

## GHS Classification

**ID224**

**Butane, 1,2-epoxy-**

**CAS 106-88-7**

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 2	Flame	Danger	Highly flammable liquid and vapour	Category 2 because of its flash point: -12 to -22degC and initial boiling point: 63 to 63.3degC (ICSC, 2004)
7 Flammable solids	Not applicable	-	-	-	Liquid (GHS definition)
8 Self-reactive substances and mixtures	Not classified	-	-	-	Not classified based on UNRTDG Class: 3, though containing chemical groups associated with self-reactive properties present
9 Pyrophoric liquids	Not classified	-	-	-	Flash point: 439degC (ICSC, 1997; NFPA (13th, 2002); HSDB , 2003)
10 Pyrophoric solids	Not applicable	-	-	-	Liquid (GHS definition)
11 Self-heating substances and mixtures	Not classified	-	-	-	Not classified because of UNRTDG 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 (but not to other elements).
14 Oxidizing solids	Not applicable	-	-	-	Liquid (GHS definition)
15 Organic peroxides	Not applicable	-	-	-	Organic compounds containing no -O-O- structure
16 Corrosive to metals	Classification not possible	-	-	-	No data available

## 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	It was set as Category 4 based on LD50= 659.3mg/kg obtained from the calculation of rat four examinations (SIDS (2001), DFGOT vol.5 (1990)).
1 Acute toxicity (dermal)	Category 4	Exclamation mark	Warning	Harmful in contact with skin	It was set as Category 4 based on LD50= 1744mg/kg obtained from the calculation of rabbit three data (SIDS (2001), DFGOT vol.5 (1990), PATTY (5th, 2001)).
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Liquid (GHS definition)
1 Acute toxicity (inhalation: vapour)	Classification not possible	-	-	-	The saturated vapor pressure concentration of this product is 171000ppm (58.0mg/L), and it is regarded that each inhalation test was done with vapor. There are two rat data with rat LC50 >18600ppm (SIDS (2001)) and rat LC50 >2000ppm (PATTY(5th, 2001) vol.6), but these data are greatly different from each other. Since the priority is equivalent, it cannot be classified.
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 skin irritativeness on humans and produces redness (SIDS (2001), ICSC (J) (2000)). Although there are statements that skin irritation on rabbits were not observed under unsealed condition (SIDS (2001), DFGOT vol.5 (1990)), necrosis on all skin layer was observed on two out of four rabbits with 1 hour exposure under sealed condition. This is considered to be the necrosis which penetrates into dermis. Moreover, there is also a statement that there is corrosivity under such conditions (SIDS (2001)). Although the effects on skin vary greatly with test conditions, from a viewpoint of safety, it was classified as Category 1A-1C based on the test data which observed critical disorders on animals(SIDS (2001)).
3 Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	Based on data (SIDS (2001)) that there is skin corrosivity with a rabbit, it was set as Category 1 according to the technological direction.
4 Respiratory/skin sensitization	Classification not possible; Skin sensitization: Not possible	(Respiratory sensitization)-; (Skin sensitization)-	(Respiratory sensitization)-; (Skin sensitization)-	(Respiratory sensitization)-; (Skin sensitization)-	Respiratory sensitization: No data. Skin sensitization: Classified as out of category based on the description of two maximisation tests and one guinea pig test, which does not describe the testing method, found no skin sensitization (SIDS (2001) and PATTY (5th, 2001).

5	Germ cell mutagenicity	Not classified	-	-	-	The substance was regarded as outside the categories by the technical guidelines. Based on the report that the dominant lethal test in rats, the in vivo chromosome aberration test using rat bone-marrow cells and the in vivo genotoxicity test in rats were all negative (SIDS (2001)).
6	Carcinogenicity	Category 2	Health hazard	Warning	Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	Based on being classified into 2B according to IARC, and into 2B according to an industrial hygiene society, and classified into 3 according to EU. So it was set as Category 2 according to the technical guidelines.
7	Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Since there is a description that child abortion and declining tendency in the number of litter size were observed with the mortal dose in parent animals (SIDS (2001)) and although there is no description about the toxicity signs in parental animals, there is a description that decreased number of child and increased fetal absorption were observed in 2 of 24 cases (SIDS (2001)), it was classified into Category 2.
8	Specific target organs/systemic toxicity following single exposure	Category 3 (respiratory tract irritation)	Exclamation mark	Warning	may cause respiratory irritation or may cause drowsiness and dizziness (respiratory tract irritation)	Since there are the descriptions of respiratory irritation in human (PATTY (5th, 2001)) and membrane irritation and breathing difficulties in animals (SIDS (2001), DFGOT vol.5 (1990)). Based on this results that it has respiratory irritation, it was classified into Category 3 (respiratory irritant).
9	Specific target organs/systemic toxicity following repeated exposure	Category 2 (nervous system, respiratory organs, kidneys, Olfactory organ)	Health hazard	Warning	may cause damage to organs (nervous system, respiratory organs, kidneys, Olfactory organ) through prolonged or repeated exposure	There are statements of neurological symptoms such as a straub tail and movement instability (SIDS (2001)), hemorrhagic of pulmonaries (SIDS (2001), IRIS (2005), DFGOT vol.5 (1999)), nephropathy (SIDS (2001)), and a renal tubular necrosis (SIDS (2001)) in studies using rats and mouse. Moreover, the findings of the inflammation or the necrosis of nasal tissues (membrane) are indicated in almost all data (SIDS (2001), IRIS (2005), DFGOT vol.5 (1999)). Based on the findings that every such development dose of toxicity was the amount of exposure in the range of Category 2 guidance value in repetitive exposure, it was classified in Category 2 (a nervous system, the respiratory system, the kidney, olfactus organ).
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 48-hour EC50=69.8mg/L of Crustacea (Daphnia magna) (SIDS, 2004).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since rapidly degrading (BOD: 109% (existing chemical safety inspections data)), and less bio-accumulative (log Kow=0.86 (PHYSPROP Database, 2005)).