

GHS Classification

ID97

Ethylenediamine

CAS 107-15-3

Date Classified: Apr. 20, 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 "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 3	Flame	Warning	Flammable liquid and vapour	The flash point is 34degC (c.c.) (ICSC, 2003) which is classified into Category 3. Classified into Class 3 and Class 8 (UN#1604) (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 385degC (ICSC, 2003)
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 no oxygen, fluorine and chlorine
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	Classification not possible	-	-	-	No data available. Corrosivity to metals remains uncertain, though classified as "corrosive substances" (as the classification based on UN Recommendations on the Transport of Dangerous Goods includes "skin corrosivity") (UN#1604).

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 860mg/kg calculated from the testing data of rat LD50 (oral route) of 637mg/kg, 1,500mg/kg, 1,850mg/kg. (SIDS (2003)), and 1,160mg/kg. (ACGIH (7th 2001)).
1 Acute toxicity (dermal)	Category 3	Skull and crossbones	Danger	Toxic in contact with skin	Based on the testing data of rabbit LD50 (dermal route) of 560 mg/kg representing the lower of the two testing data, 560mg/kg (SIDS (2003)) and 657mg/kg (ACGIH (7th 2001)).
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)	Not classified	-	-	-	Based on an LC50 value (8 hours) of over 29 mg/L (SIDS (2003)) calculated from testing data of rat (inhalation of vapour). The LC50 value (4 hours equivalent) is calculated at over 58 mg/L. The saturated vapour concentration under a saturated vapor pressure of 1.7kPa (25degC) (SIDS (2003)) stands at 17,000 ppm, which is converted into 41 mg/L (1 ppm=2.46 mg/m3 (25degC)). The LC50 value calculated (over 58 mg/L) exceeds the saturated vapour concentration. The substance, under the test conditions, is considered "mist" and hence not classified according to the criteria
2 Skin corrosion / irritation	Category 1A-1C	Corrosion	Danger	Causes severe skin burns and eye damage	Based on the description in the report on rabbit temporary skin irritation tests (CICAD 15 (1999), SIDS (2003)): Exposure to ethylene diamine (for 6-12 minutes to 70% solution and for 24 hours to undiluted solution) causes dermal necrosis; the substance is considered "corrosive" to skin, though the results are not those of 4-hour application. Although classified into 1A-1C, as the 6-12 minute application of 70% solution suggests "corrosiveness," the substance is should be placed in Category 1A from the viewpoint of safety.
3 Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	Based on the description in the report on rabbit eye irritation tests (ACGIH (7th, 2001), CICAD 15 (1999), SIDS (2003)): Administration of eye drops (undiluted solution) causes permanent damage to the eyes; the substance is considered to have "irreversible effects" on the eyes.
4 Respiratory/skin sensitization	Respiratory sensitization: Category 1 Skin sensitization: Category 1	(Respiratory sensitization) Health hazard (Skin sensitization) Exclamation mark	(Respiratory sensitization) Danger (Skin sensitization) Warning	(Respiratory sensitization) May cause allergic or asthmatic symptoms or breathing difficulties if inhaled (Skin sensitization) May cause allergic skin reaction	Respiratory sensitization: based on the classification by the Japan Society for Occupational Health and the Japanese Society of Occupational Allergy (Respiratory Sensitizing Substances). Based on the description in the report on respiratory sensitization (CICAD 15 (1999), SIDS (2003)): Occupational exposure to ethylene diamine causes asthma; the substance is considered to cause "respiratory sensitization." Skin sensitization: based on the classification by the Japan Society for Occupational Health and the Japanese Society of Occupational Allergy (Skin Sensitizing Substances). Based on the description in the report on human skin sensitization (CICAD 15 (1999), SIDS (2003), MOE Risk Assessment vol. 3 (2004)) and guinea pig skin sensitization (CICAD 15 (1999), SIDS (2003)): Patch tests on dermatitis patients show positive, as do guinea pig skin sensitization tests. The substance is thus considered to cause "skin sensitization."
5 Germ cell mutagenicity	Not classified	-	-	-	Based on the negative data on multi-generation mutagenicity tests (dominant lethal tests), the absence of data on germ cell mutagenicity tests in vivo, and the absence of data on somatic cell mutagenicity tests in vivo, described in CER1 Hazard Data 99-20 (1999), SIDS (2001).
6 Carcinogenicity	Not classified	-	-	-	Due to the fact that the substance is classified as Category A4 by ACGIH (2005).
7 Toxic to reproduction	Classification not possible	-	-	-	Insufficient data available

8	Specific target organs/systemic toxicity following single exposure	Category 1 (blood system, kidneys, respiratory organs)	Health hazard	Danger	Causes damage to organs (blood system, kidneys, respiratory organs)	Based on the human evidence including "tingling sensation on the face, mild irritation to the eyes and nasal mucosa," "corrosive damage to the eye/skin/respiratory tract, pulmonary edema (with inhalation of the vapor or mist)" (MOE Risk Assessment vol. 3 (2004)), "erythema, anuria, tachycardia, an increase in blood potassium concentrations, irritating cough associated with phlegm, gastralgia associated with diarrhea, vomiting, nephropathy associated with hemolysis and anuria, fatal hyperkalemia" (CERI Hazard Data 99-20 (2000)).
9	Specific target organs/systemic toxicity following repeated exposure	Category 2 (liver, kidneys, visual organs)	Health hazard	Warning	May cause damage to organs through prolonged or repeated exposure (liver, kidneys, visual organs)	Based on the evidence from animal studies including "cloudy swelling of the liver/convoluted renal tubules," "cataract, conjunctivitis, retinal atrophy" (MOE Risk Assessment vol. 3 (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)	Category 2	-	-	Toxic to aquatic life	It was classified into Category 2 from 48 hours LC50=3mg/L of the crustacea (<i>Daphnia magna</i>) (SIDS, 2003).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since there was rapidly degrading (the decomposition by BOD: 94% (Existing Chemical Safety Inspections Data)) and the bio-accumulation was low ($\log K_{ow} = -2.04$ (PHYSPROP Database, 2005)), it was classified into Not classified.