPG equipment and accessories - Transportable refillable aluminium cylinders for liquefied petroleum gas (LPG) - Procedure for checking before, during and after filling
(10) p	EN 12755:2000	Transportable gas cylinders - Filling conditions for acetylene bundles

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(12) An interval of 15 years for the periodic inspection of refillable welded steel cylinders may be granted in accordance with special packing provision v (2) of paragraph (10), if the following provisions are applied.

**1. General provisions**

1.1 For the application of this section, the competent authority shall not delegate its tasks and duties to Xb bodies (inspection bodies of type B) or IS bodies (in-house inspection services) (for the definitions of Xb and IS bodies, see 6.2.3.6.1).

1.2 The owner of the cylinders shall apply to the competent authority for granting the 15 year interval, and shall demonstrate that the requirements of sub-paragraphs 2, 3 and 4 are met.

1.3 Cylinders manufactured since 1 January 1999 shall have been manufactured in conformity with the following standards:

- EN 1442; or
- EN 13322-1; or
- Annex I, parts 1 to 3 to Council Directive 84/527/EEC<sup>a</sup>

as applicable according to the table in 6.2.4.

Other cylinders manufactured before 1 January 2009 in conformity with ADR in accordance with a technical code accepted by the national competent authority may be accepted for a 15 year interval, if they are of equivalent safety to the provisions of ADR as applicable at the time of application.

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<sup>a</sup> Council directive on the approximation of the laws of the Member States relating to welded unalloyed steel gas cylinders, published in the Official Journal of the European Communities No. L 300 of 19.11.1984.



1.4 The owner shall submit documentary evidence to the competent authority demonstrating that the cylinders comply with the provisions of sub-paragraph 1.3. The competent authority shall verify that these conditions are met.

1.5 The competent authority shall check whether the provisions of sub-paragraphs 2 and 3 are fulfilled and correctly applied. If all provisions are fulfilled, it shall authorise the 15-year interval for the cylinders. In this authorisation, the type of cylinder (as specified in the type approval) or a group of cylinders (see Note) covered shall be clearly identified. The authorisation shall be delivered to the owner; the competent authority shall keep a copy. The owner shall keep the documents for as long as the cylinders are authorised for a 15 year interval.

*NOTE: A group of cylinders is defined by the production dates of identical cylinders for a period, during which the applicable provisions of ADR and of the technical code accepted by the competent authority have not changed in their technical content. Example: Cylinders of identical design and volume having been manufactured according to the provisions of ADR as applicable between 1 January 1985 and 31 December 1988 in combination with a technical code accepted by the competent authority applicable for the same period, form one group in terms of the provisions of this paragraph.*

1.6 The competent authority shall monitor the owner of the cylinders for compliance with the provisions of ADR and the authorisation given as appropriate, but at least every three years or when changes to the procedures are introduced.

## 2. Operational provisions

2.1 Cylinders having been granted a 15 year interval for periodic inspection shall only be filled in filling centres applying a documented quality system to ensure that all the provisions of paragraph (7) of this packing instruction and the requirements and responsibilities of [EN 1439:2017](#) and [EN 13952:2017/EN 1439:2008](#) are fulfilled and correctly applied.

2.2 The competent authority shall verify that these requirements are fulfilled and check this as appropriate, but at least every three years or when changes to the procedures are introduced.

2.3 The owner shall provide documentary evidence to the competent authority that the filling centre complies with the provisions of sub-paragraph 2.1.

2.4 If a filling centre is situated in a different Contracting Party to ADR, the owner shall provide additional documentary evidence that the filling centre is monitored accordingly by the competent authority of that Contracting Party to ADR.

2.5 To prevent internal corrosion, only gases of high quality with very low potential contamination shall be filled into the cylinders. This is deemed to be fulfilled, if the gases conform to the limitations on corrosiveness as specified in ISO 9162:1989.

## 3. Provisions for qualification and periodic inspection

3.1 Cylinders of a type or group already in use, for which a 15 year interval has been granted and to which the 15 year interval has been applied, shall be subject to a periodic inspection according to 6.2.3.5.

*NOTE: For the definition of a group of cylinders, see Note to sub-paragraph 1.5.*

3.2 If a cylinder with a 15-year interval fails the hydraulic pressure test during a periodic inspection e.g. by bursting or leakage, the owner shall investigate and produce a report on the cause of the failure and if other cylinders (e.g. of the same type or group) are affected. In the latter case, the owner shall inform the competent authority. The competent authority shall then decide on appropriate measures and inform the competent authorities of all other Contracting Parties to ADR accordingly.

3.3 If internal corrosion as defined in the standard applied (see sub-paragraph 1.3) has been detected, the cylinder shall be withdrawn from use and shall not be granted any further period for filling and carriage.

3.4 Cylinders having been granted a 15 year interval shall only be fitted with valves designed and manufactured for a minimum 15 year period of use according to EN 13152:2001 + A1:2003, EN 13153:2001 + A1:2003, EN ISO 14245:2010 or EN ISO 15995:2010. After a periodic inspection, a new valve shall be fitted to the cylinder, except that manually operated valves, which have been refurbished or inspected according to EN 14912:2005 may be re-fitted, if they are suitable for another 15 year period of use. Refurbishment or inspection shall only be carried out by the manufacturer of the valves or according to his technical instruction by an enterprise qualified for such work and operating under a documented quality system.

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P200	PACKING INSTRUCTION (cont'd)	P200
4.	<p><b>Marking</b></p> <p>Cylinders having been granted a 15 year interval for periodic inspection in accordance with this paragraph shall additionally be marked clearly and legibly with "P15Y". This mark shall be removed if the cylinder is no longer authorised for a 15 year interval.</p> <p><i>NOTE: This mark shall not apply to cylinders subject to the transitional provision in 1.6.2.9, 1.6.2.10 or the provisions of special packing provision v (1) of paragraph (10) of this packing instruction.</i></p>	
(13)	<p>An interval of 15 years for the periodic inspection of seamless steel and aluminium alloy cylinders and bundles of such cylinders may be granted in accordance with special packing provisions ua or va of paragraph (10), if the following provisions are applied:</p> <p><b>1. General provisions</b></p> <p>1.1 For the application of this paragraph, the competent authority shall not delegate its tasks and duties to Xb bodies (inspection bodies of type B) or IS bodies (in-house inspection services) (for the definitions of Xb and IS bodies, see 6.2.3.6.1).</p> <p>1.2 The owner of the cylinders or bundles of cylinders shall apply to the competent authority for granting the 15 year interval, and shall demonstrate that the requirements of sub-paragraphs 2, 3 and 4 are met.</p> <p>1.3 Cylinders manufactured since 1 January 1999 shall have been manufactured in conformity with one of the following standards:</p> <ul style="list-style-type: none"> <li>- EN 1964-1 or EN 1964-2; or</li> <li>- EN 1975; or</li> <li>- EN ISO 9809-1 or EN ISO 9809-2; or</li> <li>- EN ISO 7866; or</li> <li>- Annex I, parts 1 to 3 to Council Directive 84/525/EEC<sup>b</sup> and 84/526/EEC<sup>c</sup> as applicable at the time of manufacture (see also the table in 6.2.4.1).</li> </ul> <p>Other cylinders manufactured before 1 January 2009 in conformity with ADR in accordance with a technical code accepted by the national competent authority may be accepted for a 15 year interval for periodic inspection, if they are of equivalent safety to the provisions of ADR as applicable at the time of application.</p> <p><i>NOTE: This provision is considered to be fulfilled if the cylinder has been reassessed according to the procedure for the reassessment of conformity described in Annex III of Directive 2010/35/EU of 16 June 2010 or Annex IV, Part II, of Directive 1999/36/EC of 29 April 1999.</i></p> <p>Cylinders and bundles of cylinders marked with the United Nations packaging symbol specified in 6.2.2.7.2 (a) shall not be granted a 15 year interval for periodic inspection.</p> <p>1.4 Bundles of cylinders shall be constructed such that contact between cylinders along the longitudinal axis of the cylinders does not result in external corrosion. The supports and restraining straps shall be such as to minimise the risk of corrosion to the cylinders. Shock absorbent materials used in supports shall only be allowed if they have been treated to eliminate water absorption. Examples of suitable materials are water resistant belting and rubber.</p> <p>1.5 The owner shall submit documentary evidence to the competent authority demonstrating that the cylinders comply with the provisions of sub-paragraph 1.3. The competent authority shall verify that these conditions are met.</p>	

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<sup>b</sup> Council Directive on the approximation of the laws of the Member States relating to seamless, steel gas cylinders, published in the Official Journal of the European Communities No. L 300 of 19.11.1984.

<sup>c</sup> Council Directive on the approximation of the laws of the Member States relating to seamless, unalloyed aluminium and aluminium alloy gas cylinders, published in the Official Journal of the European Communities No. L 300 of 19.11.1984.

1.6 The competent authority shall check whether the provisions of sub-paragraphs 2 and 3 are fulfilled and correctly applied. If all provisions are fulfilled, it shall authorise the 15 year interval for periodic inspection for the cylinders or bundles of cylinders. In this authorisation a group of cylinders (see NOTE below) covered shall be clearly identified. The authorisation shall be delivered to the owner; the competent authority shall keep a copy. The owner shall keep the documents for as long as the cylinders are authorised for a 15 year interval.

*NOTE: A group of cylinders is defined by the production dates of identical cylinders for a period, during which the applicable provisions of ADR and of the technical code accepted by the competent authority have not changed in their technical content. Example: Cylinders of identical design and volume having been manufactured according to the provisions of ADR applicable between 1 January 1985 and 31 December 1988 in combination with a technical code accepted by the competent authority applicable for the same period form one group in terms of the provisions of this paragraph.*

1.7 The owner shall ensure compliance with the provisions of ADR and the authorisation given as appropriate and shall demonstrate this to the competent authority on request but at least every three years or when significant changes to the procedures are introduced.

## 2. Operational provisions

2.1 Cylinders or bundles of cylinders having been granted a 15 year interval for periodic inspection shall only be filled in filling centres applying a documented and certified quality system to ensure that all the provisions of paragraph (7) of this packing instruction and the requirements and responsibilities of [EN ISO 24431:2016](#), [EN 1919:2000](#), [EN 1920:2000](#) or EN 13365:2002 as applicable are fulfilled and correctly applied. The quality system, according to the ISO 9000 (series) or equivalent, shall be certified by an accredited independent body recognized by the competent authority. This includes procedures for pre- and post-fill inspections and the filling process for cylinders, bundles of cylinders and valves.

2.2 Aluminium alloy cylinders and bundles of such cylinders without RPVs having been granted a 15 year interval for periodic inspection shall be checked prior to every fill in accordance with a documented procedure which shall at least include the following:

- Open the cylinder valve or the main valve of the bundle of cylinders to check for residual pressure;
- If gas is emitted, the cylinder or bundle of cylinders may be filled;
- If no gas is emitted, the internal condition of the cylinder or bundle of cylinders shall be checked for contamination;
- If no contamination is detected, the cylinder or bundle of cylinders may be filled.

If contamination is detected corrective action is to be carried out.

2.3 Seamless steel cylinders fitted with RPVs and bundles of seamless steel cylinders equipped with main valve(s) with a residual pressure device having been granted a 15 year interval for periodic inspection shall be checked prior to every fill in accordance with a documented procedure which shall at least include the following:

- Open the cylinder valve or bundle of cylinders main valve to check for residual pressure;
- If gas is emitted, the cylinder or bundle of cylinders may be filled;
- If no gas is emitted the functioning of the residual pressure device shall be checked;
- If the check shows that the residual pressure device has retained pressure the cylinder or bundle of cylinders may be filled;
- If the check shows that the residual pressure device has not retained pressure, the internal condition of the cylinder or bundle of cylinders shall be checked for contamination:
  - If no contamination is detected, the cylinder or bundle of cylinders may be filled following repair or replacement of the residual pressure device;
  - If contamination is detected, a corrective action shall be carried out.

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**P200**

**PACKING INSTRUCTION (cont'd)**

**P200**

2.4 To prevent internal corrosion, only gases of high quality with very low potential contamination shall be filled into cylinders or bundles of cylinders. This is deemed to be fulfilled, if the compatibility of gases/material is acceptable in accordance with EN ISO 11114-1:2012 and EN 11114-2:2013, and the gas quality meets the specifications in EN ISO 14175:2008 or, for gases not covered in the standard, a minimum purity of 99.5% by volume and a maximum moisture content of 40 ml/m<sup>3</sup>(ppm). For nitrous oxide the values shall be a minimum purity of 98% by volume and a maximum moisture content of 70 ml/m<sup>3</sup> (ppm).

2.5 The owner shall ensure that the requirements of 2.1 to 2.4 are fulfilled and provide documentary evidence of this to the competent authority on request, but at least every three years or when significant changes to the procedures are introduced.

2.6 If a filling centre is situated in a different Contracting Party to ADR, the owner shall provide to the competent authority, on request, additional documentary evidence that the filling centre is monitored accordingly by the competent authority of that Contracting Party to ADR. See also 1.2.

**3. Provisions for qualification and periodic inspection**

3.1 Cylinders and bundles of cylinders already in use, for which the conditions of sub-paragraph 2 have been met from the date of the last periodic inspection to the satisfaction of the competent authority, may have their inspection period extended to 15 years from the date of the last periodic inspection. Otherwise the change of test period from ten to fifteen years shall be made at the time of periodic inspection. The periodic inspection report shall indicate that this cylinder or bundle of cylinders shall be fitted with a residual pressure device as appropriate. Other documentary evidence may be accepted by the competent authority.

3.2 If a cylinder with a 15 year interval fails the pressure test by bursting or leakage or if a severe defect is detected by a non-destructive test (NDT) during a periodic inspection the owner shall investigate and produce a report on the cause of the failure and if other cylinders (e.g. of the same type or group) are affected. In the latter case, the owner shall inform the competent authority. The competent authority shall then decide on appropriate measures and inform the competent authorities of all other Contracting Parties to ADR accordingly.

3.3 If internal corrosion and other defects as defined in the periodic inspection standards referenced in 6.2.4 have been detected, the cylinder shall be withdrawn from use and shall not be granted any further period for filling and carriage.

3.4 Cylinders or bundles of cylinders having been granted a 15 year interval for periodic inspection shall only be fitted with valves designed and tested according to EN 849 or EN ISO 10297 as applicable at the time of manufacture (see also the table in 6.2.4.1). After a periodic inspection a new valve shall be fitted, except that valves which have been refurbished or inspected according to EN ISO 22434:2011 may be re-fitted.

**4. Marking**

Cylinders and bundles of cylinders having been granted a 15 year interval for periodic inspection in accordance with this paragraph shall have the date (year) of the next periodic inspection as required in section 5.2.1.6 (c) and at the same time additionally be marked clearly and legibly with "P15Y". This mark shall be removed if the cylinder or bundle of cylinders is no longer authorised for a 15 year interval for periodic inspection.

*(Cont'd on next page)*

P200 PACKING INSTRUCTION (cont'd) P200											
Table 1: COMPRESSED GASES											
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar <sup>b</sup>	Maximum working pressure, bar <sup>b</sup>	Special packing provisions
1002	AIR, COMPRESSED	1A		X	X	X	X	10			ua, va
1006	ARGON, COMPRESSED	1A		X	X	X	X	10			ua, va
1016	CARBON MONOXIDE, COMPRESSED	1TF	3760	X	X	X	X	5			u
1023	COAL GAS, COMPRESSED	1TF		X	X	X	X	5			
1045	FLUORINE, COMPRESSED	1TOC	185	X			X	5	200	30	a, k, n, o
1046	HELIUM, COMPRESSED	1A		X	X	X	X	10			ua, va
1049	HYDROGEN, COMPRESSED	1F		X	X	X	X	10			d, ua, va
1056	KRYPTON, COMPRESSED	1A		X	X	X	X	10			ua, va
1065	NEON, COMPRESSED	1A		X	X	X	X	10			ua, va
1066	NITROGEN, COMPRESSED	1A		X	X	X	X	10			ua, va
1071	OIL GAS, COMPRESSED	1TF		X	X	X	X	5			
1072	OXYGEN, COMPRESSED	1O		X	X	X	X	10			s, ua, va
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	1T		X	X	X	X	5			z
1660	NITRIC OXIDE, COMPRESSED	1TOC	115	X			X	5	225	33	k, o
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	1TF	≤ 5000	X	X	X	X	5			z
1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	1F		X	X	X	X	10			z, ua, va
1955	COMPRESSED GAS, TOXIC, N.O.S.	1T	≤ 5000	X	X	X	X	5			z
1956	COMPRESSED GAS, N.O.S.	1A		X	X	X	X	10			z, ua, va
1957	DEUTERIUM, COMPRESSED	1F		X	X	X	X	10			d, ua, va
1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	1F		X	X	X	X	10			z, ua, va
1971	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content	1F		X	X	X	X	10			ua, va
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	1F		X	X	X	X	10			d, ua, va
2190	OXYGEN DIFLUORIDE, COMPRESSED	1TOC	2.6	X			X	5	200	30	a, k, n, o
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	1O		X	X	X	X	10			z, ua, va

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 1: COMPRESSED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar <sup>b</sup>	Maximum working pressure, bar <sup>b</sup>	Special packing provisions		
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	1TO	≤ 5000	X	X	X	X	5			z		
3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	1TC	≤ 5000	X	X	X	X	5			z		
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	1TFC	≤ 5000	X	X	X	X	5			z		
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	1TOC	≤ 5000	X	X	X	X	5			z		

<sup>a</sup> Not applicable for pressure receptacles made of composite materials.

<sup>b</sup> Where the entries are blank, the working pressure shall not exceed two thirds of the test pressure.

P200		PACKING INSTRUCTION (cont'd)								P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES											
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions
1001	ACETYLENE, DISSOLVED	4F		X			X	10	60		c, p
1005	AMMONIA, ANHYDROUS	2TC	4000	X	X	X	X	5	29	0.54	b, ra
1008	BORON TRIFLUORIDE	2TC	387	X	X	X	X	5	225 300	0.715 0.86	a
1009	BROMOTRIFLUORO-METHANE (REFRIGERANT GAS R 13B1)	2A		X	X	X	X	10	42 120 250	1.13 1.44 1.60	ra ra ra
1010	BUTADIENES, STABILIZED (1,2-butadiene) or	2F		X	X	X	X	10	10	0.59	ra
1010	BUTADIENES, STABILIZED (1,3-butadiene) or	2F		X	X	X	X	10	10	0.55	ra
1010	BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED	2F		X	X	X	X	10	10	0.50	ra, v, z
1011	BUTANE	2F		X	X	X	X	10	10	0.52	ra, v
1012	BUTYLENES MIXTURES or	2F		X	X	X	X	10	10	0.50	ra, z
1012	1-BUTYLENE or	2F		X	X	X	X	10	10	0.53	
1012	CIS-2-BUTYLENE or	2F		X	X	X	X	10	10	0.55	
1012	TRANS-2 BUTYLENE	2F		X	X	X	X	10	10	0.54	
1013	CARBON DIOXIDE	2A		X	X	X	X	10	190 250	0.68 0.76	ra, ua, va ra, ua, va
1017	CHLORINE	2TOC	293	X	X	X	X	5	22	1.25	a, ra
1018	CHLORODIFLUORO-METHANE (REFRIGERANT GAS R 22)	2A		X	X	X	X	10	27	1.03	ra
1020	CHLOROPENTAFLUORO-ETHANE (REFRIGERANT GAS R 115)	2A		X	X	X	X	10	25	1.05	ra
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2A		X	X	X	X	10	11	1.20	ra
1022	CHLOROTRIFLUORO-METHANE (REFRIGERANT GAS R 13)	2A		X	X	X	X	10	100 120 190 250	0.83 0.90 1.04 1.11	ra ra ra ra
1026	CYANOGEN	2TF	350	X	X	X	X	5	100	0.70	ra, u
1027	CYCLOPROPANE	2F		X	X	X	X	10	18	0.55	ra
1028	DICHLORODIFLUORO-METHANE (REFRIGERANT GAS R 12)	2A		X	X	X	X	10	16	1.15	ra
1029	DICHLOROFLUORO-METHANE (REFRIGERANT GAS R 21)	2A		X	X	X	X	10	10	1.23	ra
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2F		X	X	X	X	10	16	0.79	ra

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions		
1032	DIMETHYLAMINE, ANHYDROUS	2F		X	X	X	X	10	10	0.59	b, ra		
1033	DIMETHYL ETHER	2F		X	X	X	X	10	18	0.58	ra		
1035	ETHANE	2F		X	X	X	X	10	95 120 300	0.25 0.30 0.40	ra ra ra		
1036	ETHYLAMINE	2F		X	X	X	X	10	10	0.61	b, ra		
1037	ETHYL CHLORIDE	2F		X	X	X	X	10	10	0.80	a, ra		
1039	ETHYL METHYL ETHER	2F		X	X	X	X	10	10	0.64	ra		
1040	ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C	2TF	2900	X	X	X	X	5	15	0.78	l, ra		
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	2F		X	X	X	X	10	190 250	0.66 0.75	ra ra		
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	4A		X		X	X	5			b, z		
1048	HYDROGEN BROMIDE, ANHYDROUS	2TC	2860	X	X	X	X	5	60	1.51	a, d, ra		
1050	HYDROGEN CHLORIDE, ANHYDROUS	2TC	2810	X	X	X	X	5	100 120 150 200	0.30 0.56 0.67 0.74	a, d, ra a, d, ra a, d, ra a, d, ra		
1053	HYDROGEN SULPHIDE	2TF	712	X	X	X	X	5	48	0.67	d, ra, u		
1055	ISOBUTYLENE	2F		X	X	X	X	10	10	0.52	ra		
1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2A		X	X	X	X	10			ra, z		
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED	2F		X	X	X	X	10			c, ra, z		
	Propadiene with 1% to 4% methylacetylene	2F		X	X	X	X	10	22	0.52	c, ra		
	Mixture P1	2F		X	X	X	X	10	30	0.49	c, ra		
	Mixture P2	2F		X	X	X	X	10	24	0.47	c, ra		
1061	METHYLAMINE, ANHYDROUS	2F		X	X	X	X	10	13	0.58	b, ra		
1062	METHYL BROMIDE with not more than 2% chloropicrin	2T	850	X	X	X	X	5	10	1.51	a		
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2F		X	X	X	X	10	17	0.81	a, ra		



P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions		
1064	METHYL MERCAPTAN	2TF	1350	X	X	X	X	5	10	0.78	d, ra, u		
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2TOC	115	X		X	X	5	10	1.30	k		
1069	NITROSYL CHLORIDE	2TC	35	X			X	5	13	1.10	k, ra		
1070	NITROUS OXIDE	2O		X	X	X	X	10	180 225 250	0.68 0.74 0.75	ua, va ua, va ua, va		
1075	PETROLEUM GASES, LIQUEFIED	2F		X	X	X	X	10			v, z		
1076	PHOSGENE	2TC	5	X		X	X	5	20	1.23	a, k, ra		
1077	PROPYLENE	2F		X	X	X	X	10	27	0.43	ra		
1078	REFRIGERANT GAS, N.O.S.	2A		X	X	X	X	10			ra, z		
	Mixture F1	2A		X	X	X	X	10	12	1.23			
	Mixture F2	2A		X	X	X	X	10	18	1.15			
	Mixture F3	2A		X	X	X	X	10	29	1.03			
1079	SULPHUR DIOXIDE	2TC	2520	X	X	X	X	5	12	1.23	ra		
1080	SULPHUR HEXAFLUORIDE	2A		X	X	X	X	10	70	1.06	ra, ua, va		
									140	1.34	ra, ua, va		
									160	1.38	ra, ua, va		
1081	TETRAFLUROETHYLENE, STABILIZED	2F		X	X	X	X	10	200		m, o, ra		
1082	TRIFLUOROCHLOROETHYLENE, STABILIZED (REFRIGERANT GAS R1113)	2TF	2000	X	X	X	X	5	19	1.13	ra, u		
1083	TRIMETHYLAMINE, ANHYDROUS	2F		X	X	X	X	10	10	0.56	b, ra		
1085	VINYL BROMIDE, STABILIZED	2F		X	X	X	X	10	10	1.37	a, ra		
1086	VINYL CHLORIDE, STABILIZED	2F		X	X	X	X	10	12	0.81	a, ra		
1087	VINYL METHYL ETHER, STABILIZED	2F		X	X	X	X	10	10	0.67	ra		
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	2T	850	X	X	X	X	5	10	1.51	a		
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2T	<sup>d</sup>	X	X	X	X	5	17	0.81	a		
1589	CYANOGEN CHLORIDE, STABILIZED	2TC	80	X			X	5	20	1.03	k		
1741	BORON TRICHLORIDE	2TC	2541	X	X	X	X	5	10	1.19	a, ra		
1749	CHLORINE TRIFLUORIDE	2TOC	299	X	X	X	X	5	30	1.40	a		
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2A		X	X	X	X	10	22	1.11	ra		

P200		PACKING INSTRUCTION (cont'd)									P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES												
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions	
1859	SILICON TETRAFLUORIDE	2TC	450	X	X	X	X	5	200 300	0.74 1.10	a	
1860	VINYL FLUORIDE, STABILIZED	2F		X	X	X	X	10	250	0.64	a, ra	
1911	DIBORANE	2TF	80	X			X	5	250	0.07	d, k, o	
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2F		X	X	X	X	10	17	0.81	a, ra	
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2A		X	X	X	X	10	190 250	0.66 0.75	ra ra	
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2A		X	X	X	X	10	10	1.30	ra	
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2F		X	X	X	X	10	250	0.77	ra	
1962	ETHYLENE	2F		X	X	X	X	10	225 300	0.34 0.38		
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	2F		X	X	X	X	10		<sup>b</sup>	ra, ta, v, z	
	Mixture A	2F						10	10	0.50		
	Mixture A01	2F						10	15	0.49		
	Mixture A02	2F						10	15	0.48		
	Mixture A0	2F						10	15	0.47		
	Mixture A1	2F						10	20	0.46		
	Mixture B1	2F						10	25	0.45		
	Mixture B2	2F						10	25	0.44		
	Mixture B	2F						10	25	0.43		
Mixture C	2F						10	30	0.42			
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2T		X	X	X	X	5			z	
1968	INSECTICIDE GAS, N.O.S.	2A		X	X	X	X	10			ra, z	
1969	ISOBUTANE	2F		X	X	X	X	10	10	0.49	ra, v	
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2A		X	X	X	X	10	31	1.01	ra	
1974	CHLORODIFLUOROBROMOMETHANE (REFRIGERANT GAS R 12B1)	2A		X	X	X	X	10	10	1.61	ra	

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions		
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	2TOC	115	X		X	X	5			k, z		
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	2A		X	X	X	X	10	11	1.32	ra		
1978	PROPANE	2F		X	X	X	X	10	23	0.43	ra, v		
1982	TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)	2A		X	X	X	X	10	200 300	0.71 0.90			
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	2A		X	X	X	X	10	10	1.18	ra		
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2A		X	X	X	X	10	190 250	0.88 0.96	ra ra		
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2F		X	X	X	X	10	35	0.73	ra		
2036	XENON	2A		X	X	X	X	10	130	1.28			
2044	2,2-DIMETHYLPROPANE	2F		X	X	X	X	10	10	0.53	ra		
2073	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water,	4A											
	with more than 35% but not more than 40% ammonia	4A		X	X	X	X	5	10	0.80	b		
	with more than 40% but not more than 50% ammonia	4A		X	X	X	X	5	12	0.77	b		
2188	ARSINE	2TF	20	X			X	5	42	1.10	d, k		
2189	DICHLOROSILANE	2TFC	314	X	X	X	X	5	10 200	0.90 1.08	a		
2191	SULPHURYL FLUORIDE	2T	3020	X	X	X	X	5	50	1.10	u		
2192	GERMANE <sup>c</sup>	2TF	620	X	X	X	X	5	250	0.064	d, ra, r, q		
2193	HEXAFLUROETHANE (REFRIGERANT GAS R 116)	2A		X	X	X	X	10	200	1.13			
2194	SELENIUM HEXAFLUORIDE	2TC	50	X			X	5	36	1.46	k, ra		
2195	TELLURIUM HEXAFLUORIDE	2TC	25	X			X	5	20	1.00	k, ra		
2196	TUNGSTEN HEXAFLUORIDE	2TC	160	X			X	5	10	3.08	a, k, ra		
2197	HYDROGEN IODIDE, ANHYDROUS	2TC	2860	X	X	X	X	5	23	2.25	a, d, ra		
2198	PHOSPHORUS PENTAFLUORIDE	2TC	190	X			X	5	200 300	0.90 1.25	k k		
2199	PHOSPHINE <sup>c</sup>	2TF	20	X			X	5	225 250	0.30 0.45	d, k, q, ra d, k, q, ra		
2200	PROPADIENE, STABILIZED	2F		X	X	X	X	10	22	0.50	ra		

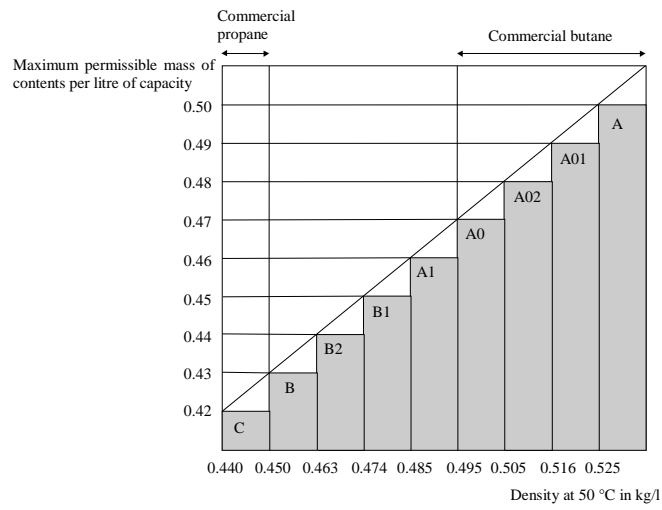
P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions		
2202	HYDROGEN SELENIDE, ANHYDROUS	2TF	2	X			X	5	31	1.60	k		
2203	SILANE <sup>c</sup>	2F		X	X	X	X	10	225 250	0.32 0.36	q q		
2204	CARBONYL SULPHIDE	2TF	1700	X	X	X	X	5	30	0.87	ra, u		
2417	CARBONYL FLUORIDE	2TC	360	X	X	X	X	5	200 300	0.47 0.70			
2418	SULPHUR TETRAFLUORIDE	2TC	40	X			X	5	30	0.91	a, k, ra		
2419	BROMOTRIFLUORO-ETHYLENE	2F		X	X	X	X	10	10	1.19	ra		
2420	HEXAFLUOROACETONE	2TC	470	X	X	X	X	5	22	1.08	ra		
2421	NITROGEN TRIOXIDE	2TOC	CARRIAGE PROHIBITED										
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2A		X	X	X	X	10	12	1.34	ra		
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2A		X	X	X	X	10	25	1.04	ra		
2451	NITROGEN TRIFLUORIDE	2O		X	X	X	X	10	200	0.50			
2452	ETHYLACETYLENE, STABILIZED	2F		X	X	X	X	10	10	0.57	c, ra		
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2F		X	X	X	X	10	30	0.57	ra		
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2F		X	X	X	X	10	300	0.63	ra		
2455	METHYL NITRITE	2A	CARRIAGE PROHIBITED										
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2F		X	X	X	X	10	10	0.99	ra		
2534	METHYLCHLOROSILANE	2TFC	600	X	X	X	X	5			ra, z		
2548	CHLORINE PENTAFLUORIDE	2TOC	122	X			X	5	13	1.49	a, k		
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	2A		X	X	X	X	10	31	0.12	ra		
									42	0.17	ra		
									100	0.64	ra		
2601	CYCLOBUTANE	2F		X	X	X	X	10	10	0.63	ra		
2602	DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	2A		X	X	X	X	10	22	1.01	ra		
2676	STIBINE	2TF	20	X			X	5	200	0.49	k, ra, r		
2901	BROMINE CHLORIDE	2TOC	290	X	X	X	X	5	10	1.50	a		

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions		
3057	TRIFLUOROACETYL CHLORIDE	2TC	10	X		X	X	5	17	1.17	k, ra		
3070	ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12,5% ethylene oxide	2A		X	X	X	X	10	18	1.09	ra		
3083	PERCHLORYL FLUORIDE	2TO	770	X	X	X	X	5	33	1.21	u		
3153	PERFLUORO(METHYL VINYL ETHER)	2F		X	X	X	X	10	20	0.75	ra		
3154	PERFLUORO(ETHYL VINYL ETHER)	2F		X	X	X	X	10	10	0.98	ra		
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2O		X	X	X	X	10			z		
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	2A		X	X	X	X	10	18	1.05	ra		
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2TF	≤ 5000	X	X	X	X	5			ra, z		
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2F		X	X	X	X	10			ra, z		
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2T	≤ 5000	X	X	X	X	5			z		
3163	LIQUEFIED GAS, N.O.S.	2A		X	X	X	X	10			ra, z		
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2A		X	X	X	X	10	49 35	0.95 0.87	ra ra		
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2F		X	X	X	X	10	48	0.78	ra		
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2A		X	X	X	X	10	13	1.21	ra		
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE with not more than 8.8% ethylene oxide	2A		X	X	X	X	10	10	1.16	ra		
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	2A		X	X	X	X	10	26	1.02	ra		
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	2A		X	X	X	X	10	17	1.03	ra		
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2TF	More than 2900	X	X	X	X	5	28	0.73	ra		
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2TO	≤ 5000	X	X	X	X	5			z		

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions		
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2TC	≤ 5000	X	X	X	X	5			ra, z		
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2TFC	≤ 5000	X	X	X	X	5			ra, z		
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2TOC	≤ 5000	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	4TC		X	X	X	X	5			b		
3337	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane)	2A		X	X	X	X	10	36	0.82	ra		
3338	REFRIGERANT GAS R 407A (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane)	2A		X	X	X	X	10	32	0.94	ra		
3339	REFRIGERANT GAS R 407B (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane)	2A		X	X	X	X	10	33	0.93	ra		
3340	REFRIGERANT GAS R 407C (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 23% difluoromethane and 25% pentafluoroethane)	2A		X	X	X	X	10	30	0.95	ra		
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S	2F		X	X	X	X	10			ra, z		
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2TF		X	X	X	X	5			ra, z		
3374	ACETYLENE, SOLVENT FREE	2F		X			X	5	60		c, p		

<sup>a</sup> Not applicable for pressure receptacles made of composite materials.

b For mixtures of UN No. 1965, the maximum permissible filling mass per litre of capacity is as follows:



c Considered as pyrophoric.

d Considered to be toxic. The  $LC_{50}$  value still to be determined.

P200 PACKING INSTRUCTION (cont'd) P200												
Table 3: SUBSTANCES NOT IN CLASS 2												
UN No.	Name and description	Class	Classification Code	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period, years <sup>a</sup>	Test pressure, bar	Filling ratio	Special packing provisions
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	TF1	40	X			X	5	100	0.55	k
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	CT1	966	X		X	X	5	10	0.84	a, ab, ac
1745	BROMINE PENTAFLUORIDE	5.1	OTC	25	X		X	X	5	10	<sup>b</sup>	k, ab, ad
1746	BROMINE TRIFLUORIDE	5.1	OTC	50	X		X	X	5	10	<sup>b</sup>	k, ab, ad
2495	IODINE PENTAFLUORIDE	5.1	OTC	120	X		X	X	5	10	<sup>b</sup>	k, ab, ad

<sup>a</sup> Not applicable for pressure receptacles made of composite materials.

<sup>b</sup> A minimum ullage of 8% by volume is required.

P201 PACKING INSTRUCTION P201	
This instruction applies to UN Nos. 3167, 3168 and 3169.	
The following packagings are authorized:	
(1)	Cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the competent authority.
(2)	The following combination packagings provided that the general provisions of 4.1.1 and 4.1.3 are met: Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Inner packagings: (a) For non-toxic gases, hermetically sealed inner packagings of glass or metal with a maximum capacity of 5 litres per package; (b) For toxic gases, hermetically sealed inner packagings of glass or metal with a maximum capacity of 1 litre per package. Packagings shall conform to the packing group III performance level.



<b>P202</b>	<b>PACKING INSTRUCTION</b>	<b>P202</b>
<i>(Reserved)</i>		

<b>P203</b>	<b>PACKING INSTRUCTION</b>	<b>P203</b>
This instruction applies to Class 2 refrigerated liquefied gases.		
<b>Requirements for closed cryogenic receptacles:</b>		
(1) The special packing provisions of 4.1.6 shall be met.		
(2) The requirements of Chapter 6.2 shall be met.		
(3) The closed cryogenic receptacles shall be so insulated that they do not become coated with frost.		
(4) Test pressure		
Refrigerated liquids shall be filled in closed cryogenic receptacles with the following minimum test pressures:		
(a) For closed cryogenic receptacles with vacuum insulation, the test pressure shall not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar);		
(b) For other closed cryogenic receptacles, the test pressure shall be not less than 1.3 times the maximum internal pressure of the filled receptacle, taking into account the pressure developed during filling and discharge.		
(5) Degree of filling		
For non-flammable, non-toxic refrigerated liquefied gases (classification codes 3A and 3O) the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) shall not exceed 98% of the water capacity of the pressure receptacle.		
For flammable refrigerated liquefied gases (classification code 3F) the degree of filling shall remain below the level at which, if the contents were raised to the temperature at which the vapour pressure equalled the opening pressure of the relief valve, the volume of the liquid phase would reach 98% of the water capacity at that temperature.		
(6) Pressure-relief devices		
Closed cryogenic receptacles shall be fitted with at least one pressure-relief device.		
(7) Compatibility		
Materials used to ensure the leakproofness of the joints or for the maintenance of the closures shall be compatible with the contents. In the case of receptacles intended for the carriage of oxidizing gases (classification code 3O), these materials shall not react with these gases in a dangerous manner.		
(8) Periodic inspection		
(a) The periodic inspection and test frequencies of pressure relief valves in accordance with 6.2.1.6.3 shall not exceed five years.		
(b) The periodic inspection and test frequencies of non-UN closed cryogenic receptacles in accordance with 6.2.3.5.2 shall not exceed 10 years.		

*(Cont'd on next page)*

P203	PACKING INSTRUCTION ( <i>cont'd</i> )	P203
<b>Requirements for open cryogenic receptacles:</b>		
Only the following non oxidizing refrigerated liquefied gases of classification code 3A may be carried in open cryogenic receptacles: UN Nos. 1913, 1951, 1963, 1970, 1977, 2591, 3136 and 3158.		
Open cryogenic receptacles shall be constructed to meet the following requirements:		
<ol style="list-style-type: none"> <li>(1) The receptacles shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during their normal use and during normal conditions of carriage.</li> <li>(2) The capacity shall be not more than 450 litres.</li> <li>(3) The receptacle shall have a double wall construction with the space between the inner and outer wall being evacuated (vacuum insulation). The insulation shall prevent the formation of hoar frost on the exterior of the receptacle.</li> <li>(4) The materials of construction shall have suitable mechanical properties at the service temperature.</li> <li>(5) Materials which are in direct contact with the dangerous goods shall not be affected or weakened by the dangerous goods intended to be carried and shall not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods.</li> <li>(6) Receptacles of glass double wall construction shall have an outer packaging with suitable cushioning or absorbent materials which withstand the pressures and impacts liable to occur under normal conditions of carriage.</li> <li>(7) The receptacle shall be designed to remain in an upright position during carriage, e.g. have a base whose smaller horizontal dimension is greater than the height of the centre of gravity when filled to capacity or be mounted on gimbals.</li> <li>(8) The openings of the receptacles shall be fitted with devices allowing gases to escape, preventing any splashing out of liquid, and so configured that they remain in place during carriage.</li> <li>(9) Open cryogenic receptacles shall bear the following marks permanently affixed e.g. by stamping, engraving or etching: <ul style="list-style-type: none"> <li>- The manufacturer's name and address;</li> <li>- The model number or name;</li> <li>- The serial or batch number;</li> <li>- The UN number and proper shipping name of gases for which the receptacle is intended;</li> <li>- The capacity of the receptacle in litres.</li> </ul> </li> </ol>		

P204	PACKING INSTRUCTION	P204
<i>(Deleted)</i>		

P205	PACKING INSTRUCTION	P205
This instruction applies to UN No. 3468.		
<ol style="list-style-type: none"> <li>(1) For metal hydride storage systems, the special packing provisions of 4.1.6 shall be met.</li> <li>(2) Only pressure receptacles not exceeding 150 litres in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.</li> <li>(3) Metal hydride storage systems meeting the applicable requirements for the construction and testing of pressure receptacles containing gas of Chapter 6.2 are authorised for the carriage of hydrogen only.</li> <li>(4) When steel pressure receptacles or composite pressure receptacles with steel liners are used, only those bearing the "H" mark, in accordance with 6.2.2.9.2 (j) shall be used.</li> <li>(5) Metal hydride storage systems shall meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008 (Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride) and their conformity and approval shall be assessed in accordance with 6.2.2.5.</li> <li>(6) Metal hydride storage systems shall be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent mark on the system as specified by ISO 16111:2008.</li> <li>(7) The periodic test requirements for a metal hydride storage system shall be in accordance with ISO 16111:2008 and carried out in accordance with 6.2.2.6, and the interval between periodic inspections shall not exceed five years.</li> </ol>		

P206	PACKING INSTRUCTION	P206
This instruction applies to UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505.		
Unless otherwise indicated in ADR, cylinders and pressure drums conforming to the applicable requirements of Chapter 6.2 are authorized.		
<p>(1) The special packing provisions of <b>4.1.6</b> shall be met.</p> <p>(2) The maximum test period for periodic inspection shall be 5 years.</p> <p>(3) Cylinders and pressure drums shall be so filled that at 50 °C the non-gaseous phase does not exceed 95% of their water capacity and they are not completely filled at 60 °C. When filled, the internal pressure at 65 °C shall not exceed the test pressure of the cylinders and pressure drums. The vapour pressures and volumetric expansion of all substances in the cylinders and pressure drums shall be taken into account.</p> <p>For liquids charged with a compressed gas both components – the liquid and the compressed gas – have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle. When experimental data is not available, the following steps shall be carried out:</p> <p>(a) Calculation of the vapour pressure of the liquid and of the partial pressure of the compressed gas at 15 °C (filling temperature);</p> <p>(b) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15 °C to 65 °C and calculation of the remaining volume for the gaseous phase;</p> <p>(c) Calculation of the partial pressure of the compressed gas at 65 °C considering the volumetric expansion of the liquid phase;</p> <p><i>NOTE: The compressibility factor of the compressed gas at 15 °C and 65 °C shall be considered.</i></p> <p>(d) Calculation of the vapour pressure of the liquid at 65 °C;</p> <p>(e) The total pressure is the sum of the vapour pressure of the liquid and the partial pressure of the compressed gas at 65 °C;</p> <p>(f) Consideration of the solubility of the compressed gas at 65 °C in the liquid phase.</p> <p>The test pressure of the cylinders or pressure drums shall not be less than the calculated total pressure minus 100 kPa (1bar).</p> <p>If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (f)) into account.</p> <p>(4) The minimum test pressure shall be in accordance with packing instruction P200 for the propellant but shall not be less than 20 bar.</p>		
<b>Additional requirement:</b>		
Cylinders and pressure drums shall not be offered for carriage when connected with spray application equipment such as a hose and wand assembly.		
<b>Special packing provision:</b>		
<b>PP89</b> For UN Nos. 3501, 3502, 3503, 3504 and 3505, notwithstanding 4.1.6.9 (b), non-refillable cylinders used may have a water capacity in litres not exceeding 1 000 litres divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with ISO 11118:1999, which limits the maximum capacity to 50 litres.		

<b>P207</b>	<b>PACKING INSTRUCTION</b>	<b>P207</b>
This instruction applies to UN No. 1950.		
The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
(a) Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2). Packagings shall conform to the packing group II performance level.		
(b) Rigid outer packagings with a maximum net mass as follows: Fibreboard                      55 kg Other than fibreboard        125 kg The provisions of 4.1.1.3 need not be met.		
The packagings shall be designed and constructed to prevent excessive movement of the aerosols and inadvertent discharge during normal conditions of carriage.		
<b>Special packing provision:</b>		
<b>PP87</b> For UN 1950 waste aerosols carried in accordance with special provision 327, the packagings shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. The packagings shall be adequately ventilated to prevent the creation of flammable atmosphere and the build-up of pressure.		
<b>Special packing provision specific to RID and ADR</b>		
<b>RR6</b> For UN 1950 in the case of carriage by full load, metal articles may also be packed as follows: The articles shall be grouped together in units on trays and held in position with an appropriate plastics cover; these units shall be stacked and suitably secured on pallets.		

P208	PACKING INSTRUCTION	P208
This instruction applies to Class 2 adsorbed gases.		
(1)	The following packagings are authorized provided the general packing requirements of 4.1.6.1 are met: Cylinders specified in Chapter 6.2 and in accordance with ISO 11513:2011 or ISO 9809-1:2010.	
(2)	The pressure of each filled cylinder shall be less than 101.3 kPa at 20 °C and less than 300 kPa at 50 °C.	
(3)	The minimum test pressure of the cylinder shall be 21 bar.	
(4)	The minimum burst pressure of the cylinder shall be 94.5 bar.	
(5)	The internal pressure at 65 °C of the filled cylinder shall not exceed the test pressure of the cylinder.	
(6)	The adsorbent material shall be compatible with the cylinder and shall not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material shall not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction).	
(7)	The quality of the adsorbent material shall be verified at the time of each fill to ensure that the pressure and chemical stability requirements of this packing instruction are met each time an adsorbed gas package is offered for carriage.	
(8)	The adsorbent material shall not meet the criteria of any of the classes in ADR.	
(9)	Requirements for cylinders and closures containing toxic gases with an LC <sub>50</sub> less than or equal to 200 ml/m <sup>3</sup> (ppm) (see Table 1) shall be as follows:	
	(a) Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads matching those of the valve outlets.	
	(b) 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.	
	(c) Each cylinder and closure shall be tested for leakage after filling.	
	(d) Each valve shall be capable of withstanding the test pressure of the cylinder and be directly connected to the cylinder by either a taper-thread or other means which meets the requirements of ISO 10692-2:2001.	
	(e) Cylinders and valves shall not be fitted with a pressure relief device.	
(10)	Valve outlets for cylinders containing pyrophoric gases shall be fitted with gas-tight plugs or caps having threads matching those of the valve outlets.	
(11)	The filling procedure shall be in accordance with Annex A of ISO 11513:2011.	
(12)	The maximum period for periodic inspections shall be 5 years.	
(13)	Special packing provisions that are specific to a substance (see Table 1).	
	<i>Material compatibility</i>	
	a: Aluminium alloy cylinders shall not be used.	
	d: When steel cylinders are used, only those bearing the "H" mark in accordance with 6.2.2.7.4 (p) are permitted.	
	<i>Gas specific provisions</i>	
	r: The filling of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the cylinder.	
	<i>Material compatibility for n.o.s. adsorbed gas entries</i>	
	z: The construction materials of the cylinders and their accessories shall be compatible with the contents and shall not react to form harmful or dangerous compounds therewith.	

*(Cont'd on next page)*

P208 PACKING INSTRUCTION (cont'd) P208				
Table 1: ADSORBED GASES				
UN No.	Name and description	Classification code	LC <sub>50</sub> ml/m <sup>3</sup>	Special packing provisions
3510	ADSORBED GAS, FLAMMABLE, N.O.S.	9F		z
3511	ADSORBED GAS, N.O.S.	9A		z
3512	ADSORBED GAS, TOXIC, N.O.S.	9T	≤ 5000	z
3513	ADSORBED GAS, OXIDIZING, N.O.S.	9O		z
3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	9TF	≤ 5000	z
3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	9TO	≤ 5000	z
3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	9TC	≤ 5000	z
3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	9TFC	≤ 5000	z
3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	9TOC	≤ 5000	z
3519	BORON TRIFLUORIDE, ADSORBED	9TC	387	a
3520	CHLORINE, ADSORBED	9TOC	293	a
3521	SILICON TETRAFLUORIDE, ADSORBED	9TC	450	a
3522	ARSINE, ADSORBED	9TF	20	d
3523	GERMANE, ADSORBED	9TF	620	d, r
3524	PHOSPHORUS PENTAFLUORIDE, ADSORBED	9TC	190	
3525	PHOSPHINE, ADSORBED	9TF	20	d
3526	HYDROGEN SELENIDE, ADSORBED	9TF	2	

P209 PACKING INSTRUCTION P209	
This packing instruction applies to UN No. 3150 devices, small, hydrocarbon gas powered or hydrocarbon gas refills for small devices	
(1)	The special packing provisions of 4.1.6 when applicable shall be met.
(2)	The articles shall comply with the provisions of the country in which they were filled.
(3)	The devices and refills shall be packed in outer packagings conforming to 6.1.4 tested and approved in accordance with Chapter 6.1 for packing group II.

P300 PACKING INSTRUCTION P300	
This instruction applies to UN No. 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.	
<b>Additional requirements:</b>	
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 No. 3165.		
The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
(1)	<p>Aluminium pressure receptacle made from tubing and having welded heads.</p> <p>Primary containment of the fuel within this receptacle shall consist of a welded aluminium bladder having a maximum internal volume of 46 litres.</p> <p>The outer receptacle shall have a minimum design gauge pressure of 1 275 kPa and a minimum burst gauge pressure of 2 755 kPa.</p> <p>Each receptacle shall be leak checked during manufacture and before dispatch and shall be found leakproof.</p> <p>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.</p> <p>Maximum quantity of fuel per unit and package is 42 litres.</p>	
(2)	<p>Aluminium pressure receptacle.</p> <p>Primary containment of the fuel within this receptacle shall consist of a welded vapour tight fuel compartment with an elastomeric bladder having a maximum internal volume of 46 litres.</p> <p>The pressure receptacle shall have a minimum design gauge pressure of 2 860 kPa and a minimum burst gauge pressure of 5 170 kPa.</p> <p>Each receptacle shall be leak-checked during manufacture and before dispatch 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.</p> <p>Maximum quantity of fuel per unit and package is 42 litres.</p>	

P302	PACKING INSTRUCTION	P302
This instruction applies to UN No. 3269.		
The following combination packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
Outer packagings:		
Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2);		
Inner packagings:		
The activator (organic peroxide) shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 g per inner packaging if solid.		
The base material and the activator shall be each separately packed in inner packagings.		
The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of a leakage.		
Packagings shall conform to the packing group II or III performance level according to the criteria for Class 3 applied to the base material.		

P400	PACKING INSTRUCTION	P400
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p>		
<p>(1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar);</p>		
<p>(2) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F or 4G), drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1D or 1G) or jerricans (3A1, 3A2, 3B1 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;</p>		
<p>(3) Steel, aluminium or metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2), jerricans (3A1, 3A2, 3B1 or 3B2) or boxes (4A, 4B or 4N) 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.</p>		
<p><b>Special packing provision:</b></p>		
<p><b>PP86</b> For UN Nos. 3392 and 3394, air shall be eliminated from the vapour space by nitrogen or other means.</p>		

P401	PACKING INSTRUCTION	P401
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p>		
<p>(1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6 MPa (6 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar);</p>		
<p>(2) Combination packagings:</p>		
<p>Outer packagings:</p>		
<p style="padding-left: 40px;">Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</p>		
<p style="padding-left: 40px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p>		
<p style="padding-left: 40px;">Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2).</p>		
<p>Inner packagings:</p>		
<p style="padding-left: 40px;">Glass, metal or plastics which have threaded closures with a maximum capacity of 1 litre.</p>		
<p style="padding-left: 40px;">Each inner packaging shall be surrounded by inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.</p>		
<p style="padding-left: 40px;">The maximum net mass per outer packaging shall not exceed 30 kg.</p>		
<p><b>Special packing provision specific to RID and ADR:</b></p>		
<p><b>RR7</b> For UN Nos. 1183, 1242, 1295 and 2988, the pressure receptacles shall however be subjected to the tests every five years.</p>		



P402	PACKING INSTRUCTION	P402
<p>The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:</p>		
<p>(1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6 MPa (6 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar);</p>		
<p>(2) Combination packagings:</p>		
<p>Outer packagings:</p>		
<p style="padding-left: 40px;">Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</p>		
<p style="padding-left: 40px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p>		
<p style="padding-left: 40px;">Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2).</p>		
<p>Inner packagings with a maximum net mass as follows:</p>		
<p style="padding-left: 40px;">Glass                    10 kg</p>		
<p style="padding-left: 40px;">Metal or plastics      15 kg</p>		
<p>Each inner packaging shall be fitted with threaded closures.</p>		
<p>Each inner packaging shall be surrounded by inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.</p>		
<p>The maximum net mass per outer packaging shall not exceed 125 kg.</p>		
<p>(3) Steel drums (1A1) with a maximum capacity of 250 litres;</p>		
<p>(4) Composite packagings consisting of a plastics receptacle with outer steel drum or aluminium (6HA1 or 6HB1) with a maximum capacity of 250 litres.</p>		
<p><b>Special packing provisions specific to RID and ADR:</b></p>		
<p><b>RR4</b> For UN No. 3130, the openings of receptacles shall be tightly closed by means of two devices in series, one of which shall be screwed or secured in an equivalent manner.</p>		
<p><b>RR7</b> For UN No. 3129, the pressure receptacles shall however be subjected to the tests every five years.</p>		
<p><b>RR8</b> For UN Nos. 1389, 1391, 1411, 1421, 1928, 3129, 3130, 3148 and 3482, the pressure receptacles shall however be subjected to an initial test and to periodic tests at a pressure of not less than 1 MPa (10 bar).</p>		

P403 PACKING INSTRUCTION P403	
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:	
<b>Combination packagings:</b>	
<b>Inner packagings</b>	<b>Outer packagings</b>
Glass 2 kg Plastics 15 kg Metal 20 kg	<b>Drums</b> steel (1A1, 1A2) 400 kg aluminium (1B1, 1B2) 400 kg other metal (1N1, 1N2) 400 kg plastics (1H1, 1H2) 400 kg plywood (1D) 400 kg fibre (1G) 400 kg
Inner packagings shall be hermetically sealed (e.g. by taping or by threaded closures).	<b>Boxes</b> steel (4A) 400 kg aluminium (4B) 400 kg other metal (4N) 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) 250 kg
	<b>Jerricans</b> steel (3A1, 3A2) 120 kg aluminium (3B1, 3B2) 120 kg plastics (3H1, 3H2) 120 kg
<b>Single packagings:</b>	
<b>Drums</b> steel (1A1, 1A2) 250 kg aluminium (1B1, 1B2) 250 kg metal other than steel or aluminium (1N1, 1N2) 250 kg plastics (1H1, 1H2) 250 kg	
<b>Jerricans</b> steel (3A1, 3A2) 120 kg aluminium (3B1, 3B2) 120 kg plastics (3H1, 3H2) 120 kg	
<b>Composite packagings</b> plastics receptacle with outer steel or aluminium drums (6HA1 or 6HB1) 250 kg plastics receptacle with outer fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1) 75 kg plastics receptacle with outer steel or aluminium crate or box or with outer wooden, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2) 75 kg	
<b>Pressure receptacles</b> , provided that the general provisions of 4.1.3.6 are met.	
<b>Additional requirement:</b> Packagings shall be hermetically sealed.	
<b>Special packing provision:</b> PP83 Deleted.	

P404	PACKING INSTRUCTION	P404
This instruction applies to pyrophoric solids: UN Nos.: 1383, 1854, 1855, 2008, 2441, 2545, 2546, 2846, 2881, 3200, 3391 and 3393.		
The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
(1) <b>Combination packagings</b>		
<b>Outer packagings:</b>	(1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2)	
<b>Inner packagings:</b>	Metal receptacles with a maximum net mass of 15 kg each. Inner packagings shall be hermetically sealed and have threaded closures; Glass receptacles, with a maximum net mass of 1 kg each, having threaded closures with gaskets, cushioned on all sides and contained in hermetically sealed metal cans.	
Outer packagings shall have a maximum net mass of 125 kg.		
(2) <b>Metal packagings:</b> (1A1, 1A2, 1B1, 1N1, 1N2, 3A1, 3A2, 3B1 and 3B2) Maximum gross mass: 150 kg;		
(3) <b>Composite packagings:</b> Plastics receptacle with outer steel or aluminium drum (6HA1 or 6HB1) Maximum gross mass: 150 kg.		
<b>Pressure receptacles</b> , provided that the general provisions of 4.1.3.6 are met.		
<b>Special packing provision:</b>		
<b>PP86</b> For UN Nos. 3391 and 3393, air shall be eliminated from the vapour space by nitrogen or other means.		

P405	PACKING INSTRUCTION	P405
This instruction applies to UN No. 1381.		
The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
(1) For UN No. 1381, phosphorus, wet:		
(a) <b>Combination packagings</b>		
<b>Outer packagings:</b>	(4A, 4B, 4N, 4C1, 4C2, 4D or 4F) Maximum net mass: 75 kg	
<b>Inner packagings:</b>	(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) <b>Drums</b> (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2); maximum net mass: 400 kg <b>Jerricans</b> (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 UN No. 1381, dry phosphorus:		
(a) When fused, <b>drums</b> (1A2, 1B2 or 1N2) with a maximum net mass of 400 kg; or		
(b) In projectiles or hard cased articles when carried without Class 1 components: as specified by the competent authority.		

<b>P406</b>	<b>PACKING INSTRUCTION</b>	<b>P406</b>
<p>The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:</p> <p>(1) Combination packagings</p> <p style="padding-left: 20px;">outer packagings: (4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 1G, 1D, 1H1, 1H2, 3H1 or 3H2)</p> <p style="padding-left: 20px;">inner packagings: water-resistant packagings;</p> <p>(2) Plastics, plywood or fibreboard drums (1H2, 1D or 1G) or boxes (4A, 4B, 4N, 4C1, 4D, 4F, 4C2, 4G and 4H2) with a water resistant inner bag, plastics film lining or water resistant coating;</p> <p>(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 with outer steel or aluminium drums (6HA1 or 6HB1), plastics receptacle with outer fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1), plastics receptacle with outer steel or aluminium crate or box or with outer wooden, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2).</p>		
<p><b>Additional requirements:</b></p> <ol style="list-style-type: none"> <li>1. Packagings shall be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.</li> <li>2. Packagings shall be so constructed and closed so as to avoid an explosive overpressure or pressure build-up of more than 300 kPa (3 bar).</li> </ol>		
<p><b>Special packing provisions:</b></p> <p><b>PP24</b> UN Nos. 2852, 3364, 3365, 3366, 3367, 3368 and 3369 shall not be carried in quantities of more than 500 g per package.</p> <p><b>PP25</b> For UN No. 1347, the quantity carried shall not exceed 15 kg per package.</p> <p><b>PP26</b> For UN Nos. 1310, 1320, 1321, 1322, 1344, 1347, 1348, 1349, 1517, 2907, 3317 and 3376 packagings shall be lead free.</p> <p><b>PP48</b> For UN No. 3474, metal packagings shall not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.1.4, are not considered metal packagings.</p> <p><b>PP78</b> UN No. 3370 shall not be carried in quantities of more than 11.5 kg per package.</p> <p><b>PP80</b> For UN No. 2907, packagings shall meet the packing group II performance level. Packagings meeting the test criteria of packing group I shall not be used.</p>		

<b>P407</b>	<b>PACKING INSTRUCTION</b>	<b>P407</b>
<p>This instruction applies to UN Nos. 1331, 1944, 1945 and 2254.</p>		
<p>The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:</p> <p>Outer packagings:</p> <p style="padding-left: 20px;">Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</p> <p style="padding-left: 20px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p style="padding-left: 20px;">Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2).</p> <p>Inner packagings:</p> <p style="padding-left: 20px;">Matches shall be tightly packed in securely closed inner packagings to prevent accidental ignition under normal conditions of carriage.</p> <p>The maximum gross mass of the package shall not exceed 45 kg except for fibreboard boxes which shall not exceed 30 kg.</p> <p>Packagings shall conform to the packing group III performance level.</p>		
<p><b>Special packing provision:</b></p> <p><b>PP27</b> UN No. 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.</p>		

P408	PACKING INSTRUCTION	P408
This instruction applies to UN No. 3292.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<p>(1) For cells:</p> <p style="padding-left: 40px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p style="padding-left: 40px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p style="padding-left: 40px;">Jerricans (3A2, 3B2, 3H2).</p> <p>There shall be sufficient cushioning material to prevent contact between cells and between cells and the internal surfaces of the outer packaging and to ensure that no dangerous movement of the cells within the outer packaging occurs in carriage.</p> <p>Packagings shall conform to the packing group II performance level.</p>		
<p>(2) Batteries may be carried unpacked or in protective enclosures (e.g. fully enclosed or wooden slatted crates). The terminals shall not support the weight of other batteries or materials packed with the batteries. Packagings need not meet the requirements of 4.1.1.3.</p>		
<b>Additional requirement:</b>		
Cells and 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:		
<p>(1) Fibre drum (1G) which may be fitted with a liner or coating; maximum net mass: 50 kg;</p> <p>(2) Combination packagings: Fibreboard box (4G) with a single inner plastic bag; maximum net mass: 50 kg;</p> <p>(3) Combination packagings: Fibreboard box (4G) or fibre drum (1G) with plastics inner packagings each containing a maximum of 5 kg; maximum net mass: 25 kg.</p>		

P410		PACKING INSTRUCTION		P410	
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:					
<b>Combination packagings:</b>		<b>Maximum net mass</b>			
<b>Inner packagings</b>		<b>Outer packagings</b>		<b>Packing group II</b>	<b>Packing group III</b>
Glass	10 kg	<b>Drums</b>			
Plastics <sup>a</sup>	30 kg	steel (1A1, 1A2)		400 kg	400 kg
Metal	40 kg	aluminium (1B1, 1B2)		400 kg	400 kg
Paper <sup>a,b</sup>	10 kg	other metal (1N1, 1N2)		400 kg	400 kg
Fibre <sup>a,b</sup>	10 kg	plastics (1H1, 1H2)			
		plywood (1D)		400 kg	400 kg
		fibre (1G) <sup>a</sup>		400 kg	400 kg
		<b>Boxes</b>			
		steel (4A)		400 kg	400 kg
		aluminium (4B)		400 kg	400 kg
		other metal (4N)		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) <sup>a</sup>		400 kg	400 kg
		expanded plastics (4H1)		60 kg	60 kg
		solid plastics (4H2)		400 kg	400 kg
		<b>Jerricans</b>			
		steel (3A1, 3A2)		120 kg	120 kg
		aluminium (3B1, 3B2)		120 kg	120 kg
		plastics (3H1, 3H2)		120 kg	120 kg
<b>Single packagings:</b>					
<b>Drums</b>					
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
<b>Jerricans</b>					
steel (3A1 or 3A2)			120 kg		120 kg
aluminium (3B1 or 3B2)			120 kg		120 kg
plastics (3H1 or 3H2)			120 kg		120 kg
<b>Boxes</b>					
steel (4A) <sup>c</sup>			400 kg		400 kg
aluminium (4B) <sup>c</sup>			400 kg		400 kg
other metal (4N) <sup>c</sup>			400 kg		400 kg
natural wood (4C1) <sup>c</sup>			400 kg		400 kg
plywood (4D) <sup>c</sup>			400 kg		400 kg
reconstituted wood (4F) <sup>c</sup>			400 kg		400 kg
natural wood with sift-proof walls (4C2) <sup>c</sup>			400 kg		400 kg
fibreboard (4G) <sup>c</sup>			400 kg		400 kg
solid plastics (4H2) <sup>c</sup>			400 kg		400 kg
<b>Bags</b>					
Bags (5H3, 5H4, 5L3, 5M2) <sup>c, d</sup>			50 kg		50 kg

<sup>a</sup> These packagings shall be sift-proof.

<sup>b</sup> These inner packagings shall not be used when the substances being carried may become liquid during carriage.

<sup>c</sup> These packagings shall not be used when the substances being carried may become liquid during carriage.

<sup>d</sup> These packagings shall only be used for packing group II substances when carried in a closed vehicle or container.

(Cont'd on next page)

P410	PACKING INSTRUCTION (cont'd)		P410
	Maximum net mass		
	Packing group II	Packing group III	
<b>Composite packagings</b>			
plastics receptacle with outer steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1, 6HD1, or 6HH1)	400 kg	400 kg	
plastics receptacle with outer steel or aluminium crate or box, or outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	75 kg	75 kg	
glass receptacle with outer steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1 or 6PG1) or outer steel or aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PD2, or 6PG2) or with outer solid or expanded plastics packaging (6PH1 or 6PH2)	75 kg	75 kg	
<b>Pressure receptacles</b> , provided that the general provisions of 4.1.3.6 are met.			
<b>Special packing provisions:</b>			
<b>PP39</b> For UN No. 1378, for metal packagings a venting device is required.			
<b>PP40</b> For UN Nos. 1326, 1352, 1358, 1395, 1396, 1436, 1437, 1871, 2805 and 3182, packing group II, bags are not allowed.			
<b>PP83</b> Deleted.			

P411	PACKING INSTRUCTION		P411
This instruction applies to UN No. 3270.			
The following packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:			
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);			
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);			
Jerricans (3A2, 3B2, 3H2);			
provided that explosion is not possible by reason of increased internal pressure.			
The maximum net mass shall not exceed 30 kg.			

P412	PACKING INSTRUCTION		P412
This instruction applies to UN No. 3527			
The following combination packagings are authorized, provided that the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:			
(1) Outer packagings:			
Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);			
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2)			
Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2);			
(2) Inner packagings:			
(a) The activator (organic peroxide) shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 g per inner packaging if solid.			
(b) The base material and the activator shall be each separately packed in inner packagings.			
The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of a leakage.			
Packagings shall conform to the packing group II or III performance level according to the criteria for Class 4.1 applied to the base material.			

P500	PACKING INSTRUCTION	P500
This instruction applies to UN No. 3356.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).		
Packagings shall conform to the packing group II performance level.		
The generator(s) shall be carried 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 No. 2015.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<b>Combination packagings:</b>	<b>Inner packaging maximum capacity</b>	<b>Outer packaging maximum net mass</b>
(1) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4H2) or drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D) or jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 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
<b>Single packagings:</b>	<b>Maximum capacity</b>	
<b>Drums</b> steel (1A1) aluminium (1B1) metal other than steel or aluminium (1N1) plastics (1H1)	250 l	
<b>Jerricans</b> steel (3A1) aluminium (3B1) plastics (3H1)	60 l	
<b>Composite packagings</b> plastics receptacle with outer steel or aluminium drum (6HA1, 6HB1) plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1) plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2) glass receptacle with outer steel, aluminium, fibre or plywood drum (6PA1, 6PB1, 6PD1 or 6PG1) or with outer steel, aluminium, wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer solid or expanded plastics packaging (6PH1 or 6PH2).	250 l 250 l 60 l 60 l	
<b>Additional requirements:</b>		
1. Packagings shall have a maximum filling degree of 90%.		
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:				
<b>Combination packagings:</b>				<b>Maximum net mass</b>
<b>Inner packagings</b>		<b>Outer packagings</b>		
Glass	5 l	<b>Drums</b>		
Metal	5 l	steel (1A1, 1A2)		125 kg
Plastics	5 l	aluminium (1B1, 1B2)		125 kg
		other metal (1N1, 1N2)		125 kg
		plywood (1D)		125 kg
		fibre (1G)		125 kg
		plastics (1H1, 1H2)		125 kg
		<b>Boxes</b>		
		steel (4A)		125 kg
		aluminium (4B)		125 kg
		other metal (4N)		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
<b>Single packagings:</b>				<b>Maximum capacity</b>
<b>Drums</b>				
steel (1A1)				250 l
aluminium (1B1)				
plastics (1H1)				
<b>Jerricans</b>				
steel (3A1)				60 l
aluminium (3B1)				
plastics (3H1)				
<b>Composite packagings:</b>				
plastics receptacle with outer steel or aluminium drum (6HA1, 6HB1)				250 l
plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)				250 l
plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)				60 l
glass receptacle with outer steel, aluminium, fibre or plywood drum (6PA1, 6PB1, 6PD1 or 6PG1) or with outer steel, aluminium, wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer solid or expanded plastics packaging (6PH1 or 6PH2).				60 l
<b>Special packing provision:</b>				
<b>PP28</b> For UN No. 1873, parts of packagings which are in direct contact with perchloric acid shall be constructed of glass or plastics.				

<b>P503 PACKING INSTRUCTION P503</b>		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<b>Combination packagings:</b>		
<b>Inner packagings</b>	<b>Outer packagings</b>	<b>Maximum net mass</b>
Glass 5 kg Metal 5 kg Plastics 5 kg	<b>Drums</b> steel (1A1, 1A2) 125 kg aluminium (1B1, 1B2) 125 kg other metal (1N1, 1N2) 125 kg plywood (1D) 125 kg fibre (1G) 125 kg plastics (1H1, 1H2) 125 kg	
	<b>Boxes</b> steel (4A) 125 kg aluminium (4B) 125 kg other metal (4N) 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) 40 kg expanded plastics (4H1) 60 kg solid plastics (4H2) 125 kg	
<b>Single packagings:</b>		
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:		
<b>Combination packagings:</b>		<b>Maximum net mass</b>
(1)	Glass receptacles with a maximum capacity of 5 litres in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2 outer packagings	75 kg
(2)	Plastics receptacles with a maximum capacity of 30 litres in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2 outer packagings	75 kg
(3)	Metal receptacles with a maximum capacity of 40 litres in 1G, 4F or 4G outer packagings	125 kg
(4)	Metal receptacles with a maximum capacity of 40 litres in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 4A, 4B, 4N, 4C1, 4C2, 4D, 4H2 outer packagings	225 kg
<b>Single packagings:</b>		<b>Maximum capacity</b>
<b>Drums</b>		
	steel, non-removable head (1A1)	250 l
	steel, removable head (1A2)	250 l
	aluminium, non-removable head (1B1)	250 l
	aluminium, removable head (1B2)	250 l
	metal other than steel or aluminium, non-removable head (1N1)	250 l
	metal other than steel or aluminium, removable head (1N2)	250 l
	plastics, non-removable head (1H1)	250 l
	plastics, removable head (1H2)	250 l
<b>Jerricans</b>		
	steel, non-removable head (3A1)	60 l
	steel, removable head (3A2)	60 l
	aluminium, non-removable head (3B1)	60 l
	aluminium, removable head (3B2)	60 l
	plastics, non-removable head (3H1)	60 l
	plastics, removable head (3H2)	60 l
<b>Composite packagings</b>		
	plastics receptacle with outer steel or aluminium drum (6HA1, 6HB1)	250 l
	plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)	120 l
	plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 l
	glass receptacle with outer steel, aluminium, fibre or plywood drum (6PA1, 6PB1, 6PD1 or 6PG1) or with outer steel, aluminium, wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer solid or expanded plastics packaging (6PH1 or 6PH2).	60 l
<b>Special packing provisions:</b>		
<b>PP10</b> For UN No. 2014, 2984 and 3149, the packaging shall be vented.		

<b>P505 PACKING INSTRUCTION P505</b>		
This instruction applies to UN No. 3375.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<b>Combination packagings:</b>	<b>Inner packaging maximum capacity</b>	<b>Outer packaging maximum net mass</b>
Boxes (4B, 4C1, 4C2, 4D, 4G, 4H2) or drums (1B2, 1G, 1N2, 1H2, 1D) or jerricans (3B2, 3H2) with glass, plastics or metal inner packagings	5 l	125 kg
<b>Single packagings:</b>	<b>Maximum capacity</b>	
<b>Drums</b>		
aluminium (1B1, 1B2)	250 l	
plastics (1H1, 1H2)	250 l	
<b>Jerricans:</b>		
aluminium (3B1, 3B2)	60 l	
plastics (3H1, 3H2)	60 l	
<b>Composite packagings:</b>		
plastics receptacle with outer aluminium drum (6HB1)	250 l	
plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)	250 l	
plastics receptacle with outer aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 l	
glass receptacle with outer aluminium, fibre or plywood drum (6PB1, 6PG1, 6PD1) or with outer expanded or solid plastics plastics receptacles (6PH1 or 6PH2) or with outer aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PB2, 6PC, 6PG2 or 6PD2)	60 l	

P520		PACKING INSTRUCTION								P520
This instruction applies to organic peroxides of Class 5.2 and self-reactive substances of Class 4.1										
The packagings listed below are authorized provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.7.1 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 2.2.41.4 and 2.2.52.4. 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, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2), drums (1A1, 1A2, 1B1, 1B2, 1G, 1H1, 1H2 and 1D), jerricans (3A1, 3A2, 3B1, 3B2, 3H1 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).										
<b>Maximum quantity per packaging/package <sup>a</sup> for packing methods OP1 to OP8</b>										
<b>Packing Method</b>	OP1	OP2 <sup>a</sup>	OP3	OP4 <sup>a</sup>	OP5	OP6	OP7	OP8		
<b>Maximum Quantity</b>										
Maximum mass (kg) for solids and for combination packagings (liquid and solid)	0.5	0.5/10	5	5/25	25	50	50	400 <sup>b</sup>		
Maximum contents in litres for liquids <sup>c</sup>	0.5	-	5	-	30	60	60	225 <sup>d</sup>		
<sup>a</sup> 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. <sup>b</sup> 60 kg for jerricans / 200 kg for boxes and, for solids, 400 kg in combination packagings with outer packagings comprising boxes (4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) and with inner packagings of plastics or fibre with a maximum net mass of 25 kg. <sup>c</sup> Viscous substances shall be treated as solids when they do not meet the criteria provided in the definition for "liquids" presented in 1.2.1. <sup>d</sup> 60 litres for jerricans.										
<b>Additional requirements:</b>										
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 maximum contents of 0.5 kg for solids or 0.5 litre for liquids.										
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 "EXPLOSIVE" subsidiary <del>risk-hazard</del> label (model No.1, see 5.2.2.2.2) shall also comply with the provisions given in 4.1.5.10 and 4.1.5.11.										
<b>Special packing provisions:</b>										
<b>PP21</b> For certain self-reactive substances of types B or C, UN Nos. 3221, 3222, 3223, 3224, 3231, 3232, 3233 and 3234, a smaller packaging than that allowed by packing methods OP5 or OP6 respectively shall be used (see 4.1.7 and 2.2.41.4).										
<b>PP22</b> UN No. 3241, 2-Bromo-2-nitropropane-1, 3-diol, shall be packed in accordance with packing method OP6.										

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P520	PACKING INSTRUCTION (cont'd)	P520
<b>Special packing provisions (cont'd):</b>		
<b>PP94</b> Very small amounts of energetic samples of 2.1.4.3 may be carried under UN No. 3223 or UN No. 3224, as appropriate, provided that:		
<ol style="list-style-type: none"> <li>1. Only combination packagings with outer packagings comprising boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) are used;</li> <li>2. The samples are carried in microtiter plates or multi-titer plates made of plastics, glass, porcelain or stoneware as inner packaging;</li> <li>3. The maximum amount per individual inner cavity does not exceed 0.01 g for solids or 0.01 ml for liquids;</li> <li>4. The maximum net quantity per outer packaging is 20 g for solids or 20 ml for liquids, or in the case of mixed packing the sum of grams and millilitres does not exceed 20; and</li> <li>5. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</li> </ol>		
<b>PP95</b> Small amounts of energetic samples of 2.1.4.3 may be carried under UN No. 3223 or UN No. 3224, as appropriate, provided that:		
<ol style="list-style-type: none"> <li>1. The outer packaging consists only of corrugated fibreboard of type 4G having minimum dimensions of 60 cm (length) by 40.5 cm (width) by 30 cm (height) and minimum wall thickness of 1.3 cm;</li> <li>2. The individual substance is contained in an inner packaging of glass or plastics of maximum capacity 30 ml placed in an expandable polyethylene foam matrix of at least 130 mm thickness having a density of <math>18 \pm 1 \text{ g/l}</math>;</li> <li>3. Within the foam carrier, inner packagings are segregated from each other by a minimum distance of 40 mm and from the wall of the outer packaging by a minimum distance of 70 mm. The package may contain up to two layers of such foam matrices, each carrying up to 28 inner packagings;</li> <li>4. The maximum content of each inner packaging does not exceed 1 g for solids or 1 ml for liquids;</li> <li>5. The maximum net quantity per outer packaging is 56 g for solids or 56 ml for liquids, or in the case of mixed packing the sum of grams and millilitres does not exceed 56; and</li> <li>6. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</li> </ol>		

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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 (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 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 carriage.		
Maximum net mass: 75 kg		

P601	PACKING INSTRUCTION	P601
<p>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:</p>		
<p>(1) Combination packagings with a maximum gross mass of 15 kg, consisting of</p> <ul style="list-style-type: none"> <li>– one or more glass inner packaging(s) with a maximum quantity of 1 litre each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during carriage, individually placed in</li> <li>– metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in</li> <li>– 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings;</li> </ul>		
<p>(2) Combination packagings consisting of metal or plastics inner packagings not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 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 carriage;</p>		
<p>(3) Packagings consisting of:</p> <p>Outer packagings: Steel or plastics drums (1A1, 1A2, 1H1 or 1H2), tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly;</p> <p>Inner packagings:</p> <p>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:</p> <ul style="list-style-type: none"> <li>(a) The hydraulic pressure test shall be conducted at a pressure of at least 0.3 MPa (gauge pressure);</li> <li>(b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa;</li> <li>(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;</li> <li>(d) Their capacity shall not exceed 125 litres;</li> </ul>		

*(Cont'd on next page)*

<b>P601</b>	<b>PACKING INSTRUCTION (cont'd)</b>	<b>P601</b>
<p>(3) <i>Packagings consisting of: (cont'd)</i></p> <p>(e) Closures shall be of a screw cap type that are:</p> <ul style="list-style-type: none"> <li>(i) physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage; and</li> <li>(ii) provided with a cap seal;</li> </ul> <p>(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;</p> <p>(g) The complete packaging shall be visually inspected to the satisfaction of the competent authority at least every 3 years; and</p> <p>(h) The outer and inner packaging shall bear in clearly legible and durable characters:</p> <ul style="list-style-type: none"> <li>(i) the date (month, year) of the initial test and the latest periodic test and inspection;</li> <li>(ii) the stamp of the expert who carried out the test and inspection;</li> </ul> <p>(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure). Pressure receptacles may not be equipped with any pressure relief device. Each pressure receptacle containing a toxic by inhalation liquid with an LC<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup> (ppm) shall be closed with a plug or valve conforming to the following:</p> <ul style="list-style-type: none"> <li>(a) Each plug or valve shall have a taper-threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle without damage or leakage;</li> <li>(b) Each valve shall be of the packless type with non-perforated diaphragm, except that, for corrosive substances, a valve may be of the packed type with an assembly made gas-tight by means of a seal cap with gasket joint attached to the valve body or the pressure receptacle to prevent loss of substance through or past the packing;</li> <li>(c) Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasket material;</li> <li>(d) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.</li> </ul> <p>Each pressure receptacle with a wall thickness at any point of less than 2.0 mm and each pressure receptacle which does not have fitted valve protection shall be carried in an outer packaging. Pressure receptacles shall not be manifolded or interconnected.</p>		
<p><b>Special packing provision:</b></p> <p><b>PP82</b> <i>(Deleted)</i></p>		
<p><b>Special packing provisions specific to RID and ADR:</b></p> <p><b>RR3</b> <i>(Deleted)</i></p> <p><b>RR7</b> For UN No. 1251, the pressure receptacles shall however be subjected to the tests every five years.</p> <p><b>RR10</b> UN No. 1614, when completely absorbed by an inert porous material, shall be packed in metal receptacles of a capacity of not more than 7.5 litres, placed in wooden cases in such a manner that they cannot come into contact with one another. The receptacles shall be entirely filled with the porous material which shall not shake down or form dangerous spaces even after prolonged use or under impact, even at temperatures of up to 50 °C.</p>		



P602	PACKING INSTRUCTION	P602
<p>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:</p>		
<p>(1) Combination packagings with a maximum gross mass of 15 kg, consisting of</p> <ul style="list-style-type: none"> <li>– one or more glass inner packaging(s) with a maximum quantity of 1 litre each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during carriage, individually placed in</li> <li>– metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in</li> <li>– 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings;</li> </ul>		
<p>(2) Combination packagings consisting of metal or plastics inner packagings individually packed with absorbent material sufficient to absorb the entire contents and inert cushioning material in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 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 carriage. Inner packagings shall not exceed 5 litres in capacity;</p>		
<p>(3) Drums and composite packagings (1A1, 1B1, 1N1, 1H1, 6HA1 or 6HH1), subject to the following conditions:</p> <ul style="list-style-type: none"> <li>(a) The hydraulic pressure test shall be conducted at a pressure of at least 0.3 MPa (gauge pressure);</li> <li>(b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa; and</li> <li>(c) Closures shall be of a screw cap type that are: <ul style="list-style-type: none"> <li>(i) physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage; and</li> <li>(ii) provided with a cap seal;</li> </ul> </li> </ul>		
<p>(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure). Pressure receptacles may not be equipped with any pressure relief device. Each pressure receptacle containing a toxic by inhalation liquid with an LC<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup> (ppm) shall be closed with a plug or valve conforming to the following:</p> <ul style="list-style-type: none"> <li>(a) Each plug or valve shall have a taper-threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle without damage or leakage;</li> <li>(b) Each valve shall be of the packless type with non-perforated diaphragm, except that, for corrosive substances, a valve may be of the packed type with an assembly made gas-tight by means of a seal cap with gasket joint attached to the valve body or the pressure receptacle to prevent loss of substance through or past the packing;</li> <li>(c) Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasket material;</li> <li>(d) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.</li> </ul> <p>Each pressure receptacle with a wall thickness at any point of less than 2.0 mm and each pressure receptacle which does not have fitted valve protection shall be carried in an outer packaging. Pressure receptacles shall not be manifolded or interconnected.</p>		

P603	PACKING INSTRUCTION	P603
This instruction applies to UN 3507.		
The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 and the special packing provisions of 4.1.9.1.2, 4.1.9.1.4 and 4.1.9.1.7 are met:		
Packagings consisting of:		
<ul style="list-style-type: none"> <li>(a) Metal or plastics primary receptacle(s); in</li> <li>(b) Leakproof rigid secondary packaging(s); in</li> <li>(c) A rigid outer packaging: <ul style="list-style-type: none"> <li>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</li> <li>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</li> <li>Jerricans (3A2, 3B2, 3H2).</li> </ul> </li> </ul>		
<b>Additional requirements:</b>		
<ol style="list-style-type: none"> <li>1. Primary inner receptacles shall be packed in secondary packagings in a way that, under normal conditions of carriage, 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 to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them.</li> <li>2. The contents shall comply with the provisions of 2.2.7.2.4.5.2.</li> <li>3. The provisions of 6.4.4 shall be met.</li> </ol>		
<b>Special packing provision:</b>		
In the case of fissile-excepted material, limits specified in 2.2.7.2.3.5 shall be met.		

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:		
<p>(a) Inner packagings comprising:</p> <ul style="list-style-type: none"> <li>(i) leakproof primary receptacle(s);</li> <li>(ii) a leakproof secondary packaging;</li> <li>(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 either individually wrapped or separated so as to prevent contact between them;</li> </ul> <p>(b) A rigid outer packaging:</p> <ul style="list-style-type: none"> <li>Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</li> <li>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</li> <li>Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2).</li> </ul> <p>The smallest external dimension shall be not less than 100 mm.</p>		
<b>Additional requirements:</b>		
<p>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.</p> <p>2. Other than for exceptional consignments, e.g. whole organs which require special packaging, the following additional requirements shall apply:</p> <ul style="list-style-type: none"> <li>(a) 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 secured by positive means, e.g., tape, paraffin sealing tape or manufactured locking closure;</li> <li>(b) 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 6.3.3. 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;</li> <li>(c) 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 carriage 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;</li> <li>(d) Lyophilised substances may also be carried in primary receptacles that are flame-sealed glass ampoules or rubber-stoppered glass vials fitted with metal seals.</li> </ul> <p>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 <del>and temperatures in the range -40 °C to +55 °C. This primary receptacle or secondary packaging shall also be capable of withstanding temperatures in the range -40 °C to +55 °C.</del></p> <p>4. Other dangerous goods shall not be packed in the same packaging as Class 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Classes 3, 8 or 9 may be packed in each primary receptacle containing infectious substances. These small quantities of dangerous goods of Classes 3, 8 or 9 are not subject to any additional requirements of ADR when packed in accordance with this packing instruction.</p> <p>5. Alternative packagings for the carriage of animal material may be authorized by the competent authority of the country of origin <sup>a</sup> in accordance with the provisions of 4.1.8.7.</p>		

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<sup>a</sup> If the country of origin is not a Contracting Party to ADR, the competent authority of the first Contracting Party to the ADR reached by the consignment.

P621	PACKING INSTRUCTION	P621
This instruction applies to UN No. 3291.		
The following packagings are authorized provided that the general provisions of 4.1.1 except 4.1.1.15 and 4.1.3 are met:		
(1) Provided that there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A2, 3B2, 3H2).		
Packagings shall conform to the packing group II performance level for solids.		
(2) For packages containing larger quantities of liquid:		
Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);		
Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2);		
Composites (6HA1, 6HB1, 6HG1, 6HH1, 6HD1, 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2, 6PA1, 6PB1, 6PG1, 6PD1, 6PH1, 6PH2, 6PA2, 6PB2, 6PC, 6PG2 or 6PD2).		
Packagings shall conform to the packing group II performance level for liquids.		
<b>Additional requirement:</b>		
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 No. 3373.

- (1) The packaging shall be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage, including transshipment between cargo transport units and between cargo 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 to prevent any loss of contents that might be caused under normal conditions of carriage by vibration or by changes in temperature, humidity or pressure.
- (2) The packaging shall consist of at least three components:
  - (a) a primary receptacle;
  - (b) a secondary packaging; and
  - (c) an outer packagingof which either the secondary or the outer packaging shall be rigid.
- (3) Primary receptacles shall be packed in secondary packagings in such a way that, under normal conditions of carriage, 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 compromise the integrity of the cushioning material or of the outer packaging.
- (4) For carriage, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped) with minimum dimensions of 50 mm by 50 mm; the width of the line shall be at least 2 mm and the letters and numbers shall be at least 6 mm high. The proper shipping name "BIOLOGICAL SUBSTANCE, CATEGORY B" in letters at least 6 mm high shall be marked on the outer packaging adjacent to the diamond-shaped mark.



- (5) At least one surface of the outer packaging shall have a minimum dimension of 100 mm × 100 mm.
- (6) The completed package shall be capable of successfully passing the drop test in 6.3.5.3 as specified in 6.3.5.2 at a height of 1.2 m. Following the appropriate drop sequence, there shall be no leakage from the primary receptacle(s) which shall remain protected by absorbent material, when required, in the secondary packaging.

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P650	PACKING INSTRUCTION (cont'd)	P650
(7)	<p>For liquid substances:</p> <ul style="list-style-type: none"> <li>(a) The primary receptacle(s) shall be leakproof;</li> <li>(b) The secondary packaging shall be leakproof;</li> <li>(c) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them;</li> <li>(d) Absorbent material shall be placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;</li> <li>(e) The primary receptacle or the secondary packaging shall be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar).</li> </ul>	
(8)	<p>For solid substances:</p> <ul style="list-style-type: none"> <li>(a) The primary receptacle(s) shall be siftproof;</li> <li>(b) The secondary packaging shall be siftproof;</li> <li>(c) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them;</li> <li>(d) If there is any doubt as to whether or not residual liquid may be present in the primary receptacle during carriage then a packaging suitable for liquids, including absorbent materials, shall be used.</li> </ul>	
(9)	<p>Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen:</p> <ul style="list-style-type: none"> <li>(a) When dry ice or liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. When used, ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packagings in the original position. If ice is used, the outside packaging or overpack shall be leakproof.</li> <li>(b) The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</li> </ul>	
(10)	When packages are placed in an overpack, the package marks required by this packing instruction shall either be clearly visible or be reproduced on the outside of the overpack.	
(11)	Infectious substances assigned to UN No. 3373 which are packed and packages which are marked in accordance with this packing instruction are not subject to any other requirement in ADR.	
(12)	Clear instructions on filling and closing such packages shall be provided by packaging manufacturers and subsequent distributors to the consignor or to the person who prepares the package (e.g. patient) to enable the package to be correctly prepared for carriage.	
(13)	Other dangerous goods shall not be packed in the same packaging as Class 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Classes 3, 8 or 9 may be packed in each primary receptacle containing infectious substances. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction no other requirements of ADR need be met.	
(14)	If any substance has leaked and has been spilled in a cargo transport unit, it may not be reused until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated. Any other goods and articles carried in the <del>same vehicle or container</del> same cargo transport unit shall be examined for possible contamination.	
<b>Additional requirement:</b>		
Alternative packagings for the carriage of animal material may be authorized by the competent authority of the country of origin <sup>a</sup> in accordance with the provisions of 4.1.8.7.		

<sup>a</sup> *If the country of origin is not a Contracting Party to ADR, the competent authority of the first Contracting Party to the ADR reached by the consignment.*

P800	PACKING INSTRUCTION	P800
This instruction applies to UN Nos. 2803 and 2809.		
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met:		
<p>(1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.</p> <p>(2) Steel flasks or bottles with threaded closures with a capacity not exceeding 3 l; or</p> <p>(3) Combination packagings which conform to the following requirements:</p> <p style="margin-left: 20px;">(a) Inner packagings shall comprise glass, metal or rigid plastics intended to contain liquids with a maximum net mass of 15 kg each;</p> <p style="margin-left: 20px;">(b) The inner packagings shall be packed with sufficient cushioning material to prevent breakage;</p> <p style="margin-left: 20px;">(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;</p> <p style="margin-left: 20px;">(d) The following outer packagings and maximum net masses are authorized:</p>		
<b>Outer packaging:</b>	<b>Maximum net mass</b>	
<b>Drums</b>		
steel (1A1, 1A2)	400 kg	
metal, other than steel or aluminium (1N1, 1N2)	400 kg	
plastics (1H1, 1H2)	400 kg	
plywood (1D)	400 kg	
fibre (1G)	400 kg	
<b>Boxes</b>		
steel (4A)	400 kg	
metal, other than steel or aluminium (4N)	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	
<b>Special packing provision:</b>		
<p><b>PP41</b> For UN No. 2803, when it is necessary to carry gallium at low temperatures in order to maintain it in a completely solid state, the above packagings may be overpack ed 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.</p>		

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, except 4.1.1.3, and 4.1.3 are met:		
<ul style="list-style-type: none"> <li>(1) Rigid outer packagings;</li> <li>(2) Wooden slatted crates;</li> <li>(3) Pallets.</li> </ul>		
<b>Additional requirements:</b>		
<ul style="list-style-type: none"> <li>1. Batteries shall be protected against short circuits.</li> <li>2. Batteries stacked shall be adequately secured in tiers separated by a layer of electrically non-conductive material.</li> <li>3. Battery terminals shall not support the weight of other superimposed elements.</li> <li>4. Batteries shall be packaged or secured to prevent inadvertent movement. Any cushioning material used shall be inert.</li> </ul>		

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P801a	PACKING INSTRUCTION	P801a
This instruction applies to used batteries of UN Nos. 2794, 2795, 2800 and 3028.		
Stainless steel or solid plastics battery boxes of a capacity of up to 1 m <sup>3</sup> are authorized provided the following provisions are met:		
<ul style="list-style-type: none"> <li>(1) The battery boxes shall be resistant to the corrosive substances contained in the storage batteries;</li> <li>(2) Under normal conditions of carriage, no corrosive substance shall leak from the battery boxes and no other substance (e.g. water) shall enter the battery boxes. No dangerous residues of corrosive substances contained in the storage batteries shall adhere to the outside of the battery boxes;</li> <li>(3) The battery boxes shall not be loaded with storage batteries to a height greater than the height of their sides;</li> <li>(4) No storage battery containing substances or other dangerous goods which may react dangerously with one another shall be placed in a battery box;</li> <li>(5) The battery boxes shall be either: <ul style="list-style-type: none"> <li>(a) covered; or</li> <li>(b) carried in closed or sheeted vehicles or containers.</li> </ul> </li> </ul>		



<b>P802</b>	<b>PACKING INSTRUCTION</b>	<b>P802</b>
The following packagings are authorized, provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
(1)	Combination packagings: Outer packagings: 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2; maximum net mass: 75 kg. Inner packagings: glass or plastics; maximum capacity: 10 litres;	
(2)	Combination packagings: Outer packagings: 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2; maximum net mass: 125 kg. Inner packagings: metal; maximum capacity: 40 litres;	
(3)	Composite packagings: Glass receptacle with outer steel, aluminium or plywood drum (6PA1, 6PB1 or 6PD1) or with outer steel, aluminium or wooden box or with outer wickerwork hamper (6PA2, 6PB2, 6PC or 6PD2) or with outer solid plastics packaging (6PH2); maximum capacity: 60 litres.	
(4)	Steel drums (1A1) with a maximum capacity of 250 litres;	
(5)	Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.	

<b>P803</b>	<b>PACKING INSTRUCTION</b>	<b>P803</b>
This instruction applies to UN No. 2028.		
The following packagings are authorized, provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
(1)	Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);	
(2)	Boxes ( 4A, 4B, 4N, 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 carriage.		

P804	PACKING INSTRUCTION	P804
This instruction applies to UN No. 1744.		
The following packagings are authorized provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met and the packagings are hermetically sealed:		
(1) Combination packagings with a maximum gross mass of 25 kg, consisting of		
<ul style="list-style-type: none"> <li>- one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during carriage, individually placed in</li> <li>- metal or rigid plastics receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in</li> <li>- 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings.</li> </ul>		
(2) Combination packagings consisting of metal or 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 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 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 carriage;		
(3) Packagings consisting of:		
Outer packagings:		
Steel or plastics drums (1A1, 1A2, 1H1 or 1H2) tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly;		
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 300 kPa (3 bar) (gauge pressure);		
(b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa (0.3 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;		
(e) Closures shall be of a screw type that are:		
<ul style="list-style-type: none"> <li>(i) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage;</li> <li>(ii) Provided with a cap seal;</li> </ul>		
(f) The outer and inner packagings shall be subjected periodically to an internal inspection and 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:		
<ul style="list-style-type: none"> <li>(i) the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging; and</li> <li>(ii) the name or authorized symbol of the expert who carried out the tests and inspections;</li> </ul>		
(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.		
(a) They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure);		
(b) They shall be subjected periodically to an internal inspection and leakproofness test at intervals of not more than two and a half years;		
(c) They may not be equipped with any pressure relief device;		
(d) Each pressure receptacle shall be closed with a plug or valve(s) fitted with a secondary closure device; and		
(e) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.		

P900	PACKING INSTRUCTION	P900
<i>(Reserved)</i>		

P901	PACKING INSTRUCTION	P901
This instruction applies to UN No. 3316.		
The following combination packagings are authorized provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2).		
Packagings shall conform to the performance level consistent with the packing group assigned to the kit as a whole (see special provision 251 of Chapter 3.3). Where the kit contains only dangerous goods to which no packing group is assigned, packagings shall meet the packing group II performance level.		
Maximum quantity of dangerous goods per outer packaging: 10 kg excluding the mass of any carbon dioxide, solid (dry ice) used as a refrigerant.		
<b>Additional requirements:</b>		
Dangerous goods in kits shall be packed in inner packagings which shall <del>not exceed either 250 ml or 250 g and shall</del> be protected from other materials in the kit.		

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P902	PACKING INSTRUCTION	P902
This instruction applies to UN No. 3268.		
<b>Packaged articles:</b>		
The following packagings are authorized provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A2, 3B2, 3H2).		
Packagings shall conform to the packing group III performance level.		
The packagings shall be designed and constructed so as to prevent movement of the articles and inadvertent operation during normal conditions of carriage.		
<b>Unpackaged articles:</b>		
The articles may also be carried unpackaged in dedicated handling devices or cargo transport units <u>when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations, when moved from where they are manufactured to an assembly plant</u>		
<b>Additional requirement:</b>		
Any pressure receptacle shall be in accordance with the requirements of the competent authority for the substance(s) contained therein.		

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P903	PACKING INSTRUCTION	P903
<p>This instruction applies to UN Nos. 3090 , 3091, 3480 and 3481.</p> <p><u>For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.</u> The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met:</p>		
<p>(1) For cells and batteries:</p> <p style="padding-left: 40px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p style="padding-left: 40px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p style="padding-left: 40px;">Jerricans (3A2, 3B2, 3H2).</p> <p>Cells or batteries shall be packed in packagings so that the cells or batteries are protected against damage that may be caused by the movement or placement of the cells or batteries within the packaging.</p> <p>Packagings shall conform to the packing group II performance level.</p>		
<p>(2) In addition for cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, and assemblies of such cells or batteries:</p> <p style="padding-left: 40px;">(a) Strong outer packagings;</p> <p style="padding-left: 40px;">(b) Protective enclosures (e.g., fully enclosed or wooden slatted crates); or</p> <p style="padding-left: 40px;">(c) Pallets or other handling devices.</p> <p>Cells or batteries shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements.</p> <p>Packagings need not meet the requirements of 4.1.1.3.</p>		
<p>(3) For cells or batteries packed with equipment:</p> <p>Packagings conforming to the requirements in paragraph (1) of this packing instruction, then placed with the equipment in an outer packaging; or</p> <p>Packagings that completely enclose the cells or batteries, then placed with equipment in a packaging conforming to the requirements in paragraph (1) of this packing instruction.</p> <p>The equipment shall be secured against movement within the outer packaging.</p> <p><u>For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium metal or lithium ion cells or batteries with which it is packed for its operation.</u></p>		
<p>(4) For cells or batteries contained in equipment:</p> <p>Strong outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use. They shall be constructed in such a manner as to prevent accidental operation during carriage. Packagings need not meet the requirements of 4.1.1.3.</p> <p>Large equipment can be offered for carriage unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.</p> <p>Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be carried when intentionally active in strong outer packagings.</p>		
<p><b>Additional requirement:</b></p> <p>Cells or batteries shall be protected against short circuit.</p>		

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<b>P903a</b>	<b>PACKING INSTRUCTION</b>	<b>P903a</b>
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<b>P903b</b>	<b>PACKING INSTRUCTION</b>	<b>P903b</b>
<i>(Deleted)</i>		

<b>P904</b>	<b>PACKING INSTRUCTION</b>	<b>P904</b>
<p>This instruction applies to UN No. 3245.</p> <p>The following packagings are authorized:</p> <p>(1) Packagings meeting the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.8 and 4.1.3 and so designed that they meet the construction requirements of 6.1.4. Outer packagings constructed of suitable material, and 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 carriage of inner packagings of combination packagings the packaging shall be designed and constructed to prevent inadvertent discharge during normal conditions of carriage.</p> <p>(2) Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:</p> <p>(a) An inner packaging comprising:</p> <ul style="list-style-type: none"> <li>(i) primary receptacle(s) and a secondary packaging, the primary receptacle(s) or the secondary packaging shall be leakproof for liquids or siftproof for solids;</li> <li>(ii) for liquids, absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in a quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;</li> <li>(iii) if multiple fragile primary receptacles are placed in a single secondary packaging they shall be individually wrapped or separated to prevent contact between them;</li> </ul> <p>(b) An outer packaging shall be strong enough for its capacity, mass and intended use, and with a smallest external dimension of at least 100 mm.</p> <p>For carriage, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line shall be at least 2 mm and the letters and numbers shall be at least 6 mm high.</p> <div style="text-align: center;">  </div>		
<p><b>Additional requirement:</b></p> <p><u>Ice, dry ice and liquid nitrogen</u></p> <p>When dry ice or liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. When used, ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packaging in the original position. If ice is used, the outside packaging or overpack shall be leakproof.</p>		

P905	PACKING INSTRUCTION	P905
This instruction applies to UN Nos. 2990 and 3072.		
Any suitable packaging is authorized, provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> 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 carried unpackaged.		
<b>Additional requirements:</b>		
<ol style="list-style-type: none"> <li>1. All dangerous substances and articles contained as equipment within the appliances shall be secured to prevent inadvertent movement and in addition: <ol style="list-style-type: none"> <li>(a) Signal devices of Class 1 shall be packed in plastics or fibreboard inner packagings;</li> <li>(b) Non-flammable, non-toxic gases shall be contained in cylinders as specified by the competent authority, which may be connected to the appliance;</li> <li>(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</li> <li>(d) Small quantities of other dangerous substances (for example in Classes 3, 4.1 and 5.2) shall be packed in strong inner packagings.</li> </ol> </li> <li>2. Preparation for transport and packaging shall include provisions to prevent any accidental inflation of the appliance.</li> </ol>		

P906	PACKING INSTRUCTION	P906
This instruction applies to UN Nos. 2315, 3151, 3152 and 3432.		
The following packagings are authorized, provided the general provisions of <b>4.1.1</b> and <b>4.1.3</b> are met:		
<ol style="list-style-type: none"> <li>(1) For liquids and solids containing or contaminated with PCBs, polyhalogenated biphenyls, polyhalogenated terphenyls or halogenated monomethyldiphenylmethanes: Packagings in accordance with packing instructions P001 or P002, as appropriate.</li> <li>(2) For transformers and condensers and other articles: <ol style="list-style-type: none"> <li>(a) Packagings in accordance with packing instructions P001 or P002. The articles shall be secured with suitable cushioning material to prevent inadvertent movement during normal conditions of carriage; or</li> <li>(b) Leakproof packagings which are capable of containing, in addition to the articles, at least 1.25 times the volume of the liquid PCBs, polyhalogenated biphenyls, polyhalogenated terphenyls or halogenated monomethyldiphenylmethanes 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 articles. 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.</li> </ol> </li> </ol>		
Notwithstanding the above, liquids and solids not packaged in accordance with packing instructions P001 and P002 and unpackaged transformers and condensers may be carried in cargo transport units fitted with a leakproof metal tray to a height of at least 800 mm, containing sufficient inert absorbent material to absorb at least 1.1 times the volume of any free liquid.		
<b>Additional requirement:</b>		
Adequate provisions shall be taken to seal the transformers and condensers to prevent leakage during normal conditions of carriage.		

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P907	PACKING INSTRUCTION	P907
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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, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1.

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 non-flammable, non-toxic gases, the inner cylinder or receptacle, its contents and filling ratio 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 carriage, 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 carriage. 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.

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P908	PACKING INSTRUCTION	P908
<p>This instruction applies to damaged or defective lithium ion cells and batteries and damaged or defective lithium metal cells and batteries, including those contained in equipment, of UN Nos. 3090, 3091, 3480 and 3481.</p>		
<p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>For cells and batteries and equipment containing cells and batteries:</p> <p style="margin-left: 40px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G)</p> <p style="margin-left: 40px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2)</p> <p style="margin-left: 40px;">Jerricans (3A2, 3B2, 3H2)</p> <p>Packagings shall conform to the packing group II performance level.</p> <ol style="list-style-type: none"> <li>1. Each damaged or defective cell or battery or equipment containing such cells or batteries shall be individually packed in inner packaging and placed inside an outer packaging. The inner packaging or outer packaging shall be leak-proof to prevent the potential release of electrolyte.</li> <li>2. Each inner packaging shall be surrounded by sufficient non-combustible and <u>electrically</u> non-conductive thermal insulation material to protect against a dangerous evolution of heat.</li> <li>3. Sealed packagings shall be fitted with a venting device when appropriate.</li> <li>4. Appropriate measures shall be taken to minimize the effects of vibrations and shocks, prevent movement of the cells or batteries within the package that may lead to further damage and a dangerous condition during carriage. Cushioning material that is non-combustible and <u>electrically</u> non-conductive may also be used to meet this <u>requirement</u>.</li> <li>5. Non combustibility shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured.</li> </ol> <p>For leaking cells or batteries, sufficient inert absorbent material shall be added to the inner or outer packaging to absorb any release of electrolyte.</p> <p>A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.</p>		
<p><b>Additional requirement:</b></p> <p>Cells or batteries shall be protected against short circuit.</p>		

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P909	PACKING INSTRUCTION	P909
<p>This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 carried for disposal or recycling, either packed together with or packed without non-lithium batteries.</p>		
<p>(1) Cells and batteries shall be packed in accordance with the following:</p> <p>(a) The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3, are met:</p> <p style="padding-left: 20px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p style="padding-left: 20px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2); and</p> <p style="padding-left: 20px;">Jerricans (3A2, 3B2, 3H2).</p> <p>(b) Packagings shall conform to the packing group II performance level.</p> <p>(c) Metal packagings shall be fitted with an <a href="#">electrically</a> non-conductive lining material (e.g. plastics) of adequate strength for the intended use.</p> <p>(2) However, lithium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g may be packed in accordance with the following:</p> <p>(a) In strong outer packaging up to 30 kg gross mass meeting the general provisions of 4.1.1, except 4.1.1.3, and 4.1.3.</p> <p>(b) Metal packagings shall be fitted with an <a href="#">electrically</a> non-conductive lining material (e.g. plastics) of adequate strength for the intended use.</p> <p>(3) For cells or batteries contained in equipment, strong outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3. Equipment may also be offered for carriage unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.</p> <p>(4) In addition, for cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging's capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3.</p>		
<p><b>Additional requirements:</b></p> <p>1. Cells and batteries shall be designed or packed to prevent short circuits and the dangerous evolution of heat.</p> <p>2. Protection against short circuits and the dangerous evolution of heat includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>- individual protection of the battery terminals,</li> <li>- inner packaging to prevent contact between cells and batteries,</li> <li>- batteries with recessed terminals designed to protect against short circuits, or</li> <li>- the use of an <a href="#">electrically</a> non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging.</li> </ul> <p>3. Cells and batteries shall be secured within the outer packaging to prevent excessive movement during carriage (e.g. by using a non-combustible and <a href="#">electrically</a> non-conductive cushioning material or through the use of a tightly closed plastics bag).</p>		

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P910	PACKING INSTRUCTION	P910
<p>This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 production runs consisting of not more than 100 cells <u>and-or</u> batteries and to pre-production prototypes of cells <u>and-or</u> batteries when these prototypes are carried for testing.</p>		
<p>The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met:</p>		
<p>(1) For cells and batteries, including when packed with equipment:</p> <ul style="list-style-type: none"> <li>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</li> <li>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</li> <li>Jerricans (3A2, 3B2, 3H2).</li> </ul> <p>Packagings shall conform to the packing group II performance level and shall meet the following requirements:</p> <ul style="list-style-type: none"> <li>(a) Batteries and cells, including equipment, of different sizes, shapes or masses shall be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;</li> <li>(b) Each cell or battery shall be individually packed in an inner packaging and placed inside an outer packaging;</li> <li>(c) Each inner packaging shall be completely surrounded by sufficient non-combustible and <u>electrically</u> non-conductive thermal insulation material to protect against a dangerous evolution of heat;</li> <li>(d) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during carriage. Cushioning material that is non-combustible and <u>electrically</u> non-conductive may be used to meet this requirement;</li> <li>(e) Non-combustibility shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured;</li> <li>(f) A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.</li> </ul>		
<p>(2) For cells and batteries contained in equipment:</p> <ul style="list-style-type: none"> <li>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</li> <li>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</li> <li>Jerricans (3A2, 3B2, 3H2).</li> </ul> <p>Packagings shall conform to the packing group II performance level and shall meet the following requirements:</p> <ul style="list-style-type: none"> <li>(a) Equipment of different sizes, shapes or masses shall be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;</li> <li>(b) The equipment shall be constructed or packaged in such a manner as to prevent accidental operation during carriage;</li> <li>(c) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and <u>electrically</u> non-conductive; and</li> <li>(d) Non-combustibility shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured.</li> </ul>		

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P910	PACKING INSTRUCTION (cont'd)	P910
<p>(3) The equipment or the batteries may be carried unpackaged under conditions specified by the competent authority of any Contracting Party to ADR, which may also recognize an approval granted by the competent authority of a country which is not a Contracting Party to ADR, provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. Additional conditions that may be considered in the approval process include, but are not limited to:</p> <p>(a) The equipment or the battery shall be strong enough to withstand the shocks and loadings normally encountered during carriage, including trans-shipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and</p> <p>(b) The equipment or the battery shall be fixed in cradles or crates or other handling devices in such a way that it will not become loose during normal conditions of carriage.</p>		
<p><b>Additional requirements</b></p> <p>The cells and batteries shall be protected against short circuit; Protection against short circuits includes, but is not limited to,</p> <ul style="list-style-type: none"> <li>- individual protection of the battery terminals,</li> <li>- inner packaging to prevent contact between cells and batteries,</li> <li>- batteries with recessed terminals designed to protect against short circuits, or</li> <li>- the use of a <u>electrically non-conductive and non-combustible cushioning material</u> to fill empty space between the cells or batteries in the <u>packaging</u>.</li> </ul>		

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P911	PACKING INSTRUCTION	P911
<p><u>This instruction applies to damaged or defective cells and batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.</u></p>		
<p><u>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</u></p>		
<p><u>For cells and batteries and equipment containing cells and batteries:</u></p>		
<p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p>		
<p><u>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u></p>		
<p><u>Jerricans (3A2, 3B2, 3H2)</u></p>		
<p><u>The packagings shall conform to the packing group I performance level.</u></p>		
<p>(1) <u>The packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the cells or batteries:</u></p>		
<p>(a) <u>The outside surface temperature of the completed package shall not have a temperature of more than 100°C. A momentary spike in temperature up to 200°C is acceptable;</u></p>		
<p>(b) <u>No flame shall occur outside the package;</u></p>		
<p>(c) <u>No projectiles shall exit the package;</u></p>		
<p>(d) <u>The structural integrity of the package shall be maintained; and</u></p>		
<p>(e) <u>The packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.</u></p>		
<p>(2) <u>The additional packaging performance requirements shall be verified by a test as specified by the competent authority of any ADR Contracting Party who may also recognize a test specified by the competent authority of a country which is not an ADR Contracting Party provided that this test has been specified in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions<sup>a</sup>.</u> <u>A verification report shall be available on request. As a minimum requirement, the cell or battery name, the cell or battery number, the mass, type, energy content of the cells or batteries, the packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.</u></p>		
<p>(3) <u>When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</u></p>		

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P911	PACKING INSTRUCTION	P911
<b>Additional requirement:</b>		
Cells or batteries shall be protected against short circuit.		
<sup>a</sup> The following criteria, as relevant, may be considered to assess the performance of the packaging:		
(a) The assessment shall be done under a quality management system (as described e.g. in section 2.2.9.1.7 (e)) allowing for the traceability of tests results, reference data and characterization models used;		
(b) The list of hazards expected in case of thermal run-away for the cell or battery type, in the condition it is carried (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of possible hazards for lithium cells or batteries (rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;		
(c) The mitigating effects of the packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density [kg·m <sup>-3</sup> ], specific heat capacity [J·kg <sup>-1</sup> ·K <sup>-1</sup> ], heating value [kJ·kg <sup>-1</sup> ], thermal conductivity [W·m <sup>-1</sup> ·K <sup>-1</sup> ], melting temperature and flammability temperature [K], heat transfer coefficient of the outer packaging [W·m <sup>-2</sup> ·K <sup>-1</sup> ], ...);		
(d) The test and any supporting calculations shall assess the result of a thermal run-away of the cell or battery inside the packaging in the normal conditions of carriage;		
(e) In case the SOC of the cell or battery is not known, the assessment used, shall be done with the highest possible SOC corresponding to the cell or battery use conditions;		
(f) The surrounding conditions in which the packaging may be used and carried shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the packaging;		
(g) The tests or the model calculation shall consider the worst case scenario for the thermal run-away triggering and propagation inside the cell or battery; this scenario includes the worst possible failure in the normal carriage condition, the maximum heat and flame emissions for the possible propagation of the reaction;		
(h) These scenarios shall be assessed over a period of time long enough to allow all the possible consequences to occur (e.g. 24 hours).		

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R001	PACKING INSTRUCTION	R001	
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:			
Light gauge metal packagings	Maximum capacity/maximum net mass		
	Packing group I	Packing group II	Packing group III
steel, non-removable head (0A1)	Not allowed	40 l / 50 kg	40 l / 50 kg
steel, removable head (0A2) <sup>a</sup>	Not allowed	40 l / 50 kg	40 l / 50 kg
<sup>a</sup> Not allowed for UN No. 1261 NITROMETHANE.			
NOTE 1: This instruction applies to solids and liquids (provided the design type is tested and marked appropriately).			
NOTE 2: For Class 3, packing group II, these packagings may be used only for substances with no subsidiary <del>hsk</del> hazard and a vapour pressure of not more than 110 kPa at 50 °C and for slightly toxic pesticides.			

**4.1.4.2**      *Packing instructions concerning the use of IBCs*

<b>IBC01</b>	<b>PACKING INSTRUCTION</b>	<b>IBC01</b>
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> are met: Metal (31A, 31B and 31N).		
<b>Special packing provision specific to RID and ADR:</b>		
<b>BB1</b> For UN No. 3130, the openings of receptacles for this substance shall be tightly closed by means of two devices in series, one of which shall be screwed or secured in an equivalent manner.		
<b>IBC02</b>	<b>PACKING INSTRUCTION</b>	<b>IBC02</b>
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> are met:		
(1) Metal (31A, 31B and 31N);		
(2) Rigid plastics (31H1 and 31H2);		
(3) Composite (31HZ1).		
<b>Special packing provisions:</b>		
<b>B5</b> For UN Nos. 1791, 2014, 2984 and 3149, IBCs shall be provided with a device to allow venting during carriage. The inlet to the venting device shall be sited in the vapour space of the IBC under maximum filling conditions during carriage.		
<b>B7</b> 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 carried in large volumes.		
<b>B8</b> 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.		
<b>B15</b> For UN No. 2031 with more than 55% nitric acid, the permitted use of rigid plastics IBCs and of composite IBCs with a rigid plastics inner receptacle shall be two years from their date of manufacture.		
<b>B16</b> For UN No. 3375, IBCs of type 31A and 31N are not allowed without competent authority approval.		
<b>Special packing provisions specific to RID and ADR:</b>		
<b>BB2</b> For UN No.1203, notwithstanding special provision 534 (see 3.3.1), IBCs shall only be used when the actual vapour pressure is not more than 110 kPa at 50 °C, or 130 kPa at 55 °C.		
<b>BB4</b> For UN Nos. 1133, 1139, 1169, 1197, 1210, 1263, 1266, 1286, 1287, 1306, 1866, 1993 and 1999, assigned to packing group III in accordance with 2.2.3.1.4, IBCs with a capacity greater than 450 litres are not permitted.		
<b>IBC03</b>	<b>PACKING INSTRUCTION</b>	<b>IBC03</b>
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> are met:		
(1) Metal (31A, 31B and 31N);		
(2) Rigid plastics (31H1 and 31H2);		
(3) Composite (31HZ1, 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2).		
<b>Special packing provision:</b>		
<b>B8</b> The pure form of this substance shall not be carried 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.		
<b>B19</b> For UN Nos. 3532 and 3534, IBCs shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.		

IBC04	PACKING INSTRUCTION	IBC04
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> are met:		
Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N).		

IBC05	PACKING INSTRUCTION	IBC05
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> 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).		

IBC06	PACKING INSTRUCTION	IBC06
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> 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).		
<b>Additional requirement:</b>		
Where the solid may become liquid during carriage see 4.1.3.4.		
<b>Special packing provisions:</b>		
<b>B12</b> For UN No. 2907, IBCs shall meet the packing group II performance level. IBCs meeting the test criteria of packing group I shall not be used.		

IBC07	PACKING INSTRUCTION	IBC07
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> 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);		
(4) Wooden (11C, 11D and 11F).		
<b>Additional requirements:</b>		
1. Where the solid may become liquid during carriage see 4.1.3.4.		
2. Liners of wooden IBCs shall be siftproof.		
<b>Special packing provision:</b>		
<b>B18</b> For UN Nos. 3531 and 3533, IBCs shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.		

IBC08	PACKING INSTRUCTION	IBC08
<p>The following IBCs are authorized, provided the general provisions of <b>4.1.1</b>, <b>4.1.2</b> and <b>4.1.3</b> are met:</p>		
<p>(1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N);</p>		
<p>(2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2);</p>		
<p>(3) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1);</p>		
<p>(4) Fibreboard (11G);</p>		
<p>(5) Wooden (11C, 11D and 11F);</p>		
<p>(6) Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2).</p>		
<p><b>Additional requirement:</b></p>		
<p>Where the solid may become liquid during carriage see 4.1.3.4.</p>		
<p><b>Special packing provisions:</b></p>		
<p><b>B3</b> Flexible IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.</p>		
<p><b>B4</b> Flexible, fibreboard or wooden IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.</p>		
<p><b>B6</b> For UN Nos. 1363, 1364, 1365, 1386, 1408, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC testing requirements of Chapter 6.5.</p>		
<p><b>B13</b> <i>Note: For UN Nos. 1748, 2208, 2880, 3485, 3486 and 3487, carriage by sea in IBCs is prohibited according to the IMDG Code.</i></p>		
<p><b>Special packing provision specific to RID and ADR</b></p>		
<p><b>BB3</b> For UN 3509, IBCs are not required to meet the requirements of 4.1.1.3.</p>		
<p>IBC's meeting the requirements of 6.5.5, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used.</p>		
<p>When the only residues are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible IBCs may be used.</p>		
<p>When liquid residues are present, rigid IBCs that provide a means of retention (e.g. absorbent material) shall be used.</p>		
<p>Before being filled and handed over for carriage, every IBC shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any IBC showing signs of reduced strength, shall no longer be used (minor dents and scratches are not considered as reducing the strength of the IBC).</p>		
<p>IBC's intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.</p>		

IBC99	PACKING INSTRUCTION	IBC99
<p>Only IBCs which are approved for these goods by the competent authority may be used. A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.</p>		

IBC100	PACKING INSTRUCTION	IBC100
This instruction applies to UN Nos. 0082, 0222, 0241, 0331 and 0332.		
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , <b>4.1.2</b> and <b>4.1.3</b> and special provisions of <b>4.1.5</b> 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).	
<b>Additional requirements:</b>		
1.	IBC's shall only be used for free flowing substances.	
2.	Flexible IBC's shall only be used for solids.	
<b>Special packing provisions:</b>		
<b>B3</b>	For UN No. 0222, flexible IBC's shall be sift-proof and water resistant or shall be fitted with a sift-proof and water resistant liner.	
<b>B9</b>	For UN No. 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 IBC's are not authorized.	
<b>B10</b>	For UN No. 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 IBC's are not authorized.	
<b>B17</b>	For UN No. 0222, metal IBC's 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. <u>The formulations listed below may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.</u>							
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/kg)	Control Temperature	Emergency Temperature		
3109	<b>ORGANIC PEROXIDE, TYPE F, LIQUID</b>						
	tert-Butyl cumyl peroxide	31HA1	1000				
	tert-Butyl hydroperoxide, not more than 72% with water	31A <u>31HA1</u>	1 250 <u>1 000</u>				
	tert-Butyl peroxyacetate, not more than 32% in diluent type A	31A 31HA1	1 250 1 000				
	tert-Butyl peroxybenzoate, not more than 32% in diluent type A	31A	1 250				
	tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than 37% in diluent type A	31A 31HA1	1 250 1 000				
	Cumyl hydroperoxide, not more than 90% in diluent type A	31HA1	1 250				
	Dibenzoyl peroxide, not more than 42% as a stable dispersion in water	31H1	1 000				
	Di-tert-butyl peroxide, not more than 52% in diluent type A	31A 31HA1	1 250 1 000				
	1,1-Di-(tert-butylperoxy) cyclohexane, not more than 42% in diluent type A	31H1	1 000				
	1,1-Di-(tert-butylperoxy) cyclohexane, not more than 37% in diluent type A	31A	1 250				
	Dilauroyl peroxide, not more than 42%, stable dispersion, in water	31HA1	1 000				
	<u>2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane, not more than 52% in diluent type A</u>	<u>31HA1</u>	<u>1000</u>				
	Isopropyl cumyl hydroperoxide, not more than 72% in diluent type A	31HA1	1 250				
	p-Menthyl hydroperoxide, not more than 72% in diluent type A	31HA1	1 250				
	Peroxyacetic acid, stabilized, not more than 17%	31A 31H1 31H2 31HA1	1 500 1 500 1 500 1 500				
	<u>3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane not more than 27% in diluent type A</u>	<u>31HA1</u>	<u>1000</u>				
	3110	<b>ORGANIC PEROXIDE, TYPE F, SOLID</b>					
		Dicumyl peroxide	31A 31H1 31HA1	2 000			
3119	<b>ORGANIC PEROXIDE, TYPE F, LIQUID, TEMPERATURE CONTROLLED</b>						
	<u>tert-Amyl peroxy-2-ethylhexanoate, not more than 62% in diluent type A</u>	<u>31HA1</u>	<u>1000</u>	<u>+15 °C</u>	<u>+20 °C</u>		
	tert-Amyl peroxy-pivalate, not more than 32% in diluent type A	31A	1 250	+10 °C	+15 °C		
	tert-Butyl peroxy-2-ethylhexanoate, not more than 32% in diluent type B	31HA1 31A	1 000 1 250	+30 °C +30 °C	+35 °C +35 °C		
	tert-Butyl peroxyneodecanoate, not more than 32% in diluent type A	31A	1 250	0 °C	+10 °C		

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tert-Butyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1 250	-5 °C	+5 °C
tert-Butyl peroxy-pivalate, not more than 27% in diluent type B	31HA1 31A	1 000 1 250	+10 °C +10 °C	+15 °C +15 °C
Cumyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1 250	-15 °C	-5 °C

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IBC520		PACKING INSTRUCTION (cont'd)				IBC520
UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control Temperature	Emergency Temperature	
3119 (cont'd)	tert-Butyl peroxyneodecanoate, not more than 42% stable dispersion, in water	31A	1 250	-5 °C	+5 °C	
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, not more than 42%, stable dispersion, in water	31HA1	1 000	+30 °C	+35 °C	
	Dicetyl peroxydicarbonate, not more than 42%, stable dispersion, in water	31HA1	1 000	+30 °C	+35 °C	
	Di-(2-neodecanoylperoxyisopropyl)benzene, not more than 42%, stable dispersion, in water	31A	1 250	-15 °C	-5 °C	
	3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1 250	-15 °C	-5 °C	
	Di-(2-ethylhexyl) peroxydicarbonate, not more than 62%, stable dispersion, in water	31A	1 250	-20 °C	-10 °C	
		31HA1	1000	-20 °C	-10 °C	
	Dimyristyl peroxydicarbonate, not more than 42%, stable dispersion, in water	31HA1	1 000	+15 °C	+20 °C	
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52% in diluent type A	31HA1	1 000	+10 °C	+15 °C	
		31A	1 250	+10 °C	+15 °C	
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water	31A	1 250	+10 °C	+15 °C	
	1,1,3,3-Tetramethylbutyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1 250	-5 °C	+5 °C	
		31HA1	1 000	-5 °C	+5 °C	
	1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate, not more than 67%, in diluent type A	31HA1	1000	+15 °C	+20 °C	
	Dicyclohexylperoxydicarbonate, not more than 42% as a stable dispersion, in water	31A	1 250	+10 °C	+15 °C	
Diisobutyl peroxide, not more than 28% as a stable dispersion in water	31HA1	1 000	-20 °C	-10 °C		
	31A	1 250	-20 °C	-10 °C		
Diisobutyl peroxide, not more than 42% as a stable dispersion in water	31HA1	1 000	-25 °C	-15 °C		
	31A	1 250	-25 °C	-15 °C		
<b>3120</b>	<b>ORGANIC PEROXIDE, TYPE F, SOLID, TEMPERATURE CONTROLLED</b> No formulation listed					
<b>Additional requirements:</b>						
1. IBCs shall be provided with a device to allow venting during carriage. The inlet to the pressure-relief device shall be sited in the vapour space of the IBC under maximum filling conditions during carriage.						
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 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 No. 3291.		
The following IBCs are authorized, provided the general provisions of <b>4.1.1</b> , except 4.1.1.15, <b>4.1.2</b> and <b>4.1.3</b> are met: Rigid, leakproof IBCs conforming to the packing group II performance level.		
<b>Additional requirements:</b>		
<ol style="list-style-type: none"><li>1. There shall be sufficient absorbent material to absorb the entire amount of liquid present in the IBC.</li><li>2. IBCs shall be capable of retaining liquids.</li><li>3. IBCs intended to contain sharp objects such as broken glass and needles shall be resistant to puncture.</li></ol>		

**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 litres Plastics 30 litres Metal 40 litres	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Fibreboard (50G)	Not allowed	Not allowed	Maximum capacity: 3 m <sup>3</sup>	

LP02		PACKING INSTRUCTION (SOLIDS)			LP02
The following large packagings are authorized provided the general provisions 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 <sup>b</sup> 50 kg Metal 50 kg Paper <sup>a, b</sup> 50 kg Fibre <sup>a, b</sup> 50 kg	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Fibreboard (50G) Flexible plastics (51H) <sup>c</sup>	Not allowed	Not allowed	Maximum capacity: 3 m <sup>3</sup>	
<p><sup>a</sup> These inner packagings shall not be used when the substances being carried may become liquid during carriage.</p> <p><sup>b</sup> These inner packagings shall be sift-proof.</p> <p><sup>c</sup> To be used with flexible inner packagings only.</p> <p><b>Special packing provisions:</b></p> <p><b>L2</b> Deleted.</p> <p><b>L3</b> Note: For UN Nos. 2208 and 3486, carriage by sea in large packagings is prohibited.</p>					

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LP02	PACKING INSTRUCTION (SOLIDS) (cont'd)	LP02
<b>Special packing provision specific to RID and ADR:</b>		
<b>LL1</b> For UN 3509, large packagings are not required to meet the requirements of 4.1.1.3.		
Large packagings meeting the requirements of 6.6.4, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used.		
When the only residues are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible large packagings may be used.		
When liquid residues are present, rigid large packagings that provide a means of retention (e.g. absorbent material) shall be used.		
Before being filled and handed over for carriage, every large packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any large packaging showing signs of reduced strength, shall no longer be used (minor dents and scratches are not considered as reducing the strength of the large packaging).		
Large packagings intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.		

LP03	PACKING INSTRUCTION	LP03
<u>This instruction applies to UN Nos. 3537 to 3548.</u>		
<u>(1) The following large packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</u>		
<u>Rigid large packagings conforming to the packing group II performance level made of:</u>		
<u>steel (50A);</u>		
<u>aluminium (50B);</u>		
<u>metal other than steel or aluminium (50N);</u>		
<u>rigid plastics (50H);</u>		
<u>natural wood (50C);</u>		
<u>plywood (50D);</u>		
<u>reconstituted wood (50F);</u>		
<u>rigid fibreboard (50G).</u>		
<u>(2) Additionally, the following conditions shall be met:</u>		
<u>(a) Receptacles within articles containing liquids or solids shall be constructed of suitable materials and secured in the article in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the article itself or the outer packaging;</u>		
<u>(b) Receptacles containing liquids with closures shall be packed with their closures correctly oriented. The receptacles shall in addition conform to the internal pressure test provisions of 6.1.5.5;</u>		
<u>(c) Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials shall be properly secured. Any leakage of the contents shall not substantially impair the protective properties of the article or of the outer packaging;</u>		
<u>(d) Receptacles within articles containing gases shall meet the requirements of Section 4.1.6 and Chapter 6.2 as appropriate or be capable of providing an equivalent level of protection as packing instructions P200 or P208; and</u>		
<u>(e) Where there is no receptacle within the article, the article shall fully enclose the dangerous substances and prevent their release under normal conditions of carriage.</u>		
<u>(3) Articles shall be packed to prevent movement and inadvertent operation during normal conditions of carriage.</u>		

LP99	PACKING INSTRUCTION	LP99
Only large packagings which are approved for these goods by the competent authority may be used. A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.		

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LP101 PACKING INSTRUCTION LP101		
The following 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) Fibreboard (50G)
<b>Special packing provision:</b>		
<p><b>L1</b> 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, 0502 and 0510:</p> <p>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 carriage. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for carriage unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices.</p>		

LP102 PACKING INSTRUCTION LP102		
The following 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
<b>Bags</b> water resistant  <b>Receptacles</b> fibreboard metal plastics wood  <b>Sheets</b> fibreboard, corrugated  <b>Tubes</b> 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) Fibreboard (50G)

LP200 PACKING INSTRUCTION LP200	
This instruction applies to UN No. 1950.	
The following large packagings are authorized for aerosols, provided that the general provisions of 4.1.1 and 4.1.3 are met:	
Rigid large packagings conforming to the packing group II performance level, made of:	
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:**

**L2** The large packagings shall be designed and constructed to prevent dangerous movement of the aerosols and inadvertent discharge during normal conditions of carriage. For waste aerosols carried in accordance with special provision 327, the large packagings shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. The large packagings shall be adequately ventilated to prevent the creation of a flammable atmosphere and the build-up of pressure.

**LP621** **PACKING INSTRUCTION** **LP621**

This instruction applies to UN No. 3291.

The following large packagings are authorized, provided the general provisions of **4.1.1** and **4.1.3** 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 No. 3268.		
Packaged articles:		
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met:		
<u>Packagings conforming to the packing group III performance level. Rigid large packagings conforming to the packing group III performance level, made of:</u>		
<ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul>		
The packagings shall be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of carriage.		
Unpackaged articles:		
The articles may also be carried unpackaged in dedicated handling devices or cargo transport units <u>when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations, when moved from where they are manufactured to an assembly plant.</u>		
<b>Additional requirement:</b>		
Any pressure receptacle shall be in accordance with the requirements of the competent authority for the substance(s) contained in the pressure receptacle(s).		

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LP903	PACKING INSTRUCTION	LP903
This instruction applies to UN Nos. 3090, 3091, 3480 and 3481.		
The following large packagings are authorized for a single battery <u>and for a single item of equipment containing batteries, including for a battery contained in equipment</u> , provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Rigid large packagings conforming to the packing group II performance level, made of:		
<ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul>		
<u>The battery or the equipment shall be packed so that the battery or the equipment is protected against damage that may be caused by its movement or placement within the large packaging. The battery shall be packed so that the battery is protected against damage that may be caused by its movement or placement within the large packaging.</u>		
<b>Additional requirement:</b>		
Batteries shall be protected against short circuit.		

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LP904	PACKING INSTRUCTION	LP904
<p>This instruction applies to single damaged or defective batteries <u>and to single items of equipment containing damaged or defective cells and batteries</u> of UN Nos. 3090, 3091, 3480 and 3481, <del>including those contained in equipment.</del></p>		
<p><del>The following large packagings are authorized for a single damaged or defective battery and for a single item of equipment containing damaged or defective cells and batteries, provided the general provisions of 4.1.1 and 4.1.3 are met.</del>The following large packagings are authorized for a single damaged or defective battery and for a single damaged or defective battery contained in equipment, provided the general provisions of 4.1.1 and 4.1.3 are met</p>		
<p><del>For batteries and equipment containing cells and batteries:</del>For batteries and equipment containing batteries, large packagings made of:</p>		
<p><u>Rigid large packagings conforming to the packing group II performance level, made of:</u></p> <ul style="list-style-type: none"> <li>steel (50A)</li> <li>aluminium (50B)</li> <li>metal other than steel or aluminium (50N)</li> <li>rigid plastics (50H)</li> <li>plywood (50D)</li> </ul>		
<p><u>Packagings shall conform to the packing group II performance level.</u></p>		
<ol style="list-style-type: none"> <li>1. <del>The damaged or defective battery or equipment containing such cells or batteries shall be</del>Each damaged or defective battery or equipment containing such a battery shall be individually packed in an inner packaging and placed inside an outer packaging. The inner packaging or outer packaging shall be leak-proof to prevent the potential release of electrolyte.</li> <li>2. <del>Each</del>The inner packaging shall be surrounded by sufficient non-combustible and <u>electrically</u> non-conductive thermal insulation material to protect against a dangerous evolution of heat.</li> <li>3. Sealed packagings shall be fitted with a venting device when appropriate.</li> <li>4. Appropriate measures shall be taken to minimize the effects of vibrations and shocks, prevent movement of the battery <u>or the equipment</u> within the package that may lead to further damage and a dangerous condition during carriage. Cushioning material that is non-combustible and <u>electrically</u> non-conductive may also be used to meet this requirement.</li> <li>5. Non combustibility shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured.</li> </ol>		
<p>For leaking <u>cells and</u> batteries, sufficient inert absorbent material shall be added to the inner or outer packaging to absorb any release of electrolyte.</p>		
<p><b>Additional requirement:</b></p>		
<p><u>Cells and b</u>Batteries shall be protected against short circuit.</p>		

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LP905	PACKING INSTRUCTION	LP905
<p>This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 <u>production runs consisting of not more than 100 cells and batteries and to pre-production prototypes of cells and batteries when these prototypes are carried for testing.</u></p>		
<p><u>The following large packagings are authorized for a single battery and for a single item of equipment containing cells or batteries, provided that the general provisions of 4.1.1 and 4.1.3 are met:</u></p>		
<p>(1) <u>For a single battery:</u></p>		
<p><u>Rigid large packagings conforming to the packing group II performance level, made of:</u></p> <ul style="list-style-type: none"> <li><u>steel (50A);</u></li> <li><u>aluminium (50B);</u></li> <li><u>metal other than steel or aluminium (50N);</u></li> <li><u>rigid plastics (50H);</u></li> <li><u>natural wood (50C);</u></li> <li><u>plywood (50D);</u></li> <li><u>reconstituted wood (50F);</u></li> <li><u>rigid fibreboard (50G).</u></li> </ul>		

LP905	PACKING INSTRUCTION	LP905
<p>Large packagings shall also meet the following requirements:</p> <p>(a) A battery of different size, shape or mass may be packed in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;</p> <p>(b) The battery shall be packed in an inner packaging and placed inside the outer packaging;</p> <p>(c) The inner packaging shall be completely surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat;</p> <p>(d) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the battery within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; and</p> <p>(e) Non-combustibility shall be assessed according to a standard recognized in the country where the large packaging is designed or manufactured.</p> <p>(2) For a single item of equipment containing cells or batteries:</p> <p>Rigid large packagings conforming to the packing group II performance level, made of:</p> <p>_____ Steel (50A);</p> <p>_____ Aluminium (50B);</p> <p>_____ Metal other than steel or aluminium (50N);</p> <p>_____ Rigid plastics (50H);</p> <p>_____ Natural wood (50C);</p> <p>_____ Plywood (50D);</p> <p>_____ Reconstituted wood (50F);</p> <p>_____ Rigid fibreboard (50G).</p> <p>Large packagings shall also meet the following requirements:</p> <p>(a) A single item of equipment of different size, shape or mass may be packed in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;</p> <p>(b) The equipment shall be constructed or packed in such a manner as to prevent accidental operation during carriage;</p> <p>(c) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement, it shall be non-combustible and electrically non-conductive; and</p> <p>(d) Non-combustibility shall be assessed according to a standard recognized in the country where the large packaging is designed or manufactured.</p> <p><b>Additional requirement:</b></p> <p>Cells and batteries shall be protected against short circuit.</p>		

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LP906	PACKING INSTRUCTION	LP906
<p>This instruction applies to damaged or defective batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.</p> <p>The following large packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>For a single battery and for a single item of equipment containing batteries :</p> <p>Rigid large packagings conforming to the packing group I performance level, made of:</p> <p>_____ steel (50A);</p> <p>_____ aluminium (50B);</p> <p>_____ metal other than steel or aluminium (50N);</p> <p>_____ rigid plastics (50H);</p> <p>_____ plywood (50D);</p> <p>_____ rigid fibreboard (50G)</p>		

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LP906	PACKING INSTRUCTION	LP906
<p>(1) The large packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the battery:</p> <p>(a) The outside surface temperature of the completed package shall not have a temperature of more than 100 °C. A momentary spike in temperature up to 200 °C is acceptable;</p> <p>(b) No flame shall occur outside the package;</p> <p>(c) No projectiles shall exit the package;</p> <p>(d) The structural integrity of the package shall be maintained; and</p> <p>(e) The large packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.</p> <p>(2) The additional large packaging performance requirements shall be verified by a test as specified by the competent authority of any ADR Contracting Party who may also recognize a test specified by the competent authority of a country which is not an ADR Contracting Party provided that this test has been specified in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions<sup>a</sup>.</p> <p>A verification report shall be available on request. As a minimum requirement, the battery name, the battery number, the mass, type, energy content of the batteries, the large packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.</p> <p>(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</p>		
<p><b>Additional requirement:</b></p> <p>Batteries shall be protected against short circuit.</p>		
<p><sup>a</sup> The following criteria, as relevant, may be considered to assess the performance of the large packaging:</p> <p>(a) The assessment shall be done under a quality management system (as described e.g. in section 2.2.9.1.7 (e)) allowing for the traceability of tests results, reference data and characterization models used;</p> <p>(b) The list of hazards expected in case of thermal run-away for the battery type, in the condition it is carried (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of possible hazards for lithium batteries (rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;</p> <p>(c) The mitigating effects of the large packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density [<math>\text{kg}\cdot\text{m}^{-3}</math>], specific heat capacity [<math>\text{J}\cdot\text{kg}^{-1}\cdot\text{K}^{-1}</math>], heating value [<math>\text{kJ}\cdot\text{kg}^{-1}</math>], thermal conductivity [<math>\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}</math>], melting temperature and flammability temperature [K], heat transfer coefficient of the outer packaging [<math>\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}</math>], ...);</p> <p>(d) The test and any supporting calculations shall assess the result of a thermal run-away of the battery inside the large packaging in the normal conditions of carriage;</p> <p>(e) In case the SOC of the battery is not known, the assessment used, shall be done with the highest possible SOC corresponding to the battery use conditions;</p> <p>(f) The surrounding conditions in which the large packaging may be used and carried shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the large packaging;</p> <p>(g) The tests or the model calculation shall consider the worst case scenario for the thermal run-away triggering and propagation inside the battery; this scenario includes the worst possible failure in the normal carriage condition, the maximum heat and flame emissions for the possible propagation of the reaction;</p> <p>(h) These scenarios shall be assessed over a period of time long enough to allow all the possible consequences to occur (e.g. 24 hours).</p>		

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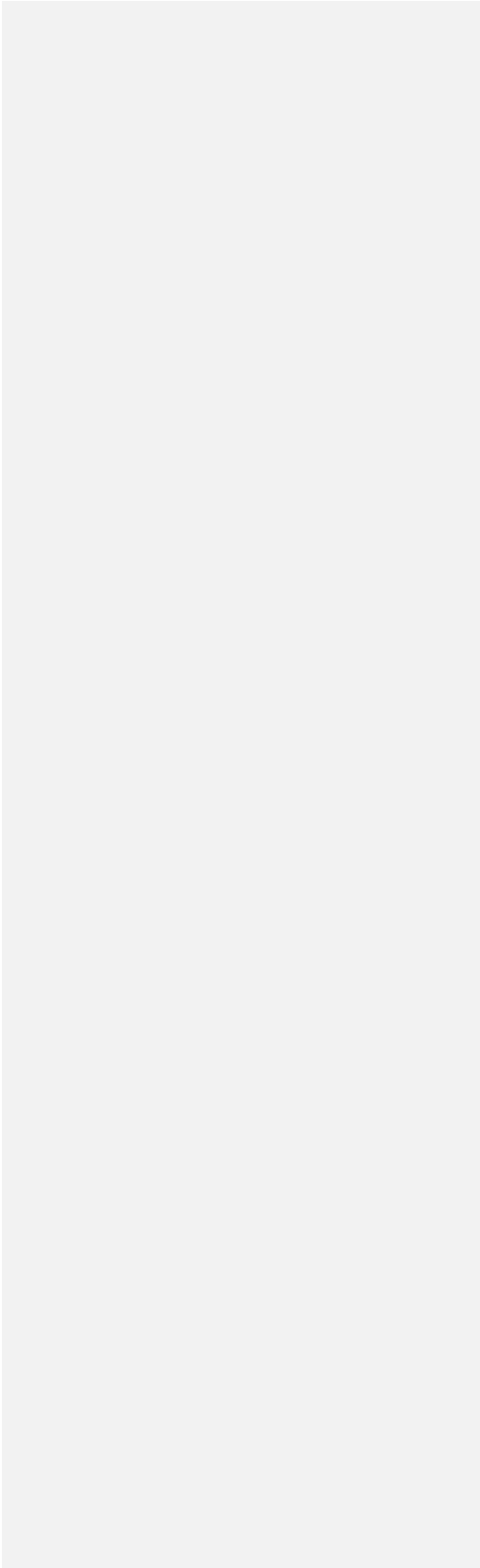
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#### 4.1.5 Special packing provisions for goods of Class 1

- 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 carriage including foreseeable changes in temperature, humidity and pressure;
  - (b) The complete package can be handled safely in normal conditions of carriage; and
  - (c) The packages will withstand any loading imposed on them by foreseeable stacking to which they will be subject during carriage 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 carriage, shall have been classified in accordance with the procedures detailed in 2.2.1.
- 4.1.5.4 Class 1 goods shall be packed in accordance with the appropriate packing instruction shown in Column (8) of Table A of Chapter 3.2, as detailed in 4.1.4.
- 4.1.5.5 Unless otherwise specified in ADR, packagings, including IBCs and large packagings, shall conform to the requirements of chapters 6.1, 6.5 or 6.6, as appropriate, and shall meet their test requirements for packing group II.
- 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 carriage.
- 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 carriage. 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 carriage, 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

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systems shall be protected against stimuli encountered during normal conditions of carriage. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for carriage 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 carriage.

Where such large explosive articles are as part of their operational safety and suitability tests subjected to test regimes that meet the intentions of ADR and such tests have been successfully undertaken, the competent authority may approve such articles to be carried in accordance with ADR.

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 (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 4A, 4B, 4N 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 packaging has been approved by a competent authority regardless of whether the packaging complies with the packing instruction assignment in Column (8) of Table A of Chapter 3.2.

#### **4.1.6 Special packing provisions for goods of Class 2 and goods of other classes assigned to packing instruction P200**

4.1.6.1 This section provides general requirements applicable to the use of pressure receptacles and open cryogenic receptacles for the carriage of Class 2 substances and goods of other classes assigned to packing instruction P200 (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 carriage, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

4.1.6.2 Parts of pressure receptacles and open cryogenic 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) (see also table of standards at the end of this section).

4.1.6.3 Pressure receptacles, including their closures and open cryogenic receptacles, 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 relevant packing instructions of 4.1.4.1. This sub-section also applies to pressure receptacles which are elements of MEGCs and battery-vehicles.

4.1.6.4 A change of use of a refillable pressure receptacle shall include emptying, purging and evacuation operations to the extent necessary for safe operation (see also table of standards at the end of this section). In addition, a pressure receptacle that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary ~~risk-hazard~~ shall not be authorized for the carriage of a Class 2 substance unless the necessary inspection and testing as specified in 6.2.1.6 and 6.2.3.5 respectively have been performed.

4.1.6.5 Prior to filling, the packer shall perform an inspection of the pressure receptacle or open cryogenic receptacle and ensure that the pressure receptacle or open cryogenic receptacle is authorized for the substance and, in case of a chemical under pressure, for the propellant to be carried and that the requirements have been met. Shut-off valves shall be closed after filling and remain closed during carriage. The consignor shall verify that the closures and equipment are not leaking.

*NOTE: Shut-off valves fitted to individual cylinders in bundles may be open during carriage, unless the substance carried is subject to special packing provision 'k' or 'q' in packing provision P200.*

4.1.6.6 Pressure receptacles and open cryogenic 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

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exceeded. Bundles of cylinders shall not be filled in excess of the lowest working pressure of any given cylinder in the bundle.

4.1.6.7 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 and open cryogenic receptacles shall be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in one outer packaging.

4.1.6.8 Valves and other components which are to remain connected to the valve during carriage (e.g. handling devices or adaptors) shall be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or shall be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the following methods (see also table of standards at the end of this section):

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- (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) Pressure receptacles are carried in frames, (e.g. cylinders in bundles); or
- (e) Pressure receptacles are carried in protective boxes. For UN pressure receptacles the packaging as prepared for carriage shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.

4.1.6.9 Non-refillable pressure receptacles shall:

- (a) be carried in an outer packaging, such as a box or crate, or in shrink-wrapped 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<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup>; and
- (d) not be repaired after being put into service.

4.1.6.10 Refillable pressure receptacles, other than cryogenic receptacles, shall be periodically inspected according to the provisions of 6.2.1.6, or 6.2.3.5.1 for non UN receptacles, and packing instruction P200, P205 or P206 as applicable. Pressure relief valves for closed cryogenic receptacles shall be subject to periodic inspections and tests according to the provisions of 6.2.1.6.3 and packing instruction P203. Pressure receptacles shall not be filled after they become due for periodic inspection but may be carried after the expiry of the time-limit for purposes of performing inspection or disposal, including the intermediate carriage operations.

4.1.6.11 Repairs shall be consistent with the fabrication and testing requirements of the applicable design and construction standards and are only permitted as indicated in the relevant periodic inspection standards specified in chapter 6.2. Pressure receptacles, other than the jacket of closed cryogenic 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.

4.1.6.12 Receptacles shall not be offered for filling:

- (a) when damaged to such an extent that the integrity of the receptacle or its service equipment may be affected;

- (b) unless the 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 marks are legible.

4.1.6.13 Filled receptacles shall not be offered for carriage:

- (a) when leaking;
- (b) when damaged to such an extent that the integrity of the receptacle or its service equipment may be affected;
- (c) unless the 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 marks are legible.

4.1.6.14 Owners shall, on the basis of a reasoned request from the competent authority, provide it with all the information necessary to demonstrate the conformity of the pressure receptacle in a language easily understood by the competent authority. They shall cooperate with that authority, at its request, on any action taken to eliminate non-conformity of the pressure receptacles which they own.

4.1.6.15 For UN pressure receptacles, the ISO standards listed below shall be applied. For other pressure receptacles, the requirements of section 4.1.6 are considered to have been complied with if the following standards, as relevant, are applied:

Applicable paragraphs	Reference	Title of document
4.1.6.2	<a href="#">EN ISO 11114-1:2012 + A1:2017</a> <del>ISO 11114-1:2012</del>	Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic Materials
	ISO 11114-2:2013	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic Materials
4.1.6.4	ISO 11621:1997	Gas cylinders – Procedures for change of gas service <i>NOTE: The EN version of this ISO standard fulfils the requirements and may also be used.</i>
4.1.6.8 Valves with inherent protection	<a href="#">Annex A of EN ISO 10297:2006 or annex A of EN ISO 10297:2014 or annex A of EN ISO 10297:2014 + A1:2017</a> <del>Annex A of ISO 10297:2006 or annex A of ISO 10297:2014</del>	Gas cylinder – Refillable gas cylinder valves – Specification and type testing <i>NOTE: The EN version of this ISO standard fulfils the requirements and may also be used.</i>
	EN 13152:2001 + A1:2003	Testing and specifications of LPG cylinder valves – self closing
	EN 13153:2001 + A1:2003	Testing and specifications of LPG cylinder valves – manually operated
	EN ISO 14245:2010	Gas cylinders – Specifications and testing of LPG cylinder valves – Self closing (ISO 14245:2006)
	EN ISO 15995:2010	Gas cylinders – Specifications and testing of LPG cylinder valves – Manually operated (ISO 15995:2006)
	<a href="#">EN ISO 17879:2017</a>	<a href="#">Gas cylinders - Self-closing cylinder valves - Specification and type testing</a>
4.1.6.8 (b) and (c)	either ISO 11117:1998 or ISO 11117:2008 + Cor 1:2009	Gas Cylinders – Valve Protection caps and valve guards for industrial and medical gas cylinders – Design construction and tests
	EN 962:1996 + A2:2000	Valve protection caps and valve guards for industrial and medical gas cylinders – Design, construction and tests
	ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride

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**4.1.7 Special packing provisions for organic peroxides (Class 5.2) and self-reactive substances of Class 4.1**

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 Use of packagings (except IBCs)**

4.1.7.1.1 Packagings for organic peroxides and self-reactive substances shall conform to the requirements of Chapter 6.1 and shall meet its test requirements for packing group II.

4.1.7.1.2 The packing methods for organic peroxides and self-reactive substances are listed in packing instruction 520 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 2.2.41.4 and 2.2.52.4.

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 20.4.3 (b) (resp. 20.4.2 (b)) of the Manual of Tests and Criteria 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 20.4.3 (c) (resp. 20.4.2 (c)) of the Manual of Tests and Criteria 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 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 packing instruction IBC520 may be carried in IBCs in accordance with this packing instruction. IBCs shall conform to the requirements of Chapter 6.5 and shall meet its test requirements for packing group II.

4.1.7.2.2 Other organic peroxides and self-reactive substances of type F may be carried 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 carriage 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 20.4.3 (f) [resp. 20.4.2 (f)] of the Manual of Tests and Criteria, exit box F of Figure 20.1 (b) of the Manual;
- (b) To prove the compatibility of all materials normally in contact with the substance during carriage;
- (c) To determine, when applicable, the control and emergency temperatures associated with the carriage 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 carriage of the substance.

If the country of origin is not a Contracting Party to ADR, the classification and transport conditions shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.

4.1.7.2.3 Emergencies to be taken into account are self-accelerating decomposition and fire engulfment. To prevent explosive rupture of metal or composite 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 (Class 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 carriage.

4.1.8.2 The definitions in 1.2.1 and the general packing provisions of 4.1.1.1 to 4.1.1.17, except 4.1.1.10 to 4.1.1.12 and 4.1.1.15 apply to infectious substances packages. However, liquids shall only be filled into packagings which have an appropriate resistance to the internal pressure that may develop under normal conditions of carriage.

4.1.8.3 An itemized list of contents shall be enclosed between the secondary packaging and the outer packaging. When the infectious substances to be carried are unknown, but suspected of meeting the criteria for inclusion in Category A, the words "suspected Category A infectious substance" shall be shown, in parenthesis, following the proper shipping name on the document inside the outer packaging.

4.1.8.4 Before an empty packaging is returned to the consignor, or sent elsewhere, it shall be disinfected or sterilized to nullify any hazard and any label or mark indicating that it had contained an infectious substance shall be removed or obliterated.

4.1.8.5 Provided an equivalent level of performance is maintained, the following variations in the primary receptacles placed within a secondary packaging are allowed without the need for further testing of the completed packaging:

- (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 primary receptacle tested (e.g. shape: round, rectangular, etc.);

- (ii) the material of construction of the primary receptacles (e.g. glass, plastics, metal) offers resistance to impact and stacking forces equivalent to or better than that of the primary receptacles originally tested;
  - (iii) the primary receptacles have the same or smaller openings and the closure is of equivalent design (e.g. screw cap, friction lid, etc.);
  - (iv) sufficient additional cushioning material is used to take up empty spaces and to prevent significant movement of the primary receptacles; and
  - (v) primary receptacles are oriented within the secondary packagings 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.

4.1.8.6 Paragraphs 4.1.8.1 to 4.1.8.5 only apply to infectious substances of Category A (UN Nos. 2814 and 2900). They do not apply to UN No. 3373 BIOLOGICAL SUBSTANCE, CATEGORY B (see packing instruction P650 of 4.1.4.1), nor to UN No. 3291 CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.

4.1.8.7 For the carriage of animal material, packagings or IBCs not specifically authorized in the applicable packing instruction shall not be used for the carriage of a substance or article unless specifically approved by the competent authority of the country of origin<sup>2</sup> and provided:

- (a) The alternative packaging complies with the general requirements of this Part;
- (b) When the packing instruction indicated in Column (8) of Table A of Chapter 3.2 so specifies, the alternative packaging meets the requirements of Part 6;
- (c) The competent authority of the country of origin<sup>2</sup> 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 Column (8) of Table A of Chapter 3.2; 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.

#### **4.1.9 Special packing provisions for radioactive material**

##### **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 2.2.7.2.2, 2.2.7.2.4.1, 2.2.7.2.4.4, 2.2.7.2.4.5, 2.2.7.2.4.6, special provision 336 of Chapter 3.3 and 4.1.9.3.

The types of packages for radioactive materials covered by ADR, are:

- (a) Excepted package (see 1.7.1.5);
- (b) Industrial package Type 1 (Type IP-1 package);
- (c) Industrial package Type 2 (Type IP-2 package);
- (d) Industrial package Type 3 (Type IP-3 package);
- (e) Type A package;
- (f) Type B(U) package;
- (g) Type B(M) package;

<sup>2</sup> If the country of origin is not a Contracting Party to ADR, the competent authority of the first Contracting Party to the ADR reached by the consignment.

(h) Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements.

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<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters; and
- (b) 0.4 Bq/cm<sup>2</sup> for all other alpha emitters.

These limits are applicable when averaged over any area of 300 cm<sup>2</sup> of any part of the surface.

4.1.9.1.3 A package shall not contain any items other than those that are necessary for the use of the radioactive material. The interaction between these items and the package under the conditions of carriage applicable to the design, shall not reduce the safety of the package.

4.1.9.1.4 Except as provided in 7.5.11, CV33, the level of non-fixed contamination on the external and internal surfaces of overpacks, containers, tanks, IBCs and vehicles shall not exceed the limits specified in 4.1.9.1.2.

4.1.9.1.5 For radioactive material having other dangerous properties the package design shall take into account those properties. Radioactive material with a subsidiary ~~riskhazard~~, packaged in packages that do not require competent authority approval, shall be carried in packagings, IBCs, tanks or bulk containers fully complying with the requirements of the relevant chapters of Part 6 as appropriate, as well as applicable requirements of chapters 4.1, 4.2 or 4.3 for that subsidiary ~~riskhazard~~.

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4.1.9.1.6 Before a packaging is first used to carry radioactive material, it shall be confirmed that it has been manufactured in conformity with the design specifications to ensure compliance with the relevant provisions of ADR and any applicable certificate of approval. The following requirements shall also be fulfilled, if applicable:

- (a) If the design pressure of the containment system exceeds 35 kPa (gauge), it shall be ensured that the containment system of each packaging conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;
- (b) For each packaging intended for use as a Type B(U), Type B(M) or Type C package and for each packaging intended to contain 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 each packaging intended to contain fissile material, it shall be ensured that the effectiveness of the criticality safety features is within the limits applicable to or specified for the design and in particular where, in order to comply with the requirements of 6.4.11.1 neutron poisons are specifically included, checks shall be performed to confirm the presence and distribution of those neutron poisons.

4.1.9.1.7 Before each shipment of any package, it shall be ensured that the package contains neither:

- (a) Radionuclides different from those specified for the package design; nor
- (b) Contents in a form, or physical or chemical state different from those specified for the package design.

4.1.9.1.8 Before each shipment of any package, it shall be ensured that all the requirements specified in the relevant provisions of ADR and in the applicable certificates of approval have been fulfilled. The following requirements shall also be fulfilled, if applicable:

- (a) 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;
- (b) 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;

- (c) 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 6.4.8.8 and 6.4.10.3 were made;
- (d) For packages containing fissile material the measurement specified in 6.4.11.5 (b) and the tests to demonstrate closure of each package as specified in 6.4.11.8 shall be performed.

4.1.9.1.9 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.

4.1.9.1.10 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.

4.1.9.1.11 Except for packages or overpacks carried under exclusive use under the conditions specified in 7.5.11, CV33 (3.5)(a), the maximum radiation level at any point on any external surface of a package or overpack shall not exceed 2 mSv/h.

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

#### **4.1.9.2 Requirements and controls for carriage of LSA material and SCO**

4.1.9.2.1 The quantity of LSA material or SCO in a single Type IP-1 package, Type IP-2 package, Type IP-3 package, 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 For LSA material and SCO which are or contain fissile material, which is not excepted under 2.2.7.2.3.5, the applicable requirements of 7.5.11, CV33 (4.1) and (4.2) shall be met.

4.1.9.2.3 For LSA material and SCO which are or contain fissile material, the applicable requirements of 6.4.11.1 shall be met.

4.1.9.2.4 LSA material and SCO in groups LSA-I and SCO-I may be carried unpackaged under the following conditions:

- (a) All unpackaged material other than ores containing only naturally occurring radionuclides shall be carried in such a manner that under routine conditions of carriage there will be no escape of the radioactive contents from the vehicle nor will there be any loss of shielding;
- (b) Each vehicle shall be under exclusive use, except when only carrying SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than ten times the corresponding level according to the definition of "contamination" in 2.2.7.1.2;
- (c) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in 2.2.7.2.3.2 (a)(i), measures shall be taken to ensure that the radioactive material is not released into the vehicle;
- (d) Unpackaged fissile material shall meet the requirements of 2.2.7.2.3.5 (e).

4.1.9.2.5 LSA material and SCO, except as otherwise specified in 4.1.9.2.4, shall be packaged in accordance with the table below:

**Table 4.1.9.2.5: Industrial package requirements for LSA material and SCO**

Radioactive contents	Industrial package type	
	Exclusive use	Not under exclusive use
LSA-I Solid <sup>a</sup> 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 <sup>a</sup>	Type IP-1	Type IP-1
SCO-II	Type IP-2	Type IP-2

<sup>a</sup> Under the conditions specified in 4.1.9.2.4, LSA-I material and SCO-I may be carried unpackaged.

#### 4.1.9.3 Packages containing fissile material

The contents of packages containing fissile material shall be as specified for the package design either directly in ADR or in the certificate of approval.

#### 4.1.10 Special provisions for mixed packing

4.1.10.1 When mixed packing is permitted in accordance with the provisions of this section, different dangerous goods or dangerous goods and other goods may be packed together in combination packagings conforming to 6.1.4.21, provided that they do not react dangerously with one another and that all other relevant provisions of this Chapter are complied with.

**NOTE 1:** See also 4.1.1.5 and 4.1.1.6.

**NOTE 2:** For radioactive material, see 4.1.9.

4.1.10.2 Except for packages containing Class 1 goods only or Class 7 goods only, if wooden or fibreboard boxes are used as outer packagings, a package containing different goods packed together shall not weigh more than 100 kg.

4.1.10.3 Unless otherwise prescribed by a special provision applicable according to 4.1.10.4, dangerous goods of the same class and the same classification code may be packed together.

4.1.10.4 When indicated for a given entry in Column (9b) of Table A of Chapter 3.2, the following special provisions shall apply to the mixed packing of the goods assigned to that entry with other goods in the same package.

- MP 1 May only be packed together with goods of the same type within the same compatibility group.
- MP 2 Shall not be packed together with other goods.
- MP 3 Mixed packing of UN No. 1873 with UN No. 1802 is permitted.
- MP 4 Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of ADR. However, if this organic peroxide is a hardener or compound system for Class 3 substances, mixed packing is permitted with these substances of Class 3.
- MP 5 UN No. 2814 and UN No. 2900 may be packed together in a combination packaging in conformity with packing instruction P620. They shall not be packed together with other goods; this does not apply to UN No. 3373 Biological substance, Category B packed in

accordance with packing instruction P650 or to substances added as coolants, e.g. ice, dry ice or refrigerated liquid nitrogen.

- MP 6 Shall not be packed together with other goods. This does not apply to substances added as coolants, e.g. ice, dry ice or refrigerated liquid nitrogen.
- MP 7 May - in quantities not exceeding 5 litres per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,
- provided they do not react dangerously with one another.
- MP 8 May - in quantities not exceeding 3 litres per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,
- provided they do not react dangerously with one another.
- MP 9 May be packed together in an outer packaging for combination packagings in accordance with 6.1.4.21:
- with other goods of Class 2;
  - with goods of other classes, when the mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,
- provided they do not react dangerously with one another.
- MP 10 May - in quantities not exceeding 5 kg per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,
- provided they do not react dangerously with one another.
- MP 11 May - in quantities not exceeding 5 kg per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes (except substances of packing group I or II of Class 5.1) when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,
- provided they do not react dangerously with one another.
- MP 12 May - in quantities not exceeding 5 kg per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes (except substances of packing group I or II of Class 5.1) when mixed packing is also permitted for these; or

- with goods which are not subject to the requirements of ADR,  
provided they do not react dangerously with one another.
- Packagings shall not weigh more than 45 kg. If fibreboard boxes are used as outer packagings however, a package shall not weigh more than 27 kg.
- MP 13 May - in quantities not exceeding 3 kg per inner packaging and per package - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,  
provided they do not react dangerously with one another.
- MP 14 May - in quantities not exceeding 6 kg per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,  
provided they do not react dangerously with one another.
- MP 15 May - in quantities not exceeding 3 litres per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,  
provided they do not react dangerously with one another.
- MP 16 *(Reserved)*
- MP 17 May - in quantities not exceeding 0.5 litre per inner packaging and 1 litre per package - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of other classes, except Class 7, when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,  
provided they do not react dangerously with one another.
- MP 18 May - in quantities not exceeding 0.5 kg per inner packaging and 1 kg per package - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of other classes, except Class 7, when mixed packing is also permitted for these; or
  - with goods which are not subject to the requirements of ADR,  
provided they do not react dangerously with one another.
- MP 19 May - in quantities not exceeding 5 litres per inner packaging - be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or



- with goods which are not subject to the requirements of ADR, provided they do not react dangerously with one another.
- MP 20 May be packed together with substances covered by the same UN number.
- Shall not be packed together with goods of Class 1 having different UN numbers, except if provided for by special provision MP 24.
- Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of ADR.
- MP 21 May be packed together with articles covered by the same UN number.
- Shall not be packed together with goods of Class 1 having different UN numbers, except for:
- (a) their own means of initiation, provided that
    - (i) the means of initiation will not function under normal conditions of carriage; or
    - (ii) such means have at least two effective protective features which prevent explosion of an article in the event of accidental functioning of the means of initiation; or
    - (iii) when such means do not have two effective protective features (i.e. means of initiation assigned to compatibility group B), in the opinion of the competent authority of the country of origin<sup>2</sup> the accidental functioning of the means of initiation does not cause the explosion of an article under normal conditions of carriage;
  - (b) articles of compatibility groups C, D and E.
- Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of ADR.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1. For the description of the goods in the transport document, see 5.4.1.2.1 (b).
- MP 22 May be packed together with articles covered by the same UN number.
- Shall not be packed together with goods of Class 1 having different UN numbers, except
- (a) With their own means of initiation, provided that the means of initiation will not function under normal conditions of carriage; or
  - (b) With articles of compatibility groups C, D and E; or
  - (c) If provided for by special provision MP 24.
- Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of ADR.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1. For the description of the goods in the transport document, see 5.4.1.2.1 (b).

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<sup>2</sup> If the country of origin is not a Contracting Party to ADR, the approval shall require validation by the competent authority of the first country Contracting Party to ADR reached by the consignment.

- MP 23 May be packed together with articles covered by the same UN number.
- Shall not be packed together with goods of Class 1 having different UN numbers, except
- (a) With their own means of initiation, provided that the means of initiation will not function under normal conditions of carriage; or
  - (b) If provided for by special provision MP 24.
- Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of ADR.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1. For the description of the goods in the transport document, see 5.4.1.2.1 (b).
- MP 24 May be packed together with goods with the UN numbers shown in the table below, under the following conditions:
- if a letter A is indicated in the table, the goods with those UN numbers may be included in the same package without any special limitation of mass;
  - if a letter B is indicated in the table, the goods with those UN numbers may be included in the same package up to a total mass of 50 kg of explosive substances.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1. For the description of the goods in the transport document, see 5.4.1.2.1 (b).

UN No.	0012	0014	0027	0028	0044	0054	0160	0161	0186	0191	0194	0195	0197	0238	0240	0312	0333	0334	0335	0336	0337	0373	0405	0428	0429	0430	0431	0432	0505	0506	0507	0509				
0012		A																																		
0014	A																																			
0027				B	B		B	B																										B		
0028			B	B			B	B																											B	
0044			B	B			B	B																											B	
0054									B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0160			B	B	B			B																											B	
0161			B	B	B		B																												B	
0186					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0191					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0194					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0195					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0197					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0238					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0240					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0312					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	
0333																		A	A	A	A															
0334																		A	A	A	A															
0335																		A	A	A	A															
0336																		A	A	A	A															
0337																		A	A	A	A															
0373					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0405					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0428					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0429					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0430					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0431					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0432					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0505					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0506					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0507					B				B	B	B	B	B	B	B	B							B	B	B	B	B	B	B	B	B	B	B	B	B	B
0509			B	B	B		B	B																												

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Commented [24038]: ECE/TRANS/WP.15/240

