

GHS Classification

ID627

Dimethyl sulfate

CAS 77-78-1

Date Classified: Feb. 20, 2007 (Environmental Hazards: Feb. 10, 2006)

Physical Hazards

Reference Manual: GHS Classification Manual (Feb. 10, 2006)

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Explosives	Not applicable	-	-	-	There are no chemical groups associated with explosive properties present in the molecules.
2 Flammable gases	Not applicable	-	-	-	Liquid (GHS definition)
3 Flammable aerosols	Not applicable	-	-	-	Not aerosol products
4 Oxidizing gases	Not applicable	-	-	-	Liquid (GHS definition)
5 Gases under pressure	Not applicable	-	-	-	Liquid (GHS definition)
6 Flammable liquids	Category 4	-	Warning	Combustible liquid	Flash point: >60degC and <=93degC
7 Flammable solids	Not applicable	-	-	-	Liquid (GHS definition)
8 Self-reactive substances and mixtures	Not applicable	-	-	-	There are no chemical groups associated with explosive or self-reactive properties present in the molecule.
9 Pyrophoric liquids	Not classified	-	-	-	Flash point: 188degC (Weiss, 2nd, 1986, p400)
10 Pyrophoric solids	Not applicable	-	-	-	Liquid (GHS definition)
11 Self-heating substances and mixtures	Not classified	-	-	-	UNRTDG Class: 6.1
12 Substances and mixtures, which in contact with water, emit flammable gases	Not applicable	-	-	-	The chemical structure of the substance does not contain metals or metalloids(B, Si, P, Ge, As, Se, Sn, Sb, Te, Bi, Po, At).
13 Oxidizing liquids	Not classified	-	-	-	UNRTDG Class: 6.1
14 Oxidizing solids	Not applicable	-	-	-	Liquid (GHS definition)
15 Organic peroxides	Not applicable	-	-	-	Containing no -O-O- structure
16 Corrosive to metals	Not classified	-	-	-	UNRTDG Class: 6.1

Health Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Acute toxicity (oral)	Category 3	Skull and crossbones	Danger	Toxic if swallowed	Calculated based on rat oral LD50 values = 440mg/kg (CERI Hazard Data (1999), EHC 48 (1985), EU-RAR (2002)), 1450mg/kg (CERI Hazard Data (1999)), 205mg/kg (EHC 48 (1985), EU-RAR (2002)), and 106mg/kg (EU-RAR (2002)). Since the calculated values was 188.1mg/kg, it was set as Category 3.
1 Acute toxicity (dermal)	Classification not possible	-	-	-	No data available
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Liquid (GHS definition)
1 Acute toxicity (inhalation: vapour)	Category 1	Skull and crossbones	Danger	Fatal if inhaled	Judging it as vapor from its vapor pressure. Calculated based on rat inhalation LC50 (1 hour) = 64ppm (4 hour equivalent: 0.168mg/L) (CERI Hazard Data (1999), EHC 48 (1985), DFGOT vol4 (1992)), 0.335mg/L (4 hour equivalent: 0.168mg/L) (EU-RAR (2002)), LC50 (4 hours) = 9ppm (equivalent 0.05mg/L) (CERI Hazard Data (1999)), 0.045mg/L (EHC 48 (1985), EU-RAR (2002)) and 0.168mg/L (EU-RAR (2002)). Calculated value is 0.0748mg/L, and it was classified as Category 1 based on the equivalent of this value at 14ppm.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2 Skin corrosion / irritation	Category 1A-1C	Corrosion	Danger	Causes severe skin burns and eye damage	Based on descriptions that it has strong irritative and corrosive effect on human skin (CERI Hazard Data (1999)) and that necrosis was seen in rabbit skin application test (CERI Hazard Data (1999), EU-RAR (2002)), it was classified as Category 1A-1C.
3 Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	From description that it had strong stimuli and corrosive effect to an eye and the skin in humans (CERI Hazard Data(1999)), and from description that severe irritation was acknowledged by apply to the eye of the rabbit (CERI Hazard Data (1999) and EU-RAR (2002)), it was set as Category 1.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible; Skin sensitization: Classification not possible	-	-	-	No data available

5	Germ cell mutagenicity	Category 2	Health hazard	Warning	Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	In the dominant lethality test using the mouse it gave negative (EHC 48 (1985), EU-RAR (2002) and CERI Hazard Data (1999)), however, it gave positive in the chromosomal aberration test (IARC 71 (1999) EHC 48 (1985) and CERI Hazard Data (1999)) using myeloid cells of rat and mouse, positive in the mouse spot test (EHC 48 (1985), CERI Hazard Data (1999)) and negative (EU-RAR (2002)). And it gave positive in the chromosomal aberration test (EHC 48 (1985), CERI Hazard Data (1999)) using the rat and the mouse peripheral lymphocytes, and positive in the chromosomal aberration test (IARC 71 (1999)) using the fetal mouse, and there was no report of the in vivo genotoxicity examination with the productive cells. So we classified it as Category 2.
6	Carcinogenicity	Category 1B	Health hazard	Danger	May cause cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	It is classified into A3 according to ACGIH (7th, 2001) and is classified into B-2 according to EPA (2005). And it is classified into 2A according to IARC 71 (1999), into 2 according to EU (2005), and into 2A according to Japan Society for Occupational Health (2005). Therefore, it was set as category 1B.
7	Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Since although fetotoxicity was clearly observed at high dose exposure test in inhalation exposure tests to rats and mice in all pregnant period or 1-13 days of pregnant (EHC 48 (1985), ACGIH (7th, 2001) and the CERI hazard data collection(1999)), details of the test method and effects on mother animals are not clear, therefore, it was classified into Category 2.
8	Specific target organs/systemic toxicity following single exposure	Category 1 (respiratory, central nervous system, liver, kidneys, heart); Category 3 (respiratory tract irritation)	Health hazard	Danger	Cause damage to organs (respiratory, central nervous system, liver, kidneys, heart); May cause respiratory irritation or may cause drowsiness and dizziness (respiratory tract irritation)	According to the descriptions that pulmonary edemas and respiratory disorders are identified in human exposure cases (CERI Hazard Data (1999), EHC 48 (1985), ACGIH (7th, 2001), DFGOT vol4 (1992) and EU-RAR (2002)), that effects on the central nerve systems such as convulsion, coma and paralysis are observed in human exposure cases (CERI Hazard Data(1999), EHC 48 (1985), ACGIH (7th, 2001)), and that kidney or liver tardive or cardiac delayed disorder were observed in human exposure cases (EHC 48 (1985) and ACGIH (7th, 2001)). So it was judged that the target organs were respiratory systems, central nerve systems, kidney, liver and cardiac, and they were all set as Category 1. In addition, such irritant as inflammation of the upper respiratory tract etc., has been identified in low concentrations, too. It was set as Category 3 (respiratory irritant).
9	Specific target organs/systemic toxicity following repeated exposure	Category 2 (lung)	Health hazard	Warning	May cause damage to organs (lung) through prolonged or repeated	Since there was description in the ICSC (J)(1995) that lungs may be risked by effect of repeated exposure, it was judged that lungs were target organ, and classified to as Category 2.
10	Aspiration hazard	Classification not possible	-	-	-	No data available

Environmental Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
11 Hazardous to the aquatic environment (acute)	Category 2	-	-	Toxic to aquatic life	It was classified into Category 2 from 96-hour LC50=7.5mg/L of fishes (Bluegill), and others (EU-RAR, 2002).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since rapidly degrading (28-day decomposition rate of the OECD test guideline 301A: 87% (EU-RAR, 2002)), and less bio-accumulative (log Kow=0.16 (PHYSPROP Database, 2005)).