



SAFETY DATA SHEET

LOW HYDROGEN CARBON STEEL WELDING ELECTRODES

Rev. 1

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Names	PHC6H, PH27, PH27P, PH56S, PH77, PH16TC
Product Group	Low Hydrogen Carbon Steel
AWS Spec	E7016, E7018, E7018-1, E7028, E7048, E8018G
Manufacturer	Weldwell New Zealand
Address	59 Thames Street, Napier, New Zealand
Telephone No	+64 6 834-1600
Facsimile	+64 6 834-1608
Emergency Telephone No	0800 CHEMCALL (0800 243 622) 24 Hours

2 HAZARDS IDENTIFICATION

Dangerous Goods	Non-dangerous Goods
Hazardous Substances	Non-dangerous goods according to the criteria of NOHSC and the ADG Code
HSNO Classifications	None
Hazard Statements	Limited evidence of carcinogenic effect
Precautionary Statements	Wear suitable protective clothing and use only in well ventilated areas. Avoid contact with skin.

3 COMPOSITION / INFORMATION ON INGREDIENTS

Name: Metal Alloy wire with flux coating which upon use, generates welding fumes as:

Chemical Entity	Cas No	Values %
Iron Oxide Fume	1309-37-1	10-40%
Silica Welding Fumes	69012-64-2	1-10%
Magnesium Oxide Fumes	7440 47 3	0-10%
Manganese Fume	7439-96-5	0-15%
Titanium, Sodium, Potassium and Calcium Oxide Fumes	Not available	30-60%
Fluorine Fume	16984 48 8	1-10%
Action of arc on air may generate:		
Ozone	10028-15-6	
Nitrogen Oxides	Mixture	

4 FIRST AID MEASURES

SWALLOWED

Not normally a hazard due to the physical form of product. The material is a physical irritant to the gastrointestinal 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

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.

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.

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 in the event of a fire.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use firefighting procedures suitable for surrounding area.

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 INCOMBATABILITY

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

Welding arc and metals sparks can ignite combustibles.

HAZHEM

None

6 ACCIDENTAL RELEASE MEASURES

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.
- Prevent, by any means available, spillage from entering drains or water courses.

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

7 HANDLING AND STORAGE

Handling	No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels. Keep dry.
Storage	Keep separate from acids and strong bases to prevent possible chemical reactions. Keep dry.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL	STEL mg/m ³	Peak	Peak mg/m ³	IDLH ppm
Australia Exposure Standards	Fluoride Fume as F		2.5					
Australia Exposure Standards	Manganese fume Fume as in Mn				3			
Australia Exposure Standards	Ozone	0.1						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 0.18-110-50% 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

MATERIAL DATA

FLUORIDE FUME: Fluoride (as F) TWA 2.5mg/m³

MANGANESE FUME:

It is the goal of the ACGIH (and other agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience).

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

NITROGEN OXIDE:

WELDING FUMES:

For nitric oxide:

Odour Threshold: 0.3 to 1 ppm.

NOTE: Detector tubes for nitrogen oxide, measuring in excess of 10 ppm, are commercially available.<

OZONE:

WELDING FUMES:

For 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.

In addition to complying with any individual exposure standards for specific contaminants, where current manual welding processes are used, the fume concentration inside the welders 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.

During use the gases nitric oxide, nitrogen peroxide and ozone may be produced by the consumption of the electrode or the action of the welding arc on the atmosphere.

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 Welding Gloves

Feet Safety Footwear

Other Overalls

Eyewash unit

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

RESPIRATOR

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

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

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Special ventilation requirements apply for processes which result in the generation of 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.

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

9 PHYSICAL AND CHEMICAL PROPERTIES

Welding consumables applicable to this sheet as shipped are non-reactive, non-flammable, non-explosive and essentially non-hazardous until welded. Insoluble in water. 0.06% C, 1.3% Mn, 0.4% Si, 0.02% P, 0.01% S, 0.02% Cu.

Physical State	Cored Wire
Colour	White / Grey
Odour	Not applicable
Form	Round wire
Melting Range	%C > 1500
Solubility in H ₂ O	Immiscible
Specific gravity (water=1)	>4

10 STABILITY AND REACTIVITY

General: Welding consumables applicable to this sheet are solid and non-volatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base

metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.

Stability: This product is stable under normal conditions.

Reactivity: Contact with acids or strong bases may cause generation of gas.

11 TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label.

ACUTE HEALTH EFFECTS

- 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.

Manganese fume is toxic and produces nervous system effects characterised by tiredness. Acute poisoning is rare although acute inflammation of the lungs may occur.

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.

If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.

Harmful levels of ozone may be found when working in enclosed 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.

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.

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.

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 may occur. The central nervous system may be involved.

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 over-exposed individuals, however, no confirmatory studies of this effect in welders have been reported.

TOXICITY AND IRRITATION

- Not available. Refer to individual constituents.

CARCINOGEN

Iron oxide fume	International Agency for Research on Cancer (IARC) – Agents Reviewed by the IARC Monographs	Group	3	Not classifiable as to its carcinogenicity to humans
Fluoride fume	International Agency for Research on Cancer (IARC) – Agents Reviewed by the IARC Monographs	Group	3	Not classifiable as to its carcinogenicity to humans

REPROTOXIN

Manganese fume	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility sterility	H si
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12 ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. WEelding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
Welding Fumes	No Data Available	No Data Available	No Data Available	No Data Available
Iron Oxide Fumes	No Data Available	No Data Available	No Data Available	No Data Available
Manganese Fumes	No Data Available	No Data Available	No Data Available	No Data Available
Magnesium Oxide Fume	No Data Available	No Data Available	No Data Available	No Data Available
Silica Welding Oxide Fume	No Data Available	No Data Available	No Data Available	No Data Available
Fluoride Fume	No Data Available	No Data Available	LOW	HIGH
Ozone	No Data Available	No Data Available	LOW	No Data Available
Nitrogen Oxides	No Data Available	No Data Available	No Data Available	No Data Available

13 DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with local regulations.

Recycle containers if possible, or dispose of in an authorised landfill.

14 TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions necessary.

15 REGULATORY INFORMATION

POISONS SCHEDULE

None

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

"Australia – South Australia Controlled Substances (Poisons) Regulations – Schedule E: Schedule 2 poisons authorised to be sold by holder of a medicine sellers licence", "Australia FAISD Handbook – First Aid Instructions, Warning Statements, and General Safety Precautions", "Australia Hazardous Substances Information System – Consolidated Lists", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) – Schedule 4", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) – Scheduler 5", "Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) – Schedule 6", "Fisher Transport Information", "International Agency for Research on Cancer (IARC) – Agents Reviewed by the IARC Monographs", "International Council of Chemical Associations (ICCA) – High Production Volume List", "International Numbering System for Food Additives", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-Aldrich Transport Information"

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 – Domestic water supply quality", "Australia – Australian Capital Territory – Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (IRRIG)", "Australia Drinking Water Guideline Values for Physical and Chemical Characteristics", "Australia Exposure Standards", "Australia Hazardous Substances Information System – Consolidated Lists", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia National Environment Protection (Ambient Air Quality) Measure – Schedule 1: Pollutants", "Australia National Environment Protection (Ambient Air Quality) Measure – Schedule 2 Table 1: Standards and Goal for Pollutants other than Particles as PM2.5", "Australia National Pollutant Inventory", "Fisher Transport Information", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-Aldrich Transport Information", "WHO Guidelines for Drinking-water Quality – Chemicals for which guideline values have not been established"

Magnesium Oxide Fume (CAS: 7440-47-3) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances Information System- Consolidated Lists", "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", "Fisher Transport Information", "International Council of Chemical Associations (ICCA) – High Production Volume List", "International; Numbering System for Food Additives", "OECD List of High Production Volume (HPV) Chemicals", "Sigma-Aldrich Transport Information".

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

"Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "OECD 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: Ambient environmental standards (IRRIIG) – inorganic chemicals)", "Australia Exposure Standards", "Australia Hazardous Substances Information System – Consolidated Lists", "Australia New Zealand Food Standard Code – Maximum Residue Limits (Australia only) – schedule 1", "Australia Standard for the Uniform Scheduling of Medicines and poisons (SUSMP) – Schedule 3", "International Agency for Research on Cancer (IARC) – Agents Reviewed by the IARC Monographs".

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

"Australia – Victoria Occupational Health and Safety Regulations – Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 2", "Australia Drinking Water Guideline Values for Physical and Chemical Characteristics", "Australia Exposure Standards", "Australia Hazardous Substances Information System – Consolidated Lists", "Australia National Environment Protection (Ambient Air Quality) Measure – Schedule 1: Pollutants", "Australia National Environment Protection (Ambient Air Quality) Measure – Schedule 2 Table 1: Standards and Goals for Pollutants other than Particles as PM2.5", "Australia Quarantine and Inspection Service List of chemical compounds that are accepted solely for use at establishments registered to prepare meat and meat products for the purpose of the Export Control Act 1982", "OECD List of High Production Volume (HPV) Chemicals", "United Nations Consolidated List of Products Whose Consumption and/or Sale Have Been Banned, Withdrawn, Severely Restricted or Not Approved by Governments"

16 OTHER INFORMATION

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