



Material Safety Data Sheet Copper (II) Oxide

Edition: 04/09/2014

In compliance with Regulation (EC)1907/2006
Regulation (EC) 1272/2008 and Regulation (EC) 453/2010

1.1) Identification of substance/preparation and of the company undertaking

Material	Cupric Oxide
Synonyms	Black Copper Oxide, Copper (II) Oxide, Copper Oxide, Tenorite
EC No	215-269-1
CAS No	1317-38-0
REACH registration No	01-2119502447-44-0000
Company	Inoxia Ltd 45.7 Dunsfold Park Stovolds Hill Cranleigh Surrey GU6 8TB Tel: 02032 909990 safety@inoxia.co.uk www.inoxia.co.uk

1.2) Relevant identified uses

Use of the substance/preparation:

Substance used as such, in formulation or in formulation of products for:

- Brake pads
- Fertiliser
- Glass
- Ceramics
- Coatings and inks
- Adhesives
- Catalysts
- Lubricants and greases
- Pyrotechnics
- Non Ferrous Smelting
- Putties and fillers for construction chemicals
- Washing and cleaning products

Uses advised against

There is no known adverse use of the substance

2) Hazard Identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Product definition: Substance

Aquatic Acute 1, H400

Aquatic Chronic 3, H412

Classification according to Directive 67/548/EEC (Dangerous substances directive)

N; R50

Full text of R,H & S-phrases: see section 16

See Section 11 for more detailed information on health effects and symptoms.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 (CLP)

Hazard pictograms (CLP):

GHS09



Signal word (CLP): WARNING

Hazard statements (CLP) :

H400: Very toxic to aquatic life (Aquatic Acute 1)

H412: Harmful to aquatic life with long lasting effects (Aquatic Chronic 3)

Precautionary statements (CLP):

Disposal:

P273: Avoid release to the environment.

P391: Collect spillage.

P501: Dispose of contents and container in accordance with all local, regional, national and international regulations.

Safety phrases (CLP):

S60: This material and its container must be disposed of as hazardous waste.

S61: Avoid release to the environment. Refer to special instructions/safety data sheets.

2.3. Other hazards

This substance/mixture does not meet the PBT criteria of REACH, annex XIII.

This substance/mixture does not meet the vPvB criteria of REACH, annex XIII.

3) Composition

Chemical Name	EC-No	CAS-No.	Weight %	Classification (67/548/EEC)	Classification (1272/2008/EC)
Cupric Oxide	1317-38-0	215-269-1	>97	N, R:50	Aquatic Acute 1 H400 Aquatic Chronic 3: H412
Ingredients determined not to be hazardous			Balance		

4) First Aid Measures

4.1. Description of first aid measures

First-aid measures after inhalation: Remove victim to fresh air. If breathing is difficult, give oxygen. If breathing stops, perform cardio pulmonary resuscitation (CPR). Take to hospital.

First-aid measures after skin contact: Wash immediately with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse.

First-aid measures after eye contact : In case of eye contact, immediately rinse with clean water for 20-30 minutes. Call a doctor.

First-aid measures after ingestion: If swallowed, do not induce vomiting: seek medical advice immediately and show the container or label

4.2. Most important symptoms and effects, both acute and delayed

Gastro-intestinal symptoms following high oral intake of Copper compounds, Vomiting may occur. The most critical organ for delayed effects of "Copper" excess is liver. Nose/lung irritation may occur after inhalation of dusts.

4.3. Indication of any immediate medical attention and special treatment needed

Call a physician immediately. Treat symptomatically.

5) Fire Fighting

5.1. Extinguishing media

Suitable extinguishing media: Water, foam, Powder. CO2. Sand.

Unsuitable extinguishing media: None.

5.2. Special hazards arising from the substance or mixture

Fire hazard: Non combustible.

Explosion hazard: Not known

Hazardous combustion products: In the event of a fire; Carbon Dioxide, Carbon Monoxide and Copper Oxides may be released.

5.3. Advice for firefighters

Protection during firefighting: Use of approved supplied air or self-contained breathing apparatus operated in positive pressure mode are satisfactory. Totally impervious protective suits, gloves, and boots must be worn.

6) Accidental Release

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Keep public away from danger area. See section 8.2. Avoid dust production. Avoid all contact with this substance.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent entry to sewers and soil. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up: Collect mechanically and transfer into appropriate container for disposal. Avoid dust production.

See section 8 and 13 for more information.

6.4. Reference to other sections

See section 8 and 13 for more information.

7) Handling/Storage

7.1. Precautions for safe handling

Precautions for safe handling: Do not breathe dust. Avoid all contact with this substance Wash hands plentifully and other exposed areas with water after handling. Remove contaminated clothing and shoes. Wash clothing before re-using.

Packagings: Even those that have been emptied, will retain product residue. Always obey safety warnings and handle empty packagings as if they were full. Avoid all contact with this substance.

Hygiene measures: When using do not eat, drink or smoke. Wash hands and other exposed areas with mild soap and water before eat, drink or smoke and when leaving work. Remove contaminated clothing and shoes.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in dry, cool, well-ventilated area. Keep away from food, drink and animal feeding stuffs.

Incompatible products: None known

7.3. Specific end use(s)

No additional information available

8) Exposure Controls

Country	Long term exposure limit	Short term exposure limit	Notes	Source
Australia	1 mg/m ³		Copper, dusts and mists (as Cu)	NOHSC: 1003*
UK	1 mg/m ³	2 mg/m ³	Copper, dusts and mists (as Cu)	OHSA website**
Germany	0.1 mg/m ³	0.2 mg/m ³	Copper and its inorganic compounds, inhalable aerosol.	OHSA website**
France	1 mg/m ³	2 mg/m ³	Copper, dusts and mists (as Cu)	OHSA website**
Spain	1 mg/m ³		Copper, dusts and mists (as Cu)	OHSA website**
Netherlands	0.1 mg/m ³	0.2 mg/m ³	inhalable aerosol.	OHSA website**

Predicted No Effect Concentrations (PNECs) and Derived No Effect Levels (DNELs)

Worker long term systemic effects long term systemic effects	Dermal (external) Dermal (external)	DNEL for dry Copper compounds DNEL for dry slurries or Copper compounds found in solution	137 mg/kg bw/day 137 mg/kg bw/day
General population: long term systemic effects	Oral (internal)	DNEL based on internal Copper dose	0.041 mg Cu/kg bw/day
Environmental	Freshwater Marine water Sediment freshwater	PNEC, including a default bioavailability correction PNEC, including a default bioavailability correction PNEC	7.8µg dissolved Cu/L (1) 5.2 µg dissolved Cu/L (1) 87 mg Cu/kg dry wt. (1)

	Sediment estuarine	PNEC	288 mg Cu/kg dry wt. (1)
	Sediment marine	PNEC, including a default bioavailability correction	676 mg Cu/kg dry wt. (1)
	Soil	PNEC	65 mg Cu/kg dry wt. (1)
	STP	PNEC	0.23 mg dissolved Cu/L

8.2. Exposure controls

Appropriate engineering controls: Use as far as possible in a closed system. Provide a regular control of the atmosphere. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Local exhaust and general ventilation must be adequate to meet exposure standards. Please refer to the annex (exposure scenarios).

Hand protection: Use gloves resistant to chemical products corresponding to EN 374:3. Take advice to gloves' supplier.

Eye protection: Wear safety glasses with side shields according EN 166.

Skin and body protection: Wear closed protective clothing.

Respiratory protection: Use respiratory protection mask according to EN 140 or EN 405 with filter type P3 according to EN 143:2000 or FFP3 according to EN 149:2001.

Environmental exposure controls: Prevent entry to sewers and soil.

9) Physical/Chemical Properties

Physical state	Solid powder.
Colour	black
Odour	odourless.
Odour threshold	Not applicable
pH	No data available
Relative evaporation rate (butylacetate=1)	No data available
Melting point	1,326 °C
Freezing point	No data available
Boiling point	Not applicable
Flash point	Not flammable
Self ignition temperature	Not applicable
Decomposition temperature	>1,326°C
Flammability (solid, gas)	Not flammable
Vapour pressure	No information
Relative vapour density at 20 °C	No data available
Density	6.31 g/cm ³
Solubility in water	Insoluble (<0.1mg/l)
Viscosity, kinematic	Not applicable
Viscosity, dynamic	No data available
Explosive properties	No data available
Oxidising properties	Product is not explosive
Explosive limits	No data available

10) Stability/Reactivity

10.1. Reactivity

Stable under normal conditions of handling and storage.

10.2. Chemical stability

Stable under normal conditions of handling and storage.

10.3. Possibility of hazardous reactions

No information available

10.4. Conditions to avoid

Protect from moisture and strong heat

10.5. Incompatible materials

Strong acids

10.6. Hazardous decomposition products

Does not decompose under normal conditions. Hazardous polymerisation will not occur.

11)

Absorption	Copper is an essential element and therefore, its concentration in the body is strictly and efficiently regulated by homeostatic mechanisms.
Oral	An oral absorption of 25% has been adopted, based on studies in the rat.
Inhalation	The “respirable” and “inhalable” fraction is assumed by default to be 100%. If necessary, however, the Multiple Path Model of Particle Deposition (MPPD)1 can be used to quantify particle size dependent absorption of the “inhalable” fraction.
Dermal	A dermal absorption of 0.3% has been adopted for soluble and insoluble copper substances in solution or suspension, based on in-vitro percutaneous tests with human skin. For dry exposure, a dermal absorption value of 0.03% applies.
Acute toxicity Oral	LD50>2,500 mg/kg bw (male rats). Test guideline OECD 423 [Sanders, 2002]. Cupric Oxide does not meet the criteria for classification.
Inhalation	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. Cupric oxide does not meet the criteria for classification.
Dermal	LD50>2,000 mg/kg (male and female rats). Test guideline OECD 402 [Sanders, 2002]. Cupric Oxide does not meet the criteria for classification.

Skin corrosion/irritation: Based on available data, the classification criteria are not met.**Serious eye damage/irritation:** Based on available data, the classification criteria are not met.**Genotoxicity:** Based on available data, the classification criteria are not met.**Aspiration hazard:** Based on available data, the classification criteria are not met.**Respiratory or skin sensitisation:** Based on available data, the classification criteria are not met.**Germ cell mutagenicity:** Based on available data, the classification criteria are not met.**Carcinogenicity:** Based on available data, the classification criteria are not met.**Reproductive toxicity:** Based on available data, the classification criteria are not met.**STOT – single exposure:** Based on available data, the classification criteria are not met.

STOT – repeated exposure: Based on available data, the classification criteria are not met.

12) Ecological Information

12.1. Acute Toxicity

Acute toxicity of Copper ions was assessed using 451 L(E)C50 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)C50 obtained for *Daphnia magna* 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].

According to Directive 67/548/EEC:-

Dangerous for the environment (N) R50: Very toxic to aquatic organisms.

According to CLP/GHS:-

Aquatic Acute 1 H400: Very toxic to aquatic life, M-factor 1.

Aquatic Chronic 2 H412: Harmful to aquatic life with long lasting effects.

12.1.1. Chronic Freshwater Toxicity

Chronic toxicity of copper ions from soluble copper compounds was assessed using 139 NOEC/EC10 values from 27 species representing different trophic levels (fish, invertebrates and algae). Species-specific NOECs were normalised using Biotic Ligand Models and used to derive Species Sensitivity Distributions (SSD) and a lowest HC5 (the median fifth percentile of the SSD) of 7.8 µg dissolved Cu/L. This value is considered to be protective of 90% of EU surface waters and represents a reasonable worst case. Applying an assessment factor of 1, a default chronic freshwater PNEC of 7.8 µg dissolved Cu/L is assigned to assess local risks.

12.1.2. Chronic Marine Waters Toxicity

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.

12.1.3. Chronic Freshwater Sediment Toxicity

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.

12.1.3. Chronic Terrestrial Toxicity

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 65.5 mg Cu/kg dry weight [Oorts et al.,

2010]. Applying an assessment factor of 1, a default chronic soil PNEC of 65.5 mg Cu/kg dry weight is assigned.

12.1.4. Toxicity to Sewage Treatment Plant 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.

12.2. Persistence and degradability

Copper ions derived from Copper Oxide cannot be degraded. The fate of Copper ions in the water column was modelled using the Ticket Unit World Model [Rader, 2010]. Removal was also assessed using data from one mesocosm and three field studies. "Rapid" removal was demonstrated, defined as 70% removal within 28 days. Literature data confirm the strong binding of Copper ions to sediment, with the formation of stable Cu-S complexes. Re-mobilization of Copper ions to the water column is therefore not expected. Copper Oxide does not meet the criteria as "persistent".

12.3. Bio-accumulative potential

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

12.4. Mobility in soil

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

12.4. 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.

12.5. Other adverse effects

Cupric Oxide does not contribute to ozone depletion, ozone formation, global warming or acidification.

13) Disposal Consideration

13.1. Waste treatment methods

Waste treatment methods: Dispose of this material and its container at hazardous or special waste collection point. Dispose in a safe manner in accordance with local/national regulations.

Additional information: Empty packaging can have residues or dusts and are subject to proper waste disposal, as above. Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials: See the European waste catalogue.

14) Transport Information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. UN number

UN 3077

14.2. UN proper shipping name

ENVIRONMENTALLY HAZARDOUS SUBSTANCE
SOLID, N.O.S – (CONTAINS COPPER OXIDE)

14.3. Transport hazard class(es)

Class 9

14.4. Packing group

PG III

14.5. Environmental hazards

Other information: No supplementary information available.

14.6. Special precautions for user

14.6.1. Overland transport

IERG Number: 47

Hazchem Code: 2Z

14.6.2. Transport by sea

No additional information available

14.6.3. Air transport

IATA symbol: Miscellaneous dangerous

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

15) Regulatory Information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

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. Other regulations, restrictions and prohibition regulations: Not required.

Poisons schedule S6

15.1.2. National regulation

16) Other Information

Indication of changes: according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EC) No 453/20101

Data sources: Reach dossier.

Abbreviations and acronyms:

ADN: European Agreement concerning international carriage of Dangerous goods by Inland waterways

ADR: European Agreement concerning international carriage of Dangerous goods by Road

AF: Assessment factor

BCF: Bioconcentration factor

Bw: Body weight

CAS: Chemical Abstracts Service

CLP: Classification, labelling, packaging

CSR: Chemical Safety Report

DMEL: Derived maximum effect level

DNEL: Derivative No effect Level

EC: European Community

ELV: Emission limit values

EN: European Norm

EUH: European Hazard Statement

EWC: European Waste catalogue

IATA: International Air Transport Association

ICAO: International Civil Aviation Organization

IMDG: International Maritime Dangerous Goods

LC50: Median lethal concentration
 LD50: Median lethal dose
 NOAEL: No-observed-adverse-effect-level
 NOEC: No observed effect concentration
 NOEL: No observed effect level
 OEL: Operator exposure level
 PBT: Persistent, bioaccumulative, Toxic
 PEC: Predicted effect level
 PNEC: Predicted No effect Concentration
 REACH: Registration, evaluation and autorisation of chemicals
 RID: Regulations concerning the international carriage of dangerous goods by rail
 STEL: Short Term Exposure Limit
 TWA: Time weighted average
 vPvB: Very persistent, very bioaccumulative.

Training advice: None.

Full text of R-, H-, P- and S-phrases:

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
R50	Very toxic to aquatic organisms
P273	Avoid release to the environment.
P391	Collect spillage.
P501	Dispose of contents/containers in accordance with all local. Regional. National and international regulations
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/safets data sheets.
N	Dangerous for the environment

SDS EU (REACH Annex II)

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