

1. PRODUCT & COMPANY IDENTIFICATION

| | | |
|-----|---------------------|--|
| 1.1 | Product Name: | BRASS BLACK METAL FINISH |
| 1.2 | Chemical Name: | Acid Mixture |
| 1.3 | Synonyms: | 15232, 15225, 74000, BB2-QT, BB2, M24 |
| 1.4 | Trade Names: | Brass Black Metal Finish |
| 1.5 | Product Use: | Blackening Solution for Brass & Copper |
| 1.6 | Distributor's Name: | Birchwood Casey. |

2. HAZARDS IDENTIFICATION

| | | | |
|-----|---------------------------|---|--|
| 2.1 | Hazard Identification: | <p>This product is classified as a hazardous substance and as dangerous goods according to the classification criteria of [NOHSC: 1088 (2004)] and ADG Code (Australia).</p> <p>DANGER! TOXIC IF SWALLOWED. MAY CAUSE SEVERE SKIN BURNS OR EYE DAMAGE. MAY CAUSE DAMAGE TO ORGANS THROUGH PROLONGED OR REPEATED EXPOSURE.</p> <p><u>Hazard Statements (H):</u> H301 – Toxic if swallowed. H314 - Causes severe skin burns and eye damage. H373 - May cause damage to organs through prolonged or repeated exposure. H410 – Very toxic to aquatic life with long lasting effects.</p> <p><u>Precautionary Statements (P):</u> P220 - Keep/Store away from clothing/ combustible materials. P273 – Avoid release to the environment. P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection. P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P501 - Dispose of contents/ container to an approved waste disposal plant.</p> | |
| 2.2 | Effects of Exposure: | <p><u>Eyes:</u> Severe or permanent eye damage.</p> <p><u>Skin:</u> Burns upon direct contact.</p> <p><u>Ingestion:</u> Severe burns of mouth, throat, stomach.</p> <p><u>Inhalation:</u> Severe irritation or burns in respiratory tract and mucous membranes. Possible lung damage.</p> | |
| 2.3 | Symptoms of Overexposure: | <p><u>Eyes:</u> Redness, burning, irritation, and swelling around eyes</p> <p><u>Skin:</u> Redness, burning, itching, rash, blistering of skin.</p> <p><u>Ingestion:</u> Nausea, vomiting, severe abdominal pain.</p> <p><u>Inhalation:</u> Coughing, wheezing, swelling of throat, irritation in mucous membranes, difficulty breathing.</p> | |
| 2.4 | Acute Health Effects: | May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if swallowed. Causes burns. May be harmful if absorbed through skin. | |
| 2.5 | Chronic Health Effects: | May damage the nervous system, kidney and/or liver. | |
| 2.6 | Target Organs: | Eyes, skin, nervous system, kidneys, liver, respiratory system, spleen, blood forming organs, bones. | |

3. COMPOSITION & INGREDIENT INFORMATION


| CHEMICAL NAME(S) | CAS No. | RTECS No. | EINECS No. | % | EXPOSURE LIMITS IN AIR (mg/m ³) | | | | | | | | | OTHER |
|--------------------|------------|-----------|------------|--------|---|------|--------|---------|---------|-------|------|------|--|-------|
| | | | | | ACGIH | | NOHSC | | | OSHA | | | | |
| | | | | | ppm | | ppm | | | ppm | | | | |
| | | | | | TLV | STEL | ES-TWA | ES-STEL | ES-PEAK | TLV | STEL | IDLH | | |
| WATER | 7732-18-5 | ZC0110000 | 231-791-2 | 60-100 | NA | NA | NF | NF | NF | NA | NA | NA | | |
| PHOSPHORIC ACID | 7664-38-2 | TB6300000 | 231-633-2 | 7-13 | (1) | (3) | NF | NF | NF | NA | NA | 1000 | | |
| | | | | | | | | | | | | | | |
| SELENIOS ACID | 7783-00-8 | VS7175000 | 231-974-7 | 1-5 | (0.2) | NA | (0.2) | NF | NF | (0.2) | NA | NA | | |
| | | | | | | | | | | | | | | |
| CUPRIC SULFATE | 7758-99-8 | NA | NA | 1-5 | (1) | NA | NF | NF | NF | (1) | NA | 1000 | | |
| | | | | | | | | | | | | | | |
| AMMONIUM MOLYBDATE | 13106-76-8 | NA | 236-031-3 | 1-5 | (10) | NA | NF | NF | NF | NA | NA | NA | | |
| | | | | | | | | | | | | | | |
| ZINC SULFATE | 7733-02-0 | QR9600000 | 232-104-9 | 1-3 | (0.1) | NA | NF | NF | NF | (1) | NA | NA | | |
| | | | | | | | | | | | | | | |

NA = Not Available; ND = Not Determined; NE = Not Established; NF = Not Found; C = Ceiling Limit; See Section 16 for Additional Definitions of Terms Used
 NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-2010 format.

4. FIRST AID MEASURES

| | | | | | | | | | | | | | | | |
|-----------------------------|--|--|---|---------------|----------|---------------------|----------|-------------------------|----------|-----------------------------|--|-------------|-------------|--------------|----------|
| 4.1 | First Aid: | <p>Ingestion: DO NOT INDUCE VOMITING. Contact Poison Control Center 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>Eyes: If product gets in the eyes, flush eyes thoroughly with copious amounts of water for at least 15 minutes, holding eyelid(s) open to ensure complete flushing. If the eyes or face become swollen during or following use, consult a physician or emergency room immediately.</p> <p>Skin: Remove contaminated clothing and wash affected areas with soap and water. If discomfort persists and/or the skin reaction worsens, contact a physician immediately. Do not wear contaminated clothing until after it has been properly cleaned.</p> <p>Inhalation: Remove victim to fresh air at once. Under extreme conditions, if breathing stops, perform artificial respiration. Seek immediate medical attention.</p> | | | | | | | | | | | | | |
| 4.2 | Medical Conditions Aggravated by Exposure: | Pre-existing dermatitis, other skin conditions, and disorders of the target organs (eyes, skin, respiratory system, liver, blood-forming organs) or impaired kidney function may be more susceptible to the effects of this substance. | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #0056b3; color: white;">HEALTH</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="background-color: #ff0000; color: white;">FLAMMABILITY</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="background-color: #ffa500; color: white;">PHYSICAL HAZARDS</td> <td style="text-align: center;">0</td> </tr> <tr> <td colspan="2" style="background-color: #cccccc;">PROTECTIVE EQUIPMENT</td> </tr> <tr> <td style="font-size: x-small;">EYES</td> <td style="font-size: x-small;">SKIN</td> </tr> <tr> <td style="font-size: x-small;">LUNGS</td> <td style="font-size: x-small;">H</td> </tr> </table> | HEALTH | 3 | FLAMMABILITY | 0 | PHYSICAL HAZARDS | 0 | PROTECTIVE EQUIPMENT | | EYES | SKIN | LUNGS | H |
| HEALTH | 3 | | | | | | | | | | | | | | |
| FLAMMABILITY | 0 | | | | | | | | | | | | | | |
| PHYSICAL HAZARDS | 0 | | | | | | | | | | | | | | |
| PROTECTIVE EQUIPMENT | | | | | | | | | | | | | | | |
| EYES | SKIN | | | | | | | | | | | | | | |
| LUNGS | H | | | | | | | | | | | | | | |

5. FIREFIGHTING MEASURES

| | | | |
|-----|---------------------------|--|--|
| 5.1 | Fire & Explosion Hazards: | Non-flammable. May react with metals to release hydrogen gas, which can form explosive mixtures with air. May intensify fire; oxidizer. |  |
| 5.2 | Extinguishing Methods: | Use fire-extinguishing media appropriate for surrounding materials. | |
| 5.3 | Firefighting Procedures: | As with any fire, firefighters should wear appropriate protective equipment including a MSHA/NIOSH approved or equivalent self-contained breathing apparatus (SCBA) and protective clothing. Fight fires as for surrounding materials. Hazardous decomposition products may be released. Thermal degradation may produce oxides of carbon, phosphorous, selenium and/or nitrogen, hydrocarbons and/or derivatives. Fire should be fought from a safe distance. 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. | |





6. ACCIDENTAL RELEASE MEASURES

| | | |
|-----|---------|---|
| 6.1 | Spills: | <p>Before cleaning any spill or leak, individuals involved in spill cleanup must wear appropriate Personal Protective Equipment (PPE). Use safety glasses or safety goggles and face shield; use gloves and other protective clothing (e.g., apron, boots, etc.) to prevent skin contact.</p> <p>Small Spills: Wear appropriate protective equipment including gloves and protective eyewear. Use a non-combustible, inert material such as vermiculite or sand to soak up the product and place into a container for later disposal.</p> <p>Large Spills: Keep incompatible materials (e.g., organics such as oil) away from spill. Stay upwind and away from spill or release. Isolate immediate hazard area and keep unauthorized personnel out of area. Stop spill or release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant. Recover as much free liquid as possible and collect in acid-resistant container. Use absorbent to pick up residue. Avoid discharging liquid directly into a sewer or surface waters.</p> |
|-----|---------|---|

7. HANDLING & STORAGE INFORMATION

| | | |
|-----|---------------------------|---|
| 7.1 | Work & Hygiene Practices: | Avoid breathing mists or spray. Avoid eye and skin contact. Wear protective equipment when handling product. Keep out of the reach of children. Do not eat, drink or smoke when handling this product. Wash thoroughly after handling. Do not expose to heat and flame. Use only in ventilated areas. Keep out of the reach of children. Immediately clean-up and decontaminate any spills or residues. |
| 7.2 | Storage & Handling: | Use and store in a cool, dry, well-ventilated location (e.g., local exhaust ventilation, fans) away from heat and direct sunlight. Store in acid-resistant containers. Keep containers covered when not in use. Avoid temperatures above 40°C (120°F). Keep away from incompatible substances (see Section 10). Protect containers from physical damage. |
| 7.3 | Special Precautions: | Empty containers may retain hazardous product residues. |

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

| | | | |
|-----|-------------------------------------|---|---|
| 8.1 | Ventilation & Engineering Controls: | Use local or general exhaust ventilation to effectively remove and prevent buildup of vapors or mist generated from the handling of this product. Ensure appropriate decontamination equipment is available (e.g., sink, safety shower, eye-wash station). | |
| 8.2 | Respiratory Protection: | In instances where vapors or sprays 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. |  |
| 8.3 | Eye Protection: | Safety glasses with side shields must be used when handling or using this product. A protective face shield is also recommended. |  |
| 8.4 | Hand Protection: | Wear protective, chemical-resistant gloves (e.g., neoprene) when using or handling this product. |  |
| 8.5 | Body Protection: | A chemical resistant apron and/or protective clothing are recommended when handling or using this product. |  |

9. PHYSICAL & CHEMICAL PROPERTIES

| | | |
|------|---|---|
| 9.1 | Appearance: | Clear, blue liquid |
| 9.2 | Odor: | Odorless |
| 9.3 | Odor Threshold: | NA |
| 9.4 | pH: | 0.99 |
| 9.5 | Melting Point/Freezing Point: | NA |
| 9.6 | Initial Boiling Point/Boiling Range: | > 100 °C (> 212 °F) |
| 9.7 | Flashpoint: | NA |
| 9.8 | Upper/Lower Flammability Limits: | NA |
| 9.9 | Vapor Pressure: | NA |
| 9.10 | Vapor Density: | < 1.0 (air = 1.0) |
| 9.11 | Relative Density: | 1.094 |
| 9.12 | Solubility: | Complete (water) |
| 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: | Evaporation Rate: < 1.0 (ethyl ether = 1.0) |

10. STABILITY & REACTIVITY

| | | |
|------|-----------------------------------|---|
| 10.1 | Stability: | Stable at normal temperatures. |
| 10.2 | Hazardous Decomposition Products: | Reaction with organics and strong reducing agents can produce organoselenides and hydrogen selenide. Thermal decomposition may produce selenium, nitrogen, phosphoric and copper oxides, and hydrogen fluoride gas. |
| 10.3 | Hazardous Polymerization: | Will not occur. |
| 10.4 | Conditions to Avoid: | Excessive heat. |
| 10.5 | Incompatible Substances: | Cyanides, water-reactive substances, strong reducing agents, chlorinated cleaners or sanitizers, combustible organic materials, and most metals. |

11. TOXICOLOGICAL INFORMATION

| | | | | |
|------|------------------------------|---|-----------------|----------------|
| 11.1 | Routes of Entry: | Inhalation: YES | Absorption: YES | Ingestion: YES |
| 11.2 | Toxicity Data: | Solution; LD ₅₀ (oral, rat) = 1030 mg/kg; Phosphoric Acid: LD ₅₀ (oral, rat) = 1530 mg/kg | | |
| 11.3 | Acute Toxicity: | See Section 2.4 | | |
| 11.4 | Chronic Toxicity: | See Section 2.5 | | |
| 11.5 | Suspected Carcinogen: | Components in this product are listed by IARC as Group 3 (Not classifiable as to its carcinogenicity to humans) | | |
| 11.6 | Reproductive Toxicity: | This product is not reported to cause 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 contains nickel sulfate, which is 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 2.3 | | |
| 11.8 | Biological Exposure Indices: | NE | | |
| 11.9 | Physician Recommendations: | Treat symptomatically. | | |

12. ECOLOGICAL INFORMATION

| | | |
|------|------------------------------|---|
| 12.1 | Environmental Stability: | No data available. |
| 12.2 | Effects on Plants & Animals: | No data available. |
| 12.3 | Effects on Aquatic Life: | Very toxic to aquatic life with long lasting effects. Phosphoric Acid: EC ₅₀ (Daphnia magna, 12h) = 4.6 mg/L |

13. DISPOSAL CONSIDERATIONS

| | | |
|------|-------------------------|---|
| 13.1 | Waste Disposal: | Review current local, state and federal laws, codes, statutes and regulations to determine current status and appropriate disposal method for the ingredients listed in Section 2. Any disposal practice must be in compliance with local, state, and federal laws and regulations. Contact the appropriate agency for specific information. Treatment, transport, storage and disposal of hazardous waste must be provided by a licensed facility or waste hauler. |
| 13.2 | Special Considerations: | U.S. EPA Hazardous Waste – Characteristic - Corrosive (D002), Characteristic - Toxic (D010) |





14. TRANSPORTATION INFORMATION

| | | | |
|------|----------------------|--|--|
| 14.1 | 49 CFR (GND): | UN3264, CORROSIVE LIQUIDS, ACIDIC, INORGANIC, N.O.S. (SELENIOS ACID, PHOSPHORIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L) | |
| 14.2 | IATA (AIR): | UN3264, CORROSIVE LIQUIDS, ACIDIC, INORGANIC, N.O.S. (SELENIOS ACID, PHOSPHORIC ACID), 8, III, LTD QTY (IP VOL ≤ 0.5 L) | |
| 14.3 | IMDG (OCN): | UN3264, CORROSIVE LIQUIDS, ACIDIC, INORGANIC, N.O.S. (SELENIOS ACID, PHOSPHORIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L) | |
| 14.4 | TDGR (Canadian GND): | UN3264, CORROSIVE LIQUIDS, ACIDIC, INORGANIC, N.O.S. (SELENIOS ACID, PHOSPHORIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L) | |
| 14.5 | ADR/RID (EU): | UN3264, CORROSIVE LIQUIDS, ACIDIC, INORGANIC, N.O.S. (SELENIOS ACID, PHOSPHORIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L) | |
| 14.6 | SCT (MEXICO): | UN3264, LIQUIDOS, CORROSIVOS, ACIDO, INORGANICO, N.E.P. (ACIDO SELENIO, ACIDO FOSFORICO), 8, III, CANTIDAD LIMITADA (IP VOL ≤ 5.0 L) | |
| 14.7 | ADGR (AUS): | UN3264, CORROSIVE LIQUIDS, ACIDIC, INORGANIC, N.O.S. (SELENIOS ACID, PHOSPHORIC ACID), 8, III, LTD QTY (IP VOL ≤ 5.0 L) | |



15. REGULATORY INFORMATION

| | | | |
|------|-----------------------------------|--|--|
| 15.1 | SARA Reporting Requirements: | This product contains <u>Selenious Acid</u> , <u>Cupric Sulfate</u> and <u>Phosphoric Acid</u> , substances subject to SARA Title III, section 313 reporting requirements. | |
| 15.2 | SARA Threshold Planning Quantity: | NA | |
| 15.3 | TSCA Inventory Status: | The components of this product are listed on the TSCA Inventory. | |
| 15.4 | CERCLA Reportable Quantity (RQ): | <u>Selenious Acid</u> : 10 lbs (4.54 kg); <u>Cupric Sulfate</u> : 10 lbs (4.54 kg); <u>Phosphoric Acid</u> : 5,000 lbs (2,270 kg) | |
| 15.5 | Other Federal Requirements: | NA | |
| 15.6 | Other Canadian Regulations: | This product has been classified according to the hazard criteria of the CPR and the MSDS 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 Class E (Corrosive Material). WHMIS Class D1 (Materials Causing Immediate and Serious Toxic Effects). | |
| 15.7 | State Regulatory Information: | <p><u>Selenious Acid</u> is found on the following state criteria lists: Florida Toxic Substances List (FL), Massachusetts Hazardous Substances List (MA), Minnesota Hazardous Substances List (MN), Pennsylvania Right-to-Know List (PA), and Wisconsin Hazardous Substances List (WI).</p> <p><u>Zinc Sulfate</u> is found on the following state criteria lists: MA, and PA.</p> <p><u>Phosphoric Acid</u> is found on the following state criteria lists: FL, MA, MN, 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> | |

Prepared to OSHA, ACC, ANSI, NOHSC, WHMIS, 2001/58 & 1272/2008/EC Standards SDS Revision: 1.0 SDS Revision Date: 6/24/2014

| | | | |
|------|---------------------|---|--|
| 15.8 | Other Requirements: | <p>The primary components of this product are listed in Annex I of EU Directive 67/548/EEC.</p> <p><u>Selenious Acid</u>: Corrosive (C), Toxic (T).</p> <p><u>Risk Phrases (R)</u>: R35 – Causes severe burns.</p> <p><u>Safety Phrases (S)</u>: S1/2-7/9-24/25-26-28-46 - Keep locked up and out of the reach of children. Keep container tightly closed and in a well-ventilated place. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash with plenty of soap and warm water. If swallowed, seek medical advice immediately and show this container or label.</p> <p><u>Phosphoric acid</u>: Irritant (Xi).</p> <p><u>Risk Phrases (R)</u>: 36/38 – Irritating to eyes and skin. <u>Safety Phrases (S)</u>: 1/2-26-45 – Keep locked up and out of reach of children. In case of contact with eyes, rinse immediately with copious amounts of water. In case of accident or if you feel unwell seek medical advice immediately.</p> <p><u>Cupric sulfate</u>: Harmful (XN); Environmental danger (N).</p> <p><u>Risk Phrases (R)</u>: 22-36/8-50/53 – Harmful if swallowed. Irritating to eyes and skin. Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.</p> <p><u>Safety Phrases (S)</u>: 22-60-61 – Do not breathe dust. This material and/or its container must be disposed of as a hazardous waste. Avoid release to the environment. Refer to special instructions/Safety data sheets.</p> |     |
|------|---------------------|---|--|

16. OTHER INFORMATION

| | | | |
|------|----------------------|--|--|
| 16.1 | Other Information: | <p>DANGER! Toxic if swallowed. May cause severe skin burns or eye damage. May cause damage to organs through prolonged or repeated exposure. May be fatal if swallowed or harmful if inhaled. Causes severe burns to eyes and skin. In case of contact with eyes, rinse immediately with copious amounts of water. In case of accident or if you feel unwell seek medical advice immediately. KEEP LOCKED UP AND OUT OF REACH OF CHILDREN.</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 & Birchwood Casey'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: |  | |
| 16.5 | Prepared by: |  | |

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 |
| TLV | Threshold Limit Value |
| OSHA | U.S. Occupational Safety and Health Administration |
| PEL | Permissible Exposure Limit |
| IDLH | Immediately Dangerous to Life and Health |

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. |

| | | | |
|-----------------------------|--|---|----------------------------------|
| | | | |
| 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:

| | |
|----------------|--|
| NA | Not Available |
| NR | No Results |
| NE | Not Established |
| ND | Not Determined |
| ML | Maximum Limit |
| SCBA | Self-Contained Breathing Apparatus |
| Flam. | Flammable |
| Liq. | Liquid |
| Sol. | Solid |
| Tox. | Toxicity |
| Irrit. | Irritation |
| Sens. | Sensitization |
| Ox. | Oxidizing |
| Corr. | Corrosion |
| Repr. | Reproductive (Harm) |
| Asp. | Aspiration |
| Inh. | Inhalation |
| Dam. | Damage |
| STOT SE | Specific Target Organ Toxicity – Single Exposure |
| STOT RE | Specific Target Organ Toxicity – Repeated Exposure |

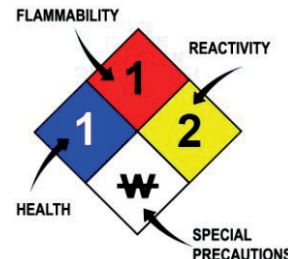
NATIONAL FIRE PROTECTION ASSOCIATION: NFPA

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:

| | |
|---|---|
| LD₅₀ | Lethal Dose (solids & liquids) which kills 50% of the exposed animals |
| LC₅₀ | Lethal concentration (gases) which kills 50% of the exposed animal |
| ppm | Concentration expressed in parts of material per million parts |
| TD₀₁ | Lowest dose to cause a symptom |
| TCLo | Lowest concentration to cause a symptom |
| TD₀₁, LD₀₁, & LD₀₂ or TC, TC₀₁, LC₀₁, & LC₀₂ | 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 | Wassergefährungsklassen (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 |