



WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 1 of 18

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

WIA AUSTARC 77

SYNONYMS

PH7725, PH732, PH7740, PH7750, W.I.A., "metal arc-welding flux-coated electrode", MMAW, "basic coated iron powder electrode", "low hydrogen mild steel welding rod"

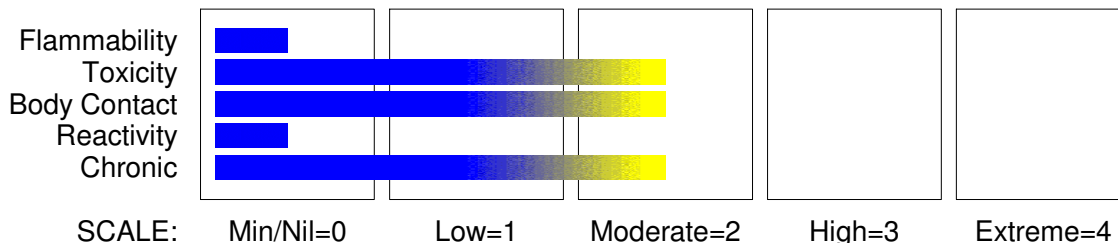
PRODUCT USE

Consumable, basic flux coated, low hydrogen status, iron powder electrode for manual metal arc welding in all positions except vertical down. Used where high ductility, low temperature impact properties and x- ray quality is required. Ideal for heavy plate and highly restrained work pieces for penstocks, turbines, pressure vessels, heavy girders, earth moving plant, etc. For low hydrogen levels electrodes should be baked out at 400°C for 1 hour to obtain <5mL (H₂)/100 g weld metal. After bakeout the electrodes should be used direct from a hot box set at 100- 150°C.

SUPPLIER

Company: Welding Industries of Australia
Address:
5 Allen Street
Melrose Park
SA, 5039
AUST
Telephone: +61 8 8276 6494
Telephone: 1300 300 884
Fax: 1300 301 884

HAZARD RATINGS



WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 2 of 18

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

None under normal operating conditions.

SAFETY

Safety Codes

S51

S09

S27

Safety Phrases

Use only in well ventilated areas.

Keep container in a well ventilated place.

Take off immediately all contaminated clothing.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
metal alloy wire with flux coat which upon use, generates: welding fumes as		Not avail.
iron oxide fume	1309-37-1	30-60
manganese fume	7439-96-5	1-5
fluoride fume	16984-48-8	1-5
silica welding fumes	69012-64-2	1-10
magnesium oxide fume	1309-48-4	1-5
potassium and calcium oxide fumes		10-30
titanium and aluminium oxide fumes		1-10
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 physical form of product.

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.

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 3 of 18
Section 4 - FIRST AID MEASURES

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.
- Protheses 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].

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

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 4 of 18
Section 4 - FIRST AID MEASURES

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

Product is considered stable and hazardous polymerisation will not occur.

HAZCHEM: None

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.

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 5 of 18
Section 6 - ACCIDENTAL RELEASE MEASURES

- Clean up/sweep up area. Water may be required.
- If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

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

life-threatening health effects is:

iron oxide fume	500 mg/m ³
silica welding fumes	50 mg/m ³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

iron oxide fume	25 mg/m ³
silica welding fumes	10 mg/m ³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

iron oxide fume	15 mg/m ³
silica welding fumes	6 mg/m ³

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

iron oxide fume	10 mg/m ³
silica welding fumes	2 mg/m ³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

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

where percentage is percentage of ingredient found in the mixture

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.

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 6 of 18
Section 7 - HANDLING AND STORAGE

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.

carton

STORAGE INCOMPATIBILITY

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

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.

Keep dry.

Bake out before use.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+ + + + + +

+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m ³	STEL mg/m ³	Peak ppm	Peak mg/m ³
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	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			

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 7 of 18

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Source	Material	TWA mg/m ³	STEL mg/m ³	Peak ppm	Peak mg/m ³
Australia Exposure Standards	magnesium oxide fume (Magnesium oxide (fume))	10			
Australia Exposure Standards	ozone (Ozone)			0.1	0.2

The following materials had no OELs on our records

- silica welding fumes: CAS:69012- 64- 2

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
iron oxide fume	2, 500	
manganese fume	500	
magnesium oxide fume	750	
ozone		5

ODOUR SAFETY FACTOR (OSF)

OSF=0.00025 (welding fumes)

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

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 8 of 18

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

MATERIAL DATA

None assigned. 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).

IRON OXIDE FUME:

Not available

MANGANESE FUME:

Not available

FLUORIDE FUME:

Not available

SILICA WELDING FUMES:

Not available

MAGNESIUM OXIDE FUME:

Not available

OZONE:

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 9 of 18

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

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 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].

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet

Issue Date: 14-Jul-2006

NC317TCP

CHEMWATCH 68259

Version No:4

CD 2007/3 Page 10 of 18

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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	BE- - AUS	-
1000	50	-	BE- - AUS
5000	50	Airline *	-
5000	100	-	BE- - 2
10000	100	-	BE- - 3
	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

For manual arc welding operations the nature of ventilation is determined by the location of the work.

· For outdoor work, natural ventilation is generally sufficient.

· For indoor work, conducted in open spaces, use mechanical (general exhaust or plenum) ventilation. (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. (In confined spaces always check that oxygen has not been depleted by excessive rusting of steel or snowflake corrosion of aluminium)

Mechanical or local exhaust ventilation may not be required where the process working time does not exceed 24 mins. (in an 8 hr. shift) provided the work is intermittent (a maximum of 5 mins. every hour). 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.)

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 11 of 18
Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 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 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 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. 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 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

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet

Issue Date: 14-Jul-2006

NC317TCP

CHEMWATCH 68259

Version No:4

CD 2007/3 Page 12 of 18

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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

Light grey, iron powder/basic flux coated rod with black tip. Imprint code, PH77 7018 E4818, on flux. No odour cold. Insoluble in water. Tensile strength of weld metal 552 MPa; CVN Impact Value 160J @ - 40°C. Typical weld metal composition: 0.05%C, 1.28%Mn, 0.30%Si, 0.011%S, 0.022%P, balance Fe.

PHYSICAL PROPERTIES

Does not mix with water.

Sinks in water.

Molecular Weight: Not applicable.

Melting Range (°C): 1500 approx

Solubility in water (g/L): Immiscible

pH (1% solution): Not applicable.

Volatile Component (%vol): Not applicable

Relative Vapour Density (air=1): Not available.

Lower Explosive Limit (%): Not applicable

Autoignition Temp (°C): Not applicable

State: Manufactured

Boiling Range (°C): Not applicable

Specific Gravity (water=1): >4

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 available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Product is considered stable and hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 13 of 18
Section 11 - TOXICOLOGICAL INFORMATION

SWALLOWED

Not normally a hazard due to physical form of product.
Considered an unlikely route of entry in commercial/industrial environments.

EYE

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

INHALED

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

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

Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort. A single acute over-exposure may even cause nose bleed. Pre-existing respiratory conditions such as emphysema, bronchitis may be aggravated by exposure. Occupational asthma may result from exposure.

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

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet

Issue Date: 14-Jul-2006

NC317TCP

CHEMWATCH 68259

Version No:4

CD 2007/3 Page 14 of 18

Section 11 - TOXICOLOGICAL INFORMATION

exposure to iron dusts may lead to eye disorders.

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.

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

Ozone is suspected to produce lung cancer in laboratory animals; no reports of this effect have been documented in exposed human populations.

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.

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:

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

MANGANESE FUME:

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

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

FLUORIDE FUME:

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

TOXICITY

Oral (human) LDLo: 50 mg/kg

Oral (human) TDLo: 3 mg/kg

IRRITATION

Nil Reported

SILICA WELDING FUMES:

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

TOXICITY

Oral (rat) LD₅₀: 3160 mg/kg

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

IRRITATION

No data [RTECS]

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet

Issue Date: 14-Jul-2006

NC317TCP

CHEMWATCH 68259

Version No:4

CD 2007/3 Page 15 of 18

Section 11 - TOXICOLOGICAL INFORMATION

reversible. [PATTYS]

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.

MAGNESIUM OXIDE FUME:

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

TOXICITY

Inhalation (human) TClO: 400 mg/m³

Substance has been investigated as a tumorigen;

found to be an equivocal tumorigenic agent by RTECS criteria

in rodents.

IRRITATION

Nil Reported

OZONE:

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

Asthma-like symptoms may continue for months or even years after exposure to the material

ceases. This may be due to a non-allergenic condition known as reactive airways

dysfunction syndrome (RADS) which can occur following exposure to high levels of highly

irritating compound. Key criteria for the diagnosis of RADS include the absence of

preceding respiratory disease, in a non-atopic individual, with abrupt onset of

persistent asthma-like symptoms within minutes to hours of a documented exposure to the

irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to

severe bronchial hyperreactivity on methacholine challenge testing and the lack of

minimal lymphocytic inflammation, without eosinophilia, have also been included in the

criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an

infrequent disorder with rates related to the concentration of and duration of exposure

to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that

occurs as result of exposure due to high concentrations of irritating substance (often

particulate in nature) and is completely reversible after exposure ceases. The disorder

is characterised by dyspnea, cough and mucus production.

NOTE: Aggravates chronic obstructive pulmonary diseases. Suspected also of

increasing the risk of ac

NITROGEN OXIDES:

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:3

manganese fume

ILOM ILOEI

CARCINOGEN

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

Category: 3

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

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet
Issue Date: 14-Jul-2006
NC317TCP

CHEMWATCH 68259
Version No:4
CD 2007/3 Page 16 of 18
Section 11 - TOXICOLOGICAL INFORMATION

Section 12 - ECOLOGICAL INFORMATION

No data
Refer to data for ingredients, which follows:

SILICA WELDING FUMES:
No data

OZONE:
DO NOT discharge into sewer or waterways.
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.
Ozone is found in the atmosphere in varying proportions as it is produced continuously in the outer layers of the atmosphere by the action of solar UV radiation on oxygen in the air. It is also formed locally in the air from lightning and from electrical sparks. In the upper atmosphere it inhibits penetration of UV radiation and so is beneficial to life. At ground level it is a harmful pollutant because of the damage it can cause to lungs and to a wide range of materials

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

WIA Austarc 77 (CAS: None):
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)

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet

Issue Date: 14-Jul-2006

NC317TCP

CHEMWATCH 68259

Version No:4

CD 2007/3 Page 17 of 18

Section 15 - REGULATORY INFORMATION

Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 2
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 4
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6
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

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

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (IRRIG - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (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

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

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (IRRIG - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (STOCK - 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 Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 2
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 4
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6

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

magnesium oxide fume (CAS: 1309-48-4) 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 Therapeutic Goods Administration (TGA) Substances that may be used as active ingredients in Listed medicines
CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

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

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

EXPOSURE STANDARD FOR MIXTURES

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

Composite Exposure Standard for Mixture (TWA) (mg/m³): 6 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 (%)
nitrogen oxides	3.00	6.0000	0.1

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.

At the "Composite Exposure Standard for Mixture" (TWA) (mg/m³): 6 mg/m³

continued...

WIA AUSTARC 77

Chemwatch Material Safety Data Sheet

Issue Date: 14-Jul-2006

NC317TCP

CHEMWATCH 68259

Version No:4

CD 2007/3 Page 18 of 18

Section 16 - OTHER INFORMATION

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: 14-Jul-2006

Print Date: 23-Oct-2007