

STOODY 102, 104, 105, 107, 965G, 965-O, BUILD UP, 850-0

Chemwatch Material Safety Data Sheet

Issue Date: 6-Nov-2006

NC317ECP

CHEMWATCH 4686-10

Revision No:1

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

STOODY 102, 104, 105, 107, 965G, 965-O, BUILD UP, 850-0

SYNONYMS

"Build Up-G", "Build Up-O", "Super Build Up"

PRODUCT USE

Composite wires for Open Arc, Gas Metal Arc and Submerged Arc Welding.

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 | % |
|---|--------------------------------------|-----|
| tubular wire which in use generates welding fumes including iron oxide fume chromium fume | Not avail. 1309-37-1 7440-47-3 | >60 |

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| | |
|---|------------|
| manganese fume | 7439-96-5 |
| silica welding fumes | 69012-64-2 |
| fluoride fume | 16984-48-8 |
| nickel fume | 7440-02-0 |
| molybdenum fume | 7439-98-7 |
| copper fume | 7440-50-8 |
| action of arc on air may generate ozone | 10028-15-6 |
| nitrogen oxides | Mixture |

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.
- For "arc eye", i.e. welding flash or UV light burns to the eye:
- Place eye pads or light clean dressings over both eyes.
- Seek medical assistance.

SKIN

In case of burns:

- Quickly immerse affected area in cold running water for 10 to 15 minutes.
- Bandage lightly with a sterile dressing. Treat for shock if required.
- Lay patient down. Keep warm and rested.
- Transport to hospital, or doctor.

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.

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Section 4 - FIRST AID MEASURES

- 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].
- For acute or short term repeated exposures to fluorides:
- Fluoride absorption from gastro-intestinal tract may be retarded by calcium salts, milk or antacids.
 - Fluoride particulates or fume may be absorbed through the respiratory tract with 20-30% deposited at alveolar level.
 - Peak serum levels are reached 30 mins. post-exposure; 50% appears in the urine within 24 hours.
 - For acute poisoning (endotracheal intubation if inadequate tidal volume), monitor breathing and evaluate/monitor blood pressure and pulse frequently since shock may supervene with little warning. Monitor ECG immediately; watch for arrhythmias and evidence of Q-T prolongation or T-wave changes. Maintain monitor. Treat shock vigorously with isotonic saline (in 5% glucose) to restore blood volume and enhance renal excretion.
 - Where evidence of hypocalcaemic or normocalcaemic tetany exists, calcium gluconate (10 ml of a 10% solution) is injected to avoid tachycardia.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

| Determinant | Index | Sampling Time | Comments |
|--------------------|--------------------|----------------|----------|
| Fluorides in urine | 3 mg/gm creatinine | Prior to shift | B, NS |
| | 10mg/gm creatinine | End of shift | B, NS |

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other exposures.

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.

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Section 5 - FIRE FIGHTING MEASURES

HAZCHEM: None

Personal Protective Equipment

Breathing apparatus.

Gas tight chemical resistant suit.

Limit exposure duration to 1 BA set 30 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 in suitable containers for disposal.

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.

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.

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Section 7 - HANDLING AND STORAGE

STORAGE INCOMPATIBILITY

Segregate from strong acids.

STORAGE REQUIREMENTS

- Keep dry.
- Store under cover.
- Protect containers against physical damage.
- 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 | iron oxide fume (Iron oxide fume (Fe ₂ O ₃) (as Fe)) | | 5 | | | | | |
| Australia Exposure Standards | iron oxide fume (Inspirable dust (Not specified)) | | 10 | | | | | |
| Australia Exposure Standards | chromium fume (Chromium (metal)) | | 0.5 | | | | | |
| Australia Exposure Standards | chromium fume (Chromium (III) compounds (as Cr)) | | 0.5 | | | | | |
| Australia Exposure Standards | manganese fume (Manganese, fume (as Mn)) | | 1 | | 3 | | | |
| Australia Exposure Standards | manganese fume (Manganese, dust & compounds (as Mn)) | | 1 | | | | | |
| Australia Exposure Standards | fluoride fume (Fluorides (as F)) | | 2.5 | | | | | |
| Australia Exposure Standards | nickel fume (Nickel, metal) | | 1 | | | | | |
| Australia Exposure Standards | molybdenum fume (Molybdenum, insoluble compounds (as Mo)) | | 10 | | | | | |
| Australia Exposure Standards | copper fume (Copper, dusts & mists (as Cu)) | | 1 | | | | | |
| Australia Exposure Standards | copper fume (Copper (fume)) | | 0.2 | | | | | |
| Australia Exposure Standards | ozone (Ozone) | | | | | 0.1 | 0.2 | |

The following materials had no OELs on our record under the following CAS

- manganese fume: CAS:7439-96-5
- silica welding fumes: CAS:69012-64-2
- fluoride fume: CAS:16984-48-8
- molybdenum fume: CAS:7439-98-7
- copper fume: CAS:7440-50-8
- nitrogen oxides:

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EMERGENCY EXPOSURE LIMITS

| Material | Revised IDLH Value (mg/m ³) | Revised IDLH Value (ppm) |
|-----------------|--|-----------------------------|
| iron oxide fume | 2, 500 | |
| chromium fume | 250 | |
| manganese fume | 500 | |
| nickel fume | 10 | |
| molybdenum fume | 5, 000 | |
| copper fume | 100 | |
| ozone | | 5 |

Not available. Refer to individual constituents.

INGREDIENT DATA

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).

For each of the following

IRON OXIDE FUME:

CHROMIUM FUME:

MANGANESE FUME:

SILICA WELDING FUMES:

FLUORIDE FUME:

COPPER FUME:

Not available

NICKEL FUME:

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

MOLYBDENUM FUME:

An increased incidence of non-specific symptoms including headache, weakness, fatigue, anorexia and joint and muscle weakness has been reported to occur in mining and metallurgy workers exposed to 60-600 mg (as Mo). Some investigators have attributed gout and elevated uric acid concentration found in some Armenians to result from exposures to Armenian soils rich in molybdenum, whilst exposure has been implicated as a cause of bone disease amongst Indians. "These involvements are speculative". [US National Research Council]. As far as it is known, the recommended TLV-TWA incorporates a large margin of safety against potential pulmonary or systemic effects.

OZONE:

NOTE: Detector tubes for ozone, measuring in excess of 0.05 ppm, are commercially available.

Exposure at 0.2 ppm appears to produce mild acute but not cumulative effects. It is thought that exposures of the order of 0.1 ppm will be tolerated by most workers including asthmatics. Chronic exposure at

continued...

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

0.1 ppm or more can induce significant adverse effects in the lower respiratory tract of both normal and atopic individuals.

Human exposure for 2 hours at an average concentration of 1.5 ppm ozone resulted in a 20% reduction in timed vital capacity of the lung and other effects. Concentrations of ozone in excess of a few tenths ppm cause occasional discomfort to exposed individuals manifest as headache, dryness of the throat and mucous membranes of the eyes and nose following exposures of short duration.

Exposure to ozone during moderate to heavy work loads results in significantly decreased forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) at 0.12 ppm; this effect is greater at higher concentrations.

NITROGEN OXIDES:

Data for nitrogen dioxide:

TLV TWA: 3 ppm 6 mg/m3 STEL: 5 ppm 10 mg/m3

ES TWA: 3 ppm 5.6 mg/m3 STEL: 5 ppm 9.4 mg/m3

IDLH Level: 50 ppm

NOTE: Detector tubes for nitrogen dioxide, measuring in excess of 0.5 ppm, are commercially available.

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

| 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

For flux core arc welding the nature of ventilation is determined by the by BOTH the location of the work and the scale of weld production.

- For outdoor work, natural ventilation is generally sufficient for both normal and high levels of production.

- For indoor work, conducted in open spaces, use mechanical (general exhaust or plenum) ventilation for normal levels of production and mechanical exhaust ventilation using local exhaust systems. (Open work spaces exceed 300 cubic metres per welder)

- For work conducted in limited or confined spaces, mechanical ventilation, using local exhaust systems, is required at all levels of production. (In confined spaces always check that 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.

Special ventilation requirements apply for processes which result in the generation of barium, chromium, lead, or nickel fume and in those processes which generate ozone.

The use of mechanical ventilation by local exhaust systems is required as a minimum in all circumstances (including outdoor work). (In confined spaces always check that 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. 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: welding, brazing fumes (released at relatively low velocity into moderately still air) | Air Speed: 0.5- 1.0 m/s (100- 200 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 welding or brazing fumes generated 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.

If risk of inhalation or overexposure exists, wear SAA approved respirator or work in fume hood.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Tubular wire containing alloys and minerals. No odour cold. Insoluble in water.

PHYSICAL PROPERTIES

Does not mix with water.

Sinks in water.

Molecular Weight: Not applicable

Melting Range (°C): >1500

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): >6

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.

Arc rays can injure eyes.

SKIN

Skin contact does not normally present a hazard, though it is always possible that occasionally individuals may be found who react to substances usually regarded as inert. Chrome fume, as the chrome VI oxide, is corrosive to the skin and may aggravate pre-existing skin conditions such as dermatitis and eczema. As a potential skin sensitiser, the fume may cause dermatoses to appear suddenly and without warning. Absorption of chrome VI compounds through the skin can cause systemic poisoning effecting the kidneys and liver.

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 devices are inadequate, up to 10% of exposed workers are expected to be symptomatic.

Arc rays can burn skin.

INHALED

Chrome fume is irritating to the respiratory tract and lungs. Toxic effects result from over-exposure. Asthmatic conditions may result as a consequence of the sensitising action of chrome VI compounds.

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.

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.

Fluoride vapours and thermally produced particulates (fume) of the calcium, sodium and potassium salts are potent mucous membrane irritants.

Manganese fume is toxic and produces nervous system effects characterised by tiredness.

Acute poisoning is rare although acute inflammation of the lungs may occur. A chemical pneumonia may also result from frequent exposure. 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.

Harmful levels of ozone may be found when working in confined spaces. Symptoms of exposure include irritation of the upper membranes of the respiratory tract and lungs as well as pulmonary (lung) changes including irritation, accumulation of fluid (congestion and oedema) and in some cases haemorrhage. Exposure may aggravate any pre-existing lung condition such as bronchitis, asthma or emphysema.

CHRONIC HEALTH EFFECTS

Principal route of exposure is inhalation of welding fumes from electrodes and workpiece. Reaction products arising from electrode core and flux appear as welding fume depending on welding conditions, relative volatilities of metal oxides and any coatings on the workpiece. Studies of lung cancer among welders indicate that they may experience a 30-40% increased risk compared to the general population. Since smoking and exposure to other cancer-causing agents, such as asbestos fibre, may influence these results, it is not clear whether welding, in fact, represents a significant lung cancer risk. Whilst mild steel welding represents little risk, the stainless steel welder, exposed to chromium and nickel fume, may be at risk and it is this factor which may account for the overall increase in lung cancer incidence among welders. Cold isolated electrodes are relatively harmless.

Welding fume with high levels of ferrous materials may lead to particle deposition in the lungs (siderosis) after long exposure. This clears up when exposure stops. Chronic exposure to iron dusts may lead to eye disorders.

Exposure to fume containing high concentrations of water-soluble chromium (VI) during the welding of stainless steels in confined spaces has been reported to result in chronic chrome intoxication, dermatitis and asthma. Certain insoluble chromium (VI) compounds have been named as carcinogens (by the ACGIH) in other work environments. Chromium may also appear in welding fumes as Cr₂O₃ or double oxides with iron. These chromium (III) compounds are generally biologically inert.

severe disorders of the nervous system, has been reported in welders working on Mn steels in confined spaces.

Extended exposure to inorganic fluorides causes fluorosis, which includes signs of joint pain and stiffness, tooth discolouration, nausea and vomiting, loss of appetite, diarrhoea or constipation, weight loss, anaemia, weakness and general unwellness. There may also be frequent urination and thirst. Redness, itchiness and allergy-like inflammation of the skin and mouth cavity can occur. The central nervous system may be involved.

Other welding process exposures can arise from radiant energy UV flash burns, thermal burns or electric shock

The welding arc emits ultraviolet radiation at wavelengths that have the potential to produce skin tumours in animals and in over-exposed individuals, however, no confirmatory studies of this effect in welders have been reported.

TOXICITY AND IRRITATION

Not available. Refer to individual constituents.

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

WELDING FUMES:

Not available. Refer to individual constituents.

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

IRON OXIDE FUME:

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

No oral toxicity data.

Substance has been investigated as a tumorigen;

found to be an equivocal tumorigenic agent by RTECS criteria.

CHROMIUM FUME:

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

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Section 11 - TOXICOLOGICAL INFORMATION

Evidence of carcinogenicity may be inadequate or limited in animal testing.
Not available.

MANGANESE FUME:

TOXICITY

Inhalation (man) TCl_o: 2.3 mg/m³

Oral (rat) LD₅₀: 9000 mg/kg

The substance has been investigated as a tumorigen;

found to be an equivocal tumorigenic agent by RTECS.

IRRITATION

Skin (rabbit) 500mg/24H Mild

Eye (rabbit) 500mg/24H Mild

SILICA WELDING FUMES:

TOXICITY

Oral (rat) LD₅₀: 3160 mg/kg

[RTECS]

Reports indicate high/prolonged exposures to amorphous silicas induced lung fibrosis in experimental animals; in some experiments these effects were reversible. [PATTYS]

IRRITATION

No data

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

FLUORIDE FUME:

TOXICITY

Oral (human) LDLo: 50 mg/kg

Oral (human) TDLo: 3 mg/kg

IRRITATION

Nil Reported

NICKEL FUME:

TOXICITY

Oral (rat) LD₅₀: 5000 mg/kg

IRRITATION

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].

MOLYBDENUM FUME:

No significant acute toxicological data identified in literature search.

COPPER FUME:

Not available. Refer to individual constituents.

OZONE:

TOXICITY

Inhalation (human) LCLo: 50 ppm/30m

Inhalation (human) TCl_o: 1 ppm

Inhalation (rabbit) LC₅₀: 36 ppm/3m

NOTE: Aggravates chronic obstructive pulmonary diseases. Suspected also of increasing the risk of acute and chronic respiratory disease, mutagenesis and fetotoxicity. In animals short-term exposure to ambient concentrations of less than 1 ppm results in reduced capacity to kill intrapulmonary organisms and allows purulent bacteria to proliferate [Ellenhorn etal]

IRRITATION

Eye (rabbit): 2 ppm/4h

NITROGEN OXIDES:

continued...

STOODY 102, 104, 105, 107, 965G, 965-O, BUILD UP, 850-0

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Section 11 - TOXICOLOGICAL INFORMATION

Data for nitrogen dioxide:

TOXICITY

Inhalation (human) LCLo: 200 ppm/1m

Inhalation (man) TCLo: 6200 ppb/10m

Substance has been investigated as a mutagen and reproductive effector.

NOTE: Interstitial edema, epithelial proliferation and, in high concentrations, fibrosis and emphysema develop after repeated exposure.

IRRITATION

Nil reported

| MATERIAL | CARCINOGEN | REPROTOXIN | SENSITISER | SKIN |
|-----------------|--------------------|------------|------------|------|
| iron oxide fume | IARC:Group 3 | | | |
| chromium fume | IARC:Group 3 | | | |
| manganese fume | | ILOM ILOEI | | |
| nickel fume | IARC:Group 2B NTPB | ILOM ILOEI | AUOEL | |

CARCINOGEN

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

Category: Group 3: Not classifiable as to carcinogenicity to humans

CARCINOGEN

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

Category: Group 3: Not classifiable as to carcinogenicity to humans

REPROTOXIN

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

REPROTOXIN

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

CARCINOGEN

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

Category: Group 2B: Possibly carcinogenic to humans

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

Section 12 - ECOLOGICAL INFORMATION

DO NOT discharge into sewer or waterways.

Refer to data for ingredients, which follows:

SILICA WELDING FUMES:

No data

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

continued...

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)

1- 10

Effects of high availability in water

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

| | |
|-----------|--|
| 100- 1000 | affected and a variety of fish show sublethal effects. 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.

OZONE:

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.

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

Air Transport IATA:

| | | | |
|------------------|------|--------------------|------|
| ICAO/IATA Class: | None | ICAO/IATA Subrisk: | None |
| UN/ID Number: | None | Packing Group: | - |
| ERG Code: | - | | |
| Shipping name: | None | | |

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

Section 15 - REGULATORY INFORMATION**POISONS SCHEDULE: None****REGULATIONS**

welding fumes (CAS No:Not avail):
No regulations applicable

iron oxide fume (CAS: 1309-37-1) is found on the following regulatory lists;

- Australia Exposure Standards
- Australia High Volume Industrial Chemical List (HVICL)
- Australia Inventory of Chemical Substances (AICS)
- International Agency for Research on Cancer (IARC) Carcinogens
- International Council of Chemical Associations (ICCA) - High Production Volume List
- OECD Representative List of High Production Volume (HPV) Chemicals

chromium fume (CAS: 7440-47-3) 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 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 Ecosystem maintenance - Inorganic chemicals
- 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 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

manganese fume (CAS: 7439-96-5) is found on the following regulatory lists;

- Australia - Australian Capital Territory Environment Protection Regulation
- Agricultural Uses (IRRIG) - Physical and chemical quality
- Australia - Australian Capital Territory Environment Protection Regulation Domestic water quality standards - Inorganic chemicals
- Australia - Australian Capital Territory Environment Protection Regulation
- Pollutants entering waterways - Agricultural uses (Irrig)
- Australia - Australian Capital Territory Environment Protection Regulation
- Pollutants entering waterways - Domestic water quality
- Australia Exposure Standards
- Australia Inventory of Chemical Substances (AICS)
- Australia National Pollutant Inventory
- 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

silica welding fumes (CAS: 69012-64-2) is found on the following regulatory lists;

- Australia Inventory of Chemical Substances (AICS)
- OECD Representative List of High Production Volume (HPV) Chemicals

fluoride fume (CAS: 16984-48-8) is found on the following regulatory lists;

- 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 Domestic water quality standards - Inorganic chemicals
- Australia Dangerous Goods Code Draft 7th Edition - List of Common Pesticides with Corresponding UN Numbers
- Australia Exposure Standards
- Australia National Pollutant Inventory
- Australia Poisons Schedule

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
- 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 Domestic water quality standards - Inorganic chemicals
- Australia - Australian Capital Territory Environment Protection Regulation Ecosystem maintenance - Inorganic chemicals
- 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

molybdenum fume (CAS: 7439-98-7) 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 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 Domestic water quality standards - Inorganic chemicals

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 Exposure Standards

Australia Inventory of Chemical Substances (AICS)

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

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 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 Domestic water quality standards - Inorganic chemicals

Australia - Australian Capital Territory Environment Protection Regulation Ecosystem maintenance - Inorganic chemicals

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

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

ozone (CAS: 10028-15-6) is found on the following regulatory lists;

Australia - Australia New Zealand Food Standards Code - Processing Aids - Permitted bleaching agents, washing and peeling agents and in water used as an ingredient in other

STOODY 102, 104, 105, 107, 965G, 965-O, BUILD UP, 850-0

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Section 15 - REGULATORY INFORMATION

foods

Australia - Australia New Zealand Food Standards Code - Processing Aids - Permitted processing aids used in packaged water and in water used as an ingredient in other foods
Australia Exposure Standards

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

No data available for nitrogen oxides as CAS: Mixture.

Section 16 - OTHER INFORMATION

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