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Working Party on the Transport of Dangerous Goods  
(Bern, 28 May – 1 June 2001)

AMENDMENTS TO CHAPTER 4.1 TO ACCOMMODATE THE PROVISIONS ADOPTED  
FOR CLASS 2 RECEPTACLES IN THE UN MODEL REGULATIONS

Transmitted by the European Industrial Gases Association (EIGA) \*/

Introduction

Much of the text adopted in the 12<sup>th</sup> Revision of the UN Model Regulations for the packing provisions for Class 2 receptacles is based upon the RID/ADR. Some changes were made, however, to the structure and content of P200 that includes now three sub-tables (one for the compressed gases, one for the liquefied and dissolved gases and one for substances from other classes that are packed in gas receptacles), and some new provisions have been introduced.

In view of keeping as much as possible the benefit of harmonisation, EIGA proposes to adopt the new structure of P200 and the new requirements except in the cases where they are in conflict with already adopted principles within ADR or RID: e.g. the classification code, or the “non-mandatory” character of the use of EN or ISO standards or the use of “capsules” that is not foreseen in the UN Model regulations.

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\*/ Circulated by the Central Office for International Carriage by Rail (OCTI) under the symbol OCTI/RID/GT/III/2001/32.

EIGA took the opportunity to propose for the carriage in capsules the same limitations as for the aerosols and cartridges: not for pyrophoric gases or toxic gases with a LC<sub>50</sub> lower than 200 ppm.

The comments of EIGA to the proposed text are shown in italics. New text proposed by EIGA is underlined.

### Proposals

Amend Chapter 4.1 as follows

**Proposal 1:** Replace the existing P200 with the following:

| P200   | PACKING INSTRUCTION | P200 |
|--|---------------------|------|
| <p><b>Type of packagings:</b> Cylinder, tubes, pressure drums and bundles of cylinders</p> <p>Cylinder, tubes, pressure drums and bundles of cylinders are authorised provided the special packing provisions of <b>4.1.6</b> and the provisions listed below under (1) to (9): <i>(present ADR text)</i></p> <p><del>For pressure receptacles, the general packing requirements of 4.1.6.1 shall be met. In addition, for MEGCs, the general requirements of 4.2.4 shall be met.</del></p> <p><del>Cylinders, tubes, pressure drums, bundles of cylinders constructed as specified in 6.2 and MEGCs constructed as specified in 6.7.5 are authorised for the transport of a specific substance when specified in the following tables. For some substances the special packing provisions may prohibit a particular type of cylinder, tube, pressure drum or bundle of cylinders. (new UN text redundant with present ADR/RID text; the reference to the construction requirements appear in 4.1.6 and should not be repeated here; the reference to MEGC's is redundant as well, 4.2 and 4.3 will refer to P200 for the filling of the elements.)</del></p> <p><b>General</b></p> <p>(1) Receptacles shall be so closed and leakproof as to prevent escape of the gases; <i>(present ADR text)</i></p> <p>(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 <i>(new text of UN; additional requirements on pressure relief devices for UN approved pressure receptacles have been introduced in 6.2.5.1);</i></p> <p>(3) <i>(new UN text that replaces existing ADR/RID paragraphs (10) and (11))</i> 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:</p> <ul style="list-style-type: none"><li>(a) the UN number, name and description, and classification of the substance;</li><li>(b) the LC<sub>50</sub> for toxic substances;</li><li>(c) the types of pressure receptacles authorised for the substance, shown by the letter "X";</li><li>(d) the maximum test period for periodic inspection of the pressure receptacles;</li><li>(e) the minimum test pressure of the pressure receptacles;</li><li>(f) the maximum working pressure of the pressure receptacles for compressed gases (<del>where no value is given, the working pressure shall not exceed two thirds of the test pressure</del>) or the maximum filling ratio(s) <del>dependent on the test pressure(s)</del> for liquefied and dissolved gases; <i>(crossed out text is redundant with following paragraphs or wrong -for low pressure liquefied gases, the filling ratio is not related to the test pressure)</i></li><li>(g) special packing provisions that are specific to a substance.</li></ul> |                     |      |

P200

PACKING INSTRUCTION (cont'd)

P200

Test pressure and filling ratios

- (4) The minimum test pressure required for is 1 MPa (10 bar); *(present ADR text, to be kept, essential requirement)*
- (5) *(new UN text that replaces existing ADR/RID texts of (3), (4), (5) and (6))* 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 provided that the above criterion is met, except where special packing provision "o" applies.

For high pressure liquefied gases for which data is not provided in the table, the maximum filling ratio (FR) shall be determined as follows:

$$FR = 8.5 H 10^{-4} H d_g H P_h$$

where FR = maximum filling ratio  
 $d_g$  = gas density (at 15 °C, 1 bar)(in g/l)  
 $P_h$  = minimum test pressure (in bar)

If the density of the gas is unknown, the maximum filling ratio shall be determined as follows:

$$FR = \frac{P_h \times MM \times 10^{-3}}{R \times 338}$$

where FR = maximum filling ratio  
 $P_h$  = minimum test pressure (in bar)  
 MM = molecular mass (in g/mol)  
 R =  $8.31451 \times 10^{-2}$  bar.l/mol.K (gas constant)

For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components.

- (c) For low pressure liquefied gases, the maximum mass of contents per litre of water capacity (filling factor) shall equal 0.95 times the density of the liquid phase at 50 °C; in addition, the liquid phase shall not fill the pressure receptacle at any temperature up to 60 °C. The test pressure of the pressure receptacle shall be at least equal to the vapour pressure (absolute) of the liquid at 65 °C, minus 100 kPa (1 bar).

For low pressure liquefied gases for which filling data is not provided in the table, the maximum filling ratio shall be determined as follows:

$$FR = (0.0032 H BP - 0.24) H d_l$$

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

| P200   | PACKING INSTRUCTION (cont'd) | P200 |
|--|------------------------------|------|
| <p>(d) For UN 1001, acetylene, dissolved, and UN 3374 acetylene, solvent free, see (9), special packing provision p.</p> <p>(6) Other test pressure and degree of filling may be used provided they satisfy the general requirements outlined in the previous paragraphs of this section;</p>  |                              |      |
| <p><b>Periodic inspections</b></p>   |                              |      |
| <p>(7) Refillable receptacles shall be subjected to periodic inspections in accordance with the provisions of 6.2.1.6.</p> <p>(8) If special requirements for certain substances do not appear in the table below, periodic inspections shall be carried out: <i>(essential requirement, existing text of ADR/RID modified in (a) and (b))</i></p> <p>(a) <u>Every 5 years in the case of 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 4C;</u></p> <p>(b) <u>Every 5 years in the case of receptacles intended for the carriage of substances from other classes;</u></p> <p>(c) Every 10 years in the case of receptacles intended for the carriage of gases of classification codes 1A, 1O, 1F, 2A, 2O and 2F.</p>  |                              |      |
| <p>By derogation from this paragraph, the periodic inspection of receptacles which make use of composite materials (composite receptacles) shall be carried out at intervals determined by the competent authority of the Contracting Party to ADR (RID) which has approved the technical code for the design and construction. <i>(present ADR/RID text)</i></p>  |                              |      |
| <p><b>Special packing provisions</b></p>   |                              |      |
| <p>(9) Keys for the column "Special packing provisions": <i>(new UN text to replace (12))</i></p> <p>Material compatibility (for gases see EN ISO 11114-1:1997 and EN ISO 11114-2:2000)</p> <p>a: Aluminium alloy pressure receptacles are not authorized.</p> <p>b: Copper valves shall not be used.</p> <p>c: Metal parts in contact with the contents shall not contain more than 65% copper <i>(70% in present ADR/RID)</i>.</p> <p>d: When steel pressure receptacles are used, only those resistant to hydrogen embrittlement shall be authorized. <i>(new text)</i></p> <p>Requirements for toxic substances with an LC<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup> (ppm)</p> <p>k: Valve outlets shall be fitted with gas tight plugs or caps <u>which shall be made of material not liable to attack by the contents of the receptacle.</u> <i>(text transferred from ADR 4.1.6.5)</i></p> <p>Each cylinder within a bundle shall be fitted with an individual valve that shall be closed during transport. After filling, the manifold shall be evacuated, purged and plugged. <i>(second sentence is new UN text)</i></p> |                              |      |

| P200  | PACKING INSTRUCTION (cont'd) | P200 |
|---|------------------------------|------|
| <p>The pressure receptacle(s) shall: <i>(new UN requirement):</i></p> <ul style="list-style-type: none"><li>(i) have a test pressure greater than or equal to 200 bar and a minimum wall thickness of 3.5 mm for aluminium alloy or 2 mm for steel; or</li><li>(ii) have an outer packaging meeting the packing group I performance level; or</li><li>(iii) <u>be carried in a metallic, wooden or strong plastic box</u> <i>(new text proposed by EIGA)</i></li></ul> <p>Pressure receptacles shall not be fitted with a pressure relief device. <i>(new UN text, but redundant with (2))</i></p> <p>Cylinders and individual cylinders in a bundle shall be limited to a maximum water capacity of 85 litres. <i>(new UN text)</i></p> <p>Each valve shall have a taper threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle. <i>(new UN text)</i></p> <p>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 <i>(new UN text)</i></p> <p><u>Carriage in capsules is not allowed</u> <i>(new text proposed by EIGA):</i></p> <p>Each pressure receptacle shall be tested for leakage after filling <i>(new UN text)</i></p>  |                              |      |
| <p>Gas specific provisions</p> <ul style="list-style-type: none"><li>l: UN 1040 ethylene oxide may also be packed in hermetically sealed glass or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the packing group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging shall be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55 °C is achieved. The total quantity in any outer packaging shall not exceed 2.5 kg. <i>(new UN text)</i></li><li>m: Pressure receptacles shall be filled to a working pressure not exceeding 5 bar. <i>(new text, applies to UN 1081 tetrafluoroethylene reflecting the existing ADR restriction)</i></li><li>n: A pressure receptacle shall contain not more than 5 kg of the gas.</li><li>o: In no case shall the working pressure or filling ratio shown in the table be exceeded. <i>(new text for F2, NO, F2O, diborane and tetrafluoroethylene)</i></li><li>p: For UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free: cylinders shall be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene shall not exceed the values prescribed in the approval <del>or in ISO 3807-1:2000 or ISO 3807-2:2000, as applicable.</del> <i>(last part of UN text crossed out because in ADR/RID, D/A cylinders are always subject to approval)</i></li></ul> <p>For UN 1001 acetylene, dissolved, cylinders shall contain a quantity of acetone or suitable solvent as specified in the approval <del>(see ISO 3807-1:2000 or ISO 3807-2:2000, as applicable;</del> <i>crossed out see previous remark</i>); cylinders fitted with pressure relief devices</p> |                              |      |

| P200  | PACKING INSTRUCTION (cont'd) | P200  |
|---|------------------------------|---|
| <p>or manifolded together shall be transported vertically.</p> <p>The test pressure of 52 bar applies only to cylinders conforming to ISO 3807-2:2000. <i>(UN text crossed out because US only)</i></p> <p>q: The valves of pressure receptacles for pyrophoric gases or flammable mixtures of gases containing more than 1% of pyrophoric compounds shall be fitted with gas-tight plugs or caps <u>which shall be made of material not liable to attack by the contents of the receptacle.</u> <i>(new text transferred from ADR 4.1.6.5)</i>. When these pressure receptacles are manifolded in a bundle, each of the pressure receptacles shall be fitted with an individual valve that shall be closed during transport, and the manifold outlet valve shall be fitted with a gas-tight plug or cap. <u>Carriage in capsules is not allowed</u> <i>(last sentence is new text proposed by EIGA)</i>:</p> <p>r: <i>(add the existing special requirement “n” for capsules modified as follows and to be applied accordingly, the restriction on capsules appear under k and q)</i><br/>allowed for carriage in capsules under the following conditions:</p> <ul style="list-style-type: none"> <li>(a) The mass of gas shall not exceed 150 g per capsule;</li> <li>(b) The capsules shall be free from faults liable to impair the strength;</li> <li>(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;</li> <li>(d) The capsules shall be placed in an outer packaging of sufficient strength. A package shall not weigh more than 75 kg.</li> </ul> <p>s: 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 <i>(instead of “in accordance with ISO 11621:1997 and not contaminated with oil” as in UN text that makes ISO standard mandatory)</i>.</li> </ul> <p>Periodic inspection</p> <p>u: The interval between periodic tests may be extended to 10 years for aluminium alloy pressure receptacles <del>when the alloy of the pressure receptacle has been subjected to stress corrosion testing as specified in ISO 7866:1999.</del> <i>(deleted to be in line with existing ADR/RID text and because it would restrict to new receptacles)</i></p> <p>v: The interval between inspections for steel cylinders 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;</li> <li>(b) in accordance with the requirements of a technical code or a standard recognised by the competent authority, or standard EN 1440:1996 “Transportable refillable welded cylinders for liquefied petroleum gas (LPG) - Periodic requalification”. <i>(existing ADR/RID text of “m”)</i></li> </ul> <p>(10) The applicable requirements of this packing instruction are considered to have been complied with if the following standards, as relevant, are applied:</p> |                              |   |
| Applicable requirements   | Reference                    | Title of document   |
| P200 (9) (p)  | EN1801: 1998                 | Transportable gas cylinders – Filling conditions for single acetylene cylinders (including list of permissible porous masses) |
| P200 (9) (p)  | EN 12755: 2000               | Transportable gas cylinders – Filling conditions for acetylene bundles  |

*The column for the MEGC has been deleted; the allowance to transport in MEGC or in battery-vehicles is given by the tank code in columns 10 or 12 of Chapter 3.2*

| 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 | Test pressure, bar <sup>1</sup> | Working pressure, bar <sup>1</sup> | Special packing provisions |      |
| 1002                      | AIR, COMPRESSED                                     | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1006                      | ARGON, COMPRESSED                                   | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1014                      | CARBON DIOXIDE AND OXYGEN MIXTURE, COMPRESSED       | 1O                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1016                      | CARBON MONOXIDE, COMPRESSED                         | 1TF                          | 376<br>0                           | X         | X     | X              | X                    | 5                  |                                 |                                    | u                          |      |
| 1023                      | COAL GAS, COMPRESSED                                | 1TF                          |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    |                            |      |
| 1045                      | FLUORINE, COMPRESSED                                | 1TO<br>C                     | 185                                | X         |       |                | X                    | 5                  | 200                             | 30                                 | a, k,<br>n, o              |      |
| 1046                      | HELIUM, COMPRESSED                                  | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1049                      | HYDROGEN, COMPRESSED                                | 1F                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | d                          |      |
| 1056                      | KRYPTON, COMPRESSED                                 | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1065                      | NEON, COMPRESSED                                    | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1066                      | NITROGEN, COMPRESSED                                | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1071                      | OIL GAS, COMPRESSED                                 | 1TF                          |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    |                            |      |
| 1072                      | OXYGEN, COMPRESSED                                  | 1O                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | s                          |      |
| 1612                      | HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE | 1T                           |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | z                          |      |
| 1660                      | NITRIC OXIDE, COMPRESSED                            | 1TO<br>C                     | 115                                | X         |       |                | X                    | 5                  | 200                             | 50                                 | k, o                       |      |
| 1953                      | COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.            | 1TF                          |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | z                          |      |
| 1954                      | COMPRESSED GAS, FLAMMABLE, N.O.S.                   | 1F                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | z                          |      |
| 1955                      | COMPRESSED GAS, TOXIC, N.O.S.                       | 1T                           |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | z                          |      |
| 1956                      | COMPRESSED GAS, N.O.S.                              | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | z                          |      |
| 1957                      | DEUTERIUM, COMPRESSED                               | 1F                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | d                          |      |
| 1964                      | HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.         | 1F                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | z                          |      |

<sup>1</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 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 | Test pressure, bar <sup>1</sup> | Working pressure, bar <sup>1</sup> | Special packing provisions |      |
| 1971                      | METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content | 1F                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1979                      | RARE GASES MIXTURE, COMPRESSED   | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1980                      | RARE GASES AND OXYGEN MIXTURE, COMPRESSED                                | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 1981                      | RARE GASES AND NITROGEN MIXTURE, COMPRESSED                              | 1A                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    |                            |      |
| 2034                      | HYDROGEN AND METHANE MIXTURE, COMPRESSED                                 | 1F                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | d                          |      |
| 2190                      | OXYGEN DIFLUORIDE, COMPRESSED  | 1TO<br>C                     | 2.6                                | X         |       |                | X                    | 5                  | 200                             | 30                                 | a, k,<br>n, o              |      |
| 2600                      | CARBON MONOXIDE AND HYDROGEN MIXTURE, COMPRESSED                         | 1TF                          |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | d, u                       |      |
| 3156                      | COMPRESSED GAS, OXIDIZING, N.O.S.  | 1O                           |                                    | X         | X     | X              | X                    | 10                 |                                 |                                    | z                          |      |
| 3303                      | COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.                                 | 1TO                          |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | z                          |      |
| 3304                      | COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.                                 | 1TC                          |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | z                          |      |
| 3305                      | COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.                      | 1TF<br>C                     |                                    | X         | X     | X              | X                    | 5                  |                                 |                                    | z                          |      |
| 3306                      | COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.                      | 1TO<br>C                     |                                    | 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | 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                  | 33                 | 0.53                 | b                          |
| 1008   | BORON TRIFLUORIDE   | 2TC                 | 387*                               | X         | X              | X                    | X     | 5                  | 225<br>300         | 0.715<br>0.86        |                            |
| 1009   | BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)                      | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 42<br>120<br>250   | 1.13<br>1.44<br>1.60 |                            |
| 1010   | BUTADIENES, STABILIZED (1,2-butadiene), or                          | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.59                 | z                          |
| 1010   | BUTADIENES, STABILIZED (1,3-butadiene), or                          | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.55                 |                            |
| 1010   | BUTADIENES, STABILIZED (mixtures of 1,3-butadiene and hydrocarbons) | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.50                 |                            |
| 1011   | BUTANE  | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.51                 | v                          |
| 1012   | BUTYLENE (butylenes mixture) or                                     | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.50                 | z                          |
| 1012   | BUTYLENE (1-butylene) or  | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.53                 |                            |
| 1012   | BUTYLENE (cis-2-butylene) or  | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.55                 |                            |
| 1012   | BUTYLENE (trans-2-butylene)   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.54                 |                            |
| 1013   | CARBON DIOXIDE  | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 190<br>250         | 0.66<br>0.75         |                            |
| 1015   | CARBON DIOXIDE AND NITROUS OXIDE MIXTURE                            | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 250                | 0.75                 |                            |
| 1017   | CHLORINE  | 2TC                 | 293                                | X         | X              | X                    | X     | 5                  | 22                 | 1.25                 | a                          |
| 1018   | CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)                        | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 29                 | 1.03                 |                            |
| 1020   | CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)                     | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 25                 | 1.08                 |                            |
| 1021   | 1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)          | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 12                 | 1.20                 |                            |

\* This LC<sub>50</sub> value is under review.

| 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar       | Filling ratio                | Special packing provisions |
| 1022   | CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)  | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 100<br>120<br>190<br>250 | 0.83<br>0.90<br>1.04<br>1.10 |                            |
| 1026   | CYANOGEN   | 2TF                          | 350                                | X         | X              | X                    | X     | 5                  | 100                      | 0.70                         | u                          |
| 1027   | CYCLOPROPANE   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 20                       | 0.53                         |                            |
| 1028   | DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)   | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 18                       | 1.15                         |                            |
| 1029   | DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)   | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 10                       | 1.23                         |                            |
| 1030   | 1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)  | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 18                       | 0.79                         |                            |
| 1032   | DIMETHYLAMINE, ANHYDROUS   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                       | 0.59                         | b                          |
| 1033   | DIMETHYL ETHER   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 18                       | 0.58                         |                            |
| 1035   | ETHANE   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 95<br>120<br>300         | 0.25<br>0.29<br>0.39         |                            |
| 1036   | ETHYLAMINE   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                       | 0.61                         | b                          |
| 1037   | ETHYL CHLORIDE   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                       | 0.80                         | a                          |
| 1039   | ETHYL METHYL ETHER   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                       | 0.64                         |                            |
| 1040   | ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C | 2TF                          | 2900*                              | X         | X              | X                    | X     | 5                  | 15                       | 0.78                         | l                          |
| 1041   | ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% ethylene oxide but not more than 87% | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 190<br>250               | 0.66<br>0.75                 |                            |
| 1043   | FERTILIZER AMMONIATING SOLUTION with free ammonia  | CARRIAGE PROHIBITED          |                                    |           |                |                      |       |                    |                          |                              |                            |

| 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 | Pressure drums | Bundles of cylinders | Test period, years | Test pressure, bar | Filling ratio                          | Special packing provisions   |                              |
| 1048   | HYDROGEN BROMIDE, ANHYDROUS   | 2TC                 | 2860                               | X         | X              | X                    | X                  | 5                  | 60                                     | 1.54                         | a, d                         |
| 1050   | HYDROGEN CHLORIDE, ANHYDROUS  | 2TC                 | 2810*                              | X         | X              | X                    | X                  | 5                  | 100<br>120<br>150<br>200               | 0.30<br>0.56<br>0.67<br>0.74 | a, d<br>a, d<br>a, d<br>a, d |
| 1053   | HYDROGEN SULPHIDE   | 2TF                 | 712                                | X         | X              | X                    | X                  | 5                  | 55                                     | 0.67                         | d, u                         |
| 1055   | ISOBUTYLENE   | 2F                  |                                    | X         | X              | X                    | X                  | 10                 | 10                                     | 0.52                         |                              |
| 1058   | LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air  | 2A                  |                                    | X         | X              | X                    | X                  | 10                 | Test pressure = 1.5 x working pressure |                              |                              |
| 1060   | METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED or METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED (Propadiene with 1% to 4% methylacetylene) | 2F<br>2F            |                                    | X<br>X    | X<br>X         | X<br>X               | X<br>X             | 10<br>10           | 22                                     | 0.52                         | c, z<br>c                    |
| 1061   | METHYLAMINE, ANHYDROUS  | 2F                  |                                    | X         | X              | X                    | X                  | 10                 | 13                                     | 0.58                         | b                            |
| 1062   | METHYL BROMIDE  | 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                            |
| 1064   | METHYL MERCAPTAN  | 2TF                 | 1350                               | X         | X              | X                    | X                  | 5                  | 10                                     | 0.78                         | d, u                         |
| 1067   | DINITROGEN TETROXIDE (NITROGEN DIOXIDE)   | 2TO<br>C            | 115                                | X         |                | X                    |                    | 5                  | 10                                     | 1.30                         | k                            |
| 1069   | NITROSYL CHLORIDE   | 2TC                 | 35                                 | X         |                | X                    |                    | 5                  | 13                                     | 1.10                         | k                            |
| 1070   | NITROUS OXIDE   | 2O                  |                                    | X         | X              | X                    | X                  | 10                 | 180<br>225<br>250                      | 0.68<br>0.74<br>0.75         |                              |
| 1075   | PETROLEUM GASES, LIQUEFIED  | 2F                  |                                    | X         | X              | X                    | X                  | 10                 |  |                              | v, z                         |
| 1076   | PHOSGENE  | 2TC                 | 5                                  | X         | X              | X                    |                    | 5                  | 20                                     | 1.23                         | k                            |
| 1077   | PROPYLENE   | 2F                  |                                    | X         | X              | X                    | X                  | 10                 | 30                                     | 0.43                         |                              |
| 1078   | REFRIGERANT GAS, N.O.S.   | 2A                  |                                    | X         | X              | X                    | X                  | 10                 |  |                              | z                            |

\* This LC<sub>50</sub> value is under review.

| 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio        | Special packing provisions |
| 1079   | SULPHUR DIOXIDE                                | 2TC                          | 2520                               | X         | X              | X                    | X     | 5                  | 14                 | 1.23                 |                            |
| 1080   | SULPHUR HEXAFLUORIDE                           | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 70<br>140<br>160   | 1.04<br>1.33<br>1.37 |                            |
| 1081   | TETRAFLUOROETHYLENE, STABILIZED                | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 200                |                      | m, o                       |
| 1082   | TRIFLUOROCHLOROETHYLENE, STABILIZED            | 2TF                          | 2000                               | X         | X              | X                    | X     | 5                  | 19                 | 1.13                 | u                          |
| 1083   | TRIMETHYLAMINE, ANHYDROUS                      | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.56                 | b                          |
| 1085   | VINYL BROMIDE, STABILIZED                      | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                 | 1.37                 | a                          |
| 1086   | VINYL CHLORIDE, STABILIZED                     | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 12                 | 0.81                 | a                          |
| 1087   | VINYL METHYL ETHER, STABILIZED                 | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.67                 |                            |
| 1581   | CHLOROPICRIN AND METHYL BROMIDE MIXTURE        | 2T                           | 850                                | X         | X              | X                    | X     | 5                  | 10                 | 1.51                 | a                          |
| 1582   | CHLOROPICRIN AND METHYL CHLORIDE MIXTURE       | 2T                           | *                                  | 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                 |                            |
| 1749   | CHLORINE TRIFLUORIDE                           | 2TO<br>C                     | 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                 |                            |
| 1859   | SILICON TETRAFLUORIDE                          | 2TC                          | 450                                | X         | X              | X                    | X     | 5                  | 200<br>300         | 0.74<br>1.10         |                            |
| 1860   | VINYL FLUORIDE, STABILIZED                     | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 250                | 0.64                 | a                          |
| 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                          |

\* This LC<sub>50</sub> value is under review.

| 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 1952   | ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide  | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 190<br>250         | 0.66<br>0.75  |                            |
| 1958   | 1,2-DICHLORO-1,1,2,2-TETRAFLUROETHANE (REFRIGERANT GAS R 114)   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 1.30          |                            |
| 1959   | 1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)  | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 250                | 0.77          |                            |
| 1962   | ETHYLENE  | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 225<br>300         | 0.34<br>0.37  |                            |
| 1965   | HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.  | 2F                  |                                    | X         | X              | X                    | X     | 10                 |                    |               | v, z                       |
| 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                 |                    |               | z                          |
| 1969   | ISOBUTANE   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.49          | v                          |
| 1973   | CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502) | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 31                 | 1.05          |                            |
| 1974   | CHLORODIFLUOROBROMO-METHANE (REFRIGERANT GAS R 12B1)  | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 1.61          |                            |
| 1975   | NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)   | 2TO<br>C            | 115                                | X         | X              | X                    |       | 5                  |                    |               | k, z                       |
| 1976   | OCTAFLUROCYCLOBUTANE (REFRIGERANT GAS RC 318)   | 2.A                 |                                    | X         | X              | X                    | X     | 10                 | 11                 | 1.34          |                            |
| 1978   | PROPANE   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 25                 | 0.42          | v                          |
| 1982   | TETRAFLUROMETHANE (REFRIGERANT GAS R 14)  | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 200<br>300         | 0.62<br>0.94  |                            |

| 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 | Pressure drums | Bundles of cylinders | Tubes  | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 1983   | 1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)   | 2A                           |                                    | X         | X              | X                    | X      | 10                 | 10                 | 1.18          |                            |
| 1984   | TRIFLUOROMETHANE (REFRIGERANT GAS R 23)   | 2A                           |                                    | X         | X              | X                    | X      | 10                 | 190<br>250         | 0.87<br>0.95  |                            |
| 2035   | 1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)  | 2F                           |                                    | X         | X              | X                    | X      | 10                 | 35                 | 0.75          |                            |
| 2036   | XENON   | 2A                           |                                    | X         | X              | X                    | X      | 10                 | 130                | 1.24          |                            |
| 2044   | 2,2-DIMETHYLPROPANE   | 2F                           |                                    | X         | X              | X                    | X      | 10                 | 10                 | 0.53          |                            |
| 2073   | AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 40% ammonia with more than 40% but not more than 50% ammonia | 4A                           |                                    | X<br>X    | X<br>X         | X<br>X               | X<br>X | 5<br>5             | 10<br>12           | 0.80<br>0.77  | b<br>b                     |
| 2188   | ARSINE  | 2TF                          | 20                                 | X         |                | X                    |        | 5                  | 42                 | 1.10          | d, k                       |
| 2189   | DICHLOROSILANE  | 2TF<br>C                     | 314                                | X         | X              | X                    | X      | 5                  | 10                 | 0.90          |                            |
| 2191   | SULPHURYL FLUORIDE  | 2T                           | 3020                               | X         | X              | X                    | X      | 5                  | 50                 | 1.10          | u                          |
| 2192   | GERMANE   | 2TF                          | 620*                               | X         | X              | X                    | X      | 5                  | 250                | 1.02          | d                          |
| 2193   | HEXAFLUOROETHANE (REFRIGERANT GAS R 116)  | 2A                           |                                    | X         | X              | X                    | X      | 10                 | 200                | 1.10          |                            |
| 2194   | SELENIUM HEXAFLUORIDE   | 2TC                          | 50                                 | X         |                | X                    |        | 5                  | 36                 | 1.46          | k                          |
| 2195   | TELLURIUM HEXAFLUORIDE  | 2TC                          | 25                                 | X         |                | X                    |        | 5                  | 20                 | 1.00          | k                          |
| 2196   | TUNGSTEN HEXAFLUORIDE   | 2TC                          | 160*                               | X         |                | X                    |        | 5                  | 10                 | 2.70          | a, k                       |
| 2197   | HYDROGEN IODIDE, ANHYDROUS  | 2TC                          | 2860                               | X         | X              | X                    | X      | 5                  | 23                 | 2.25          | a, d                       |
| 2198   | PHOSPHORUS PENTAFLUORIDE  | 2TC                          | 190*                               | X         |                | X                    |        | 5                  | 200<br>300         | 0.90<br>1.34  | k<br>k                     |
| 2199   | PHOSPHINE   | 2TF                          | 20                                 | X         |                | X                    |        | 5                  | 225<br>250         | 0.30<br>0.45  | d, k<br>d, k               |
| 2200   | PROPADIENE, STABILIZED  | 2F                           |                                    | X         | X              | X                    | X      | 10                 | 22                 | 0.50          |                            |
| 2202   | HYDROGEN SELENIDE, ANHYDROUS  | 2TF                          | 2                                  | X         |                | X                    |        | 5                  | 31                 | 1.60          | k                          |

| 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio        | Special packing provisions |
| 2203   | SILANE   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 225<br>250         | 0.32<br>0.36         | d, q<br>d, q               |
| 2204   | CARBONYL SULPHIDE  | 2TF                 | 1700                               | X         | X              | X                    | X     | 5                  | 26                 | 0.84                 | u                          |
| 2417   | CARBONYL FLUORIDE  | 2TC                 | 360                                | X         | X              | X                    | X     | 5                  | 200<br>300         | 0.47<br>0.70         |                            |
| 2418   | SULPHUR TETRAFLUORIDE  | 2TC                 | 40                                 | X         |                | X                    |       | 5                  | 30                 | 0.91                 | k                          |
| 2419   | BROMOTRIFLUOROETHYLENE   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 1.19                 |                            |
| 2420   | HEXAFLUOROACETONE  | 2TC                 | 470                                | X         | X              | X                    | X     | 5                  | 22                 | 1.08                 |                            |
| 2421   | NITROGEN TRIOXIDE  | 2TO<br>C            | CARRIAGE PROHIBITED                |           |                |                      |       |                    |                    |                      |                            |
| 2422   | OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 12                 | 1.34                 |                            |
| 2424   | OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)  | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 25                 | 1.09                 |                            |
| 2451   | NITROGEN TRIFLUORIDE   | 2O                  |                                    | X         | X              | X                    | X     | 10                 | 200<br>300         | 0.50<br>0.75         |                            |
| 2452   | ETHYLACETYLENE, STABILIZED   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.57                 | c                          |
| 2453   | ETHYL FLUORIDE (REFRIGERANT GAS R 161)   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 30                 | 0.57                 |                            |
| 2454   | METHYL FLUORIDE (REFRIGERANT GAS R 41)   | 2F                  |                                    | X         | X              | X                    | X     | 10                 | 300                | 0.36                 |                            |
| 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                 |                            |
| 2534   | METHYLCHLOROSILANE   | 2TF<br>C            | 600                                | X         | X              | X                    | X     | 5                  |                    |                      | z                          |
| 2548   | CHLORINE PENTAFLUORIDE   | 2TO<br>C            | 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<br>42<br>100    | 0.11<br>0.20<br>0.66 |                            |

| 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 2601   | CYCLOBUTANE  | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.63          |                            |
| 2602   | DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500) | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 22                 | 1.01          |                            |
| 2676   | STIBINE  | 2TF                          | 20                                 | X         |                | X                    |       | 5                  | 20                 | 1.20          | k                          |
| 2901   | BROMINE CHLORIDE   | 2TO<br>C                     | 290                                | X         | X              | X                    | X     | 5                  | 10                 | 1.50          | a                          |
| 3057   | TRIFLUOROACETYL CHLORIDE   | 2TC                          | 10*                                | X         | X              | X                    |       | 5                  | 17                 | 1.17          | k                          |
| 3070   | ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12,5% ethylene oxide   | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 18                 | 1.09          |                            |
| 3083   | PERCHLORYL FLUORIDE  | 2TO                          | 770                                | X         | X              | X                    | X     | 5                  | 33                 | 1.21          | k, u                       |
| 3153   | PERFLUORO(METHYL VINYL ETHER)  | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 20                 | 0.75          |                            |
| 3154   | PERFLUORO(ETHYL VINYL ETHER)   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 10                 | 0.98          |                            |
| 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                 | 22                 | 1.04          |                            |
| 3160   | LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.  | 2TF                          |                                    | X         | X              | X                    | X     | 5                  |                    |               | z                          |
| 3161   | LIQUEFIED GAS, FLAMMABLE, N.O.S.   | 2F                           |                                    | X         | X              | X                    | X     | 10                 |                    |               | z                          |
| 3162   | LIQUEFIED GAS, TOXIC, N.O.S.   | 2T                           |                                    | X         | X              | X                    | X     | 5                  |                    |               | z                          |
| 3163   | LIQUEFIED GAS, N.O.S.  | 2A                           |                                    | X         | X              | X                    | X     | 10                 |                    |               | z                          |
| 3220   | PENTAFLUOROETHANE (REFRIGERANT GAS R 125)  | 2A                           |                                    | X         | X              | X                    | X     | 10                 | 49<br>36           | 0.95<br>0.72  |                            |
| 3252   | DIFLUOROMETHANE (REFRIGERANT GAS R 32)   | 2F                           |                                    | X         | X              | X                    | X     | 10                 | 48                 | 0.78          |                            |

\* This LC<sub>50</sub> value is under review.



| 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 3296   | HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 15                 | 1.20          |                            |
| 3297   | ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE with not more than 8.8% ethylene oxide        | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 10                 | 1.16          |                            |
| 3298   | ETHYLENE OXIDE AND PENTAFLUROETHANE MIXTURE with not more than 7.9% ethylene oxide               | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 26                 | 1.02          |                            |
| 3299   | ETHYLENE OXIDE AND TETRAFLUROETHANE MIXTURE with not more than 5.6% ethylene oxide               | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 17                 | 1.03          |                            |
| 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          |                            |
| 3307   | LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.  | 2TO                 |                                    | X         | X              | X                    | X     | 5                  |                    |               | z                          |
| 3308   | LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.  | 2TC                 |                                    | X         | X              | X                    | X     | 5                  |                    |               | z                          |
| 3309   | LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.   | 2TF<br>C            |                                    | X         | X              | X                    | X     | 5                  |                    |               | z                          |
| 3310   | LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.   | 2TO<br>C            |                                    | 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   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 36                 | 0.82          |                            |
| 3338   | REFRIGERANT GAS R 407A   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 36                 | 0.94          |                            |
| 3339   | REFRIGERANT GAS R 407B   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 38                 | 0.93          |                            |
| 3340   | REFRIGERANT GAS R 407C   | 2A                  |                                    | X         | X              | X                    | X     | 10                 | 35                 | 0.95          |                            |
| 3354   | INSECTICIDE GAS, FLAMMABLE, N.O.S  | 2F                  |                                    | X         | X              | X                    | X     | 10                 |                    |               | z                          |
| 3355   | INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.  | 2TF                 |                                    | 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 | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 3374   | ACETYLENE, SOLVENT FREE | 2F                           |                                    | X         |                | X                    |       | 5                  | 60                 |               | c, p                       |

The existing notes a, b (with the diagram) and c shall be added here.

| P200                               |  | PACKING INSTRUCTION (cont'd) |                     |                                    |           |                |                      |       |                    |                    | P200          |                            |
|------------------------------------|--|------------------------------|---------------------|------------------------------------|-----------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|
| Table 3: SUBSTANCES NOT IN CLASS 2 |  |                              |                     |                                    |           |                |                      |       |                    |                    |               |                            |
| UN No.                             | Name and description   | Class or Division            | Classification Code | LC <sub>50</sub> ml/m <sup>3</sup> | Cylinders | Pressure drums | Bundles of cylinders | Tubes | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 1051                               | HYDROGEN CYANIDE, STABILIZED containing less than 3% water                   | 6.1                          | TF1                 | 140                                | X         |                | X                    |       | 5                  | 100                | 0.55          | k                          |
| 1052                               | HYDROGEN FLUORIDE, ANHYDROUS   | 8                            | CT1                 | 966*                               | X         | X              | X                    |       | 5                  | 10                 | 0.84          |                            |
| 1745                               | BROMINE PENTAFLUORIDE  | 5.1                          | OT<br>C             | 25*                                | X         |                | X                    |       | 5                  | 10                 | **            | k                          |
| 1746                               | BROMINE TRIFLUORIDE  | 5.1                          | OT<br>C             | 180                                | X         |                | X                    |       | 5                  | 10                 | **            | k                          |
| 2495                               | IODINE PENTAFLUORIDE   | 5.1                          | OC<br>T             | 120                                | X         |                | X                    |       | 5                  | 10                 | **            | k                          |
| 2983                               | ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide | 3                            | FT1                 |                                    | X         | X              | X                    |       | 5                  | 10                 |               | z                          |

*(1614 HYDROGEN CYANIDE STABILISED should be re-assigned to P099 in Chapter 3.2)*

**Proposal 2: Modify 4.1.6 as follows :**

**Delete 4.1.6.5 (this is covered by special conditions k and q in P200 (9))**

**Add the new UN text as following paragraphs after existing 4.1.6.6 (renumbered as 4.1.6.5) and renumber existing 4.1.6.7 as 4.1.6.10**

4.1.6.6 Non-refillable pressure receptacles shall:

\* This LC<sub>50</sub> value is under review.

\*\* A minimum ullage of 8% by volume is required.

- (a) be transported in an outer packaging, such as a box, or crate, or in shrink-wrapped trays or stretch-wrapped trays;
- (b) be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas;
- (c) not be used for toxic gases with an  $LC_{50}$  less than or equal to  $200 \text{ ml/m}^3$ ; and
- (d) not be repaired after being put into service.

4.1.6.7 Pressure receptacles shall not be subjected to repairs of any of the following;

- (a) weld cracks or other weld defects;
- (b) cracks in walls;
- (c) leaks or defects in the material of the wall, head or bottom.

4.1.6.8 Pressure receptacles shall not be offered for filling:

- (a) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;
- (b) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; and
- (c) unless the required certification, retest, and filling markings are legible.

4.1.6.9 Charged pressure receptacles shall not be offered for transport;

- (a) when leaking;
- (b) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;
- (c) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; and
- (d) unless the required certification, retest, and filling markings are legible."

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