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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS
(Twenty first session)
Geneva, 4-13 December 2000,
agenda item 2(a),

WORK OF THE SUB-COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

Development of provisions for the transport of gases

Suggestions to modify ST/SG/AC.10/2000/22

Transmitted by the European Industrial Gases Association (EIGA)

1. Further consideration by EIGA experts of the provisions developed by the working group coupled with the paper ST/SG/AC.10/2000/30 transmitted by the expert from the USA has lead to the preparation of this informal paper which it is hoped will ease the work of the working group at its next meeting.

2. The proposed text revisions are presented in the order they appear in ST/SG/AC.10/2000/22.

3. The P200 liquefied gas list has been included to facilitate discussions on consequential changes to the dangerous Goods List. Similarly, the non-Class 2 substance list is included for discussion. Also, editorial corrections of the Proper Shipping Names have been made to ensure complete alignment with Rev. 11 of the Model Regulations. Those not in alignment are highlighted or an adjacent note appears in the table.

   At the July Plenary Meeting of the Sub-Committee a new special packing provision PP79 was adopted for ethylene oxide (see ST/SG/AC.10/2000/7 page 24 for details). This has been incorporated into the attached P200 table as special condition ‘l’.

4. The majority of this proposal is a new version of Section 6.2.2.5, Quality Assurance which has been edited to remove detail. The intention is to convert the original technical report from the style of a standard into text more like that of model regulations.

Proposal 1

Proposed texts: 1.2.1 Definitions

Pressure drums are welded transportable pressure receptacles of a water capacity exceeding 150 litres and of not more than[1000] litres, (e.g. cylindrical receptacles equipped with rolling hoops, ~~receptacles~~ spheres on skids ~~and receptacles in frames~~);

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

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

Note : *For portable tanks see 6.7.2.1, 6.7.3.1, 6.7.4.1, as appropriate.*

Proposal 2

2.2.1.2 The transport condition of a gas is described according to its physical state as:

(a) ***Compressed gas*** – a gas which when packaged under pressure for transport is entirely gaseous at -50 °C; this category includes all gases with a critical temperature below -50 °C;

2.2.1.3 The class comprises compressed gases; liquefied gases; dissolved gases; refrigerated liquefied gases; mixtures of one or more gases with one or more vapours of substances of other classes; articles charged with a gas; ~~tellurium hexafluoride~~; aerosols.

Proposal 3

4.1.6 Special packing provisions for dangerous goods of Class 2

4.1.6.1 ***General requirements***

4.1.6.1.1 This section provides general requirements applicable to the use of pressure receptacles for the transport of Class 2 gases and other dangerous goods that are required to be transported in pressure receptacles (e.g. Hydrogen cyanide, stabilized, UN 1051). ~~Compressed g~~Gases shall be transported in . . . . . .

4.1.6.1.8 Valves shall be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the following methods:

(a) Valves are placed inside the neck of the pressure receptacle and protected by a threaded plug or cap;

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

(c) Valves are protected by shrouds or guards;

(d) Valves are designed and constructed in such a way that they are inherently able to withstand damage without leakage of product; or

(e) Pressure receptacles are transported in ~~protective boxes or~~ frames, e.g. bundles;

(f) Pressure receptacles are transported in protective boxes meeting the PG I performance level

For pressure receptacles with valves as described in (b) and (c), the requirements of ISO 11117:1998 shall be met; for unprotected valves as described in (d), the requirements of annex A of ISO 10297:1999 shall be met.

4.1.6.1.9 Non-refillable pressure receptacles shall:

(a) be transported in an outer packaging, such as a box or crate;

(b) be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas;

(c) not be used for toxic gases with an LC_{50} less than or equal to 200 ml/m^3;

~~(d) not be subject to periodic inspection requirements;~~ and

(~~e~~d) not be repaired after being put into service.

P200	**PACKING INSTRUCTION**	**P200**

This packing instruction applies to Class 2 compressed gases, liquefied gases, ~~and~~ dissolved gases and substances of other Classes assigned the P 200 packing instruction.

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

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

(1) Pressure receptacles containing toxic ~~gases~~ 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 as 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.

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

1. the UN number, proper shipping name, and classification of the gas;
2. the LC_{50} for toxic gases;
3. the types of pressure receptacles authorised for the gas;
4. the maximum test period for periodic inspection of the pressure receptacles;
5. the minimum test pressure of the pressure receptacles;
6. 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;
7. special packing provisions that are specific to a ~~gas~~ substance.

(3) *[Omitted for brevity]*

(4) Keys for the column “Special packing provisions”:

Material Compatibility (see ISO 11114-1:1997 and ISO 11114-2:2000)

a: Aluminium pressure receptacles are not authorised.

b: Copper valves shall not be used.

c: Metal parts in contact with the contents shall not contain more than 65% copper.

d: Only pressure receptacles bearing the ‘H’ mark shall be used .

Requirements for toxic ~~gases~~ substances with an LC_{50} less than or equal to 200 ml/m^3 (ppm)

k: Valve outlets shall be fitted with gas tight plugs or caps.

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

P200	PACKING INSTRUCTION (cont'd)	P200

The pressure receptacle(s) shall:

(i) have a test pressure greater than or equal to 200 bar and a minimum wall thickness of 3.5 mm for aluminium alloy or 2 mm for steel; or

(ii) have an outer packaging meeting the PG I performance level.

Pressure receptacles shall not be fitted with a pressure relief device.

Cylinders and individual cylinders in a bundle shall be limited to a maximum water capacity of 85 litres.

Each valve shall have a taper threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle.

Each valve shall either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing.

Each pressure receptacle shall be tested for leakage after filling.

Gas specific limitations

l: UN 1040 ethylene oxide may also be packed in hermetically sealed glass or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the packing group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging shall be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55 °C is achieved. The total quantity in any outer packaging shall not exceed 2.5 kg.

m: Pressure receptacles shall be filled to a working pressure not exceeding 5 bars.

n: Pressure receptacles shall contain not more than 5 kg of the gas.

o: The use of test pressures and filling ratio combinations other than those indicated are permitted provided that the settled pressure at 65 °C does not exceed the test pressure of the pressure receptacle.

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

q: The valves of pressure receptacles for pyrophoric gases or flammable mixtures of gases containing more than 1% of pyrophoric compounds shall be fitted with gas-tight plugs or caps. When these pressure receptacles are manifolded in a bundle, each of the pressure receptacles shall be fitted with an individual valve that shall be closed during transport, and the manifold outlet valve shall be fitted with a gas-tight plug or cap.

s: Aluminium pressure receptacles shall be:
- equipped only with brass or stainless steel valves; and
- cleaned in accordance with ISO 11621:1997 and not contaminated with oil.

Periodic Inspection

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

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

Requirements for N.O.S. Descriptions

z: The construction materials of the pressure receptacles and their accessories shall be compatible with the contents and shall not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio shall be calculated in accordance with the relevant requirements of (3).

Toxic gases with an LC_{50} less than or equal to 200 ml/m^3 shall not be transported in tubes or pressure drums and shall meet the requirements of special packing provision k.

For pressure receptacles containing pyrophoric gases or flammable mixtures of gases containing more than 1% pyrophoric compounds, the requirements of special packing provision q shall be met.

The necessary steps shall be taken to prevent dangerous reactions (i.e. polymerisation or decomposition) during transport. If necessary, stabilisation or addition of an inhibitor shall be required.

Mixtures containing diborane, UN 1911, shall be filled to a pressure such that, if complete decomposition of the diborane occurs, two thirds of the test ~~working~~ pressure of the pressure receptacle shall not be exceeded.

Table of LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Proper Shipping Name	Class or Division	Subsidiary Risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test Period, years	Test Pressure, bar	Filling Ratio	Special Packing Provisions
1001	ACETYLENE, DISSOLVED	2.1			Y		Y			10	60 52		c, p
1005	AMMONIA, ANHYDROUS	2.3	8	7338 *	Y	Y	Y	Y	Y	5	33	0.53	b
1008	BORON TRIFLUORIDE	2.3	8	387*	Y	Y	Y	Y	Y	5	225 300	0.715 0.86	o o
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2.2			Y	Y	Y	Y	Y	10	42 120 250	1.13 1.44 1.60	o o o
1010	BUTADIENES, STABILIZED (1,2-butadiene), or	2.1	Single entry in the UN Dangerous Goods List as BUTADIENES, STABILIZED		Y	Y	Y	Y	Y	10	10	0.59	
1010	BUTADIENES, STABILIZED (1,3-butadiene), or	2.1			Y	Y	Y	Y	Y	10	10	0.55	
1010	BUTADIENES, STABILIZED (mixtures of 1,3-butadiene and hydrocarbons)	2.1			Y	Y	Y	Y	Y	10	10	0.5	z
1011	BUTANE	2.1			Y	Y	Y	Y	Y	10	10	0.51	v
1012	BUTYLENE (butylenes mixture) or	2.1	Single entry in the UN Dangerous Goods List as BUTYLENE		Y	Y	Y	Y	Y	10	10	0.5	z
1012	BUTYLENE (1-butylene) or	2.1			Y	Y	Y	Y	Y	10	10	0.53	
1012	BUTYLENE (cis-2-butylene) or	2.1			Y	Y	Y	Y	Y	10	10	0.55	
1012	BUTYLENE (trans-2 butylene)	2.1			Y	Y	Y	Y	Y	10	10	0.54	
1013	CARBON DIOXIDE	2.2			Y	Y	Y	Y	Y	10	190 250	0.66 0.75	o o
1015	CARBON DIOXIDE AND NITROUS OXIDE MIXTURE	2.2			Y	Y	Y	Y	Y	10	250	0.75	o
1017	CHLORINE	2.3	8	293	Y	Y	Y	Y	Y	5	22	1.25	a
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	2.2			Y	Y	Y	Y	Y	10	29	1.03	
1020	CHLOROPENTAFLUORO-ETHANE (REFRIGERANT GAS R 115)	2.2			Y	Y	Y	Y	Y	10	25	1.08	
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2.2			Y	Y	Y	Y	Y	10	12	1.2	
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	2.2			Y	Y	Y	Y	Y	10	100 120 190 250	0.83 0.90 1.04 1.10	o o o o
1026	CYANOGEN	2.3	2.1	350	Y	Y	Y	Y	Y	5	100	0.70	u
1027	CYCLOPROPANE	2.1			Y	Y	Y	Y	Y	10	20	0.53	
1028	DICHLORODIFLUORO-METHANE (REFRIGERANT GAS R 12)	2.2			Y	Y	Y	Y	Y	10	18	1.15	

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1029	DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)	2.2			Y	Y	Y	Y	Y	10	10	1.23	
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2.1			Y	Y	Y	Y	Y	10	18	0.79	
1032	DIMETHYLAMINE, ANHYDROUS	2.1			Y	Y	Y	Y	Y	10	10	0.59	b
1033	DIMETHYL ETHER	2.1			Y	Y	Y	Y	Y	10	18	0.58	
1035	ETHANE	2.1	1040 ETHYLENE OXIDE has no comma in UN DGL, but meaning clearer with it		Y	Y	Y	Y	Y	10	95 120 300	0.25 0.29 0.39	o o o
1036	ETHYLAMINE	2.1			Y	Y	Y	Y	Y	10	10	0.61	b
1037	ETHYL CHLORIDE	2.1			Y	Y	Y	Y	Y	10	10	0.80	a
1039	ETHYL METHYL ETHER	2.1			Y	Y	Y	Y	Y	10	10	0.64	
1040	ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C	2.3	2.1	2900 *	Y	Y	Y	Y	Y	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			Y	Y	Y	Y	Y	10	190 250	0.66 0.75	o o
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	2.2			Y	Y	Y			5			b, z
1048	HYDROGEN BROMIDE, ANHYDROUS	2.3	8	2 860	Y	Y	Y	Y	Y	5	60	1.54	a, d
1050	HYDROGEN CHLORIDE, ANHYDROUS	2.3	8	3120 *	Y	Y	Y	Y	Y	5	100 120 150 200	0.30 0.56 0.67 0.74	a, d, o a, d, o a, d, o a, d, o
1053	HYDROGEN SULPHIDE	2.3	2.1	712	Y	Y	Y	Y	Y	5	55	0.67	d, u
1055	ISOBUTYLENE	2.1			Y	Y	Y	Y	Y	10	10	0.52	
1058 *	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2.2			Y	Y	Y	Y	Y	10	Test pressure = 1.5 x working pressure ~~⅔ test pressure~~		
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED or	2.1	Single entry in D G List as METHYL-ACETYLENE AND PROPADIENE MIXTURE, STABILIZED		Y	Y	Y	Y	Y	10			c, z
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED (Propadiene with 1% to 4% methylacetylene)	2.1			Y	Y	Y	Y	Y	10	22	0.52	c
1061	METHYLAMINE, ANHYDROUS	2.1			Y	Y	Y	Y	Y	10	13	0.58	b
1062	METHYL BROMIDE	2.3		850	Y	Y	Y	Y	Y	5	10	1.51	a

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1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2.1			Y	Y	Y	Y	Y	10	17	0.81	a
1064	METHYL MERCAPTAN	2.3	2.1	1 350	Y	Y	Y	Y	Y	5	10	0.78	d, u
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2.3	5.1,8	115	Y		Y			5	10	1.30	k
1069	NITROSYL CHLORIDE	2.3	8	35	Y		Y			5	13	1.10	k
1070	NITROUS OXIDE	2.2	5.1		Y	Y	Y	Y	Y	10	180 225 250	0.68 0.74 0.75	o o o
1075	PETROLEUM GASES, LIQUEFIED	2.1			Y	Y	Y	Y	Y	10	see chart at end of table		v, z
1076	PHOSGENE	2.3	8	5	Y	Y *	Y			5	20	1.23	k
1077	PROPYLENE	2.1			Y	Y	Y	Y	Y	10	30	0.43	
1078	REFRIGERANT GAS, N.O.S.	2.2			Y	Y	Y	Y	Y	10			z
1079	SULPHUR DIOXIDE	2.3	8	2 520	Y	Y	Y	Y	Y	5	14	1.23	
1080	SULPHUR HEXAFLUORIDE	2.2			Y	Y	Y	Y	Y	10	70 140 160	1.04 1.33 1.37	o o o
1081	TETRAFLUOROETHYLENE, STABILIZED	2.1			Y	Y	Y	Y	Y	10	200	~~5 bar~~	m
1082	TRIFLUOROCHLOROETHYLENE, STABILIZED	2.3	2.1	2000	Y	Y	Y	Y	Y	5	19	1.13	u
1083	TRIMETHYLAMINE, ANHYDROUS	2.1			Y	Y	Y	Y	Y	10	10	0.56	b
1085	VINYL BROMIDE, STABILIZED	2.1			Y	Y	Y	Y	Y	10	10	1.37	a
1086	VINYL CHLORIDE, STABILIZED	2.1			Y	Y	Y	Y	Y	10	12	0.81	a
1087	VINYL METHYL ETHER, STABILIZED	2.1			Y	Y	Y	Y	Y	10	10	0.67	
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE	2.3		850*	Y	Y	Y	Y	Y	5	10	1.51	a
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2.3		*	Y	Y	Y	Y	Y	5	17	0.81	a
1589	CYANOGEN CHLORIDE, STABILIZED	2.3	8	80	Y		Y			5	20	1.03	k
1741	BORON TRICHLORIDE	2.3	8	2 541	Y	Y	Y	Y	Y	5	10	1.19	
1749	CHLORINE TRIFLUORIDE	2.3	5.1,8	299	Y	Y	Y	Y	Y	5	30	1.40	a
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2.2			Y	Y	Y	Y	Y	10	22	1.11	
1859	SILICON TETRAFLUORIDE	2.3	8	450	Y	Y	Y	Y	Y	5	200 300	0.74 1.1	o o
1860	VINYL FLUORIDE, STABILIZED	2.1			Y	Y	Y	Y	Y	10	250	0.64	a, o
1911	DIBORANE	2.3	2.1	80	Y		Y			5	250	0.07	d, k

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1912	METHYLCHLORIDE AND METHYLENE CHLORIDE MIXTURE	2.1			Y	Y	Y	Y	Y	10	17	0.81	a
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2.2			Y	Y	Y	Y	Y	10	190 250	0.66 0.75	
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2.2			Y	Y	Y	Y	Y	10	10	1.30	
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2.1			Y	Y	Y	Y	Y	10	250	0.77	o
1962	ETHYLENE	2.1			Y	Y	Y	Y	Y	10	225 300	0.34 0.37	o o
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	2.1			Y	Y	Y	Y	Y	10	see chart at end of table		v, z
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2.3			Y	Y	Y	Y	Y	5			z
1968	INSECTICIDE GAS, N.O.S.	2.2			Y	Y	Y	Y	Y	10			z
1969	ISOBUTANE	2.1			Y	Y	Y	Y	Y	10	10	0.49	v
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUORO-ETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2.2			Y	Y	Y	Y	Y	10	31	1.05	
1974	CHLORODIFLUOROBROMO-METHANE (REFRIGERANT GAS R 12B1)	2.2			Y	Y	Y	Y	Y	10	10	1.61	
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	2.3	5.1,8	115	Y	Y *	Y			5			k, z
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	2.2			Y	Y	Y	Y	Y	10	11	1.34	
1978	PROPANE	2.1			Y	Y	Y	Y	Y	10	25	0.42	v
1982	TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)	2.2			Y	Y	Y	Y	Y	10	200 300	0.62 0.94	o o
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	2.2			Y	Y	Y	Y	Y	10	10	1.18	
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2.2			Y	Y	Y	Y	Y	10	190 250	0.87 0.95	o o
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2.1			Y	Y	Y	Y	Y	10	35	0.75	
2036	XENON	2.2			Y	Y	Y	Y	Y	10	130	1.24	o

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2044	2,2-DIMETHYLPROPANE	2.1			Y	Y	Y	Y	Y	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	Single entry in UN DG list comprising 35% up to 50%		 Y Y	 Y Y	 Y Y	 Y Y	 Y Y	 5 5	 10 12	 0.80 0.77	 b b
2188	ARSINE	2.3	2.1	20	Y		Y			5	42	1.10	d, k
2189	DICHLOROSILANE	2.3	2.1,8	314	Y	Y	Y	Y	Y	5	10	0.90	
2191	SULPHURYL FLUORIDE	2.3		3 020	Y	Y	Y	Y	Y	5	50	1.10	u
2192	GERMANE	2.3	2.1	20*	Y		Y			5	250	1.02	d, k, o
2193	HEXAFLUOROETHANE (REFRIGERANT GAS R 116)	2.2			Y	Y	Y	Y	Y	10	200	1.10	o
2194	SELENIUM HEXAFLUORIDE	2.3	8	50	Y		Y			5	36	1.46	k, o
2195	TELLURIUM HEXAFLUORIDE	2.3	8	25	Y		Y			5	20	1.0	k
2196	TUNGSTEN HEXAFLUORIDE	2.3	8	160*	Y		Y			5	10	2.70	a, k
2197	HYDROGEN IODIDE, ANHYDROUS	2.3	8	2 860	Y	Y	Y	Y	Y	5	23	2.25	a, d
2198	PHOSPHORUS PENTAFLUORIDE	2.3	8	190 *	Y		Y			5	200 300	0.9 1.34	k, o k, o
2199	PHOSPHINE	2.3	2.1	20	Y		Y			5	225 250	0.30 0.51	d, k, o d, k, o
2200	PROPADIENE, STABILIZED	2.1			Y	Y	Y	Y	Y	10	22	0.50	
2202	HYDROGEN SELENIDE, ANHYDROUS	2.3	2.1	2	Y		Y			5	31	1.60	k
2203	SILANE	2.1			Y	Y	Y	Y	Y	10	225 250	0.32 0.41	d, o, q d, o, q
2204	CARBONYL SULPHIDE	2.3	2.1	1 700	Y	Y	Y	Y	Y	5	26	0.84	u
2417	CARBONYL FLUORIDE	2.3	8	360	Y	Y	Y	Y	Y	5	200 300	0.47 0.7	o o
2418	SULPHUR TETRAFLUORIDE	2.3	8	40	Y		Y			5	30	0.91	k
2419	BROMOTRIFLUOROETHYLENE	2.1			Y	Y	Y	Y	Y	10	10	1.19	
2420	HEXAFLUOROACETONE	2.3	8	470	Y	Y	Y	Y	Y	5	22	1.08	
2421	NITROGEN TRIOXIDE	2.3	5.1,8	57	Y		Y			5			k
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2.2			Y	Y	Y	Y	Y	10	12	1.34	
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2.2			Y	Y	Y	Y	Y	10	25	1.09	
2451	NITROGEN TRIFLUORIDE	2.2	5.1		Y	Y	Y	Y	Y	10	200 300	0.5 0.75	o o
2452	ETHYLACETYLENE, STABILIZED	2.1			Y	Y	Y	Y	Y	10	10	0.57	c

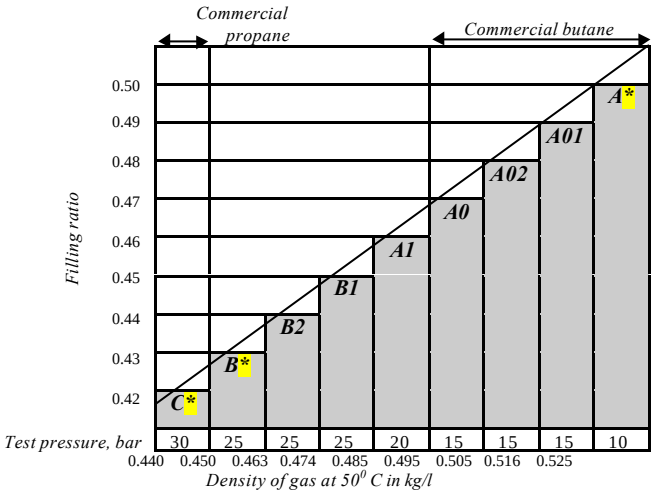
Table of LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Proper Shipping Name	Class or Division	Subsidiary Risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test Period, years	Test Pressure, bar	Filling Ratio	Special Packing Provisions
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2.1			Y	Y	Y	Y	Y	10	30	0.57	
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2.1			Y	Y	Y	Y	Y	10	300	0.36	
2455	METHYL NITRITE	2.2											
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2.1			Y	Y	Y	Y	Y	10	10	0.99	
2534	METHYLCHLOROSILANE	2.3	2.1,8	600	Y	Y	Y	Y	Y	5			z
2548	CHLORINE PENTAFLUORIDE	2.3	5.1,8	122	Y		Y			5	13	1.49	a, k
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	2.2			Y	Y	Y	Y	Y	10	31 42 100	0.11 0.20 0.66	
2601	CYCLOBUTANE	2.1			Y	Y	Y	Y	Y	10	10	0.63	
2602	DICHLORODIFLUORO-METHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	2.2			Y	Y	Y	Y	Y	10	22	1.01	
2676	STIBINE	2.3	2.1	20	Y		Y			5	20	1.2	k
2901	BROMINE CHLORIDE	2.3	5.1,8	290	Y	Y	Y	Y	Y	5	10	1.5	a
3057	TRIFLUOROACETYL CHLORIDE	2.3	8	10	Y	Y *	Y			5	17	1.17	k
3070	ETHYLENE OXIDE AND DICHLORODIFLUORO-METHANE MIXTURE with not more than 12,5% ethylene oxide	2.2			Y	Y	Y	Y	Y	10	18	1.09	
3083	PERCHLORYL FLUORIDE	2.3	5.1	770	Y	Y	Y	Y	Y	5	33	1.21	k, u
3153	PERFLUORO(METHYL VINYL ETHER)	2.1			Y	Y	Y	Y	Y	10	20	0.75	
3154	PERFLUORO(ETHYL VINYL ETHER)	2.1			Y	Y	Y	Y	Y	10	10	0.98	
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2.2	5.1		Y	Y	Y	Y	Y	10			z
3159	1,1,1,2-TETRAFLUORO-ETHANE (REFRIGERANT GAS R 134a)	2.2			Y	Y	Y	Y	Y	10	22	1.04	
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		Y	Y	Y	Y	Y	5			z
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2.1			Y	Y	Y	Y	Y	10			z
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2.3			Y	Y	Y	Y	Y	5			z
3163	LIQUEFIED GAS, N.O.S.	2.2			Y	Y	Y	Y	Y	10			z

Table of LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Proper Shipping Name	Class or Division	Subsidiary Risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test Period, years	Test Pressure, bar	Filling Ratio	Special Packing Provisions
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2.2			Y	Y	Y	Y	Y	10	49 36	0.95 0.72	o o
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2.1			Y	Y	Y	Y	Y	10	48	0.78	
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2.2			Y	Y	Y	Y	Y	10	15	1.2	
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUORO-ETHANE MIXTURE, with not more than 8,8% ethylene oxide	2.2			Y	Y	Y	Y	Y	10	10	1.16	
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7,9% ethylene oxide	2.2			Y	Y	Y	Y	Y	10	26	1.02	
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5,6% ethylene oxide	2.2			Y	Y	Y	Y	Y	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	Y	Y	Y	Y	Y	5	28	0.73	
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2.3	5.1		Y	Y	Y	Y	Y	5			z
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2.3	8		Y	Y	Y	Y	Y	5			z
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2.3	2.1,8		Y	Y	Y	Y	Y	5			z
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2.3	5.1,8		Y	Y	Y	Y	Y	5			z
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	2.3	8		Y	Y	Y	Y		5			b
3337	REFRIGERANT GAS R 404A	2.2			Y	Y	Y	Y	Y	10	36	0.82	
3338	REFRIGERANT GAS R 407A	2.2			Y	Y	Y	Y	Y	10	36	0.94	
3339	REFRIGERANT GAS R 407B	2.2			Y	Y	Y	Y	Y	10	38	0.93	
3340	REFRIGERANT GAS R 407C	2.2			Y	Y	Y	Y	Y	10	35	0.95	
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S	2.1			Y	Y	Y	Y	Y	10			z
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2.3	2.1		Y	Y	Y	Y	Y	5			z
3374	ACETYLENE, SOLVENT FREE	2.1			Y		Y			5	60 52		c, p

Test pressures and filling ratios for UN 1075 and UN 1965



E.g, for densities between 0.505 kg/l and 0.516 kg/l, and a pressure receptacle with a test pressure of 15 bar, a filling ratio of 0.48 shall be used.

Table of SUBSTANCES NOT IN CLASS 2

UN No.	Proper Shipping Name	Class or Division	Subsidiary Risk	LC_{50} ml/m^3	Cylinders	Pressure drums	Bundles of cylinders	Tubes	MEGCs	Test Period, years	Test Pressure, bar	Filling Ratio	Special Packing Provisions
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	3	140	Y		Y			2	100	0.55	PG I, k
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	6.1	966	Y	Y	Y			8	10	0.84	PG I
1614	HYDROGEN CYANIDE, STABILIZED containing less than 3% water and absorbed in a porous inert material	6.1		140	Y		Y				6		PG I, k
1745	BROMINE PENTAFLUORIDE	5.1	6.1,8	25	Y		Y			8	10	92%	PG I, k
1746	BROMINE TRIFLUORIDE	5.1	6.1,8	180	Y		Y			8	10	92%	PG I, k
2495	IODINE PENTAFLUORIDE	5.1	6.1,8	120	Y		Y			8	10	92%	PG I, k
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	3	6.1		Y	Y	Y				10		PG I, z

Proposal 4

The existing provisions on the leakproofness test for aerosols under 6.2.2 should be renumbered.

6.2 Requirements for the construction and testing of pressure receptacles

6.2.1.2 ***Materials***

6.2.1.2.2 Under ~~all service~~ normal conditions of handling and transport, the construction material shall resist brittle fracture at the lowest working temperature of the receptacle and its fittings.

[6.2.2.5 ***Quality ~~conformance~~ assurance system ~~for approval of pressure receptacles and requirements for manufacturers and inspection bodies~~***

~~Note: This section describes an international quality conformance system that ensures and documents compliance to relevant pressure receptacle design and manufacturing standards and the requirements in these model regulations. The text is generally adopted from ISO/TR 14600:2000.~~

6.2.2.5.1 ***Definitions***

For the purposes of this section:

Quality ~~conformance~~ assurance system means a system for overall approval by the competent authority, inclusive of pressure receptacle design type approval, manufacturer's quality system, approval of manufacturers, and approval of inspection bodies;

~~***Accreditation body*** means a body approved by the competent authority having authority for the approval of inspection bodies;~~

~~***Note:*** *This may be the competent authority or a different entity.*~~

~~***Quality system*** means the organisational structure, procedures, processes, and resources needed to implement quality management;~~
~~***Verify*** means confirm by examination or provision of objective evidence that specified requirements have been fulfilled;~~

Design type means a pressure receptacle design as specified by a particular pressure receptacle standard, ~~e.g. ISO 7866, ISO 9809-1, ISO 9809-2, etc.~~

6.2.2.5.2 ***General requirements***

~~6.2.2.5.2.1 Framework~~ ***Competent Authority***

6.2.2.5.2.~~1.~~1 The competent authority in the country of ~~manufacture~~ approval shall be responsible for ensuring the implementation of this quality ~~conformance~~ assurance system ~~in accordance with national law.~~

~~***Note:*** *The country of approval (authorising the UN marking) may be different from the country of manufacture, if for example, this quality conformance system is not in place in the country of manufacture.*~~

~~6.2.2.5.2.1.2 The competent authority of a country of pressure receptacle manufacture approval~~ and shall supply, upon request, evidence demonstrating compliance to this quality ~~conformance~~ assurance system to its counterpart in a country of use.

~~6.2.2.5.2.1.3 It is the objective that the competent authority in the country of use shall accept for filling, transport, use, and refilling, pressure receptacles which have been certificated in accordance with the requirements of this quality conformance system, provided the relevant design standard has been ratified by that country.~~

~~6.2.2.5.2.1.4 Where the competent authority in a country of use believes, on reasonable grounds, that the applicable pressure receptacle standard or the quality conformance system has not been complied with or that certain pressure receptacles present a danger to public safety, it shall take appropriate steps to ensure an acceptable level of safety. The competent authority shall define what actions are required to enable the pressure receptacles to be acceptable. The affected pressure receptacles may be detained, condemned, re-exported, re-examined, or subject to such other actions as the competent authority stipulates.~~

6.2.2.5.2.~~1.~~2 The competent authority ~~shall retain its authority, but~~ may delegate its functions in this quality ~~conformance~~ assurance system in whole or in part to ~~a~~ qualified entit~~y~~ies of its choice.

6.2.2.5.2.~~1.~~3 The competent authority, or its delegated entity, shall make available a current list of :

(a) approved inspection bodies and their identity mark

(b) approved manufacturers and their identity mark.

~~(a) be knowledgeable of relevant pressure receptacle standards;~~

~~(b) have a staff sufficient in number, technical competence, and skill to adequately carry out its supervisory and administrative responsibilities;~~

~~(c) when operating its own inspection and testing activities, ensure that these activities conform with the stipulations given for inspection bodies and testing laboratories in 6.2.2.5.2.2 (inspection body) and 6.2.2.5.2.4 (testing laboratory);~~

~~(d) not require additional tests and results thereof in excess of those specified in the relevant standard, unless there is evidence of undue risk to public;~~

~~(e) approve inspection bodies and make available a current list of approved inspection bodies and their identity mark;~~

~~***Note:*** *This activity may be undertaken by an accreditation body, as authorised by the competent authority. ISO/IEC TR 17010:1998 may be used for guidance.*~~

~~(f) ensure confidentiality of the commercial and proprietary activities of the inspection bodies and manufacturers;~~

~~(g) provide a system for identification of the manufacturer for each pressure receptacle; and~~

~~(h) be free from any influence which could prevent it from operating in an impartial manner.~~

~~6.2.2.5.2.2~~ ***Inspection body***

6.2.2.5.2.~~2.1~~4 The inspection body shall be approved by the competent authority ~~or the accreditation body, if applicable,~~ as an inspector of pressure receptacles and

~~The inspection body may be an integral part of the competent authority or a separate body, domestic or foreign.~~

~~An inspection body shall apply for approval to the competent authority or the accreditation body, if applicable, of the country of manufacture. Such application shall include detailed and complete information on the inspection body's organisation, staffing, documented quality system, technical competence, inspection methods and procedures, records and reports, confidentiality and security, related to inspection of pressure receptacles and a manufacturer's quality system.~~

~~***Note:*** *The competent authority of the country of manufacture may accept an approval of an inspection body by another competent authority.*~~

~~The inspection body may use the manufacturer's testing laboratory or the manufacturer's selected testing laboratory.~~

~~The inspection body may delegate certain functions in accordance with 6.2.2.5.4.15.~~

~~6.2.2.5.2.2.26 The general requirements for an inspection body~~ shall ~~be as follows~~:

(a) have a staff with an organisational structure, capable, competent, and skilled, to satisfactorily perform its technical functions;

(b) have access to suitable and adequate facilities and equipment;

(c) operate in an impartial manner and be free from any influence which could prevent it from doing so;

(d) ensure confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;

(e) maintain clear demarcation between actual inspection body functions and unrelated functions;

(f) operate a documented quality system;

(g) ensure that the tests and inspections specified in the relevant pressure receptacle standard and these model regulations are performed;

(h) maintain an effective and appropriate report and record system in accordance with 6.2.2.5.5 (records);

~~(i) to require a written and accepted order before providing its services to a client;~~ and

~~(j) to provide the competent authority with their registered identity mark.~~

~~***Note:** ISO/IEC 17020:1998 or ISO Guide 65 :1996 may be used for guidance.*~~

6.2.2.5.2.5 The services of an inspection body shall be required by manufacturers in design type approval, pressure receptacle production testing and inspection, and certification to verify conformity with the relevant pressure receptacle standard (see 6.2.2.5.~~3~~4 (approval process) and 6.2.2.5.~~4~~5 (production inspection and certification)).

~~6.2.2.5.2.3 *Manufacturer*~~

6.2.2.5.2.~~3.1~~6 The manufacturer shall

(a) operate a documented quality system in accordance with 6.2.2.5.3.~~4.~~

(b) apply for design type approvals in accordance with 6.2.2.5.~~3~~ (approval process)

(c) select an inspection body from the list of approved inspection bodies maintained by the competent authority

(d) maintain records in accordance with 6.2.2.5.~~5~~6 (records).

~~6.2.2.5.2.3.2 The manufacturer shall apply for design type approvals in accordance with 6.2.2.5.3 (approval process).~~

~~6.2.2.5.2.3.3 The manufacturer shall select an inspection body from the list of approved inspection bodies maintained by the competent authority.~~

~~6.2.2.5.2.3.4 The manufacturer may use his own testing laboratory or select a testing laboratory, subject to approval by the inspection body.~~

~~6.2.2.5.2.3.5 The manufacturer shall maintain records in accordance with 6.2.2.5.5 (records).~~

~~6.2.2.5.2.4 *Testing Laboratory*~~

6.2.2.5.2.~~4.1~~7 The testing laboratory~~, or the function it performs, may be an integral part of the manufacturer, the competent authority, the inspection body, or a separate body, domestic or foreign. The services of a testing laboratory other than the one chosen by the manufacturer shall be required in cases where the testing capabilities are deemed by the inspection body to be insufficient.~~

~~6.2.2.5.2.4.2 The general requirements for a testing laboratory~~ shall <u>have</u> ~~be as follows~~:

(a) ~~to have a~~ staff with an organisational structure, sufficient in number, competence, and skill ~~to perform the tests;~~ <u>and</u>

(b) ~~to have~~ suitable and adequate facilities and equipment ~~to satisfactorily perform its technical functions;~~

<u>to satisfactorily perform the tests required by the manufacturing standard</u>

~~(c) to generate an appropriate report and record and transmit copy to the inspection body and the manufacturer;~~

~~(d) to ensure that accurate measuring and testing equipment is used in the laboratory through initial and periodic calibration to the required level;~~

~~(e) to ensure that the environment in which the tests are undertaken does not invalidate the test results or adversely affect the required accuracy of measurement; and~~

~~(f) to require a written and accepted order before providing its services to a client.~~

~~***Note:** ISO/IEC 17025:1999 may be used for guidance.*~~

6.2.2.5.~~3.4~~3. Manufacturer's quality system

6.2.2.5.3.~~4.~~1 ~~The quality system documentation~~ The quality system shall contain all the elements, requirements, and provisions adopted by the manufacturer. It shall be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The contents shall in particular include adequate descriptions of:

(a) the organisational structure, responsibilities, and power of the management with regard to design and product quality;

(b) the design control and design verification techniques, processes, and systematic actions that will be used when designing the pressure receptacles;

(c) the relevant pressure receptacle manufacturing, quality control, quality assurance, and process operation instructions that will be used;

(d) quality records, such as inspection reports, test data, and calibration data;

(e) management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 6.2.2.5.3.~~4.2~~ 4(audit of the quality system);

(f) the process describing how customer requirements are met;

(g) the process for control of documents and their revision;

(h) the means for control of non-conforming pressure receptacles, purchased components, in-process and final materials; and

(i) training programmes for relevant personnel.

6.2.2.5.3.~~4.~~2 Audit of the quality system

The quality system shall be <u>initially</u> assessed to determine whether it satisfies~~, to the satisfaction of~~ the competent authority~~,~~ the requirements referred to in 6.2.2.5.3.~~4.1~~1(~~quality system documentation~~).

~~The purpose of the audit shall be to ensure that the manufacturer duly fulfils the obligations resulting from the approved quality system.~~

~~For audit purposes, the manufacturer shall provide unrestricted access to the locations of design, manufacture, service, inspection, testing, and storage, and shall provide all necessary information and documentation.~~

The manufacturer shall be notified of the results of the audit. The notification shall contain the conclusions of the audit and any corrective actions required.

Periodic audits shall be carried out, to the satisfaction of the competent authority, to ensure that the manufacturer maintains and applies the quality system. Reports of the periodic audits shall be provided to the manufacturer.

6.2.2.5.3.~~4.~~3. Maintenance of the quality system

The manufacturer shall ~~undertake to fulfil the obligations resulting from the quality system as approved and to~~ maintain the quality system as approved in order that it remains adequate and efficient.

The manufacturer shall notify the competent authority that approved the quality system, of any intended changes. The proposed changes shall be evaluated in order to determine whether the amended quality system will still satisfy the requirements referred to (in 6.2.2.5.3.~~4.1~~ 1) ~~(quality system documentation), or whether a reassessment is required, to the satisfaction of the competent authority~~.

~~***Note:*** *Certified quality systems, such as the ISO 9000 series, may be accepted by the competent authority when assessing the quality system according to 6.2.2.5.3.4 (manufacturer's quality system). ISO Guide 61:1996 and ISO Guide 62:1996 may be used for guidance*.~~

6.2.2.5.4~~3~~ ***Approval process***

~~6.2.2.5.3.1 Layout of the approval process~~

~~The approval process for the manufacture of pressure receptacles shall consist of the following steps:~~

~~(a) application for initial design type approval (6.2.2.5.3.2);~~

~~(b) application for subsequent design type approval (6.2.2.5.3.3), if it follows an initial design type approval;~~

~~(c) quality system procedures (6.2.2.5.3.4);~~

~~(d) design type approval procedures (6.2.2.5.3.5).~~

~~6.2.2.5.3.2 Application for~~ ***Initial design type approval***

~~6.2.2.5.3.2.1 The initial design type approval shall consist of approval of the manufacturer's quality system and approval of the pressure receptacle design to be produced. An application for an initial design type approval shall encompass the requirements of 6.2.2.5.3.2 (application for initial design type approval), 6.2.2.5.3.4 (manufacturer's quality system), and 6.2.2.5.3.5 (procedure for design type approval).~~

6.2.2.5.~~3.2.2~~4.1A manufacturer desiring to produce pressure receptacles in accordance with a pressure receptacle standard and these model regulations shall apply for, obtain, and retain a Design Type Approval Certificate issued by the competent authority in the country of ~~manufacture~~ approval for at least one pressure receptacle design type in accordance with the procedure given in 6.2.2.5.~~3.2.3~~4.2. This written approval shall, on request, be submitted to the competent authority of the country of use.

6.2.2.5.~~3.2.3~~4.2The application ~~shall be made by the manufacturer to the competent authority of the country of manufacture and~~ shall include:

(a) the name and registered address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;

(b) the address of the manufacturing facility (if different from the above);

(c) the name and title of the person(s) responsible for the quality system;

(d) the designation of the pressure receptacle and the relevant pressure receptacle standard;

~~***Note:*** *The criteria for determining the design type are provided in the applicable pressure receptacle standard.*~~

(e) ~~a written declaration that the same application has not been submitted and denied by any other competent authority~~ details of any refusal of approval of a similar application by any other competent authority;

~~(f) the technical documentation required for design type approval according to 6.2.2.5.3.2.4~~;

(f) the ~~name~~ identity of the inspection body for design type approval; and

(g) documentation on the manufacturing facility as specified under 6.2.2.5.3.~~4.1~~1 (quality system documentation) or proof of audit.

(h) the technical documentation required for design type approval~~6.2.2.5.3.3 2.4 The technical documentation for design type approval~~ which shall enable verification of the conformity of the pressure receptacles with the requirements of the relevant pressure receptacle design standard. It shall cover the design and method of manufacture and shall contain, as far as is relevant for assessment, at least the following:

(i) pressure receptacle design standard, design and manufacturing drawings, showing components and subassemblies, if any;

(ii) descriptions and explanations necessary for the understanding of the drawings and intended use of the pressure receptacles;

(iii) a list of the standards necessary to fully define the manufacturing process;

(iv) design calculations and material specifications; and

(v) design type approval test reports, describing the results of examinations and tests carried out in accordance with 6.2.2.5.~~3.5.1~~ 4.7.

6.2.2.5.~~3.2.5~~4.3 An initial audit in accordance with 6.2.2.5.3.~~4.2~~ 2(audit of the quality system) shall be performed to the satisfaction of the competent authority.

6.2.2.5.~~3.2.6~~4.4 If the manufacturer is denied approval, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.~~3.2.7~~4.5 Following approval, changes to the information submitted under 6.2.2.5.~~3.2.2~~ 4.1 relating to the initial approval shall be provided to the competent authority.

~~6.2.2.5.3.3 Application for~~ ***Subsequent design type approvals***

6.2.2.5.~~3.3.1~~ 4.6An application for a subsequent design type approval shall encompass the requirements of 6.2.2.5.~~3.3~~ 4.7 ~~(application for subsequent design type approvals)~~ and 6.2.2.5.~~3.5~~ 4.8 (procedure for design type approval), provided a manufacturer is in the possession of an initial design type approval. In such a case, the manufacturer's quality system according to 6.2.2.5.3~~.4~~ (manufacturer's quality system) shall have been approved during the initial design type approval and shall be applicable for the new design.

6.2.2.5.~~3.3.2~~ 4.7The application shall include:

(a) the name and address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;

(b) ~~a written declaration that the same application has not been submitted and denied by any other competent authority~~ details of any refusal of approval of a similar application by any other competent authority;

(c) evidence that initial design type approval has been granted; and

(d) the technical documentation, as described in 6.2.2.5.~~3.2.4~~ 4.2(h).

~~6.2.2.5.3.5~~ Procedure for design type approval

6.2.2.5.~~3.5.1~~4.8 ~~Inspection body~~ The inspection body shall:

(a) examine the technical documentation to verify that:

(i) the design is in accordance with the relevant provisions of the standard, and

(ii) the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;

(c) verify that the production inspections have been carried out as required in accordance with 6.2.2.5.~~4~~ 5(production inspection and ~~inspection~~ certification);

(c) randomly select pressure receptacles from a prototype production lot and supervise the tests of these pressure receptacles as required for design type approval;

(d) perform or have performed the examinations and tests specified in the pressure receptacle standard to determine that:

(i) the standard has been applied and fulfilled, and

(ii) the procedures adopted by the manufacturer meet the requirements of the standard; and

(e) ensure that the various type approval examinations and tests are correctly and competently carried out.

6.2.2.5.~~3.5.2~~4.9 ~~Recommendations -~~After prototype testing has been carried out with satisfactory results, ~~the inspection body shall recommend to the competent authority that the manufacturer be issued -~~a Design Type Approval Certificate shall be issued.

~~The recommendation shall contain the name and address of the manufacturer, results and conclusions of the examination, and the necessary data for identification of the design type.~~

~~After these examinations and tests have been performed with acceptable results, the competent authority shall issue a written approval to the manufacturer with a Design Type Approval Certificate for each design type that is approved, including the authorisation to affix the pressure receptacle certification marking to each pressure receptacle manufactured and approved. A list of the relevant parts of the technical documentation shall be annexed to the Design Type Approval Certificate.~~

If the manufacturer is denied a design type certification, the competent authority shall provide written detailed reasons for such denial.

~~***Note:*** *In the case where the competent authority has delegated its authority to the inspection body, the Design Type Approval Certificate may be issued directly to the manufacturer, with a copy to the competent authority.*~~

6.2.2.5.~~3.5.3~~4.10 Modifications to approved design types.

The manufacturer shall inform the issuing competent authority of modifications to the approved design type as specified in the pressure receptacle standard. A subsequent design type approval shall be requested where such modifications constitute a new design according to the relevant pressure receptacle standard. This additional approval shall be given in the form of an amendment to the original Design Type Approval Certificate.

6.2.2.5.4.11 Upon ~~the~~ request ~~of the manufacturer~~, the competent authority shall communicate to any other competent authority, information concerning design type approval, modifications of approvals, and withdrawn approvals.

6.2.2.5.~~4~~5 Production inspection and certification

~~6.2.2.5.4.1~~ ~~General requirements~~ An inspection body, or its delegate, shall carry out the inspection and certification of each pressure receptacle. The inspection body selected by the manufacturer for inspection and testing during production may be different from the inspection body used for the design type approval testing.

Where it can be demonstrated to the satisfaction of the inspection body that the manufacturer has trained and competent inspectors, independent of the manufacturing operations, inspection may be performed by those inspectors. In such a case, the manufacturer shall maintain training records of the inspectors.

The inspection body shall verify that the inspections by the manufacturer, and tests performed on those pressure receptacles, fully conform to the standard and the requirements of these model regulations. Should non-conformance in conjunction with this inspection and testing be determined, the permission to have inspection performed by the manufacturer's inspectors may be withdrawn.

The manufacturer shall, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the pressure receptacle certification marking shall be considered a declaration that the pressure receptacle complies with the applicable pressure receptacle standards and the requirements of this quality ~~conformance~~ assurance system and these model regulations. The inspection body shall affix or delegate the manufacturer to affix the pressure receptacle certification marking and the registered mark of the inspection body to each approved pressure receptacle.

~~***Note:*** *Misuse of the prescribed marks is subject to sanctions by the competent authority.*~~

~~6.2.2.5.4.2 Production inspection – Details~~

~~The inspection body shall ensure that the requirements of the applicable pressure receptacle standards and these model regulations are complied with. A certificate of compliance, signed by the inspection body and the manufacturer, shall be issued before the pressure receptacles are dispatched.~~

6.2.2.5.~~5~~6 Records

Design type approval and certificate of compliance records shall be retained by the manufacturer and the inspection body for not less than 20 years.]

6.2.2.6 and 6.2.2.7 Marking of refillable and non-refillable pressure receptacles

In response to the problems highlighted by the expert from the USA in document ST/SG/AC.10/2000/27, EIGA recommends replacing all references to "The two alphabetic characters identifying the country authorising the UN marking as specified in the alpha-2 code of ISO 3166-1:1997" as in e.g. 6.2.2.1 (d) by the phrase "The State authorising the allocation of the mark; indicated by the distinguishing signs of motor vehicles in international traffic" as appears in e.g. 6.5.2.1.1 (e) of the 11th Revision of the Model Regulations. This has the advantage that country identification in cylinder certification markings would be in alignment with other marking schemes in the UN Model Regulations.

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