SAFETY DATA SHEET

Prepared to OSHA, ACC, ANSI, NOHSC, WHMIS, 2001/58 & 1272/2008/EC Standards | SDS Revision: 1.1 | SDS Revision Date: 7/25/2015

1. PRODUCT & COMPANY IDENTIFICATION

1.1	Product Name:	**CR2032 LITHIUM BUTTON CELL BATTERIES**
1.2	Chemical Name:	Lithium Manganese Dioxide Battery
1.3	Synonyms:	P/N 68129
1.4	Trade Names:	Thunderbolt Magnum
1.5	Product Uses & Restrictions:	Battery
1.6	Distributor's Name:	Harbor Freight Tools, Inc.
1.7	Distributor's Address:	26541 Agoura Road, Calabasas, CA 91302 USA
1.8	Emergency Phone:	**CHEMTREC: +1 (703) 527-3887 / +1 (800) 424-9300 (CCN 676687)**
1.9	Business Phone / Fax:	+1 (800) 423-2567

2. HAZARDS IDENTIFICATION

2.1 Hazard Identification:

This product is classified as a HAZARDOUS SUBSTANCE and as DANGEROUS GOODS according to the classification criteria of NOHSC: 1008 (2004) and ADG Code (Australia).

If handled properly, there are no known serious health risks. Inhalation, absorption & ingestion are unlikely under normal conditions as the battery is hermetically sealed within the device. However, if device is crushed, or compromised in a fire, contact with the lithium metal battery and material may cause damage to eyes & skin tissue as well as the nose, throat, lungs & respiratory tract if inhaled. Please strictly observe safety instructions.

The following statements apply to the contents of the lithium metal battery if it has been compromised (e.g., opened, crushed, punctured). These statements do not apply to the hermetically sealed device which has not been damaged or compromised.

DANGER! CONTACT WITH WATER RELEASES FLAMMABLE GASES WHICH MAY IGNITE SPONTANEOUSLY. CAUSES SEVERE SKIN BURNS AND EYE DAMAGE. MAY BE HARMFUL IF SWALLOWED.

Hazard Statements (H): H260 - In contact with water releases flammable gases which may ignite spontaneously. H314 - Causes severe skin burns and eye damage. EU014 – Reacts violently with water.

Precautionary Statements (P): P223 – Keep away from any possible contact with water, because of violent reaction and possible flash fire. P264 – Wash hands and exposed skin surfaces thoroughly with warm water and soap after handling. P280 – Wear protective gloves/eye protection/face protection. P301+P330+P331 – IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P310 – Immediately call a Poison Control Center or doctor/physician. P370+P378 – In case of fire: Use Lith-X powder, Class D fire extinguisher, Dry Lithium Chloride, or Graphite Powder for extinction. P402+P404 – Store in a dry place. Store in a closed container. P501 – Dispose of contents through a licensed treatment, storage, disposal facility (TSDF).



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
MANGANESE DIOXIDE	1313-13-9	OP0350000	215-202-6	15-40	(5)	NA	(5)	NF	NF	(5)	NA	NA	
	Acute Tox. Oral 4; Acute Tox. Inh. 4; H302, H332												
1,2-DIMETHOXYETHANE	110-71-4	KI1451000	NA	3-7	3	NA	3	NF	NF	NA	NA	NA	
TETRAFLUOROETHYLENE (TEFLON)	116-14-3	KX4025000	204-126-9	1-5	(10)	NA	(10)	NF	NF	(15)	NA	NA	
LITHIUM METAL	7439-93-2	OJ5540000	231-102-5	1-5	NA	NA	NF	NF	NF	NA	NA	NA	
	Water React 1; Skin Corr. 1B; H260, H314												
CARBON BLACK	1333-86-4	FF5800000	215-609-9	0.5-2.5	(3.5)	NA	(3.5)	NF	NF	(3.5)	NA	NA	
PROPYLENE CARBONATE	108-32-7	FF9650000	203-572-1	1-5	NA	NA	NF	NF	NF	NA	NA	NA	
	Eye Irrit. 2B; H319												
GRAPHITE	7782-42-5	MD9659600	231-955-3	0.5-1.5	(2)	NA	(2)	NF	NF	NA	NA	NA	
	Eye Irrit. 2; STOT SE 3; H319, H335												
LITHIUM PERCHLORATE	7791-03-9	NA	232-237-2	0.1-1	NA	NA	NF	NF	NF	NA	NA	NA	
	Ox. Sol. 2; Skin Irrit. 2; Eye Irrit. 2B; STOT SE 3; H272, H315, H319, H335												

4. FIRST AID MEASURES

4.1	First Aid:	Device is hermetically sealed. Exposure to lithium battery component is not expected under normal conditions of use. Ingestion: Swallowing a battery can be harmful. 3 volt lithium coin batteries lodged in the esophagus should be removed immediately. Leakage, chemical burns and potential perforation can occur within hours of ingestion. Seek medical attention immediately. Have physician call the NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up at +1 (202) 625-3333 collect day or night. Eyes: Contents of an open battery can cause severe irritation. Splashes are not likely; however, if product gets in the eyes, flush with copious amounts of lukewarm water seek immediate medical attention. Skin: Contents of an open battery can cause skin irritation. Remove contaminated clothing and flush affected areas. Wash thoroughly with soap and water. Inhalation: Remove victim to fresh air at once. If breathing is difficult, administer oxygen. If breathing stops give artificial respiration. Keep person warm, quiet and get medical attention.
4.2	Effects of Exposure:	Ingestion: Not anticipated under normal handling and use. Irritation to the internal/external mouth area may occur following exposure to leaking battery. Eyes: Not anticipated under normal handling and use. If device is damaged, eye and mucous membrane irritation may occur following exposure to leaking battery. Skin: Not anticipated under normal handling and use. Irritation may occur following exposure to leaking battery. Inhalation: Not anticipated. Respiratory irritation may occur if fumes are released due to an abundance of leaking batteries.
4.3	Symptoms of Overexposure:	Ingestion: Not anticipated. Irritation may occur following exposure to leaking battery. Eyes: Not anticipated. If device is damaged, eye and mucous membrane irritation may occur following exposure to a leaking battery. Skin: Not anticipated. Irritation may occur following exposure to leaking battery. Symptoms of skin overexposure may include redness, itching, and irritation of affected areas. Inhalation: Not anticipated. Respiratory irritation may occur if fumes are released due to heat or an abundance of leaking batteries. Respiratory irritation, headache, irritability may occur if fumes are released due to heat or an abundance of leaking batteries.
4.4	Acute Health Effects:	Non-irritating when used as directed. No acute health effects reported by the manufacturer.
4.5	Chronic Health Effects:	Non-irritating when used as directed. No chronic health effects reported by the manufacturer.
4.6	Target Organs:	The manufacturer has not reported specific data.
4.7	Medical Conditions Aggravated by Exposure:	An initial x-ray should be obtained promptly to determine battery location. Batteries lodged in the esophagus should be removed immediately since leakage, burns and perforation can occur as soon as 4-6 hours after ingestion.

HEALTH	1
FLAMMABILITY	0
PHYSICAL HAZARDS	1
PROTECTIVE EQUIPMENT	B

5. FIREFIGHTING MEASURES

5.1	Fire & Explosion Hazards:	As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products (See Section 2). Water will cool the fire but may react with available lithium in the batteries producing flammable hydrogen. DO NOT RECHARGE. As a typical sealed battery they may rupture when exposed to excessive heat. Rupture may expose lithium to moisture causing it to react or release flammable or corrosive materials. Do not accumulate undischarged batteries together. In case of fire where lithium batteries are present, flood area with water or smother with a Class D fire extinguisher appropriate for lithium metal, such as Lith-X. Virtually all fires involving lithium batteries can be controlled by flooding with water. However, the contents of the battery will react with water and form hydrogen gas. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended. A smothering agent will extinguish burning lithium batteries. Emergency Responders should wear self-contained breathing apparatus. Burning lithium manganese dioxide batteries produce toxic and corrosive lithium hydroxide fumes.
5.2	Extinguishing Methods:	Lith-X-Powder, Class D Fire Extinguisher, Dry Lithium Chloride, Graphite Powder. Not flammable under normal conditions. However, battery will burn if involved in a fire. Call fire department. Cool exterior of battery if exposed to fire to prevent rupture. The electrolyte vapors generated by heat or fire are corrosive.
5.3	Firefighting Procedures:	DO NOT USE WATER, moist sand, CO_2, class ABC or soda ash extinguisher. When water is used hydrogen gas may be evolved which can form an explosive mixture with air. Keep containers cool until well after the fire is out, do NOT use water. As in any fire, wear MSHA/NIOSH approved self-contained breathing apparatus (pressure-demand) and full protective gear. Keep containers cool until well after the fire is out. Use water spray to cool fire-exposed surfaces and to protect personal. Fight fire upwind. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply, or any natural waterway. Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.



6. ACCIDENTAL RELEASE MEASURES

6.1	Spills:	None under normal conditions. If the contents leak, observe the following instructions: Secure spill area and maximize ventilation. Stop spill or leak at source if safely possible. Deny entry to all unprotected individuals. Individuals involved in the cleanup must wear appropriate personal protective equipment to avoid breathing vapors or touching liquid. Recover or cover with inert absorbent material and place into appropriate container(s) for disposal. If in water remove if safe to do so. If necessary, dike well ahead of the spill to prevent runoff into drains, sewers or any natural waterway or drinking supply. Spills are unlikely as the battery is enclosed hermetically sealed device.

7. HANDLING & STORAGE INFORMATION

7.1	Work & Hygiene Practices:	DO NOT swallow, apply excessive force to the positive terminal, drop, weld the terminal or wire to the body of the battery directly, short-circuit the battery, charge, forcibly discharge, heat, expose to open flame, disassemble, reverse the positive and negative terminals when mounting, use different batteries together, touch any liquid that leaks from the battery, or hold the battery for an extended period.
7.2	Storage & Handling:	Keep battery away from water. Never store in hot or very humid place. Storage and handling areas should be equipped with proper containment to capture and neutralize spills.
7.3	Special Precautions:	Do not expose to excessive physical shock or vibration. Storage and use areas should be equipped with eyewash stations and safety showers.

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	
MANGANESE DIOXIDE	(5)	NA	(5)	NF	NF	(5)	NA	NA	
GRAPHITE	(2)	NA	(2)	NF	NF	NA	NA	NA	
CARBON BLACK	(3.5)	NA	(3.5)	NF	NF	(3.5)	NA	NA	
TEFLON	(10)	NA	(10)	NF	NF	(15)	NA	NA	
1,2-DIMETHOXYETHANE	3	NA	3	NF	NF	NA	NA	NA	

8.2	Ventilation & Engineering Controls:	General mechanical (e.g., fans) or natural ventilation is sufficient when this product is in use. Ensure appropriate decontamination equipment is available (e.g., sink, safety shower, eye-wash station). Upon completion of work activities involving large quantities of this product (fluid), wash any exposed areas thoroughly with soap and water.	
8.3	Respiratory Protection:	No special respiratory protection is required under typical circumstances of use or handling. In instances where mist or vapors of this product are generated, and respiratory protection is needed, use only protection authorized by 29 CFR §1910.134, applicable U.S. State regulations, or the Canadian CAS Standard Z94.4-93 and applicable standards of Canadian Provinces, EC member States, or Australia.	
8.4	Eye Protection:	Avoid eye contact. Wear protective eyewear (e.g., safety glasses with side-shield) at all times when handling this product. Contact lenses pose a special hazard; soft lenses may absorb and concentrate irritants. Have suitable eye wash water available. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).	
8.5	Hand Protection:	Use gloves constructed of chemical-resistant materials such as neoprene or heavy nitrile rubber if frequent or prolonged contact is expected. If necessary, refer to U.S. OSHA 29 CFR §1910.138, the appropriate standards of Canada, or the EU member states. Do not wear rings, watches or jewelry that could entrap the material against the skin.	
8.6	Body Protection:	No apron required when handling sealed undamaged battery. Where contact is likely corrosive-resistant apron, clothing and boots. Protective clothing, if used, should include long-sleeves, apron, boots and additional facial protection. If necessary, refer to appropriate standards of Canada, the EU member states, or U.S. OSHA.	

9. PHYSICAL & CHEMICAL PROPERTIES

9.1	Appearance:	Hermetically sealed, metallic article.
9.2	Odor:	None for sealed device.
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:	2.0-3.0
9.12	Solubility:	Insoluble
9.13	Partition Coefficient (log P_{ow}):	NA
9.14	Autoignition Temperature:	NA

9. PHYSICAL & CHEMICAL PROPERTIES – cont'd

9.15	Decomposition Temperature:	NA
9.16	Viscosity:	NA
9.17	Other Information:	NA

10. STABILITY & REACTIVITY

10.1	Stability:	Stable under normal conditions; unstable with heat or contamination or if broken or leaking.
10.2	Hazardous Decomposition Products:	Sulfur dioxide, hydrogen chloride, hydrogen.
10.3	Hazardous Polymerization:	Will not occur.
10.4	Conditions to Avoid:	Prolonged overcharge; sources of ignition. Excessive physical shock and vibration. Contact with organic materials, combustibles, strong reducing agents, strong oxidizers and humidity.
10.5	Incompatible Substances:	Contact with organic materials, strong reducing agents, strong oxidizers, water and excessive humidity.

11. TOXICOLOGICAL INFORMATION

11.1	Routes of Entry:	Inhalation:	NO	Absorption:	NO	Ingestion:	YES
11.2	Toxicity Data:	This product has NOT been tested on animals to obtain toxicology data. Toxicology data, found in scientific literature, is available for some of the components of the product and is presented below: Manganese Dioxide: LD_{50} (oral, rat): > 3,478 mg/kg; 1,2-Dimethoxyethane: LD_{Lo} (oral, rat): 1,000 mg/kg, LC_{Lo} (inh-6h, rat): 63 g/m^3 Propylene Carbonate: LD_{50} (oral, rat): 29,100 uL/kg; LD_{50} (dermal, rabbit):> 20 mL/kg; LC_{50} (inh, rat): > 5 g/m^3					
11.3	Acute Toxicity:	See Section 4.4.					
11.4	Chronic Toxicity:	See Section 4.5.					
11.5	Suspected Carcinogen:	Carbon Black is listed as IARC Group 2B (Possibly carcinogenic to humans); CA65 (cancer).					
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 cause teratogenic effects in humans.					
	Reproductive Toxicity:	This product is not reported to cause 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:	There are no specific data available for this product.
12.2	Effects on Plants & Animals:	There are no specific data available for this product.
12.3	Effects on Aquatic Life:	There are no specific data available for this product.

13. DISPOSAL CONSIDERATIONS

13.1	Waste Disposal:	Dispose of in accordance with federal, state, provincial and 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):	UN3090, LITHIUM METAL BATTERIES, 9, II (NET WGT ≤ 5.0 kg)	
14.2	IATA (AIR):	UN3090, LITHIUM METAL BATTERIES, 9, II – FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT. See Section II of Packing Instruction 968. *	
14.3	IMDG (OCN):	UN3090, LITHIUM METAL BATTERIES, 9, II (NET WGT ≤ 5.0 kg) See IMDG Code Special Provision 188	
14.4	TDGR (Canadian GND):	UN3090, LITHIUM METAL BATTERIES, 9, II (NET WGT ≤ 5.0 kg)	
14.5	ADR/RID (EU):	UN3090, LITHIUM METAL BATTERIES, 9, II (NET WGT ≤ 5.0 kg)	
14.6	SCT (MEXICO):	UN3090, BATERIAS DE LITIA, 9, II (NET WGT ≤ 5.0 kg)	
14.7	ADGR (AUS):	UN3090, LITHIUM METAL BATTERIES, 9, II (NET WGT ≤ 5.0 kg)	

* Each package must be labeled with a Cargo Aircraft Only label in addition to the lithium battery handling label. Additional marking is required for lithium metal batteries transported by all modes of transport in the United States or to Canada. See also 49 CFR § 173.185 (c)(iii).

LITHIUM METAL BATTERIES ARE FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT

15. REGULATORY INFORMATION

15.1	SARA Reporting Requirements:	This product does not contain any substances subject to SARA Title III, section 313 reporting requirements.
15.2	SARA Threshold Planning Quantity:	There are no specific Threshold Planning Quantities for the components of this product.
15.3	TSCA Inventory Status:	The components of this product are listed on the TSCA Inventory or are otherwise exempt.
15.4	CERCLA Reportable Quantity (RQ):	NA
15.5	Other Federal Requirements:	Manganese (and its compounds) is listed as a Hazardous Air Pollutant (HAP). Manganese (and its compounds) is listed as Toxic Pollutants under the Clean Water Act (CWA). None of the ingredients 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. None of the components of this product are listed on the Priorities Substances List. WHMIS D2B (Other Toxic Effects) 
15.7	State Regulatory Information:	Carbon Black is listed in the following state criteria lists: California Proposition 65 (CA65), Massachusetts Hazardous Substances List (MA), Minnesota Hazardous Substances List (MN), New Jersey Right-to-Know List (NJ), and Pennsylvania Right-to-Know List (PA). Lithium is found on the following state criteria lists: FL, MA, NJ and PA. Propylene Carbonate is found on the following state criteria lists: NJ and PA. 1,2-Dimethoxyethane is found on the following state criteria lists: FL, MA and PA. 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). **WARNING:** This product contains a substance(s) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires this warning be given to customers in the State of California. **NOTE**: Perchlorate Material - special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate.
15.8	Other Requirements:	The primary components of this product are not listed in Annex I of EU Directive 67/548/EEC: Harmful (Xn). Risk Phrases (R): 65 – Harmful may cause lung damage if swallowed. Safety Phrases (S): 2-62 - Keep away from children. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label where possible. 

16. OTHER INFORMATION

16.1	Other Information:	**DANGER: IN CONTACT WITH WATER RELEASES FLAMMABLE GASES WHICH MAY IGNITE SPONTANEOUSLY. CAUSES SEVERE SKIN BURNS AND EYE DAMAGE. MAY BE HARMFUL IF SWALLOWED.** Keep away from any possible contact with water, because of violent reaction and possible flash fire. Wash hands and exposed skin surfaces thoroughly with warm water and soap after handling. Wear protective gloves/eye protection/face protection. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a Poison Control Center or doctor/physician. In case of fire: Use Lith-X powder, Class D fire extinguisher, Dry Lithium Chloride, or Graphite Powder for extinction. P402+P404 – Store in a dry place. Store in a closed container. **KEEP OUT OF THE REACH OF CHILDREN.** **WARNING:** This product contains a substance(s) known to the State of California to cause cancer, birth defects or other reproductive harm
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 & Harbor Freight Tools USA, Inc.'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:	**Harbor Freight Tools USA, Inc.** 26541 Agoura Road Calabasas, CA 91302 USA Tel: +1 (805) 388-1000 http://www.harborfreight.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 http://www.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

EXPOSURE LIMITS IN AIR:

ACGIH	American Conference on Governmental Industrial Hygienists
C	Ceiling Limit
ES	Exposure Standard (Australia)
IDLH	Immediately Dangerous to Life and Health
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.

HMIS-III 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		**G**	
B		**H**	
C		**I**	
D		**J**	
E		**K**	
F		**X**	**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:

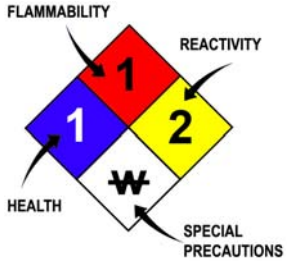
ML	Maximum Limit
mg/m3	milligrams per cubic meter
NA	Not Available
ND	Not Determined
NE	Not Established
NF	Not Found
NR	No Results
ppm	parts per million
SCBA	Self-Contained Breathing Apparatus

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 s
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
NOHSC	National Occupational Health and Safety Commission (Australia)
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)
HMIS-III	National Paint & Coatings Association Hazardous Materials Identification System

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