Material Safety Data Sheet

PACWELD 106 – All Purpose "Rutile" Electrode

Identity	Supplier's Name	Supplier's Address	Date	Telephone No.	Facsimile No.
Pacweld Welding Consumable	3D Safety Services Pty Ltd	27 Sir Joseph Banks Street Botany, NSW 2019	01-10-2004	1300 663 195	1300 663 495

This product is hazardous according to Worksafe Australia Criteria

Section 1 - Pacweld Numbers For Grouping						
Group A	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Bare or Core Stainless Wires**
102 106 107 108 212 800 800A 800SR	103 105 116 118	531 532 533 535 538 540	5056T	101 104 112 130 132	211 213 214	11 13 14F 17 17F 1104F 1117F

Section 2 – Fire and Explosion Hazard

Welding consumable applicable to this sheet as shipped are non-reactive, non-flammable, non explosive, and essentially non-hazardous until welded. Packaging used may be flammable. Welding arcs and sparks can ignite combustible and flammable products.

Section 3 - Reactivity

Welding fumes present a hazard, not the ingredients of the electrode. The composition and quantity of these are dependent upon the metal being welding, procedures, electrodes type and electrode size. Other conditions which also influence the composition and quantity of the fumes and gases to which worker may be exposed include: coatings on the metal being welded (such as paint, plating or galvanising). The number of welders and volume of work area, quality and amount of ventilation, position of welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapours from cleaning and degreasing activities).

Decomposition products of normal operation include those originating from the volatilisation, reaction or oxidisation of the electrode materials. Plus those from the base metal and coatings etc, as noted above. These elements and/or oxides are virtually always present as complex oxides and not as metals (Characterisation of Arc Welding Fume: American Welding Society).

Reasonably expected constituents of the fume would include: primary and secondary complex oxides of manganese, silicon and titanium. All groups may have fluorides present. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. One recommended way to determine to composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welders helmet, if worn, or in the worker's breathing zone. Refer AS3853 WTIA technical note and AS1674 Part 3 Fume.

Section 4 - Group A		
Substance	**CAS No.**	**Exposure Limit (mg/m^3)**
Iron Oxide	1309-37-1	5
Manganese	7439-96-5	1.3 STEL
Silica	60676-86-0	0.1
Titanium Dioxide	13463-67-7	5
Fluorides (1)	---	2.5 (as F)
Molybdenum (2)	7439-98-7	5

Section 5 – Group B		
Substance	**CAS No.**	**Exposure Limit (mg/m^3)**
Iron Oxide	1309-37-1	5
Manganese	7439-96-5	1.3 STEL
Silica	60676-86-0	0.1
Titanium Dioxide	13463-67-7	5
Fluorides	---	2.5 (as F)
Nickel (soluble)	---	0.05 (as Ni) **
Nickel compounds	---	0.05 (as Ni) **
Magnesium Oxide	1309-48-4	5
Molybdenum	7439-98-7	5

Section 6 - Group C		
Substance	**CAS No.**	**Exposure Limit (mg/m^3)**
Iron Oxide	1309-37-1	5
Manganese	7439-96-5	1.3 STEL
Silica	60676-86-0	0.1
Titanium Dioxide	13463-67-7	5
Fluorides	---	2.5 (as F)
Chromium Oxides (as Cr (II), Cr (III))	---	0.5 (as Cr(II), (Cr(III)
Chromium (insoluble, as Cr (VI))	---	0.05 (as Cr (VI) **
Calcium Oxide	1305-78-8	2

Section 7 – Group D							
Material	**CAS No.**	**Weight**	**TLV (1) mg/m^3**	**Material**	**CAS No.**	**Weight**	**TLV (1) mg/m^3**
SiO_2	61790-53-2	0	10	Fe	7439-89-6	25	5
TiO_2	13463-67-7	30	10	Cr	7440-47-7	20	.5
Al_2O_3	1344-28-1	5	10	Ni	7440-02-0	0	1
Fe_2O_3	1309-37-1	0	5 ***	Mo	7439-98-7	4	10

MnO	7439-96-5	0	5	Nb	7440-01-1	0	---
CaO	1305-78-8	10	2	V	1314-62-1	0	.05 ****
MgO	1309-48-4	0	10	W	7440-33-7	0	5
$K_2O + Na_2O$	---	0	---	C	1333-86-4	5	3.5
F^-	---	5	2.5	Cu	7440-50-8	0	1
BaO	7440-39-3	0	.5 ***	Co	7440-48-4	0	0.5
Mn	7439-96-5	3	5				
Si	7440-21-3	0	10				
Cellulose & Derivatives	9004-34-6	0	10				
Wire and strip composition (including outer strip for flux-cored wire and manual electrode core-wire)							
Fe	7439-89-6	100	5	W	7440-33-7	0	5
Cr	7440-47-3	0	0.5	C	1333-86-4	0	3.5
Ni	7440-02-0	0	1	Cu	7440-50-8	0	1
Mo	7439-98-7	0	10	Co	7440-48-4	0	.05
Nb	7440-03-1	0	---	Si	7440-21-3	0	10
V	1314-62-1	0	.05 **	Mn	7439-96-5	0	5

Section 8 - Group E		
Substance	**CAS No.**	**Exposure Limit (mg/m³)**
Iron Oxide	1309-37-1	5
Manganese	7439-96-5	1.3 STEL *
Silica	60676-86-0	0.1
Titanium Dioxide	13463-67-7	5
Fluorides	---	2.5 (as F)
Nickel (soluble)	---	0.05 (as Ni) **
Nickel compounds	---	0.05 (as Ni) **
Magnesium Oxide	1309-48-4	5
Chromium Oxides (as Cr (II), Cr (III))	---	0.5 (as Cr(II), (Cr(III))
Chromium (insoluble, as Cr (VI))	---	0.05 (as Cr (VI) **
Molybdenum	7439-98-7	5

Section 9 – Group F		
Substance	**CAS No.**	**Exposure Limit (mg/m³)**
Iron Oxide	1309-37-1	5
Manganese	7439-96-5	1.3 STEL *
Silica	60676-86-0	0.1
Titanium Dioxide	13463-67-7	5
Fluorides	---	2.5 (as F)
Nickel (soluble)	---	0.05 (as Ni) **
Nickel compounds	---	0.05 (as Ni) **

Barium	7440-39-3	0.5
Copper	7440-50-8	0.1

Legend

(1) Present ** Confirmed Human Carcinogen
(2) Present *** as Barium
(3) Present in Pacweld 535 **** as $V_2 0_5$
* STEL Short Term Exposure Limit ***** as Fe

Section 10 - Bare or Core Stainless Steel Wire			
Element	**CAS No.**	**PEL (mg/m^3) (1)**	**TLV (mg/m^3) (2)**
Chromium (VI)	7440-47-3	0.1	0.05
Nickel (soluble)	7440-02-0	10	0.1
Molybdenum (soluble)	7439-98-7	50	5.0
Manganese	7439-96-5	5.0 (ceiling)	1.0 (fume)
Silicon	60676-76-86-0	Not Listed	5 mg/m^3 respirable dust
$Si0_2$ (amphorous, respirable)	---	---	10 mg/m^3 total dust
Copper (fume)	7440-50-8	0.1	0.2

Section 11 – Self Shielded Tubular Wire Carbon Steel				
Element		**CAS No.**	**PEL (mg/m^3) (1)**	**TLV (mg/m^3) (2)**
Iron +	75-95	7439-89-6	5 R 10 (Oxide fume)	10 * 5 (Oxide fume)
Manganese	<2	7439-96-5	5 CL * (dust) 1.3 STEL * (fume)	5 (dust) 1.3 STEL * (fume)
Titanium Dioxide	<4	13463-67-7	5 R	10 *
Magnesium	<3	1309-48-4	5 R * (fume)	10 (fume)
Silicon	<2	7440-21-3	5 R	10
Fluorspar	5-10	7789-75-5	2.5 (as F)	2.5 (as F)
Barium Fluoride	<3	7787-32-8	0.5 (as Ba)	0.5 (as Ba)
Aluminium	<3	7429-90-5	5 R * (dust) 5 (fume)	10 (dust) 5 (fume)
Nickel	<1	7440-02-0	1 (metal & insoluble compounds) 0.1 (soluble compounds)	1 (metal & insoluble compounds) 0.1 (soluble compounds)
Calcium Carbonate	<2	1317-65-3	5R * 5 (as Ca0)	10 2 (as Ca0)
Strontium Fluoride	<2	7783-48-4	2.5 (as F)	2.5 (as F)

Section 12 - Health Hazard

Electric arc welding may create one or more of the following health hazards:

- ARC RAYS can injure eyes and burn skin
- ELECTRIC SHOCK can kill, see Section 15
- FUMES AND GASES can be dangerous to your health
- PRIMARY ROUTES OF ENTRY are the respiratory system, eyes and/or skin

Section 13 – Short Term (Acute) Over Exposure Effects

May result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat or eyes.

IRON, IRON OXIDE – None are known. Treat as nuisance dust or fume.

MANGANESE – Metal fume fever, characterised by chills, fever, upset stomach, vomiting, irritation of throat and aching of body.

FLUORIDES – Fluoride compounds evolved may cause skin and eye burns, pulmonary oedema and bronchitis.

NICKEL, NICKEL COMPOUNDS – Metallic taste, nausea, tightness in chest, fever, allergic reactions.

CHROMIUM – Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory system, lung damage and asthma like symptoms. Dust on the skin can form ulcers. Eyes may be burned by chromium (6) compounds. Allergic reaction are likely in some people form chromium compounds.

COPPER – Metal fume fever can be caused by fresh copper oxide.

BARIUM – Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia.

Section 14 - Long Term (Acute) Over Exposure Effects

Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or 'siderosis'.

IRON, IRON OXIDE FUMES - Siderosis or deposits of iron in lungs which is believed to affect pulmonary function. Lungs will clear in time when exposure to iron fumes and its compound ceases. Iron and magnetite (Fe_30_4) are not regarded as fibrogenic materials.

MANGANESE - Central nervous system effects referred to as 'manganism' symptoms include muscular weakness, tremors similar to Parkinson's disease. Behavioural changes and changes in handwriting may also appear.

FLUORIDES - Serious bone erosion (osteoporosis) and mottling of teeth.

NICKEL, NICKEL COMPOUNDS - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers.

CHROMIUM - Ulceration and perforation of the nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds.

COPPER - No adverse long term health effects have been reported in the literature.

BARIUM - Long-term exposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature.

Section 15 - Precautions For Safe handling and Use

Read and understand the manufacture's instructions and the precautionary label on this product.

VENTILATION - Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases below the TLV's in the workers breathing zone and the general area. Train the welder to keep his head out of the fumes.

RESPIRATORY PROTECTION - Use approved fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

EYE PROTECTION - Wear helmet or use faceshield with filter lens. As a rule of thumb, begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective

screens and flash goggles, if necessary, to shield others.

PROTECTIVE CLOTHING - Wear head, hand and body protection which help to prevent injury from radiation, sparks and electrical shocks. At a minimum, this includes welders gloves and a protective faceshield and may include arm protectors, aprons, hats, shoulder protection, as well as dark non-synthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

WASTE DISPOSAL - Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with local body regulations.

SPECIAL PRECAUTION - Maintain exposure below the TLV. Use industrial hygiene monitoring to ensure that your use of the product does not create exposures which exceed TLV's.

3D Safety Services Pty Ltd believes this information to be accurate and to reflect qualified expert opinion regarding current research. However, 3D Safety Services Pty Ltd cannot make any express and implied warranty as to this information.