p

1. PRODUCT & COMPANY IDENTIFICATION

1.1	Product Name:	**COR-MET® DUPLEX / SPECIALTY STAINLESS STEEL**
1.2	Chemical Name:	Iron Base Alloy
1.3	Synonyms:	FC-O, FC-G, MC-G, FC-S, MC-T, T0-3, T0-4
1.4	Trade Names:	17-4 PH, 2209, 2552, 2553
1.5	Product Use:	Welding Wire
1.6	Distributor's Name:	Cor-Met®, Inc.
1.7	Distributor's Address:	12500 Grand River Road, Brighton, MI 48116
1.8	Emergency Phone:	**COR-MET: +1 (800) 848-2719**
1.9	Business Phone / Fax:	Tel: +1 (810) 227-3251 // Fax: +1 (810) 227-9266

2. HAZARDS IDENTIFICATION

2.1 Hazard Identification:

Prepared in accordance with UN Globally Harmonized standards. Intended to comply with OSHA 29 CFR 1910.1200. Canadian WHMIS and Australian Work Health and Safety standards.

DANGER! MAY CAUSE CANCER. MAY CAUSE DAMAGE TO ORGANS (LUNGS) THROUGH PROLONGED OR REPEATED EXPOSURE. CAUSES SERIOUS EYE IRRITATION. MAY CAUSE RESPIRATORY IRRITATION.

Classification: Carc. 1A; STOT RE 2; Eye Irrit. 2; STOT SE 3

2.2 Label Elements:

Hazard Statements (H): H350 – May cause cancer. H319 – Causes serious eye irritation. H335 – May cause respiratory irritation. H372 – Causes damage to organs (lungs) through prolonged or repeated exposure.

Precautionary Statements (P): P203 – Obtain, read and follow instructions before use. P260 – Do not breathe dust/fume. P264 – Wash hands and exposed skin areas with soap and warm water thoroughly after handling. P270 – Do not eat, drink or smoke when using this product. P271 – Use only outdoors or in a well-ventilated area. P280 – Wear protective gloves/protective clothing/eye protection/face protection. P304+P340 – IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P318 – If exposed or concerned, get medical advice. P319 – Get medical help if you feel unwell. P337+P317 – If eye irritation persists: Get medical help. P405 – Store locked up. P501 – Dispose of contents and container to a licensed treatment, storage or disposal facility (TSDF).

2.3 Other Warnings:

WARNING: Electric shock from welding equipment or electrodes may be fatal. The welding process uses electrical circuits that sustain a welding arc between the electrode and the base plate. The welding arc converts the electrical energy into a localized, concentrated heat source. The tremendously high temperatures of the arc cause the welding continuous wire and rod electrode (or filler metal, when used as such) to decompose. Electric arc working may create one or more health hazards. Hot metal spatter and heat from electric arcs, welding flames or the thermal spray process may cause burns to the hands and body or may cause fire if it comes into contact with combustible materials. UV, IR and light radiation from an electric arc may cause damage to unprotected eyes. Wear suitable protective equipment. Fumes and gases generated during the welding process can be harmful to your health and noise generated during welding can damage hearing. See also American National Standard Z-49.1, "Safety in Welding, Cutting and Allied Processes" published by the American Welding Society for additional safety precautions and hazard warnings.

WARNING! This product can expose you to chemicals including Hexavalent Chromium, and Nickel, which are known to the State of California to cause cancer or reproductive harm. For more information, go to www.P65Warnings.ca.gov.

3. COMPOSITION & INGREDIENT INFORMATION

CHEMICAL NAME(S)	CAS No.	RTECS No.	EINECS No.	%	EXPOSURE LIMITS IN AIR (mg/m³) ACGIH ppm TLV	ACGIH ppm STEL	NOHSC ppm ES-TWA	NOHSC ppm ES-STEL	NOHSC ppm ES-PEAK	OSHA ppm PEL	OSHA ppm STEL	OSHA ppm IDLH	OTHER
IRON	7439-89-6	NO4565500	231-096-4	55-75	(5.0)	NA	NF	NF	NF	(10.0)	NA	NA	0.5 - NIOSH
CHROMIUM #	7440-47-3	GB4200000	231-157-5	15-27	(0.5)	NA	(0.5)	NF	NF	(1.0)	NA	25	
NICKEL	7440-02-0	QR5950000	231-111-4	4-10.5	(5.0)	NA	NF	NF	NF	(5.0)	NA	NA	
	Carc. 2; STOT RE 1; Skin Sens. 1; Aquatic Chronic 3; H351, H372**, H317, H412												
MOLYBDENUM	7439-98-7	QA4680000	231-107-2	2.5-4	(10.0)	NA	(10.0)	NF	NF	(15.0)	NA	(5000)	
COPPER	7440-50-8	GL5325000	231-159-6	0.5-5	(1.0)**	NA	(1.0)	NF	NF	(1.0)	NA	NA	(0.2) FUME

The exposure limit for welding fume has been established at 5 mg/m3 with OSHA's PEL and ACGIH's TLV. The individual complex compounds within the fume may have lower exposure limits than the general welding fume PEL/TLV. An Industrial Hygienist, the OSHA Permissible Exposure Limits For Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits.

4. FIRST AID MEASURES

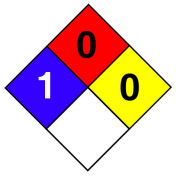
4.1	First Aid:	Eyes:	Flush eyes thoroughly with copious amounts of water for at least 15 minutes, holding eyelid(s) open to ensure complete flushing. If irritation persists, seek immediate medical attention.
		Skin:	Remove contaminated clothing and wash affected areas with soap and water. If irritation persists, seek prompt medical attention. Do not wear contaminated clothing until after it has been properly cleaned.
		Inhalation:	Remove victim to fresh air at once. If breathing is difficult, administer supplemental oxygen and seek immediate medical attention. If breathing stops, perform artificial respiration.
		Ingestion:	Ingestion is unlikely; however, particulates from grinding or cutting may be ingested. DO NOT INDUCE VOMITING. Contact ChemTrec at +1 (703) 527-3887 or the nearest Poison Control Center or local emergency telephone number for assistance and instructions. Seek immediate medical attention. If vomiting occurs spontaneously, keep victim's head lowered (forward) to reduce the risk of aspiration.
4.2	Effects of Exposure:	Ingestion:	Gastrointestinal irritation, nausea, and/or vomiting.
		Eyes:	Mild to moderate irritant.
		Skin:	Redness, irritation, rash at site of exposure. Chromium dust on skin can form ulcers.
		Inhalation:	Inhalation of chromium and chromates, in fumes, can cause a metallic taste, tightness in the chest, nausea, fever, fatigue and allergic reaction. Fumes may cause irritation to nasal membranes, bronchial tubes and lungs.
4.3	Symptoms of Overexposure:	Ingestion:	Intestinal discomfort, nausea, vomiting, and diarrhea.
		Eyes:	Mild irritation, redness, and watering.
		Skin:	Contact dermatitis, characterized by localized red or puffy dry skin and itching.
		Inhalation:	Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, metal fume fever, difficulty in breathing, frequent coughing, or chest pain.
4.4	Acute Health Effects:	Ingestion:	Gastrointestinal irritation and central nervous system depression.
		Eyes:	Mild to moderate irritant.
		Skin:	Prolonged or repeated contact may cause contact dermatitis (localized redness or rash).
		Inhalation:	Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, metal fume fever, difficulty in breathing, frequent coughing, or chest pain. Overexposure to metals oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24-48 hours following overexposure.
4.5	Chronic Health Effects:	Ingestion:	Ingestion or inhalation of fluorides may cause serious bone erosion (osteoporosis) and mottling of teeth.
		Eyes:	None reported by the manufacturer.
		Skin:	Prolonged or repeated contact may cause contact dermatitis (localized redness or rash).
		Inhalation:	Long term exposure to welding and allied processes gases, dusts and fumes may contribute to pulmonary irritation or pneumoconiosis or "siderosis." Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's Disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems.
4.6	Target Organs:	Eyes, Skin & Respiratory System.	
4.7	Medical Conditions Aggravated by Exposure:	Individuals with allergies or impaired respiratory function may have symptoms worsened by exposure to welding fumes; however, such reaction cannot be predicted due to the variation in the composition and in the quantity of the decomposition products.	

HEALTH	1
FLAMMABILITY	0
PHYSICAL HAZARDS	0
PROTECTIVE EQUIPMENT	E

EYES	SKIN	LUNGS

5. FIREFIGHTING MEASURES

5.1	Fire & Explosion Hazards:	This product is not flammable.
5.2	Extinguishing Methods:	Water, CO_2, Halon or Dry Chemical
5.3	Firefighting Procedures:	Fight fires as for surrounding materials. Firefighters should wear a MSHA/NIOSH approved or equivalent self-contained breathing apparatus (SCBA) and protective clothing. Fire should be fought from a safe distance. Keep containers cool until well after the fire is out. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply, or any natural waterway.



6. ACCIDENTAL RELEASE MEASURES

6.1	Spills:	Spilled product may produce a slip hazard. Before cleaning any spill, individuals involved in spill cleanup must wear appropriate Personal Protective Equipment including gloves, glasses and NIOSH approved (or equivalent) dust respirator. Carefully vacuum or sweep up the spilled powder, particulate or slag. Dispose of properly in accordance with local, state, provincial and federal regulations. Wash all affected areas. Remove any contaminated clothing and wash thoroughly before reuse.

7. HANDLING & STORAGE INFORMATION

7.1	Work & Hygiene Practices:	Avoid contact to eyes, skin, and mucous membranes. Avoid inhalation of vapors, gases, fumes and dusts. Wash thoroughly after handling and use. Do not smoke, eat, drink, chew gum or tobacco, or apply cosmetics within the working area. Do not store or bring tobacco products, gum, food, drinks or cosmetics within the working area. Otherwise follow the standards of good industrial hygiene practices.
7.2	Storage & Handling:	No unusual methods are required. Keep product contained and retain all warning and identity labels. Preferred storage is a sheltered warm area with temperature and humidity control to prevent high humidity and "going through the dew point." Static charge may occur during powder transfer. Keep away from incompatible materials listed in Section 10. Open containers slowly on a stable surface. Keep container tightly closed when not in use.
7.3	Special Precautions:	Read and understand the manufacturer's instructions and the precautionary label on this product. See American National Standard Z-49.1, "Safety in Welding, Cutting and Allied Processes," published by the American Welding Society, P. O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for additional details regarding fire and explosion control, exposure control and other special precautions.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

8.1 Exposure Limits: ppm (mg/m^3)

	ACGIH		NOHSC			OSHA			OTHER
CHEMICAL NAME(S)	TLV	STEL	ES-TWA	ES-STEL	ES-PEAK	PEL	STEL	IDLH	
IRON	(5.0)	NA	NF	NF	NF	(10.0)	NA	NA	0.5 - NIOSH
CHROMIUM #	(0.5)	NA	(0.5)	NF	NF	(1.0)	NA	25	
NICKEL	(5.0)	NA	NF	NF	NF	(5.0)	NA	NA	
MOLYBDENUM	(10.0)	NA	(10.0)	NF	NF	(15.0)	NA	(5000)	
COPPER	(1.0)**	NA	(1.0)	NF	NF	(1.0)	NA	NA	(0.2) FUME

8.2	Ventilation & Engineering Controls:	Use industrial hygiene monitoring equipment to ensure that exposure does not exceed threshold limit values. Use with adequate ventilation (e.g., open doors and windows, local exhaust ventilation). Ensure appropriate decontamination equipment is available (e.g., sink, safety shower, eye-wash station). Use in a chemical fume hood when working with large quantities of product and provide adequate ventilation (e.g., local exhaust ventilation, fans).
8.3	Respiratory Protection:	CAUTION: Welding or cutting may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. Use adequate ventilation. Use NIOSH approved respiratory protection. See ANSI Z49.1-1967 Safety in Welding and Cutting published by the American Welding Society. Keep the exposure within legal limits. In the worker's breathing zone and the general area, the fumes and gases must be kept below the TLVs and the equivalent exposure must compute to less than one. Keep exposure as low as possible. Use respirable fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the TLV. Where respiratory protection is necessary, NIOSH approved respiratory protection should be used. The selection of the appropriate respiratory protection (dust respirator, etc.) should be based on the actual or potential airborne contaminants and their concentrations present. 
8.4	Eye Protection:	Wear helmet or use face shield with filter lens according to ANSI Z87.1. Provide protective screens and flash goggles, if necessary, to shield others. Wear safety glasses with UV protective side shields or goggles. Wear contact lenses in combination with safety eyewear, except where the contact lenses create a likelihood of injury from intense heat, highly particulate atmosphere, or where their use is prohibited. 
8.5	Hand Protection:	Wear head, hand and body protection that help to prevent injury from hot metal, sparks, slag, infrared radiation, UV radiation, abrasions, contusions and heat stress. Protective clothing will not generally prevent shock except for leather if kept dry. Gloves made of leather with inside seams (or those that give equal performance) are preferred. 
8.6	Body Protection:	Wear head, hand and body protection that help to prevent injury from radiation, sparks and electrical shock. Wear flame resistant ear plugs to keep sparks out of ears. See ANSI Z-49.1. The clothing may include heat/fire resistant gloves, overalls, aprons, sleeves, footwear, welder's spats and head cover. Wear garments made of leather, heavyweight tightly woven wool or cotton. Keep clothing clean (free of oil, grease or solvents) and in good repair. Do not wear clothing with frayed edges, tears or holes. Do not roll up sleeves or trousers (pants should not be cuffed). 

9. PHYSICAL & CHEMICAL PROPERTIES

9.1	Appearance:	Solid wire, silver-grey color
9.2	Odor:	Odorless
9.3	Odor Threshold:	NA
9.4	pH:	NA
9.5	Melting Point/Freezing Point:	NA
9.6	Initial Boiling Point/Boiling Range:	NA
9.7	Flashpoint:	NA
9.8	Upper/Lower Flammability Limits:	NA
9.9	Vapor Pressure:	NA
9.10	Vapor Density:	NA

9. PHYSICAL & CHEMICAL PROPERTIES – cont'd

9.11	Relative Density:	7.2 – 7.8 g/cm^3
9.12	Solubility:	NA
9.13	Partition Coefficient (log P_{ow}):	NA
9.14	Autoignition Temperature:	NA
9.15	Decomposition Temperature:	NA
9.16	Viscosity:	NA
9.17	Other Information:	NA

10. STABILITY & REACTIVITY

10.1	Stability:	Stable under normal conditions of use (see section 7).
10.2	Hazardous Decomposition Products:	Irritating vapors and toxic gases (e.g., carbon monoxide and carbon dioxide) when burned or during
10.3	Hazardous Polymerization:	Will not occur.
10.4	Conditions to Avoid:	Use or storage near incompatible substances.
10.5	Incompatible Substances:	Strong oxidizing agents, strong acids and bases.

11. TOXICOLOGICAL INFORMATION

11.1	Routes of Entry:	Inhalation:	YES	Absorption:	YES	Ingestion:	NO

11.2 Toxicity Data:

Manganese & Manganese Oxides: High short-term (acute) exposure to manganese and its compounds may cause "metal fume fever," a condition characterized by sever flu-like symptoms of chills, fever, upset stomach, vomiting, irritation of the throat and aching of the body. Symptoms generally disappear within 48 hours after discontinuation of exposure (for example over a weekend), may quickly reappear upon resumption of exposure ("Monday morning syndrome"), and may dissipate during the workweek as the body adjusts to exposure. Chronic overexposure to Manganese compounds may result in central nervous system (CNS) effects, with symptoms that may include behavioral changes, impairment of muscle function, and sexual dysfunction. In severe cases, irreversible CNS effects may result, with a host of symptoms that mimic Parkinson's disease or muscular dystrophy.

Molybdenum: Overexposure to oxides of molybdenum may affect the body if they are inhaled, ingested or if they contact the eyes. Effects could include irritation of the eyes, nose, and throat, weight loss, and digestive disturbances. Long term effects are not known, but may be associated with muscle and joint aches, headache.

Silicon & Silicon Oxides: (Amorphous Silica) Short term overexposure may be a possible eye irritant. Repeated inhalation of amorphous silica can cause pneumoconiosis or non-disabling fibrosis of the lung.

Titanium Oxides: Oxides of titanium are considered to have minimal toxicity, as a nuisance dust. Exposure may cause mild irritation of the respiratory system and eyes. Titanium Dioxide: LC_{50} (rat, inh-4h) > 6.82 mg/L

Niobium: Short term exposure may result in eye and skin irritation, as well as irritation to the respiratory tract. Long term exposure may result in kidney damage and moderate fibrosis of the lungs.

Additional Information: See Section 2, "Hazard Identification," for general overview of hazards associated with use of this product, and for health hazards and symptoms associated with acute and chronic exposures to welding fumes generated from this product. See Section 3 of this SDS for specific constituents of this product in order to determine applicability of information provided in this section.

11.3	Acute Toxicity:	See Section 4.4
11.4	Chronic Toxicity:	See Section 4.5
11.5	Suspected Carcinogen:	Nickel is listed as IARC Group 2B (Possibly carcinogenic to humans); NTP15 Group 1 (Known human carcinogen); CA65 (cancer). Chromium in the form of "hexavalent chromium," is considered a human carcinogen, and thus a mutagen as well. While this product does not contain hexavalent chromium, it is well known that the chromium in this product is converted to various chemical forms during the welding process, including hexavalent chromium. Therefore, use of this product in normal welding operations must be considered to represent a cancer hazard. Other constituents of this product are not considered carcinogens or mutagens.
		WARNING! This product can expose you to chemicals including Hexavalent Chromium, and Nickel, which are known to the State of California to cause cancer or reproductive harm. For more information, go to www.P65Warnings.ca.gov.
11.6	Reproductive Toxicity:	This product is not reported to produce reproductive system effects in humans.
	Mutagenicity:	Chromium in the form of "hexavalent chromium," is believed to produce mutagenic effects in humans.
	Embryotoxicity:	This product is not reported to produce embryotoxic effects in humans.
	Teratogenicity:	This product is not reported to produce teratogenic effects in humans.
	Reproductive Toxicity:	This product is not reported to produce reproductive system effects in humans.
11.7	Irritancy of Product:	See Section 4.2
11.8	Biological Exposure Indices:	Consult Occupational Physician for the availability and appropriateness of biological exposure indices (e.g., blood tests, urine tests, etc.).
11.9	Physician Recommendations:	Treat symptomatically.

12. ECOLOGICAL INFORMATION

12.1	Environmental Stability:	There is no specific data available for this product.
12.2	Effects on Plants & Animals:	There is no specific data available for this product.
12.3	Effects on Aquatic Life:	There is no specific data available for this product.

13. DISPOSAL CONSIDERATIONS

13.1	Waste Disposal:	Dispose of in accordance with federal, state, provincial or local regulations.
13.2	Special Considerations:	NA

14. TRANSPORTATION INFORMATION

The basic description (ID Number, proper shipping name, hazard class & division, packing group) is shown for each mode of transportation. Additional descriptive information may be required by 49 CFR, IATA/ICAO, IMDG and the CTDGR.

14.1	49 CFR (GND):	NOT REGULATED	
14.2	IATA (AIR):	NOT REGULATED	
14.3	IMDG (OCN):	NOT REGULATED	
14.4	TDGR (Canadian GND):	NOT REGULATED	
14.5	ADR/RID (EU):	NOT REGULATED	
14.6	SCT (MEXICO):	NOT REGULATED	
14.7	ADGR (AUS):	NOT REGULATED	

15. REGULATORY INFORMATION

15.1	SARA Reporting Requirements:	The following chemicals are listed on the SARA Title III (EPCRA 313 Toxic Chemical List): Chromium, Manganese, Nickel.
15.2	SARA TPQ:	There are no specific Threshold Planning Quantities for the components of this product.
15.3	TSCA Inventory Status:	All chemical substances of this product are listed on the TSCA inventory or are otherwise exempt from inventory status.
15.4	CERCLA Reportable Quantity:	Chromium: 2,270 kg (5,000 lbs); Nickel: 45.4 kg (100 lbs)
15.5	Other Federal Requirements:	Manganese (and its compounds), Chromium (and its compounds), and Nickel (and its compounds) are listed as Hazardous Air Pollutants (HAPs). Manganese (and its compounds), Chromium (and its compounds), and Nickel (and its compounds) are listed as Toxic Pollutants under the Clean Water Act (CWA). Chromium, Copper and Nickel are listed as Priority Pollutants under the Clean Water Act (CWA). This product does not contain any Class 1 or Class 2 ozone depletors.
15.6	Other Canadian Regulations:	This product has been classified according to the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by the CPR. The components of this product are listed on the DSL/NDSL. The following chemicals are listed on the Ingredient Disclosure List: Chromium, Manganese, Nickel and Molybdenum.
15.7	State Regulatory Information:	Chromium is found on the following state criteria lists: Florida Toxic Substances List (FL), Massachusetts Hazardous Substances List (MA), Michigan Critical Substances List (MI), Minnesota Hazardous Substances List (MN), New Jersey Right-to-Know List (NJ), New York Hazardous Substances List (NY), Pennsylvania Right-to-Know List (PA), and Washington Permissible Exposures List (WA). Nickel is listed on the following state criteria lists: FL, MA, MI, MN, NJ, PA and WA. No other hazardous ingredients in this product, present in a concentration of 1.0% or greater, are listed on any of the following state criteria lists: California Proposition 65 (CA65), Delaware Air Quality Management List (DE), Florida Toxic Substances List (FL), Massachusetts Hazardous Substances List (MA), Michigan Critical Substances List (MI), Minnesota Hazardous Substances List (MN), New Jersey Right-to-Know List (NJ), New York Hazardous Substances List (NY), Pennsylvania Right-to-Know List (PA), Washington Permissible Exposures List (WA), Wisconsin Hazardous Substances List (WI).
15.8	Other Requirements:	**WARNING**! This product can expose you to chemicals including Hexavalent Chromium, and Nickel, which are known to the State of California to cause cancer or reproductive harm. For more information, go to www.P65Warnings.ca.gov.

16. OTHER INFORMATION

16.1	Other Information:	**DANGER! MAY CAUSE CANCER. MAY CAUSE DAMAGE TO ORGANS (LUNGS) THROUGH PROLONGED OR REPEATED EXPOSURE. CAUSES SERIOUS EYE IRRITATION. MAY CAUSE RESPIRATORY IRRITATION.** Obtain, read and follow instructions before use. Do not breathe dust/fume. Wash hands and exposed skin areas with soap and warm water thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned, get medical advice. Get medical help if you feel unwell. If eye irritation persists: Get medical help. Store locked up. **NOTE**: Local ventilation should be used during handling and use. Good housekeeping and personal hygiene are recommended. Some individuals may show sensitivity to exposure. Failure to observe proper practices may be hazardous to health. Use only in well-ventilated areas. Harmful by inhalation. Avoid contact with skin and eyes. Do not breathe gas, fumes, vapor or spray. Wear suitable protective clothing, gloves and eye/face protection. In case of insufficient ventilation wear suitable respiratory protective equipment. Avoid overexposure to metal fumes, powders and particulates. **WARNING**: Electric shock from welding equipment or electrodes may be fatal. The welding process uses electrical circuits that sustain a welding arc between the electrode and the base plate. The welding arc converts the electrical energy into a localized, concentrated heat source. The tremendously high temperatures of the arc cause the welding continuous wire and rod electrode (or filler metal, when used as such) to decompose. Electric arc working may create one or more health hazards. Hot metal spatter and heat from electric arcs, welding flames or the thermal spray process may cause burns to the hands and body or may cause fire if it comes into contact with combustible materials. UV, IR and light radiation from an electric arc may cause damage to unprotected eyes. Wear suitable protective equipment. Fumes and gases generated during the welding process can be harmful to your health and noise generated during welding can damage hearing. See also American National Standard Z-49.1, “Safety in Welding, Cutting and Allied Processes” published by the American Welding Society for additional safety precautions and hazard warnings. **KEEP OUT OF REACH OF CHILDREN**. **WARNING**! This product can expose you to chemicals including Hexavalent Chromium, and Nickel, which are known to the State of California to cause cancer or reproductive harm. For more information, go to www.P65Warnings.ca.gov.
16.2	Terms & Definitions:	See last page of this Safety Data Sheet.
16.3	Disclaimer:	This Safety Data Sheet is offered pursuant to OSHA’s Hazard Communication Standard, 29 CFR §1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of ShipMate's & Cor-Met’s knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type, either expressed or implied, are provided. The information contained herein relates only to the specific product(s). If this product(s) is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.
16.4	Prepared for:	**Cor-Met, Inc.** 12500 Grand River Road Brighton, MI 48116 USA Tel: +1 (810) 227-3251 Fax: +1 (810) 227-9266 http://www.cor-met.com/ E-mail: sales@cor-met.com
16.5	Prepared by:	**ShipMate, Inc.** P.O. Box 787 Sisters, Oregon 97759-0787 USA Tel: +1 (310) 370-3600 Fax: +1 (310) 370-5700 https://shipmate.com

DEFINITION OF TERMS

A large number of abbreviations and acronyms appear on a SDS. Some of these that are commonly used include the following:

GENERAL INFORMATION:

CAS No.	Chemical Abstract Service Number
RTECS No.	Registry of Toxic Effects of Chemical Substances Number
EINECS No.	European Inventory of Existing Commercial Chemical Substances Number

EXPOSURE LIMITS IN AIR:

ACGIH	American Conference on Governmental Industrial Hygienists
IDLH	Immediately Dangerous to Life and Health
NOHSC	National Occupational Health and Safety Commission (Australia)
OSHA	U.S. Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

FIRST AID MEASURES:

CPR	Cardiopulmonary resuscitation - method in which a person whose heart has stopped receives manual chest compressions and breathing to circulate blood and provide oxygen to the body.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: HMIS

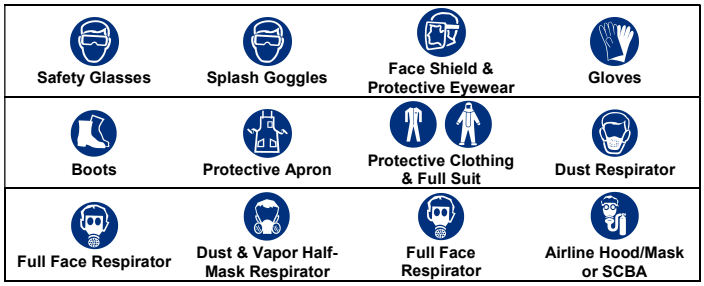
HEALTH, FLAMMABILITY & REACTIVITY RATINGS:

0	Minimal Hazard
1	Slight Hazard
2	Moderate Hazard
3	Severe Hazard
4	Extreme Hazard

HEALTH
FLAMMABILITY
PHYSICAL HAZARDS
PERSONAL PROTECTION

PERSONAL PROTECTION RATINGS:

A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
X	**Consult your supervisor or SOPs for special handling directions.**



OTHER STANDARD ABBREVIATIONS:

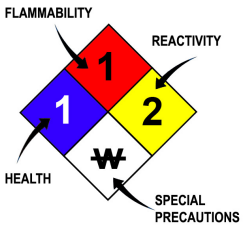
Carc	Carcinogenic
Irrit	Irritant
NA	Not Available
NR	No Results
ND	Not Determined
NE	Not Established
NF	Not Found
SCBA	Self-Contained Breathing Apparatus
Sens	Sensitization
STOT RE	Specific Target Organ Toxicity – Repeat Exposure
STOT SE	Specific Target Organ Toxicity – Single Exposure

NATIONAL FIRE PROTECTION ASSOCIATION: NFPA

FLAMMABILITY LIMITS IN AIR:	
Autoignition Temperature	Minimum temperature required to initiate combustion in air with no other source of ignition
LEL	Lower Explosive Limit - lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source
UEL	Upper Explosive Limit - highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source

HAZARD RATINGS:

0	Minimal Hazard
1	Slight Hazard
2	Moderate Hazard
3	Severe Hazard
4	Extreme Hazard
ACD	Acidic
ALK	Alkaline
COR	Corrosive
W	Use No Water
OX	Oxidizer
TREFOIL	Radioactive



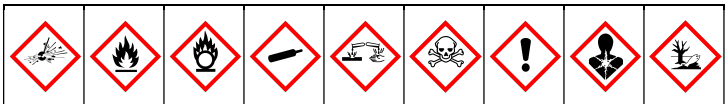
TOXICOLOGICAL INFORMATION:

LD_{50}	Lethal Dose (solids & liquids) which kills 50% of the exposed animals
LC_{50}	Lethal concentration (gases) which kills 50% of the exposed animal
ppm	Concentration expressed in parts of material per million parts
TD_{lo}	Lowest dose to cause a symptom
TCLo	Lowest concentration to cause a symptom
TD_{lo}, LD_{lo}, & LD_o or TC, TC_o, LC_{lo}, & LC_o	Lowest dose (or concentration) to cause lethal or toxic effects
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
RTECS	Registry of Toxic Effects of Chemical Substances
BCF	Bioconcentration Factor
TL_m	Median threshold limit
log K_{ow} or log K_{oc}	Coefficient of Oil/Water Distribution

REGULATORY INFORMATION:

WHMIS	Canadian Workplace Hazardous Material Information System
DOT	U.S. Department of Transportation
TC	Transport Canada
EPA	U.S. Environmental Protection Agency
DSL	Canadian Domestic Substance List
NDSL	Canadian Non-Domestic Substance List
PSL	Canadian Priority Substances List
TSCA	U.S. Toxic Substance Control Act
EU	European Union (European Union Directive 67/548/EEC)
WGK	Wassergefährdungsklassen (German Water Hazard Class)

CLP/GHS (1272/2008/EC) PICTOGRAMS:



GHS01	GHS02	GHS03	GHS04	GHS05	GHS06	GHS07	GHS08	GHS09
Explosive	Flammable	Oxidizer	Pressurized	Corrosive	Toxic	Harmful Irritating	Health Hazard	Environment