

CIGWELD COMWELD COMCOAT N

Chemwatch Material Safety Data Sheet

Issue Date: 11-Dec-2006

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

CIGWELD COMWELD COMCOAT N

SYNONYMS

"Product Codes: 321215, 322029, 322030, 322208"

PRODUCT USE

Flux coated nickel bronze filler rod for oxy- acetylene gas flame braze welding. Can produce braze welds on steel which, when tested to destruction, fail in the mild steel. Good wear resistance make it suitable for building up worn areas.

SUPPLIER

Company: CIGWELD Pty Ltd

Address:

71 Gower Street

Preston

VIC 3072

AUS

Telephone: (03) 9474 7400

Telephone: 1300 654 674

Emergency Tel: (03) 9474 7400

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

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

POISONS SCHEDULE

None

RISK

Limited evidence of a carcinogenic effect.

SAFETY

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.

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

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
wire comprising		
copper	7440-50-8	48^
zinc	7440-66-6	42^
nickel	7440-02-0	10^

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

coated with flux comprising		
boric acid	10043-35-3	
sodium metaborate	7775-19-1	
in use generates		
welding fumes	Not avail.	>60
including		
copper fume	7440-50-8	
zinc oxide fume	1314-13-2	
nickel fume	7440-02-0	

Section 4 - FIRST AID MEASURES

SWALLOWED

Not normally a hazard due to the physical form of product. The material is a physical irritant to the gastro-intestinal tract.

EYE

- Particulate bodies from welding spatter may be removed carefully.
- DO NOT attempt to remove particles attached to or embedded in eye.
- Lay victim down, on stretcher if available and pad BOTH eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye.
- Seek urgent medical assistance, or transport to hospital.

SKIN

If skin or hair contact occurs:

- 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

Copper, magnesium, aluminium, antimony, iron, manganese, nickel, zinc (and their compounds) in welding, brazing, galvanising or smelting operations all give rise to thermally produced particulates of smaller dimension than may be produced if the metals are divided mechanically. Where insufficient ventilation or respiratory protection is available these particulates may produce "metal fume fever" in workers from an acute or long term exposure.

- Onset occurs in 4-6 hours generally on the evening following exposure. Tolerance develops in workers but may be lost over the weekend. (Monday Morning Fever)
- Pulmonary function tests may indicate reduced lung volumes, small airway obstruction and decreased carbon monoxide diffusing capacity but these abnormalities resolve after several months.
- Although mildly elevated urinary levels of heavy metal may occur they do not correlate with clinical effects.
- The general approach to treatment is recognition of the disease, supportive care and prevention of exposure.
- Seriously symptomatic patients should receive chest x-rays, have arterial blood gases determined and be observed for the development of tracheobronchitis and pulmonary edema. [Ellenhorn and Barceloux: Medical Toxicology].

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Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- There is no restriction on the type of extinguisher which may be used.

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 to be a significant fire risk, however containers may burn.
- In a fire may decompose on heating and produce toxic / corrosive fumes.

FIRE INCOMPATIBILITY

Welding electrodes should not be allowed to come into contact with strong acids or other substances which are corrosive to metals.

Welding arc and metal sparks can ignite combustibles.

HAZCHEM: None

Personal Protective Equipment

Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

Clean up all spills immediately.
Avoid contact with skin and eyes.
Wear impervious gloves and safety glasses.
Use dry clean up procedures and avoid generating dust.
Place spilled material in clean, dry, sealable, labelled container.

MAJOR SPILLS

Minor hazard.

- Clear area of personnel.
- Alert Fire Brigade and tell them location and nature of hazard.
- Control personal contact by using protective equipment if risk of overexposure exists.
- Prevent, by any means available, spillage from entering drains or water courses.
- Contain spill/secure load if safe to do so.
- Bundle/collect recoverable product and label for recycling.
- Collect remaining product and place in appropriate containers for disposal.
- Clean up/sweep up area. Water may be required.
- If contamination of drains or waterways occurs, advise emergency services.

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

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Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- 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.
- 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

- Packaging as recommended by manufacturer.
- Check that containers are clearly labelled.
- Multi-wall paper container NOTE: Bags should be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.

STORAGE INCOMPATIBILITY

Segregate from strong acids.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC
Australia Exposure Standards	boric acid (Inspirable dust (Not specified))		10					
Australia Exposure Standards	copper fume (Copper, dusts & mists (as Cu))		1					
Australia Exposure Standards	copper fume (Copper (fume))		0.2					
Australia Exposure Standards	zinc oxide fume (Zinc oxide (dust) (a))		10					
Australia Exposure Standards	zinc oxide fume (Zinc oxide (fume))		5		10			
Australia Exposure Standards	nickel fume (Nickel, metal)		1					

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC
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The following materials had no OELs on our records

- sodium metaborate: CAS:7775-19-1 CAS:10555-76-7 CAS:15293-77-3 CAS:35585-58-1

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
copper fume	100	
zinc oxide fume	500	
nickel fume	10	

MATERIAL DATA

Not available. Refer to individual constituents.

INGREDIENT DATA

SODIUM METABORATE:

CEL TWA: 1 mg/m³ (compare TLV TWA: borates, sodium salts, anhydrous)

WELDING FUMES:

In addition to complying with any individual exposure standards for specific contaminants, where current manual welding processes are used, the fume concentration inside the welder's helmet should not exceed 5 mg/m³, when collected in accordance with the appropriate standard (AS 3640, for example).

ES* TWA: 5 mg/m³

TLV* TWA: 5 mg/m³, B2 (a substance of variable composition)

OES* TWA: 5 mg/m³

Most welding, even with primitive ventilation, does not produce exposures inside the welding helmet above 5 mg/m³. That which does should be controlled (ACGIH). Inspirable dust concentrations in a workers breathing zone shall be collected and measured in accordance with AS 3640, for example. Metal content can be analytically determined by OSHA Method ID25 (ICP-AES) after total digestion of filters and dissolution of captured metals. Sampling of the Respirable Dust fraction requires cyclone separator devices (elutriators) and procedures to comply with AS 2985 (for example).

COPPER FUME:

Not available

ZINC OXIDE FUME:

Zinc oxide intoxication (intoxication zincale) is characterised by general depression, shivering, headache, thirst, colic and diarrhoea.

Exposure to the fume may produce metal fume fever characterised by chills, muscular pain, nausea and vomiting. Short-term studies with guinea pigs show pulmonary function changes and morphologic evidence of small airway inflammation. A no-observed-adverse-effect level (NOAEL) in guinea pigs was 2.7 mg/m³ zinc oxide. Based on present data, the current TLV-TWA may be inadequate to protect exposed workers although known physiological differences in the guinea pig make it more susceptible to functional impairment of the airways than humans.

NICKEL FUME:

NOTE: Detector tubes for nickel, measuring in excess of 0.25 mg/m³ (as Ni), are commercially available.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTION

EYE

Welding helmet with suitable filter. Welding hand shield with suitable filter.

- 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].

For most open welding/brazing operations, goggles, even with appropriate filters, will not afford sufficient facial protection for operators. Where possible use welding helmets or handshields corresponding to AS 1336 and AS 1338 which provide the maximum possible facial protection from flying particles and fragments. [WRIA-WTIA Technical Note 7].

HANDS/FEET

Welding Gloves

Safety footwear.

OTHER

Overalls.

- Eyewash unit.

Aprons, sleeves, shoulder covers, leggings or spats of pliable flame resistant leather or other suitable materials may also be required in positions where these areas of the body will encounter hot metal.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	- AUS P	-
1000	50	-	- AUS P
5000	50	Airline *	-
5000	100	-	- 2 P
10000	100	-	- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

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

Special ventilation requirements apply for processes which result in the generation of aluminium, copper, fluoride, manganese or zinc fume.

- For work conducted outdoors and in open work spaces, the use of mechanical (general exhaust or plenum) ventilation is required as a minimum. (Open work spaces exceed 300 cubic meters per welder)

- For indoor work, conducted in limited or confined work spaces, use of mechanical ventilation by local exhaust systems is mandatory. (In confined spaces always check that

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

oxygen has not been depleted by excessive rusting of steel or snowflake corrosion of aluminium)
Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec.
If risk of inhalation or overexposure exists, wear SAA approved respirator or work in fume hood.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Pink flux- coated wire.

PHYSICAL PROPERTIES

Does not mix with water.
Sinks in water.

Molecular Weight: Not Applicable
Melting Range (°C): 910
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: Manufactured

Boiling Range (°C): Not Applicable
Specific Gravity (water=1): 7.0
pH (as supplied): Not Applicable
Vapour Pressure (kPa): Not Applicable
Evaporation Rate: Not Applicable
Flash Point (°C): Not Applicable

Upper Explosive Limit (%): Not Applicable
Decomposition Temp (°C): Not Available
Viscosity: Not Applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

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

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Not normally a hazard due to physical form of product.

EYE

Fumes from welding/brazing operations may be irritating to the eyes.

SKIN

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
Nickel dusts, fumes and salts are potent contact allergens and sensitisers producing a dermatitis known as "nickel" rash.

In the absence of properly designed ventilation systems or where respiratory protective

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Section 11 - TOXICOLOGICAL INFORMATION

devises are inadequate, up to 10% of exposed workers are expected to be symptomatic. The material may accentuate any pre-existing skin condition. Open cuts, abraded or irritated skin should not be exposed to this material.

INHALED

Fumes evolved during welding operations may be irritating to the upper-respiratory tract and may be harmful if inhaled.

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.

Inhalation of freshly formed zinc oxide particles sized below 1.5 microns and generally between 0.02 to 0.05 microns may result in "metal fume fever", with symptoms resembling influenza. 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. Leucocytosis, a transient increase in white blood cell counts, is reported as a common finding in metal fume fever but is not known to be common amongst welders. Severe over-exposure to zinc oxide, following inhalation of fumes or finely divided dusts may result in bronchitis or pneumonia; a bluish skin tint may be present.

Regular exposure to nickel fume, as the oxide, may result in "metal fume fever" a sometimes debilitating upper respiratory tract condition resembling influenza.

Symptoms include malaise, fever, weakness, nausea and may appear quickly if operations occur in closed or poorly ventilated areas. Pulmonary oedema, pulmonary fibrosis and asthma has been reported in welders using nickel alloys; level of exposure are generally not available and case reports are often confounded by mixed exposures to other agents.

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.

Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

Principal routes of exposure include accidental contact with the molten metal and inhalation of fume arising as a consequence of the action of the flame on the rod / wire. Although fume generation rates are generally low, excessive heating of the material, well above its quoted melting point, may result in over-exposure.

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Section 11 - TOXICOLOGICAL INFORMATION

TOXICITY AND IRRITATION

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

BORIC ACID:

TOXICITY

Oral (woman) LDLo: 200 mg/kg

Oral (rat) LD50: 2660 mg/kg

Inhalation (rat) LCLo: 28 mg/m³/4h

Dermal (man) LDLo: 2430 mg/kg

IRRITATION

Skin (human): 15 mg/3d - I- Mild

SODIUM METABORATE:

TOXICITY

anhydrous:

Oral (rat) LD50: 2330 mg/kg

for octahydrate

Oral (rat) LD50: 2660 mg/kg *

Dermal (g.pig) LD50: >2000 mg/kg *

IRRITATION

Nil Reported

Nil reported

* Kodak

WELDING FUMES:

Not available. Refer to individual constituents.

WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

COPPER FUME:

Not available.

ZINC OXIDE FUME:

TOXICITY

Oral (human) LDLo: 500 mg/kg

Inhalation (human) TCLo: 600 mg/m³

IRRITATION

Skin (rabbit): 500 mg/24h Mild

Eye (rabbit): 500 mg/24h Mild

NICKEL FUME:

TOXICITY

Oral (rat) LD50: 5000 mg/kg

WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

IRRITATION

MATERIAL	CARCINOGEN	REPROTOXIN	SENSITISER	SKIN
nickel fume	IARC:2B NTPB	ILOM ILOEI	AUOEL	

CARCINOGEN

IARC: International Agency for Research on Cancer (IARC) Carcinogens: nickel fume

Category: 2B

CARCINOGEN

NTPB: US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen: nickel fume Category:

REPROTOXIN

ILOM: ILO Agents toxic to the male reproductive system: nickel fume

REPROTOXIN

ILOEI: ILO Chemicals in the electronics industry that have toxic effects on reproduction: nickel fume

SENSITISER

AUOEL: Australia Exposure Standards - Sensitisers: nickel fume

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Section 12 - ECOLOGICAL INFORMATION

DO NOT discharge into sewer or waterways.
Refer to data for ingredients, which follows:

BORIC ACID:

Fish LC50 (96hr.) (mg/l): 79- 100
Daphnia magna EC50 (48hr.) (mg/l): 115- 153

COPPER FUME:

The material is classified as an ecotoxin* because the Fish LC50 (96 hours) is less than or equal to 0.1 mg/l

* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993
Commission of the European Communities.

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

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Section 12 - ECOLOGICAL INFORMATION

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.

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Section 13 - DISPOSAL CONSIDERATIONS

- 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.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None

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

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE: None

REGULATIONS

boric acid (CAS: 10043-35-3) is found on the following regulatory lists;

- Australia Exposure Standards
- Australia High Volume Industrial Chemical List (HVICL)
- Australia Inventory of Chemical Substances (AICS)
- Australia National Pollutant Inventory
- Australia Poisons Schedule
- OECD Representative List of High Production Volume (HPV) Chemicals

boric acid (CAS: 11113-50-1) is found on the following regulatory lists;

- Australia Exposure Standards
- Australia Inventory of Chemical Substances (AICS)
- Australia National Pollutant Inventory

sodium metaborate (CAS: 7775-19-1) is found on the following regulatory lists;

- 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

OECD Representative List of High Production Volume (HPV) Chemicals

sodium metaborate (CAS: 10555-76-7) is found on the following regulatory lists;

- 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

OECD Representative List of High Production Volume (HPV) Chemicals

sodium metaborate (CAS: 15293-77-3) is found on the following regulatory lists;

- 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

OECD Representative List of High Production Volume (HPV) Chemicals

sodium metaborate (CAS: 35585-58-1) is found on the following regulatory lists;

- Australia Inventory of Chemical Substances (AICS)
- Australia National Pollutant Inventory

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Section 15 - REGULATORY INFORMATION

Australia Poisons Schedule

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

6

OECD Representative List of High Production Volume (HPV) Chemicals

welding fumes (CAS No:Not avail):

No regulations applicable

copper fume (CAS: 7440-50-8) is found on the following regulatory lists;

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

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (AQUA/1 to 6 - inorganic chemicals)

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - inorganic chemicals)

Australia - Australian Capital Territory Environment Protection Regulation Agricultural Uses (IRRIG) - Physical and chemical quality

Australia - Australian Capital Territory Environment Protection Regulation Agricultural uses (STOCK) - Physical and chemical quality

Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Agricultural uses (Irrig)

Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Agricultural uses (Stock)

Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Domestic water quality

Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Ecosystem maintenance

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

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OECD Representative List of High Production Volume (HPV) Chemicals

WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water

zinc oxide fume (CAS: 1314-13-2) is found on the following regulatory lists;

Australia Exposure Standards

Australia High Volume Industrial Chemical List (HVICL)

Australia Inventory of Chemical Substances (AICS)

Australia National Pollutant Inventory

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

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Australia Therapeutic Goods Administration (TGA) Sunscreening agents permitted as active ingredients in listed products

OECD Representative List of High Production Volume (HPV) Chemicals

nickel fume (CAS: 7440-02-0) is found on the following regulatory lists;

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

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (AQUA/1 to 6 - inorganic chemicals)

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - inorganic chemicals)

Australia - Australian Capital Territory Environment Protection Regulation Agricultural Uses (IRRIG) - Physical and chemical quality

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Section 15 - REGULATORY INFORMATION

Australia - Australian Capital Territory Environment Protection Regulation
Agricultural uses (STOCK) - Physical and chemical quality
Australia - Australian Capital Territory Environment Protection Regulation
Pollutants entering waterways - Agricultural uses (Irrig)
Australia - Australian Capital Territory Environment Protection Regulation
Pollutants entering waterways - Agricultural uses (Stock)
Australia - Australian Capital Territory Environment Protection Regulation
Pollutants entering waterways - Domestic water quality
Australia - Australian Capital Territory Environment Protection Regulation
Pollutants entering waterways - Ecosystem maintenance
Australia - Western Australia Hazardous Substances Prohibited for Specified Uses or
Methods of Handling
Australia Exposure Standards
Australia High Volume Industrial Chemical List (HVICL)
Australia Inventory of Chemical Substances (AICS)
Australia National Pollutant Inventory
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals
WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are
of health significance in drinking-water

No data available for boric acid as CAS: 41685-84-1.

No data available for welding fumes as CAS: Not avail.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
boric acid	10043- 35- 3, 11113- 50- 1, 41685- 84- 1
sodium metaborate	7775- 19- 1, 10555- 76- 7, 15293- 77- 3, 35585- 58- 1

REPRODUCTIVE HEALTH GUIDELINES

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
boric acid	1.5 mg/m ³	100	R	NA	-

These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive
American Industrial Hygiene Association Journal 57: 641-649 (1996).

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Section 16 - OTHER INFORMATION

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