



International Civil Aviation Organization

DGP/21-WP/14
13/9/07

WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

TWENTY-FIRST MEETING

Montréal, 5 to 16 November 2007

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

**DRAFT AMENDMENTS TO THE SUPPLEMENT
TO THE TECHNICAL INSTRUCTIONS**

(Presented by the Secretary)

SUMMARY

Below are the draft amendments to the Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air.

The DGP is invited to agree to the draft amendments in this working paper.

Part S-3

DANGEROUS GOODS LIST AND LIMITED QUANTITIES EXCEPTIONS

(ADDITIONAL INFORMATION
FOR PART 3 OF THE
TECHNICAL INSTRUCTIONS)

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Chapter 2

DANGEROUS GOODS LIST

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DGP-WG/07-WP/53:

Add A223 in Column 7 of Table S-3-1 for each of the substances listed in the new Appendix 6 to the Supplement, List of Toxic by Inhalation Liquids shown below.

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Chapter 3

SPECIAL PROVISIONS

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A223 This substance is toxic by inhalation.

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DGP/20-WP/93 (yellow cover report):

Editorial Note.— The following is a consequential amendment agreed to by DGP/20 as a result of Amendment 9 to Annex 18, which will become applicable on 20 November 2008:

**Part S-7
STATE'S RESPONSIBILITIES**

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**Chapter 4
PROVISION OF INFORMATION**

**4.1 DANGEROUS GOODS
ACCIDENTS AND INCIDENTS**

4.1.1 The effectiveness and possible need for the modification of dangerous goods regulations and practices can only be measured if dangerous goods accidents and incidents, and discoveries of undeclared or misdeclared dangerous goods in cargo, are investigated, reported and analysed.

4.1.2 Each State must establish procedures for investigating and compiling information concerning dangerous goods accidents and incidents, and discoveries of undeclared or misdeclared dangerous goods in cargo, which occur on its territory and which involve the transport of dangerous goods originating in or destined for another State.

4.1.3 Each State should establish procedures for investigating and compiling information concerning dangerous goods accidents and incidents, and discoveries of undeclared or misdeclared dangerous goods in cargo, which occur on its territory, other than those described in 4.1.2.

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**4.6 UNDECLARED OR MISDECLARED
DANGEROUS GOODS IN CARGO**

The State in which undeclared or misdeclared dangerous goods are discovered in cargo, involving goods originating or destined for another State must carry out an investigation into the circumstances of the discovery such as is considered appropriate to its seriousness

4.64.7 COMPLIANCE ASSURANCE

The competent authority should ensure compliance with the Technical Instructions. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, the classification of dangerous goods and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of the Technical Instructions are being met in practice.

DGP-WG/07-WP/53:

Insert new appendix as follows:

Appendix 7
LIST OF TOXIC BY INHALATION LIQUIDS

| UN No. | Name | Class | UN packing group | Sub-sidiary risk | RTECS | LC ₅₀ (ppm) | SVC (ppm) | Notes |
|--------|---------------------------------|-------|------------------|------------------|--------|------------------------|-----------|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1541 | Acetone cyanohydrin, stabilized | 6.1 | | | OD9275 | -- | 13200 | Decomposes to acetone and highly toxic hydrogen cyanide at room temperatures. |
| 1092 | Acrolein, stabilized | 6.1 | | 3 | AS1050 | 25 | 289000 | |
| 1098 | Allyl alcohol | 6.1 | | 3 | BA5075 | 253 | 26000 | |
| 1722 | Allyl chloroformate | 6.1 | | 3, 8 | LQ5775 | 61 | 20400 | |
| 2334 | Allylamine | 6.1 | | 3 | BA5425 | 590 | 261000 | |
| 1560 | Arsenic trichloride | 6.1 | | | CG1750 | -- | 11500 | Capable of forming highly toxic arsine gas. Explosion hazard in dust form when exposed to flame. |
| 2692 | Boron tribromide | 8 | | | ED7400 | -- | 73700 | Decomposes to highly toxic hydrogen bromide at high temperatures. Fire and explosion may result in contact with water, steam, or alcohol. |
| 1745 | Bromine pentafluoride | 5.1 | | 6.1, 8 | EF9350 | -- | 453000 | Decomposition produces highly toxic hydrogen fluoride and hydrogen bromide. Contact with combustibles produces fire or explosion. Contact with water produces explosion. |
| 1746 | Bromine trifluoride | 5.1 | | 6.1, 8 | EF9360 | 50 | 9200 | |
| 1569 | Bromoacetone | 6.1 | | 3 | UC0525 | -- | 11900 | Decomposition produces highly toxic hydrogen bromide. |
| 2743 | n-Butyl chloroformate | 6.1 | | 3, 8 | LQ5890 | -- | 9870 | As with all chloroformates, decomposition produces toxic gases. |
| 2485 | n-Butyl isocyanate | 6.1 | | 3 | NQ8250 | 105 | 13900 | |
| 2484 | tert-Butyl isocyanate | 6.1 | | 3 | NQ8300 | 22 | 19700 | |
| 1695 | Chloroacetone, stabilized | 6.1 | | 3, 8 | UC0700 | 262 | 41900 | |

| UN No. | Name | Class | UN packing group | Subsidiary risk | RTECS | LC ₅₀ (ppm) | SVC (ppm) | Notes |
|--------|---|-------|------------------|-----------------|--------|------------------------|-----------|---|
| 2668 | Chloroacetonitrile | 6.1 | II | 3 | AL8225 | -- | 13200 | Decomposes to produce toxic and flammable vapors including hydrogen cyanide. Reacts with strong oxidants, reducing agents, acids, bases, steam, producing highly toxic and flammable fumes. |
| 1752 | Chloroacetyl chloride | 6.1 | | 8 | AO6475 | 660 | 24600 | |
| 2232 | 2-Chloroethanal | 6.1 | | | AB2450 | 160 | 24300 | |
| 1580 | Chloropicrin | 6.1 | | | PB6300 | -- | 26100 | Decomposes to form toxic gases including oxides of nitrogen, chlorine and carbon monoxide. Extremely noxious with an odor threshold of only 1.1 ppm. |
| 1754 | Chlorosulphonic acid (with or without sulphur trioxide) | 8 | | | FX5730 | 16 | 1320 | |
| 1143 | Crotonaldehyde, stabilized | 6.1 | | 3 | GP9499 | 93 | 42100 | |
| 2488 | Cyclohexyl isocyanate | 6.1 | | 3 | NQ8650 | 15 | 2170 | |
| 2521 | Diketene, stabilized | 6.1 | | 3 | RQ8225 | 551 | 10500 | |
| 1595 | Dimethyl sulphate | 6.1 | | 8 | WS8225 | 17 | 1000 | |
| 2382 | Dimethylhydrazine, symmetrical | 6.1 | | 3 | MV2625 | 680 | 92000 | |
| 1163 | Dimethylhydrazine, unsymmetrical | 6.1 | | 3, 8 | MV2450 | 504 | 206000 | |
| 1182 | Ethyl chloroformate | 6.1 | | 3, 8 | LQ6125 | 145 | 55300 | |
| 2826 | Ethyl chlorothioformate | 8 | | 3 | LQ6950 | 138 | 10900 | |
| 1892 | Ethyldichloroarsine | 6.1 | | | CH3500 | 36 | 2800 | |
| 1135 | Ethylene chlorohydrin | 6.1 | | 3 | KK0875 | 74 | 6450 | |
| 1605 | Ethylene dibromide | 6.1 | | | KH9275 | 650 | 11300 | |
| 1185 | Ethyleneimine, stabilized | 6.1 | | 3 | KX5075 | 76 | 217000 | |
| 2646 | Hexachlorocyclopentadiene | 6.1 | | | GY1225 | 3 | 100 | |
| 3294 | Hydrogen cyanide, solution in alcohol with not more than 45% hydrogen cyanide | 6.1 | | 3 | -- | | | Concentrations of HCN solution up to 45% HCN may give off toxic HCN vapors. |
| 1051 | Hydrogen cyanide, stabilized containing less than 3% water | 6.1 | | 3 | MW6825 | 40 | 842000 | |
| 1052 | Hydrogen fluoride, anhydrous | 8 | | 6.1 | MW7875 | 1300 | 1020000 | |
| 1994 | Iron pentacarbonyl | 6.1 | | 3 | NO4900 | 6 | 30300 | |
| 2407 | Isopropyl chloroformate | 6.1 | | 3, 8 | LQ6475 | 299 | 36800 | |
| 2483 | Isopropyl isocyanate | 3 | | 6.1 | NQ9230 | | | |
| 3079 | Methacrylonitrile, stabilized | 3 | | 6.1 | UD1400 | 656 | 84200 | |
| 3246 | Methanesulphonyl chloride | 6.1 | | 8 | -- | | | Decomposition products include highly toxic chlorine gas. |

| UN No. | Name | Class | UN packing group | Subsidiary risk | RTECS | LC ₅₀ (ppm) | SVC (ppm) | Notes |
|--------|---|-------|------------------|-----------------|--------|------------------------|-----------|---|
| 2605 | Methoxymethyl isocyanate | 3 | | 6.1 | NQ9240 | -- | -- | Decomposition products include toxic gases such as hydrogen cyanide, oxides of nitrogen and carbon monoxide. Classified by analogy to methyl isocyanate. Odorless at concentrations in air far above safe levels. |
| 1647 | Methyl bromide and ethylene dibromide mixture, liquid | 6.1 | | | PA5300 | -- | -- | Methyl bromide is a Division 2.3 gas and ethylene dibromide is a toxic by inhalation liquid with an LC ₅₀ of 650 and an SVC of 11300. Mixtures of any ratio will be toxic by inhalation. |
| 1238 | Methyl chloroformate | 6.1 | | 3, 8 | FG3675 | 88 | 135000 | |
| 1239 | Methyl chloromethyl ether | 6.1 | | 3 | KN6650 | 160 | 210000 | |
| 3023 | 2-Methyl-2-heptanethiol | 6.1 | | 3 | MJ1500 | 102 | 5000 | |
| 2644 | Methyl iodide | 6.1 | | | PA9450 | 448 | 414000 | |
| 2480 | Methyl isocyanate | 6.1 | | 3 | NQ9450 | 22 | 458000 | |
| 2477 | Methyl isothiocyanate | 6.1 | | 3 | PA9625 | 635 | 27400 | |
| 2606 | Methyl orthosilicate | 6.1 | | 3 | VV9800 | 200 | 13300 | |
| 1251 | Methyl vinyl ketone, stabilized | 6.1 | | 3, 8 | EM9800 | 5 | 93400 | |
| 1244 | Methylhydrazine | 6.1 | | 3, 8 | MV5600 | 68 | 50300 | |
| 1259 | Nickel carbonyl | 6.1 | | 3 | QR6300 | 18 | 422000 | |
| 2032 | Nitric acid, red fuming | 8 | | 5.1, 6.1 | QU5900 | 134 | 55300 | |
| 1380 | Pentaborane | 4.2 | | 6.1 | RY8925 | 12 | 225000 | |
| 1670 | Perchloromethyl mercaptan | 6.1 | | | PB0370 | -- | 32900 | Classification based on analogy with hydrogen sulfide and on human experience. Considered approximately 20 times more toxic than hydrogen sulfide. Exposure causes lacrimation, eye inflammation; nose, throat irritation; cough; dyspnea; deep breath pain, coarse rales; vomiting; pallor; tachycardia; acidosis; anuria. |
| 2487 | Phenyl isocyanate | 6.1 | | 3 | DA3675 | 16 | 2470 | |
| 2337 | Phenyl mercaptan | 6.1 | | 3 | DC0525 | 66 | 1450 | |

| <i>UN No.</i> | <i>Name</i> | <i>Class</i> | <i>UN packing group</i> | <i>Subsidiary risk</i> | <i>RTECS</i> | <i>LC₅₀ (ppm)</i> | <i>SVC (ppm)</i> | <i>Notes</i> |
|---------------|------------------------------|--------------|-------------------------|------------------------|--------------|------------------------------|------------------|---|
| 1672 | Phenylcarbylamine chloride | 6.1 | | | NJ6700 | -- | -- | Classification is based on human experience. Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin. Decomposes to produce corrosive and toxic gases. |
| 1810 | Phosphorus oxychloride | 8 | | | TH4897 | 96 | 35500 | |
| 2740 | n-Propyl chloroformate | 6.1 | | 3, 8 | LQ6830 | 319 | 25500 | |
| 2482 | n-Propyl isocyanate | 6.1 | | 3 | NR0190 | 44 | 69700 | |
| 1809 | Phosphorus trichloride | 6.1 | | 8 | TH3675 | 208 | 125000 | |
| 1829 | Sulphur trioxide, stabilized | 8 | | | WT4830 | 347 | 98700 | |
| 1834 | Sulphuryl chloride | 8 | | | WT4870 | 131 | 142000 | |
| 1510 | Tetranitromethane | 5.1 | | 6.1 | PB4025 | 36 | 11000 | |
| 2474 | Thiophosgene | 6.1 | | | XN2450 | -- | 150000 | Classification is based on human experience. May be fatal if inhaled, swallowed or absorbed through the skin. Causes burns. Severe skin, eye and respiratory irritant. Also reacts violently with water to produce toxic fumes. |
| 1838 | Titanium tetrachloride | 8 | | | XR1925 | 119 | 12800 | |
| 2442 | Trichloroacetyl chloride | 8 | | | A07140 | 128 | 22700 | |
| 2438 | Trimethylacetyl chloride | 6.1 | | 3, 8 | AO7200 | 507 | 35500 | |

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