

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Stock No	SML 83
Name	Cuprous Oxide
Other names	Copper (I) Oxide Red Copper Oxide Dicopper Oxide Cuprite
Formula	Cu_2O
CAS no.	1317-39-1
EC no.	215-270-7
REACH reg. no	01-2119513794-36-0005
Supplier	Simba Materials Limited t/a CTM Potters Supplies Unit 7-8, Broomhouse Lane Ind Estate, Edlington, Doncaster DN12 1EQ Telephone +44 (0)1709 770801 Fax +44 (0)1709 770803 email : doncaster@ctmpotterssupplies.co.uk Unit 10A, Millpark Ind Estate, White Cross Road, Woodbury Salterton EX5 1EL Telephone +44 (0)1395 233077 Fax +44 (0)1395 233905 admin@ctmpotterssupplies.co.uk
Product use	See Identified Use Chart below for uses

Identified use no.	Identified use name	Industrial	Professional	Consumer
1	Electroplating and galvanic (e.g. electronics)	✓	✓	
2	Catalysts	✓		
3	Brazing paste		✓	
4	Ceramics (e.g. in brick-making)	✓	✓	✓
5	Coatings, inks	✓	✓	✓
6	Fertilisers	✓	✓	
7	Pigments	✓		
8	Powder metals	✓		
9	Putties, fillers, construction chemicals	✓	✓	✓
10	Pyrotechnics (including fireworks)		✓	✓
11	Rubber and plastics	✓	✓	✓
12	Thermit welding	✓	✓	
13	Industrial distribution	✓		
14	Formulation of fertilisers product mixtures	✓		
15	Formulation of fertiliser products		✓	
16	Use of fertilisers		✓	✓
17	Formulation of plant protection products	✓	✓	

There are no known uses advised against.

2 HAZARDS IDENTIFICATION

Classification according to regulation (EC) no. 1272/2008 (Classification, labelling and packaging)

Signal word Warning



Hazard statement	H302	Harmful if swallowed (Acute Tox. 4).
	H400	Very toxic to aquatic life (Aquatic Acute 1).
	H410	Very toxic to aquatic life, with long-lasting effects (Aquatic Chronic 1).
Precautionary statement - Prevention	P264	Wash thoroughly after handling.
	P270	Do not eat, drink or smoke when using this product.
	P280	Wear protective gloves/protective clothing/eye protection/face protection.
Precautionary statement - Reaction	P301/312	IF SWALLOWED: call a poison centre or doctor if you feel unwell.
	P304/340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
	P305/338/351	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
	P312	Call a POISON CENTRE if you feel unwell.
	P337/313	If eye irritation persists, get medical advice/attention.

Precautionary statement - Disposal	P273	Avoid release to the environment
	P391	Collect spillage.
	P501	Dispose of contents/container to an approved waste disposal plant.

3 COMPOSITION/INFORMATION ON INGREDIENTS

	CAS	EINECS	Proportion	Hazard
Cuprous Oxide	1317-39-1	215-270-7	>97%	H302, Acute Tox. 4 H400: Aquatic Acute 1 H410: Aquatic Chronic 1
Cupric Oxide	1317-38-0	215-269-1	<1%	H400: Aquatic Acute 1 H412: Aquatic Chronic 3
Others, not classified	--	--	<0.5%	--

4 FIRST AID MEASURES

General	Symptoms of poisoning may occur after several hours; therefore medical observation will be required for at least 48 hours after an accident.
Inhalation	Following inhalation, move to fresh air. Symptoms of fresh air may occur after several hours, therefore medical observation of breathing may be necessary.
Skin contact	Following contact with skin, wash off immediately with plenty of water.
Eye contact	In case of contact with eyes, immediately flush with plenty of water.
Ingestion	In case of ingestion, drink plenty of water and if you feel unwell seek medical attention.

Most important symptoms and effects, both acute and delayed	Gastro-intestinal symptoms are the first symptoms following high oral intake of Copper compounds. Vomiting may occur. The most critical organ for delayed effects of "Copper" excess is the liver. Nose/lung irritation may occur after inhalation of dusts.
Advice to doctor	Treat symptomatically.
First aid Facilities	Normal washroom facilities.
Other information	For advice, please contact a Poisons Information Centre.

5 FIRE-FIGHTING MEASURES

Extinguishing media	Not combustible under normal conditions of use. Use a suitable extinguishing medium to suit the surrounding fire, e.g. CO2, powder, water, dry powder.
Protective equipment	In the event of a fire, wear self-contained breathing apparatus.
Hazardous combustion products	In the event of a fire; Carbon Dioxide, Carbon Monoxide, and Copper Oxides may be released.
Other information	Collect contaminated fire-fighting water separately. It must not enter the sewage system.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures	Avoid formation of dust. Use a dust mask and eye protection. Do not breathe dust and avoid contact with eyes. Ensure adequate ventilation. No smoking.
Environmental precautions	Do not allow material to enter drains or other bodies of water.
Methods and materials for containment and clean-up	Clean/scoop up spills immediately, and place in a suitable container for disposal.

For more information on exposure controls, personal protection, or disposal considerations; check sections 8 to 13 of this Safety Data Sheet.

7 HANDLING AND STORAGE

Conditions for safe storage	Store in a dry, cool place. Avoid naked flames and other sources of ignition.
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8 EXPOSURE CONTROLS & PERSONAL PROTECTION

	CAS	EINECS	Value
Cuprous Oxide	1317-39-1	215-270-7	8 hrs: 1 mg/m ³ , TLV 8 hrs: 1 mg/m ³ , PEL
Cupric Oxide	1317-38-0	215-269-1	8 hrs: 1 mg/m ³ , TLV 8 hrs: 1 mg/m ³ , PEL

Exposure controls for Industrial settings

For environmental assessment, the Metal EUSES calculator for Downstream Users can be freely downloaded from <http://www.archeconsulting.be/Metal-CSA-toolbox/du-scaling-tool>. For environmental monitoring, the physico-chemical characteristics of the local receiving environment should preferably be monitored (see section 12).

Engineering controls

Take precautionary measures against static discharges.

Hygienic measures

When using; do not eat, drink or smoke. Wash hand before breaks and at the end of work.

Occupational exposure limits

Not classified.

Respiratory protection

The airborne concentration should be kept as low as possible by appropriate ventilation and collection methods. If this is not available then an approved dust mask should be worn.

Eye protection

Goggles or face shield.

Skin protection

Rubber or neoprene gloves. Other protective clothing, apron, sleeves, coveralls, boots sufficient to prevent contact.

9 PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Solid; fine orange powder.

Odour

Odourless.

pH

7 (1% solution)

Melting point

>400 °C at 101.72 Pa

Boiling point

N/A (to a solid that melts above 400°C)

Bulk density

5870 kg/m³ at 20 °C

Relative density / specific gravity

5.87

Relative density

5.87 at 20 °C

Solubility in water

Slightly soluble (0.1-100 mg/l) at 20±0.5 °C and pH 6.5-6.6

Partition coefficient (n-Octanol/water)

N/A (to inorganic substances)

Flammability	Not flammable.
Auto-ignition temperature	No auto-ignition.
Decomposition temperature	1800 °C
Viscosity	N/A (to an inorganic solid)
Explosive properties	Non-explosive.
Oxidising properties	Non-oxidising.

10 STABILITY AND REACTIVITY

Reactivity	N/A (see Section 9)
Chemical stability	Stable under normal conditions
Conditions to avoid	Avoid environments with high humidity and contact with acids.
Incompatible materials	Strong acids.
Possibility of hazardous reactions	No known dangerous decomposition products.
Hazardous polymerisation	Will not occur.

11 TOXICOLOGICAL INFORMATION

Absorption	Copper is an essential element and therefore, its concentration in the body is strictly and efficiently regulated by homeostatic mechanisms.	
	<u>Oral:</u>	An oral absorption of 25% has been adopted, based on studies in the rat.
	<u>Inhalation:</u>	Copper Oxide showed little/no toxicity when administered to test animals by other routes. Furthermore, information on the particle size, distribution and low water solubility of Copper Oxide indicate a low potential for inhalation exposure.
Acute toxicity	<u>Dermal:</u>	A dermal absorption of 0.3% has been adopted for soluble and insoluble copper substances in solution or suspension, based on <i>in-vitro</i> percutaneous tests with human skin. For dry exposure, a dermal absorption value of 0.03% applies.
	<u>Oral:</u>	The acute oral LD ₅₀ in the rat was estimated to be 1240 mg/kg bw. Cuprous Oxide meets the criteria for classification as Harmful according to Annex VI of Commission Directive 2001/59/EC.
	<u>Inhalation:</u>	LC ₅₀ = 5.0 mg/l
	<u>Dermal:</u>	Non-irritant (OECD)

STOT single exposure	Cuprous Oxide is not classified on the basis of acute oral, inhalation or dermal toxicity. Cuprous Oxide does not meet the criteria for classification as STOT for a single exposure.
Skin irritation/corrosion	No skin irritation was seen in test animals (rabbits). Test guideline OECD 404 [Sanders, 2002]. Cuprous oxide does not meet the criteria for classification.
Eye irritation/corrosion	A test carried out in 3 male rabbits resulted in scattered or diffuse corneal opacity in one treated eye up to 72 hours and iridial inflammation up to 48 hours. Test guideline 405 [Sanders, 2002]. Cuprous oxide does not meet the criteria for classification.
Chronic effects	Cuprous Oxide is classified as Harmful, but is not considered a dangerous material for working [Ullmann Encyclopaedia, band 15, page 560 (19-78)].
Skin sensitisation	A Guinea-pig maximisation test was carried out in accordance with OECD guideline 406. No cutaneous reaction attributable to sensitisation (erythema or oedema) was recorded in animals from the treated or control groups after the challenge phase with the test item at 2.5% or 1.25%. Cuprous Oxide does not meet the criteria for classification.
Genotoxicity	Negative results were obtained for Copper Sulphate <i>in vitro</i> in a bacterial cell reverse mutation assay (OECD 471). An <i>in vivo</i> unscheduled DNA synthesis test (equivalent to OECD 486) and a mouse micronucleus test (EC method B.12) performed on Copper Sulphate also gave negative results [Ballantyne, 1994; Ward, 1994; Riley, 1994]. Cuprous Oxide does not meet the criteria for classification.
Carcinogenicity	Based on weight of evidence, Copper compounds do not have carcinogenic potential.
Toxicity for reproduction	NOAEL for toxicity to reproduction of Copper Sulphate Pentahydrate in rats is >1500 ppm in food. Test guideline OECD 416 [Mylchreest, 2005]. The NOAEL for maternal toxicity and developmental effects in rabbits in a study according to OECD 414 was 6 mg Cu/kg bw/day [Munley, 2003]. Cuprous oxide does not meet the criteria for classification.

12 ECOLOGICAL INFORMATION

Eco-toxicity	Copper is a necessary trace element and stimulates plant growth and yield on Copper deficient soil. Copper is an integral part of various oxidation enzymes, and several animal diseases may occur if the diet is deficient in Copper. Cuprous Oxide is an active ingredient in antifouling paints and accordingly toxic to primitive marine organisms.
Acute aquatic toxicity test results and environmental classification	Acute toxicity of Copper ions was assessed using 451 L(E)C ₅₀ values from studies on soluble Copper compounds. The lowest species-specific geometric mean reference value of 25.0 µg Cu/L was an L(E)C ₅₀ obtained for <i>Daphnia magna</i> at pH 5.5 - 6.5 [Van Sprang et al., 2010]. Copper is an essential nutrient regulated by homeostatic mechanisms and does not bio-accumulate. Bio-available Copper ions are rapidly removed from the water column [Rader, 2010].
Chronic	Chronic toxicity of Copper ions from soluble Copper compounds was assessed

freshwater toxicity test results and PNEC derivation

using 104 NOEC/EC₁₀ values from 34 species representing different trophic levels (fish, invertebrates, and algae). Species-specific NOECs were calculated after normalizing to Dissolved Organic Carbon (DOC) and were used to derive SSDs and HC₅ values. Normalization at a typical DOC for freshwaters of 2 mg/l resulted in an HC₅ of 7.8 µg dissolved Cu/L. Applying an assessment factor of 1, a default chronic freshwater PNEC of 7.8 µg dissolved Cu/l is assigned to assess local risks.

Chronic marine waters toxicity test results and PNEC derivation

Chronic toxicity of Copper ions from soluble Copper compounds was assessed using 51 NOEC/EC₁₀ values from 24 species representing different trophic levels (fish, invertebrates and algae). Species-specific NOECs were calculated after normalizing to Dissolved Organic Carbon (DOC) and were used to derive SSDs and HC₅ values. Normalization at a typical DOC for coastal waters of 2 mg/l resulted in an HC₅ of 5.2 µg dissolved Cu/L. Applying an assessment factor of 1, a default chronic marine PNEC of 5.2 µg dissolved Cu/l is assigned to assess local risks.

Chronic freshwater sediment toxicity test results and PNEC derivation

Toxicity of Copper ions from soluble Copper compounds was assessed using 62 NOEC values from 6 benthic species. The NOECs were related to DOC and Acid Volatile Sulphide (AVS) and were used to derive SSDs and HC₅ values. An HC₅ of 1741 mg Cu/kg OC, corresponding to 87 mg Cu/kg dry weight, was calculated for a low AVS sediment with a default OC of 5%. Applying an assessment factor of 1, a default chronic freshwater sediment PNEC of 87 mg Cu/kg dry weight is assigned to assess local risks.

Chronic terrestrial toxicity test results and PNEC derivation

Toxicity of Copper ions from soluble Copper compounds was assessed using 252 NOEC/EC₁₀ values from 28 different species representing different trophic levels (decomposers, primary producers, primary consumers). NOEC values were adjusted to account for differences between lab-spiked soils and field-contaminated soils by the addition of a leaching ageing factor of 2. The adjusted values were then normalized to a range of EU soils using regression bio-availability models and used to derive SSDs and a lowest HC₅ value of 65 mg Cu/kg dry weight [Oorts et al., 2010]. Applying an assessment factor of 1, a default chronic soil PNEC of 65 mg Cu/kg dry weight is assigned.

Toxicity to Sewage Treatment Plant (STP) micro-organisms

The toxicity of Copper ions from soluble Copper compounds was assessed using NOEC and EC₅₀ values from high quality studies with STP bacteria and protozoa. The NOEC was 0.23 mg Cu/L in the STP [Cha et al., 2004]. Applying an assessment factor of 1, a PNEC of 0.23 mg Cu/L is assigned for Sewage Treatment Plant.

For more information on how the environmental classification was derived and how to assess bio-availability, contact your supplier.

Bio-accumulative potential

The "bio-accumulative" criteria are not applicable to essential metals.

Mobility in soil

Copper ions bind strongly to soil. The median water-soil partitioning coefficient (K_p) is 2120 L/kg.

Results of PBT and vPvB assessment

The PBT and vPvB criteria of Annex XIII to the Regulation do not apply to inorganic substances, such as copper and its inorganic compounds. Copper (as Copper Oxide) is not PBT or vPvB.

Other adverse effects

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system

13 DISPOSAL CONSIDERATIONS

The product should be collected for recycling, or be disposed of in a place where Copper is tolerated or needed. Leakage to water should be avoided. Comply with local legislation.

14 TRANSPORT INFORMATION

Sea transport (IMDG)	<u>UN Number:</u>	3077
	<u>Hazard class:</u>	9
	<u>Packing group:</u>	III
	<u>IMDG EMS:</u>	F-A, S-F
	<u>Proper shipping name:</u>	Environmentally hazardous substance, solid, n.o.s. - (contains Copper Oxide)
Air transport (IATA)	<u>UN Number:</u>	3077
	<u>Class:</u>	9
	<u>Packing group:</u>	III
	<u>Proper shipping name:</u>	Environmentally hazardous substance, solid, n.o.s. - (contains Copper Oxide)
	<u>IATA symbol:</u>	Miscellaneous dangerous substance
Road transport (ADR)	<u>UN Number:</u>	3077
	<u>Class:</u>	9
	<u>Hazard no.:</u>	90
	<u>Packing group:</u>	III
	<u>Proper shipping name:</u>	Environmentally hazardous substance, solid, n.o.s. - (contains Copper Oxide)
Rail transport (RID)	<u>UN Number:</u>	3077
	<u>Class:</u>	9
	<u>Packing group:</u>	III
	<u>Proper shipping name:</u>	Environmentally hazardous substance, solid, n.o.s. - (contains Copper Oxide)

15 REGULATORY INFORMATION

EINECS All components listed.

Copper Oxide is not a SEVESO substance, ozone depleting substance, nor a persistent organic pollutant. A chemical safety assessment has been carried out for the substance. A list of full references can be provided upon request.

16 OTHER INFORMATION

Supplier's notes This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.