

POWERS POWERLOADS

ChemWatch Material Safety Data Sheet
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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

POWERS POWERLOADS

SYNONYMS

PROPER SHIPPING NAME

CARTRIDGES, POWER DEVICE

PRODUCT USE

22, 25, 27 calibre construction tool propellant containers for explosive actuated tools (bolt guns). These charges should be used only by registered qualified operators for use in approved tools and as otherwise provided for in relevant State Regulations; for example Victorian Occupational Health & Safety (Explosive-Powered Tools) Regulations 1985 and subsequent amendments.

SUPPLIER

Company: Powers Fasteners Australasia Pty Ltd
Address:
Factory 3, 205 Abbots Road
Dandenong South
VIC 3175
AUSTRALIA
Telephone: +61 3 8787 5888
Telephone: 1800 677 872 (freecall)
Fax: +61 3 8787 5899

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. DANGEROUS GOODS.

continued...

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Section 2 - HAZARDS IDENTIFICATION ...

According to the Criteria of NOHSC, and the ADG Code.

POISONS SCHEDULE

None

RISK

Risk of explosion by shock, friction, fire or other sources of ignition.
Very toxic by inhalation, in contact with skin and if swallowed.
Danger of cumulative effects.
Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
May cause harm to the unborn child.

SAFETY

Avoid shock and friction.
Keep locked up.
Keep container in a well ventilated place.
Avoid exposure - obtain special instructions before use.
To clean the floor and all objects contaminated by this material, use water and detergent.
This material and its container must be disposed of in a safe way.
Keep away from food, drink and animal feeding stuffs.
Take off immediately all contaminated clothing.
In case of accident or if you feel unwell IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).
In case of accident by inhalation: remove casualty to fresh air and keep at rest.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|--|------------|-------|
| shell as | | |
| copper | 7440-50-8 | 45-60 |
| zinc | 7440-66-6 | 21-26 |
| propellant as | | |
| nitrocellulose | 9004-70-0 | 7-17 |
| nitroglycerin | 55-63-0 | 5-11 |
| priming mix/primer as | | |
| lead styphnate | 63918-97-8 | <1 |
| guanyl nitrosaminoguanyltetrazene | 109-27-3 | <1 |
| barium nitrate | 10022-31-8 | <1 |
| No other ingredient information disclosed. | | |

continued...

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Section 4 - FIRST AID MEASURES

SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
 - For advice, contact a Poisons Information Centre or a doctor.
 - Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
 - For advice, contact a Poisons Information Centre or a doctor.
 - Urgent hospital treatment is likely to be needed.
 - If conscious, give water to drink.
 - INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- NOTE: Wear a protective glove when inducing vomiting by mechanical means.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
 - If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
 - If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with 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.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- 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.
- Prostheses 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.

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Section 4 - FIRST AID MEASURES ...

NOTES TO PHYSICIAN

Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Flooding quantities of water only.

FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard.

- May be violently or explosively reactive.
 - Wear breathing apparatus plus protective gloves.
 - Prevent, by any means available, spillage from entering drains or water courses.
 - Consider evacuation (or protect in place).
- Fight fire from a safe distance, with adequate cover.
Cool fire exposed containers with water spray from a protected location.
DO NOT approach containers suspected to be hot.
If safe to do so, remove containers from path of fire.

FIRE/EXPLOSION HAZARD

Explosive.

Dangerous hazard when exposed to heat or flame.

Decomposes on heating and produces toxic fumes of carbon monoxide (CO) and nitrogen oxides (NOx)

Product may explode if heated above 200 deg. C.

FIRE INCOMPATIBILITY

Avoid reaction with acids or alkalis

HAZCHEM

1[Y]E

Personal Protective Equipment

PERSONAL PROTECTION EQUIPMENT

Breathing apparatus.

Gas tight chemical resistant suit.

Limit exposure duration to 1 BA set - 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

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Section 6 - ACCIDENTAL RELEASE MEASURES ...

MINOR SPILLS

Clean up all spills immediately.
Avoid contact with skin and eyes.
Wear impervious gloves and safety glasses.
Remove all ignition sources.
Use dry clean up procedures and avoid generating dust.
Place in clean drum then flush area with water.

MAJOR SPILLS

Clear area of personnel and move upwind.
Alert Fire Brigade and tell them location and nature of hazard.

- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses.
- Consider evacuation (or protect in place).

No smoking, naked lights or ignition sources. Increase ventilation.
Stop leak if safe to do so.
Use dry clean up procedures and avoid generating dust.
Spills of contents should be wetted.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labelled containers for recycling.
Collect residues and seal in labelled drums for disposal.
After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
If contamination of drains or waterways occurs, advise emergency services.

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area.
Avoid smoking, naked lights, heat or ignition sources.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Must not be struck by metal implements.
Avoid shock and friction.
Use spark-free tools when handling.
Keep containers securely sealed when not in use.
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.

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Section 7 - HANDLING AND STORAGE ...

SUITABLE CONTAINER

Packaging shall be in accordance to Packaging Instruction 134 of the Australian Explosives Code (AEC).

Locked metal containers.

Charges shall be clearly colour marked to indicate their relative strength.

Check that containers are clearly labelled.

STORAGE INCOMPATIBILITY

Segregate from acids and alkalis

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed as supplied.
- No smoking, naked lights, heat or ignition sources.
- Store in a cool, dry, well ventilated area.
- Store under cover and away from sunlight.
- Store below safe storage (control) temperature.
- Store away from flammable or combustible materials, debris and waste.
- Store away from incompatible materials.
- Store away from foodstuff containers
- DO NOT stack on wooden floors or wooden pallets.
- Protect containers against physical damage, FRICTION or SHOCK.
- Check regularly for spills and leaks.
- Observe manufacturer's storage and handling recommendations.
- Keep locked up.
- Special regulatory requirements may apply.
- Restrictions may apply on quantities and to other materials permitted in the same location.

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 |
|-------------------------------|-------------------------------|------------|--------------------------|-------------|---------------------------|-------------|---------------------------|
| Australian Exposure Standards | Copper (fume) | | 0.2 | | | | |
| Australian Exposure Standards | Copper, dusts & mists (as Cu) | | 1 | | | | |
| Australian Exposure Standards | Nitroglycerin (NG) | 0.05 | 0.46 | | | | |

No data available for zinc as (CAS: 7440-66-6) / (CAS: 9004-70-0) / (CAS: 63918-97-8) /

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION ...

(CAS: 15245-44-0) / (CAS: 50-55-5) / (CAS: 50-56-6) / (CAS: 109-27-3) / (CAS: 10022-31-8) / (CAS: 34053-87-7)

None assigned.

ODOUR SAFETY FACTOR (OSF)

OSF=7.7 (guanyl nitrosaminoguanilyltetrazene)

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

| Class | OSF | Description |
|-------|--------|--|
| A | 550 | Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV-TWA for example) is being reached, even when distracted by working activities |
| B | 26-550 | As "A" for 50-90% of persons being distracted |
| C | 1-26 | As "A" for less than 50% of persons being distracted |
| D | 0.18-1 | 10-50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached |
| E | <0.18 | As "D" for less than 10% of persons aware of being tested |

EXPOSURE STANDARDS FOR MIXTURE

"Worst Case" computer-aided prediction of vapour components/concentrations:

Composite Exposure Standard for Mixture (TWA) (mg/m³): 0.46 mg/m³

If the breathing zone concentration of ANY of the components listed below is exceeded, "Worst Case" considerations deem the individual to be overexposed.

Component Breathing Zone ppm Breathing Zone mg/m³ Mixture Conc: (%)

| Component | Breathing zone (ppm) | Breathing Zone (mg/m ³) | Mixture Conc (%) |
|---------------|----------------------|-------------------------------------|------------------|
| nitroglycerin | 0.05 | 0.4600 | 11.0 |

Operations which produce a spray/mist or fume/dust, introduce particulates to the breathing zone.

If the breathing zone concentration of ANY of the components listed below is exceeded, "Worst Case" considerations deem the individual to be overexposed.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION ...

At the "Composite Exposure Standard for Mixture" (TWA) (mg/m³): 11 mg/m³

| Component | Breathing Zone (mg/m ³) | Concentration (%) |
|----------------|--|----------------------|
| copper | 1.8818 | 45.0 |
| nitrocellulose | 0.6273 | 15.0 |
| lead styphnate | 0.0418 | 1.0 |
| barium nitrate | 0.0418 | 1.0 |

INGREDIENT DATA

COPPER:

TLV TWA: 1 mg/m³ Dusts and mists as Cu [ACGIH]
TLV TWA: 0.2 mg/m³ Fume [ACGIH]
PEL TWA: 1 mg/m³ [OSHA Z1]
copper dusts and mists, as Cu (A.Wt: 63.54)
ES TWA: 1 mg/m³
TLV TWA: 1 mg/m³
OES TWA: 1 mg/m³; STEL: 2 mg/m³
copper fume, as Cu
ES-TWA: 0.2 mg/m³
TLV-TWA: 0.2 mg/m³
OES-TWA: 0.2 mg/m³
IDLH Level: 100 mg/m³ (fume)

ZINC:

Not available. Refer to individual constituents.

NITROCELLULOSE:

TLV TWA: 10 mg/m³ (Value for particulate matter containing no asbestos and <1% crystalline silica, Inhalable fraction) [ACGIH]
TLV TWA: 3 mg/m³ (Value for particulate matter containing no asbestos and <1% crystalline silica, Respirable fraction) [ACGIH]
No exposure limits set by NOHSC or ACGIH
as dust not otherwise classified
Dusts not otherwise classified, as inspirable dust;
ES TWA: 10 mg/m³

NITROGLYCERIN:

TLV TWA: 0.05 ppm Skin [ACGIH]
PEL Ceiling: 0.2 ppm, 2 mg/m³ [OSHA Z1] (SKIN) [OSHA Z1]
TLV TWA: 0.05 ppm, 0.46 mg/m³ (skin)
ES TWA: 0.05 ppm, 0.46 mg/m³ (skin)
OES TWA: 0.2 ppm, 1.9 mg/m³; STEL: 0.2 ppm, 1.9 mg/m³ (skin)
Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.
MAK value: 0.05 ppm, 0.47 mg/m³
MAK Category II Peak Limitation: For substances with systemic effects and with a half-life in humans of less than two hours.
Allows excursions of 2 times the MAK value, for 30 minutes (on average), four times per shift.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION ...

Designated H in List of MAK values: Danger of cutaneous absorption. Absorption of such substances through the skin can pose an incomparably larger danger of toxicity than their inhalation. To avoid health risks when handling such substances, meticulous cleaning of the skin, hair and clothing is imperative.

MAK values, and categories and groups are those recommended within the Federal Republic of Germany

IDLH Level: 75 mg/m³

Workplace exposure should be controlled to concentrations that will not cause vasodilation (as indicated by throbbing headache and/or decrease in blood pressure). The TLV-TWA recognises the development of tolerance to the action of organic nitrates, the fact that wide variations in individual susceptibility occur and takes into account industrial experience with propylene glycol dinitrate including the development of tolerance to headache resulting from repeated 8-hour exposures at 0.2 ppm. The limit is protective ONLY if skin contact is prevented. Exposure at or below the recommended TLV-TWA is thought to minimise the risk of acute and chronic health effects of nitroglycerin.

LEAD STYPHNATE:

TLV TWA: 0.05 mg/m³ A3;BEI [ACGIH]

None assigned. Data for post-detonation products.

ES TWA: 0.15 mg/m³

ES* TWA: 0.15 mg/m³ (fumes)

TLV TWA: 0.05 mg/m³, A3

NIOSH REL-TWA: 0.1 mg Pb/m³ for inorganic lead

IDLH Level: 100 mg/m³ (as Pb)

CAUTION: This substance has been classified by the ACGIH as A3

Animal Carcinogen (at relatively high doses).

The lead concentration in air is to be maintained so that the lead concentration in workers' blood remains below 0.060 mg/100 g of whole blood. The recommended TLV-TWA has been derived following a review of reports of adverse effects on reproduction, blood-pressure and other end-points of toxicity. A particular focus was an assessment of pre-natal blood lead (PbB) levels and post-natal cognitive levels. The fact that lead is a cumulative toxicant which can produce subtle, persistent and apparently permanent effects in the off-spring of lead exposed women is of particular concern. A current view holds that the identification of the PbB levels, that are protective during a working lifetime, is a necessary prerequisite in the recommendation of the TLV because PbB values, rather than workplace air lead concentrations, are more clearly related to adverse health effects.

(see Biological Exposure Index - BEI - in "Advice to Doctor".)

GUANYL NITROSAMINO GUANYL TETRAZENE:

No exposure limits set by NOHSC or ACGIH

BARIUM NITRATE:

barium soluble compounds, as Ba (A.Wt: 137.33)

ES TWA: 0.5 mg/m³

TLV TWA: 0.5 mg/m³

IDLH Level: 50 mg/m³

The recommended TLV-TWA is based on satisfactory results achieved while employing an internal limit for barium nitrate at a national laboratory. It is not known what degree of added safety this limit incorporates.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION ...

PERSONAL PROTECTION

EYE

- Safety glasses with side shields.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET

Wear physical protective gloves, eg. leather.
Wear safety footwear.

OTHER

Overalls.
Hard hat
Ear protection.
Leather apron.

RESPIRATOR

| Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|-------------------|----------------------|----------------------|------------------------|
| 10 x ES | P2 Air-line* | - | - |
| 50 x ES | Air-line** | P2 Air-line* | PAPR-P2 |
| 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

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Metal small arms type cartridges for explosive powering of construction tools. Colour coded to indicate strength of charge.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES ...

PHYSICAL PROPERTIES

Molecular Weight: Not applicable
Melting Range (°C): Not applicable
Solubility in water (g/L): Not applicable
pH (1% solution): Not applicable
Volatile Component (%vol): Not applicable
Relative Vapour Density (air=1): Not applicable
Lower Explosive Limit (%): Not available
Autoignition Temp (°C): Not available
State: Manufactured

Boiling Range (°C): Not applicable
Specific Gravity (water=1): Not applicable
pH (as supplied): Not applicable
Vapour Pressure (kPa): Not applicable
Evaporation Rate: Not applicable
Flash Point (°C): Not available
Upper Explosive Limit (%): Not available
Decomposition Temp (°C): Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of shock and friction.
 - Presence of open flame.
- Product is considered stable and hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Considered an unlikely route of entry in commercial/industrial environments.
The material is discomforting to the gastro-intestinal tract and harmful if swallowed

EYE

The material is discomforting to the eyes

SKIN

The material is discomforting to the skin.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

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Section 11 - TOXICOLOGICAL INFORMATION ...

INHALED

The material is discomforting to the upper respiratory tract

CHRONIC HEALTH EFFECTS

Principal routes of exposure are usually by inhalation of generated dust skin contact / eye contact with the material

Powers Powerloads

Not available.

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances

COPPER:

TOXICITY

Oral (human) TDLo : 0.12 mg/kg

WARNING: Inhalation of high concentrations of copper fume may cause "metal

fume fever", an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever.

IRRITATION

Nil Reported

NITROCELLULOSE:

No significant acute toxicological data identified in literature search.

NITROGLYCERIN:

TOXICITY

Oral (rat) LD50: 105 mg/kg

Intravenous (man) TDLo: 51.429 mg/kg/2D-I

Substance has been investigated as a tumorigen, mutagen and reproductive effector.

Equivocal tumorigen by RTECS criteria.

Reproductive effector in rats.

IRRITATION

Skin (rabbit): 500 mg/24h - Mild

LEAD STYPHNATE:

Not available. Refer to individual constituents.

GUANYL NITROSAMINO GUANYL TETRAZENE:

No significant acute toxicological data identified in literature search.

BARIUM NITRATE:

TOXICITY

Oral (rat) LD50: 355 mg/kg

IRRITATION

Skin (rabbit): 500 mg/24h - mild

Eye (rabbit): 100 mg/24h - moderate

Section 12 - ECOLOGICAL INFORMATION

No data for Powers Powerloads.
Refer to data for ingredients, which follows:

COPPER:

Hazardous Air Pollutant: No

Copper is unlikely to accumulate in the atmosphere due to a short residence time

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Section 12 - ECOLOGICAL INFORMATION ...

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 *

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Section 12 - ECOLOGICAL INFORMATION ...

| | |
|---|---|
| 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) 6.1-25 mg/kg | Contaminated soils (150-450 mg/kg) 80 mg/kg | Mining/smelting soils 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

ZINC:

Hazardous Air Pollutant: No

continued...

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Section 12 - ECOLOGICAL INFORMATION ...

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

The product has no effect on the environment unless in finely divided form. In this form it can be harmful to aquatic life. Acute toxicity data in the form of 96 hour LC50s for Australian freshwater animals are:
fish - 0.14 to 38 mg Zn/L; and crustaceans - 0.43 to 32 mg Zn/L.

NITROCELLULOSE:

The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the alimentary tract. The concern with nitrate in the environment is related to its conversion to nitrite.

Methaemoglobinaemia is caused following exposure to high levels of nitrite and produces difficulties in oxygen transport in the blood. Thousands of cases involving poisoning of infants, particularly in rural areas, have been reported as a result of drinking nitrate rich well-water.

Other concerns deriving from exposure to environmental nitrates relate to the production of nitrosamines following the reaction of food nitrites and secondary amines. Other nitroso-compounds may result following reaction with nitrites and amides, ureas, carbamates and other nitrogenous compounds. Nitrosamines produce liver damage, haemorrhagic lung lesions, convulsions and coma in rats, and teratogenic effects in experimental animals.

The N-nitroso class of compounds include potent carcinogens and mutagens: induction of tumors by single doses of N-nitroso compounds testify to this.

NITROGLYCERIN:

Hazardous Air Pollutant: No
Daphnia magna EC50 (48hr.) (mg/l): 26
Algae IC50 (72hr.) (mg/l): 6.5
Half-life Soil - High (hours): 168
Half-life Soil - Low (hours): 48
Half-life Air - High (hours): 17.6
Half-life Air - Low (hours): 1.76
Half-life Surface water - High (hours): 168
Half-life Surface water - Low (hours): 48
Half-life Ground water - High (hours): 336
Half-life Ground water - Low (hours): 96
Aqueous biodegradation - Aerobic - High (hours): 168
Aqueous biodegradation - Aerobic - Low (hours): 48
Aqueous biodegradation - Anaerobic - High (hours): 672
Aqueous biodegradation - Anaerobic - Low (hours): 192
Aqueous biodegradation - Removal secondary treatment - High (hours): 100%
Aqueous photolysis half-life - High (hours): 2784
Aqueous photolysis half-life - Low (hours): 928

continued...

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Section 12 - ECOLOGICAL INFORMATION ...

Photolysis maximum light absorption - High (nano-m): 323
Aqueous photolysis half-life - High (hours): 2784
Aqueous photolysis half-life - Low (hours): 928
Photooxidation half-life water - High (hours): 4695
Photooxidation half-life water - Low (hours): 2711
Photooxidation half-life air - High (hours): 17.6
Photooxidation half-life air - Low (hours): 1.76
First order hydrolysis half-life (hours): 81600
Base rate constant [MOH]-HR]-1: 2.36E-02 M

log Kow : 2

Toxicity invertebrate: cell mult. inhib. 1.3-7mg/L

Effects on algae and plankton: cell mult. inhib. algae 7mg/L

The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the alimentary tract. The concern with nitrate in the environment is related to its conversion to nitrite.

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The N-nitroso class of compounds include potent carcinogens and mutagens: induction of tumors by single doses of N-nitroso compounds testify to this.

LEAD STYPHNATE:

The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the alimentary tract. The concern with nitrate in the environment is related to its conversion to nitrite.

Methaemoglobinaemia is caused following exposure to high levels of nitrite and produces difficulties in oxygen transport in the blood. Thousands of cases involving poisoning of infants, particularly in rural areas, have been reported as a result of drinking nitrate rich well-water.

Other concerns deriving from exposure to environmental nitrates relate to the production of nitrosamines following the reaction of food nitrites and secondary amines. Other nitroso-compounds may result following reaction with nitrites and amides, ureas, carbamates and other nitrogenous compounds. Nitrosamines produce liver damage, haemorrhagic lung lesions, convulsions and coma in rats, and teratogenic effects in experimental animals.

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Section 12 - ECOLOGICAL INFORMATION ...

The N-nitroso class of compounds include potent carcinogens and mutagens: induction of tumors by single doses of N-nitroso compounds testify to this.

GUANYL NITROSAMINO GUANYLTETRAZENE:

No data for guanyl nitrosaminoguanilyltetrazene.

BARIUM NITRATE:

Hazardous Air Pollutant: No

The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the alimentary tract. The concern with nitrate in the environment is related to its conversion to nitrite.

Methaemoglobinaemia is caused following exposure to high levels of nitrite and produces difficulties in oxygen transport in the blood. Thousands of cases involving poisoning of infants, particularly in rural areas, have been reported as a result of drinking nitrate rich well-water.

Other concerns deriving from exposure to environmental nitrates relate to the production of nitrosamines following the reaction of food nitrites and secondary amines. Other nitroso-compounds may result following reaction with nitrites and amides, ureas, carbamates and other nitrogenous compounds. Nitrosamines produce liver damage, haemorrhagic lung lesions, convulsions and coma in rats, and teratogenic effects in experimental animals.

The N-nitroso class of compounds include potent carcinogens and mutagens: induction of tumors by single doses of N-nitroso compounds testify to this.

Section 13 - DISPOSAL CONSIDERATIONS

- Consult manufacturer for recycling options and recycle where possible .
- Consult State Land Waste Management Authority for disposal.
- Incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Shipping Name:

continued...

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Section 14 - TRANSPORTATION INFORMATION ...

CARTRIDGES, POWER DEVICE
Dangerous Goods Class: 1.4S
UN/NA Number: 0323
ADR Number: None
Packing Group:
Labels Required: explosive
Additional Shipping Information:
International Transport Regulations:
IMO: 1.4S

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Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE

None

REGULATIONS

copper (CAS: 7440-50-8) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

zinc (CAS: 7440-66-6) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

nitrocellulose (CAS: 9004-70-0) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

nitroglycerin (CAS: 55-63-0) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

lead styphnate (CAS: 15245-44-0) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

guanyl nitrosaminoguanyltetrazene (CAS: 109-27-3) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

barium nitrate (CAS: 10022-31-8) is found on the following regulatory lists:
Australian Inventory of Chemical Substances (AICS)

continued...

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Section 16 - OTHER INFORMATION

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