116	PACKING INSTRUCTION 116	116

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 paper, multiwall, water-resistant (5M2) plastics, film (5H4) textile, sift-proof (5L2) textile, water-resistant (5L3) woven plastics (5H1, 5H2, 5H3) Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with sift-proof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) steel (1A1, 1A2) Jerricans plastics (3H1, 3H2) steel (3A1, 3A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0082, 0241, 0331 and 0332, inner packagings are not necessary if leakproof, removable head drums are used as the outer packaging.
— For UN 0082, 0241, 0331 and 0332, inner packagings are not required when the explosive is contained in a material impervious to liquid.
— For UN 0081, inner packagings are not required when contained in rigid plastic which is impervious to nitric esters.
— UN 0331, inner packagings are not required when bags (5H2), (5H3) or (5H4) are used as outer packagings.
— For UN 0081, bags must not be used as outer packagings.

132	PACKING INSTRUCTION 132	132

a) Articles consisting of closed metal, plastic or fibreboard casings that contain a detonating explosive, or consisting of plastic-bonded detonating explosives

Inner packagings	*Intermediate packagings*	*Outer packagings*
Not necessary	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with sift-proof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A)

b) Articles without closed casings

Inner packagings	*Intermediate packagings*	*Outer packagings*
Receptacles fibreboard metal plastics wood Sheets paper plastics	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with sift-proof walls (4C2) other metal (4N) plywood (4D) reconstituted wood (4F) solid plastics (4H2) steel (4A)

144 PACKING INSTRUCTION 144 144

Inner packagings	*Intermediate packagings*	*Outer packagings*
Receptacles fibreboard metal plastics wood Dividing partitions in the outer packings	Not necessary	Boxes aluminium (4B) expanded plastics (4H1) natural wood, ordinary (4C1) with metal liner other metal (4N) plywood (4D) with metal liner reconstituted wood (4F) with metal liner steel (4A)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0248 and UN 0249, packagings must be protected against the ingress of water. When CONTRIVANCES, WATER ACTIVATED are transported unpackaged, they must be provided with at least two independent protective features which prevent the ingress of water.

Chapter 4

CLASS 2 — GASES

4.1 SPECIAL PACKING PROVISIONS FOR DANGEROUS GOODS OF CLASS 2

4.1.1 General requirements

4.1.1.1 This section provides general requirements applicable to the use of cylinders and closed cryogenic receptacles for the transport of Class 2 gases (e.g. UN 1072 **Oxygen, compressed**). Cylinders and closed cryogenic receptacles must be constructed and closed so as to prevent any loss of contents which might be caused under normal conditions of transport, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

4.1.1.2 Parts of cylinders and closed cryogenic receptacles that are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). In addition to the requirements specified in the relevant packing instruction, which take precedence, the applicable provisions of ISO 11114-1:1997 and ISO 11114-2:2000 must be met.

4.1.1.3 Cylinders and closed cryogenic receptacles, including their closures, must be selected that are able to contain a gas or a mixture of gases according to the requirements of 6;5.1.2 of the Technical Instructions and the requirements of the specific packing instructions of this Part.

4.1.1.4 Refillable cylinders must not be filled with a gas or gas mixture different from that previously contained unless the necessary operations for change of gas service have been performed. The change of service for compressed and liquefied gases must be in accordance with ISO 11621:1997, as applicable. In addition, a cylinder that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary risk must not be authorized for the transport of a Class 2 substance unless the necessary inspection and testing as specified in 6;5.1.6 of the Technical Instructions have been performed.

4.1.1.5 Prior to filling, the filler must perform an inspection of the cylinder or closed cryogenic receptacle and ensure that the cylinder or closed cryogenic receptacle is authorized for the gas to be transported and that the provisions of the Technical Instructions have been met. Shut-off valves must be closed after filling and remain closed during transport. The shipper must verify that the closures and equipment are not leaking.

4.1.1.6 Cylinders and closed cryogenic receptacles must be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance. Reactive gases and gas mixtures must be filled to a pressure such that if complete decomposition of the gas occurs, the working pressure of the cylinder must not be exceeded.

4.1.1.7 Cylinders and closed cryogenic receptacles, including their closures, must conform to the design, construction, inspection and testing requirements detailed in 6;5 of the Technical Instructions. When outer packagings are prescribed, the cylinders must be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in an outer packaging.

4.1.1.8 Valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage, which could cause inadvertent release of the contents of the cylinder and closed cryogenic receptacle, by one of the following methods:

a) Valves are placed inside the neck of the cylinder and closed cryogenic receptacle and protected by a threaded plug or cap;

b) Valves are protected by caps. Caps must possess vent holes of a sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;

c) Valves are protected by shrouds or guards;

d) Not used; or

e) Cylinders and closed cryogenic receptacles are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6;4.3 of the Technical Instructions at the Packing Group I performance level.

For cylinders and closed cryogenic receptacles with valves as described in b) and c), the requirements of ISO 11117:1998 must be met; for valves with inherent protection, the requirements of Annex A of ISO 10297:2006 must be met. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 must be met.

4.1.1.9 Non-refillable cylinders and closed cryogenic receptacles must:

a) be transported in an outer packaging, such as a box, or crate, or in shrink-wrapped trays or stretch-wrapped trays;

b) not used;

c) not be repaired after being put into service.

4.1.1.10 Refillable cylinders, other than closed cryogenic receptacles, must be periodically inspected according to the provisions of 6;5.1.6 and Packing Instruction 200 or 214 of the Technical Instructions. Cylinders and closed cryogenic receptacles must not be filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

4.1.1.11 Repairs must be consistent with the fabrication and testing requirements of the applicable design and construction standards and are only permitted as indicated in the relevant periodic inspection standards specified in 6;5.2.4 of the Technical Instructions. Cylinders, other than the jacket of closed cryogenic receptacles, must not be subjected to repairs of any of the following:

a) weld cracks or other weld defects;

b) cracks in walls;

c) leaks or defects in the material of the wall, head or bottom.

4.1.1.12 Cylinders and closed cryogenic receptacles must not be offered for filling:

a) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;

b) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or

c) unless the required certification, retest, and filling markings are legible.

4.1.1.13 Filled cylinders and closed cryogenic receptacles must not be offered for transport:

a) when leaking;

b) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;

c) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or

d) unless the required certification, retest, and filling markings are legible.

Packing Instruction 200

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

Cylinders, constructed as specified in 6;5 are authorized for the transport of a specific substance when specified in the following tables (Table 1 and Table 2). Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and markings conform to the requirements of the appropriate national authority in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed. Valves must be suitably protected or must be designed and constructed in such a manner that they are able to withstand damage without leakage as specified in Annex B of ISO 10297:1999. Cylinders with capacities of one litre or less must be packaged in outer packaging constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use, and secured or cushioned so as to prevent significant movement within the outer packaging during normal conditions of transport. For some substances, the special packing provisions may prohibit a particular type of cylinder. The following requirements must be met:

1) Pressure relief devices must be fitted on cylinders used for the transport of UN 1013 **Carbon dioxide** and UN 1070 **Nitrous oxide**. Other cylinders must be fitted with a pressure relief device if specified by the appropriate national authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, must be specified by the appropriate national authority of the country of use. Manifolding of cylinders is not permitted.

2) The following two tables cover compressed gases (Table 1) and liquefied and dissolved gases (Table 2). They provide:

   a) the UN number, name and description, and classification of the substance;
   b) the LC_{50} for toxic substances;
   c) the types of cylinders authorized for the substance, shown by the letter "X";
   d) the maximum test period for periodic inspection of the cylinders;
   e) the minimum test pressure of the cylinders;
   f) the maximum working pressure of the cylinders for compressed gases (where no value is given, the working pressure must not exceed two-thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
   g) special packing provisions that are specific to a substance.

3) In no case must cylinders be filled in excess of the limit permitted in the following requirements:

   a) For compressed gases, the working pressure must be not more than two-thirds of the test pressure of the cylinders. Restrictions to this upper limit on working pressure are imposed by special packing provision "o". In no case must the internal pressure at 65°C exceed the test pressure.

   b) For high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not exceed the test pressure of the cylinders.

      The use of test pressures and filling ratios other than those in the table is permitted provided that the above criterion is met, except where special packing provision "o" applies.

      For high pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio (FR) must be determined as follows:

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

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

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

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

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

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

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

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

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

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

   d) For UN 1001, **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, see p).

4) Gas mixtures containing any of the following gases must not be offered for transport in aluminium alloy cylinders unless approved by the appropriate national authority of the State of Origin and the State of the Operator:

UN 1037 **Ethyl chloride**
UN 1063 **Methyl chloride**
UN 1063 **Refrigerant gas R 40**
UN 1085 **Vinyl bromide, stabilized**
UN 1086 **Vinyl chloride, stabilized**
UN 1860 **Vinyl fluoride, stabilized**
UN 1912 **Methyl chloride and methylene chloride mixture**

5) "Special packing provisions":

Material compatibility

a) Aluminium alloy cylinders are forbidden.
b) Copper valves are forbidden.
c) Metal parts in contact with the contents must not contain more than 65 per cent copper.
d) When steel cylinders are used, only those bearing the "H" mark in accordance with 6;5.2.7.4 p) are permitted.

Gas specific provisions:

l) UN 1040 **Ethylene oxide** may also be packed in hermetically sealed glass ampoules or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the Packing Group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging must be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. The maximum net mass in any outer packaging must not exceed 2.5 kg. When cylinders are used, they must be of the seamless or welded steel types that are equipped with suitable pressure relief devices. Each cylinder must be tested for leakage with an inert gas before each refilling and must be insulated with three coats of heat retardant paint or in any equally efficient manner. The maximum net quantity per cylinder must not exceed 25 kg.

m) Cylinders must be filled to a working pressure not exceeding 5 bar.

o) In no case must the working pressure or filling ratio shown in the table be exceeded.

p) For UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**: cylinders must be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene must not exceed the values prescribed in the approval or in ISO 3807-1:2000 or ISO 3807-2:2000, as applicable.

For UN 1001 **Acetylene, dissolved**, cylinders must contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000 or ISO 3807-2:2000, as applicable); cylinders fitted with pressure relief devices must be transported vertically.

The test pressure of 52 bar applies only to cylinders conforming to ISO 3807-2:2000.

ra) Ethyl chloride may be carried in securely sealed glass ampoules (IP.8) containing not more than 5 g of ethyl chloride with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons with not more than 12 ampoules per carton. The cartons must be tightly packed to prevent movement in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) that meet the performance testing requirements of 6;4 at the Packing Group II performance level. Not more than 300 g of ethyl chloride is permitted per package.

s) Aluminium alloy cylinders must be:

— Equipped only with brass or stainless steel valves; and
— Cleaned in accordance with ISO 11621:1997 and not contaminated with oil.

Periodic inspection:

u) The interval between periodic tests may be extended to 10 years for aluminium alloy cylinders when the alloy of the cylinder has been subjected to stress corrosion testing as specified in ISO 7866:1999.

v) The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the appropriate national authority of the country of use.

Requirements for N.O.S. descriptions and for mixtures:

z) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio must be calculated in accordance with the relevant requirements of PI 200.

The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

Note.— For the carriage of oxygen to provide life support to aquatic animals, see Note 7 of the Introductory Notes to this Part.

Table 1. COMPRESSED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar*	Maximum working pressure, bar*	Special packing provisions*
1002	**Air, compressed**	2.2			X	10			
1006	**Argon, compressed**	2.2			X	10			
1046	**Helium, compressed**	2.2			X	10			
1049	**Hydrogen, compressed**	2.1			X	10			d
1056	**Krypton, compressed**	2.2			X	10			
1065	**Neon, compressed**	2.2			X	10			
1066	**Nitrogen, compressed**	2.2			X	10			
1071	**Oil gas, compressed**	2.3	2.1		X	5			
1072	**Oxygen, compressed**	2.2	5.1		X	10			s
1954	**Compressed gas, flammable, n.o.s.**	2.1			X	10			z
1956	**Compressed gas, n.o.s.**	2.2			X	10			z
1957	**Deuterium, compressed**	2.1			X	10			d
1964	**Hydrocarbon gas mixture, compressed, n.o.s.**	2.1			X	10			z
1971	**Methane, compressed or natural gas, compressed** with high methane content	2.1			X	10			
2034	**Hydrogen and methane mixture, compressed**	2.1			X	10			
3156	**Compressed gas, oxidizing, n.o.s.**	2.2	5.1		X	10			z

* Where the entries are blank, the working pressure must not exceed two-thirds of the test pressure.

Table 2. LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1001	**Acetylene, dissolved**	2.1			X	10	60 52		c, p
1009	**Bromotrifluoromethane (refrigerant gas R 13b1)**	2.2			X	10	42 120 250	1.13 1.44 1.60	
1010	**Butadienes, stabilized** (1,2-butadiene)	2.1			X	10	10	0.59	
1010	**Butadienes, stabilized** (1,3-butadiene)	2.1			X	10	10	0.55	z
1010	**Butadienes and hydrocarbon mixture, stabilized** containing more than 40% butadienes	2.1			X	10			v z

1011	**Butane**	2.1			X	10	10	0.52	v
1012	**Butylene** (butylenes mixture)	2.1			X	10	10	0.50	z
1012	**Butylene** (1-butylene)	2.1			X	10	10	0.53	
1012	**Butylene** (cis-2-butylene)	2.1			X	10	10	0.55	
1012	**Butylene** (trans-2 butylene)	2.1			X	10	10	0.54	
1013	**Carbon dioxide**	2.2			X	10	190 250	0.68 0.76	
1018	**Chlorodifluoromethane (refrigerant gas R 22)**	2.2			X	10	27	1.03	
1020	**Chloropentafluoroethane (refrigerant gas R 115)**	2.2			X	10	25	1.05	
1021	**1-Chloro-1,2,2,2-tetrafluoroethane (refrigerant gas R 124)**	2.2			X	10	11	1.20	
1022	**Chlorotrifluoromethane (refrigerant gas R 13)**	2.2			X	10	100 120 190 250	0.83 0.90 1.04 1.11	
1027	**Cyclopropane**	2.1			X	10	18	0.55	
1028	**Dichlorodifluoromethane (refrigerant gas R 12)**	2.2			X	10	16	1.15	
1029	**Dichlorofluoromethane (refrigerant gas R 21)**	2.2			X	10	10	1.23	
1030	**1,1-Difluoroethane (Refrigerant gas R 152 a)**	2.1			X	10	16	0.79	
1032	**Dimethylamine, anhydrous**	2.1			X	10	10	0.59	b
1033	**Dimethyl ether**	2.1			X	10	18	0.58	
1035	**Ethane**	2.1			X	10	95 120 300	0.25 0.30 0.40	
1036	**Ethylamine**	2.1			X	10	10	0.61	b
1037	**Ethyl chloride**	2.1			X	10	10	0.80	a, ra
1039	**Ethyl methyl ether**	2.1			X	10	10	0.64	
1041	**Ethylene oxide and carbon dioxide mixture** with more than 9% ethylene oxide but not more than 87%	2.1			X	10	190 250	0.66 .75	
1043	**Fertilizer ammoniating solution** with free ammonia	2.2			X	5			b, z
1055	**Isobutylene**	2.1			X	10	10	0.52	
1058	**Liquefied gases,** non-flammable, charged with nitrogen, carbon dioxide or air	2.2			X	10	Test pressure = 1.5 × working pressure		
1060	**Methylacetylene and propadiene mixture, stabilized**	2.1			X	10			c, z
1060	**Methylacetylene and propadiene mixture, stabilized** (propadiene with 1% to 4% methylacetylene)	2.1			X	10	22	0.52	c
1061	**Methylamine, anhydrous**	2.1			X	10	13	0.58	b

1063	**Methyl chloride (refrigerant gas R 40)**	2.1			X	10	17	0.81	a
1070	**Nitrous oxide**	2.2	5.1		X	10	180 225 250	0.68 0.74 0.75	
1075	**Petroleum gases, liquefied**	2.1			X	10			v, z
1077	**Propylene**	2.1			X	10	27	0.43	
1078	**Refrigerant gas, n.o.s.**	2.2			X	10			z
1080	**Sulphur hexafluoride**	2.2			X	10	70 140 160	1.06 1.34 1.38	
1081	**Tetrafluoroethylene, stabilized**	2.1			X	10	200		m, o
1083	**Trimethylamine, anhydrous**	2.1			X	10	10	0.56	b
1085	**Vinyl bromide, stabilized**	2.1			X	10	10	1.37	a
1086	**Vinyl chloride, stabilized**	2.1			X	10	12	0.81	a
1087	**Vinyl methyl ether, stabilized**	2.1			X	10	10	0.67	
1858	**Hexafluoropropylene (refrigerant gas R 1216)**	2.2			X	10	22	1.11	
1860	**Vinyl fluoride, stabilized**	2.1			X	10	250	0.64	a
1912	**Methyl chloride and methylene chloride mixture**	2.1			X	10	17	0.81	a
1952	**Ethylene oxide and carbon dioxide mixture** with not more than 9% ethylene oxide	2.2			X	10	190 250	0.66 0.75	
1958	**1,2-dichloro-1,1,2,2-tetrafluoroethane (refrigerant gas R 114)**	2.2			X	10	10	1.30	
1959	**1,1-difluoroethylene (refrigerant gas R 1132a)**	2.1			X	10	250	0.77	
1962	**Ethylene**	2.1			X	10	225 300	0.34 0.38	
1965	**Hydrocarbon gas mixture, liquefied, n.o.s.**	2.1			X	10			v, z
1968	**Insecticide gas, n.o.s.**	2.2			X	10			z
1969	**Isobutane**	2.1			X	10	10	0.49	v
1973	**Chlorodifluoromethane and chloropentafluoroethane mixture** with fixed boiling point, with approximately 49% chlorodifluoromethane **(refrigerant gas R 502)**	2.2			X	10	31	1.01	
1974	**Chlorodifluorobromo-methane (refrigerant gas R 12b1)**	2.2			X	10	10	1.61	
1976	**Octafluorocyclobutane (refrigerant gas R C318)**	2.2			X	10	11	1.32	
1978	**Propane**	2.1			X	10	23	0.43	v
1982	**Tetrafluoromethane (refrigerant gas R 14)**	2.2			X	10	200 300	0.71 0.90	

1983	**1-chloro-2,2,2-trifluoroethane (refrigerant gas R 133a)**	2.2			X	10	10	1.18	
1984	**Trifluoromethane (refrigerant gas R 23)**	2.2			X	10	190 250	0.88 0.96	
2035	**1,1,1-trifluoroethane (refrigerant gas R 143a)**	2.1			X	10	35	0.73	
2036	**Xenon**	2.2			X	10	130	1.28	
2044	**2,2-dimethylpropane**	2.1			X	10	10	0.53	
2073	**Ammonia solution,** relative density less than 0.880 at 15°C in water, with more than 35% but not more than 40% ammonia with more than 40% but not more than 50% ammonia	2.2			 X X	 5 5	 10 12	 0.80 0.77	 b b
2193	**Hexafluoroethane (refrigerant gas R 116)**	2.2			X	10	200	1.13	
2200	**Propadiene, stabilized**	2.1			X	10	22	0.50	
2419	**Bromotrifluoroethylene**	2.1			X	10	10	1.19	
2422	**Octafluorobut-2-ene (refrigerant gas R 1318)**	2.2			X	10	12	1.34	
2424	**Octafluoropropane (refrigerant gas R 218)**	2.2			X	10	25	1.04	
2451	**Nitrogen trifluoride**	2.2	5.1		X	10	200	0.50	
2452	**Ethylacetylene, stabilized**	2.1			X	10	10	0.57	c
2453	**Ethyl fluoride (refrigerant gas R 161)**	2.1			X	10	30	0.57	
2454	**Methyl fluoride (refrigerant gas R 41)**	2.1			X	10	300	0.63	
2517	**1-chloro-1,1-difluoroethane (refrigerant gas R 142b)**	2.1			X	10	10	0.99	
2599	**Chlorotrifluoromethane and trifluoromethane azeotropic mixture** with approximately 60% chlorotrifluoromethane (refrigerant gas R 503)	2.2			X	10	31 42 100	0.12 0.17 0.64	
2601	**Cyclobutane**	2.1			X	10	10	0.63	
2602	**Dichlorodifluoro-methane and difluoroethane azeotropic mixture** with approximately 74% dichlorodifluoromethane (refrigerant gas R 500)	2.2			X	10	22	1.01	
3070	**Ethylene oxide and dichlorodifluoro-methane mixture** with not more than 12.5% ethylene oxide	2.2			X	10	18	1.09	
3153	**Perfluoro(methyl vinyl ether)**	2.1			X	10	20	0.75	
3154	**Perfluoro(ethyl vinyl ether)**	2.1			X	10	10	0.98	
3157	**Liquefied gas, oxidizing, n.o.s.**	2.2	5.1		X	10			z
3159	**1,1,1,2-tetrafluoroethane (refrigerant gas R 134a)**	2.2			X	10	18	1.05	