

## GHS Classification

**ID60**

**CAS 108-45-2**

**m-Phenylenediamine**

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 ICSG (2004). Classified into Division 6.1 (UN#1630-m-p) (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 560degC (ICSC,2004).
11 Self-heating substances and mixtures	Classification not possible	-	-	-	Test methods applicable to liquid substances are not available (melting point: 62-63degC (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	-	-	-	Test methods applicable to solid substances are not available

## 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	Based on the LD50 value of 204mg/kg calculated from the testing data of rat LD50 (oral route) of 204mg/kg (CERI Hazard Data 98-29 (1999)), 650mg/kg (IARC 16 (1978)) and 280mg/kg (MOE Risk Assessment vol. 3 (2004)).
1 Acute toxicity (dermal)	Category 4	Exclamation mark	Warning	Harmful in contact with skin	Based on the rat LD50 (dermal route) of 1,100mg/kg (CERI Hazard Data 98-29 (1999)).
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	-	-	-	No data available
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	Based on the evidence of "mild to moderate irritation" from rabbit skin irritation tests (ACGIH (7th, 2001) and CERI Hazard Data 98-29 (1999)). Also based on the description of human health effects (ACGIH (7th, 2001), CERI Hazard Data 98-29 (1999) and MOE Risk Assessment vol. 3 (2004)): "skin irritant."
3 Serious eye damage / eye irritation	Category 2A-2B	Exclamation mark	Warning	Causes serious eye irritation	Based on the description in the report on rabbit eye irritation tests (CERI Hazard Data 98-29 (1999)): "conjunctival injection and corneal opacity were observed." Also based on the description of human health effects (MOE Risk Assessment vol. 3 (2004)): "irritating to the eye." The substance is thus considered an eye irritant (though the severity of the effects is unknown). It should be placed in Category 2A from the viewpoint of safety if further subclassification is needed.
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 in the report on guinea pig skin sensitization tests (CERI Hazard Data 98-29 (1999)): "Skin sensitization: positive." Also CERI Hazard Data 98-29 (1999), PATTY (4th, 1999) and MOE Risk Assessment vol. 3 (2004) contain descriptions that indicate a potential to cause skin sensitization in humans. Also due to the fact that the substance is classified into "Skin Sensitizing Substance" by the ad hoc committee of the Japanese Society of Occupational Allergy and "Skin Sensitizing Substance: Group 1" by the Japan Society for Occupational Health.
5 Germ cell mutagenicity	Category 2	Health hazard	Warning	Suspected of causing genetic defects	Based on negative data on multi-generation mutagenicity tests (dominant lethal tests), the absence of data on germ cell mutagenicity tests in vivo and germ cell genotoxicity tests in vivo, and positive data on somatic cell mutagenicity tests in vivo (micronucleus tests), described in CERI Hazard Data 98-29 (1999) and NTP DB (Access on March 2006).
6 Carcinogenicity	Not classified	-	-	-	Due to the fact that the substance is classified as Category A4 by ACGIH (2001) and Group 3 by IARC (1987).
7 Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Based on the evidence of minor anomaly in filial generation at doses inducing maternal toxicity, described in MOE Risk Assessment vol. 3 (2004).
8 Specific target organs/systemic toxicity following single exposure	Category 2 (central nervous system, respiratory organs)	Health hazard	Warning	Causes damage to organs (central nervous system, respiratory organs)	Based on the human evidence including "airway edema" (IUCILID (2000)) and the evidence from animal studies including "acute pulmonary edema following dermal exposure" (RTECS (2004)), "clonic convulsion" and "cyanosis" (IUCILID (2000)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1. However, as the referenced study is rated as Priority 2, which does not meet the specified criterion 1b (iii), the substance is classified as Category 2 in accordance with the technical guideline.

9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (nervous system, liver, kidneys, bladder) Category 2 (cardiovascular system, blood system, respiratory organs)	Health hazard	Danger Warning	Causes damage to organs through prolonged or repeated exposure (nervous system, liver, kidneys, bladder) May cause damage to organs through prolonged or repeated exposure (cardiovascular system, blood system,	Based on the human evidence including "abnormal reflex, hyperesthesia of the skin, pathological changes on the kidneys and liver," "death from sub-acute hepatatrophy with jaundice" (MOE Risk Assessment vol. 3 (2004)), "fibrosis in the lung, thickening of finger skin," "reflux esophagitis, leg edema, bradycardia, cardiac block, sclerodactylia, dilatation of peripheral vessels of fingers, fibrosis in the lung, esophageal dilatation," "death from hepatatrophy with jaundice" (IUCILID (2000)), "mucosal edema of the bladder, polypous swelling, cellular infiltration (eosinophilic leukocyte) in the bladder triangle area and cervix" (ACGIH (7th, 2001)), and the evidence from animal studies including "increased degeneration of the liver accompanied by pyknosis of hepatocytes" (ACGIH (7th, 2001)), "sedation, methemoglobinemia" (MOE Risk Assessment vol. 3 (2004)), "damage to the liver and central nervous system" (IUCILID (2000)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Categories 1 and 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 EC50=2.0mg/L of the crustacea (Daphnia magna) (MOE eco-toxicity tests of chemicals (2001) and others.).
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=24(Existing Chemical Safety Inspections Data)), since there was no rapidly degrading (the decomposition by BOD: 2%(Existing Chemical Safety Inspections Data)), it was classified into Category 2.