SAFETY DATA SHEET (SDS)

MILD STEEL & LOW ALLOYS

1	**Identification**
1.1	**GHS product identifier** **Trade names:** 220, 221 RP, 222, 223 XC®, 224 Super 18 (E7018), 226X, 293 XC, FCO222, FCO225N, FCS171, FCS210N2, FCS223N, FCS224N, FCS1171M, FCS2780, Arcfusion Wires (XM71, XR71, XR81, XM81, XM91, XR91, XR111, XRS99), ER70S-2, ER70S-3, ER70S-6, CC Steel, LBS Steel, Hi Test Steel, P444, PRO3000, PRO3038, #1 Cast Iron
1.2	**Other means of identification:** N. App.
1.3	**Recommended use of the chemical and restriction on use:** Metal cored and flux cored welding wire used for arc welding, gas metal arc welding, shielded metal welding and oxy-fuel welding. Metal Flame Spray Powder (P444, PRO3000, PRO3038). Do not weld near flammable or combustible materials.
1.4	**Supplier:** Arctec Alloys Limited 4304 - 10 St. N.E., Calgary, Alberta, T2E 6K3 Phone: (403) 250-9355
1.5	**Emergency phone number:** HealthLink 24/7 (Alberta Health Services): 800-624-2356 Out-of-province or internet phone users: 866-408-5465
2	**Hazard(s) Identification**
2.1	**Classification of the substance or mixture:** Class: Carcinogenicity — Category: 1A Class: Reproductive Toxicity — Category: 2 Class: Germ Cell Mutagenicity — Category: 1B Class: Respiratory Sensitization — Category: 1 Class: Skin Sensitization — Category: 1 Class: Specific Target Organ Toxicity – (repeated exposure) — Category: 1 Target Organs: Lungs, Kidneys, Liver, Respiratory System, Nerves, Blood, Eyes, Skin 
2.2	**GHS label elements:** **Signal Word:** Danger **Hazard Statements:** H315 Causes skin irritation. H317 May cause an allergic skin reaction. H319 Causes serious eye irritation. H331 Toxic if inhaled. H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled. H340 May cause genetic defects. H350 May cause cancer. H361 Suspected of damaging fertility or the unborn child. H372 Causes damage to organs through prolonged or repeated exposure. H410 Very toxic to aquatic life with long-lasting effects. **Precautionary Statements:** P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P283 Wear fire resistant or flame retardant clothing.
P284 In case of inadequate ventilation wear respiratory protection.

Response Statements:

P308 + P313 If exposed or concerned, get medical advice/attention.
P314 Get medical attention if you feel unwell.
P332 + P352 IF SKIN irritation occurs: Wash with plenty of water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical attention.

2.3 Other hazards which do not result in classification

Other hazards:

Persons with pacemakers should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.
Heat: Spatter and melting metal can cause burn injuries and start fires.
Radiation: Arc rays can severely damage eyes or skin.
Electricity: Electric shock can kill.

3 Composition/Information on Ingredients

Chemical Name	Weight %											CAS Number	EINECS Number
	220	221RP	222	223 XC®	224 Super 18	293 XC	FCO 222	FCO 225N	FCS 171	FCS 210 N2	FCS 223N		
Aluminum	2-12	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	0.1-1	<0.1	<0.1	<0.1	7429-90-5	231-072-3
Aluminum silicate	<0.1	5-10	5-10	1-5	1-5	1-5	<0.1	<0.1	<0.1	<0.1	<0.1	1302-76-7	215-106-4
Calcium fluoride	<0.1	<0.1	<0.1	5-10	5-10	5-10	<0.1	<0.1	<0.1	<0.1	<0.1	7789-75-5	232-188-7
Chromium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1-1	<0.1	7440-47-3	231-157-5
Feldspar	2-12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	68476-25-5	270-666-7
Iron	10-20	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	7439-89-6	231-096-4
Manganese	1-11	3-7	3-7	1-5	1-5	1-5	0.1-1	1-5	1-5	1-5	1-5	7439-96-5	231-105-1
Mica	1-11	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	12001-26-2	601-648-2
Molybdenum	<0.1	<0.1	<0.1	<0.1	<0.1	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	7439-98-7	231-107-2
Nickel	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	<0.1	0.1-1	0.1-1	1-5	0.1-1	7440-02-0	231-111-4
Potassium silicate	8-18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1312-76-1	215-199-1
Silica, amorphous fumed	5-15	0.1-1	<0.1	<0.1	<0.1	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	69012-64-2	273-761-1
Silicon	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1-1	<0.1	7439-98-7	231-107-2
Titanium dioxide	35-45	1-3	10-30	1-5	1-5	1-5	<0.1	<0.1	<0.1	<0.1	<0.1	13463-67-7	236-675-5
Vanadium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.01-1	<0.1	7440-62-2	231-171-1

Chemical Name	Weight %										CAS Number	EINECS Number
	FCS 224N	FCS 1171 M	FCS 2780	XM71	XR71	XR81	XM81	XM91	XR91	XR 111	XRS 99		
Aluminum silicate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	1302-76-7	215-106-4
Calcium fluoride	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5-10	7789-75-5	232-188-7
Chromium	<0.1	<0.1	10-30	0.1-1	0.1-1	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	7440-47-3	231-157-5
Iron	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	60-100	7439-89-6	231-096-4
Manganese	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	7439-96-5	231-105-1
Nickel	0.5-1.5	<0.1	10-30	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.5-1.5	1-5	<0.1	7440-02-0	231-111-4
Silica, amorphous fumed	0.1-1	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	69012-64-2	273-761-1
Titanium dioxide	3-7	5-9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	13463-67-7	236-675-5

Chemical Name	Weight %											CAS Number	EINECS Number
	ER 70S-2	ER 70S-3	ER 70S-6	CC Steel	LBS Steel	Hi Test Steel	P444	PRO 3000	PRO 3038	#1 Cast Iron	226X		
Aluminum	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	<0.1	<0.1	<0.1	7429-90-5	231-072-3
Aluminum silicate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	1302-76-7	215-106-4
Barium carbonate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-11	<0.1	513-77-9	208-167-3
Boron	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	<0.1	<0.1	<0.1	<0.1	7440-42-8	231-151-2
Calcium fluoride	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-11	5-10	7789-75-5	232-188-7
Chromium	<0.1	<0.1	<0.1	<0.1	0-6	<0.1	5-10	<0.1	10-30	<0.1	<0.1	7440-47-3	231-157-5
Copper	0.1-1	0.1-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7440-50-8	231-159-6
Iron	60-100	60-100	60-100	60-100	60-100	60-100	1-5	<0.1	5-10	60-100	60-100	7439-89-6	231-096-4
Manganese	1-5	1-5	1-5	1-5	0-2	1-5	<0.1	<0.1	<0.1	1-11	1-5	7439-96-5	231-105-1
Molybdenum	<0.1	<0.1	<0.1	<0.1	0-2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7439-98-7	231-107-2
Nickel	<0.1	<0.1	<0.1	<0.1	0-1	<0.1	60-100	60-100	60-100	<0.1	1-5	7440-02-0	231-111-4
Silicon	0.5-1.5	0.1-1	<0.1	<0.1	<0.1	<0.1	1-5	<0.1	<0.1	<0.1	<0.1	7439-98-7	231-107-2
Sodium silicate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-11	<0.1	1344-09-8	215-687-4
Titanium dioxide	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1-5	13463-67-7	236-675-5
Tungsten	<0.1	<0.1	<0.1	<0.1	0-1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7440-33-7	231-143-9

4 First Aid Measures

4.1 Description of necessary first-aid measures

Inhalation:	If breathing has stopped, perform artificial respiration. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Obtain emergency medical assistance immediately! If breathing is difficult, provide fresh air and call Poison Center/doctor.
Eye:	For radiation burns due to arc flash, see doctor. To remove dusts or fumes, flush cautiously with water for at least fifteen minutes. Remove contact lenses if present and easy to do. If irritation persists, see a doctor.
Skin:	For skin burns from arc radiation, promptly flush with cool water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with water.
Ingestion:	Not applicable
Electric Shock:	Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Obtain emergency medical assistance immediately!

4.2 **Most important symptoms/effects, acute and delayed:** Asthma, chest pain, cough, wheezing, chest tightness.

4.3 **Indication of immediate medical attention and special treatment needed:** Asthma, chest pain, cough, wheezing, chest tightness. For severe inhalation exposure, watch person for at least 48 hours in case pulmonary oedema develops.

4.4 **General:** Move to fresh air and get medical assistance.

5 Fire Fighting Measures

5.1 **Suitable extinguishing media:** No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation.

5.2 **Specific hazards arising from the substance or mixture:** Depends on burning materials. Smoke may contain toxic metal fumes such as chromium, nickel, manganese from welding consumables.

5.3 **Special protective equipment or actions for fire-fighters:** Wear self-contained breathing apparatus.

6 Accidental Release Measures

6.1 **Personal precautions, protective equipment and emergency procedures:** Refer to Section 8

6.2 **Environmental precautions:** Refer to Section 13

6.3 **Methods and materials for containment and cleaning up:** Place in suitable container for appropriate disposal.

7 Handling and Storage

7.1 **Precautions for safe handling:** Wear gloves when handling welding consumables. Avoid exposure to fume and dust. Retain all warning and identity labels.

7.2 **Conditions for safe storage, including any incompatibilities:** Store in a dry place. Keep separate from chemical substances such as acids and strong bases which could cause chemical reactions.

7.3 **Specific end use(s):** Welding.

8 Exposure Controls/Personal Protection

8.1 **Control parameters:**

Exposure limits: Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable regulatory exposure limits. The following limits can be used as guidance. Unless noted, all values apply to 8-hour time weighted average exposures (TWA).

Substance	CAS#	ACGIH TLV mg/m³	Alberta OEL mg/m³	BC EL mg/m³
Aluminum (metal and insoluble compounds)	7429-90-5	1(R)	N.Av.	1(R)
Aluminum oxide	1344-28-1	N.Av.	10	N.Av.
Boron oxide	1303-86-2	10	10	10
Chromium (Cr) metal	7440-47-3	0.5(I)	0.5	0.5
Chromium CrIII compounds	7440-47-3	0.003(I) (water-soluble)	0.5	0.5
Copper (fume)	7439-89-6	0.2	0.2	0.2
Insoluble inorganic nickel compounds	7440-02-0	0.2(I)	0.2	0.05
Iron oxide	1309-37-1	5(R)	5(R)	5
Manganese	7439-96-5	0.02(R), 0.1(I)	0.2	0.02(R), 0.1(I)
Mica	12001-26-2	3(R)	3(R)	3(R)
Molybdenum (metal and insoluble compounds)	7439-98-7	3(R), 10(I)	5	3(R), 10(I)
Nickel metal	7440-02-0	1.5(I)	1.5	0.05
Silica (amorphous fume)	69012-64-2	N.Av.	N.Av.	4.0, 1.5(R)
Soluble inorganic nickel compounds	7440-02-0	0.1(I)	0.1	0.05
Titanium dioxide	13463-67-7	10	10	10
Tungsten (metal and insoluble compounds)	7440-33-7	3(R)	5	5
Vanadium pentoxide	1314-62-1	0.05(I)	0.05(R)	0.05(I)
Water-insoluble CrVI compounds	7440-47-3	N.Av.	0.01	0.01
Water-soluble CrVI compounds	7440-47-3	0.0002(I)	0.05	0.025

ACGIH TLVs: Threshold Limit Values according to American Conference of Governmental Industrial Hygienists.
Alberta OELs: Alberta Occupational Exposure Limits
BC ELs: British Columbia Exposure Limits
(R) Respirable fraction, (I) Inhalable fraction. If no (R) or (I) designation is shown, values refer to total particulate.

8.2 **Appropriate engineering controls:** Ensure sufficient local exhaust and general ventilation to keep exposures to welding fumes and gases below regulatory exposure limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. If coating contains lead or mercury, remove before welding.

8.3 **Individual protection measures:** Wear hand, head, eye, hearing and body protection such as welder's gloves, helmet or face shield with filter lens, ear muffs/plugs, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry. Check condition of protective clothing and equipment on a regular basis. Use respiratory protection (P100 air purifying or supplied air respirator as appropriate) where ventilation is not sufficient to keep exposures below regulatory limits. Never use air purifying respirators in oxygen deficient atmospheres.

9 Physical and Chemical Properties

9.1 **Physical and chemical properties**

Information on basic physical and chemical properties:

Appearance, colour:	Solid (wire or rod), non-volatile with varying color.
Physical state:	Solid
Auto-ignition temperature:	Not available

	Decomposition temperature:	Not available
	Evaporation rate:	Not applicable
	Explosive properties:	Not applicable
	Flammability (solid, gas):	Not applicable
	Flash point:	Not applicable
	Initial boiling point and boiling range:	Not available
	Melting point:	>1300 °C / >2300 °C
	Freezing Point:	>1300 °C / >2300 °C
	Odour:	None
	Odour threshold:	Not applicable
	Oxidising Properties:	Not applicable
	Partition coefficient (n-octanol/water):	Not available
	pH:	Not available
	Relative density:	Not available
	Solubility:	Not applicable
	Upper / Lower flammability or explosive limits:	Not applicable
	Vapour density:	Not applicable
	Vapour pressure:	Not applicable
	Viscosity:	Not applicable
10	**Stability and Reactivity**	
10.1	**Reactivity:** May react with acids and strong bases producing gas.	
10.2	**Chemical stability:** This product is stable under normal conditions.	
10.3	**Possibility of hazardous reactions:** May react with acids and strong bases producing gas.	
10.4	**Conditions to avoid:** Wet, acids, bases	
10.5	**Incompatible materials:** Acids, bases	
10.6	**Hazardous decomposition products:** When this product is used in a welding process, hazardous decomposition products include those from the volatilization, reaction or oxidation of the materials listed in Section 2 and those from the base metal coating. Carbon oxides, nitrogen oxides and ozone may also be produced. Allow cleaning solvents to dry off work before welding. Thermal decomposition products of halogenated cleaning solvents may be highly poisonous. The amount of fumes generated from manual metal arc welding varies with welding parameters and dimensions, but is generally no more than 5 to 15 g/kg consumable.	
11	**Toxicological Information**	
11.1	Likely Routes of Exposure: **x** Inhalation **x** Skin contact **x** Eye contact __ Ingestion	
	Acute Toxicity: Overexposure to welding fumes can cause irritation of eyes, nose, throat and lungs. It may result in metal fume fever (chills, fever, upset stomach, vomiting, throat irritation, muscle aches), dizziness, nausea, dryness or irritation of the nose, throat, lungs and eyes. Airway restriction with tightening of chest and cough may occur. Excessive exposure may cause delayed pulmonary oedema (after 24-48 hours), which may be fatal. High short term exposure to vanadium has been shown to cause headache, CNS depression, dry mouth, metallic taste, green tongue, abdominal pain, diarrhea, black stools, eye irritation, occupational asthma, pulmonary edema, tracheitis, rhinitis, nose bleed, peripheral vasoconstriction of lungs, spleen, kidney, intestine, and skin rash dermatitis.	
	Skin corrosion/irritation: Irritation	
	Serious eye damage/ irritation: Irritation	
	Respiratory and/or skin sensitization: Yes	
	Germ cell mutagenicity: Not available	
	Genotoxicity: Yes	
	Carcinogenicity: Yes	
	Reproductive toxicity: Yes	
	STOT – Single Exposure: Not available	
	STOT – Repeated Exposure: Yes – lungs and skin	
	Harmful if inhaled: Yes	

Single exposure: Yes

Aspiration hazard: No

Repeated exposure: Yes

Interactive effects: Not available

Chemical Name	CAS Number	EINECS Number	LC50, inhalation, 4 Hours	LD50, oral
Aluminum	7429-90-5	231-072-3	N.Av.	N.Av.
Aluminum silicate	1302-76-7	215-106-4	N.Av.	N.Av.
Ammonium chloride	12125-02-9	235-186-4	N.Av.	1650 mg/kg
Barium carbonate	513-77-9	208-167-3	N.Av.	132 – 277 mg/kg, rat
Boron	7440-42-8	231-151-2	N.Av.	N.Av.
Cadmium	7440-43-9	231-152-8	4.2 mg/cu m, 4 h, rat (based on conversion from 30 minute data)	225 mg/kg, rat
Calcium fluoride	7789-75-5	232-188-7	N.Av.	4250 mg/kg, rat
Chromium metal and Chromium III Compounds	7440-47-3	231-157-5	N.Av.	>2000 mg/kg, rat
Chromium VI Compounds	N.Av.	N.Av.	N.Av.	46-113 mg/kg, rat
Copper	7440-50-8	231-159-6	N.Av.	472 mg/kg, rat
Feldspar	68476-25-5	270-666-7	N.Av.	500 mg/kg, rat (quartz)
Iron	7439-89-6	231-096-4	N.Av.	750 mg/kg, rat
Manganese	7439-96-5	231-105-1	>1500 mg/m3	9000 mg/kg, rat
Mica	12001-26-2	601-648-2	N.Av.	>2000 mg/kg, rat
Molybdenum	7439-98-7	231-107-2	>5840 mg/m3, rat, 4H	2689 mg/kg, rat
Nickel	7440-02-0	231-111-4	N.Av.	>9000 mg/kg, rat
Potassium silicate	1312-76-1	215-199-1	>2060 mg/m3, rat	>5000 mg/kg, rat
Silica, amorphous fumed	69012-64-2	273-761-1	>2200 mg/m3, rat, 4H	>5000 mg/kg, rat
Silicon	7439-98-7	231-107-2	N.Av.	3160 mg/kg, rat
Sodium silicate	1344-09-8	215-687-4	N.Av.	1100 – 1600 mg/kg, rat
Titanium dioxide	13463-67-7	236-675-5	>6800 mg/m3, rat, 4H	>5000 mg/kg, rat
Tungsten	7440-33-7	231-143-9	N.Av.	5000 mg/kg, rat
Vanadium	7440-62-2	231-171-1	N.Av.	>2000 mg/kg, rat

Chronic Toxicity:

Repeated exposure to welding fumes may cause a progressive lung disease (mixed-dust pneumoconiosis) which impairs breathing. Lung fibrosis has been reported in workers after long term aluminum exposure. Inhalation of barium compounds may cause irritation and baritosis, a benign deposition of dust in the lungs. Swallowing of barium compounds can cause gastrointestinal problems and adverse effects on the nervous system, potentially with serious problems with heart function and paralysis. Boron compounds can cause irritation of the eyes, nose, throat and lungs. No significant long term effects were found for humans, but some evidence of reproductive toxicity in test animals. Exposure to fluorides can cause eye, nose and throat irritation and fluorosis, a potentially crippling bone disease. Cadmium is a human carcinogen (IARC Group 1, Carcinogenic to Humans; and ACGIH A2, Suspected Human Carcinogen). Inhalation of cadmium fume can cause lung irritation, possibly leading to delayed pulmonary oedema, which may be fatal. Intake of cadmium into the body by any route may damage the kidneys. Cadmium remains in the body for many years, only slowly being metabolized and excreted.

Inhalation of copper fume may cause metal fume fever and nasal congestion, ulceration and perforation.

HEXAVALENT CHROMIUM COMPOUNDS AND CERTAIN NICKEL COMPOUNDS ARE CONFIRMED OR SUSPECTED CARCINOGENS. Kidney and liver damage may also occur. Chromium and nickel compounds can cause allergic skin rash. Inhalation of hexavalent chromium compounds can cause asthma and bronchitis.

Although inhalation of iron is not especially toxic in comparison to many other metals, it will deposit in the lungs possibly causing siderosis. This may lead to breathlessness, coughing and decreased lung function. Deposition can also occur in the eyes, and in some cases may lead to cataracts and night blindness. Manganese exposure can cause neurological damage including: slowness, changes in gait, changes in handwriting, muscle spasm,

	cramps, tremors, slurred speech, and behavioral changes. These may become permanent with long term overexposure. Mica exposure can cause irritation of the eyes, nose, throat and lungs. Long term exposure can cause lung disease, including fibrosis. Molybdenum trioxide is classified as probably carcinogenic to humans by the IARC (Group 2A). Soluble molybdenum compounds are classified as animal carcinogens by the ACGIH (A3). Animal experiments and human experience suggest that inhalation of molybdenum and compounds can cause lung inflammation and damage. Silica fume may cause "ferro-alloy disease", which is characterized by recurrent fever over a period of 3 to 12 weeks. Lung damage may occur, but is thought not to progress further unlike silicosis produced by crystalline silica. Crystalline silica exposure can lead to progressive irreversible lung damage (silicosis) and increase the risk of lung cancer. Sodium silicate can cause irritation of the eyes, nose and throat, likely leading long term to bronchitis. Titanium dust and fume may cause irritation of eyes, nose, throat and lungs. Tungsten may cause lung fibrosis, with cough and difficulty breathing. Little information was found on long term exposures to vanadium other than irritant effects and possible asthma. Zinc fume exposure may cause metal fume fever with cough, chills, fever, shortness of breath, chest pain, nausea and vomiting.
12	**Ecological Information**
12.1	**Toxicity:** Not available
12.2	**Persistence and degradability:** Not available
12.3	**Bioaccumulative potential:** Not available
12.4	**Mobility in soil:** Not available
12.5	**Results of PBT and vPvB assessment:** Not available
12.6	**Other adverse effects:** Not available
12.7	**Other:** Welding consumables and materials could degrade / weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater. Nickel is harmful to the environment, harmful to aquatic organisms, and may cause long-term adverse effects in the aquatic environment.
13	**Disposal Considerations**
13.1	**Disposal and waste treatment methods:** Reuse or recycle where possible. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, provincial and local regulations. Use recycling procedures if available. **USA RCRA:** Unused products or product residue containing chromium is considered hazardous waste if discarded, RCRA ID characteristic Toxic Hazardous Waste D007. Residues from welding consumables and processes could degrade and accumulate in soils and groundwater.
14	**Transportation Information**
14.1	**UN number:** Not applicable
14.2	**UN proper shipping name:** Not applicable
14.3	**Transport hazard class(es):** Not applicable
14.4	**Packing group:** Not applicable
14.5	**Environmental hazards:** Not applicable
14.6	**Special precautions for user:** Not applicable
14.7	**Transport in bulk according to Annex II of MARPOL and the IBC Code:** Not applicable
15	**Regulatory Information**
15.1	**Safety health and environmental regulations /legislation specific for the substance or mixture (applies to the airborne emissions during use).**
	Canada:
	Class: Carcinogenicity — Category: 1A
	Class: Reproductive Toxicity — Category: 2
	Class: Germ Cell Mutagenicity — Category:1B
	Class: Respiratory Sensitization — Category: 1
	Class: Skin Sensitization — Category: 1

	Class: Specific Target Organ Toxicity – (repeated exposure) Category: 1 Target Organs: Lungs, Kidneys, Liver, Respiratory System, Nerves, Blood, Eyes, Skin Canadian Environmental Protection Act (CEPA): All constituents of this product are on the Domestic Substance List (DSL).
	USA: Under the OSHA Hazard Communication Standard, this product is considered hazardous. This product contains or produces a chemical known to the state of California to cause cancer and birth defects, or other reproductive harm (California Health & Safety Code § 25249.5 et seq.). United States EPA Toxic Substance Control Act: All constituents of this product are on the TSCA inventory list or are excluded from listing. **CERCLA/SARA Title III Reportable Quantities (RQs):** Product is a solid solution in the form of a solid article: Chromium RQ 5000 lbs; Copper RQ 5000 lbs; Manganese RQ N.Av; Nickel RQ 100 lbs. Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee. The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 313 reporting (shown with de minimis concentrations): Chromium, 1.0%; Copper, 1.0%. See Section 3 for weight %.
15.2	**Other:** Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe all applicable regulations. Take precautions when welding and protect yourself and others. WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation. ELECTRIC SHOCK can kill. ARC RAYS and SPARKS can injure eyes and burn skin. Wear correct hand, head, eye and body protection.
16	**Other Information**
16.1	**USA:** American National Standard Z49.1. "Safety in Welding and Cutting", ANSI/AWS F1.5. Methods for Sampling and analyzing Gases from Welding and Allied Processes., ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA. NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169 **Canada:** CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes"
16.2	This SDS has been prepared by Arctec Alloys Limited based on information obtained from sources believed to be accurate and reliable. However, this information is provided without any representation or warranty, expressed or implied, regarding accuracy or completeness thereof. The conditions or methods of handling, storage, use and disposal of the product are beyond the control and knowledge of Arctec Alloys Limited. For this and other reasons Arctec Alloys Limited does not assume responsibility, and expressly disclaims liability for loss, damage or expense arising from it or in any way connected with the handling, storage, use or disposal of the product.