

GHS Classification

ID50

Nitrobenzene

CAS 98-95-3

Date Classified: Jul. 24, 2006 (Environmental Hazards: Mar. 31, 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 classified	-	-	-	Cannot be classified due to lack of data. However, the substance could be classified as "Explosives" since it contains nitro groups with its oxygen budget calculated at -162; the decomposition energy is 1.76kJ/g, though the kick-off temperature is 280degC (Bretherick (J) (5th, 1998)). Classified into Division 6.1 (UN#1662) (UN Recommendations on the Transport of Dangerous Goods)
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 4	-	Warning	Combustible liquid	The flash point is 88degC (c.c.) (ICSC, 2004), which is classified into Category 4.
7 Flammable solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
8 Self-reactive substances and mixtures	Not classified	-	-	-	Not classified as self-reactive substances given the kick-off temperature of 280degC(Bretherick (J) (5th, 1998)) (though containing nitro groups). Classified into Division 6.1 (UN#1662) (UN Recommendations on the Transport of Dangerous Goods)
9 Pyrophoric liquids	Not classified	-	-	-	Not pyrophoric when in contact with air at ordinary temperatures: the auto-ignition temperature is 480degC (ICSC, 2004))
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 classified	-	-	-	No data available, though being organic compounds containing oxygen bound to elements other than carbon and hydrogen. Classified into Division 6.1 (UN#1662) (UN Recommendations on the Transport of Dangerous Goods)
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 Division 6.1 (UN#1662) (UN Recommendations on the Transport of Dangerous Goods)

Health Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Acute toxicity (oral)	Category 4	Exclamation mark	Warning	Harmful if swallowed	Based on the LD50 value of 444mg/kg calculated from the testing data of rat LD50 (oral route) of 600mg/kg, 780mg/kg (CERI Hazard Data 96-40 (1997)), 640mg/kg (CERI-NITE Hazard Assessment No.6 (2004)) and 349mg/kg (MOE Risk Assessment vol. 2 (2003)).
1 Acute toxicity (dermal)	Category 3	Skull and crossbones	Danger	Toxic in contact with skin	Based on the rabbit LD50 (dermal route) value of 760mg/kg representing the lower of the two testing data, 2,100mg/kg and 760mg/kg (EHC 230 (2003)).
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: dust, mist)	Classification not possible	-	-	-	No data available
1 Acute toxicity (inhalation: dust, mist)	Category 4	Exclamation mark	Warning	Harmful if inhaled	Based on the testing data of rat LC50 (inhalation of dust/mist) of 2.92mg/L (MOE Risk Assessment vol. 2 (2003)) exceeded 90% of the saturated vapour concentration (1.62mg/L) under a saturated vapour pressure of 0.245mmHg (25degC) (MOE Risk Assessment vol. 2 (2003)), the substance was considered as "dust/mist."
2 Skin corrosion / irritation	Category 3	-	Warning	Causes mild skin irritation	Based on the description in the report on rabbit skin irritation tests (exposure duration unknown) (EHC 230 (2003)): "The test animals exhibited scores of '1' (only slight erythema which was barely noticed at 24 hours; the reactions resolved at 48, 72, 96 hours, i.e., scores of '0')." Also based on the description in PATTY (4th, 1999) of human effects: "The substance induced irritation of the eye and skin." The substance is thus considered
3 Serious eye damage / eye irritation	Category 2B	-	Warning	Causes eye irritation	Based on the description in the report on rabbit eye irritation tests (EHC 230 (2003)): "Application of 0.05mL to lower part of the eyelid produced slight effects." Also based on the description in PATTY (4th, 1999) of human effects: "The substance induced irritation of the eye and skin." The substance is thus considered a mild eye irritant.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible Skin sensitization: Not classified	(Respiratory sensitization) - (Skin sensitization) -	(Respiratory sensitization) - (Skin sensitization)	(Respiratory sensitization) - (Skin sensitization) -	Respiratory sensitization: No data available Skin sensitization: Based on the description in the report on guinea pig skin sensitization tests (EHC 230 (2003) and IUCILID (2000)): "Skin sensitization: negative."
5 Germ cell mutagenicity	Not classified	-	-	-	Based on the absence of data on multi-generation mutagenicity tests, germ cell mutagenicity tests in vivo, and negative data on somatic cell mutagenicity tests in vivo (chromosome aberration tests), described in NITE Initial Risk Assessment No.6 (2005), IARC 65 (1996), EHC 230 (2003) and NTP DB (Access on Feb., 2006).
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), Category A3 by ACGIH (2001) and Group 2B by IARC (1996).
7 Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Based on the evidence of adverse effects on fertility due to testicular toxicity, described in NITE Initial Risk Assessment No.6 (2005), MOE Risk Assessment vol. 2 (2003) and EHC 230 (2003).

8	Specific target organs/systemic toxicity following single exposure	Category 1 (nervous system, blood system, testes, liver, kidneys)	Health hazard	Danger	Causes damage to organs (nervous system, blood system, testes, liver, kidneys)	Based on the human evidence: "the toxic symptoms began with headache, dizziness and nausea followed shortly by loss of consciousness and coma; a 19-year-old woman who ingested 50mL became unconsciousness and had cyanosis 30 minutes after ingestion; the blood methemoglobin level rose to 82% in 90 minutes." "moderate jaundice and elevated bilirubin/AST/ALT levels were detected on day 6" (CERI-NITE Hazard Assessment No.6 (2004)). Also based on the evidence from animal studies including "increased methemoglobin" (CERI Hazard Data 98-40 (1997)), "hypertrophy of hepatocyte nucleolus, centrilobular necrosis, spermatocyte necrosis, polykaryocyte formation of seminiferous epithelial cells" (CERI-NITE Hazard Assessment No.6 (2004)), "necrosis of hepatic lobules; slight swelling of glomerulus and renal tubular epithelium" (EHC 230 (2003)), "malacia and gliosis of cerebellum brachium" (CERI-NITE Hazard Assessment No.6 (2004)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1 (blood system, testes, liver, kidneys) and Category 2 (central nervous system).
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (nervous system, blood system, liver, thyroid gland, respiratory organs, testes, adrenal, kidneys)	Health hazard	Danger	Causes damage to organs through prolonged or repeated exposure (nervous system, blood system, liver, thyroid gland, respiratory organs, testes, adrenal, kidneys)	Based on the human evidence including "depression and excitement" (CERI Hazard Data 98-40 (1997)), "severe headache, dizziness, paralysis of the lower limbs, depression and excitement, loss of appetite, cyanosis, methemoglobinemia, jaundice, hepatopathy, hypotension and hyperalgesia" (CERI-NITE Hazard Assessment No.6 (2004)), and the evidence from animal studies including "bronchiolization of alveolar wall, hypertrophy of centrilobular hepatocytes, hyperplasia of follicular epithelial cells in the thyroid gland, formation of multinucleated hepatocytes: female; reduced RBC/hematocrit/hemoglobin levels, bronchiolization of alveolar wall, nasal degeneration/inflammatory lesion, elevated blood methemoglobin levels," "seminiferous tubular epithelial degeneration and a decrease in/lack of sperm count in epididymis," "necrosis/gliosis of the central nervous system" (CERI-NITE Hazard Assessment No.6 (2004)), "dose-dependent increase in the adrenal reticular vacuolation" (MOE Risk Assessment vol. 2 (2003)), "cyst of the kidney" (EHC 230 (2003)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1 (blood system, liver, thyroid gland, respiratory organs, testes, adrenal, kidneys) and Category 2 (central nervous system).
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 hours LC50=6.7mg/L of the crustacea (Mysid Shrimp) (EHC230, 2003).
11 Hazardous to the aquatic environment (chronic)	Category 2	Environment	-	Toxic to aquatic life with long lasting effects	Although acute toxicity was Category 2 and the bio-accumulation potential was low (BCF=7.7(Existing Chemical Safety Inspections Data)), since there was no rapidly degrading (the decomposition by BOD: 3.3%(Existing Chemical Safety Inspections Data)), it was classified into Category 2.