











Zirconium & Zr Compounds	7440-67-7	Metal	5 mg/m <sup>3</sup>	USA. ACGIH TLVs
		Metal	10 mg/m <sup>3</sup>	USA. ACGIH TLVs Ceiling
		Compound	5 mg/m <sup>3</sup>	USA. OSHA PELs
		Compound	5 mg/m <sup>3</sup>	USA. ACGIH TLVs
		Compound	10 mg/m <sup>3</sup>	USA. ACGIH TLVs Ceiling

### Exposure Limits – Canada

Common Name	CAS Number	Form	Exposure Limit	Source
Calcium Carbonate	1317-65-3	Total Dust	10 mg/m <sup>3</sup>	Canada. Alberta OEL TWA
		Total Dust	20 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA STEL
		Total Dust	10 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA
		Respirable	3 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA
		Total Dust	10 mg/m <sup>3</sup>	Canada. Saskatchewan OEL for 8hr ACL
		Total Dust	20 mg/m <sup>3</sup>	Canada. Saskatchewan OEL for 15min ACL
Manganese & Mn Compounds	7439-96-5	As Mn	0.2 mg/m <sup>3</sup>	Canada. Alberta OEL TWA
		As Mn	0.2 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA
		As Mn (Inhalable)	0.1 mg/m <sup>3</sup>	Canada. Manitoba OEL TWA
		As Mn (Respirable)	0.02 mg/m <sup>3</sup>	Canada. Manitoba OEL TWA
		As Mn	0.2 mg/m <sup>3</sup>	Canada. New Brunswick OEL TWA
		As Mn	0.1 mg/m <sup>3</sup>	Canada. Newfoundland & Labrador OEL TWA
		As Mn	0.1 mg/m <sup>3</sup>	Canada. Nova Scotia OEL TWA
		As Mn	1 mg/m <sup>3</sup>	Canada. Nunavut OEL TWA
		As Mn	3 mg/m <sup>3</sup>	Canada. Nunavut OEL STEL
		As Mn	5 mg/m <sup>3</sup>	Canada. Nunavut OEL Ceiling
		As Mn	1 mg/m <sup>3</sup>	Canada. Northwest Territories OEL TWA
		As Mn	3 mg/m <sup>3</sup>	Canada. Northwest Territories OEL STEL
		As Mn	5 mg/m <sup>3</sup>	Canada. Northwest Territories OEL Ceiling
		As Mn	0.2 mg/m <sup>3</sup>	Canada. Ontario OEL TWA
		As Mn	0.2 mg/m <sup>3</sup>	Canada. Prince Edward Island OEL TWA
		Silicon	7440-21-3	Total Dust
Total Dust	3 mg/m <sup>3</sup>			Canada. New Brunswick OEL TWA
Total Dust	10 mg/m <sup>3</sup>			Canada. Nunavut OEL TWA
Total Dust	10 mg/m <sup>3</sup>			Canada. Northwest Territories OEL TWA
Total Dust	10 mg/m <sup>3</sup>			Canada. Ontario OEL TWA
Total Dust	10 mg/m <sup>3</sup>			Canada. Quebec OEL TWA
Total Dust	10 mg/m <sup>3</sup>			Canada. Saskatchewan OEL STEL
Total Dust	5 mg/m <sup>3</sup>			Canada. Yukon OEL Ceiling
Total Dust	10 mg/m <sup>3</sup>			Canada. Saskatchewan OEL TWA

		Total Dust	20 mg/m <sup>3</sup>	Canada. Saskatchewan OEL STEL
		Total Dust	10 mg/m <sup>3</sup>	Canada. Yukon OEL TWA
		Total Dust	20 mg/m <sup>3</sup>	Canada. Yukon OEL STEL
Silica (Quartz)	14808-60-7	Respirable Fraction	0.025 mg/m <sup>3</sup>	Canada. Alberta OEL TWA
		Respirable Fraction	0.025 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA
		Respirable Fraction	0.025 mg/m <sup>3</sup>	Canada. Manitoba OEL TWA
		Respirable Fraction	0.1 mg/m <sup>3</sup>	Canada. Ontario OEL TWA
		Respirable Fraction	0.05 mg/m <sup>3</sup>	Canada. Quebec OEL TWA
		Respirable Fraction	0.1 mg/m <sup>3</sup>	Canada. Saskatchewan OEL TWA
Titanium Dioxide	13463-67-7	Total Dust	10 mg/m <sup>3</sup>	Canada. Alberta OEL TWA
		Dust (Respirable)	3 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA
		Total Dust	10 mg/m <sup>3</sup>	Canada. British Columbia OEL TWA
		Total Dust	10 mg/m <sup>3</sup>	Canada. Manitoba OEL TWA
		Total Dust	10 mg/m <sup>3</sup>	Canada. Ontario OEL TWA
		Total Dust	10 mg/m <sup>3</sup>	Canada. Quebec OEL TWA
		Total Dust	10 mg/m <sup>3</sup>	Canada. Saskatchewan OEL TWA
		Total Dust	20 mg/m <sup>3</sup>	Canada. Saskatchewan OEL STEL

#### Exposure Limits – Mexico

Common Name	CAS Number	Form	Exposure Limit	Source
Calcium Carbonate	1317-65-3	Total Dust	20 mg/m <sup>3</sup>	Mexico. OEL CTT
		Total Dust	10 mg/m <sup>3</sup>	Mexico. OEL CPT
Manganese & Mn Compounds	7439-96-5	As Mn	0.2 mg/m <sup>3</sup>	Mexico. OEL CPT
		As Mn Fume	1.0 mg/m <sup>3</sup>	Mexico. OEL CPT
		As Mn Fume	3.0 mg/m <sup>3</sup>	Mexico. OEL CTT
Silicon	7440-21-3	Total Dust	10 mg/m <sup>3</sup>	Mexico. OEL CPT
		Total Dust	20 mg/m <sup>3</sup>	Mexico. OEL CTT
Silica	69012-46-2	Fume	10 mg/m <sup>3</sup>	Mexico. OEL CPT
		Fume (Respirable)	3 mg/m <sup>3</sup>	Mexico. OEL CPT
Silica (Quartz)	14808-60-7	Respirable Fraction	0.1 mg/m <sup>3</sup>	Mexico. OEL CPT
Titanium Dioxide	13463-67-7	Total Dust	20 mg/m <sup>3</sup>	Mexico. OEL CTT
		Total Dust	10 mg/m <sup>3</sup>	Mexico. OEL CPT

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Solid or tubular wire
Color:	Various
Odor:	None
Odor threshold:	Not Applicable
pH:	Not Applicable
Melting point	>2000F (1100C)
Initial Boiling Point & Range:	Data Not Available
Flash point	Data Not Available
Evaporation rate	Data Not Available
Flammability	Data Not Available
Upper flammability/explosive limit:	Data Not Available
Lower flammability/explosive limit:	Data Not Available
Vapor pressure	Not Applicable
Vapor density:	Not Applicable
Relative density	0.2-0.3 lbs/in <sup>3</sup>
Solubility in water	Data Not Available
Solubility (other)	Data Not Available
Partition coefficient	Data Not Available
Auto-ignition temperature	Data Not Available
Decomposition temperature:	Data Not Available
Viscosity :	Data Not Available

## 10. STABILITY AND REACTIVITY

**Reactivity** – This product is not reactive under normal conditions as shipped.

**Chemical stability** – This product is chemically stable under normal conditions as shipped.

**Possibility of hazardous reactions** – Polymerization reactions will not occur.

**Conditions to avoid** – Protect product from moisture and contamination.

**Incompatible materials** – Data not available

**Hazardous decomposition products** – Welding electrodes and wires emit fumes and gases when used under normal conditions. These fumes and gases produced during welding operations cannot be easily classified, and will differ in quantity and form from those ingredients listed in Section 3 of this SDS. The composition and quantity of these fumes and gases are directly dependent upon the metal being welded, any material coatings (such as primer or galvanizing), the welding process, the welding consumables and the welding procedures. Other conditions which also influence the composition and quantity of the fumes and gases produced include the number of welders in the work area, the volume of the work area, the quality and amount of ventilation or exhaust, and the proximity of the welder's head to the fume plume.

Decomposition products of welding consumables under normal operation include oxides of elements present in the welding consumable and base material. Manganese compounds may be present in the fume from manganese bearing electrodes. Hexavalent chromium may be present in the fume from electrodes containing chromium. Nickel compounds may be present in the fume from nickel bearing electrodes. Fluoride containing consumables may generate gaseous and particulate fluoride. Gases such as carbon monoxide, carbon dioxide, ozone and nitrogen oxides may also be produced in the arc area.

## 11. TOXICOLOGICAL INFORMATION

**Information on likely routes of exposure:**

**Oral** – Unknown health effects, but this exposure is unlikely to occur.

**Inhalation** – Inhalation of welding fumes may lead to acute and/or chronic health hazards (see table below).

**Skin** – Arc rays can burn the skin. Weld fume deposited on the skin may cause irritation (see table below).

**Eye** – Arc rays can injure the eyes. Weld fume contact with the eyes may cause irritation (see table below).

**Information on toxicological effects:**



The acute and chronic effects of compounds which may be exposed to the welder are listed in the table below. Also listed are the available measured values of toxicity for that substance and whether it is classified as carcinogenic.

<b>Substance</b>	<b>Short-Term Exposure Effects</b>	<b>Long Term Exposure Effects</b>	<b>Toxicity Measure</b>	<b>Carcinogenicity</b>
Aluminium Oxide	May cause eye & respiratory irritation.	May cause effects on central nervous system.	LC50 (Rat, Oral Exposure) >5,000 mg/kg	Not classifiable
Barium Compounds	May cause irritation to the nose, throat, and respiratory tract.	May cause baratosis (deposits of barium in lungs). Baratosis is benign & does not progress to fibrosis.	LD50 (Rat, Oral Exposure) = 418 mg/kg	Not classifiable
Chromium as Cr+3	May cause eye, skin & respiratory irritation.	May cause chronic bronchitis, sinusitis, rhinitis and asthma.	LC50 (Rat, 14 day Oral Exposure) >5,000 mg/kg	Not classifiable
Chromium as Cr+6	May cause eye, skin & respiratory irritation.	May cause lung, nasal and sinus cancer, ulceration and perforation of the nasal septum and skin rash.	LC50 (Rat, Oral Exposure) = 29 mg/kg	IARC-1 NTP-known OSHA
Cobalt Compounds	May cause respiratory irritation and cardiovascular inflammation.	May cause chronic irritation, diminished pulmonary function, asthma and fibrosis.	LC50 (Rat, 30 min Inhalation Exposure) = 165mg/m <sup>3</sup>	Not classifiable
Copper Oxide	May cause metal fume fever with upper respiratory irritation, chills, and aching muscles.	Prolonged contact may cause skin sensitization.	LD50 (Rat, Oral Exposure) = 470mg/kg	Not classifiable
Fluorides	May cause eye, skin & respiratory irritation.	May cause serious bone erosion and mottling of teeth (fluorosis).	LD50 (Rat, Oral Exposure) = 31 mg/kg	Not classifiable
Iron Oxide	May cause respiratory irritation.	May cause siderosis (deposits of iron in lungs). Siderosis is benign and does not progress to fibrosis.	LD50 (Rat, Oral Exposure) > 10,000 mg/kg	Not classifiable
Lithium Compounds	May cause eye & skin irritation.	May adversely affect the central nervous system & kidneys, and may be a reproductive toxin.	LC50 (Rat, 4 hour Inhalation Exposure) > 2.17 mg/L	Not classifiable
Magnesium Oxide	May cause eye & respiratory irritation.	May cause decreased lung function.	LD50 (Rat, Oral Exposure) = 3870 mg/kg	Not classifiable
Manganese Oxide	May cause respiratory irritation, metal fume fever with chills, fever, upset stomach, body ache, vomiting.	May cause brain and central nervous system effects resulting in arm and leg tremors, slurred speech and poor coordination.	LD50 (Rat, 4 hour Inhalation Exposure) = 19 mg mg/kg	Not classifiable
Molybdenum	May cause eye & respiratory irritation.	Not found.	Not found	Not classifiable
<b>Substance</b>	<b>Short-Term Exposure Effects</b>	<b>Long Term Exposure Effects</b>	<b>Toxicity Measure</b>	<b>Carcinogenicity</b>
Nickel Oxide	May cause respiratory irritant, inhalation of fumes may cause pneumonitis.	Prolonged exposure may lead to asthma. Nickel refinery workers showed a higher incidence of lung and nasal cancers.	LD50 (Rat, Inhalation Exposure) > 5,000 mg/kg	IARC-1 NTP-known
Niobium	May cause respiratory irritation.	Not found.	Not found	Not classifiable
Silica	May cause eye & respiratory irritation.	Crystalline silica is a known carcinogen. Overexposure may also result in silicosis.	Not found	IARC-1 NTP-known

Titanium Dioxide	May cause respiratory irritation.	May be carcinogenic.	LD50 (Rat, Oral Exposure) > 10 g/kg	IARC-2B
Tungsten compounds	May cause respiratory irritation.	Not found.	Not found	Not found
Vanadium Oxide	May cause eye, skin & respiratory irritation.	Exposure to high concentrations of fume may lead to chronic nasal hyperplasia.	LD50 (Rat, Oral Exposure) =10 mg/kg	Not classifiable
Zirconium Oxide	May cause eye & respiratory irritation.	May cause decreased lung function.	Not found	Not classifiable
Carbon Dioxide	At low levels, may cause headache, dizziness, loss of coordination, nausea. At high levels can cause coma and possibly death.	Long term exposure may affect the body's metabolism.	LC50 (Human, Inhalation Exposure) =100,000 ppm/min	Not classifiable
Carbon Monoxide	May cause effects on the blood, resulting in carboxyhaemoglobinemia and cardiac disorders. High levels may result in death.	May have effects on the cardiovascular system and central nervous system. May cause toxicity to human reproduction or development.	LC50 (Rat, 4 hour Inhalation Exposure) =1807 ppm	Not classifiable
Ozone	May cause eye and respiratory tract irritation. Inhalation may cause lung oedema. May cause effects on the central nervous system, resulting in headache and impaired performance.	May cause decreased lung function.	LC50 (Rat, 3 hour Inhalation Exposure) =4.5 mg/m <sup>3</sup>	Not classifiable
Nitric Oxide	May cause respiratory irritation. Inhalation may cause lung oedema. Exposure far above the OEL may result in death.	May cause decreased lung function.	LC50 (Rat, Inhalation Exposure) =160 mg/m <sup>3</sup>	Not classifiable
Nitrogen Dioxide	Corrosive to the skin and respiratory tract. Inhalation may cause lung oedema. Exposure far above the OEL may result in death.	May cause effects on the immune system and lungs, resulting in decrease in resistance to infection.	LC50 (Rat, 4 hour Inhalation Exposure) =88 ppm	Not classifiable

**Other information on toxicological effects:**

**Germ cell mutagenicity** – Not classified

**Reproductive toxicity** – Not classified

**Specific target organ toxicity (Single exposure)** – Not classified

**Specific target organ toxicity (Repeated exposure)** – Not classified

**Aspiration hazard** – Not classified

**12. ECOLOGICAL INFORMATION**

<b>Toxicity:</b>	Not classified
<b>Persistence and degradability:</b>	No information available
<b>Bioaccumulative potential:</b>	No information available
<b>Mobility in soil:</b>	No information available

**13. DISPOSAL CONSIDERATIONS**

Discard any product, residue, waste or packaging in an environmentally acceptable manner in compliance with federal, State, or local laws. Do not dispose of any waste, remaining product or by-product in the sewer.

**14. TRANSPORT INFORMATION**

**UN Number:** Not regulated  
**UN Proper Shipping Name:** Not regulated  
**Transport Hazard Class:** Not regulated  
**Packing Group:** Not regulated  
**IMDG:** Not regulated  
**ICAO/IATA:** Not regulated

**15. REGULATORY INFORMATION****U.S. Federal Regulations:**

Emergency Planning & Community Right-To-Know Act (EPCRA) of 1986

Section 313 Hazardous Chemicals:

Aluminum, Aluminum Oxide, Barium and Barium Compounds, Chromium, Copper, Lithium Carbonate, Manganese, Nickel, Silicon & Silica, Iron & Iron Oxide, Magnesium, Zirconium and Vanadium.

Superfund Amendments and Reauthorization Act of 1986 (SARA):

Hazard categories – Acute (Immediate) and Chronic (Delayed)

Toxic Substances Control Act (TSCA) Inventory:

Iron – Listed

Silicon – Listed

**U.S. State Laws:**

California Proposition 65:

Titanium Dioxide – Carcinogenic

Silica (Quartz) - Carcinogenic

**Warning:** These products contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

New Jersey Community Worker and Right-to-Know Act

Titanium Dioxide – Listed

Manganese – Listed

Massachusetts Right-to-Know Act Substance List

Titanium Dioxide – Listed

Manganese – Listed

Silica (Quartz) – Listed

Pennsylvania Right-to-Know Act Hazardous Substances List

Titanium Dioxide – Listed

Manganese – Listed

Rhode Island Right-to-Know Act Substance List

Manganese – Listed

Minnesota Right-to-Know Act Hazardous Substances List

Titanium Dioxide – Listed

Manganese – Listed

Silica (Quartz) – Listed

**Canadian Regulations:**

This product is classified according to the requirements of the Canadian Controlled Products Regulations Section 33, and this SDS contains all required information.

**16. OTHER INFORMATION**

**DISCLAIMER:** Users should take all standard and reasonable precautions when using this product for its intended use. The manufacturer does not recommend this product for any uses other than that described. The manufacturer makes no claims and provides no warranty for non-standard use.

<b>NFPA 704:</b>	<b>HEALTH:</b>	<b>2</b>	<b>FLAMMABILITY:</b>	<b>0</b>	<b>REACTIVITY:</b>	<b>0</b>
<b>HMIS:</b>	<b>HEALTH:</b>	<b>2</b>	<b>FLAMMABILITY:</b>	<b>0</b>	<b>PHYSICAL HAZARD:</b>	<b>0</b>

**SDS Revisions**

Preparation date:	5/12/2015	Revision date:	--	Revision number:	0
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*Note: Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, Exocor makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Exocor be responsible for damages of any nature whatsoever resulting from the use of, misuse or reliance upon information. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or any other nature are made hereunder with respect to information or the product to which information refers. Regulatory requirements are subject to change and may differ from one location to another. It is the buyer's responsibility to ensure its activities comply with federal, State, Provincial, and local laws and regulations.*