


Prepared to OSHA, ACC, ANSI, NOHSC, WHMIS, 2001/58 & 1272/2008/EC Standards	SDS Revision: 1.1	SDS Revision Date: 9/30/2015
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## 1. PRODUCT & COMPANY IDENTIFICATION

1.1	Product Name:	<b>J-10</b>
1.2	Chemical Name:	Metal Powder
1.3	Synonyms:	NA
1.4	Trade Names:	J-10
1.5	Product Use:	Professional Use Only
1.6	Distributor's Name:	The NanoSteel Company, Inc.
1.7	Distributor's Address:	272 W. Exchange Street, Suite 300, Providence RI 02903
1.8	Emergency Phone:	<b>CHEMTREC: +1 (703) 527-3887 / +1 (800) 424-9300</b>
1.9	Business Phone / Fax:	Tel: +1 (401) 270-3549 / Fax: +1 (401) 270-9306

## 2. HAZARDS IDENTIFICATION

2.1	Hazard Identification:	<p>This product is classified as a HAZARDOUS SUBSTANCE but NOT DANGEROUS GOODS according to the classification criteria of NOHSC: 1088 (1999) and ADG Code (Australia).  <b>WARNING! CAUSES SERIOUS EYE IRRITATION. MAY CAUSE RESPIRATORY IRRITATION.</b>                  Classification: Eye Irrit. 2; STOT SE 3  <u>Hazard Statements (H):</u> H319 – Causes serious eye irritation. H335 – May cause respiratory irritation.  <u>Precautionary Statements (P):</u> P261 – Avoid breathing dust/spray. P264 – Wash hands and exposed skin areas with soap and warm water thoroughly after handling. P271 – Use only outdoors or in a well-ventilated area. P280 – Wear protective gloves/eye protection. P304+P340 – IF INHALED: Remove victim to fresh air and keep at rest in a position 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. P312 – Call a POISON CENTER or doctor/physician if you feel unwell. P337+P313 – If eye irritation persists: Get medical advice/attention. P403+P233 – Store in a well-ventilated place. Keep container tightly closed. P405 – Store locked up. P501 – Dispose of contents/container to licensed and permitted disposal or recycling facility.</p> <p>Light from additive manufacturing equipment may cause damage to unprotected eyes. Wear suitable protective equipment. Electric shock from welding equipment may be fatal. Fumes and gases generated during additive manufacturing process may be harmful to your health.</p>	
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## 3. COMPOSITION & INGREDIENT INFORMATION

CHEMICAL NAME(S)	CAS No.	RTECS No.	EINECS No.	%	EXPOSURE LIMITS IN AIR (mg/m <sup>3</sup> )									OTHER
					ACGIH		NOHSC			OSHA				
					ppm		ppm			ppm				
					TLV	STEL	ES-TWA	ES-STEL	ES-PEAK	PEL	STEL	IDLH		
IRON	7439-89-6	NO4565500	231-096-4	≥ 40.0	(5.0)	NA	NF	NF	NF	(10.0)	NA	NA	0.5 – NIOSH	
CHROMIUM #	7440-47-3	GB4200000	231-157-5	< 20.0	(0.5)	NA	(0.5)	NF	NF	(1.0)	NA	NA		
NICKEL	7440-02-0	Qr5950000	231-111-4	< 15.0	NA	NA	NF	1	NF	NA	NA	10	SENSITIZER	
SILICON	7440-21-3	VW0400000	231-130-8	< 5.0	(10.0)	NA	(10.0)	NF	NF	(10.0)	NA	NA		
BORON *	7440-42-8	ED7350000	231-151-2	< 2.0	(10.0)	NA	NF	NF	NF	(15.0)	NA	NA		
CARBON *	7440-44-0	FF5250100	231-153-3	< 1.0	(3.5)	NA	NF	NF	NF	(3.5)	NA	(1750)		
MOLYBDENUM	7439-98-7	QA4680000	231-107-2	< 0.1	10	NA	NF	10	NF	NA	NA	1000		
MANGANESE	7439-96-5	OO9275000	231-105-1	< 0.1	(10.0)	NA	(1.0)	NF	NF	(10.0)	NA	(500)	(1.0)	
TUNGSTEN	7440-33-7	YO7175000	231-143-9	< 0.1	(5.0)	(10.0)	(5.0)	(10.0)	NF	(5.0)	NA	NA	(1.0)	

## 4. FIRST AID MEASURES

4.1	First Aid:	<p><b>Ingestion:</b> 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.</p> <p><b>Eyes:</b> 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.</p> <p><b>Skin:</b> 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.</p> <p><b>Inhalation:</b> 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.</p>															
4.2	Effects of Exposure:	<p><b>Ingestion:</b> Gastrointestinal irritation, nausea and or/vomiting</p> <p><b>Eyes:</b> Mild to moderate irritant.</p> <p><b>Skin:</b> redness, irritation, rash at site of exposure</p> <p><b>Inhalation:</b> Inhalation of chromium and chromates in fumes can cause metallic taste tightness in the chest, nausea, fever, fatigue and allergic reaction. Fumes may cause irritation to nasal membranes, bronchial tubes and lungs.</p>															
4.3	Symptoms of Overexposure:	<p><b>Ingestion:</b> Intestinal discomfort, nausea vomiting and diarrhea</p> <p><b>Eyes:</b> Mild irritation, redness and watering.</p> <p><b>Skin:</b> Contact dermatitis, characterized by localized red or puffy dry skin and itching.</p> <p><b>Inhalation:</b> 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.</p>															
4.4	Acute Health Effects:	Moderate irritation to eyes and skin near affected areas. Additionally, high concentrations of vapors can cause drowsiness, dizziness, headaches and nausea.															
4.5	Chronic Health Effects:	The material may accentuate any pre-existing dermatitis condition.															
4.6	Target Organs:	Eyes, skin and 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.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #0000FF; color: white;"><b>HEALTH</b></td> <td style="text-align: center;"><b>1</b></td> </tr> <tr> <td style="background-color: #FF0000; color: white;"><b>FLAMMABILITY</b></td> <td style="text-align: center;"><b>0</b></td> </tr> <tr> <td style="background-color: #FFA500; color: white;"><b>PHYSICAL HAZARDS</b></td> <td style="text-align: center;"><b>0</b></td> </tr> <tr> <td colspan="2" style="background-color: #000000; color: white;"><b>PROTECTIVE EQUIPMENT</b></td> </tr> <tr> <td style="background-color: #000000; color: white;"><b>EYES</b></td> <td style="text-align: center;"><b>E</b></td> </tr> <tr> <td style="background-color: #000000; color: white;"><b>SKIN</b></td> <td></td> </tr> <tr> <td style="background-color: #000000; color: white;"><b>LUNGS</b></td> <td></td> </tr> </table>	<b>HEALTH</b>	<b>1</b>	<b>FLAMMABILITY</b>	<b>0</b>	<b>PHYSICAL HAZARDS</b>	<b>0</b>	<b>PROTECTIVE EQUIPMENT</b>		<b>EYES</b>	<b>E</b>	<b>SKIN</b>		<b>LUNGS</b>	
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<b>LUNGS</b>																	

## 5. FIREFIGHTING MEASURES

5.1	Fire & Explosion Hazards:	This product is not flammable.	
5.2	Extinguishing Methods:	Water, CO <sub>2</sub> , Halon (if permitted) 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. Dispose of properly in accordance with local, state and federal regulations. Wash all affected areas. Remove any contaminated clothing and wash thoroughly before reuse.
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## 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." 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 <sup>3</sup> )	CHEMICAL NAME(S)	ACGIH		NOHSC			OSHA			OTHER
			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	NA	
		NICKEL	NA	NA	NF	1	NF	NA	NA	10	SENSITIZER
		SILICON	(10.0)	NA	(10.0)	NF	NF	(10.0)	NA	NA	
		BORON	(10.0)	NA	NF	NF	NF	(15.0)	NA	NA	
		CARBON	(3.5)	NA	NF	NF	NF	(3.5)	NA	(1750)	
		MOLYBDENUM	10	NA	NF	10	NF	NA	NA	1000	
		MANGANESE	(10.0)	NA	(1.0)	NF	NF	(10.0)	NA	(500)	(1.0)
		TUNGSTEN	(5.0)	(10.0)	(5.0)	(10.0)	NF	(5.0)	NA	NA	(1.0)
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:	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. 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. However, at least a NIOSH approved type TC-21-C dust mask is recommended.									
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:	Powder, 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
9.11	Relative Density:	7.6 g/cm <sup>3</sup>
9.12	Solubility:	NA
9.13	Partition Coefficient (log P <sub>ow</sub> ):	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 involved in fire.
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: NO	Ingestion: YES
11.2	Toxicity Data:	This product has not been tested on animals to obtain toxicological data. (*) Boron and carbon in a pure dust form can be a health hazard. Long term exposure to boron dust can be poisonous and affect the nervous system. Long term exposure to carbon dust can cause pneumoconiosis. However, their presence in this alloy is not believed to present a health hazard due to their relatively low concentration and chemical form. (#) Chromium and its compounds are listed in the current annual report on carcinogens (prepared by the National Toxicology Program). Their presence in this alloy is not believed to present a carcinogenic or any other health hazard due to their relatively low concentration and chemical form.		
11.3	Acute Toxicity:	See section 4.4		
11.4	Chronic Toxicity:	See section 4.5		
11.5	Suspected Carcinogen:	Chromium, in some forms (e.g., hexavalent chromium) is considered carcinogenic. However, this alloy does not contain any hexavalent chromium. Therefore, this alloy is not believed to present a carcinogenic or any other health hazard due to their relatively low concentration and chemical form. Nickel is listed: IARC Group 2B; ACGIH A4		
11.6	Reproductive Toxicity:	This product is not reported to produce reproductive toxicity in humans.		
	Mutagenicity:	This product is not reported 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 effects in humans.		
11.7	Irritancy of Product:	See section 4.3		
11.8	Biological Exposure Indices:	NE		
11.9	Physician Recommendations:	Treat symptomatically.		

## 12. ECOLOGICAL INFORMATION

12.1	Environmental Stability:	This product will slowly corrode in soil.
12.2	Effects on Plants & Animals:	There is no specific data available for this product.
12.3	Effects on Aquatic Life:	Releases of large volumes of this product are not expected to be harmful or fatal to overexposed aquatic life.

## 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, and Nickel
15.2	SARA Threshold Planning Quantity:	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 (RQ):	<u>Chromium</u> : 5,000 lbs (2,270 kg); <u>Nickel</u> : 100 lbs (45.4 kg)
15.5	Other Federal Requirements:	NA
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: <u>Chromium</u> , <u>Manganese</u> . WHMIS Classification: D2B (Other Toxic Effects)



## 15. REGULATORY INFORMATION – cont'd

15.7	State Regulatory Information:	<p><u>Chromium</u> 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).</p> <p><u>Nickel</u> is found on the following state criteria list: FL, MA, MI, MN, NJ, PA and WA.</p> <p><u>Manganese</u> is found on the following state criteria lists: FL, MA, MN, NJ, PA, and WA.</p> <p><u>Silicon</u> is found on the following state criteria lists: MA, MN, PA, and WA.</p> <p><u>Carbon</u> is found on the following state criteria list: NJ, and PA.</p> <p>No other 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).</p>
15.8	Other Requirements:	<p>None of the components in this product is listed in Annex I of EU Directive 67/548/EEC.</p> <p>Harmful (Xn). <u>Risk Phrases</u> (R): 9-20-24/25 - Use only in well ventilated areas. Harmful by inhalation. Avoid contact with skin and eyes. <u>Safety Phrases</u> (S): 22-36/37/39-38-51 - Do not breathe gas/fumes/spray. Wear suitable protective clothing, gloves and eye/face protection. In case of insufficient ventilation wear suitable respiratory equipment. Use only in well-ventilated areas.</p> <p>Poisons Schedule Number: None Allocated.</p>



## 16. OTHER INFORMATION

16.1	Other Information:	<p><b>WARNING! CAUSES SERIOUS EYE IRRITATION. MAY CAUSE RESPIRATORY IRRITATION.</b></p> <p>This material is used in the additive manufacturing process. Consult the NanoSteel Company Safety Data Sheet, and applicable Federal, state, provincial and local health and safety laws before using this product. Use engineering and administrative controls, personal protective equipment (PPE), including respiratory protection, and training to protect workers involved in additive manufacturing activities. Light from additive manufacturing equipment may cause damage to unprotected eyes. Wear suitable protective equipment. Electric shock from welding equipment may be fatal. Fumes and gases generated during additive manufacturing process may be harmful to your health. Administrative controls, including the use of good work and personal hygiene practices can also reduce exposure. Local ventilation should be used during handling. Good housekeeping and personal hygiene are recommended. Some individuals may show sensitivity to exposure. Failure to observe proper practices may be hazardous to health. Avoid overexposure to metal dust.</p>
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 & NanoSteel'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:	<p><b>The NanoSteel Company, Inc.</b>                  272 W. Exchange Street, Suite 300                  Providence, RI 02903 USA                  Tel: +1 (401) 270-3549                  Fax: +1 (401) 270-9306  <a href="http://www.nanosteel.com/">http://www.nanosteel.com/</a></p>
16.5	Prepared by:	<p><b>ShipMate, Inc.</b>                  P.O. Box 787                  Sisters, Oregon 97759-0787 USA                  Tel: +1 (310) 370-3600                  Fax: +1 (310) 370-5700  <a href="http://www.shipmate.com">http://www.shipmate.com</a></p>



## 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:

<b>CAS No.</b>	Chemical Abstract Service Number
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### EXPOSURE LIMITS IN AIR:

<b>ACGIH</b>	American Conference on Governmental Industrial Hygienists
<b>C</b>	Ceiling Limit
<b>IDLH</b>	Immediately Dangerous to Life and Health
<b>OSHA</b>	U.S. Occupational Safety and Health Administration
<b>PEL</b>	Permissible Exposure Limit
<b>TLV</b>	Threshold Limit Value

### FIRST AID MEASURES:

<b>CPR</b>	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.
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### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: HMIS

### HEALTH, FLAMMABILITY & REACTIVITY RATINGS:

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

<b>HEALTH</b>
<b>FLAMMABILITY</b>
<b>PHYSICAL HAZARDS</b>
<b>PERSONAL PROTECTION</b>

### PERSONAL PROTECTION RATINGS:

<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	
<b>E</b>	
<b>F</b>	

<b>G</b>	
<b>H</b>	
<b>I</b>	
<b>J</b>	
<b>K</b>	
<b>X</b>	Consult your supervisor or SOPs for special handling directions.

Safety Glasses	Splash Goggles	Face Shield & Protective Eyewear	Gloves
Boots	Synthetic Apron	Protective Clothing & Full Suit	Dust Respirator
Full Face Respirator	Dust & Vapor Half-Mask Respirator	Full Face Respirator	Airline Hood/Mask or SCBA

### OTHER STANDARD ABBREVIATIONS:

<b>ML</b>	Maximum Limit
<b>NA</b>	Not Available
<b>ND</b>	Not Determined
<b>NE</b>	Not Established
<b>NF</b>	Not Found
<b>NR</b>	No Results
<b>SCBA</b>	Self-Contained Breathing Apparatus

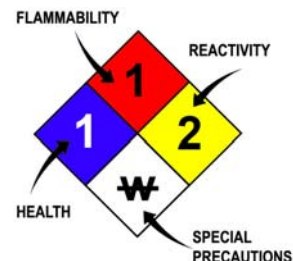
### NATIONAL FIRE PROTECTION ASSOCIATION: NFPA

### FLAMMABILITY LIMITS IN AIR:

<b>Autoignition Temperature</b>	Minimum temperature required to initiate combustion in air with no other source of ignition
<b>LEL</b>	Lower Explosive Limit - lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source
<b>UEL</b>	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
<b>ACD</b>	Acidic
<b>ALK</b>	Alkaline
<b>COR</b>	Corrosive
<b>W</b>	Use No Water
<b>OX</b>	Oxidizer
<b>TREFOIL</b>	Radioactive



### TOXICOLOGICAL INFORMATION:

<b>LD<sub>50</sub></b>	Lethal Dose (solids & liquids) which kills 50% of the exposed animals
<b>LC<sub>50</sub></b>	Lethal concentration (gases) which kills 50% of the exposed animal
<b>ppm</b>	Concentration expressed in parts of material per million parts
<b>TD<sub>01</sub></b>	Lowest dose to cause a symptom
<b>TCLo</b>	Lowest concentration to cause a symptom
<b>TD<sub>01</sub>, LD<sub>01</sub>, &amp; LD<sub>01</sub> or TC, TC<sub>01</sub>, LC<sub>01</sub>, &amp; LC<sub>01</sub></b>	Lowest dose (or concentration) to cause lethal or toxic effects
<b>IARC</b>	International Agency for Research on Cancer
<b>NTP</b>	National Toxicology Program
<b>RTECS</b>	Registry of Toxic Effects of Chemical Substances
<b>BCF</b>	Bioconcentration Factor
<b>TL<sub>m</sub></b>	Median threshold limit
<b>log K<sub>ow</sub> or log K<sub>oc</sub></b>	Coefficient of Oil/Water Distribution

### REGULATORY INFORMATION:

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

### WORKPLACE HAZARDOUS MATERIALS IDENTIFICATION (WHMIS) SYSTEM:

Class A	Class B	Class C	Class D1	Class D2	Class D3	Class E	Class F
Compressed	Flammable	Oxidizing	Toxic	Irritation	Infectious	Corrosive	Reactive

### EC (67/548/EEC) INFORMATION:

C	E	F	N	O	T	Xi	Xn
Corrosive	Explosive	Flammable	Harmful	Oxidizing	Toxic	Irritant	Harmful

### 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