

GHS Classification

ID574

Formic acid

CAS 64-18-6

Date Classified: May 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	The flash point varies with literature and is stated as 59 degC (o.c.) – 69 degC (measurements unknown). Among those, the lowest value of 59 degC (Open Cup) (Merck (13th, 2001)) was adopted, and it was classified as Category 3 (the acceptance criteria of GHS: flash point is 23 degC or more and, 60 degC or less).
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	-	-	-	The ignition points is 520 degC – 601.1degC (ICSC (J), (1997), NFPA (13th, 2002), dangerous decibel (the 2nd edition, 1993))
10 Pyrophoric solids	Not applicable	-	-	-	Liquid (GHS definition)
11 Self-heating substances and mixtures	Not classified	-	-	-	Not classified because of 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	-	-	-	Organic compounds containing no -O-O- structure
16 Corrosive to metals	Classification not possible	-	-	-	It is UNRTDG class 8 subsidiary risks 3. Although indicated as corrosive to metals (HSDB (2005)) also in literature, since there is no data, it cannot be classified.

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= 1085mg/kg obtained from the calculation using five data of oral rat LD50 values(DFGOT vol.19 (2003), PATTY (5th, 2001), NTP TR19 (1992)).
1 Acute toxicity (dermal)	Classification not possible	-	-	-	No data available
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Liquid (GHS definition)
1 Acute toxicity (inhalation: vapour)	Category 4	Exclamation mark	Warning	Harmful if inhaled	Since the saturated vapor pressure concentration of this product is 45544ppm, it is thought that each inhalation test was done with vapor. It was classified as Category 4 based on rat LC50 = 3929ppm (7.4 mg/L) (DFGOT vol.19 (2003)).
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	It has corrosive damage on human skin(PATTY and (5th, 2001), NTP TR19 (1992), ICSC (J) (1997)), and severe irritation and corrosivity are also observed for animals (DFGOT vol.19 (2003), PATTY (5th, 2001), IUCLID (2000)). These statements and C:R35 of the EU classification were judged collectively, and it was classified as Category 1A-1C.
3 Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	This is a skin corrosive substances (ICSC (J), (1997)), irreversible damages is done to an eye on humans (PATTY (5th, 2001), NTP TR19 (1992)), and a burn, severe stimulus, or corrosiveness to an animal eye (PATTY and (5th, 2001), DFGOT vol.19 (2003), NTP TR19 (1992), RTECS (2004), and IUCLID (2000)). So it was set as Category 1 based on things.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible; Skin sensitization: Classification not possible	(Respiratory sensitization)-; (Skin sensitization)-	(Respiratory sensitization)-; (Skin sensitization)-	(Respiratory sensitization)-; (Skin sensitization)-	No data available
5 Germ cell mutagenicity	Classification not possible	-	-	-	It was decided that the substance could not be classified by the technical guidelines. Because there are no data from in vivo tests and the in vitro mutagenicity tests do not show strong positive results in several parameters (DFGOT vol. 19 (2003), PATTY (5th, 2001), NTP TR19 (1992), IUCLID (2000)).
6 Carcinogenicity	Classification not possible	-	-	-	Classification not possible due to lack of data

7	Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Although there was no descriptions on general toxicity of parent animals, based on the report that shows the newborn's survival rate decrease (NTP TR19 (1992)), it is classified into the Category 2.
8	Specific target organs/systemic toxicity following single exposure	Category 1 (blood system, liver, kidneys, respiratory organs)	Health hazard	Danger	Cause damage to organs (blood system, liver, kidneys, respiratory organs)	It was classified into Category 1 (blood) based on the descriptions of effects to blood, such as hemolysis and a coagulopathy, in humans (DFGOT vol.19 (2003), PATTY(5th, 2001) vol.5). It was classified into Category 1 (liver, kidney) based on the descriptions of liver dysfunction being indicated in humans (DFGOT vol.19 (2003)) and renal dysfunction (DFGOT vol.19 (2003), PATTY (5th, 2001) vol.5). Due to the descriptions that it affects to respiratory systems, such as pneumonia, breathing difficulty, and bronchitis in human (DFGOT vol.19 (2003), PATTY(5th, 2001) vol.5 and NTP TR19 (1992)), and decreased respiratory functional is described also in guinea pigs, with the dosage range of guidance value of Category 1 (DFGOT vol.19 (2003)). So it was classified into Category 1.
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (kidneys)	Health hazard	Danger	Causes damage to organs (kidneys) through prolonged or repeated exposure	In humans, there was the statement that proteinuria and hematuria are seen (NTP TR19 (1992)), and since nephropathy was suggested, it was classified in Category 1 (kidney).
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=34.2mg/L of Crustacea (Daphnia magna) (IUCRID, 2000).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since rapidly degrading (BOD: 110% (existing chemical safety inspections data)), and less bio-accumulative (log Kow=-0.54 (PHYSPROP Database, 2005)).