

GHS Classification

ID300

Copper(II) sulfate, pentahydrate

CAS 7758-99-8

Date Classified: Oct. 23, 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	—	—	—	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	—	—	—	Non-flammable (ICSC, 2004)
8 Self-reactive substances and mixtures	Not classified	—	—	—	According to Chemical Dictionary (1994), the hydrate form can be dehydrated by heating (3-hydrate when heated at 30degC, 1-hydrate at 110degC, anhydride at 250degC). The kick-off temperature is considered to exceed 75degC.
9 Pyrophoric liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
10 Pyrophoric solids	Not classified	—	—	—	Non-flammable (ICSC, 2004)
11 Self-heating substances and mixtures	Not classified	—	—	—	Non-flammable (ICSC, 2004)
12 Substances and mixtures, which in contact with water, emit flammable gases	Not classified	—	—	—	Stable to water (water solubility: 22.05g/100g (25degC) (anhydride equivalent), Lide (84th, 2003))
13 Oxidizing liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
14 Oxidizing solids	Classification not possible	—	—	—	Classification not possible due to lack of data, though being inorganic compounds containing oxygen
15 Organic peroxides	Not applicable	—	—	—	Not organic compounds
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 4	Exclamation mark	Warning	Harmful if swallowed	Based on the rat LD50 (oral route) value of 960mg/kg (EHC 200 (1998)).
1 Acute toxicity (dermal)	Classification not possible	—	—	—	Classification not possible due to lack of data. The substance can be "Not classified" or classified into "Category 5" based on the available data (rat LD50 of >2,000mg/kg (dermal route)) (RTECS (2006)). If the study is conducted in accordance with OECD Guideline which specifies the upper limit at 2,000mg/kg, it is reasonable to consider the substance to be "Not classified" unless "there arises an urgent concern to human health," because no study is expected to be conducted with larger doses. However, "classification is not possible" since, in this study report, only numerical results are provided and study details are not available (the priority rating for the study is 2).
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
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	Based on the description in the report on human epidemiological studies (ICSC (2001)): "Causes redness and pain" (though the severity of the effects is unknown). The substance is thus considered a skin irritant.
3 Serious eye damage / eye irritation	Category 2A-2B	Exclamation mark	Warning	Causes serious eye irritation	Based on the description in the report on human epidemiological studies (ICSC (2001)): "Causes pain, redness and dimness of sight" (though the severity of the effects is unknown). Although classified into Category 2A-2B, the substance should be placed in Category 2A from the viewpoint of safety if further subclassification is needed.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible Skin sensitization: Category 1	(Respiratory sensitization) — (Skin sensitization) Exclamation mark	(Respiratory sensitization) — (Skin sensitization) Warning	(Respiratory sensitization) — (Skin sensitization) May cause an allergic skin reaction	Respiratory sensitization: No data available Skin sensitization: Due to the fact that the substance is classified into "Group 2" (as copper and its compounds) by the Japan Society for Occupational Health, and a "Skin Sensitizing Substance" (as copper) by the ad hoc committee of the Japanese Society of Occupational Allergy (2004).
5 Germ cell mutagenicity	Category 2	Health hazard	Warning	Suspected of causing genetic defects	Based on the absence of data on multi-generation mutagenicity tests, germ cell mutagenicity tests in vivo and germ cell genotoxicity tests in vivo, and positive data on somatic cell mutagenicity tests in vivo (chromosome aberration tests), described in NTP DB (Access on July, 2006), ATSDR (2004) and EHC 200 (1998).
6 Carcinogenicity	Classification not possible	—	—	—	Classification not possible based on expert judgment in the absence of existing classification (though some toxicity data are available).
7 Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Based on the evidence of malformation and adverse effects on postnatal development of pups, described in ATSDR (2004), EHC 200 (1998) and CERI Hazard Data 2001-59 (2002) (though no data are available regarding parental animals).
8 Specific target organs/systemic toxicity following single exposure	Category 1 (blood system, liver, nervous system, kidneys, respiratory organs)	Health hazard	Danger	Causes damage to organs (blood system, liver, nervous system, kidneys, respiratory organs)	Based on the human evidence: "symptoms including vomiting, lethargy, acute hemolytic anemia, renal and liver damage, neurotoxicity, increased blood pressure and respiratory rates" (EHC 200 (1998)), "deaths, probably due to central nervous system depression and hepatic and renal failure, have also been reported," "renal tubular damage was observed" (ATSDR (2004)), and the evidence from animal studies: "acute inflammatory changes were evident in the lungs" (EHC 200 (1998)). 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 (blood system, kidneys, respiratory organs) Category 2 (liver)	Health hazard	Danger	Causes damage to organs through prolonged or repeated exposure (blood system, kidneys, respiratory organs) May cause damage to organs through prolonged or repeated exposure (liver)	Based on the human evidence: "hemolytic anemia was noted," "pathological alterations include pulmonary inflammation, formation of granulomas, fibrohyaline nodules, desquamation of macrophages, and progression of diffuse fibrosis" (ATSDR (2004)). Also based on the evidence from animal studies: "protein droplets in the cytoplasm of cells in the proximal convoluted tubules," "in the kidneys, cytoplasmic protein droplets were evident, and hematological changes indicative of microcytic anemia were observed" (EHC 200 (1998)), "the earliest symptoms of hepatotoxicity are increases in serum chemistry enzymes, particularly alanine aminotransferase" (ATSDR (2004)), "repeated or prolonged exposure to aerosols may result in lung damage" (ICSC (J) (2001)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1 (kidneys) and Category 2 (liver).
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 48 hours LC50=0.00272mg/L of the crustacea (Ceriodaphnia) (ECETOC TR91, 2003).
11 Hazardous to the aquatic environment (chronic)	Category 1	Environment	Warning	Very toxic to aquatic life with long lasting effects	Since acute toxicity was Category 1 and it was a metallic compound, and since an underwater action and bio-accumulation were unknown, it was classified into Category 1.