

## GHS Classification

**ID912**

**1-Butanol**

**CAS 71-36-3**

Date Classified: Feb. 20, 2007 (Environmental Hazards: Feb. 10, 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, UNRTDG Class: 3, PGIII
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: 343degC (NFPA (12th, 1997) p325-20)
10 Pyrophoric solids	Not applicable	-	-	-	Liquid (GHS definition)
11 Self-heating substances and mixtures	Not classified	-	-	-	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 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	Not classified	-	-	-	UNRTDG Class: 3

## 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	Calculated based on the following values: Rat LD50 value = 790mg/kg ((3rd volume of MOE Risk Assessment (2004), SIDS (2004), EHC 65 (1987)), 4360mg/kg ((SIDS (2004), ACGIH (2002), PATTY (4th, 1994)), 2290mg/kg (SIDS (2004)), 2510mg/kg (SIDS (2004), ACGIH (2002), PATTY (4th, 1994)), 2100mg/kg (EHC 65 (1987), DFGOT vol.19 (2003)), and 700mg/kg (EHC 65 (1987), DFGOT vol.19 (2003)). Since the calculated values was 1227mg/kg, it was classified to category 4.
1 Acute toxicity (dermal)	Category 5	-	Warning	May be harmful in contact with skin	Calculated based on rabbit LD50 value = 3402mg/kg (SIDS (2004), DFGOT vol.19 (2003)), 5300mg/kg (SIDS (2004), EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003), PATTY (4th, 1994)), and 4200mg/kg (EHC 65 (1987), PATTY (4th, 1994)). Since the calculated values was 3636mg/kg, it was set as Category 5.
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Liquid (GHS definition)
1 Acute toxicity (inhalation: vapour)	Not classified	-	-	-	There are description that death was not observed on rats with 4-hour exposure to 8000ppm (equivalent: 24.2mg/L) (SIDS (2004), EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003) and PATTY (4th, 1994)), it was classified as out of Category. 24.2mg/L suggests that mist is intermingled from vapor pressure.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	From description that the moderate irritation was acknowledged by 24-hour patch test using the rabbit (SIDS (2004), EHC 65 (1987), DFGOT vol.19 (2003)), and from description that dermatitis was acknowledged in employment evidence of exposure (SIDS (2004), ACGIH (2002), DFGOT vol.19 (2003)), it was set as Category 2.
3 Serious eye damage / eye irritation	Category 2A	Exclamation mark	Warning	Causes serious eye irritation	The middle to severe stimulativeness was acknowledged by the test using the rabbits and it did not recover within seven days, but it recovered completely within 21 days (ECETOC TR 48 (1992)). Therefore we classified it as Category 2A. We found the descriptions that eye irritational property, such as keratoconjunctivitis, was acknowledged also by occupational exposure (exposure to vapor) in human cases (MOE Risk Assessment The 3rd volume (2004), SIDS (2004), EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003), and Japan Society for Occupational Health Recommendation of Occupational Exposure Limits (1993)).
4 Respiratory/skin sensitization	Classification not possible	-	-	-	Classification not possible due to lack of data
5 Germ cell mutagenicity	Not classified	-	-	-	Since there was a negative result (SIDS (2004), ACGIH (2002)) by the micronucleus test with the mammalian erythrocyte, which is an in vivo mutagenicity tests using a somatic, it carried out the outside of Category.
6 Carcinogenicity	Not classified	-	-	-	Since it was classified into D in EPA, it was considered as the outside of Category.

7	Toxic to reproduction	Not classified	-	-	-	It is considered as out of Category according to the guideline since only the frame variation (cervical rib) in a fetus was observed at the exposure concentrations in which dam toxicity is observed in the inhalation exposure test to the pregnant rats (MOE Risk Assessment the 3rd volume (2004), SIDS (2004), ACGIH (2002), DFGOT vol.19 (2003), and PATTY (4th, 1994)).
8	Specific target organs/systemic toxicity following single exposure	Category 3 (respiratory tract irritation, narcotic effects)	Exclamation mark	Warning	may cause respiratory irritation or may cause drowsiness and dizziness (respiratory tract irritation, narcotic	From description in MOE Risk Assessment the 3rd volume (2004) and DFGOT vol.19 (2003) that the slight stimulus was seen in human pharynx in inhalation exposure, it was considered to be respiratory irritant and was set as Category 3. Moreover, from description in SIDS (2004), EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003) and PATTY (4th, 1994) that anesthetic actions or central nervous system depression was seen in animal experiments, and from description in MOE Risk Assessment the 3rd volume (2004) and DFGOT vol.19 (2003) that headache was seen in human inhalation exposure, it was thought that there was an anesthetic actions and was set as Category 3.
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (central nervous system, auditory organ)	Health hazard	Danger	Causes damage to organs (central nervous system, auditory organ) through prolonged or repeated	Based on the descriptions that dizziness and headache were observed in human occupational exposure examples ( MOE Risk Assessment The 3rd volume (2004), EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003), PATTY (4th, 1994) and Japan Society for Occupational Health advice (1993)), and based on the descriptions that hearing loss was observed in human occupational exposure examples (EHC 65 (1987), DFGOT vol.19 (2003),PATTY (4th, 1994) and Japan Society for Occupational Health advice (1993)), the central nervous system and the auditory organ were considered to be target organ, and we categorized both of them as Category 1.
10	Aspiration hazard	Category 2	Health hazard	Warning	May be harmful if swallowed and enters airways	Category 2 because of being a primary normal alcohol composed of carbon atoms (3<=n<=13) and containing an isobutyl alcohol and ketone composed of carbon atoms (n>=13).

### Environmental Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
11 Hazardous to the aquatic environment (acute)	Not classified	-	-	-	It carried out the outside of Category from 96-hour LC50>100mg/L of fishes ( <i>Oryzias latipes</i> ) (MOE eco-toxicity tests of chemicals, 1996).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since not water-insoluble (aqueous solubility =63200mg/L(PHYSROP Database, 2005)) and acute toxicity is low.