

## GHS Classification

**ID189**

**Hexamethylenediamine**

**CAS 124-09-4**

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 applicable	—	—	—	Containing no chemical groups with explosive properties
2 Flammable gases	Not applicable	—	—	—	Classified as "solid" according to GHS definition
3 Flammable aerosols	Not applicable	—	—	—	Not aerosol products
4 Oxidizing gases	Not applicable	—	—	—	Classified as "solid" according to GHS definition
5 Gases under pressure	Not applicable	—	—	—	Classified as "solid" according to GHS definition
6 Flammable liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
7 Flammable solids	Not classified	—	—	—	Classified as "flammable" by ICSC (2004). Classified into Class 8 (UN#2280 (solid)) (UN Recommendations on the Transport of Dangerous Goods).
8 Self-reactive substances and mixtures	Not applicable	—	—	—	Containing no chemical groups with explosive or self-reactive properties
9 Pyrophoric liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
10 Pyrophoric solids	Not classified	—	—	—	Not pyrophoric when in contact with air at ordinary temperatures: the auto-ignition temperature is 305degC (ICSC, 2004).
11 Self-heating substances and mixtures	Classification not possible	—	—	—	Test methods applicable to liquid substances are not available (melting point: 23 - 41degC (ICSC 2004), test temperature: 140degC).
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	—	—	—	Classified as "solid" according to GHS definition
14 Oxidizing solids	Not applicable	—	—	—	Organic compounds containing no oxygen, fluorine and chlorine
15 Organic peroxides	Not applicable	—	—	—	Organic compounds containing no "O-O-" structure
16 Corrosive to metals	Classification not possible	—	—	—	Cannot be classified due to lack of data, though the substance acts on many metals in the presence of water according to ICSC (2004). Classified into "Corrosive Substances" by the UN Recommendations on the Transport of Dangerous Goods. However, the category includes skin corrosivity, and it is unclear whether the substance is classified as "metal" corrosive (UN#2280 (solid)).

## 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 772mg/kg calculated from the testing data of rat LD50 (oral route) of 980mg/kg (CERI Hazard Data 98-6 (1999)), 1,127mg/kg (SIDS (1996)), 750mg/kg (MOE Risk Assessment vol. 3 (2004)) and 800mg/kg (SIDS (1996)).
1 Acute toxicity (dermal)	Category 4	Exclamation mark	Warning	Harmful in contact with skin	Based on the rabbit LD50 (dermal route) value of 1,110mg/kg (ACGIH (7th, 2001)).
1 Acute toxicity (inhalation: gas)	Not applicable	—	—	—	Due to the fact that the substance is "solid" according to the GHS definition and inhalation of its gas is not expected.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	—	—	—	Insufficient data available
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	—	—	—	Insufficient data available
2 Skin corrosion / irritation	Category 1A-1C	Corrosion	Danger	Causes severe skin burns and eye damage	Based on the description in the report on several skin irritation tests with rabbits (SIDS (1996)): "Corrosive" (though the results are not those of 4-hour application). Also based on the description of the human health effects (MOE Risk Assessment vol. 3 (2004)): "Corrosive to the eye, skin and respiratory tract." The substance should be placed in Category 1A from the viewpoint of safety if further subclassification is needed.
3 Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	Based on the description in the report on eye irritation tests with rabbits (SIDS (1996)): "Corrosive." Also based on the description of the human health effects (MOE Risk Assessment vol. 3 (2004)): "Corrosive to the eye, skin and respiratory tract."
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible Skin sensitization: Category 1	(Respiratory sensitization) — (Skin sensitization) Exclamation mark	(Respiratory sensitization) — (Skin sensitization) Warning	(Respiratory sensitization) — (Skin sensitization) May cause an allergic skin reaction	Respiratory sensitization: No data available Skin sensitization: Based on the description of the human health effects: "Skin sensitization: positive." "induces allergic dermatitis." The substance is thus considered to possess a potential for sensitization for human skin, though guinea pig skin sensitization tests show negative (CERI Hazard Data 98-6 (1999) and SIDS (1996)).
5 Germ cell mutagenicity	Not classified	—	—	—	Based on the absence of data on multi-generation mutagenicity tests and germ cell mutagenicity tests in vivo, and negative data on somatic cell mutagenicity tests in vivo (chromosome aberration tests), described in SIDS (1996) and NTP DB (Access on March 2006).
6 Carcinogenicity	Classification not possible	—	—	—	Classification not possible given the insufficiency of data for use in classification, along with the absence of existing classification.
7 Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Based on the evidence of reduced birth rates and delayed ossification in the filial generation at doses causing parental toxicity, described in MOE Risk Assessment vol. 3 (2004), ACGIH (7th, 2001) and SIDS (1996).

8	Specific target organs/systemic toxicity following single exposure	Category 2 (respiratory organs, nervous system, kidneys)	Health hazard	Warning	Causes damage to organs (respiratory organs, nervous system, kidneys)	Based on the human evidence: "corrosive to the eye, skin and respiratory tract; inhalation may cause pulmonary edema." (ICSC (1998)), and the evidence from animal studies including "reduced locomotor activity, salivation, diarrhea and tremor; congestion of the kidney observed at necropsy" (CERI Hazard Data 98-6 (1996)), "decreased mobility, hyperpnoea and tremor" (SIDS (1996)). The ICSC study provides some evidence of human health effects under the heading of short-term exposure. However, the substance is classified into Category 2 since the priority rating of the study is 2, together with the absence of supporting case reports and information as to whether the effects are those of single exposure. The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 2.
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (respiratory organs, liver) Category 2 (blood system, kidneys)	Health hazard	Danger Warning	Causes damage to organs through prolonged or repeated exposure (respiratory organs, liver) May cause damage to organs through prolonged or repeated	Based on the human evidence including "irritation of the conjunctiva/upper respiratory tract and acute hepatitis" (CERI Hazard Data 98-6 (1999)), and the evidence from animal studies including "increased number of inflammatory cells in the nasal cavity, squamous epithelial hyperplasia of the respiratory epithelium, squamous epithelial hyperplasia and inflammatory cellular infiltration of the subepithelium in the trachea; alveolar decay, interstitial fibrosis, infiltration of the inflammatory cells in the lung" (CERI Hazard Data 98-6 (1999)), "sneezing, nasal catarrh and rale," "anemia accompanied by decreased WBC, degenerative changes in the kidney and liver" (SIDS (1996)). 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)	Category 3	-	-	Harmful to aquatic life	It was classified into Category 3 from 72 hours ErC50=19mg/L of the algae (Selenastrum) (MOE Eco-Toxicity Tests of Chemicals (2002) and others.).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since there was rapidly degrading (the decomposition by TOC: 96.9%(Existing Chemical Safety Inspections Data)) and the bio-accumulation was low (log Kow=0.35(PHYSPROP Database, 2005)), it was classified into Not classified.