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# COPPER(II) OXIDE

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**Chemwatch Material Safety Data Sheet (REVIEW)**

**For Workplace - Small Volume Use Only.**

**Issue Date: 26-Jul-2006**

**NC317TLP**

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**CHEMWATCH 21849**

**Version No:3**

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## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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### PRODUCT NAME

COPPER(II) OXIDE

### SYNONYMS

Cu-O, "copper oxide", "black copper oxide", "C.I. 77403", "C.I. Pigment Black 15", "CAS RN 1344-70-3 copper oxide non-specific", "copper brown", "copper monoxide", "copper monooxide", "copper (2+) oxide", "copper oxide black", "natural tenorite mineral", "native black copper oxide", paramelaconite, "melaconite mineral"

### PRODUCT USE

Ceramic colourant, reagent in analytical chemistry, insecticide for potato plants, catalyst, purification of hydrogen, batteries and electrodes, aromatic acids from cresols, electroplating and solvent for chromic iron ores. Also used for desulfurising oils, manufacture of rayon, metallurgical and welding fluxes, antifouling paints, phosphors, as pigment in glass, enamels, porcelain glazes, artificial gems, in sweetening petrol gases, in correcting Cu deficiencies in soil, as an optical glass polishing agent, to impart flux and abrasion resistance to glass fibres, pyrotechnic compositions, fungicide, trace mineral in animal feeds and as a catalyst in organic reactions. Other uses include copper chrome arsenate manufacture (perma pine wood preservatives), production of friction materials for brakes and clutches, production of ferrites for the electronic industry, manufacture of fungicides, and as a component in air- bag safety systems in motor vehicles.

### SUPPLIER

Company: Alpha Chemicals Pty Ltd  
Address:  
18 Inman Rd  
Cromer  
NSW 2099  
Australia  
Telephone: 9982 4622  
Emergency Tel: 0418 237 771  
Fax: 9982 4399

## HAZARD RATINGS

Flammability	0
Toxicity	2
Body Contact	2
Reactivity	0
Chronic	2

SCALE: Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4

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## Section 2 - HAZARDS IDENTIFICATION

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### STATEMENT OF HAZARDOUS NATURE

**HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to the Criteria of NOHSC, and the ADG Code.**

### POISONS SCHEDULE

S6

#### RISK

Harmful: danger of serious damage to health by prolonged exposure through inhalation. Inhalation and/or ingestion may produce health damage\*. Cumulative effects may result following exposure\*. May produce discomfort of the eyes and skin\*. Possible skin sensitiser\*.

\* (limited evidence).

#### SAFETY

Do not breathe dust.

Avoid contact with eyes.

Wear suitable protective clothing.

Use only in well ventilated areas.

Keep container in a well ventilated place.

To clean the floor and all objects contaminated by this material, use water and detergent.

Keep away from food, drink and animal feeding stuffs.

Take off immediately all contaminated clothing.

In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.

If swallowed, IMMEDIATELY contact Doctor or Poisons Information Centre. (show this container or label).

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## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

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NAME	CAS RN	%
copper(II) oxide	1317-38-0	>97

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## Section 4 - FIRST AID MEASURES

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### SWALLOWED

? If swallowed do NOT induce vomiting.

? If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

? Observe the patient carefully.

? Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.

? Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.

? Seek medical advice.

## EYE

If this product comes in contact with the eyes:

- ? Wash out immediately with fresh running water.
- ? Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- ? If pain persists or recurs seek medical attention.
- ? Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

## SKIN

If skin contact occurs:

- ? Immediately remove all contaminated clothing, including footwear.
- ? Flush skin and hair with running water (and soap if available).
- ? Seek medical attention in event of irritation.

## INHALED

- ? If fumes or combustion products are inhaled remove from contaminated area.
- ? Lay patient down. Keep warm and rested.
- ? Prosthesis such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- ? Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- ? Transport to hospital, or doctor.

## NOTES TO PHYSICIAN

for copper intoxication:

- ? Unless extensive vomiting has occurred empty the stomach by lavage with water, milk, sodium bicarbonate solution or a 0.1% solution of potassium ferrocyanide (the resulting copper ferrocyanide is insoluble).
- ? Administer egg white and other demulcents.
- ? Maintain electrolyte and fluid balances.
- ? Morphine or meperidine (Demerol) may be necessary for control of pain.
- ? If symptoms persist or intensify (especially circulatory collapse or cerebral disturbances, try BAL intramuscularly or penicillamine in accordance with the supplier's recommendations.
- ? Treat shock vigorously with blood transfusions and perhaps vasopressor amines.
- ? If intravascular haemolysis becomes evident protect the kidneys by maintaining a diuresis with mannitol and perhaps by alkalinising the urine with sodium bicarbonate.
- ? It is unlikely that methylene blue would be effective against the occasional methaemoglobinemia and it might exacerbate the subsequent haemolytic episode.
- ? Institute measures for impending renal and hepatic failure.
- [GOSSELIN, SMITH & HODGE: Commercial Toxicology of Commercial Products]
- ? A role for activated charcoal or emesis is, as yet, unproven.
- ? In severe poisoning CaNa<sub>2</sub>EDTA has been proposed.
- [ELLENHORN & BARCELOUX: Medical Toxicology].

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## Section 5 - FIRE FIGHTING MEASURES

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### EXTINGUISHING MEDIA

- ? There is no restriction on the type of extinguisher which may be used.
- ? Use extinguishing media suitable for surrounding area.

### FIRE FIGHTING

- ? Alert Fire Brigade and tell them location and nature of hazard.
- ? Wear breathing apparatus plus protective gloves for fire only.
- ? Prevent, by any means available, spillage from entering drains or water courses.
- ? Use fire fighting procedures suitable for surrounding area.
- ? DO NOT approach containers suspected to be hot.
- ? Cool fire exposed containers with water spray from a protected location.

- ? If safe to do so, remove containers from path of fire.
- ? Equipment should be thoroughly decontaminated after use.

## **FIRE/EXPLOSION HAZARD**

- ? Non combustible.
- ? Not considered a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of: metal oxides.
- May emit poisonous fumes.
- May emit corrosive fumes.

## **FIRE INCOMPATIBILITY**

None known.

## **HAZCHEM: None**

## **Personal Protective Equipment**

- Breathing apparatus.
- Gas tight chemical resistant suit.
- Limit exposure duration to 1 BA set 30 mins.

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## **Section 6 - ACCIDENTAL RELEASE MEASURES**

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### **EMERGENCY PROCEDURES**

#### **MINOR SPILLS**

- ? Remove all ignition sources.
- ? Clean up all spills immediately.
- ? Avoid contact with skin and eyes.
- ? Control personal contact by using protective equipment.
- ? Use dry clean up procedures and avoid generating dust.
- ? Place in a suitable labelled container for waste disposal.

#### **MAJOR SPILLS**

- Moderate hazard.
- ? CAUTION: Advise personnel in area.
- ? Alert Emergency Services and tell them location and nature of hazard.
- ? Control personal contact by wearing protective clothing.
- ? Prevent, by any means available, spillage from entering drains or water courses.
- ? Recover product wherever possible.
- ? IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal.
- ? ALWAYS: Wash area down with large amounts of water and prevent runoff into drains.
- ? If contamination of drains or waterways occurs, advise Emergency Services.

### **EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)**

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:  
copper(II) oxide 125 mg/m<sup>3</sup>

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:  
copper(II) oxide 6 mg/m<sup>3</sup>

other than mild, transient adverse effects without perceiving a clearly defined odour is:  
copper(II) oxide 3.5 mg/m<sup>3</sup>

The threshold concentration below which most people will experience no appreciable risk of health effects:

copper(II) oxide 1.25 mg/m<sup>3</sup>

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

## SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

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+ X + X 0 +

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+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

**Personal Protective Equipment advice is contained in Section 8 of the MSDS.**

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## Section 7 - HANDLING AND STORAGE

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### PROCEDURE FOR HANDLING

- ? Avoid all personal contact, including inhalation.
- ? Wear protective clothing when risk of exposure occurs.
- ? Use in a well-ventilated area.
- ? Prevent concentration in hollows and sumps.
- ? DO NOT enter confined spaces until atmosphere has been checked.
- ? DO NOT allow material to contact humans, exposed food or food utensils.
- ? Avoid contact with incompatible materials.
- ? When handling, DO NOT eat, drink or smoke.
- ? Keep containers securely sealed when not in use.
- ? Avoid physical damage to containers.
- ? Always wash hands with soap and water after handling.
- ? Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- ? Use good occupational work practice.
- ? Observe manufacturer's storing and handling recommendations.
- ? Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

### SUITABLE CONTAINER

- ? Polyethylene or polypropylene container.
- ? Check all containers are clearly labelled and free from leaks.

### STORAGE INCOMPATIBILITY

Metals and their oxides or salts may react violently with chlorine trifluoride. Chlorine trifluoride is a hypergolic oxidiser. It ignites on contact (without external source of

heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. The state of subdivision may affect the results.

May react violently when heated with aluminium, boron, cesium acetylene carbide, hydrazine, magnesium, phospham, potassium, rubidium acetylene carbide, sodium, titanium, zirconium, hydrogen, hydrogen sulfide and phthalic anhydride.

## STORAGE REQUIREMENTS

Observe manufacturer's storing and handling recommendations.

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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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### EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Peak ppm	Peak mg/m <sup>3</sup>	TWA F/CC
Australia Exposure Standards	copper(II) oxide (Copper, dusts & mists (as Cu))		1					
Australia Exposure Standards	copper(II) oxide (Copper (fume))		0.2					

### PERSONAL PROTECTION

#### EYE

? Safety glasses with side shields.  
 ? Chemical goggles.  
 ? Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

#### HANDS/FEET

Suitability and durability of glove type is dependent on usage. Factors such as:  
 ? frequency and duration of contact,  
 ? chemical resistance of glove material,  
 ? glove thickness and  
 ? dexterity,  
 are important in the selection of gloves.  
 Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids.  
 ? polychloroprene  
 ? nitrile rubber  
 ? butyl rubber  
 ? fluoroacoutchouc  
 ? polyvinyl chloride  
 Gloves should be examined for wear and/ or degradation constantly.  
 NOTE: The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

## OTHER

- ? Overalls.
- ? P.V.C. apron.
- ? Barrier cream.
- ? Skin cleansing cream.
- ? Eye wash unit.

## RESPIRATOR

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x ES	P1 Air-line*	--	PAPR-P1
50 x ES	Air-line**	P2	PAPR-P2
100 x ES	-	P3	-
		Air-line*	-
100+ x ES	-	Air-line**	PAPR-P3

\* - Negative pressure demand \*\* - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

## ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

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## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

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### APPEARANCE

Fine black to brownish black amorphous powder or black crystalline powder or granules. No odour. Occurs in nature as the minerals tenorite (triclinic crystals) and paramelaconite (tetrahedral, cubic crystals). Insoluble in water and alcohol. Slowly soluble in ammonia. Soluble in acids, alkali cyanides, (NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub> solution and ammonium chloride NH<sub>4</sub>Cl.

### PHYSICAL PROPERTIES

Solid.  
Does not mix with water.  
Sinks in water.

Molecular Weight: 79.55  
Melting Range (C): 1326  
Solubility in water (g/L): Immiscible  
pH (1% solution): Not applicable.  
Volatile Component (%vol): Not applicable.  
Relative Vapour Density (air=1): Not applicable.  
Lower Explosive Limit (%): Not applicable  
Autoignition Temp (C): Not applicable  
State: Divided solid

Boiling Range (C): Not available.  
Specific Gravity (water=1): 6.3 - 6.5  
pH (as supplied): Not applicable  
Vapour Pressure (kPa): Negligible @ 25  
Evaporation Rate: Not applicable  
Flash Point (C): Not applicable  
Upper Explosive Limit (%): Not applicable  
Decomposition Temp (C): Not applicable  
Viscosity: Not Applicable

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## Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

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### CONDITIONS CONTRIBUTING TO INSTABILITY

? Presence of incompatible materials.  
? Product is considered stable.  
? Hazardous polymerisation will not occur.

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## Section 11 - TOXICOLOGICAL INFORMATION

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### POTENTIAL HEALTH EFFECTS

#### ACUTE HEALTH EFFECTS

#### SWALLOWED

Accidental ingestion of the material may be damaging to the health of the individual. A metallic taste, nausea, vomiting and burning feeling in the upper stomach region occur after ingestion of copper and its derivatives. The vomitus is usually green/blue and discolours contaminated skin. Acute poisonings from ingestion are rare due to their prompt removal by vomiting. Should vomiting not occur or is delayed, systemic poisoning may occur producing kidney and liver damage, wide-spread capillary damage, and be fatal; death may occur after relapse from an apparent recovery. Anaemia may occur in acute poisoning.



## EYE

There is some evidence to suggest that this material can cause eye irritation and damage in some persons.

Copper salts, in contact with the eye, may produce inflammation of the conjunctiva, or even ulceration and cloudiness of the cornea.

## SKIN

There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons.

Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.

Exposure to copper, by skin, has come from its use in pigments, ointments, ornaments, jewellery, dental amalgams and IUDs (intra-uterine devices), and in killing fungi and algae. Although copper is used in the treatment of water in swimming pools and reservoirs, there are no reports of toxicity from these applications. Reports of allergic contact dermatitis following contact with copper and its salts have appeared in the literature, however the exposure concentrations leading to any effect have been poorly characterized. In studies, the possible contamination with nickel (which causes allergies definitely) has been raised as a reason for any reactions observed.

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

## INHALED

Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.

The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Copper poisoning following exposure to copper dusts and fume may result in headache, cold sweat and weak pulse. Capillary, kidney, liver and brain damage are the longer term manifestations of such poisoning. Inhalation of freshly formed metal oxide particles sized below 1.5 microns and generally between 0.02 to 0.05 microns may result in "metal fume fever". Symptoms may be delayed for up to 12 hours and begin with the sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalised feeling of malaise. Mild to severe headache, nausea, occasional vomiting, fever or chills, exaggerated mental activity, profuse sweating, diarrhoea, excessive urination and prostration may also occur. Tolerance to the fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours following removal from exposure.

## CHRONIC HEALTH EFFECTS

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

Harmful: danger of serious damage to health by prolonged exposure through inhalation.

This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. This has been demonstrated via both short- and long-term experimentation.

Copper has fairly low toxicity. Some rare hereditary conditions (Wilson disease or hepatolenticular degeneration) can lead to accumulation of copper on exposure, causing irreversible damage to a variety of organs (liver, kidney, CNS, bone, vision) and lead to death. There may be anaemia and cirrhosis of the liver.

## TOXICITY AND IRRITATION

No significant acute toxicological data identified in literature search.

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## Section 12 - ECOLOGICAL INFORMATION

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Copper is unlikely to accumulate in the atmosphere due to a short residence time for airborne copper aerosols. Airborne coppers, however, may be transported over large distances. Copper accumulates significantly in the food chain.

Drinking water standards:

3000 ug/l (UK max)  
 2000 ug/l (WHO provisional Guideline)  
 1000 ug/l (WHO level where individuals complain)  
 Soil Guidelines: Dutch Criteria  
 36 mg/kg (target)  
 190 mg/kg (intervention)  
 Air Quality Standards: no data available.

The toxic effect of copper in the aquatic biota depends on the bio-availability of copper in water which, in turn, depends on its physico-chemical form (ie.speciation). Bioavailability is decreased by complexation and adsorption of copper by natural organic matter, iron and manganese hydrated oxides, and chelating agents excreted by algae and other aquatic organisms. Toxicity is also affected by pH and hardness. Total copper is rarely useful as a predictor of toxicity. In natural sea water, more than 98% of copper is organically bound and in river waters a high percentage is often organically bound, but the actual percentage depends on the river water and its pH.

Copper exhibits significant toxicity in some aquatic organisms. Some algal species are very sensitive to copper with EC50 (96 hour) values as low as 47 ug/litre dissolved copper whilst for other algal species EC50 values of up to 481 ug/litre have been reported. However many of the reportedly high EC50 values may arise in experiments conducted with a culture media containing copper-complexing agents such as silicate, iron, manganese and EDTA which reduce bioavailability.

Toxic effects arising following exposure by aquatic species to copper are typically:

Algae EC50 (96 h)	Daphnia magna LC50 (48-96 h)	Amphipods LC50 (48-96 h)	Gastropods LC50 (48-96 h)	Crab larvae LC50 (48-96 h)
47-481 *	7-54 *	37-183 *	58-112 *	50-100 *

\* ug/litre

Exposure to concentrations ranging from one to a few hundred micrograms per litre has led to sublethal effects and effects on long-term survival. For high bioavailability waters, effect concentrations for several sensitive species may be below 10 ug Cu/litre. In fish, the acute lethal concentration of copper ranges from a few ug/litre to several mg/litre, depending both on test species and exposure conditions. Where the value is less than 50 ug Cu/litre, test waters generally have a low dissolved organic carbon (DOC) level, low hardness and neutral to slightly acidic pH. Exposure to concentrations ranging from one to a few hundred micrograms per litre has led to sublethal effects and effects on long-term survival. Lower effect concentrations are generally associated with test waters of high bioavailability.

In summary:

Responses expected for high concentration ranges of copper \*

Total dissolved Cu concentration range (ug/litre)	Effects of high availability in water
1-10	Significant effects are expected for diatoms and sensitive invertebrates, notably cladocerans. Effects on fish could be significant in freshwaters with low pH and hardness.
10-100	Significant effects are expected on various species of microalgae, some species of macroalgae, and a range of invertebrates, including crustaceans, gastropods and sea urchins. Survival of sensitive fish will be affected and a variety of fish show sublethal effects.
100-1000	Most taxonomic groups of macroalgae and invertebrates will be severely affected. Lethal levels for most fish species will be reached.
>1000	Lethal concentrations for most tolerant organisms are reached.

\* Sites chosen have moderate to high bioavailability similar to water used in most toxicity tests.

In soil, copper levels are raised by application of fertiliser, fungicides, from deposition of highway dusts and from urban, mining and industrial sources. Generally, vegetation rooted in soils reflects the soil copper levels in its foliage. This is dependent upon the bioavailability of copper and the physiological requirements of species concerned.

Typical foliar levels of copper are:

Uncontaminated soils (0.3-250 mg/kg)	Contaminated soils (150-450 mg/kg)	Mining/smelting soils
6.1-25 mg/kg	80 mg/kg	300 mg/kg

Plants rarely show symptoms of toxicity or of adverse growth effects at normal soil concentrations of copper. Crops are often more sensitive to copper than the native flora, so protection levels for agricultural crops range from 25 mg Cu/kg to several hundred mg/kg, depending on country. Chronic and or acute effects on sensitive species occur at copper levels occurring in some soils as a result of human activities such as copper fertiliser addition, and addition of sludge. when soil levels exceed 150 mg Cu/kg, native and agricultural species show chronic effects. Soils in the range 500-1000 mg Cu/kg act in a strongly selective fashion allowing the survival of only copper-tolerant species and strains. At 2000 Cu mg/kg most

species cannot survive. By 3500 mg Cu/kg areas are largely devoid of vegetation cover. The organic content of the soil appears to be a key factor affecting the bioavailability of copper.

On normal forest soils, non-rooted plants such as mosses and lichens show higher copper concentrations. The fruiting bodies and mycorrhizal sheaths of soil fungi associated with higher plants in forests often accumulate copper to much higher levels than plants at the same site. International Programme on Chemical Safety (IPCS): Environmental Health Criteria 200.

DO NOT discharge into sewer or waterways.

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## Section 13 - DISPOSAL CONSIDERATIONS

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? Recycle wherever possible or consult manufacturer for recycling options.

? Consult State Land Waste Management Authority for disposal.

? Bury residue in an authorised landfill.

? Recycle containers if possible, or dispose of in an authorised landfill.

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## Section 14 - TRANSPORTATION INFORMATION

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HAZCHEM: None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:UN, IATA, IMDG

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## Section 15 - REGULATORY INFORMATION

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**POISONS SCHEDULE: S6**

### REGULATIONS

copper(II) oxide (CAS: 1317-38-0) is found on the following regulatory lists;

Australia - Australia New Zealand Food Standards Code - Processing Aids - Permitted catalysts

Australia Dangerous Goods Code Draft 7th Edition - List of Common Pesticides with Corresponding UN Numbers

Australia Exposure Standards

Australia High Volume Industrial Chemical List (HVICL)

Australia Inventory of Chemical Substances (AICS)

Australia National Pollutant Inventory

Australia Poisons Schedule

Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6

International Council of Chemical Associations (ICCA) - High Production Volume List

OECD Representative List of High Production Volume (HPV) Chemicals

copper(II) oxide (CAS: 1317-92-6) is found on the following regulatory lists;

Australia - Australia New Zealand Food Standards Code - Processing Aids - Permitted catalysts

Australia Dangerous Goods Code Draft 7th Edition - List of Common Pesticides with Corresponding UN Numbers

Australia Exposure Standards

Australia National Pollutant Inventory

Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6

No data available for copper(II) oxide as CAS: 185461-92-1, CAS: 1344-70-3.

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## Section 16 - OTHER INFORMATION

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### INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
copper(II) oxide	1317-38-0, 1317-92-6, 185461-92-1, 1344-70-3

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from CHEMWATCH. TEL (+61 3) 9572 4700.

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