

GHS Classification

ID125

1,4-Dioxane

CAS 123-91-1

Date Classified: Sep. 20, 2006 (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	-	-	-	Containing no chemical groups with explosive properties
2 Flammable gases	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
3 Flammable aerosols	Not applicable	-	-	-	Not aerosol products
4 Oxidizing gases	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
5 Gases under pressure	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
6 Flammable liquids	Category 2	Flame	Danger	Highly flammable liquid and vapour	The flash point is 12degC (c.c.) (ICSC, 1999) and the boiling point is 101degC, which is classified into Category 2. Classified into Class 3 and Packing Group II (UN#1165) (UN Recommendations on the Transport of Dangerous Goods)
7 Flammable solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
8 Self-reactive substances and mixtures	Not applicable	-	-	-	Containing no chemical groups with explosive or self-reactive properties
9 Pyrophoric liquids	Not classified	-	-	-	Not pyrophoric when in contact with air at ordinary temperatures: the auto-ignition temperature is 180degC (ICSC, 1999)
10 Pyrophoric solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
11 Self-heating substances and mixtures	Classification not possible	-	-	-	Test methods applicable to liquid substances are not available
12 Substances and mixtures, which in contact with water, emit flammable gases	Not applicable	-	-	-	Containing no metals or metalloids (B, Si, P, Ge, As, Se, Sn, Sb, Te, Bi, Po, At)
13 Oxidizing liquids	Not applicable	-	-	-	Organic compounds containing oxygen (but not fluorine and chlorine), with the oxygen bound to carbon and hydrogen (but not to other elements)
14 Oxidizing solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
15 Organic peroxides	Not applicable	-	-	-	Organic compounds containing no "-O-O-" structure
16 Corrosive to metals	Not classified	-	-	-	Classified into Class 3 (UN Recommendations on the Transport of Dangerous Goods, UN#1165)

Health Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Acute toxicity (oral)	Not classified	-	-	-	Based on the LD50 value of 5,559mg/kg calculated from the testing data of rat LD50 (oral route) of 5,170mg/kg (CERI-NITE Hazard Assessment No.13 (2004)), 5,170mg/kg (DFGOT vol. 20 (2005)), 5,200mg/kg (IARC 11 (1976)), 5,345mg/kg (EU-RAR No.21 (2002)), 5,400mg/kg (ACGIH (7th, 2001)), 6,370mg/kg (EU-RAR No.21 (2002)), 6,500mg/kg (EU-RAR No.21 (2002)), 7,300mg/kg (CERI-NITE Hazard Assessment No.13 (2004)), 7,339mg/kg (EU-RAR No.21 (2002)).
1 Acute toxicity (dermal)	Category 5	-	Warning	May be harmful in contact with skin	Based on the rat LD50 (dermal route) of 2,100mg/kg (CERI-NITE Hazard Assessment No.13 (2004)).
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Due to the fact that the substance is "liquid" according to the GHS definition and inhalation of its gas is not expected.
1 Acute toxicity (inhalation: vapour)	Category 3	Skull and crossbones	Danger	Toxic if inhaled	Based on the LC50 value of 9,500ppm, calculated from the testing data of rat LC50 (2-hour inhalation of vapour) of 46mg/L (CERI-NITE Hazard Assessment No.13 (2004)), 51.3mg/L (4 hours) (EU-RAR No.21 (2002)), and 64,858mg/L (2 hours) (CERI Hazard Data 97-13 (1998)), was lower than 90% of the saturated vapour concentration (49,000ppm) under a saturated vapour pressure of 37mmHg (25degC) (equivalent to 4,900Pa (25degC) (HSDB (2005)), the substance was considered as "vapour containing substantially no mist" and was classified based on standard values expressed in
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	Based on the description in the report on animal skin irritation tests: "moderately irritating" (CERI-NITE Hazard Assessment No.13 (2004)) and "causes moderate, reversible irritation" (EU-RAR No.21 (2002)).
3 Serious eye damage / eye irritation	Category 2A-2B	Exclamation mark	Warning	Causes serious eye irritation	The data about human health effects showed clear positive reactions (CERI Hazard Data Book (1998), CERI-NITE Hazard Assessment Report (2004) and RU-RAR No.21 (2002)). However, the severity of positive reactions were seemed not enough to classify as corrosive. Therefore, the substance was classified as Category 2A-2B. From the standpoint of safety, it may be better to classify Category 2A.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible Skin sensitization: Classification not possible	(Respiratory sensitization) - (Skin sensitization) -	(Respiratory sensitization) - (Skin sensitization)	(Respiratory sensitization) - (Skin sensitization) -	Respiratory sensitization: No data available Skin sensitization: Insufficient data available
5 Germ cell mutagenicity	Not classified	-	-	-	Based on the absence of data on germ cell mutagenicity tests and negative data on somatic cell mutagenicity tests in vivo, described in CERI-NITE Hazard Assessment No.13 (2004), ATSDR (2004), EU-RAR (2002). Some in vivo micronucleus tests show positive, which experts consider to be insignificant.
6 Carcinogenicity	Category 2	Health hazard	Warning	Suspected of causing cancer	Due to the fact that the substance is classified as Category R by NTP (2005) and Group 2B by IARC (1999).
7 Toxic to reproduction	Not classified	-	-	-	Based on the description in CERI-NITE Hazard Assessment No.13 (2004): The effects on weight reduction of the embryo and retarded sternal ossification are minimal; their toxicological significance is negligible.

8	Specific target organs/systemic toxicity following single exposure	Category 1 (central nervous system, liver, kidneys) Category 3 (narcotic effects, respiratory tract irritation)	Health hazard and Exclamation mark	Danger Warning	Causes damage to organs (central nervous system, liver, kidneys) (Respiratory tract irritation) May cause respiratory irritation (Narcotic effects) May cause drowsiness or dizziness	Based on the human evidence including "dizziness, headache, nausea, vomiting, pharyngitis, gastralgia, sleepiness, loss of consciousness (if inhaled) (MOE Risk Assessment vol. 2 (2003)), "adverse effects on the central nervous system, liver, kidneys and lung (if inhaled or ingested in high concentrations) (MOE Risk Assessment vol. 2 (2003)), "nasal/throat/pulmonary irritation (EU-RAR No.21 (2002)), and the evidence from animal studies including "apathy, narcotic influence, staggering gait, loss of eyelid reflex, respiratory tract mucous membrane irritation" (EU-RAR No.21 (2002)).
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (kidneys, liver, central nervous system) Category 2 (respiratory organs)	Health hazard	Danger Warning	Causes damage to organs through prolonged or repeated exposure (kidneys, liver, central nervous system) May cause damage to organs through prolonged or repeated exposure (respiratory organs)	Based on the human evidence including "hemorrhagic nephritis, renal/hepatic necrosis" (CER/NITE Hazard Assessment No.13 (2004)), "hypertonia, neurological symptoms, renal failure, renal cortex necrosis associated with severe interstitial hemorrhage, severe centrolobular hepatocyte necrosis, demyelination, partial loss of nerve fibers" (EU-RAR No.21 (2002)), and the evidence from animal studies including "degeneration and reproduction of the renal tubular epithelium, degeneration and necrosis of hepatocytes, hepatocyte hyperplasia, degeneration of the respiratory epithelium (CER/NITE Hazard Assessment No.13 (2004)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for 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)	Not classified	-	-	-	It was classified into Not classified from 96 hours LC50>100mg/L of the fish (<i>Oryzias Latipest</i>) (MOE eco-toxicity tests of chemicals (1995) and others).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since it was not water-insolubility (the water-solubility =1.00*106mg/L (PHYSROP Database, 2005)), and acute toxicity was low, it was classified into Not classified.