8675605

WELDING MATERIAL SALES
www.weldingmaterialsales.com

SAFETY DATA SHEET (SDS)
SDS #500

1. IDENTIFICATION

Product Type:	**Carbon steel and low alloy steel electrodes for arc welding**
Product Names:	***E8018-B2, E9018-B3, E8018-C1, E8018-C2, E8018-C3, E10018-D2, E9018M, E11018M, E12018M, E7010-P1, E8010-P1, ER70S-2, ER70S-3, ER70S-6, ER70S-7, E70C-6M, E71T-1/1M, E70T-4, E71T-11, E71T-GS, ER80S-B2, ER90S-B3, ER80S-B6, ER90S-B9, ER80S-D2, ER100S-1, ER110S-1, ER120S-1, ER70S6 (Copper free***)
Specifications:	***AWS A5.5, A5.18, A5.20, A5.28***
Product Intended/Recommended Use:	Arc welding
Manufacturer:	***Welding Material Sales*** ***1340 Reed Road*** ***Geneva, IL 60134*** ***Tel: 630-232-6421*** ***Fax: 888-733-1512*** ***Email: info@weldingmaterialsales.com***
Emergency Telephone Number:	***800-424-9300***

2. HAZARD IDENTIFICATION

Hazard Classification: Not classified as hazardous according to the applicable Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and OSHA Hazard Communication Standard (29 CFR 1910.1200) criteria.

Label Elements:

Hazard Symbol – None
Signal Word – None
Hazard Statement – Not Applicable
Precautionary Statement – Not Applicable

Other Hazards: This product presents no hazards in its intrinsic form. However, several hazards are generated during welding operations that can be harmful.

ELECTRICITY- Electric shock can kill.

HEAT- Molten metal and weld spatter can burn skin and start fires.

RADIATION- Arc rays can injure eyes and burn skin.

FUMES AND GASES - Fumes and gases generated during welding can be dangerous to your health. See Section 11.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Common Name	Weight %
Iron	70-98
Manganese	0-4
Silicon	0-3
Silica	0-3
Aluminum	0-5
Aluminum Oxide	0-1
Chromium	0-10.0
Nickel	0-3
Niobium	0-0.3
Magnesium and compounds	0-3
Molybdenum	0-1.2
Titanium	0-0.5
Titanium Dioxide	0-10
Vanadium	0-0.3
Barium Compounds	0-10
Lithium Compounds (as Li)	0-9
Iron Oxide	0-12
Zirconium and Compounds (as Zr)	0-1
Fluorides	0-12
Graphite	0-0.5
Copper	0-0.8

4. FIRST AID MEASURES

Inhalation - If breathing has stopped, immediately seek medical assistance. Begin performing cardio pulmonary resuscitation (CPR) if you are trained to do so. If breathing is difficult, move to area with fresh air and seek medical attention immediately.

Skin contact - For skin burns due to arc radiation flush with cold water. If burn and irritation persists seek medical attention. In case of skin contact with fume or dust, wash affected areas with soap and water. Thoroughly clean shoes and wash clothing. Seek medical attention if irritation develops and persists.

Eye contact - In case of radiation burns due to arc flash move to a dark room and seek medical attention. To remove fume or dust flush with plenty of lukewarm water. Seek medical attention if irritation develops. In case of foreign metallic or slag material lodged in the eye, seek medical attention to remove it. Do not rub or agitate the eyes.

Ingestion – Although unlikely due to product form, immediately seek medical attention if wire pieces or metal powders from inside the wire are ingested. Do not induce vomiting unless directed to do so by medical personnel.

Electric Shock - Disconnect power. Use non-conductive material to pull victim from contact with live wires. If no detectible pulse, seek medical attention immediately and begin cardio pulmonary resuscitation (CPR) if you are trained to do so.

Most Serious Symptoms:

Short Term Exposure – Acute overexposure to welding fumes may result in discomfort such as irritation of the respiratory system, metal fume fever, nausea, and may aggravate pre-existing respiratory conditions.

Long Term Exposure – Chronic overexposure to welding fume may lead to iron deposits in the lungs (siderosis) and reduced pulmonary function. Manganese overexposure can lead to irreversible damage to the central nervous system resulting in impaired speech and movement. Chronic overexposure to nickel fumes and hexavalent chromium can cause cancer. Some of the products contain silica quartz, but not in an inhalable fraction. Silica quartz is a listed carcinogen.

Refer to Section 11 for more information.

5. FIRE FIGHTING MEASURES

General - Products are non-flammable as shipped. Welding arcs and spatter can ignite nearby combustible materials.

Suitable Extinguishing Media- Use methods and materials appropriate for the combustible material.

Specific Hazards Arising from the Chemical - Welding arcs and spatter can ignite nearby combustible materials.

General Firefighting Procedures- Keep people away. Isolate fire and deny entry to the area by any non-essential personnel. Fight fire from protected location or safe distance.

Special Actions for Firefighters- Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and hazardous fumes. Toxic and irritating fumes and gases may be given off during burning or thermal decomposition.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:

For Non-Emergency Personnel – Isolate the area and keep non-essential people away. Do not touch or walk through spilled material. Allow the molten metallic material to solidify and cool before disposal. If molten metal spills out of the weldment, turn off the power. Contain the flow using sand or submerged arc flux. If airborne dust and or fumes are present, wear appropriate personal protective equipment (PPE) to avoid overexposure.

For Emergency Personnel – Wear appropriate personal protective equipment (PPE), including clothes, gloves and breathing protection. Evacuate non-essential personnel.

Environmental Precautions: Keep material out of waterways and drains.

Methods and Materials for Containment and Cleaning Up: Isolate and clean up spills immediately. Avoid generating dust or airborne particles during clean up. Dispose of solidified mass per Federal, State and Local regulations.

7. HANDLING AND STORAGE

Precautions for Safe Handling: Wear safety glasses and gloves to avoid cuts and abrasion when handling welding consumables and their packaging. Do not eat drink or smoke in areas where these products are being used.

Conditions for Safe Storage, Including Any Incompatibilities: Store in a cool, dry area in the original packaging. Keep products away from heat, flame and moisture.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Appropriate Engineering Controls: Provide adequate ventilation and/or local exhaust at the weld station to keep fumes and gases away from the welder. Train welders and welding operators to keep their head out of the fumes. See ANSI Z49.1 "Safety in Welding, Cutting, and Allied Processes" for recommendations of safe work practices.

Personal Protective Equipment:

Eye/Face Protection – Wear safety glasses or goggles with appropriate side shields. Wear a helmet or face shield with an appropriate filter lens. Use protective screens to shield others in the work area.

Skin/Body Protection – Wear hand, head and body protection including welder's gloves, protective face shield and long sleeved protective clothing.

Respiratory Protection – Use NIOSH approved fume respirator or air supplied respirator when where ventilation is inadequate, welding in confined spaces or where required to by OSHA regulations. Fume sampling per AWS F1.1 "*Method for Sampling Airborne Particulates Generated by Welding and Allied Processes*" may be required. Other appropriate standards that may be considered include, but are not limited to, AWS F1.2 "*Laboratory Method for Measuring Fume Generation Rate and Total Fume Emission of Welding and Allied Processes*" and AWS F3.2 "*Ventilation Guide for Weld Fume*". For actual weld fume and particulate analysis, refer to the appropriate analytical methods recommended by NIOSH or OSHA, and consult an industrial hygiene professional.

Control Parameters:

Exposure Limits - USA

Common Name	CAS Number	Form	Exposure Limit	Source
Aluminum Metal	7429-90-5	Total Dust	15 mg/m^3	USA. OSHA PELs
		Total Dust	10 mg/m^3	USA. California OSHA PELs
		Respirable	5 mg/m^3	USA. OSHA PELs
		Respirable	1 mg/m^3	USA. ACGIH TLVs
Aluminum Oxide	1344-28-1	Total Dust	15 mg/m^3	USA. OSHA PELs
		Respirable	5 mg/m^3	USA. OSHA PELs
		Respirable	1 mg/m^3	USA. ACGIH TLVs
Barium Compounds	7440-39-3	Soluble Compounds	0.5 mg/m^3	USA. OSHA PELs
		Soluble Compounds	0.5 mg/m^3	USA. ACGIH TLVs
Calcium Carbonate	1317-65-3	Total Dust	15 mg/m^3	USA. OSHA PELs
		Total Dust	10 mg/m^3	USA. California OSHA PELs
		Respirable	5 mg/m^3	USA. OSHA PELs
Chromium	7440-47-3	Metal	1 mg/m^3	USA. OSHA PELs
		Metal	0.5 mg/m^3	USA. ACGIH TLVs
		Cr II compounds	0.5 mg/m^3	USA. OSHA PELs
		Cr III Compounds, Inorganic	0.5 mg/m^3	USA. OSHA PELs
		Cr III Compounds, Inorganic	0.5 mg/m^3	USA. ACGIH TLVs
	18540-29-9	Cr VI Compounds	0.1 mg/m^3	USA. OSHA PELs Ceiling
		Cr VI Compounds, Soluble	0.005 mg/m^3	USA. OSHA PELs

			(as Cr VI)	
		Cr VI Compounds, Soluble	0.05 mg/m^3 (as Cr)	USA. ACGIH TLVs
		Cr VI Compounds, Insoluble	0.005 mg/m^3 (as Cr VI)	USA. OSHA PELs
		Cr VI Compounds, Insoluble	0.01 mg/m^3 (as Cr)	USA. ACGIH TLVs
Cobalt	7440-48-4	As Metal, Dust & Fume	0.1 mg/m^3	USA. OSHA PELs
		As Metal, Dust & Fume	0.02 mg/m^3	USA. California OSHA PELs
		As Metal, Dust & Fume	0.02 mg/m^3	USA. ACGIH TLVs
Copper	7440-50-8	Dust	1 mg/m^3	USA. OSHA PELs & ACGIH TLVs
		Fume	0.1 mg/m^3	USA. OSHA PELs
		Fume	0.2 mg/m^3	USA. ACGIH TLVs
Fluorides	7789-75-5	As Fluorides	2.5 mg/m^3	USA. OSHA PELs & ACGIH TLVs
Iron & Iron Oxide	1309-37-1	Iron Oxide (As Fume)	10 mg/m^3	USA. OSHA PELs
		Iron Oxide (As Fume)	5 mg/m^3	USA. California OSHA PELs
		Respirable	5 mg/m^3	USA. ACGIH TLVs
Graphite	7782-42-5	Total Dust	15 mg/m^3	USA. OSHA PELs
		Total Dust	10 mg/m^3	USA. California OSHA PELs
		Respirable	5 mg/m^3	USA. OSHA PELs
		Respirable	2 mg/m^3	USA. ACGIH TLVs
Magnesite	546-93-0	Total Dust	15 mg/m^3	USA. OSHA PELs
		Total Dust	10 mg/m^3	USA. California OSHA PELs
		Total Dust	10 mg/m^3	USA. ACGIH TLVs
		Respirable	5 mg/m^3	USA. OSHA PELs
		Respirable	2 mg/m^3	USA. ACGIH TLVs
Magnesium Oxide	1309-48-4	Fume	15 mg/m^3	USA. OSHA PELs
		Fume	10 mg/m^3	USA. California OSHA PELs
		Fume (Inhalable)	10 mg/m^3	USA. ACGIH TLVs
Manganese & Mn Compounds	7439-96-5	Fume	5 mg/m^3	USA. OSHA PELs Ceiling
		Fume	0.2 mg/m^3	USA. California OSHA PELs
		Fume (Respirable)	0.02 mg/m^3	USA. ACGIH TLVs
		Fume (Inhalable)	0.1 mg/m^3	USA. ACGIH TLVs
		Inorganic	5 mg/m^3	USA. OSHA PELs Ceiling
		Inorganic	0.2 mg/m^3	USA. California OSHA PELs
		Inorganic (Respirable)	0.02 mg/m^3	USA. ACGIH TLVs
		Inorganic (Inhalable)	0.1 mg/m^3	USA. ACGIH TLVs
Molybdenum	7439-98-7	Soluble Compounds	5 mg/m^3	USA. OSHA PELs
		Soluble Compounds (Respirable)	0.5 mg/m^3	USA. ACGIH TLVs
		Insoluble compounds (Total Dust)	15 mg/m^3	USA. OSHA PELs
		Insoluble compounds (Total Dust)	10 mg/m^3	USA. California OSHA PELs
		Insoluble compounds (Respirable)	3 mg/m^3	USA. ACGIH TLVs & California OSHA PELs

		Insoluble compounds (Inhalable)	10 mg/m^3	USA. ACGIH TLVs
Nickel	7440-02-0	Metal	1 mg/m^3	USA. OSHA PELs
		Metal (Inhalable)	1.5 mg/m^3	USA. ACGIH TLVs
		Metal	0.015 mg/m^3	USA. NIOSH RELs
		Soluble Compounds	1 mg/m^3	USA. OSHA PELs
		Soluble Compounds (Inorganic)	0.1 mg/m^3	USA. ACGIH TLVs
		Insoluble Compounds	1 mg/m^3	USA. OSHA PELs
		Insoluble Compounds (Inorganic)	0.2 mg/m^3	USA. ACGIH TLVs
Potassium Silicate	1312-76-1	Total	10 mg/m^3	USA. ACGIH TLVs
Sodium Silicate	1344-09-8	Total	10 mg/m^3	USA. ACGIH TLVs
Silicon	7440-21-3	Total Dust	15 mg/m^3	USA. OSHA PELs
		Total Dust	10 mg/m^3	USA. California OSHA PELs
		Respirable	5 mg/m^3	USA. OSHA PELs
Silica (Quartz)	14808-60-7	Respirable	0.1 mg/m^3	USA. OSHA PELs
		Respirable	0.025 mg/m^3	USA. ACGIH TLVs
		Total Dust	0.3 mg/m^3	USA. OSHA PELs
Titanium Dioxide	13463-67-7	Total Dust	15 mg/m^3	USA. OSHA PELs
		Total Dust	10 mg/m^3	USA. ACGIH TLVs
Tungsten	7440-33-7	Insoluble	5.0 mg/m^3	USA. ACGIH TLVs
		Insoluble	10.0 mg/m^3	USA. ACGIH TLVs Ceiling
		Soluble	1.0 mg/m^3	USA. ACGIH TLVs
		Soluble	3.0 mg/m^3	USA. ACGIH TLVs Ceiling
Vanadium	7440-62-2	Oxide Dust	0.5 mg/m^3	USA. OSHA PELs Ceiling
		Oxide Dust (Inhalable)	0.05 mg/m^3	USA. ACGIH TLVs & California OSHA PELs
		Oxide Fume	0.1 mg/m^3	USA. OSHA PELs Ceiling
		Oxide Fume (Inhalable)	0.05 mg/m^3	USA. ACGIH TLVs & California OSHA PELs
Zirconium & Zr Compounds	7440-67-7	Metal	5 mg/m^3	USA. ACGIH TLVs
		Metal	10 mg/m^3	USA. ACGIH TLVs Ceiling
		Compound	5 mg/m^3	USA. OSHA PELs
		Compound	5 mg/m^3	USA. ACGIH TLVs
		Compound	10 mg/m^3	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^3	Canada. Alberta OEL TWA
		Total Dust	20 mg/m^3	Canada. British Columbia OEL TWA STEL
		Total Dust	10 mg/m^3	Canada. British Columbia OEL TWA
		Respirable	3 mg/m^3	Canada. British Columbia OEL TWA

		Total Dust	10 mg/m^3	Canada. Saskatchewan OEL for 8hr ACL
		Total Dust	20 mg/m^3	Canada. Saskatchewan OEL for 15min ACL
		Total Dust	10 mg/m^3	Canada. Quebec OEL TWA
Manganese & Mn Compounds	7439-96-5	As Mn	0.2 mg/m^3	Canada. Alberta OEL TWA
		As Mn	0.2 mg/m^3	Canada. British Columbia OEL TWA
		As Mn (Inhalable)	0.1 mg/m^3	Canada. Manitoba OEL TWA
		As Mn (Respirable)	0.02 mg/m^3	Canada. Manitoba OEL TWA
		As Mn	0.2 mg/m^3	Canada. New Brunswick OEL TWA
		As Mn	0.1 mg/m^3	Canada. Newfoundland & Labrador OEL TWA
		As Mn	0.1 mg/m^3	Canada. Nova Scotia OEL TWA
		As Mn	1 mg/m^3	Canada. Nunavut OEL TWA
		As Mn	3 mg/m^3	Canada. Nunavut OEL STEL
		As Mn	5 mg/m^3	Canada. Nunavut OEL Ceiling
		As Mn	1 mg/m^3	Canada. Northwest Territories OEL TWA
		As Mn	3 mg/m^3	Canada. Northwest Territories OEL STEL
		As Mn	5 mg/m^3	Canada. Northwest Territories OEL Ceiling
		As Mn	0.2 mg/m^3	Canada. Ontario OEL TWA
		As Mn	0.2 mg/m^3	Canada. Prince Edward Island OEL TWA
		As Mn	0.2 mg/m^3	Canada. Quebec OEL TWA
		As Mn	0.2 mg/m^3	Canada. Saskatchewan OEL TWA
		As Mn	0.6 mg/m^3	Canada. Saskatchewan OEL STEL
		As Mn	5 mg/m^3	Canada. Yukon OEL Ceiling
Silicon	7440-21-3	Total Dust	10 mg/m^3	Canada. British Columbia OEL TWA
		Total Dust	3 mg/m^3	Canada. New Brunswick OEL TWA
		Total Dust	10 mg/m^3	Canada. Nunavut OEL TWA
		Total Dust	10 mg/m^3	Canada. Northwest Territories OEL TWA
		Total Dust	10 mg/m^3	Canada. Ontario OEL TWA
		Total Dust	10 mg/m^3	Canada. Quebec OEL TWA
		Total Dust	10 mg/m^3	Canada. Saskatchewan OEL TWA
		Total Dust	20 mg/m^3	Canada. Saskatchewan OEL STEL
		Total Dust	10 mg/m^3	Canada. Yukon OEL TWA
		Total Dust	20 mg/m^3	Canada. Yukon OEL STEL
Silica (Quartz)	14808-60-7	Respirable Fraction	0.025 mg/m^3	Canada. Alberta OEL TWA
		Respirable Fraction	0.025 mg/m^3	Canada. British Columbia OEL TWA
		Respirable Fraction	0.025 mg/m^3	Canada. Manitoba OEL TWA
		Respirable Fraction	0.1 mg/m^3	Canada. Ontario OEL TWA
		Respirable Fraction	0.05 mg/m^3	Canada. Quebec OEL TWA
		Respirable Fraction	0.1 mg/m^3	Canada. Saskatchewan OEL TWA
Titanium Dioxide	13463-67-7	Total Dust	10 mg/m^3	Canada. Alberta OEL TWA
		Dust (Respirable)	3 mg/m^3	Canada. British Columbia OEL TWA

		Total Dust	10 mg/m^3	Canada. British Columbia OEL TWA
		Total Dust	10 mg/m^3	Canada. Manitoba OEL TWA
		Total Dust	10 mg/m^3	Canada. Ontario OEL TWA
		Total Dust	10 mg/m^3	Canada. Quebec OEL TWA
		Total Dust	10 mg/m^3	Canada. Saskatchewan OEL TWA
		Total Dust	20 mg/m^3	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^3	Mexico. OEL CTT
		Total Dust	10 mg/m^3	Mexico. OEL CPT
Manganese & Mn Compounds	7439-96-5	As Mn	0.2 mg/m^3	Mexico. OEL CPT
		As Mn Fume	1.0 mg/m^3	Mexico. OEL CPT
		As Mn Fume	3.0 mg/m^3	Mexico. OEL CTT
Silicon	7440-21-3	Total Dust	10 mg/m^3	Mexico. OEL CPT
		Total Dust	20 mg/m^3	Mexico. OEL CTT
Silica	69012-46-2	Fume	10 mg/m^3	Mexico. OEL CPT
		Fume (Respirable)	3 mg/m^3	Mexico. OEL CPT
Silica (Quartz)	14808-60-7	Respirable Fraction	0.1 mg/m^3	Mexico. OEL CPT
Titanium Dioxide	13463-67-7	Total Dust	20 mg/m^3	Mexico. OEL CTT
		Total Dust	10 mg/m^3	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^3
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 is it classified as carcinogenic.

Substance	Short-Term Exposure Effects	Long Term Exposure Effects	Toxicity Measure	Carcinogenicity
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, sinusitus, rhinitus and ashtma.	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^3	Not classifiable
Substance	**Short-Term Exposure Effects**	**Long Term Exposure Effects**	**Toxicity Measure**	**Carcinogenicity**
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
Nickel Oxide	May cause respiratory irritant, inhalation of fumes may cause pneumonitus.	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 Eposure) =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	Long term exposure may affect the body's metabolism.	LC50 (Human, Inhalation Exposure) =100,000 ppm/min	Not classifiable

	high levels can cause coma and possibly death.			
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
Substance	**Short-Term Exposure Effects**	**Long Term Exposure Effects**	**Toxicity Measure**	**Carcinogenicity**
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/m3	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^3	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

Toxicity: Not classified
Persistence and degradability: No information available
Bioaccumulative potential: No information available
Mobility in soil: No information available
Other adverse effects: Unknown

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.

NFPA 704:	**HEALTH:**	**2**	**FLAMMABILITY:**	**0**	**REACTIVITY:**	**0**
HMIS:	**HEALTH:**	**2**	**FLAMMABILITY:**	**0**	**PHYSICAL HAZARD:**	**0**

SDS Revisions

Preparation date:	5/12/2015	Revision date:	6/8/2015	Revision number:	1

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, the manufacturer 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 the manufacturer 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.*