

GHS Classification

ID995

Morpholine

CAS 110-91-8

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	-	-	-	There are no chemical groups associated with explosive properties present in the molecules.
2 Flammable gases	Not applicable	-	-	-	Liquid (GHS definition)
3 Flammable aerosols	Not applicable	-	-	-	Not aerosol products
4 Oxidizing gases	Not applicable	-	-	-	Liquid (GHS definition)
5 Gases under pressure	Not applicable	-	-	-	Liquid (GHS definition)
6 Flammable liquids	Category 3	Flame	Warning	Flammable liquid and vapour	Flash point: >=23degC and <=60degC
7 Flammable solids	Not applicable	-	-	-	Liquid (GHS definition)
8 Self-reactive substances and mixtures	Not applicable	-	-	-	There are no chemical groups associated with explosive or self-reactive properties present in the molecule.
9 Pyrophoric liquids	Not classified	-	-	-	Flash point: 255degC (Hommel, 1991 Card No.139)
10 Pyrophoric solids	Not applicable	-	-	-	Liquid (GHS definition)
11 Self-heating substances and mixtures	Not classified	-	-	-	UNRTDG Class: 8, Subsidiary risks Class: 3
12 Substances and mixtures, which in contact with water, emit flammable gases	Not applicable	-	-	-	The chemical structure of the substance does not contain metals or metalloids(B, Si, P, Ge, As, Se, Sn, Sb, Te, Bi, Po, At).
13 Oxidizing liquids	Not applicable	-	-	-	Organic compounds containing oxygen (but not chlorine and fluorine) chemically bonded only to carbon and hydrogen (but not to other elements).
14 Oxidizing solids	Not applicable	-	-	-	Liquid (GHS definition)
15 Organic peroxides	Not applicable	-	-	-	Containing no -O-O- structure
16 Corrosive to metals	Classification not possible	-	-	-	Although it is classified into the class 8 in UNRTDG, identification with skin corrosivity cannot be performed. Moreover, although there is information that it corrodes metal (HSDB (2006)), there is no data by standard test methods.

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	Rat LD50 value: 1450mg/kg (MOE Risk Assessment vol.4, 2005), 1050mg/kg (EHC 179, 1996, ACGIH 7th, 2001, PATTY 4th, 1994, IARC 47, 1989), 1600mg/kg (EHC 179, 1996, PATTY 4th, 1994, IARC 47, 1989), 1900mg/kg (EHC 179, 1996), 1420mg/kg (PATTY 4th, 1994) and 1610mg/kg (PATTY 4th, 1994). Based on the data above, the value of LD50:1287mg/kg was calculated and it was classified as category 4.
1 Acute toxicity (dermal)	Category 3	Skull and crossbones	Danger	Toxic in contact with skin	Since calculated LD50 was 386.4mg/kg, it was set as Category 3. Calculated based on rabbit LD50 value: 500ul/kg (reduced value: 503.5mg/kg, EHC 179, 1996, ACGIH 7th, 2001, IARC 47, 1989, PATTY 4th, 1994), 310 - 810mg/kg (PATTY 4th, 1994), and 1210mg/kg (PATTY 4th, 1994).
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Liquid (GHS definition)
1 Acute toxicity (inhalation: vapour)	Category 3	Skull and crossbones	Danger	Toxic if inhaled	Rat inhalation LC50 value (4 hours) is 7.8mg/L (equivalent: 2192ppm) (EHC 179, 1996, PATTY 4th, 1994, International Agency for Res. on Cancer 47, 1989). With this concentration, the steam can be judged to be with almost no mist from its vapor pressure, and was classified as Category 3 by the ppm concentration standard value.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2 Skin corrosion / irritation	Category 1A-1C	Corrosion	Danger	Causes severe skin burns and eye damage	There are statements that it has the moderate irritation to human skin (ACGIH 7th, 2001, PATTY 4th, 1994), and that it may cause redness, a pain, a burn, a blister and shows caustic when attached to the skin (MOE Risk Assessment the 4th volume, 2005). On the other hand, from description that a severe necrosis, chemical burn and inflammation are acknowledged by cutaneous administration to rabbits, and it has caustic (EHC 179, 1996, PATTY 4th, 1994, International Agency for Res. on Cancer 47, 1989, ACGIH 7th, 2001) it was set as Category 1A-1C.
3 Serious eye damage / eye irritation	Category 2A	Exclamation mark	Warning	Causes serious eye irritation	Based on the description that the edema of membrana mucosa, corneal opacity, and staphyloma were acknowledged when applied to the eyes of the rabbits (EHC 179, 1996), on the description that severe irritation was acknowledged when eyedrop was applied in the solution diluted to 1-40% (EHC 179, 1996, International Agency for Res. on Cancer 47, 1989, PATTY 4th, 1994), and on the description that the solution of this product developed edema to the cornea of the human eyes (International Agency for Res. on Cancer 47, 1989), and on the description that it had severe irritant property (ACGIH 7th, 2001, International Agency for Res. on Cancer 47, 1989, PATTY 4th, 1994). So we classified it as Category 2A.

4	Respiratory/skin sensitization	Respiratory sensitization: Classification not possible; Skin sensitization: Classification not possible	-	-	-	Respiratory organ: No data. Skin: Although there was description that it did not indicate sensitizing property (EHC 179, 1996, PATTY 4th, 1994) in the skin sensitization study by the improved Buehler method using a guinea pigs, there was no description which negates skin sensitization clearly, therefore we presupposed that we could not classify since the insufficiency of data.
5	Germ cell mutagenicity	Category 2	Health hazard	Warning	Suspected of causing genetic defects (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	Although it is negative in the dominant lethal test using a rat (PATTY 4th, 1994), it is positive in the chromosomal aberration test using the marrow cells of a rat and a guinea pig (EHC 179, 1996), and there was no data of an in vivo genotoxicity study using a germ cell. So it is set as Category 2.
6	Carcinogenicity	Not classified	-	-	-	Since it was classified into a group 3 in IARC (IARC 71, 1999) and A4 in ACGIH (ACGIH 7th, 2001), it was considered as the outside of Category.
7	Toxic to reproduction	Classification not possible	-	-	-	There are description effect on the genitalium of male and female in the inhalation exposure test for 104 weeks in the rat was not observed. And the description that on genitalium of both sexes even in the test which carried out drinking water medication of the oleic acid salt of this substance to mouse for 96 weeks, effect was not observed. And the description that in the test which administered orally the oleic acid salt of this substance to fetus organogenesis period in pregnant rats, there was no affect to an fetus even at dose which clinical symptoms manifestation to dam (all are the 4th volume of a MOE Risk Assessment document and 2005). Since there was no description which negates reproductive toxicity clearly, it cannot be classified due to insufficient data.
8	Specific target organs/systemic toxicity following single exposure	Category 1 (respiratory)	Health hazard	Danger	Cause damage to organs (respiratory)	The substance was classified as Category 1 (respiratory system) based on the reports that increased respiratory rate and pulmonary irritation were observed in rats fume inhalation exposure tests (PATTY 4th, 1994), and that it causes burning sensations, coughs, breathing difficulties, shortness of breath, and pulmonary edema in humans inhalation (MOE Risk Assessment, Vol.4 (2005)).
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (respiratory organs)	Health hazard	Danger	Causes damage to organs (respiratory organs) through prolonged or repeated exposure	We classified it into Category 1 (respiratory systems) based on the description that in the repeated inhalation exposure test for 13 weeks and 104 weeks in a rat, tissue injury, such as a cell necrosis, erosion, and an increase in squamous metaplasia, was observed in respiratory organs, such as a nasal cavity (MOE Risk Assessment the 4th volume, 2005, EHC 179, 1996, ACGIH 7th, 2001, PATTY 4th, 1994, International Agency for Res. on Cancer 47, 1989), and based on the description that respiratory irritant was observed in occupational inhalation exposure to human (MOE Risk Assessment the 4th volume, 2005, ACGIH 7th, 2001, International Agency for Res. on Cancer 47, 1989).
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 96-hour ErC50=28mg/L of algae (Selenastrum) (EHC179, 1996).
11 Hazardous to the aquatic environment (chronic)	Category 3	-	-	Harmful to aquatic life with long lasting effects	Classified into Category 3, since acute toxicity was Category 3 and not rapidly degrading (BOD: 0% (existing chemical safety inspections data)), though less bio-accumulative (BCF=0.65 (existing chemical safety inspections data)).