GHS Classification

ID299 Copper sulfate

CAS 7758-98-7 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, 2002)
8	Self-reactive substances and mixtures	Not classified	—	—	—	The decomposition temperature is >560degC (Merck (13th, 2001)), whereas 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, 2002)
11	Self-heating substances and mixtures	Not classified	—	—	—	Non-flammable (ICSC, 2002)
12	Substances and mixtures, which in contact with water, emit flammable gases	Not classified	—	—	—	Stable to water (water solubility: 20.3g/100mL (20degC), ICSC (2002))
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 3	Skull and crossbones	Danger	Toxic if swallowed	Based on the rat LD50 (oral route) value of 300mg/kg (EHC 200 (1998)).
1	Acute toxicity (dermal)	Classification not possible	—	—	—	No data available
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:	Classification not possible	—	—	—	No data available
1	Acute toxicity (inhalation: dust, mist)	Classification not possible	—	—	—	No data available
2	Skin corrosion / irritation	Category 1	—	—	—	Based on the description in ICSC (J) 2001: "Severely irritates the eye and skin; inhalation of aerosols causes respiratory irritation; oral ingestion results in corrosion." The substance is thus considered to be corrosive to the skin.
3	Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	Based on the description of the human health effects (CERI Hazard Data 2001-59 (2002)): "The substance induces strong irritation of the eye," "produces conjunctivitis, edema in the eyelid, and corneal ulcer and opacities on contact with the eye." The substance is classified into Category 1 since corneal ulceration, which involves tissue damage, is considered to have irreversible effects.
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: Based on two epidemiological case reports that suggest skin sensitizing potential in humans (EHC 200 (1998)). Also due to the fact that the substance is classified into "Group 2" (as copper or 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 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) Category 3 (respiratory tract irritation)	Health hazard	Danger	Causes damage to organs (blood system, liver, nervous system, kidneys) (Respiratory tract irritation) May cause	Based on the human evidence: "Death occurred due to methemoglobinemia; copper sulfate causes liver damage, inducing centrolobular necrosis and cholestasis in severe cases; glomerular congestion, desquamation of renal tubular cells, hemoglobin cast were reported on the deceased subjects," "nausea, vomiting, upper abdominal pain, diarrhea, hypotension, hematemesis or discharge of blood from the anus, jaundice, delirium, coma, intravascular hemolysis, oliguresis and anuria were observed" (CERI Hazard Data 2001-59 (2002)), "severely irritates the eye and skin; inhalation of aerosols produces respiratory irritation" (ICSC (J) (2001)).

9	Specific target organs/systemic toxicity following repeated exposure	Category 2 (blood system, respiratory organs)	Health hazard	Warning	May cause damage to organs through prolonged or repeated exposure (blood system, respiratory organs)	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)), "repeated or prolonged exposure to aerosols may result in lung damage" (ICSC (J) (2001)).
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=7microg/L(Copper Sulfate Anhydride Equivalent: 17microg/L) of the crustacea (Daphnia magna) (EHC200, 1998).
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.