

Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

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**Miscellaneous proposals of amendments to the Model Regulations
on the Transport of Dangerous Goods**

6.1.4 Requirements for packagings

4.1.4.1 Packing instructions concerning the use of packagings

Transmitted by the expert from Italy¹

1. Reference is made to document ST/SG/AC.10/C.3/2010/8..
2. This informal document contains a consolidated version of the packing instructions P001 to P804 including the changes proposed in ST/SG/AC.10/C.3/2010/8 which are shown in bold italics.

¹ In accordance with the programme of work of the Sub-Committee for 2009-2010 approved by the Committee at its fourth session (refer to ST/SG/AC.10/C.3/68, para. 118 (d) and ST/SG/AC.10/36, para. 14).

4.1.4 List of packing instructions

4.1.4.1 *Packing instructions concerning the use of packagings (except IBCs and large packagings)*

| P001 | | PACKING INSTRUCTION (LIQUIDS) | | | P001 |
|--|---------------------------------------|---|------------------|-------------------|------|
| The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met: | | | | | |
| | | Maximum capacity/Net mass (see 4.1.3.3) | | | |
| | | Packing group I | Packing group II | Packing group III | |
| Combination packagings | | | | | |
| Inner packagings | Outer packagings | | | | |
| Glass 10 l | Drums | | | | |
| Plastics 30 l | steel (1A2) | 250 kg | 400 kg | 400 kg | |
| Metal 40 l | aluminium (1B2) | 250 kg | 400 kg | 400 kg | |
| | other metal (1N2) | 250 kg | 400 kg | 400 kg | |
| | plastics (1H2) | 250 kg | 400 kg | 400 kg | |
| | plywood (1D) | 150 kg | 400 kg | 400 kg | |
| | fibre (1G) | 75 kg | 400 kg | 400 kg | |
| | Boxes | | | | |
| | steel (4A) | 250 kg | 400 kg | 400 kg | |
| | aluminium (4B) | 250 kg | 400 kg | 400 kg | |
| | 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 | |
| | Jerricans | | | | |
| | steel (3A2) | 120 kg | 120 kg | 120 kg | |
| | aluminium (3B2) | 120 kg | 120 kg | 120 kg | |
| | plastics (3H2) | 120 kg | 120 kg | 120 kg | |
| Single packagings | | | | | |
| Drums | | | | | |
| | steel, non-removable head (1A1) | 250 l | 450 l | 450 l | |
| | steel, removable head (1A2) | 250 l ^a | 450 l | 450 l | |
| | aluminium, non-removable head (1B1) | 250 l | 450 l | 450 l | |
| | aluminium, removable head (1B2) | 250 l ^a | 450 l | 450 l | |
| | other metal, non-removable head (1N1) | 250 l | 450 l | 450 l | |
| | other metal, removable head (1N2) | 250 l ^a | 450 l | 450 l | |
| | plastics, non-removable head (1H1) | 250 l | 450 l | 450 l | |
| | plastics, removable head (1H2) | 250 l ^a | 450 l | 450 l | |
| Jerricans | | | | | |
| | steel, non-removable head (3A1) | 60 l | 60 l | 60 l | |
| | steel, removable head (3A2) | 60 l ^a | 60 l | 60 l | |
| | aluminium, non-removable head (3B1) | 60 l | 60 l | 60 l | |
| | aluminium, removable head (3B2) | 60 l ^a | 60 l | 60 l | |
| | plastics, non-removable head (3H1) | 60 l | 60 l | 60 l | |
| | plastics, removable head (3H2) | 60 l ^a | 60 l | 60 l | |

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^aOnly substances with a viscosity more than 200 mm²/s are permitted.

| P002 | | PACKING INSTRUCTION (SOLIDS) | | | P002 |
|--|-------|--|------------------|-------------------|------|
| The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met: | | | | | |
| | | Maximum net mass (see 4.1.3.3) | | | |
| | | Packing group I | Packing group II | Packing group III | |
| Combination packagings | | | | | |
| Inner packagings | | Outer packagings | | | |
| Glass | 10 kg | Drums | | | |
| Plastics ^a | 50 kg | steel (1A2) | 400 kg | 400 kg | |
| Metal | 50 kg | aluminium (1B2) | 400 kg | 400 kg | |
| Paper ^{a, b, c} | 50 kg | other metal (1N2) | 400 kg | 400 kg | |
| Fibre ^{a, b, c} | 50 kg | plastics (1H2) | 400 kg | 400 kg | |
| | | plywood (1D) | 400 kg | 400 kg | |
| | | fibre (1G) | 400 kg | 400 kg | |
| | | Boxes | | | |
| | | steel (4A) | 400 kg | 400 kg | |
| | | aluminium (4B) | 400 kg | 400 kg | |
| | | other metal (4N) | 400 kg | 400 kg | |
| | | natural wood (4C1) | 250 kg | 400 kg | |
| | | natural wood with sift proof walls (4C2) | 250 kg | 400 kg | |
| | | plywood (4D) | 250 kg | 400 kg | |
| | | reconstituted wood (4F) | 125 kg | 400 kg | |
| | | fibreboard (4G) | 125 kg | 400 kg | |
| | | expanded plastics (4H1) | 60 kg | 60 kg | |
| | | solid plastics (4H2) | 250 kg | 400 kg | |
| | | Jerricans | | | |
| | | steel (3A2) | 120 kg | 120 kg | |
| | | aluminium (3B2) | 120 kg | 120 kg | |
| | | plastics (3H2) | 120 kg | 120 kg | |
| Single packagings | | | | | |
| Drums | | | | | |
| | | steel (1A1 or 1A2 ^d) | 400 kg | 400 kg | |
| | | aluminium (1B1 or 1B2 ^d) | 400 kg | 400 kg | |
| | | metal, other than steel, or aluminium (1N1 or 1N2 ^d) | 400 kg | 400 kg | |
| | | plastics (1H1 or 1H2 ^d) | 400 kg | 400 kg | |
| | | fibre (1G) ^e | 400 kg | 400 kg | |
| | | plywood (1D) ^e | 400 kg | 400 kg | |
| | | Jerricans | | | |
| | | Steel (3A1 or 3A2 ^d) | 120 kg | 120 kg | |
| | | Aluminium (3B1 or 3B2 ^d) | 120 kg | 120 kg | |
| | | plastics (3H1 or 3H2 ^d) | 120 kg | 120 kg | |

^a These inner packagings shall be siftproof.

^b These inner packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).

^c Paper and fibre inner packagings shall not be used for substances of packing group I.

^d These packagings shall not be used for substances of packing group I that may become liquid during transport (see 4.1.3.4).

^e These packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).

| P002 | | PACKING INSTRUCTION (SOLIDS) (cont'd) | | | P002 |
|---|-------------|---------------------------------------|------------------|-------------------|------|
| | | Maximum net mass (see 4.1.3.3) | | | |
| | | Packing group I | Packing group II | Packing group III | |
| Single packagings (cont'd) | | | | | |
| Boxes | | | | | |
| steel (4A) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| aluminium (4B) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| other metal (4N) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| natural wood (4C1) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| plywood (4D) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| reconstituted wood (4F) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| natural wood with sift proof walls (4C2) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| fibreboard (4G) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| solid plastics (4H2) ^e | Not allowed | 400 kg | 400 kg | 400 kg | |
| Bags | | | | | |
| bags (5H3, 5H4, 5L3, 5M2) ^e | Not allowed | 50 kg | 50 kg | 50 kg | |
| Composite packagings | | | | | |
| plastics receptacle in steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1 ^e , 6HD1 ^e , or 6HH1) | 400 kg | 400 kg | 400 kg | 400 kg | |
| plastics receptacle in steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2 ^e , 6HG2 ^e or 6HH2) | 75 kg | 75 kg | 75 kg | 75 kg | |
| glass receptacle in steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1 ^e or 6PG1 ^e) or in steel, aluminium, wooden or fibreboard box or in wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 ^e , or 6PD2 ^e) or in solid or expanded plastics packaging (6PH1 or 6PH2 ^e) | 75 kg | 75 kg | 75 kg | 75 kg | |
| Pressure receptacles , provided that the general provisions of 4.1.3.6 are met. | | | | | |
| Special packing provisions: | | | | | |
| PP7 For UN 2000, celluloid may be transported unpacked on pallets, wrapped in plastic film and secured by appropriate means, such as steel bands as a full load in closed cargo transport units. Each pallet shall not exceed 1000 kg. | | | | | |
| PP8 For UN 2002, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Gas cylinders and gas receptacles shall not be used for these substances. | | | | | |
| PP9 For UN 3175, UN 3243 and UN 3244, packagings shall conform to a design type that has passed a leakproofness test at the packing group II performance level. For UN 3175 the leakproofness test is not required when the liquids are fully absorbed in solid material contained in sealed bags. | | | | | |
| PP11 For UN 1309, packing group III, and UN 1362, 5H1, 5L1 and 5M1 bags are allowed if they are overpacked in plastic bags and are wrapped in shrink or stretch wrap on pallets. | | | | | |
| PP12 For UN 1361, UN 2213 and UN 3077, 5H1, 5L1 and 5M1 bags are allowed when transported in closed cargo transport units. | | | | | |
| PP13 For articles classified under UN 2870, only combination packagings meeting the packing group I performance level are authorized. | | | | | |
| PP14 For UN 2211, UN 2698 and UN 3314, packagings are not required to meet the performance tests in Chapter 6.1. | | | | | |
| PP15 For UN 1324 and UN 2623, packagings shall meet the packing group III performance level. | | | | | |

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^e These packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).

| P010 | | PACKING INSTRUCTION | | P010 |
|---|---|---|---------------------------------------|--------|
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | | | |
| | | | Maximum net mass (see 4.1.3.3) | |
| Combination packagings | | | | |
| Inner packagings | | Outer packagings | | |
| Glass | 1 l | Drums | | |
| Steel | 40 l | steel (1A2) | | 400 kg |
| | | plastics (1H2) | | 400 kg |
| | | plywood (1D) | | 400 kg |
| | | fibre (1G) | | 400 kg |
| | | Boxes | | |
| | | steel (4A) | | 400 kg |
| | | metal, other than steel or aluminium (4N) | | 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 |
| | | | Maximum capacity (see 4.1.3.3) | |
| Single packagings | | | | |
| Drums | | | | |
| | steel, non-removable head (1A1) | | | 450 l |
| Jerricans | | | | |
| | steel, non-removable head (3A1) | | | 60 l |
| Composite packagings | | | | |
| | plastics receptacle in steel drums (6HA1) | | | 250 l |

| P099 | | PACKING INSTRUCTION | | P099 |
|--|--|---------------------|--|------|
| Only packagings which are approved by the competent authority for these goods may be used (see 4.1.3.7). 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 may be used. The State's distinguishing sign for motor vehicles in international traffic of the country for which the authority acts, shall be marked on the transport documents as follows:</p> <p style="text-align: center;">“Packaging approved by the competent authority of...”</p> | | |

| P110(a) | PACKING INSTRUCTION | P110(a) |
|--|--|---|
| <p>The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:</p> | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| <p>Bags</p> <ul style="list-style-type: none"> plastics textile, plastic coated or lined rubber textile, rubberised textile | <p>Bags</p> <ul style="list-style-type: none"> plastics textile, plastic coated or lined rubber textile, rubberized <p>Receptacles</p> <ul style="list-style-type: none"> plastics metal | <p>Drums</p> <ul style="list-style-type: none"> steel, removable head (1A2) metal, other than steel or aluminium, removable head (1N2) plastics, removable head (1H2) |
| <p>Additional requirements:</p> <ol style="list-style-type: none"> 1. The intermediate packagings shall be filled with water saturated material such as an anti-freeze solution or wetted cushioning. 2. Outer packagings shall be filled with water saturated material such as an anti-freeze solution or wetted cushioning. Outer packagings shall be constructed and sealed to prevent evaporation of the wetting solution, except for UN 0224 when carried dry. | | |

| P111 | PACKING INSTRUCTION | | P111 |
|--|-------------------------|---|------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Bags paper, waterproofed plastics textile, rubberized Sheets plastics textile, rubberized | Not necessary | Boxes 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) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) plywood (1D) fibreboard (1G) plastics, removable head (1H2) | |
| Special packing provision: | | | |
| PP43 For UN 0159, inner packagings are not required when metal (1A2 or 1B2) or plastics (1H2) drums are used as outer packagings. | | | |

| P112(a) | PACKING INSTRUCTION (Solid wetted, 1.1D) | | P112(a) |
|---|--|--|---------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Bags paper, multiwall, water resistant plastics textile textile, rubberised woven plastics Receptacles metal plastics | Bags plastics textile, plastic coated or lined Receptacles metal plastics | Boxes 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) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plastics, removable head (1H2) plywood (1D) | |

| P112(b) | | PACKING INSTRUCTION (Solid dry, other than powder 1.1D) | P112(b) |
|--|--|--|----------------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Bags paper, kraft paper, multiwall, water resistant plastics textile textile, rubberised woven plastics | Bags (for UN 0150 only) plastics textile, plastic coated or lined | Bags woven plastics, sift-proof (5H2) woven plastics, water-resistant (5H3) plastics, film (5H4) textile, sift-proof (5L2) textile, water resistant (5L3) paper, multiwall, water resistant (5M2) Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> fibre (1G) plastics, removable head (1H2) plywood (1D) | |
| Special packing provisions: | | | |
| PP26 For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free. | | | |
| PP46 For UN 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg. | | | |
| PP47 For UN 0222 inner packagings are not required when the outer packaging is a bag. | | | |

| P112(c) | PACKING INSTRUCTION (Solid dry powder 1.1D) | | P112(c) |
|---|--|---|---------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| <p>Bags</p> <p>paper, multiwall, water resistant plastics</p> <p>woven plastics</p> <p>Receptacles</p> <p>fibreboard metal plastics wood</p> | <p>Bags</p> <p>paper, multiwall, water resistant with inner lining plastics</p> <p>Receptacles</p> <p>metal plastics</p> | <p>Boxes</p> <p>steel (4A) metal, other than steel or aluminium (4N) natural wood, ordinary (4C1) natural wood, sift-proof (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) aluminium (4B)</p> <p>Drums</p> <p>steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plywood (1D) plastics, removable head (1H2)</p> | |
| Additional requirements: | | | |
| <ol style="list-style-type: none"> 1. Inner packagings are not required if drums are used as the outer packaging. 2. The packaging shall be sift-proof. | | | |
| Special packing provision: | | | |
| PP26 For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free. | | | |
| PP46 For UN 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg. | | | |
| PP48 For UN 0504, metal packagings shall not be used. | | | |
| | | | |

| P113 PACKING INSTRUCTION P113 | | |
|--|-------------------------|---|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags paper plastics textile, rubberised Receptacles fibreboard metal plastics wood | Not necessary | Boxes 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) aluminium (4B) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plywood (1D) plastics, removable head (1H2) |
| Additional requirement: The packaging shall be sift-proof. | | |
| Special packing provisions: PP49 For UN 0094 and UN 0305, no more than 50 g of substance shall be packed in an inner packaging. PP50 For UN 0027, inner packagings are not necessary when drums are used as the outer packaging. PP51 For UN 0028, paper kraft or waxed paper sheets may be used as inner packagings. | | |

| P114(a) | PACKING INSTRUCTION (Solid wetted) | | P114(a) |
|--|--|---|---------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Bags plastics textile woven plastics Receptacles metal plastics | Bags plastics textile, plastic coated or lined Receptacles metal plastics | Boxes steel (4A) 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) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plastics, removable head (1H2) | |
| Additional requirement: | | | |
| Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging. | | | |
| Special packing provisions: | | | |
| PP26 For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free. | | | |
| PP43 For UN 0342, inner packagings are not required when metal (1A2 or 1B2) or plastics (1H2) drums are used as outer packagings. | | | |

| P114(b) PACKING INSTRUCTION (Solid dry) P114(b) | | |
|---|--------------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags paper, kraft plastics textile, sift-proof woven plastics, sift-proof Receptacles fibreboard metal paper plastics woven plastics, sift-proof | Not necessary | Boxes natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plywood (1D) fibre (1G) plastics, removable head (1H2) |
| Special packing provisions: PP26 For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free. PP48 For UN Nos. 0508 and 0509, metal packagings shall not be used. PP50 For UN Nos. 0160, 0161 and 0508, inner packagings are not necessary if drums are used as the outer packaging. PP52 For UN 0160 and UN 0161, when metal drums (1A2 or 1B2) are used as the outer packaging, metal packagings shall be so constructed that the risk of explosion, by reason of increase internal pressure from internal or external causes is prevented. | | |

| P115 | | PACKING INSTRUCTION | | P115 |
|--|--|---|--|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | | |
| Inner packagings | | Intermediate packagings | | Outer packagings |
| Receptacles plastics | | Bags plastics in metal receptacles Drums metal | | Boxes natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) plywood (1D) fibre (1G) plastics, removable head (1H2) |
| Special packing provisions: | | | | |
| PP45 For UN 0144, intermediate packagings are not required. | | | | |
| PP53 For UN Nos. 0075, 0143, 0495 and 0497, when boxes are used as the outer packaging, inner packagings shall have taped screw cap closures and be not more than 5 litres capacity each. Inner packagings shall be surrounded with non-combustible absorbent cushioning materials. The amount of absorbent cushioning material shall be sufficient to absorb the liquid contents. Metal receptacles shall be cushioned from each other. Net mass of propellant is a limited to 30 kg for each package when outer packagings are boxes. | | | | |
| PP54 For UN Nos. 0075, 0143, 0495 and 0497, when drums are used as the outer packaging and when intermediate packagings are drums, they shall be surrounded with non-combustible cushioning material in a quantity sufficient to absorb the liquid contents. A composite packaging consisting of a plastic receptacle in a metal drum may be used instead of the inner and intermediate packagings. The net volume of propellant in each package shall not exceed 120 litres. | | | | |
| PP55 For UN 0144, absorbent cushioning material shall be inserted. | | | | |
| PP56 For UN 0144, metal receptacles may be used as inner packagings. | | | | |
| PP57 For UN Nos. 0075, 0143, 0495 and 0497, bags shall be used as intermediate packagings when boxes are used as outer packagings. | | | | |
| PP58 For UN Nos. 0075, 0143, 0495 and 0497, drums shall be used as intermediate packagings when drums are used as outer packagings. | | | | |
| PP59 For UN 0144, fibreboard boxes (4G) may be used as outer packagings. | | | | |
| PP60 For UN 0144, aluminium drums, removable head (1B2) <i>and metal, other than steel or aluminium drums, removable head (1N2)</i> shall not be used. | | | | |

| P116 | | PACKING INSTRUCTION | | P116 |
|--|--|-------------------------|--|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | | |
| Inner packagings | | Intermediate packagings | | Outer packagings |
| Bags paper, water and oil resistant plastics textile, plastic coated or lined woven plastics, sift-proof Receptacles fibreboard, water resistant metal plastics wood, sift-proof Sheets paper, water resistant paper, waxed plastics | | Not necessary | | Bags woven plastics (5H1) paper, multiwall, water resistant (5M2) plastics, film (5H4) textile, sift-proof (5L2) textile, water resistant (5L3) Boxes steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plastics, removable head (1H2) plywood (1D) Jerricans steel, removable head (3A2) plastics, removable head (3H2) |
| Special packing provisions: | | | | |
| PP61 | For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required if leakproof removable head drums are used as the outer packaging. | | | |
| PP62 | For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required when the explosive is contained in a material impervious to liquid. | | | |
| PP63 | For UN 0081, inner packagings are not required when contained in rigid plastics which is impervious to nitric esters. | | | |
| PP64 | For UN 0331, inner packagings are not required when bags (5H2), (5H3) or (5H4) are used as outer packagings. | | | |
| PP65 | For UN Nos. 0082, 0241, 0331 and 0332, bags (5H2 or 5H3) may be used as outer packagings. | | | |
| PP66 | For UN 0081, bags shall not be used as outer packagings. | | | |

| P130 | PACKING INSTRUCTION | | P130 |
|---|--------------------------------|--|-------------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Not necessary | Not necessary | Boxes steel (4A) aluminium (4B) 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) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plastics, removable head (1H2) plywood (1D) | |
| Special packing provision: | | | |
| PP67 The following applies to UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0488 and 0502: Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems shall be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices. | | | |

| P131 | PACKING INSTRUCTION | | P131 |
|--|-------------------------|---|------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Bags paper plastics Receptacles fibreboard metal plastics wood Reels | Not necessary | Boxes steel (4A) aluminium (4B) other metal (4N) natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) Drums steel, removable head (1A2) aluminium, removable head (1B2) other metal, removable head (1N2) fibre (1G) plastics, removable head (1H2) plywood (1D) | |
| Special packing provision: | | | |
| PP68 For UN Nos. 0029, 0267 and 0455, bags and reels shall not be used as inner packagings. | | | |

| P132(a) | PACKING INSTRUCTION | | P132(a) |
|--|-------------------------|---|---------|
| (Articles consisting of closed metal, plastics or fibreboard casings that contain a detonating explosive, or consisting of plastics-bonded detonating explosives) | | | |
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Not necessary | Not necessary | Boxes steel (4A) aluminium (4B) other metal (4N) wood, natural, ordinary (4C1) wood, natural, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) | |

| P132(b) | PACKING INSTRUCTION (Articles without closed casings) | | P132(b) |
|--|--|--|---------|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | |
| Inner packagings | Intermediate packagings | Outer packagings | |
| Receptacles fibreboard metal plastics Sheets paper plastics | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) | |

| P133 PACKING INSTRUCTION P133 | | |
|--|---|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1 , 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Receptacles fibreboard metal plastics wood Trays, fitted with dividing partitions fibreboard plastics wood | Receptacles fibreboard metal plastics wood | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) |
| Additional requirement: Receptacles are only required as intermediate packagings when the inner packagings are trays. | | |
| Special packing provision: PP69 For UN Nos. 0043, 0212, 0225, 0268 and 0306, trays shall not be used as inner packagings. | | |

| P134 PACKING INSTRUCTION P134 | | |
|--|-------------------------|---|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags water resistant Receptacles fibreboard metal plastics wood Sheets fibreboard, corrugated Tubes fibreboard | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plywood (1D) plastics, removable head (1H2) fibreboard (1G) |

| P135 PACKING INSTRUCTION P135 | | |
|--|-------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags paper plastics Receptacles fibreboard metal plastics wood Sheets paper plastics | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, expanded (4H1) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> fibre (1G) plastics, removable head (1H2) plywood (1D) |

| P136 PACKING INSTRUCTION P136 | | |
|--|-------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags plastics textile Boxes fibreboard plastics wood Dividing portions in the outer packagings | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> fibre (1G) plastics, removable head (1H2) plywood (1D) |

| P137 PACKING INSTRUCTION P137 | | |
|--|-------------------------|---|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags plastics Boxes fibreboard Tubes fibreboard metal plastics Dividing partitions in the outer packagings | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plywood (1D) fibre (1G) plastics, removable head (1H2) |
| Special packing provision: PP70 For UN Nos. 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity shall face downwards and the package marked "THIS SIDE UP". When the shaped charges are packed in pairs, the conical cavities shall face inwards to minimize the jetting effect in the event of accidental initiation. | | |

| P138 PACKING INSTRUCTION P138 | | |
|--|-------------------------|---|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags plastics | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plywood (1D) plastics, removable head (1H2) fibreboard (1G) |
| Additional requirement: If the ends of the articles are sealed, inner packagings are not necessary. | | |

| P139 PACKING INSTRUCTION P139 | | |
|---|-------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags plastics Receptacles fibreboard metal plastics wood Reels Sheets paper plastics | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plywood (1D) fibre (1G) plastics, removable head (1H2) |
| Special packing provisions: PP71 For UN Nos. 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord shall be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of flexible detonating cord shall be fastened securely. PP72 For UN 0065 and UN 0289, inner packagings are not required when they are in coils. | | |

| P140 PACKING INSTRUCTION P140 | | |
|---|-------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Bags plastics Reels Sheets paper, kraft plastics | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> fibre (1G) plywood (1D) plastics, removable head (1H2) |
| Special packing provisions: PP73 For UN 0105, no inner packagings are required if the ends are sealed. PP74 For UN 0101, the packaging shall be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps. PP75 For UN 0101, steel or aluminium boxes or drums shall not be used. | | |

| P141 PACKING INSTRUCTION P141 | | |
|--|-------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Receptacles fibreboard metal plastics wood Trays, fitted with dividing partitions plastics wood Dividing partitions in the outer packagings | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> fibre (1G) plastics, removable head (1H2) plywood (1D) |

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

| P143 | | PACKING INSTRUCTION | | P143 |
|---|---|-------------------------|--|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | | | |
| Inner packagings | | Intermediate packagings | | Outer packagings |
| Bags paper, kraft plastics textile textile, rubberized Receptacles fibreboard metal plastics Trays, fitted with dividing partitions plastics wood | | Not necessary | | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) natural wood, sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plywood (1D) fibre (1G) plastics, removable head (1H2) |
| Additional requirement: | | | | |
| Instead of the above inner and outer packagings, composite packagings (6HH2) (plastic receptacle with outer solid box) may be used. | | | | |
| Special packing provision: | | | | |
| PP76 | For UN Nos. 0271, 0272, 0415 and 0491, when metal packagings are used, metal packagings shall be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes is prevented. | | | |

| P144 PACKING INSTRUCTION | | P144 |
|---|-------------------------|--|
| The following packagings are authorized, provided that the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met: | | |
| Inner packagings | Intermediate packagings | Outer packagings |
| Receptacles fibreboard metal plastics Dividing partitions in the outer packagings | Not necessary | Boxes steel (4A) aluminium (4B) <i>other metal (4N)</i> natural wood, ordinary (4C1) with metal liner plywood (4D) with metal liner reconstituted wood (4F) with metal liner plastics, expanded (4H1) plastics, solid (4H2) Drums steel, removable head (1A2) aluminium, removable head (1B2) <i>other metal, removable head (1N2)</i> plastics, removable head (1H2) |
| Special packing provision: PP 77 For UN Nos. 0248 and 0249, packagings shall be protected against the ingress of water. When water-activated contrivances are transported unpackaged, they shall be provided with at least two independent protective features which prevent the ingress of water. | | |

| | | |
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| P200 | PACKING INSTRUCTION | P200 |
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For pressure receptacles, the general packing requirements of 4.1.6.1 shall be met. In addition, for MEGCs, the general requirements of 4.2.4 shall be met.

Cylinders, tubes, pressure drums, bundles of cylinders constructed as specified in Chapter 6.2 and MEGCs constructed as specified in 6.7.5 are authorised for the transport of a specific substance when specified in the following tables. For some substances the special packing provisions may prohibit a particular type of cylinder, tube, pressure drum or bundle of cylinders.

(1) Pressure receptacles containing toxic substances with an LC_{50} less than or equal to 200 ml/m^3 (ppm) as specified in the table shall not be equipped with any pressure relief device. Pressure relief devices shall be fitted on pressure receptacles used for the transport of UN 1013 carbon dioxide and UN 1070 nitrous oxide. Other pressure receptacles shall be fitted with a pressure relief device if specified by the competent authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, shall be specified by the competent authority of the country of use.

(2) The following three tables cover compressed gases (Table 1), liquefied and dissolved gases (Table 2) and substances not in Class 2 (Table 3). They provide:

- (a) the UN number, name and description, and classification of the substance;
- (b) the LC_{50} for toxic substances;
- (c) the types of pressure receptacles authorised for the substance, shown by the letter "X";
- (d) the maximum test period for periodic inspection of the pressure receptacles;
NOTE: For pressure receptacles which make use of composite materials, the periodic inspection frequencies shall be as determined by the competent authority which approved the receptacles.
- (e) the minimum test pressure of the pressure receptacles;
- (f) the maximum working pressure of the pressure receptacles for compressed gases (where no value is given, the working pressure shall not exceed two thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
- (g) special packing provisions that are specific to a substance.

(3) In no case shall pressure receptacles be filled in excess of the limit permitted in the following requirements.

- (a) For compressed gases, the working pressure shall be not more than two thirds of the test pressure of the pressure receptacles. Restrictions to this upper limit on working pressure are imposed by (4), special packing provision "o". In no case shall the internal pressure at 65°C exceed the test pressure;
- (b) For high pressure liquefied gases, the filling ratio shall be such that the settled pressure at 65°C does not exceed the test pressure of the pressure receptacles.

The use of test pressures and filling ratios other than those in the table is permitted, except where (4), special packing provision "o" applies, provided that:

- (i) the criterion of (4), 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_g | = | gas density (at 15°C , 1 bar)(in g/l) |
| P_h | = | minimum test pressure (in bar) |

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| P200 | PACKING INSTRUCTION (cont'd) | P200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|---|---|---|-----------------------|-------|---|--------------------------------|----|---|---------------------------|---|---|---|----|---|-----------------------|----|---|---------------------------|-------|---|---|----|--|----|----------------------------------|----|--|----|--|--|
| | <p>If the density of the gas is unknown, the maximum filling ratio shall be determined as follows:</p> $FR = \frac{P_h \times MM \times 10^{-3}}{R \times 338}$ <p>where</p> <table style="margin-left: 20px;"> <tr> <td>FR</td> <td>=</td> <td>maximum filling ratio</td> </tr> <tr> <td>P_h</td> <td>=</td> <td>minimum test pressure (in bar)</td> </tr> <tr> <td>MM</td> <td>=</td> <td>molecular mass (in g/mol)</td> </tr> <tr> <td>R</td> <td>=</td> <td>8.31451×10^{-2} bar.l/mol.K (gas constant)</td> </tr> </table> <p>For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components;</p> <p>(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).</p> <p>For low pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio shall be determined as follows:</p> $FR = (0.0032 \times BP - 0.24) \times d_1$ <p>where</p> <table style="margin-left: 20px;"> <tr> <td>FR</td> <td>=</td> <td>maximum filling ratio</td> </tr> <tr> <td>BP</td> <td>=</td> <td>boiling point (in Kelvin)</td> </tr> <tr> <td>d_1</td> <td>=</td> <td>density of the liquid at boiling point (in kg/l);</td> </tr> </table> <p>(d) For UN 1001, acetylene, dissolved, and UN 3374 acetylene, solvent free, see (4), special packing provision "p".</p> <p>(4) Keys for the column "Special packing provisions":</p> <p><i>Material compatibility (for gases see ISO 11114-1:1997 and ISO 11114-2:2000)</i></p> <table style="margin-left: 20px;"> <tr> <td>a:</td> <td>Aluminium alloy pressure receptacles are not authorized.</td> </tr> <tr> <td>b:</td> <td>Copper valves shall not be used.</td> </tr> <tr> <td>c:</td> <td>Metal parts in contact with the contents shall not contain more than 65% copper.</td> </tr> <tr> <td>d:</td> <td>When steel pressure receptacles are used, only those bearing the "H" mark shall be authorized.</td> </tr> </table> <p><i>Requirements for toxic substances with an LC₅₀ less than or equal to 200 ml/m³ (ppm)</i></p> <p>k: Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads that match those of the valve outlets.</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.</p> <p>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.</p> <p>Cylinders and individual cylinders in 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 transported 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.</p> <p>Pressure receptacles shall not be fitted with a pressure relief device.</p> | FR | = | maximum filling ratio | P_h | = | minimum test pressure (in bar) | MM | = | molecular mass (in g/mol) | R | = | 8.31451×10^{-2} bar.l/mol.K (gas constant) | FR | = | maximum filling ratio | BP | = | boiling point (in Kelvin) | d_1 | = | density of the liquid at boiling point (in kg/l); | a: | Aluminium alloy pressure receptacles are not authorized. | b: | Copper valves shall not be used. | c: | Metal parts in contact with the contents shall not contain more than 65% copper. | d: | When steel pressure receptacles are used, only those bearing the "H" mark shall be authorized. | |
| FR | = | maximum filling ratio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P_h | = | minimum test pressure (in bar) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MM | = | molecular mass (in g/mol) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | = | 8.31451×10^{-2} bar.l/mol.K (gas constant) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FR | = | maximum filling ratio | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BP | = | boiling point (in Kelvin) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d_1 | = | density of the liquid at boiling point (in kg/l); | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a: | Aluminium alloy pressure receptacles are not authorized. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b: | Copper valves shall not be used. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c: | Metal parts in contact with the contents shall not contain more than 65% copper. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d: | When steel pressure receptacles are used, only those bearing the "H" mark shall be authorized. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| P200 | PACKING INSTRUCTION (<i>cont'd</i>) | P200 |
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| | <p>Cylinders and individual cylinders in a bundle shall be limited to a maximum water capacity of 85 litres.</p> <p>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.</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.</p> <p>Each pressure receptacle shall be tested for leakage after filling.</p> <p><i>Gas specific provisions</i></p> <p>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 maximum net mass in any outer packaging shall not exceed 2.5 kg.</p> <p>m: Pressure receptacles shall be filled to a working pressure not exceeding 5 bar.</p> <p>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.</p> <p>o: In no case shall the working pressure or filling ratio shown in the table be exceeded.</p> <p>p: For UN 1001 acetylene, dissolved and UN 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 or ISO 3807-2:2000, as applicable.</p> <p>For UN 1001 acetylene, dissolved: cylinders shall contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000 or ISO 3807-2:2000, as applicable); cylinders fitted with pressure relief devices or manifolded together shall be transported vertically.</p> <p>The test pressure of 52 bar applies only to cylinders conforming to ISO 3807-2:2000.</p> <p>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. 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 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.</p> <p>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.</p> <p>ra: This gas may also be packed in capsules under the following conditions:</p> <ol style="list-style-type: none"> (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 transport; (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: | Aluminium alloy pressure receptacles shall be: <ul style="list-style-type: none"> - Equipped only with brass or stainless steel valves; and - Cleaned in accordance with ISO 11621:1997 and not contaminated with oil. | |
| t: | <ul style="list-style-type: none"> (i) The wall thickness of pressure receptacles shall be not less than 3 mm. (ii) Prior to transport it shall be ensured that the pressure has not risen due to potential hydrogen generation. | |
| | <i>Periodic inspection</i> | |
| u: | The interval between periodic tests may be extended to 10 years for aluminium alloy pressure receptacles when the alloy of the pressure receptacle has been subjected to stress corrosion testing as specified in ISO 7866:1999. | |
| v: | The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the competent authority of the country of use. | |
| | <i>Requirements for N.O.S. descriptions and for mixtures</i> | |
| z: | <p>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.</p> <p>The test pressure and filling ratio shall be calculated in accordance with the relevant requirements of (3).</p> <p>Toxic substances with an LC₅₀ less than or equal to 200 ml/m³ shall not be transported 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 transported in pressure drums.</p> <p>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.</p> <p>The necessary steps shall be taken to prevent dangerous reactions (i.e. polymerisation or decomposition) during transport. If necessary, stabilisation or addition of an inhibitor shall be required.</p> <p>Mixtures containing UN 1911 diborane, shall be filled to a pressure such that, if complete decomposition of the diborane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded.</p> <p>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.</p> | |

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| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 |
|---------------------------|---|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|---------------------------------|--|----------------------------|
| Table 1: COMPRESSED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar ^a | Maximum working pressure, bar ^a | Special packing provisions |
| 1002 | AIR, COMPRESSED | 2.2 | | | X | X | X | X | X | 10 | | | |
| 1006 | ARGON, COMPRESSED | 2.2 | | | X | X | X | X | X | 10 | | | |
| 1016 | CARBON MONOXIDE, COMPRESSED | 2.3 | 2.1 | 3760 | X | X | X | X | X | 5 | | | u |
| 1023 | COAL GAS, COMPRESSED | 2.3 | 2.1 | | X | X | X | X | X | 5 | | | |
| 1045 | FLUORINE, COMPRESSED | 2.3 | 5.1 8 | 185 | X | | | X | | 5 | 200 | 30 | a, k, n, o |
| 1046 | HELIUM, COMPRESSED | 2.2 | | | X | X | X | X | X | 10 | | | |
| 1049 | HYDROGEN, COMPRESSED | 2.1 | | | X | X | X | X | X | 10 | | | d |
| 1056 | KRYPTON, COMPRESSED | 2.2 | | | X | X | X | X | X | 10 | | | |
| 1065 | NEON, COMPRESSED | 2.2 | | | X | X | X | X | X | 10 | | | |
| 1066 | NITROGEN, COMPRESSED | 2.2 | | | X | X | X | X | X | 10 | | | |
| 1071 | OIL GAS, COMPRESSED | 2.3 | 2.1 | | X | X | X | X | X | 5 | | | |
| 1072 | OXYGEN, COMPRESSED | 2.2 | 5.1 | | X | X | X | X | X | 10 | | | s |
| 1612 | HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE | 2.3 | | | X | X | X | X | X | 5 | | | z |
| 1660 | NITRIC OXIDE, COMPRESSED | 2.3 | 5.1 8 | 115 | X | | | X | | 5 | 225 | 33 | k, o |
| 1953 | COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. | 2.3 | 2.1 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 1954 | COMPRESSED GAS, FLAMMABLE, N.O.S. | 2.1 | | | X | X | X | X | X | 10 | | | z |
| 1955 | COMPRESSED GAS, TOXIC, N.O.S. | 2.3 | | ≤ 5 000 | X | X | X | X | X | 5 | | | z |

^a 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 | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar ^a | Maximum working pressure, bar ^a | Special packing provisions |
| 1956 | COMPRESSED GAS, N.O.S. | 2.2 | | | X | X | X | X | X | 10 | | | z |
| 1957 | DEUTERIUM, COMPRESSED | 2.1 | | | X | X | X | X | X | 10 | | | d |
| 1964 | HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S | 2.1 | | | X | X | X | X | X | 10 | | | z |
| 1971 | METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content | 2.1 | | | X | X | X | X | X | 10 | | | |
| 2034 | HYDROGEN AND METHANE MIXTURE, COMPRESSED | 2.1 | | | X | X | X | X | X | 10 | | | d |
| 2190 | OXYGEN DIFLUORIDE, COMPRESSED | 2.3 | 5.1 8 | 2.6 | X | | | X | | 5 | 200 | 30 | a, k, n, o |
| 3156 | COMPRESSED GAS, OXIDIZING, N.O.S. | 2.2 | 5.1 | | X | X | X | X | X | 10 | | | z |
| 3303 | COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S. | 2.3 | 5.1 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3304 | COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S. | 2.3 | 8 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3305 | COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S. | 2.3 | 2.1 8 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3306 | COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. | 2.3 | 5.1 8 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |

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| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 | |
|--|---|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|----------------------|----------------------------|--|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions | |
| 1001 | ACETYLENE, DISSOLVED | 2.1 | | | X | | | X | | 10 | 60 52 | | c, p | |
| 1005 | AMMONIA, ANHYDROUS | 2.3 | 8 | 4 000 | X | X | X | X | X | 5 | 29 | 0.54 | b | |
| 1008 | BORON TRIFLUORIDE | 2.3 | 8 | 387 | X | X | X | X | X | 5 | 225 300 | 0.715 0.86 | | |
| 1009 | BROMOTRIFLUORO-METHANE (REFRIGERANT GAS R 13B1) | 2.2 | | | X | X | X | X | X | 10 | 42 120 250 | 1.13 1.44 1.60 | | |
| 1010 | BUTADIENES, STABILIZED (1,2-butadiene), or | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.59 | | |
| 1010 | BUTADIENES, STABILIZED (1,3-butadiene), or | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.55 | | |
| 1010 | BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes | 2.1 | | | X | X | X | X | X | 10 | | | v, z | |
| 1011 | BUTANE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.52 | v | |
| 1012 | BUTYLENE (butylenes mixture) or | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.50 | z | |
| 1012 | BUTYLENE (1-butylene) or | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.53 | | |
| 1012 | BUTYLENE (cis-2-butylene) or | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.55 | | |
| 1012 | BUTYLENE (trans-2-butylene) | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.54 | | |
| 1013 | CARBON DIOXIDE | 2.2 | | | X | X | X | X | X | 10 | 190 250 | 0.68 0.76 | | |
| 1017 | CHLORINE | 2.3 | 5.1 8 | 293 | X | X | X | X | X | 5 | 22 | 1.25 | a | |
| 1018 | CHLORODIFLUORO-METHANE (REFRIGERANT GAS R 22) | 2.2 | | | X | X | X | X | X | 10 | 27 | 1.03 | | |
| 1020 | CHLOROPENTA-FLUOROETHANE (REFRIGERANT GAS R 115) | 2.2 | | | X | X | X | X | X | 10 | 25 | 1.05 | | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 |
|--|--|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------------|------------------------------|----------------------------|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 1021 | 1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124) | 2.2 | | | X | X | X | X | X | 10 | 11 | 1.20 | |
| 1022 | CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13) | 2.2 | | | X | X | X | X | X | 10 | 100 120 190 250 | 0.83 0.90 1.04 1.11 | |
| 1026 | CYANOGEN | 2.3 | 2.1 | 350 | X | X | X | X | X | 5 | 100 | 0.70 | u |
| 1027 | CYCLOPROPANE | 2.1 | | | X | X | X | X | X | 10 | 18 | 0.55 | |
| 1028 | DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12) | 2.2 | | | X | X | X | X | X | 10 | 16 | 1.15 | |
| 1029 | DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21) | 2.2 | | | X | X | X | X | X | 10 | 10 | 1.23 | |
| 1030 | 1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a) | 2.1 | | | X | X | X | X | X | 10 | 16 | 0.79 | |
| 1032 | DIMETHYLAMINE, ANHYDROUS | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.59 | b |
| 1033 | DIMETHYL ETHER | 2.1 | | | X | X | X | X | X | 10 | 18 | 0.58 | |
| 1035 | ETHANE | 2.1 | | | X | X | X | X | X | 10 | 95 120 300 | 0.25 0.30 0.40 | |
| 1036 | ETHYLAMINE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.61 | b |
| 1037 | ETHYL CHLORIDE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.80 | a, ra |
| 1039 | ETHYL METHYL ETHER | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.64 | |
| 1040 | ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C | 2.3 | 2.1 | 2 900 | X | X | X | X | X | 5 | 15 | 0.78 | l |
| 1041 | ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% ethylene oxide but not more than 87% | 2.1 | | | X | X | X | X | X | 10 | 190 250 | 0.66 0.75 | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 | |
|--|---|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--|------------------------------|------------------------------|--|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions | |
| 1043 | FERTILIZER AMMONIATING SOLUTION with free ammonia | 2.2 | | | X | | X | X | | 5 | | | b, z | |
| 1048 | HYDROGEN BROMIDE, ANHYDROUS | 2.3 | 8 | 2 860 | X | X | X | X | X | 5 | 60 | 1.51 | a, d | |
| 1050 | HYDROGEN CHLORIDE, ANHYDROUS | 2.3 | 8 | 2 810 | X | X | X | X | X | 5 | 100 120 150 200 | 0.30 0.56 0.67 0.74 | a, d a, d a, d a, d | |
| 1053 | HYDROGEN SULPHIDE | 2.3 | 2.1 | 712 | X | X | X | X | X | 5 | 48 | 0.67 | d, u | |
| 1055 | ISOBUTYLENE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.52 | | |
| 1058 | LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air | 2.2 | | | X | X | X | X | X | 10 | Test pressure = 1.5 × working pressure | | | |
| 1060 | METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED or | 2.1 | | | X | X | X | X | X | 10 | | | c, z | |
| | METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED (Propadiene with 1% to 4% methylacetylene) | 2.1 | | | X | X | X | X | X | 10 | 22 | 0.52 | c | |
| 1061 | METHYLAMINE, ANHYDROUS | 2.1 | | | X | X | X | X | X | 10 | 13 | 0.58 | b | |
| 1062 | METHYL BROMIDE | 2.3 | | 850 | X | X | X | X | X | 5 | 10 | 1.51 | a | |
| 1063 | METHYL CHLORIDE (REFRIGERANT GAS R 40) | 2.1 | | | X | X | X | X | X | 10 | 17 | 0.81 | a | |
| 1064 | METHYL MERCAPTAN | 2.3 | 2.1 | 1 350 | X | X | X | X | X | 5 | 10 | 0.78 | d, u | |
| 1067 | DINITROGEN TETROXIDE (NITROGEN DIOXIDE) | 2.3 | 5.1 8 | 115 | X | | X | X | | 5 | 10 | 1.30 | k | |
| 1069 | NITROSYL CHLORIDE | 2.3 | 8 | 35 | X | | | X | | 5 | 13 | 1.10 | k | |
| 1070 | NITROUS OXIDE | 2.2 | 5.1 | | X | X | X | X | X | 10 | 180 225 250 | 0.68 0.74 0.75 | | |
| 1075 | PETROLEUM GASES, LIQUEFIED | 2.1 | | | X | X | X | X | X | 10 | | | v, z | |
| 1076 | PHOSGENE | 2.3 | 8 | 5 | X | | X | X | | 5 | 20 | 1.23 | k | |
| 1077 | PROPYLENE | 2.1 | | | X | X | X | X | X | 10 | 27 | 0.43 | | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 | |
|--|---|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|----------------------|----------------------------|--|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions | |
| 1078 | REFRIGERANT GAS, N.O.S. | 2.2 | | | X | X | X | X | X | 10 | | | z | |
| 1079 | SULPHUR DIOXIDE | 2.3 | 8 | 2 520 | X | X | X | X | X | 5 | 12 | 1.23 | | |
| 1080 | SULPHUR HEXAFLUORIDE | 2.2 | | | X | X | X | X | X | 10 | 70 140 160 | 1.06 1.34 1.38 | | |
| 1081 | TETRAFLUORO-ETHYLENE, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 200 | | m, o | |
| 1082 | TRIFLUOROCHLORO-ETHYLENE, STABILIZED | 2.3 | 2.1 | 2 000 | X | X | X | X | X | 5 | 19 | 1.13 | u | |
| 1083 | TRIMETHYLAMINE, ANHYDROUS | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.56 | b | |
| 1085 | VINYL BROMIDE, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 10 | 1.37 | a | |
| 1086 | VINYL CHLORIDE, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 12 | 0.81 | a | |
| 1087 | VINYL METHYL ETHER, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.67 | | |
| 1581 | CHLOROPICRIN AND METHYL BROMIDE MIXTURE | 2.3 | | 850 | X | X | X | X | X | 5 | 10 | 1.51 | a | |
| 1582 | CHLOROPICRIN AND METHYL CHLORIDE MIXTURE | 2.3 | | | X | X | X | X | X | 5 | 17 | 0.81 | a | |
| 1589 | CYANOGEN CHLORIDE, STABILIZED | 2.3 | 8 | 80 | X | | | X | | 5 | 20 | 1.03 | k | |
| 1741 | BORON TRICHLORIDE | 2.3 | 8 | 2 541 | X | X | X | X | X | 5 | 10 | 1.19 | | |
| 1749 | CHLORINE TRIFLUORIDE | 2.3 | 5.1 8 | 299 | X | X | X | X | X | 5 | 30 | 1.40 | a | |
| 1858 | HEXAFLUORO-PROPYLENE (REFRIGERANT GAS R 1216) | 2.2 | | | X | X | X | X | X | 10 | 22 | 1.11 | | |
| 1859 | SILICON TETRAFLUORIDE | 2.3 | 8 | 450 | X | X | X | X | X | 5 | 200 300 | 0.74 1.10 | | |
| 1860 | VINYL FLUORIDE, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 250 | 0.64 | a | |
| 1911 | DIBORANE | 2.3 | 2.1 | 80 | X | | | X | | 5 | 250 | 0.07 | d, k, o | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 |
|--|--|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 1912 | METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE | 2.1 | | | X | X | X | X | X | 10 | 17 | 0.81 | a |
| 1952 | ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide | 2.2 | | | X | X | X | X | X | 10 | 190 250 | 0.66 0.75 | |
| 1958 | 1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114) | 2.2 | | | X | X | X | X | X | 10 | 10 | 1.30 | |
| 1959 | 1,1-DIFLUORO-ETHYLENE (REFRIGERANT GAS R 1132a) | 2.1 | | | X | X | X | X | X | 10 | 250 | 0.77 | |
| 1962 | ETHYLENE | 2.1 | | | X | X | X | X | X | 10 | 225 300 | 0.34 0.38 | |
| 1965 | HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S. | 2.1 | | | X | X | X | X | X | 10 | | | v, z |
| 1967 | INSECTICIDE GAS, TOXIC, N.O.S. | 2.3 | | | X | X | X | X | X | 5 | | | z |
| 1968 | INSECTICIDE GAS, N.O.S. | 2.2 | | | X | X | X | X | X | 10 | | | z |
| 1969 | ISOBUTANE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.49 | v |
| 1973 | CHLORODIFLUORO-METHANE AND CHLOROPENTA-FLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502) | 2.2 | | | X | X | X | X | X | 10 | 31 | 1.01 | |
| 1974 | CHLORODIFLUORO-BROMOMETHANE (REFRIGERANT GAS R 12B1) | 2.2 | | | X | X | X | X | X | 10 | 10 | 1.61 | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 | | | | | | | | | |
|--|---|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|---|---|---|---|---|---|----|------|---|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions | | | | | | | | | |
| 1975 | NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE) | 2.3 | 5.1 8 | 115 | X | | X | X | | 5 | | | k, z | | | | | | | | | |
| 1976 | OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318) | 2.2 | | | X | X | X | X | X | 10 | 11 | 1.32 | | | | | | | | | | |
| 1978 | PROPANE | 2.1 | | | X | X | X | X | X | 10 | 23 | 0.43 | v | | | | | | | | | |
| 1982 | TETRAFLUOROMETHANE (REFRIGERANT GAS R 14) | 2.2 | | | X | X | X | X | X | 10 | 200 300 | 0.71 0.90 | | | | | | | | | | |
| 1983 | 1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a) | 2.2 | | | X | X | X | X | X | 10 | 10 | 1.18 | | | | | | | | | | |
| 1984 | TRIFLUOROMETHANE (REFRIGERANT GAS R 23) | 2.2 | | | X | X | X | X | X | 10 | 190 250 | 0.88 0.96 | | | | | | | | | | |
| 2035 | 1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a) | 2.1 | | | X | X | X | X | X | 10 | 35 | 0.73 | | | | | | | | | | |
| 2036 | XENON | 2.2 | | | X | X | X | X | X | 10 | 130 | 1.28 | | | | | | | | | | |
| 2044 | 2,2-DIMETHYLPROPANE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.53 | | | | | | | | | | |
| 2073 | AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, | 2.2 | | | | | | | | | | | | | | | | | | | | |
| | with more than 35% but not more than 40% ammonia | | | | | | | | | | | | | X | X | X | X | X | 5 | 10 | 0.80 | b |
| | with more than 40% but not more than 50% ammonia | | | | | | | | | | | | | X | X | X | X | X | 5 | 12 | 0.77 | b |
| 2188 | ARSINE | 2.3 | 2.1 | 20 | X | | | X | | 5 | 42 | 1.10 | d, k | | | | | | | | | |
| 2189 | DICHLOROSILANE | 2.3 | 2.1 8 | 314 | X | X | X | X | X | 5 | 10 200 | 0.90 1.08 | | | | | | | | | | |
| 2191 | SULPHURYL FLUORIDE | 2.3 | | 3 020 | X | X | X | X | X | 5 | 50 | 1.10 | u | | | | | | | | | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | P200 | |
|--|---|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 2192 | GERMANE | 2.3 | 2.1 | 620 | X | X | X | X | X | 5 | 250 | 0.064 | d, q, r |
| 2193 | HEXAFLUROETHANE (REFRIGERANT GAS R 116) | 2.2 | | | X | X | X | X | X | 10 | 200 | 1.13 | |
| 2194 | SELENIUM HEXAFLUROIDE | 2.3 | 8 | 50 | X | | | X | | 5 | 36 | 1.46 | k |
| 2195 | TELLURIUM HEXAFLUROIDE | 2.3 | 8 | 25 | X | | | X | | 5 | 20 | 1.00 | k |
| 2196 | TUNGSTEN HEXAFLUROIDE | 2.3 | 8 | 160 | X | | | X | | 5 | 10 | 3.08 | a, k |
| 2197 | HYDROGEN IODIDE, ANHYDROUS | 2.3 | 8 | 2 860 | X | X | X | X | X | 5 | 23 | 2.25 | a, d |
| 2198 | PHOSPHORUS PENTAFLUROIDE | 2.3 | 8 | 190 | X | | | X | | 5 | 200 300 | 0.90 1.25 | k k |
| 2199 | PHOSPHINE | 2.3 | 2.1 | 20 | X | | | X | | 5 | 225 250 | 0.30 0.45 | d, k, q d, k, q |
| 2200 | PROPADIENE, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 22 | 0.50 | |
| 2202 | HYDROGEN SELENIDE, ANHYDROUS | 2.3 | 2.1 | 2 | X | | | X | | 5 | 31 | 1.60 | k |
| 2203 | SILANE | 2.1 | | | X | X | X | X | X | 10 | 225 250 | 0.32 0.36 | q q |
| 2204 | CARBONYL SULPHIDE | 2.3 | 2.1 | 1 700 | X | X | X | X | X | 5 | 30 | 0.87 | u |
| 2417 | CARBONYL FLUORIDE | 2.3 | 8 | 360 | X | X | X | X | X | 5 | 200 300 | 0.47 0.70 | |
| 2418 | SULPHUR TETRAFLUROIDE | 2.3 | 8 | 40 | X | | | X | | 5 | 30 | 0.91 | k |
| 2419 | BROMOTRIFLUORO- ETHYLENE | 2.1 | | | X | X | X | X | X | 10 | 10 | 1.19 | |
| 2420 | HEXAFLUROACETONE | 2.3 | 8 | 470 | X | X | X | X | X | 5 | 22 | 1.08 | |
| 2421 | NITROGEN TRIOXIDE | 2.3 | 5.1 8 | 57 | X | | | X | | 5 | | | k |
| 2422 | OCTAFLUROBUT-2-ENE (REFRIGERANT GAS R 1318) | 2.2 | | | X | X | X | X | X | 10 | 12 | 1.34 | |
| 2424 | OCTAFLUROPROPANE (REFRIGERANT GAS R 218) | 2.2 | | | X | X | X | X | X | 10 | 25 | 1.04 | |

| P200 PACKING INSTRUCTION (cont'd) P200 | | | | | | | | | | | | | |
|--|--|-------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|----------------------|----------------------------|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 2451 | NITROGEN TRIFLUORIDE | 2.2 | 5.1 | | X | X | X | X | X | 10 | 200 | 0.50 | |
| 2452 | ETHYLACETYLENE, STABILIZED | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.57 | c |
| 2453 | ETHYL FLUORIDE (REFRIGERANT GAS R 161) | 2.1 | | | X | X | X | X | X | 10 | 30 | 0.57 | |
| 2454 | METHYL FLUORIDE (REFRIGERANT GAS R 41) | 2.1 | | | X | X | X | X | X | 10 | 300 | 0.63 | |
| 2455 | METHYL NITRITE | 2.2 | | | | | | | | | | | |
| 2517 | 1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b) | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.99 | |
| 2534 | METHYLCHLORO-SILANE | 2.3 | 2.1 8 | 600 | X | X | X | X | X | 5 | | | z |
| 2548 | CHLORINE PENTAFLUORIDE | 2.3 | 5.1 8 | 122 | X | | | X | | 5 | 13 | 1.49 | a, k |
| 2599 | CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503) | 2.2 | | | X | X | X | X | X | 10 | 31 42 100 | 0.12 0.17 0.64 | |
| 2601 | CYCLOBUTANE | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.63 | |
| 2602 | DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500) | 2.2 | | | X | X | X | X | X | 10 | 22 | 1.01 | |
| 2676 | STIBINE | 2.3 | 2.1 | 20 | X | | | X | | 5 | 200 | 0.49 | k, r |
| 2901 | BROMINE CHLORIDE | 2.3 | 5.1 8 | 290 | X | 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 | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 3057 | TRIFLUOROACETYL CHLORIDE | 2.3 | 8 | 10 | X | | X | X | | 5 | 17 | 1.17 | k |
| 3070 | ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12.5% ethylene oxide | 2.2 | | | X | X | X | X | X | 10 | 18 | 1.09 | |
| 3083 | PERCHLORYL FLUORIDE | 2.3 | 5.1 | 770 | X | X | X | X | X | 5 | 33 | 1.21 | u |
| 3153 | PERFLUORO (METHYL VINYL ETHER) | 2.1 | | | X | X | X | X | X | 10 | 20 | 0.75 | |
| 3154 | PERFLUORO (ETHYL VINYL ETHER) | 2.1 | | | X | X | X | X | X | 10 | 10 | 0.98 | |
| 3157 | LIQUEFIED GAS, OXIDIZING, N.O.S. | 2.2 | 5.1 | | X | X | X | X | X | 10 | | | z |
| 3159 | 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a) | 2.2 | | | X | X | X | X | X | 10 | 18 | 1.05 | |
| 3160 | LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S. | 2.3 | 2.1 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3161 | LIQUEFIED GAS, FLAMMABLE, N.O.S. | 2.1 | | | X | X | X | X | X | 10 | | | z |
| 3162 | LIQUEFIED GAS, TOXIC, N.O.S. | 2.3 | | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3163 | LIQUEFIED GAS, N.O.S. | 2.2 | | | X | X | X | X | X | 10 | | | z |
| 3220 | PENTAFLUOROETHANE (REFRIGERANT GAS R 125) | 2.2 | | | X | X | X | X | X | 10 | 49 35 | 0.95 0.87 | |
| 3252 | DIFLUOROMETHANE (REFRIGERANT GAS R 32) | 2.1 | | | X | X | X | X | X | 10 | 48 | 0.78 | |
| 3296 | HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227) | 2.2 | | | X | X | X | X | X | 10 | 13 | 1.21 | |
| 3297 | ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE with not more than 8.8% ethylene oxide | 2.2 | | | X | X | X | X | X | 10 | 10 | 1.16 | |

| P200 | | PACKING INSTRUCTION (cont'd) | | | | | | | | | | | P200 |
|--|--|------------------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 3298 | ETHYLENE OXIDE AND PENTAFLUROETHANE MIXTURE with not more than 7.9% ethylene oxide | 2.2 | | | X | X | X | X | X | 10 | 26 | 1.02 | |
| 3299 | ETHYLENE OXIDE AND TETRAFLUROETHANE MIXTURE with not more than 5.6% ethylene oxide | 2.2 | | | X | X | X | X | X | 10 | 17 | 1.03 | |
| 3300 | ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide | 2.3 | 2.1 | More than 2 900 | X | X | X | X | X | 5 | 28 | 0.73 | |
| 3307 | LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S. | 2.3 | 5.1 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3308 | LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S. | 2.3 | 8 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3309 | LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S. | 2.3 | 2.1 8 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3310 | LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. | 2.3 | 5.1 8 | ≤ 5 000 | X | X | X | X | X | 5 | | | z |
| 3318 | AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia | 2.3 | 8 | | X | X | X | X | X | 5 | | | b |
| 3337 | REFRIGERANT GAS R 404A | 2.2 | | | X | X | X | X | X | 10 | 36 | 0.82 | |
| 3338 | REFRIGERANT GAS R 407A | 2.2 | | | X | X | X | X | X | 10 | 32 | 0.94 | |
| 3339 | REFRIGERANT GAS R 407B | 2.2 | | | X | X | X | X | X | 10 | 33 | 0.93 | |
| 3340 | REFRIGERANT GAS R 407C | 2.2 | | | X | X | X | X | X | 10 | 30 | 0.95 | |
| 3354 | INSECTICIDE GAS, FLAMMABLE, N.O.S | 2.1 | | | X | X | X | X | X | 10 | | | z |
| 3355 | INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S. | 2.3 | 2.1 | | X | X | X | X | X | 5 | | | z |

| P200 PACKING INSTRUCTION (cont'd) P200 | | | | | | | | | | | | | |
|--|-------------------------|-------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|
| Table 2: LIQUEFIED GASES AND DISSOLVED GASES | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 3374 | ACETYLENE, SOLVENT FREE | 2.1 | | | X | | | X | | 5 | 60 52 | | c, p |

Cont'd on next page

| P200 PACKING INSTRUCTION (cont'd) P200 | | | | | | | | | | | | | |
|--|--|-------------------|-----------------|------------------------------------|-----------|-------|----------------|----------------------|-------|--------------------|--------------------|---------------|----------------------------|
| Table 3: SUBSTANCES NOT IN CLASS 2 | | | | | | | | | | | | | |
| UN No. | Name and description | Class or Division | Subsidiary risk | LC ₅₀ ml/m ³ | Cylinders | Tubes | Pressure drums | Bundles of cylinders | MEGCs | Test period, years | Test pressure, bar | Filling ratio | Special packing provisions |
| 1051 | HYDROGEN CYANIDE, STABILIZED containing less than 3% water | 6.1 | 3 | 40 | X | | | X | | 5 | 100 | 0.55 | k |
| 1052 | HYDROGEN FLUORIDE, ANHYDROUS | 8 | 6.1 | 966 | X | | X | X | | 5 | 10 | 0.84 | t |
| 1745 | BROMINE PENTAFLUORIDE | 5.1 | 6.1 8 | 25 | X | | X | X | | 5 | 10 | ^a | k |
| 1746 | BROMINE TRIFLUORIDE | 5.1 | 6.1 8 | 50 | X | | X | X | | 5 | 10 | ^a | k |
| 2495 | IODINE PENTAFLUORIDE | 5.1 | 6.1 8 | 120 | X | | X | X | | 5 | 10 | ^a | k |
| 2983 | ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide | 3 | 6.1 | | X | | X | X | | 5 | 10 | | z |

^a 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) Compressed gas cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the competent authority. | | | | | | | | | | | | |
| (2) In addition, the following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met: | | | | | | | | | | | | |
| (a) For non-toxic gases, combination packagings with hermetically sealed inner packagings of glass or metal with a maximum capacity of 5 litres per package which meet the packing group III performance level. | | | | | | | | | | | | |
| (b) For toxic gases, combination packagings with hermetically sealed inner packagings of glass or metal with a maximum capacity of 1 litre per package which meet the packing group III performance level. | | | | | | | | | | | | |

| P202 PACKING INSTRUCTION P202 | | | | | | | | | | | | |
|-------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| (Reserved) | | | | | | | | | | | | |

| P203 | PACKING INSTRUCTION | P203 |
|--|---------------------|------|
| This instruction applies to Class 2 refrigerated liquefied gases. | | |
| Requirements for closed cryogenic receptacles: | | |
| <p>(1) The general requirements of 4.1.6.1 shall be met.</p> <p>(2) The requirements of Chapter 6.2 shall be met.</p> <p>(3) The closed cryogenic receptacles shall be so insulated that they do not become coated with frost.</p> <p>(4) Test pressure Refrigerated liquids shall be filled in closed cryogenic receptacles with the following minimum test pressures:</p> <p>(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);</p> <p>(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.</p> <p>(5) Degree of filling For non-flammable, non-toxic refrigerated liquefied gases the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) shall not exceed 98% of the water capacity of the pressure receptacle. For flammable refrigerated liquefied gases 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.</p> <p>(6) Pressure-relief devices Closed cryogenic receptacles shall be fitted with at least one pressure-relief device.</p> <p>(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 transport of oxidizing gases (i.e. with a subsidiary risk of 5.1), these materials shall not react with these gases in a dangerous manner.</p> | | |
| Requirements for open cryogenic receptacles: | | |
| <p>Only the following non oxidizing refrigerated liquefied gases of Division 2.2 may be transported in open cryogenic receptacles: UN Nos. 1913, 1951, 1963, 1970, 1977, 2591, 3136 and 3158.</p> <p>Open cryogenic receptacles shall be constructed to meet the following requirements:</p> <p>(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 transport.</p> <p>(2) The capacity shall be not more than 450 litres.</p> <p>(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.</p> <p>(4) The materials of construction shall have suitable mechanical properties at the service temperature.</p> <p>(5) Materials which are in direct contact with the dangerous goods shall not be affected or weakened by the dangerous goods intended to be transported and shall not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods.</p> <p>(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 transport.</p> <p>(7) The receptacle shall be designed to remain in an upright position during transport, e.g. have a base whose smaller horizontal dimension is greater than the height of the centre of gravity when filled to capacity or be mounted on gimbals.</p> <p>(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 transport.</p> <p>(9) Open cryogenic receptacles shall bear the following marks permanently affixed e.g. by stamping, engraving or etching:</p> <ul style="list-style-type: none"> - The manufacturer's name and address; - The model number or name; - The serial or batch number; - The UN number and proper shipping name of gases for which the receptacle is intended; - The capacity of the receptacle in litres. | | |

| 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> <ol style="list-style-type: none"> <li data-bbox="151 347 1444 481">(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 1MPa (10 bar) (gauge pressure). During transport, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar). <li data-bbox="151 481 1444 683">(2) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F or 4G), drums (1A2, 1B2, 1N2, 1D or 1G) or jerricans (3A2 or 3B2) enclosing hermetically sealed metal cans with inner packagings of glass or metal, with a capacity of not more than 1 litre each, having threaded closures with gaskets. Inner packagings shall be cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents. Inner packagings shall not be filled to more than 90% of their capacity. Outer packagings shall have a maximum net mass of 125 kg. <li data-bbox="151 683 1444 884">(3) Steel, aluminium or metal drums (1A2, 1B2 or 1N2), jerricans (3A2 or 3B2) or boxes (4A or 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>Special packing provision: PP86: For UN Nos. 3392 and 3394, air shall be eliminated from the vapour space by nitrogen or other means.</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: | | | | |
| Combination packagings | | | | |
| Inner packagings | Outer packagings | Maximum net mass | | |
| Glass 2 kg Plastic 15 kg Metal 20 kg Inner packagings shall be hermetically sealed (e.g. by taping or by threaded closures) | Drums | | | |
| | steel (1A2) | | | 400 kg |
| | aluminium (1B2) | | | 400 kg |
| | other metal (1N2) | | | 400 kg |
| | plastics (1H2) | | | 400 kg |
| | plywood (1D) | | | 400 kg |
| | fibre (1G) | | | 400 kg |
| | Boxes | | | |
| | 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 | |
| Jerricans | | | | |
| steel (3A2) | | | 120 kg | |
| aluminium (3B2) | | | 120 kg | |
| plastics (3H2) | | | 120 kg | |

| P404 | | PACKING INSTRUCTION | | P404 |
|--|--|---|--|------|
| This instruction applies to pyrophoric solids: UN Nos.: 1383, 1854, 1855, 2005, 2008, 2441, 2545, 2546, 2846, 2881, 3200, 3391, 3393 and 3461. | | | | |
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | | | |
| (1) | Combination packagings | | | |
| | Outer packagings: | (1A2, 1B2, 1N2, 1H2, 1D, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F or 4H2) | | |
| | Inner packagings: | Metal packagings with a maximum net mass of 15 kg each. Inner packagings shall be hermetically sealed and have threaded closures. | | |
| (2) | Metal packagings: | (1A1, 1A2, 1B1, 1N1, 1N2, 3A1, 3A2, 3B1 and 3B2). Maximum gross mass: 150 kg | | |
| (3) | Composite packagings: | Plastics receptacle in a steel or aluminium drum (6HA1 or 6HB1) Maximum gross mass: 150 kg | | |
| Pressure receptacles , provided that the general provisions of 4.1.3.6 are met. | | | | |
| Special packing provision: | | | | |
| PP86 | 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 4.1.1 and 4.1.3 are met: | | |
| <p>(1) For UN1381, phosphorus wet:</p> <p>(a) Combination packagings Outer packagings: (4A, 4B, 4N, 4C1, 4C2, 4D or 4F). Maximum net mass: 75 kg Inner packagings:</p> <p>(i) hermetically sealed metal cans, with a maximum net mass of 15 kg; or</p> <p>(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</p> <p>(b) Drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2). Maximum net mass: 400 kg Jerricans (3A1 or 3B1). Maximum net mass: 120 kg.</p> <p>These packagings shall be capable of passing the leakproofness test specified in 6.1.5.4 at the packing group II performance level.</p> <p>(2) For UN1381, dry phosphorus:</p> <p>(a) When fused, drums (1A2, 1B2 or 1N2) with a maximum net mass of 400 kg; or</p> <p>(b) In projectiles or hard cased articles when transported without Class 1 components as specified by the competent authority.</p> | | |

| P406 | PACKING INSTRUCTION | P406 |
|--|---------------------|------|
| <p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>(1) Combination packagings Outer packagings: (4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 1G, 1D, 1H2 or 3H2) 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 in steel or aluminium drums (6HA1 or 6HB1), plastics receptacle in fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1), plastics receptacle in steel, aluminium, wood, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2).</p> | | |
| <p>Additional requirements:</p> <ol style="list-style-type: none"> Packagings shall be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer. Packagings shall be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar). The type of packaging and maximum permitted quantity per packaging are limited by the provisions of 2.1.3.6. | | |
| <p>Special packing provisions:</p> <p>PP24 UN 2852, 3364, 3365, 3366, 3367, 3368 and 3369 shall not be transported in quantities of more than 500 g per package.</p> <p>PP25 UN 1347 shall not be transported in quantities of more than 15 kg per package.</p> <p>PP26 For UN Nos. 1310, 1320, 1321, 1322, 1344, 1347, 1348, 1349, 1517, 2907, 3317, 3344 and 3376 packagings shall be lead free.</p> <p>PP48 For UN 3474, metal packagings shall not be used.</p> <p>PP78 UN 3370 shall not be transported in quantities of more than 11.5 kg per package.</p> <p>PP80 For UN Nos. 2907 and 3344, packagings shall meet the packing group II performance level. Packagings meeting the test criteria of packing group I shall not be used.</p> | | |

| P407 | PACKING INSTRUCTION | P407 |
|--|---------------------|------|
| <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 4.1.1 and 4.1.3 are met: Combination packagings comprising securely closed inner packagings to prevent accidental ignition under normal conditions of transport. The maximum gross mass of the package shall not exceed 45 kg except for fibreboard boxes which shall not exceed 30 kg.</p> | | |
| <p>Additional requirement: Matches shall be tightly packed.</p> | | |
| <p>Special packing provision: PP27 UN 1331, Strike-anywhere matches shall not be packed in the same outer packaging with any other dangerous goods other than safety matches or wax Vesta matches, which shall be packed in separate inner packagings. Inner packagings shall not contain more than 700 strike-anywhere matches.</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: | | | | | |
| Combination packagings | | | | | |
| Inner packagings | | Outer packagings | | Maximum net mass | |
| | | | | Packing group II | Packing group III |
| Glass | 10 kg | Drums | | | |
| Plastics ^a | 30 kg | steel (1A2) | 400 kg | 400 kg | |
| Metal | 40 kg | aluminium (1B2) | 400 kg | 400 kg | |
| Paper ^{a, b} | 10 kg | other metal (1N2) | 400 kg | 400 kg | |
| Fibre ^{a, b} | 10 kg | plastics (1H2) | 400 kg | 400 kg | |
| | | plywood (1D) | 400 kg | 400 kg | |
| | | fibre (1G) ^a | 400 kg | 400 kg | |
| | | Boxes | | | |
| | | 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) ^a | 400 kg | 400 kg | |
| | | expanded plastics (4H1) | 60 kg | 60 kg | |
| | | solid plastics (4H2) | 400 kg | 400 kg | |
| | | Jerricans | | | |
| | | steel (3A2) | 120 kg | 120 kg | |
| | | aluminium (3B2) | 120 kg | 120 kg | |
| | | plastics (3H2) | 120 kg | 120 kg | |
| Single packagings | | | | | |
| Drums | | | | | |
| | steel (1A1 or 1A2) | | 400 kg | 400 kg | |
| | aluminium (1B1 or 1B2) | | 400 kg | 400 kg | |
| | metal other than steel, or aluminium (1N1 or 1N2) | | 400 kg | 400 kg | |
| | plastics (1H1 or 1H2) | | 400 kg | 400 kg | |
| Jerricans | | | | | |
| | steel (3A1 or 3A2) | | 120 kg | 120 kg | |
| | aluminium (3B1 or 3B2) | | 120 kg | 120 kg | |
| | plastics (3H1 or 3H2) | | 120 kg | 120 kg | |

Cont'd on next page

^aPackagings shall be siftproof.

^b These inner packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).

| P410 | PACKING INSTRUCTION (cont'd) | | P410 |
|--|------------------------------|--------------------------|------|
| <i>Single packagings (cont'd)</i> | Maximum net mass | | |
| | Packing group II | Packing group III | |
| Boxes | | | |
| steel (4A) ^c | 400 kg | 400 kg | |
| aluminium (4B) ^c | 400 kg | 400 kg | |
| other metal (4N) ^c | 400 kg | 400 kg | |
| natural wood (4C1) ^c | 400 kg | 400 kg | |
| plywood (4D) ^c | 400 kg | 400 kg | |
| reconstituted wood (4F) ^c | 400 kg | 400 kg | |
| natural wood with sift proof walls (4C2) ^c | 400 kg | 400 kg | |
| fibreboard (4G) ^c | 400 kg | 400 kg | |
| solid plastics (4H2) ^c | 400 kg | 400 kg | |
| Bags | | | |
| bags (5H3, 5H4, 5L3, 5M2) ^{c, d} | 50 kg | 50 kg | |
| Composite packaging | | | |
| plastics receptacle in steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1, 6HD1, or 6HH1) | 400 kg | 400 kg | |
| plastics receptacle in steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2) | 75 kg | 75 kg | |
| glass receptacle in steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1 or 6PG1) or in steel, aluminium, wooden, wickerwork hamper or fibreboard box (6PA2, 6PB2, 6PC, 6PD2, or 6PG2) or in solid or expanded plastics packaging (6PH1 or 6PH2) | 75 kg | 75 kg | |
| Pressure receptacles , provided that the general provisions of 4.1.3.6 are met. | | | |
| Special packing provisions: | | | |
| PP39 For UN 1378, for metal packagings a venting device is required. | | | |
| PP40 For UN Nos. 1326, 1352, 1358, 1437 and 1871, and for UN 3182, packing group II, bags are not allowed. | | | |
| PP83 For UN No. 2813, waterproof bags containing not more than 20 g of substance for the purposes of heat formation may be packaged for transport. Each waterproof bag shall be sealed in a plastics bag and placed within an intermediate packaging. No outer packaging shall contain more than 400 g of substance. Water or liquid that may react with the water reactive substance shall not be included in the packaging. | | | |

^c *These packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).*

^d *These packagings shall only be used for packing group II substances when transported in a closed cargo transport unit.*

| P411 | PACKING INSTRUCTION | P411 |
|--|----------------------------|-------------|
| This instruction applies to UN No. 3270. | | |
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | |
| <ul style="list-style-type: none"> (1) Fibreboard box with a maximum gross mass of 30 kg; (2) Other packagings, provided that explosion is not possible by reason of increased internal pressure. Maximum net mass shall not exceed 30 kg. | | |

| P500 | PACKING INSTRUCTION | P500 |
|---|----------------------------|-------------|
| This instruction applies to UN No. 3356. | | |
| The general provisions of 4.1.1 and 4.1.3 shall be met. | | |
| Packagings shall conform to the packing group II performance level. | | |
| The generator(s) shall be transported in a package which meets the following requirements when one generator in the package is actuated: | | |
| <ul style="list-style-type: none"> (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: | | |
| Combination packagings | Inner packaging maximum capacity | Outer packaging maximum net mass |
| (1) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4H2) or drums (1A2, 1B2, 1N2, 1H2, 1D) or jerricans (3A2, 3B2, 3H2) with glass, plastics or metal inner packagings | 5 l | 125 kg |
| (2) Fibreboard box (4G) or fibre drum (1G), with plastics or metal inner packagings each in a plastics bag | 2 l | 50 kg |
| Single packagings | Maximum capacity | |
| Drums | | |
| steel (1A1) | 250 l | |
| aluminium (1B1) | 250 l | |
| metal other than steel or aluminium (1N1) | 250 l | |
| plastics (1H1) | 250 l | |
| Jerricans | | |
| steel (3A1) | 60 l | |
| aluminium (3B1) | 60 l | |
| plastics (3H1) | 60 l | |
| Composite packagings | | |
| plastics receptacle in steel or aluminium drum (6HA1, 6HB1) | 250 l | |
| plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1) | 250 l | |
| plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2) | 60 l | |
| glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood or fibreboard box (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) | 60 l | |
| Additional requirements: | | |
| 1. Packagings shall have a minimum ullage of 10%. | | |
| 2. Packagings shall be vented. | | |

| P502 PACKING INSTRUCTION | | P502 |
|---|---|------------------|
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | |
| Combination packagings | | Maximum net mass |
| Inner packagings | Drums | |
| Glass 5 l | steel (1A2) | 125 kg |
| Metal 5 l | aluminium (1B2) | 125 kg |
| Plastic 5 l | metal other than steel or aluminium (1N2) | 125 kg |
| | plastics (1H2) | 125 kg |
| | plywood (1D) | 125 kg |
| | fibre (1G) | 125 kg |
| | Boxes | |
| | steel (4A) | 125 kg |
| | aluminium (4B) | 125 kg |
| | 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 |
| Single packagings | | Maximum capacity |
| Drums | | |
| steel (1A1) | | 250 l |
| aluminium (1B1) | | 250 l |
| plastics (1H1) | | 250 l |
| Jerricans | | |
| steel (3A1) | | 60 l |
| aluminium (3B1) | | 60 l |
| plastics (3H1) | | 60 l |
| Composite packagings | | Maximum capacity |
| plastics receptacle in steel or aluminium drum (6HA1, 6HB1) | | 250 l |
| plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1) | | 250 l |
| plastics receptacle in steel or aluminium crate or box or plastics receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2) | | 60 l |
| glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood, fibreboard or plywood box (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) | | 60 l |
| Special packing provision: | | |
| PP28 | For UN 1873, only glass inner packagings and glass inner receptacles are authorized respectively for combination packagings and composite packagings. | |

| P503 PACKING INSTRUCTION | | P503 |
|---|---|------------------|
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | |
| Combination packagings | | Maximum net mass |
| Inner packagings: | Drums | |
| Glass 5 kg | steel (1A2) | 125 kg |
| Metal 5 kg | aluminium (1B2) | 125 kg |
| Plastic 5 kg | metal other than steel or aluminium (1N2) | 125 kg |
| | plastics (1H2) | 125 kg |
| | plywood (1D) | 125 kg |
| | fibre (1G) | 125 kg |
| | Boxes | |
| | steel (4A) | 125 kg |
| | aluminium (4B) | 125 kg |
| | 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 |
| Single packagings | | Maximum capacity |
| Drums | | |
| Metal drums(1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) | | 250 kg |
| Fibreboard (1G) or plywood drums (1D) fitted with inner liners | | 200 kg |

| P504 PACKING INSTRUCTION | | P504 |
|---|-------------------------|-------------|
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | |
| Combination packagings | Maximum net mass | |
| (1) Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2) Inner packagings: Glass receptacles with a maximum capacity of 5 litres | 75 kg | |
| (2) Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2) Inner packagings: Plastic receptacles with a maximum capacity of 30 litres | 75 kg | |
| (3) Outer packagings: 1G, 4F or 4G Inner packagings: Metal receptacles with a maximum capacity of 40 litres | 125 kg | |
| (4) Outer packagings: (1A2, 1B2, 1N2, 1H2, 1D, 4A, 4B, 4N, 4C1, 4C2, 4D, 4H2) Inner packagings: Metal receptacles with a maximum capacity of 40 litres | 225 kg | |
| Single packagings | Maximum capacity | |
| Drums | | |
| steel, non-removable head (1A1) | 250 l | |
| aluminium, non-removable head (1B1) | 250 l | |
| metal other than steel or aluminium, non-removable head (1N1) | 250 l | |
| plastics, non-removable head (1H1) | 250 l | |
| Jerricans | | |
| steel non-removable head (3A1) | 60 l | |
| aluminium non-removable head (3B1) | 60 l | |
| plastics non-removable head (3H1) | 60 l | |
| Composite packagings | Maximum capacity | |
| plastics receptacle in steel or aluminium drum (6HA1, 6HB1) | 250 l | |
| plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1) | 120 l | |
| plastics receptacle in steel or aluminium crate or box or plastic receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2) | 60 l | |
| glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood, fibreboard or plywood box (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) | 60 l | |
| Special packing provision: | | |
| PP10 For UN Nos. 2014 and 3149, the packaging shall be vented. | | |

| P520 PACKING INSTRUCTION | | P520 | | | | | | | |
|--|------------|------------------------|------------|------------------------|------------|------------|------------|------------------|--|
| This instruction applies to organic peroxides of Division 5.2 and self-reactive substances of Division 4.1 | | | | | | | | | |
| The packagings listed below are authorized provided that the general provision of 4.1.1 and 4.1.3 and special provisions of 4.1.7 are met. | | | | | | | | | |
| The packing methods are designated OP1 to OP8. The packing methods appropriate for the individual currently assigned organic peroxides and self-reactive substances are listed in 2.4.2.3.2.3 and 2.5.3.2.4. | | | | | | | | | |
| The quantities specified for each packing method are the maximum quantities authorized per package. The following packagings are authorized: | | | | | | | | | |
| (1) Combination packagings with outer packagings comprising boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2), drums (1A2, 1B2, 1G, 1H2 and 1D) jerricans (3A2, 3B2 and 3H2); | | | | | | | | | |
| (2) Single packagings consisting of drums (1A1, 1A2, 1B1, 1B2, 1G, 1H1, 1H2 and 1D) and jerricans (3A1, 3A2, 3B1, 3B2, 3H1 and 3H2); | | | | | | | | | |
| (3) Composite packagings with plastics inner receptacles (6HA1, 6HA2, 6HB1, 6HB2, 6HC, 6HD1, 6HD2, 6HG1, 6HG2, 6HH1 and 6HH2). | | | | | | | | | |
| Maximum quantity per packaging/package^a for packing methods OP1 to OP8 | | | | | | | | | |
| Packing Method | OP1 | OP2^a | OP3 | OP4^a | OP5 | OP6 | OP7 | OP8 | |
| Maximum Quantity | | | | | | | | | |
| Maximum mass (kg) for solids and for combination packagings (liquid and solid) | 0.5 | 0.5/10 | 5 | 5/25 | 25 | 50 | 50 | 400 ^b | |
| Maximum contents in litres for liquids ^c | 0.5 | - | 5 | - | 30 | 60 | 60 | 225 ^d | |
| ^a 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. | | | | | | | | | |
| ^b 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. | | | | | | | | | |
| ^c Viscous liquids shall be treated as solids when they do not meet the criteria provided in the definition for "liquids" presented in 1.2.1. | | | | | | | | | |
| ^d 60 litres for jerricans. | | | | | | | | | |
| Additional requirements: | | | | | | | | | |
| 1. Metal packagings, including inner packagings of combination packagings and outer packagings of combination or composite packagings may only be used for packing methods OP7 and OP8; | | | | | | | | | |
| 2. In combination packagings, glass receptacles may only be used as inner packagings with a maximum content of 0.5 kg 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 risk 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. | | | | | | | | | |
| Special packing provisions: | | | | | | | | | |
| PP21 For certain self-reactive substances of types B or C, UN 3221, UN3222, UN3223, UN3224, UN3231, UN3232, UN3233 and UN3234 a smaller packaging than that allowed by packing methods OP5 or OP6 respectively shall be used (see 4.1.7 and 2.4.2.3.2.3). | | | | | | | | | |
| PP22 UN 3241, 2-Bromo-2-nitropropane-1, 3-diol, shall be packed in accordance with packing method OP6. | | | | | | | | | |

| P600 | PACKING INSTRUCTION | P600 |
|---|----------------------------|-------------|
| This instruction applies to UN Nos. 1700, 2016 and 2017. | | |
| <p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Outer packagings: (1A2, 1B2, 1N2, 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 transport.</p> <p>Maximum net mass: 75 kg</p> | | |

| P601 | PACKING INSTRUCTION | P601 |
|---|----------------------------|-------------|
| The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed: | | |
| <p>(1) Combination packagings with a maximum gross mass of 15 kg, consisting of</p> <ul style="list-style-type: none"> - one or more glass inner packaging(s) with a maximum net 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 transport, individually placed in - metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in - 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings. <p>(2) Combination packagings consisting of metal inner packagings not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 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 transport.</p> <p>(3) Packagings consisting of:</p> <p>Outer packagings:</p> <p>Steel or plastic drums, removable head (1A2 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"> (a) The hydraulic pressure test shall be conducted at a pressure of at least 3 bar (gauge pressure); (b) The design and production leakproofness tests shall be conducted at a test pressure of 0.30 bar; (c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides; (d) Their capacity shall not exceed 125 litres; and (e) Closures shall be of a screw cap type that are: <ul style="list-style-type: none"> (i) physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport; and (ii) provided with a cap seal. | | |

| P602 | PACKING INSTRUCTION | P602 |
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| <p>The following packagings are authorised provided that 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"> - one or more glass inner packaging(s) with a maximum net 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 transport, individually placed in - metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in - 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings. | | |
| <p>(2) Combination packagings consisting of metal inner packagings individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 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 transport. 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"> (a) The hydraulic pressure test shall be conducted at a pressure of at least 3 bar (gauge pressure); (b) The design and production leakproofness tests shall be conducted at a test pressure of 0.30 bar; and (c) Closures shall be of a screw cap type that are: <ul style="list-style-type: none"> (i) physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport; and (ii) provided with a cap seal. | | |
| <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 LC₅₀ less than or equal to 200 ml/m³ (ppm) shall be closed with a plug or valve conforming to the following:</p> <ul style="list-style-type: none"> (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; (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; (c) Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasket material; (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. <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 transported in an outer packaging. Pressure receptacles shall not be manifolded or interconnected.</p> | | |

| P800 | PACKING INSTRUCTION | P800 |
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| This instruction applies to UN Nos. 2803 and 2809. | | |
| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | |
| (1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. | | |
| (2) Steel flasks or bottles with threaded closures with a capacity not exceeding 3 l; or | | |
| (3) Combination packagings which conform to the following requirements: | | |
| (a) Inner packagings shall comprise glass, metal or rigid plastics intended to contain liquids with a maximum net mass of 15 kg each; | | |
| (b) The inner packagings shall be packed with sufficient cushioning material to prevent breakage; | | |
| (c) Either the inner packagings or the outer packagings shall have inner liners or bags of strong leakproof and puncture-resistant material impervious to the contents and completely surrounding the contents to prevent it from escaping from the package irrespective of its position or orientation; | | |
| (d) The following outer packagings and maximum net masses are authorized: | | |
| Outer packaging: | | Maximum net mass |
| Drums | | |
| steel (1A2) | | 400 kg |
| other metal (1N2) | | 400 kg |
| plastics (1H2) | | 400 kg |
| plywood (1D) | | 400 kg |
| fibre (1G) | | 400 kg |
| Boxes | | |
| steel (4A) | | 400 kg |
| 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 |
| Special packing provision: | | |
| PP41 | For UN 2803, when it is necessary to transport Gallium at low temperatures in order to maintain it in a completely solid state, the above packagings may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. If a refrigerant is used, all of the above materials used in the packaging of gallium shall be chemically and physically resistant to the refrigerant and shall have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging shall permit the release of carbon dioxide gas. | |

| P802 | PACKING INSTRUCTION | P802 |
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| The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: | | |
| (1) | Combination packagings Outer packagings: 1A2, 1B2, 1N2, 1H2, 1D, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, or 4H2; maximum net mass: 75 kg. Inner packagings: glass or plastics; maximum capacity: 10 litres. | |
| (2) | Combination packagings Outer packagings: 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 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 in steel, aluminium, plywood or solid plastics drum (6PA1, 6PB1, 6PD1, or 6PH2) or in a steel, aluminium, wood or plywood box (6PA2, 6PB2, 6PC or 6PD2); maximum capacity: 60 litres. | |
| (4) | 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. | |
| Special packing provision: | | |
| PP79 | For UN 1790 with more than 60% but not more than 85% hydrogen fluoride, see P001. | |

| 804 | PACKING INSTRUCTION | P804 |
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| This instruction applies to UN No. 1744. | | |
| The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed: | | |
| <p>(1) Combination packagings with a maximum gross mass of 25 kg, consisting of</p> <ul style="list-style-type: none"> - 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 transport, individually placed in - 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 - 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings. <p>(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 1A2, 1B2, 1N2, 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 transport;</p> <p>(3) Packagings consisting of:</p> <p>Outer packagings: Steel or plastic drums, removable head (1A2 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: 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"> (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"> (i) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport; (ii) Provided with a cap seal; (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"> (i) the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging; and (ii) the name or authorized symbol of the expert performing the tests and inspections; <p>(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.</p> <ul style="list-style-type: none"> (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. | | |