



## 危险物品专家组 (DGP)

### 第二十三次会议

2011年10月11日至21日，蒙特利尔

议程项目3: 拟定对《危险物品安全航空运输技术细则补篇》(Doc 9284SU号文件)的修订建议，以便纳入2013年—2014年版

### 对第2类危险物品信息的修改

(由J. McLaughlin提交)

#### 概要

本文件建议修改技术细则补篇中关于第2类危险物品的规定。

**危险物品专家组的行动:** 请危险物品专家组考虑召集一个工作组，在危险物品专家组第23次会议期间开会。工作组的目的是向危险物品专家组提供一份关于处理补篇中第2类危险物品事项的最后提案，供其通过。危险物品专家组第23次会议期间所作修改将可纳入下一版补篇当中。

## 1. INTRODUCTION

1.1 The DGP Working Group of the Whole Meeting in Abu Dhabi (DGP-WG/10, 7 to 11 November 2010) began efforts to review and update Class 2 Dangerous Goods in the Supplement to the Technical Instructions during this biennium (DGP/23-WP/2, paragraph 3.3.3 refers). This work involved a systematic review of how similar materials and articles are applied in the Supplement. The time and input of those panel members who participated in the numerous emails and discussions on this issue has been greatly appreciated.

1.2 In order to complete this effort, it is proposed that a working group meeting take place during DGP/23. This working paper offers the following material intended to facilitate discussion:

**Appendix A — Class 2 Dangerous Goods List:** Sorted by division for discussion purposes only, the information within this table has been reviewed for consistency with the UN Model Regulations.

**Appendix B — General Packing Requirements:** Taken from the Technical Instructions, applicable to Class 2 Dangerous Goods

**Appendix C — Summary Sheet:** For Class 2 Dangerous Goods, an outline by divisions of quantities limits assigned. This can assist the working group in discussions and in arriving at final determinations. This information is not proposed for inclusion in the Supplement, however, the DGP may wish to consider information similar to the comprehensive summary offered in DGP/23-WP/73 as a basis for information presented in the guiding principles.

**Appendix D — Packing Instruction 213 (from the Supplement):** Packing Instruction 213 is proposed to be changed to Packing Instruction 210. Currently, Packing Instruction 213 in the Technical Instructions is a different packing instruction than Packing Instruction 213 in the Supplement.

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## APPENDIX A

## CLASS 2 DANGEROUS GOODS LIST

Name	UN No.	Class or division	Sub. risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
Aerosols	1950	2.1	6.1									
Aerosols	1950	2.1	8									
Acetylene, dissolved	1001	2.1					A1		F (200)	F (5 KG)	200	15 KG
Butadienes and hydrocarbon mixture, stabilized	1010	2.1					A1				200	150 KG
Butadienes, stabilized	1010	2.1					A1		F (200)	F (5 KG)	200	150 KG
Butane	1011	2.1					A1		F (200)	F (5 KG)	200	150 KG
Butylene	1012	2.1					A1		F (200)	F (5 KG)	200	150 KG
Cyclopropane	1027	2.1					A1		F (200)	F (5 KG)	200	150 KG
Difluoroethane	1030	2.1					A1		F (200)	F (5 KG)	200	150 KG
Refrigerant gas R 152a	1030	2.1					A1		F (200)	F (5 KG)	200	150 KG
Dimethylamine, anhydrous	1032	2.1					A1		F (200)	F (5 KG)	200	150 KG
Dimethyl ether	1033	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethane	1035	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethylamine	1036	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethyl chloride	1037	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethyl chloride	1037	2.1					A1		or1		or	
Ethyl chloride	1037	2.1					A1		or2		214	0.3 KG
Ethylene, refrigerated liquid	1038	2.1										
Ethyl methyl ether	1039	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethylene oxide and carbon dioxide mixture	1041	2.1					A1		F (200)	F (5 KG)	200	25 KG
Hydrogen, compressed	1049	2.1					A1		F (200)	F (5 KG)	200	150 KG
Isobutylene	1055	2.1					A1		F (200)	F (5 KG)	200	150 KG
Methylacetylene and propadiene mixture, stabilized	1060	2.1					A1		F (200)	F (5 KG)	200	150 KG
Methylamine, anhydrous	1061	2.1					A1		F (200)	F (5 KG)	200	150 KG

Name	UN No.	Class or division	Sub. risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
<b>Methyl chloride</b>	1063	2.1					A1		F (200)	F (5 KG)	200	100 KG
<b>Refrigerant gas R 40</b>	1063	2.1					A1		F (200)	F (5 KG)	200	100 KG
<b>Petroleum gases, liquefied</b>	1075	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Propylene</b>	1077	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Tetrafluoroethylene, stabilized</b>	1081	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Trimethylamine, anhydrous</b>	1083	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Vinyl bromide, stabilized</b>	1085	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Vinyl chloride, stabilized</b>	1086	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Vinyl methyl ether, stabilized</b>	1087	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Vinyl fluoride, stabilized</b>	1860	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Methyl chloride and methylene chloride mixture</b>	1912	2.1					A1, A52		F (200)	F (5 KG)	200	150 KG
<b>Aerosols</b>	1950	2.1					A1, A145, A153		F (203)	F (75 KG)	203	150 KG
<b>Compressed gas, flammable, n.o.s.*</b>	1954	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Deuterium, compressed</b>	1957	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Difluoroethylene</b>	1959	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Refrigerant gas R 1132a</b>	1959	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Ethane, refrigerated liquid</b>	1961	2.1										
<b>Ethylene</b>	1962	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Hydrocarbon gas mixture, compressed, n.o.s.*</b>	1964	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Hydrocarbon gas mixture, liquefied, n.o.s.*</b>	1965	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Hydrogen, refrigerated liquid</b>	1966	2.1										
<b>Isobutane</b>	1969	2.1					A1		F (200)	F (5 KG)	200	150 KG
<b>Methane, compressed</b>	1971	2.1					A1		F (200)	F (5 KG)	200	150 KG

Name	UN No.	Class or division	Sub. risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
Natural gas, compressed	1971	2.1					A1		F (200)	F (5 KG)	200	150 KG
Methane, refrigerated liquid	1972	2.1										
Natural gas, refrigerated liquid	1972	2.1										
Propane	1978	2.1					A1		F (200)	F (5 KG)	200	150 KG
Hydrogen and methane mixture, compressed	2034	2.1					A1		F (200)	F (5 KG)	200	150 KG
Refrigerant gas R 143a	2035	2.1					A1		F (200)	F (5 KG)	200	150 KG
Trifluoroethane	2035	2.1					A1		F (200)	F (5 KG)	200	150 KG
Dimethylpropane	2044	2.1					A1		F (200)	F (5 KG)	200	150 KG
Propadiene, stabilized	2200	2.1					A1		F (200)	F (5 KG)	200	150 KG
Silane	2203	2.1					A2		F (202)	F (5 KG)	F (202)	F (150 KG)
Bromotrifluoroethane	2419	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethylacetylene, stabilized	2452	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethyl fluoride	2453	2.1					A1		F (200)	F (5 KG)	200	150 KG
Refrigerant gas R 161	2453	2.1					A1		F (200)	F (5 KG)	200	150 KG
Methyl fluoride	2454	2.1					A1		F (200)	F (5 KG)	200	150 KG
Refrigerant gas R 41	2454	2.1					A1		F (200)	F (5 KG)	200	150 KG
Chloro-1,1-difluoroethane	2517	2.1					A1		F (200)	F (5 KG)	200	150 KG
Refrigerant gas R 142b	2517	2.1					A1		F (200)	F (5 KG)	200	150 KG
Cyclobutane	2601	2.1					A1		F (200)	F (5 KG)	200	150 KG
Ethylene, acetylene and propylene mixture, refrigerated liquid	3138	2.1										
Perfluoro(methyl vinyl ether)	3153	2.1					A1		F (200)	F (5 KG)	200	150 KG
Perfluoro(ethyl vinyl ether)	3154	2.1					A1		F (200)	F (5 KG)	200	150 KG
Liquefied gas, flammable, n.o.s.*	3161	2.1					A1		F (200)	F (5 KG)	200	150 KG
Difluoromethane	3252	2.1					A1		F (200)	F (5 KG)	200	150 KG

Name	UN No.	Class or division	Sub-risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
Refrigerant gas R 32	3252	2.1					A1		F (200)	F (5 KG)	200	150 KG
Gas, refrigerated liquid, flammable, n.o.s.*	3312	2.1										
Insecticide gas, flammable, n.o.s.*	3354	2.1					A1		F (200)	F (5 KG)	200	150 KG
Refrigerating machines	3358	2.1					A103					
Acetylene, solvent free	3374	2.1					A1		F (200)	F (5 KG)	200	15 KG
Hydrogen in a metal hydride storage system contained in equipment	3468	2.1					A1, A143				214	100 KG G
Hydrogen in a metal hydride storage system packed with equipment	3468	2.1					A1, A143				214	100 KG G
Hydrogen in a metal hydride storage system	3468	2.1					A1, A143				214	100 KG G
Air, refrigerated liquid	1003	2.2	5.1				A1		F (202)	F (75 KG)	202	150 KG
Oxygen, compressed	1072	2.2	5.1				A202		200	75 KG	200	150 KG
Oxygen, refrigerated liquid	1073	2.2	5.1				A2		F (202)	F (75 KG)	F (202)	F (150 KG)
Nitrous oxide, refrigerated liquid	2201	2.2	5.1				A2		F (202)	F (75 KG)	F (202)	F (150 KG)
Gas, refrigerated liquid, oxidizing, n.o.s.*	3311	2.2	5.1				A2		F (202)	F (75 KG)	F (202)	F (150 KG)
Aerosols	1950	2.2	6.1									
Aerosols	1950	2.2	6.1				A1, A145, A153		F (212)	F (75 KG)	212	50 KG
Aerosols	1950	2.2	8									
Tire assemblies inflated, unserviceable, damaged or above maximum rated pressure	0	2.2					A59					

Name	UN No.	Class or division	Sub-risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
<b>Tyre assemblies inflated, unserviceable, damaged or above maximum rated pressure</b>	0	2.2					A59					
<b>Fertilizer ammoniating solution</b>	1043	2.2					A1		F (200)	F (75 KG)	200	150 KG
<b>Ammonia solution</b>	2073	2.2					A1		F (200)	F (75 KG)	200	150 KG
<b>Carbon monoxide, compressed</b>	1016	2.3	2.1				A2		See 213		See 213	
<b>Coal gas, compressed †</b>	1023	2.3	2.1				A2		See 213		See 213	
<b>Cyanogen</b>	1026	2.3	2.1				A2		See 213		See 213	
<b>Ethylene oxide</b>	1040	2.3	2.1				A2, A131		See 213		See 213	
<b>Ethylene oxide with nitrogen</b>	1040	2.3	2.1				A2					
<b>Hydrogen sulphide</b>	1053	2.3	2.1				A2		See 213		See 213	
<b>Methyl mercaptan</b>	1064	2.3	2.1				A2		See 213		See 213	
<b>Oil gas, compressed</b>	1071	2.3	2.1				A1		See 213		200	25 KG
<b>Trifluorochloroethylene, stabilized</b>	1082	2.3	2.1				A2		See 213		See 213	
<b>Diborane</b>	1911	2.3	2.1				A2		See 213		See 213	
<b>Aerosols</b>	1950	2.3	2.1									
<b>Compressed gas, toxic, flammable, n.o.s.*</b>	1953	2.3	2.1				A2		See 213		See 213	
<b>Gas cartridges</b>	2037	2.3	2.1				A2		See 213		See 213	
<b>Receptacles, small, containing gas</b>	2037	2.3	2.1				A2		See 213		See 213	
<b>Arsine</b>	2188	2.3	2.1				A2		See 213		See 213	
<b>Germane</b>	2192	2.3	2.1				A2		See 213		See 213	
<b>Phosphine</b>	2199	2.3	2.1				A2		See 213		See 213	
<b>Hydrogen selenide, anhydrous</b>	2202	2.3	2.1				A2		See 213		See 213	
<b>Carbonyl sulphide</b>	2204	2.3	2.1				A2		See 213		See 213	
<b>Stibine</b>	2676	2.3	2.1				A2		See 213		See 213	

Name	UN No.	Class or division	Sub-risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
<b>Liquefied gas, toxic, flammable, n.o.s.*</b>	3160	2.3	2.1				A2		See 213		See 213	
<b>Gas sample, non-pressurized, toxic, flammable, n.o.s.</b>	3168	2.3	2.1				A1		F (206)	F (1 L)	206	1 L
<b>Ethylene oxide and carbon dioxide mixture</b>	3300	2.3	2.1				A2		See 213		See 213	
<b>Insecticide gas, toxic, flammable, n.o.s.*</b>	3355	2.3	2.1				A2		See 213		See 213	
<b>Gas cartridges</b>	2037	2.3	5.1				A2		See 213		See 213	
<b>Receptacles, small, containing gas</b>	2037	2.3	5.1				A2		See 213		See 213	
<b>Perchloryl fluoride</b>	3083	2.3	5.1				A2		See 213		See 213	
<b>Compressed gas, toxic, oxidizing, n.o.s.*</b>	3303	2.3	5.1				A2		See 213		See 213	
<b>Liquefied gas, toxic, oxidizing, n.o.s.*</b>	3307	2.3	5.1				A2		See 213		See 213	
<b>Ammonia, anhydrous</b>	1005	2.3	8				A2		See 213		See 213	
<b>Boron trifluoride</b>	1008	2.3	8				A2		See 213		See 213	
<b>Hydrogen bromide, anhydrous</b>	1048	2.3	8				A2		See 213		See 213	
<b>Hydrogen chloride, anhydrous</b>	1050	2.3	8				A2		See 213		See 213	
<b>Nitrosyl chloride</b>	1069	2.3	8				A2		See 213		See 213	
<b>Phosgene</b>	1076	2.3	8				A2		See 213		See 213	
<b>Sulphur dioxide</b>	1079	2.3	8				A2		See 213		See 213	
<b>Cyanogen chloride, stabilized</b>	1589	2.3	8				A2		See 213		See 213	
<b>Boron trichloride</b>	1741	2.3	8				A2		See 213		See 213	
<b>Silicon tetrafluoride</b>	1859	2.3	8				A2		See 213		See 213	
<b>Gas cartridges</b>	2037	2.3	8				A2		See 213		See 213	



Name	UN No.	Class or division	Sub-risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
Receptacles, small, containing gas	2037	2.3	8				A2		See 213		See 213	
Hydrogen chloride, refrigerated liquid	2186	2.3	8									
Selenium hexafluoride	2194	2.3	8				A2		See 213		See 213	
Tellurium hexafluoride	2195	2.3	8				A2		See 213		See 213	
Tungsten hexafluoride	2196	2.3	8				A2		See 213		See 213	
Hydrogen iodide, anhydrous	2197	2.3	8				A2		See 213		See 213	
Phosphorus pentafluoride	2198	2.3	8				A2		See 213		See 213	
Carbonyl fluoride	2417	2.3	8				A2		See 213		See 213	
Sulphur tetrafluoride	2418	2.3	8				A2					
Hexafluoroacetone	2420	2.3	8				A2		See 213		See 213	
Trifluoroacetyl chloride	3057	2.3	8				A2		See 213		See 213	
Compressed gas, toxic, corrosive, n.o.s.*	3304	2.3	8				A2		See 213		See 213	
Liquefied gas, toxic, corrosive, n.o.s.*	3308	2.3	8				A2		See 213		See 213	
Ammonia solution	3318	2.3	8				A2		See 213		See 213	
Gas cartridges	2037	2.3	2.1, 8				A2		See 213		See 213	
Receptacles, small, containing gas	2037	2.3	2.1, 8				A2		See 213		See 213	
Dichlorosilane	2189	2.3	2.1, 8				A2		See 213		See 213	
Methylchlorosilane	2534	2.3	2.1, 8				A2		See 213		See 213	
Compressed gas, toxic, flammable, corrosive, n.o.s.*	3305	2.3	2.1, 8				A2		See 213		See 213	
Liquefied gas, toxic, flammable, corrosive, n.o.s.*	3309	2.3	2.1, 8				A2		See 213		See 213	
Chlorine	1017	2.3	5.1, 8				A2		See 213		See 213	



Name	UN No.	Class or division	Sub. risk	P G	Labels	State variations	Special provisions	Excepted Quantity	Passenger Aircraft		Cargo Aircraft	
									Forbidden	P Q	Forbidden	C Q
<b>Compressed gas, toxic, n.o.s.*</b>	1955	2.3					A2		See 213		See 213	
<b>Insecticide gas, toxic, n.o.s.*</b>	1967	2.3					A2		See 213		See 213	
<b>Gas cartridges</b>	2037	2.3					A2		See 213		See 213	
<b>Receptacles, small, containing gas</b>	2037	2.3					A2		See 213		See 213	
<b>Sulphuryl fluoride</b>	2191	2.3					A2		See 213		See 213	
Sulphuryl fluoride	2191	2.3					A2		See 213		See 213	
<b>Liquefied gas, toxic, n.o.s.*</b>	3162	2.3					A2		See 213		See 213	
<b>Gas sample, non-pressurized, toxic, n.o.s.</b>	3169	2.3					A1		F (206)	F (1 L)	206	1 L

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**APPENDIX B**  
**GENERAL PACKING REQUIREMENTS**

**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 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 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 these 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. 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 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. 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. 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.
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**APPENDIX C**  
**SUMMARY SHEET**

Gases Class 2			
2.1	6.1		forbidden UN1950 Aerosol
	8		forbidden UN1950 Aerosol
	none		PAX (5 KG) CAO 150 KG except Ethyl Chloride
	none		UN1063 Methyl Chloride (5 KG) PAX CAO 100KG
	none		UN1950 Aerosols (75 KG) PAX CAO 150 KG
	none		UN2203 Silane (5 KG) PAX CAO (150 KG)
	none		UN3312, UN3138, UN1038, 3312 Gas refrigerated and 3358 Refrigerating machines
	none		UN3468 Hydrogen in metal hydride Forbidden PAX CAO 100 KG G
2.2	5.1		UN1003 Air, refrigerated (75 KG) PAX CAO (150) KG
	5.1		Oxygen UN1072 75 KG PAX CAO 150 KG
	5.1		UN1073 Oxygen refrigerated liquid (75 KG) PAX CAO (150 KG) and UN3311 gas refrigerated oxidizing
	6.1		UN1950 Aerosols Forbidden
	8		UN1950 Aerosol forbidden
	none		(75 KG) PAX 150KG CAO
2.3	2.1		see 213 to be 210
	2.1		UN1071 Oil gas compressed PAX see 213 CAO 25 KG
	5.1		see 213 to be 210
	5.1 and 8		see 213 to be 210
	2.1 and 8		see 213 to be 210
	8		see 213 to be 210
	none		see 213 to be 210
	none		UN3169 Gas sample, nonpressurized and toxic (1 L) PAX 1 L CAO

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## APPENDIX D

### PROPOSED AMENDMENT TO THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS

#### Chapter 4

#### CLASS 2 — GASES

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<b>2130</b>	<b>PACKING INSTRUCTION <u>213210</u></b>	<b><u>213210</u></b>
<p>The general packing requirements of Part 4, Chapter 1 of the Technical Instructions must be met.</p> <p>Small quantities of gases in Division 2.3, including mixtures of gases, may be carried in an aircraft under the following conditions:</p> <ol style="list-style-type: none"><li>1. The maximum quantity of gas permitted per package must be determined using the following formula: Permitted mass <math>\leq 10^{-3}</math> (RMM) (LC<sub>50</sub>) where: RMM = relative molecular mass LC<sub>50</sub> expressed in mL/m<sup>3</sup> as defined in Part 2, Chapter 6 of the Technical Instructions Permitted mass expressed in grams.  For mixtures of toxic gases, where the LC<sub>50</sub> of the mixture or its mass per unit volume at NTP are unknown, the following formula shall be used to determine the permitted mass of the mixture: <math display="block">\frac{\text{mass of component 1}}{10^{-3} (\text{RMM})_1 (\text{LC}_{50})_1} + \frac{\text{mass of component 2}}{10^{-3} (\text{RMM})_2 (\text{LC}_{50})_2} + \frac{\text{mass of component } n}{10^{-3} (\text{RMM})_n (\text{LC}_{50})_n} \leq 1</math> where: NTP is normal temperature and pressure (RMM) = relative molecular mass of component 1 ... n  This latter formula makes no allowance for any synergistic effect of the mixture and it should not be used where the toxic effects are other than additive.</li><li>2. The gas must be contained in a gas cylinder which meets the requirements of Packing Instruction 200 or an IP.8 glass ampoule, provided it is compatible with the gas.  The maximum quantity of gas permitted in a glass ampoule is determined by the above formula but is further limited to not more than 100 g.</li><li>3. The glass ampoule or gas cylinder must be tightly packed as to prevent movement in an outer metal pressure vessel containing inert absorbent and cushioning material. The outer metal pressure vessels must be designed to contain the total quantity of gas in case of leakage of the ampoule or cylinder. The outer metal pressure vessel must meet the requirements of Packing Instruction 200. Special care must be taken to prevent corrosion of the inner wall of the outer metal pressure vessels.</li><li>4. The outer metal pressure vessel must be tightly packed, so as to prevent movement, in a strong outside packaging.</li></ol>		