

Revision: 000

Date: 27 October 2003

1. IDENTIFICATION OF THE SUBSTANCE AND COMPANY UNDERTAKING

General Chemical Name Copper powder

Intended/recommended use: Research.

Supplier (Distributor): New Metals & Chemicals Ltd.
Newmet House, Rue de St. Lawrence
Waltham Abbey, Essex, EN9 1PF
Telephone +44 (0)1992 711111

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	Concentration	Classification*	CAS number	EINECS No.
Copper powder	100%	R11, 36/37/38	7440-50-8	231-159-6

*see 16. OTHER INFORMATION for full text of R-phrases.

3. HAZARD IDENTIFICATION

Highly flammable..
Irritating to eyes, respiratory system and skin and harmful by inhalation.

4. FIRST AID MEASURES

Inhalation If signs/symptoms like coughing or burning occur, remove person from exposure to fresh air immediately and administer 100 percent humidified supplement oxygen with assisted ventilation as required. If breathing has ceased DO NOT use mouth-to-mouth respiration. Apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. Seek immediate medical attention.

Skin Contact Flush skin with large amounts of water. Remove contaminated clothing. If irritation persists, seek medical attention

Eye Contact	DO NOT allow patient to rub or keep eyes closed. Irrigate with copious quantities of water for at least 15 minutes. Flush under eyelids by lifting lid. DO NOT use a static eye bath. Seek immediate medical attention.
Ingestion	DO NOT induce vomiting. If patient is conscious and alert, wash out mouth with water. Give 2 cupfuls of milk with great care. Give nothing by mouth if patient is unconscious. Seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Precautions against fire and explosion

Material is highly flammable when exposed to flame or sources of ignition. Use dry sand or dry salt for fires. Fine dust can cause dust explosion.

Extinguishing media which must not be used for safety reasons

Do not use water, carbon dioxide or dry powder directly on burning metal.

Exposure hazards arising from substance, combustion products, resulting gases

Copper oxides may be formed in fire which are toxic and irritant.

Special protective equipment for fire fighters

Wear full protective clothing, including self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Evacuate all but essential authorised control personnel. Avoid inhalation, skin and eye contact. Provide sufficient ventilation.

Environmental Precautions

Prevent entry into drains, surface and ground water, soil and confined areas.

Methods for Cleaning up

Only trained, authorised personnel should be involved. Protective clothing should be

worn for spills and leaks with no fire. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Stop leak if you can do it without risk. Cover spills with dry sand, dry diatomaceous earth or dry salt followed with plastic sheet to minimise spreading. Collect material and place it into covered plastic containers, suitably marked, and dispose of through a licensed disposal contractor.

Do not flush area with water or aqueous cleansing agents. Avoid all possible ignition sources.

7. HANDLING AND STORAGE

Precautions for safe handling

To be handled by qualified and trained staff only. Avoid breathing dusts and direct contact with skin and eyes. Wash hands thoroughly after handling. See section 8 for personal protective equipment.

Ensure good ventilation/exhaustion at the workplace

Keep containers tightly sealed.

Precautions for safe storage

Keep container cool, dry and tightly closed when not in use.

Product is highly flammable.

Store away from materials listed under incompatibility (see section 10).

Superficially oxidised on exposure to air.

Specific use

Research.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values

Ingredient name	OES LTEL (8 hr TWA)	OES STEL (15 min)	MEL(LT)	MEL(ST)
Copper fume dusts and mists (as Cu)	0.2mg/m ³ 1mg/m ³			

The usual precautionary measures should be adhered to in handling chemicals. Keep away from foodstuffs, beverages and food. Instantly remove any soiled and impregnated garments. Wash hands during breaks and at end of the work. Avoid contact with the eyes and skin.

Occupational exposure controls

Eye Protection	Wear appropriate protective eyeglasses, chemical safety goggles or full face shield to European Standard EN 166.
Hand protection	Wear appropriate gloves when handling this material. Suitable material is butyl rubber. However, due regard must be taken that heavy gloves will interfere with the wearer's sense to touch and may contribute to a dangerous situation. Thinner gloves of nitrile and PVC may be used as disposable gloves and must be discarded immediately after use. Gloves should comply with European Standard EN 465-3 class 3.
Skin Protection	Use one or more of the following personal protection items as necessary to prevent skin contact: Full chemical protective suit to EN 465 standard, PVC apron, helmet and boots.
Respiratory Protection	Avoid inhalation of dust. Select the following respirator based on airborne concentration of contaminants: Full face dust respirator. Half -mask air-supplied respirator to EN 147. Full-face high efficiency filter respirator to EN 147 or EN 12941/12942. Full-face or hood compressed air breathing apparatus to EN 139 or EN 270/271. Use appropriate local exhaust ventilation, to maintain airborne exposure below control limits.
Ingestion:	Do not eat, drink or smoke when using this product. Do not ingest. Exhibit the strictest hygiene control.

Environmental exposure controls

Not generally known or suspected to cause serious health problems. In accordance with best practice only use in a fume cupboard or with local exhaust ventilation, ventilated to a scrubbing system. In case of fire, spillage, or leakage, prevent material from entering water courses, sewers or soil.

9. PHYSICAL AND CHEMICAL PROPERTIES

General information

Appearance	Reddish coloured
Odour	Odourless

Important health, safety and environmental information

pH	N/A
Boiling point/boiling range	2595°C
Melting point/melting range	1083°C
Flash point	N/A
Flammability (solid, gas)	Highly flammable
Autoignition temperature	N/A
Explosive properties	Not determined
Oxidising properties	Not oxidising
Vapour Pressure	1mm _{Hg} at 1628 ⁰ C
Relative density	8.94g/cm ³ at 20 ⁰ C
Solubility Water	Insoluble

10. STABILITY AND REACTIVITY

Stability	Stable if used and stored according to specification.
Conditions to avoid	Avoid creating dusts.
Materials to avoid	Oxidising agents, acids. Reacts violently with ammonium nitrate, bromates, chlorates, iodates, chloride, ethylene oxide, hydrazine mononitrate, hydrazoic acid and potassium oxide. A combination of finely divided copper with finely divided bromates (also chlorates or iodates) of barium, calcium, magnesium, potassium, sodium or zinc will explode with heat, percussion and sometimes light friction. Reacts violently with sodium azide.
Hazardous Decomposition Products	On decomposition will produce copper oxides. Contact with acids releases flammable gases.

11. TOXICOLOGICAL INFORMATION

Metallic copper is considered to be of low oral toxicity due to poor alimentary absorption. Exposure to dust or fumes is known to cause “Metal fume fever”.

Acute poisoning is rare but may occur after ingestion of large amounts of copper or from inhalation. Acute or intermediate exposure to excess copper affects the respiratory and central nervous system with little or no effect on other organ systems.

Effects from eye contact	Powder may cause severe irritation and damage to the eyes. Symptoms include irritation, redness and conjunctivitis palpebral edema, ulceration and corneal turbidity. Eye irritation, uveitis, abscess and loss of the eye may result from severe mechanical irritation.
Effects from skin contact	Powder may cause skin irritation. Prolonged exposure may cause allergic dermatitis. Symptoms include itching, redness, swelling, vesicle formation and pustulation.
Effects from inhalation	Dust may cause irritation to mucous membranes and upper respiratory tract. Symptoms include irritation of the eyes, nose and upper respiratory tract, wheezing, difficulty in breathing and industrial bronchitis. May cause “Metal fume fever”. Perforation of the nasal septum may also occur.
Effects from ingestion	Acute ingestion of copper salts can cause irritation to digestive tract. Symptoms include abdominal pain, nausea, vomiting salivation, epigastric burning, hemolysis, gastrointestinal bleeding with hemorrhagic gastritis, seizures, coma, shock and death. Hepatic and renal failure may develop several days after acute ingestion.
(a) Acute toxicity (oral, inhalation, dermal)	Immediately dangerous to life (man) 100mg.m ³ (as Cu)
(b) Corrosive/irritation (eye, skin, respiratory tract)	Irritant to eyes, skin and respiratory system
(c) Sensitisation (skin, respiratory)	no sensitising effect known
(d) Repeated-dose toxicity	not tested/no data
(e) Mutagenicity	not tested/no data
(f) Carcinogenicity	see below

(g) Reproductive toxicity

see below

Reproductive and tumorigenic effects have been observed on tests with laboratory animals. Material is not classified as a human carcinogen and there is inadequate data regarding its effect as an animal carcinogen.

12. ECOLOGICAL INFORMATION

(1) Ecotoxicity

(a) Aquatic toxicity

- | | | |
|-------|--------------------------------------------|--------------------|
| (i) | acute and chronic for fish | not tested/no data |
| (ii) | acute and chronic for daphnia | not tested/no data |
| (iii) | acute and chronic for algae fish | not tested/no data |
| (iv) | acute and chronic for other aquatic plants | not tested/no data |

(b) Soil toxicity

- | | | |
|-------|-----------------|--------------------|
| (i) | macro organisms | not tested/no data |
| (ii) | micro organisms | not tested/no data |
| (iii) | birds | not tested/no data |
| (iv) | bees | not tested/no data |
| (v) | plants | not tested/no data |
| (vi) | fauna | not tested/no data |

The material is not considered hazardous in the aquatic environment.

(2) Mobility

Appreciable mobilisation of copper occurred only with prolonged leaching at pH 2.8. Therefore, it does not seem likely that acidic rainfall will result in significant mobilisation of copper from organic soils unless the pH of rainfall decreases to <3.

(3) Persistence and degradability

Not tested/no data

(4) Bioaccumulation potential

Not tested/no data

(5) Other adverse effects

None known.

13. DISPOSAL CONSIDERATIONS

All waste material to be contained in a plastic sealed bin, duly marked, and disposed of as special waste through a licensed waste contractor in accordance with “The Special Waste Regulations 1996”. See sections 6 and 7.

14. TRANSPORT INFORMATION

(a)	UN number	3089
(b)	Class	4.1
(c)	Proper shipping name	Metal power, flammable, n.o.s. (copper powder)
(d)	Packing group	II
(e)	Marine pollutant	N/A
(f)	Other applicable information	N/A

15. REGULATORY INFORMATION

EC Supply: Chip-3 regulations 2002

F Highly flammable
Xi Irritant

Risk phrases:

11: Highly flammable
36/37/38: Irritating to eyes, respiratory system and skin.

Safety Phrases:

7: Keep container tightly closed
26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37/38: Wear suitable protective clothing, gloves and eye/face protection.
43: In case of fire, use dry sand or dry salt. Never use water.

This material is subject to the COSHH regulations 2002. See COSHH Essentials for further information.

16. OTHER INFORMATION

R Phrases Full Text:

- 11: Highly flammable
36/37/38: Irritating to eyes, respiratory system and skin.

Abbreviations used:

CAS	Chemical Abstracts Service Registry Numbers
EINECS	European Inventory of Existing Commercial Chemical Substances
MSDS	Material Safety Data Sheet
HSE	Health and Safety Executive
TWA	Time Weighted Average
OES	Occupational Exposure Standards

This material should only be handled by qualified, trained persons, fully familiar with its properties. During use or handling, a minimum of two persons should always be available.

References:

Chemicals (Hazard Information and Packaging for Supply) Regulations 2002

Approved classification and labelling guide. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 Guidance on Regulations L131

Approved Supply List. Information Approved for the Classification and labelling of Substances and Preparations Dangerous for Supply. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. Approved List L129

Control of Substances Hazardous to Health Regulations 2002

Health and Safety at Work Act 1974

COSHH Essentials: Easy Steps to Control Chemicals. Control of Substances Hazardous to Health Regulations

Occupational Exposure Limits 2001/2002 EH40

European Inventory of Existing Commercial Substances (EINECS) available on the European Chemicals Bureau website at www.ecb.jrc.it/existing-chemicals

First Aid at Work. The Health and Safety (First Aid) Regulations 1981. Approved Code of Practice and Guidance L74

Personal Protective Equipment (EC Directive) Regulations 1992

The Selection, Use and Maintenance of Respiratory Protective Equipment: A Practical Guide HSG53

Cost and Effectiveness of Chemical Protective Gloves for the Workplace.

Guidance for Employers and Health and Safety Specialists. HSG206

Environmental Protection Act 1990 c43

Environmental Act 1995 c25

The Special Waste Regulations 1996

The Dangerous Substances and Explosive Atmospheres Regulations 2002