WIA STAINCORD 309MO-16

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

WIA STAINCORD 309MO-16

SYNONYMS

"Product number SC309 Mo 25", "SC309 Mo 32", "SC309 Mo 40", "Welding Industries", W.I.A., "stainless-steel welding electrode", MMAW, 309Mo-16, "high chrome welding rod", "low carbon stainless welding rod"

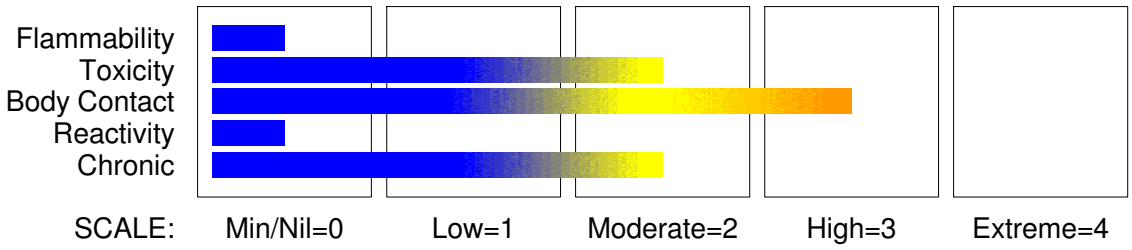
PRODUCT USE

Consumable electrode for manual metal arc welding applications involving single or multipass all position welding (except vertical down) of AISI 309Mo austenitic stainless steels.

SUPPLIER

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

HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

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

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POISONS SCHEDULE

None

RISK

Causes burns.
Limited evidence of a carcinogenic effect.
Risk of serious damage to eyes.
May cause SENSITISATION by skin contact.
Inhalation and/or ingestion may produce health damage*.
Cumulative effects may result following exposure*.
Possible respiratory sensitiser*.
May affect fertility*.
* (limited evidence).

SAFETY

Keep container in a well ventilated place.
Avoid exposure - obtain special instructions before use.
Take off immediately all contaminated clothing.
In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
metal flux-coated alloy which on use generates welding fumes as	Not avail.	
iron oxide fume	1309-37-1	30-60
fluoride fume	16984-48-8	10-30
silica welding fumes	69012-64-2	1-10
manganese fume	7439-96-5	1-10
chromium fume	7440-47-3	1-10
nickel fume	7440-02-0	1-10
aluminium fumes	7429-90-5	1-10
and fumes of		
potassium monoxide	12136-45-7	10-30
calcium oxide	1305-78-8	1-10
titanium dioxide	13463-67-7	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 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.

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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.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

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].
- Acute chromic acid ingestion causes acute gastroenteritis, hepatic necrosis, bleeding and acute tubular necrosis with renal failure. The efficacy of British Anti-Lewisite haemodialysis and exchange transfusion has not been established.
- Primary irritation, including chrome ulceration, may be treated with ointments comprising calcium-sodium-EDTA. This, together with the use of frequently renewed dressings, will ensure rapid healing of any ulcer which may develop. The mechanism of action involves the reduction of Cr (VI) or Cr (III) and subsequent chelation; the irritant effect of Cr (III) / protein complexes is thus avoided.

[ILO Encyclopedia]

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	Sampling time	Index	Comments
Total chromium in urine	Increase during shift	(10ug/g creatinine)	(B)
"	End of shift at end of workweek	(30ug/g creatinine)	(B)

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

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Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
• There is no restriction on the type of extinguisher which may be used.

FIRE FIGHTING
Alert Fire Brigade and tell them location and nature of hazard.
Product is not combustible. No special firefighting procedures required.

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
None known.

HAZCHEM
None

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

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS
Clean up all spills immediately.
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.

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/m³
fluoride fume	250 mg/m³

continued...

silica welding fumes	50 mg/m³
manganese fume	500 mg/m³
chromium fume	250 mg/m³
nickel fume	10 mg/m³
aluminium fumes	250 mg/m³
calcium oxide	25 mg/m³
titanium dioxide	500 mg/m³

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

iron oxide fume	25 mg/m³
fluoride fume	2.5 mg/m³
silica welding fumes	10 mg/m³
manganese fume	5 mg/m³
chromium fume	2.5 mg/m³
nickel fume	10 mg/m³
aluminium fumes	50 mg/m³
calcium oxide	5 mg/m³
titanium dioxide	15 mg/m³

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

iron oxide fume	15 mg/m³
fluoride fume	2.5 mg/m³
silica welding fumes	6 mg/m³
manganese fume	3 mg/m³
chromium fume	1.5 mg/m³
nickel fume	4.5 mg/m³
aluminium fumes	30 mg/m³
calcium oxide	5 mg/m³
titanium dioxide	15 mg/m³

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

iron oxide fume	10 mg/m³
fluoride fume	2.5 mg/m³
silica welding fumes	2 mg/m³
manganese fume	0.2 mg/m³
chromium fume	1 mg/m³
nickel fume	1 mg/m³
aluminium fumes	15 mg/m³
calcium oxide	5 mg/m³
titanium dioxide	15 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

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

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

+ + + + + +

continued...

+: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

Earth all lines and equipment.
- 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.

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.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL m5/m³	Peak ppm	Peak mg/m³
Australia Exposure Standards	iron oxide fume		5				
Australia Exposure Standards	iron oxide fume		10				
Australia Exposure Standards	fluoride fume		2.5				
Australia Exposure	manganese fume		1		3		

continued...

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL m5/m³	Peak ppm	Peak mg/m³
Standards							
Australia Exposure Standards	manganese fume		1				
Australia Exposure Standards	chromium fume		0.5				
Australia Exposure Standards	chromium fume		0.5				
Australia Exposure Standards	nickel fume		1				
Australia Exposure Standards	aluminium fumes		5				
Australia Exposure Standards	aluminium fumes		5				
Australia Exposure Standards	aluminium fumes		10				
Australia Exposure Standards	potassium monoxide		10				
Australia Exposure Standards	calcium oxide		2				
Australia Exposure Standards	titanium dioxide		10				
Australia Exposure Standards	ozone					0.1	0.2

The following materials had no OELs on our record under the following CAS or Chemwatch (CW) numbers
WIA Staincord 309Mo-16: No data available for CW:50518
welding fumes: No data available for CW:35201
fluoride fume: No data available for CAS:16984-48-8
silica welding fumes: No data available for CAS:69012-64-2
manganese fume: No data available for CAS:7439-96-5
potassium monoxide: No data available for CAS:12136-45-7
nitrogen oxides: No data available for
Mixture: No data available for

EMERGENCY EXPOSURE LIMITS

Material	Original IDLH Value (ppm)	Original IDLH Value (mg/m3)	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
iron oxide fume	N.E.	N.E.	2,500	
manganese fume	N.E.	N.E.	500	
chromium fume	N.E.	N.E.	250	
nickel fume	N.E.	N.E.	10	
calcium oxide	Unknown	Unknown	25	
titanium dioxide	N.E.	N.E.	5,000	
ozone	10			5

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

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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:
ES* TWA: 5 mg/m³ (as Fe in fumes and gases from welding and cutting)
TLV* TWA: 5 mg/m³ (as Fe) A4
NOTE: This substance has been classified by the ACGIH as A4 NOT classifiable as causing Cancer in humans.
OES* TWA: 5 mg/m³; STEL: 10 mg/m³ (as Fe)

FLUORIDE FUME:
TLV* TWA: 2.5 mg/m³
ES* TWA: 2.5 mg/m³
OES* TWA: 2.5 mg/m³
IDLH Level: 500 mg/m³

SILICA WELDING FUMES:
Not available. Refer to individual constituents.

MANGANESE FUME:
ES* TWA: 1 mg/m³ STEL: 3 mg/m³
OES* TWA: 1 mg/m³; STEL: 3 mg/m³ (as Mn)

CHROMIUM FUME:
as dust and fume:
TLV* TWA: 0.5 mg/m³
ES* TWA: 0.5 mg/m³

NICKEL FUME:
TLV* TWA: 1.5 mg/m³ A5 (as Ni elemental)
NOTE: This substance has been classified by the ACGIH as A5 NOT suspected of causing Cancer in humans.
ES* TWA: 1 mg/m³ Sensitiser (Under review)
NOTE: Detector tubes for nickel, measuring in excess of 0.25 mg/m³ (as Ni), are commercially available.

ALUMINIUM FUMES:
ES* TWA: 5 mg/m³ (welding fumes) (as Al) M.Wt. 26.98
TLV* TWA: 5 mg/m³ aluminum welding fumes, as Al

POTASSIUM MONOXIDE:
These "dusts" have little adverse effect on the lungs and do not produce toxic effects or organic disease. Although there is no dust which does not evoke some cellular response at sufficiently high concentrations, the cellular response caused by P.N.O.C.s has the following characteristics:
· the architecture of the air spaces remain intact,
· scar tissue (collagen) is not synthesised to any degree,
· tissue reaction is potentially reversible.
Extensive concentrations of P.N.O.C.s may:
· seriously reduce visibility,
· cause unpleasant deposits in the eyes, ears and nasal passages,

continued...

· contribute to skin or mucous membrane injury by chemical or mechanical action, per se, or by the rigorous skin cleansing procedures necessary for their removal. [ACGIH]
This limit does not apply:
· to brief exposures to higher concentrations
· nor does it apply to those substances that may cause physiological impairment at lower concentrations but for which a TLV has as yet to be determined.
This exposure standard applies to particles which
· are insoluble or poorly soluble* in water or, preferably, in aqueous lung fluid (if data is available) and
· have a low toxicity (i.e.. are not cytotoxic, genotoxic, or otherwise chemically reactive with lung tissue, and do not emit ionizing radiation, cause immune sensitization, or cause toxic effects other than by inflammation or by a mechanism of lung overload).

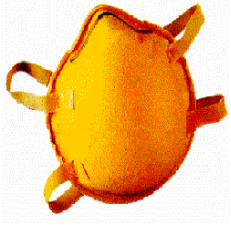
CALCIUM OXIDE:
The TLV-TWA is thought to be protective against undue irritation and is analogous to that recommended for sodium hydroxide.

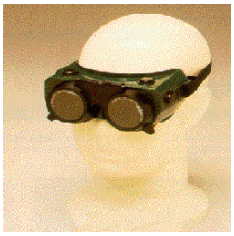
TITANIUM DIOXIDE:
Animal studies at 10 mg/m³ show no significant fibrosis, possibly reversible tissue reaction and the architecture of lung air spaces remains intact.

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 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 is 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





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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.

ENGINEERING CONTROLS

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:	Air Speed:
welding " brazing fumes (released at relatively low velocity into moderately still air)	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

continued...

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

Grey metallic welding rod of a extra low carbon, rutile type powder flux extruded around a stainless steel wire.
Cold electrodes are odourless. Insoluble in water.
Weld deposit 0.25%C< 0.8% Mn, 0.7%Si, 23.5%Cr, 13%Ni, 2.4%Mo, balance Fe.
Tensile strength 670 MPa.

PHYSICAL PROPERTIES

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

Molecular Weight: Not applicable.
Melting Range (°C): >1400
Solubility in water (g/L): Immiscible
pH (1% solution): Not applicable
Volatile Component (%vol): Negligible
Relative Vapour Density (air=1): Not available.
Lower Explosive Limit (%): Not available
Autoignition Temp (°C): Not available
State: Manufactured

Boiling Range (°C): Not applicable
Specific Gravity (water=1): >4
pH (as supplied): Not applicable
Vapour Pressure (kPa): Negligible
Evaporation Rate: Not applicable
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not available
Decomposition Temp (°C): Not available.

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

continued...

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.
The material may produce moderate eye irritation leading to inflammation.
Repeated or prolonged exposure to irritants may produce conjunctivitis.

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

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.
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.
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.
Effects on lungs are significantly enhanced in the presence of respirable particles.
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.
The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

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

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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. 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. 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. WARNING: Nickel is classified by IARC as Group 1 - CARCINOGENIC TO HUMANS. There is little information on the effects on welders of fume containing nickel. 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.

MATERIAL	CARCINOGEN	SENSITISER	SKIN	REPROTOXIN
iron oxide fume	IARC:Group 3: Not classifiable as to "carcinogenicity" to humans			
manganese fume				ILOM ILOEl
chromium fume	IARC:Group 3: Not classifiable as to "carcinogenicity" to humans			
nickel fume	IARC:Group 2B: Possibly carcinogenic to humans NTPB	AUOEL		ILOM ILOEl
titanium dioxide	IARC:Group 3: Not classifiable as to "carcinogenicity" to humans			

CARCINOGEN

IARC: International Agency for Research on Cancer (IARC)
Carcinogens: iron oxide 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: chromium fume Category: Group 3: Not classifiable as to carcinogenicity to humans
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:
SENSITISER
AUOEL: Australia Exposure Standards - Sensitisers: nickel fume
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
CARCINOGEN
IARC: International Agency for Research on Cancer (IARC)
Carcinogens: titanium dioxide Category: Group 3: Not classifiable as to carcinogenicity to humans

Section 12 - ECOLOGICAL INFORMATION

No data
Refer to data for ingredients, which follows:

SILICA WELDING FUMES:
No data

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.

continued...

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM

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 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

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

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

manganese fume (CAS: 7439-96-5) is found on the following regulatory lists;
Australia Inventory of Chemical Substances (AICS)
OECD Representative List of High Production Volume (HPV) Chemicals

chromium fume (CAS: 7440-47-3) is found on the following regulatory lists;
Australia - Western Australia Hazardous Substances Prohibited for Specified Uses or Methods of Handling
Australia Inventory of Chemical Substances (AICS)
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

nickel fume (CAS: 7440-02-0) is found on the following regulatory lists;
Australia - Western Australia Hazardous Substances Prohibited for Specified Uses or Methods of Handling
Australia High Volume Industrial Chemical List (HVICL)
Australia Inventory of Chemical Substances (AICS)
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

aluminium fumes (CAS: 7429-90-5) is found on the following regulatory lists;
Australia High Volume Industrial Chemical List (HVICL)
Australia Inventory of Chemical Substances (AICS)
OECD Representative List of High Production Volume (HPV) Chemicals

continued...

potassium monoxide (CAS: 12136-45-7) is found on the following regulatory lists;
Australia Inventory of Chemical Substances (AICS)

calcium oxide (CAS: 1305-78-8) is found on the following regulatory lists;
Australia High Volume Industrial Chemical List (HVICL)
Australia Inventory of Chemical Substances (AICS)
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

titanium dioxide (CAS: 13463-67-7) is found on the following regulatory lists;
Australia High Volume Industrial Chemical List (HVICL)
Australia Inventory of Chemical Substances (AICS)
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for welding fumes as CAS: Not avail.
No data available for ozone as CAS: 10028-15-6.
No data available for nitrogen oxides as CAS: Mixture.

Section 16 - OTHER INFORMATION

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