

GHS Classification

ID59

CAS 106-50-3

Physical Hazards

p-Phenylenediamine

Date Classified: Jul. 24, 2006 (Environmental Hazards: Mar. 31, 2006)

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#1673(σ-,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 400degC (ICSC,2004)
11 Self-heating substances and mixtures	Not classified	-	-	-	Classified into Division 6.1 (UN#1673(σ-,m-,p-)) (UN Recommendations on the Transport of Dangerous Goods)
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 rat LD50 (oral route) value of 80mg/kg representing the lower of the two testing data, 80mg/kg and 98mg/kg (CERI Hazard Data 2001-31 (2002)).
1 Acute toxicity (dermal)	Not classified	-	-	-	Based on the rabbit LD50 (dermal route) of >5,000mg/kg (CERI Hazard Data 2001-31 (2002)).
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
1 Acute toxicity (inhalation: dust, mist)	Category 5	-	Warning	May be harmful if inhaled	Based on the rat LC50 (inhalation of dust) value of 920mg/L (4 hours) (CERI Hazard Data 2001-31 (2002)).
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	Based on the description in the report on skin irritation tests in rabbits and guinea pigs (CERI Hazard Data 2001-31 (2002) and DFGOT vol.6 (1994)); "mild to moderate irritation" (though the results are not those of 4-hour application). Also based on the description in DFGOT vol.6 (1994) of human health effects: "mildly irritating."
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 (CERI Hazard Data 2001-31 (2002)): "The substance induced moderate conjunctivitis, with effects resolving by 24 hours." Also based on the description of human health effects (CERI Hazard Data 2001-31 (2002), MOE Risk Assessment vol. 3 (2004), PATTY (4th, 1999) and DFGOT vol.6 (1994)): "The substance produces severer symptoms in humans including pain and burning sensation in the eyeball followed by erythema and swelling of lid margin along with chemosis and injection of conjunctiva. In some cases, corneal epithelial erosion, iritis and iridocyclitis, while in more serious cases, corneal ulceration are observed, which may develop into visual impairment and blindness."
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 allergy or asthma symptoms or breathing difficulties if inhaled (Skin sensitization) May cause an allergic skin reaction	Respiratory sensitization: Based on the description of human health effects in CERI Hazard Data 2001-31 (2002), MOE Risk Assessment vol. 3 (2004) and PATTY (4th, 1999); "asthmatic symptoms were observed following exposure to p-phenylenediamine." Skin sensitization: Based on the description in the report on a number of skin sensitization tests in guinea pigs (CERI Hazard Data 2001-31 (2002) and DFGOT vol.6 (1994)); "Skin sensitization: positive." Also based on the description of human health effects in CERI Hazard Data 2001-31 (2002), PATTY (4th, 1999) and DFGOT vol.6 (1994): "The substance possesses a potential for sensitization for human skin. 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 Japanese Society of Contact Dermatitis, and "Skin Sensitizing Substance: Group 1" by the Japan Society for Occupational Health.
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 (micronucleus tests), described in IARC 16 (1978) and PATTY (4th, 2000).
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	Not classified	-	-	-	Based on no evidence of adverse effects on fertility of parental generation and development of filial generation, described in MOE Risk Assessment vol. 3 (2004) and CERI Hazard Data 2001-31 (2002).

8	Specific target organs/systemic toxicity following single exposure	Category 1 (muscles, kidneys)	Health hazard	Danger	Causes damage to organs (muscles, kidneys)	Based on the human evidence including "acute renal failure due to rhabdomyolysis" (MOE Risk Assessment vol. 3 (2004)), "necrosis of the muscle tissue," "rhabdomyolysis" (CERI Hazard Data 2001-31 (2002)), "rhabdomyolysis" (ACGIH (7th, 2001)), and the evidence from animal studies including "rhabdomyolysis," "necrosis of the skeletal muscles" (CERI Hazard Data 2001-31 (2002)), "died from acute renal failure caused by rhabdomyolysis" (MOE Risk Assessment vol. 3 (2004)), "kidney damage is due to distal renal tubular blockage caused by myoglobin cast" (HSDB (2005)). Although kidney effects are considered secondary, renal failure can be a direct cause of death, so it was included in the target organ list. The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1.
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (liver, nervous system, heart) Category 2 (skeletal muscles)	Health hazard	Danger Warning	Causes damage to organs through prolonged or repeated exposure (liver, nervous system, heart) May cause damage to organs through prolonged or repeated exposure (skeletal)	Based on the human evidence including "hypertrophy of the liver and spleen, and progressive neurological symptoms were observed: dizziness, gastritis, diplopia, asthenia, desquamative dermatitis were also noted," "jaundice and sub-acute hepatopathy" (CERI Hazard Data 2001-31 (2002)), and the evidence from animal studies including "degeneration of skeletal muscles" (MOE Risk Assessment vol. 3 (2004)), "degeneration of myocardial parenchyma" (ACGIH (7th, 2001)). 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 1	Environment	Warning	Very toxic to aquatic life	It was classified into Category 1 from 96 hours LC50=0.06mg/L of the fish (Fathead Minnows) (CERI Hazard Data, 2002).
11 Hazardous to the aquatic environment (chronic)	Category 1	Environment	Warning	Very toxic to aquatic life with long lasting effects	Although acute toxicity is Category 1 and bio-accumulation is low (BCF=98(Existing Chemical Safety Inspections Data,)), since there was no rapidly degrading (the decomposition by BOD: 5%(Existing Chemical Safety Inspections Data)), it was classified into Category 1.