



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)  
MEETING OF THE WORKING GROUP OF THE WHOLE**

**Beijing, China, 25 October to 3 November 2006**

**Agenda Item 3: Development of recommendations for amendments to the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2009/2010 Edition**

**IDENTIFICATION OF TOXIC BY INHALATION MATERIALS IN THE  
SUPPLEMENT**

(Presented by R. Richard)

**SUMMARY**

This working paper proposes that toxic by inhalation materials be identified in the Supplement to assist States in prescribing appropriate requirements when such substances are transported under approval by the appropriate national authority.

Action by the DGP-WG is in paragraph 2.

**1. INTRODUCTION**

1.1 Currently substances which are toxic by inhalation are forbidden from transport on both passenger and cargo aircraft. However a number of these substances are assigned Special Provision A2 which allows their transport with the approval of the appropriate national authority. It is noted that in such cases neither Table 3-1 nor Special Provision A2 provides any indication that such substances are toxic by inhalation. Such information is considered to be of importance when assigning appropriate packaging and quantity authorizations when substances are transported by approval in accordance with Special Provision A2.

1.2 A list of substances known to be toxic by inhalation is attached (see Appendix A).

**2. ACTION BY THE DGP-WG**

2.1 The DGP-WG is invited to agree to the identification of Toxic by Inhalation Substances in the Supplement by assigning a Special Provision to the applicable entries:

**2XX This substance meets the criteria of a material toxic by inhalation.**

**APPENDIX A**

**SUBSTANCES IDENTIFIED AS TOXIC BY INHALATION**

Name	UN #	Class	Sub-risk	PG
2-Chloroethanal	UN2232	6.1	6.1	I
2-Methyl-2-heptanethiol	UN3023	6.1	6.1, 3	I
Acetone cyanohydrin, stabilized	UN1541	6.1	6.1	I
Acrolein, stabilized	UN1092	6.1	6.1, 3	I
Allyl alcohol	UN1098	6.1	6.1, 3	I
Allyl chloroformate	UN1722	6.1	6.1, 3, 8	I
Allylamine	UN2334	6.1	6.1, 3	I
Ammonia solution, [relative density less than 0.880 at 15 degrees C in water, with more than 50 percent ammonia]	UN3318	2.2	2.2	
Ammonia solution, [relative density less than 0.880 at 15 degrees C in water, with more than 50 percent ammonia]	UN3318	2.3	2.3, 8	
Ammonia, anhydrous	UN1005	2.2	2.2	
Ammonia, anhydrous	UN1005	2.3	2.3, 8	
Arsenic trichloride	UN1560	6.1	6.1	I
Arsine	UN2188	2.3	2.3, 2.1	
Boron tribromide	UN2692	8	8, 6.1	I
Boron trichloride	UN1741	2.3	2.3, 8	
Boron trifluoride	UN1008	2.3	2.3	
Bromine	UN1744	8	8, 6.1	I
Bromine chloride	UN2901	2.3	2.3, 8, 5.1	
Bromine pentafluoride	UN1745	5.1	5.1, 6.1, 8	I
Bromine solutions	UN1744	8	8, 6.1	I
Bromine solutions	UN1744	8	8, 6.1	I
Bromine trifluoride	UN1746	5.1	5.1, 6.1, 8	I
Bromoacetone	UN1569	6.1	6.1, 3	II
Carbon monoxide and hydrogen mixture, compressed	UN2600	2.3	2.3, 2.1	
Carbon monoxide, compressed	UN1016	2.3	2.3, 2.1	
Carbonyl fluoride	UN2417	2.3	2.3, 8	
Carbonyl sulfide	UN2204	2.3	2.3, 2.1	
Chlorine	UN1017	2.3	2.3, 8	
Chlorine pentafluoride	UN2548	2.3	2.3, 5.1, 8	
Chlorine trifluoride	UN1749	2.3	2.3, 5.1, 8	
Chloroacetone, stabilized	UN1695	6.1	6.1, 3, 8	I
Chloroacetonitrile	UN2668	6.1	6.1, 3	II
Chloroacetyl chloride	UN1752	6.1	6.1, 8	I
Chloropicrin	UN1580	6.1	6.1	I
Chloropicrin and methyl bromide mixtures	UN1581	2.3	2.3	
Chloropicrin and methyl chloride mixtures	UN1582	2.3	2.3	

Name	UN #	Class	Sub-risk	PG
Chlorosulfonic acid [(with or without sulfur trioxide)]	UN1754	8	8, 6.1	I
Coal gas, compressed	UN1023	2.3	2.3, 2.1	
Compressed gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone A]	UN3304	2.3	2.3, 8	
Compressed gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone B]	UN3304	2.3	2.3, 8	
Compressed gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone C]	UN3304	2.3	2.3, 8	
Compressed gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone D]	UN3304	2.3	2.3, 8	
Compressed gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone A]	UN3305	2.3	2.3, 2.1, 8	
Compressed gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone B]	UN3305	2.3	2.3, 2.1, 8	
Compressed gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone C]	UN3305	2.3	2.3, 2.1, 8	
Compressed gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone D]	UN3305	2.3	2.3, 2.1, 8	
Compressed gas, toxic, flammable, n.o.s. [Inhalation hazard Zone A]	UN1953	2.3	2.3, 2.1	
Compressed gas, toxic, flammable, n.o.s. [Inhalation hazard Zone B]	UN1953	2.3	2.3, 2.1	
Compressed gas, toxic, flammable, n.o.s. [Inhalation Hazard Zone C]	UN1953	2.3	2.3, 2.1	
Compressed gas, toxic, flammable, n.o.s. [Inhalation Hazard Zone D]	UN1953	2.3	2.3, 2.1	
Compressed gas, toxic, n.o.s. [Inhalation Hazard Zone A]	UN1955	2.3	2.3	
Compressed gas, toxic, n.o.s. [Inhalation Hazard Zone B]	UN1955	2.3	2.3	
Compressed gas, toxic, n.o.s. [Inhalation Hazard Zone C]	UN1955	2.3	2.3	
Compressed gas, toxic, n.o.s. [Inhalation Hazard Zone D]	UN1955	2.3	2.3	
Compressed gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone A]	UN3306	2.3	2.3, 5.1, 8	
Compressed gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone B]	UN3306	2.3	2.3, 5.1, 8	
Compressed gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone C]	UN3306	2.3	2.3, 5.1, 8	
Compressed gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone D]	UN3306	2.3	2.3, 5.1, 8	
Compressed gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone A]	UN3303	2.3	2.3, 5.1	
Compressed gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone B]	UN3303	2.3	2.3, 5.1	
Compressed gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone C]	UN3303	2.3	2.3, 5.1	
Compressed gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone D]	UN3303	2.3	2.3, 5.1	
Crotonaldehyde, stabilized	UN1143	6.1	6.1, 3	I
Cyanogen	UN1026	2.3	2.3, 2.1	
Cyanogen chloride, stabilized	UN1589	2.3	2.3, 8	
Cyclohexyl isocyanate	UN2488	6.1	6.1, 3	I
Diborane	UN1911	2.3	2.3, 2.1	

Name	UN #	Class	Sub-risk	PG
Dichlorosilane	UN2189	2.3	2.3, 2.1, 8	
Diketene, stabilized	UN2521	6.1	6.1, 3	I
Dimethyl sulfate	UN1595	6.1	6.1, 8	I
Dimethylhydrazine, symmetrical	UN2382	6.1	6.1, 3	I
Dimethylhydrazine, unsymmetrical	UN1163	6.1	6.1, 3, 8	I
Dinitrogen tetroxide	UN1067	2.3	2.3, 5.1, 8	
Ethyl chloroformate	UN1182	6.1	6.1, 3, 8	I
Ethyl chlorothioformate	UN2826	8	8, 6.1, 3	II
Ethyl isocyanate	UN2481	3	3, 6.1	I
Ethylchloroarsine	UN1892	6.1	6.1	I
Ethylene chlorohydrin	UN1135	6.1	6.1, 3	I
Ethylene dibromide	UN1605	6.1	6.1	I
Ethylene oxide [or] Ethylene oxide with nitrogen [up to a total pressure of 1MPa (10 bar) at 50 degrees C]	UN1040	2.3	2.3, 2.1	
Ethylene oxide and carbon dioxide mixture [with more than 87 percent ethylene oxide]	UN3300	2.3	2.3, 2.1	
Ethyleneimine, stabilized	UN1185	6.1	6.1, 3	I
Fluorine, compressed	UN1045	2.3	2.3, 5.1, 8	
Gas sample, non-pressurized, toxic, flammable, n.o.s., [not refrigerated liquid]	UN3168	2.3	2.3, 2.1	
Gas sample, non-pressurized, toxic, n.o.s., [not refrigerated liquid]	UN3169	2.3	2.3	
Germane	UN2192	2.3	2.3, 2.1	
Hexachlorocyclopentadiene	UN2646	6.1	6.1	I
Hexaethyl tetraphosphate and compressed gas mixtures	UN1612	2.3	2.3	
Hexafluoroacetone	UN2420	2.3	2.3, 8	
Hydrocyanic acid, aqueous solutions [or] Hydrogen cyanide, aqueous solutions [with not more than 20 percent hydrogen cyanide]	UN1613	6.1	6.1	I
Hydrogen bromide, anhydrous	UN1048	2.3	2.3, 8	
Hydrogen chloride, anhydrous	UN1050	2.3	2.3, 8	
Hydrogen chloride, refrigerated liquid	UN2186	2.3	2.3, 8	
Hydrogen cyanide, solution in alcohol [with not more than 45 percent hydrogen cyanide]	UN3294	6.1	6.1, 3	I
Hydrogen cyanide, stabilized [with less than 3 percent water]	UN1051	6.1	6.1, 3	I
Hydrogen fluoride, anhydrous	UN1052	8	8, 6.1	I
Hydrogen iodide, anhydrous	UN2197	2.3	2.3	
Hydrogen selenide, anhydrous	UN2202	2.3	2.3, 2.1	
Hydrogen sulfide	UN1053	2.3	2.3, 2.1	
Insecticide gases, toxic, flammable, n.o.s. [Inhalation hazard Zone A]	UN3355	2.3	2.3, 2.1	
Insecticide gases, toxic, flammable, n.o.s. [Inhalation hazard Zone B]	UN3355	2.3	2.3, 2.1	
Insecticide gases, toxic, flammable, n.o.s. [Inhalation hazard Zone C]	UN3355	2.3	2.3, 2.1	
Insecticide gases, toxic, flammable, n.o.s. [Inhalation hazard Zone D]	UN3355	2.3	2.3, 2.1	

Name	UN #	Class	Sub-risk	PG
Insecticide gases, toxic, n.o.s.	UN1967	2.3	2.3	
Iron pentacarbonyl	UN1994	6.1	6.1, 3	I
Isobutyl isocyanate	UN2486	3	3, 6.1	I
Isopropyl chloroformate	UN2407	6.1	6.1, 3, 8	I
Isopropyl isocyanate	UN2483	3	3, 6.1	I
Liquefied gas toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone B]	UN3309	2.3	2.3, 2.1, 8	
Liquefied gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone A]	UN3308	2.3	2.3, 8	
Liquefied gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone B]	UN3308	2.3	2.3, 8	
Liquefied gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone C]	UN3308	2.3	2.3, 8	
Liquefied gas, toxic, corrosive, n.o.s. [Inhalation Hazard Zone D]	UN3308	2.3	2.3, 8	
Liquefied gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone A]	UN3309	2.3	2.3, 2.1, 8	
Liquefied gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone C]	UN3309	2.3	2.3, 2.1, 8	
Liquefied gas, toxic, flammable, corrosive, n.o.s. [Inhalation Hazard Zone D]	UN3309	2.3	2.3, 2.1, 8	
Liquefied gas, toxic, flammable, n.o.s. [Inhalation Hazard Zone A]	UN3160	2.3	2.3, 2.1	
Liquefied gas, toxic, flammable, n.o.s. [Inhalation Hazard Zone B]	UN3160	2.3	2.3, 2.1	
Liquefied gas, toxic, flammable, n.o.s. [Inhalation Hazard Zone C]	UN3160	2.3	2.3, 2.1	
Liquefied gas, toxic, flammable, n.o.s. [Inhalation Hazard Zone D]	UN3160	2.3	2.3, 2.1	
Liquefied gas, toxic, n.o.s. [Inhalation Hazard Zone A]	UN3162	2.3	2.3	
Liquefied gas, toxic, n.o.s. [Inhalation Hazard Zone B]	UN3162	2.3	2.3	
Liquefied gas, toxic, n.o.s. [Inhalation Hazard Zone C]	UN3162	2.3	2.3	
Liquefied gas, toxic, n.o.s. [Inhalation Hazard Zone D]	UN3162	2.3	2.3	
Liquefied gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone A]	UN3310	2.3	2.3, 5.1, 8	
Liquefied gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone B]	UN3310	2.3	2.3, 5.1, 8	
Liquefied gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone C]	UN3310	2.3	2.3, 5.1, 8	
Liquefied gas, toxic, oxidizing, corrosive, n.o.s. [Inhalation Hazard Zone D]	UN3310	2.3	2.3, 5.1, 8	
Liquefied gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone A]	UN3307	2.3	2.3, 5.1	
Liquefied gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone B]	UN3307	2.3	2.3, 5.1	
Liquefied gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone C]	UN3307	2.3	2.3, 5.1	
Liquefied gas, toxic, oxidizing, n.o.s. [Inhalation Hazard Zone D]	UN3307	2.3	2.3, 5.1	
Methacrylonitrile, stabilized	UN3079	3	3, 6.1	I
Methanesulfonyl chloride	UN3246	6.1	6.1, 8	I
Methoxymethyl isocyanate	UN2605	3	3, 6.1	I
Methyl bromide	UN1062	2.3	2.3	
Methyl bromide and ethylene dibromide mixtures, liquid	UN1647	6.1	6.1	I
Methyl chloroformate	UN1238	6.1	6.1, 3, 8	I
Methyl chloromethyl ether	UN1239	6.1	6.1, 3	I

Name	UN #	Class	Sub-risk	PG
Methyl iodide	UN2644	6.1	6.1	I
Methyl isocyanate	UN2480	6.1	6.1, 3	I
Methyl isothiocyanate	UN2477	6.1	6.1, 3	I
Methyl mercaptan	UN1064	2.3	2.3, 2.1	
Methyl orthosilicate	UN2606	6.1	6.1, 3	I
Methyl vinyl ketone, stabilized	UN1251	6.1	6.1, 3, 8	I
Methylchlorosilane	UN2534	2.3	2.3, 2.1, 8	
Methylhydrazine	UN1244	6.1	6.1, 3, 8	I
n-Butyl chloroformate	UN2743	6.1	6.1, 8, 3	I
n-Butyl isocyanate	UN2485	6.1	6.1, 3	I
Nickel carbonyl	UN1259	6.1	6.1, 3	I
Nitric acid, red fuming	UN2032	8	8, 5.1, 6.1	I
Nitric oxide and dinitrogen tetroxide mixtures [or] Nitric oxide and nitrogen dioxide mixtures	UN1975	2.3	2.3, 5.1, 8	
Nitric oxide, compressed	UN1660	2.3	2.3, 5.1, 8	
Nitrogen trioxide	UN2421	2.3	2.3, 5.1, 8	
Nitrosyl chloride	UN1069	2.3	2.3, 8	
n-Propyl chloroformate	UN2740	6.1	6.1, 3, 8	I
n-Propyl isocyanate	UN2482	6.1	6.1, 3	I
Oil gas, compressed	UN1071	2.3	2.3, 2.1	
Oxygen difluoride, compressed	UN2190	2.3	2.3, 5.1, 8	
Pentaborane	UN1380	4.2	4.2, 6.1	I
Perchloromethyl mercaptan	UN1670	6.1	6.1	I
Perchloryl fluoride	UN3083	2.3	2.3, 5.1	
Phenyl isocyanate	UN2487	6.1	6.1, 3	I
Phenyl mercaptan	UN2337	6.1	6.1, 3	I
Phenylcarbylamine chloride	UN1672	6.1	6.1	I
Phosgene	UN1076	2.3	2.3, 8	
Phosphine	UN2199	2.3	2.3, 2.1	
Phosphorus oxychloride	UN1810	8	8, 6.1	II
Phosphorus Pentafluoride	UN2198	2.3	2.3, 8	
Phosphorus trichloride	UN1809	6.1	6.1, 8	I
Selenium hexafluoride	UN2194	2.3	2.3, 8	
Silicon tetrafluoride	UN1859	2.3	2.3, 8	
Stibine	UN2676	2.3	2.3, 2.1	
Sulfur chlorides	UN1828	8	8	I
Sulfur dioxide	UN1079	2.3	2.3, 8	
Sulfur tetrafluoride	UN2418	2.3	2.3, 8	
Sulfur trioxide, stabilized	UN1829	8	8, 6.1	I
Sulfuric acid, fuming [with 30 percent or more free sulfur trioxide]	UN1831	8	8, 6.1	I
Sulfuryl chloride	UN1834	8	8, 6.1	I
Sulfuryl fluoride	UN2191	2.3	2.3	
Tellurium hexafluoride	UN2195	2.3	2.3, 8	
tert-Butyl isocyanate	UN2484	6.1	6.1, 3	I

Name	UN #	Class	Sub-risk	PG
Tetranitromethane	UN1510	5.1	5.1, 6.1	I
Thiophosgene	UN2474	6.1	6.1	II
Titanium tetrachloride	UN1838	8	8, 6.1	II
Toxic by inhalation liquid, corrosive, n.o.s. [with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 500 LC50]	UN3389	6.1	6.1, 8	I
Toxic by inhalation liquid, corrosive, n.o.s. [with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 10 LC50]	UN3390	6.1	6.1, 8	I
Toxic by inhalation liquid, flammable, n.o.s. [with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 500 LC50]	UN3383	6.1	6.1, 3	I
Toxic by inhalation liquid, flammable, n.o.s. [with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 10 LC50]	UN3384	6.1	6.1, 3	I
Toxic by inhalation liquid, n.o.s. [with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 500 LC50]	UN3381	6.1	6.1	I
Toxic by inhalation liquid, n.o.s. [with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 10 LC50]	UN3382	6.1	6.1	I
Toxic by inhalation liquid, oxidizing, n.o.s. [with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 500 LC50]	UN3387	6.1	6.1, 5.1	I
Toxic by inhalation liquid, oxidizing, n.o.s. [with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 10 LC50]	UN3388	6.1	6.1, 5.1	I
Toxic by inhalation liquid, water-reactive, n.o.s. [with an inhalation toxicity lower than or equal to 200 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 500 LC50]	UN3385	6.1	6.1, 4.3	I
Toxic by inhalation liquid, water-reactive, n.o.s. [with an inhalation toxicity lower than or equal to 1000 ml/m <sup>3</sup> and saturated vapor concentration greater than or equal to 10 LC50]	UN3386	6.1	6.1, 4.3	I
Trichloroacetyl chloride	UN2442	8	8, 6.1	II
Trifluoroacetyl chloride	UN3057	2.3	2.3, 8	
Trifluorochloroethylene, stabilized	UN1082	2.3	2.3, 2.1	
Trimethylacetyl chloride	UN2438	6.1	6.1, 8, 3	I
Tungsten hexafluoride	UN2196	2.3	2.3, 8	