

Solder



B# 96070

002/010

# MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

## PART I What is the material and what do I need to know in an emergency?

### 1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED): **STAY CLEAN LIQUID SOLDERING FLUX**

CHEMICAL NAME/CLASS: Zinc Chloride/Ammonium Chloride Solution

SYNONYMS: Not Applicable

PRODUCT USE: Metal-Working Operations

DOCUMENT NUMBER: 0099

SUPPLIER/MANUFACTURER'S NAME: J.W. HARRIS CO., INC. & HARRIS WELCO  
DIVISION/J.W. HARRIS CO.

ADDRESS: 1051 York Rd.  
Kings Mountain, NC 28086

EMERGENCY PHONE: CHEMTREC: 1-800-424-9300

BUSINESS PHONE: 704-739-6421

DATE OF PREPARATION: September 10, 1998

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

| CHEMICAL NAME                                                               | CAS #      | % w/w   | EXPOSURE LIMITS IN AIR   |                           |                                |                              |                           | OTHER<br>mg/m <sup>3</sup>                                                   |
|-----------------------------------------------------------------------------|------------|---------|--------------------------|---------------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------------------------------------|
|                                                                             |            |         | ACGIH                    |                           | OSHA                           |                              |                           |                                                                              |
|                                                                             |            |         | TLV<br>mg/m <sup>3</sup> | STEL<br>mg/m <sup>3</sup> | PEL<br>mg/m <sup>3</sup>       | STHL<br>mg/m <sup>3</sup>    | IDLH<br>mg/m <sup>3</sup> |                                                                              |
| Zinc Chloride<br>(exposure limits are for<br>Zinc Chloride fume)            | 7646-85-7  | < 30    | 1                        | 2                         | 1                              | 2 (vacated<br>1989 PEL)      | 60                        | NIOSH REL:<br>TWA = 1<br>STEL = 2<br>Carcinogen: EPA-D                       |
| Ammonium Chloride<br>(exposure limits are for<br>Ammonium Chloride<br>fume) | 12125-02-9 | 5-25    | 10                       | 20                        | 10<br>(vacated<br>1969<br>PEL) | 20 (vacated<br>1989 PEL)     | NE                        | NIOSH REL:<br>TWA = 10<br>STEL = 20                                          |
| Hydrochloric Acid                                                           | 7847-01-0  | < 5     | NE                       | 7.6 L                     | NE                             | 7.5 C                        | 76                        | NIOSH REL: 7 C<br>DFG MAK: 7<br>Carcinogen: IARC-3                           |
| Methanol                                                                    | 67-56-1    | < 5     | 20 <sup>2</sup> (skin)   | 328                       | 260                            | 325<br>(vacated<br>1989 PEL) | 796(1)                    | NIOSH REL:<br>TWA = 260 (skin)<br>STEL = 325<br>DFG MAK:<br>TWA = 260 (skin) |
| Water                                                                       | 7732-18-5  | Balance | NE                       | NE                        | NE                             | NE                           | NE                        | NE                                                                           |

NE = Not Established, C = Ceiling Limit. See Section 10 for Definitions of Terms Used.

NOTE(1): All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

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### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a clear, colorless liquid, possessing a slight, sweet odor. This material is acidic and can irritate and burn the skin, eyes, and any other contaminated tissue. This product is not flammable nor reactive under normal circumstances; however, it may generate flammable hydrogen gas upon contact with metals. Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant routes of over-exposure for this product are by contact with skin, eye contact, or inhalation of mists or sprays generated by this product. The symptoms of overexposure to this product, by route of entry, are as follows:

**INHALATION:** If vapors, mists, or sprays of this product are inhaled, they can irritate and burn the nose, throat, and respiratory system. Symptoms of inhalation over-exposure may include sore throat, choking, coughing, and difficulty breathing. Prolonged or repeated over-exposure may cause burns and ulcers to the nose and throat, dental erosion, bronchitis, and stomach pains. It has been reported that a worker developed asthmatic symptoms after performing soldering work with a flux containing Ammonium and Zinc Chlorides (components of this product). It has been reported that inhalation of Methanol (a component of this product) vapors in high concentrations can cause blindness. Severe inhalation overexposure may cause pulmonary edema (a life-threatening accumulation of fluid in the lungs) or pneumonitis. Symptoms of pulmonary edema (e.g., shortness of breath, chest pains) can be delayed for several hours after exposure. Severe inhalation of vapors or fumes (as may occur if individuals are exposed in poorly-ventilated areas, such as confined spaces) may be harmful.

**CONTACT WITH SKIN or EYES:** Depending on the duration and concentration of over-exposure, skin contact with this product can irritate and burn the skin. Repeated or prolonged over-exposure to this product may result in dermatitis (red, dry, itchy skin) and ulceration. Depending on the duration and concentration of over-exposure, eye contact with this product can irritate and burn the eyes. Eye over-exposure can cause pain, tearing, and redness. Severe eye over-exposure may cause blindness.

**SKIN ABSORPTION:** Methanol (a component of this product) is readily absorbed through the skin. Because Methanol is a minor component of this product, skin absorption is not anticipated to be a significant route of over-exposure.

**INGESTION:** Ingestion is not anticipated to be a likely route of occupational exposure for this product. If this product is swallowed, it can irritate and burn the mouth, throat, and other tissues of the digestive system. Symptoms can include headache, drowsiness, confusion, nausea, vomiting, burning sensation in the esophagus and stomach, abdominal pain, bloody diarrhea, convulsions, high blood pressure, and coma. Ingestion of Methanol (a component of this product) can cause blindness though due to the relatively low concentration of Methanol in the product, this is not anticipated to be a significant hazard). Severe ingestion over-exposure may be fatal.



**INJECTION:** Though not anticipated to be a likely route of occupational exposure for this product, injection of this product (via punctures or lacerations by a contaminated object) may cause local reddening, tissue swelling, and discomfort in addition to the wound.

**HEALTH EFFECTS OR RISKS FROM OVER-EXPOSURE: An Explanation in Lay Terms.** Symptoms associated with over-exposure to this product are as follows:

**ACUTE:** Symptoms of inhalation over-exposure may include sore throat, choking, coughing, difficulty breathing. Lung damage may occur after severe inhalation exposures. Depending on the duration and concentration of over-exposure, skin or eye contact with this product can irritate and burn contaminated tissue. Ingestion overexposure may be harmful or fatal.

**CHRONIC:** Prolonged or repeated inhalation over-exposure may cause burns and ulcers to the nose and throat, dental erosion, bronchitis, and stomach pains. Repeated or prolonged over-exposure to this product may result in dermatitis (red, dry, itchy skin) and ulceration. Refer to Section 11 (Toxicology Information) for additional data.

**TARGET ORGANS:** Skin, eyes, respiratory system, central nervous system.

| HAZARDOUS MATERIAL INFORMATION SYSTEM                                              |               |                                                                                     |               |
|------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------|
| HEALTH                                                                             |               | (BLUE)                                                                              | 3             |
| FLAMMABILITY                                                                       |               | (RED)                                                                               | 0             |
| REACTIVITY                                                                         |               | (YELLOW)                                                                            | 0             |
| PROTECTIVE EQUIPMENT                                                               |               |                                                                                     | D             |
| EYES                                                                               | RESPIRATORY   | HANDS                                                                               | BODY          |
|  | SEE SECTION 8 |  | SEE SECTION 8 |
| For routine applications.                                                          |               |                                                                                     |               |

See Section 16 for Definition of Ratings

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SOLDERING FLUX MSDS

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**PART II** *What should I do if a hazardous situation occurs?***4. FIRST-AID MEASURES**

**SKIN EXPOSURE:** If this product irritates the skin, begin decontamination with running water. Minimum flushing is for 15 minutes. Do not interrupt flushing. Victim must seek medical attention if any adverse reaction occurs.

**EYE EXPOSURE:** If this product enters the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Do not interrupt flushing. Victim must seek immediate medical attention.

**INHALATION:** If vapors, mists or sprays of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Victim must seek medical attention if any adverse reaction occurs.

**INGESTION:** If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink large quantities of water. If milk is available, victim should drink it after drinking water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take copy of label and MSDS to health professional with victim.

**5. FIRE-FIGHTING MEASURES**

**FLASH POINT:** Not flammable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):** Lower (LEL): Not applicable.  
Upper (UEL): Not applicable

**FIRE EXTINGUISHING MATERIALS:** This material is not flammable. Use extinguishing media appropriate for surrounding fire.

Water Spray: YES (for cooling)

Halon: YES

Dry Chemical: YES

Carbon Dioxide: YES

Foam: YES

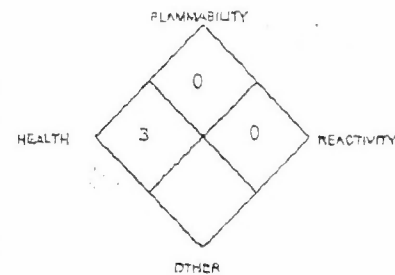
Other: Any "ABC" Class.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** This product is acidic and presents a contact hazard to firefighters. During a fire, irritating and toxic gases (e.g., carbon monoxide, carbon dioxide, hydrogen chloride, nitrogen and zinc oxides, and ammonia) may be generated.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing (e.g., chemical splash suit) may be necessary. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

**NFPA RATING**

See Section 16 for  
Definition of Ratings

**6. ACCIDENTAL RELEASE MEASURES**

**SPILL AND LEAK RESPONSE:** Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

In the event of an incidental release of this product, personnel should wear gloves, safety glasses (or goggles), and face shield during clean up. In the event of a non-incidental release, minimum Personal Protective Equipment should be Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus. Absorb spilled liquid with poly pads or other suitable absorbing material. Neutralize area with sodium bicarbonate or other agent suitable for acids. Test area with litmus paper to insure neutralization is complete. Decontaminate the area thoroughly. Place all spill residue in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures and appropriate Canadian standards (see Section 13, Disposal Considerations).

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**PART III** *How can I prevent hazardous situations from occurring*

**7. HANDLING and STORAGE**

**WORK PRACTICES AND HYGIENE PRACTICES:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat or drink while handling this material. Avoid generating splashes or sprays of this product. Remove contaminated clothing immediately.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. Empty containers may contain residual liquid; therefore, empty containers should be handled with care.

Store this product in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible chemicals (see Section 10, Stability and Reactivity). Material should be stored in secondary containers or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Keep container tightly closed when not in use. Inspect all incoming containers before storage to ensure they are properly labeled and not damaged.

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures and appropriate Canadian standards.

**8. EXPOSURE CONTROLS - PERSONAL PROTECTION**

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Exhaust directly to the outside, taking necessary precautions for environmental protection. Prudent practice is to ensure eyewash/safety shower stations are available near areas where this product is used.

**RESPIRATORY PROTECTION:** Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients) if applicable. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the appropriate standards of Canada and its Provinces. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown. The following NIOSH respiratory selection guidelines are available for Zinc Chloride Fume:

| <u>CONCENTRATION</u>                                                              | <u>RESPIRATORY PROTECTION</u>                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UP TO 10 mg/m <sup>3</sup> :                                                      | Dust, mist, and fume respirator or Supplied-Air Respirator (SAR).                                                                                                                                                                                               |
| UP TO 25 mg/m <sup>3</sup> :                                                      | Powered air-purifying respirator with dust, mist, and fume filter(s) or SAR operated in a continuous-flow mode.                                                                                                                                                 |
| UP TO 50 mg/m <sup>3</sup> :                                                      | Full-facepiece respirator with high-efficiency particulate filter(s), powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter(s), full-facepiece Self-Contained Breathing Apparatus (SCBA), or full-facepiece SAR. |
| <b>EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:</b> | Positive pressure full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.                                                                                                                                        |
| <b>ESCAPE:</b>                                                                    | Full-facepiece respirator with high-efficiency particulate filter(s) or escape-type SCBA.                                                                                                                                                                       |

**EYE PROTECTION:** Safety glasses or goggles. Faceshields may be needed if operations generate splashes or sprays.

**HAND PROTECTION:** Wear neoprene or rubber gloves for routine industrial use.

**BODY PROTECTION:** None needed for normal circumstances of use. Use body protection appropriate for task (i.e., apron, coveralls, chemically-resistant boots).

**9. PHYSICAL and CHEMICAL PROPERTIES**

- RELATIVE VAPOR DENSITY (air = 1): 4.0
- SPECIFIC GRAVITY (water = 1): 0.9
- SOLUBILITY IN WATER: Slightly soluble.
- VAPOR PRESSURE: Not established.
- ODOR THRESHOLD: Not established.
- COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not established.
- APPEARANCE AND COLOR: This product is a clear, colorless liquid with a slight, sweet odor.
- HOW TO DETECT THIS SUBSTANCE (warning properties): Litmus paper will turn red upon contact with this product. The odor may also act as a distinguishing characteristic of this product.
- EVAPORATION RATE (nBuAc = 1): > 1
- FREEZING/MELTING POINT: Not established.
- BOILING POINT: Not established.
- pH: Not applicable.

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# 10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide, hydrogen chloride, nitrogen and zinc oxides, and ammonia.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers, acids, alkalis and their carbonates, hydrogen cyanide, interhalogens, ammonium nitrate, potassium chlorate, lead and silver salts.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Extreme temperatures, incompatible materials.

## PART IV Is there any other useful information about this material?

# 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Human toxicological data are available for the components of this product, as listed below. Other data for animals are available but are not presented in this Material Safety Data Sheet.

**HYDROCHLORIC ACID:**  
 LC<sub>50</sub> (inhalation, human) = 1300 ppm/ 30 minutes  
 LC<sub>50</sub> (inhalation, human) = 3000 ppm/ 5 minutes  
 LD<sub>50</sub> (unreported, man) = 61 mg/kg  
**METHANOL:**  
 DNA Inhibition System (lymphocyte, human) 300 mmol/L  
 LD<sub>50</sub> (oral, man) = 6472 mg/kg; central nervous system, pulmonary, gastrointestinal effects

**METHANOL (continued):**  
 TDLo (oral, man) = 3429 mg/kg; eye effects  
 LDLo (oral, human) = 428 mg; central nervous system, pulmonary effects  
 LDLo (oral, human) = 143 mg/kg; eye, pulmonary, gastrointestinal effects  
 TDLo (oral, woman) = 4000 mg/kg; eye, pulmonary, gastrointestinal effects  
 TCLo (inhalation, human) = 86000 mg/m<sup>3</sup>; eye, pulmonary effects

**METHANOL (continued):**  
 TCLo (inhalation, human) = 500 ppm; eye, central nervous system, pulmonary effects  
**ZINC CHLORIDE:**  
 DNA Inhibition System (human, lymphocyte) = 0.360 mmol/L  
 TCLo (inhalation, man) = 4800 mg/m<sup>3</sup>/ 30 minutes; pulmonary effects  
 TCLo (inhalation, human) < 4800 mg/m<sup>3</sup>/ 3 hours

SUSPECTED CANCER AGENT: Hydrochloric Acid (a component of this product) is on the following list:

IARC-Group 3, Not Classifiable as to Carcinogenicity to Humans

Zinc Chloride (a component of this product) is on the following list:

EPA-D, Not Classifiable as to Human Carcinogenicity.

The other components of this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA, and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product can severely irritate and burn contaminated tissue.

SENSITIZATION TO THE PRODUCT: It has been reported that a worker developed asthmatic symptoms after performing soldering work with a flux containing Ammonium and Zinc Chlorides (components of this product).

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product on the human reproductive system.

Mutagenicity: This product is not reported to produce mutagenic effects in humans. Human mutation data are available for Methanol and Zinc Chloride (components of this product); these data were obtained during clinical studies on specific human tissues exposed to high doses of these compounds. Animal mutation data are available for Ammonium Chloride and Hydrochloric Acid (components of this product); these data were obtained during clinical studies on specific animal tissues exposed to high doses of these compounds.

Embryotoxicity: This product is not reported to produce embryotoxic effects in humans.

Teratogenicity: This product is not reported to cause teratogenic effects in humans. Clinical studies on test animals exposed to relatively high doses of Methanol and Zinc Chloride (components of this product) indicate teratogenic effects.

Reproductive Toxicity: This product is not reported to cause adverse reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Hydrochloric Acid, Methanol, and Zinc Chloride (components of this product) indicate adverse reproductive effects.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

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### 11. TOXICOLOGICAL INFORMATION (Continued)

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there is a ACGIH Biological Exposure Index (BEI) associated with Methanol (a component of this product).

| CHEMICAL DETERMINANT            | SAMPLING TIME  | BEI       |
|---------------------------------|----------------|-----------|
| METHANOL<br>• Methanol in urine | • End of shift | • 15 mg/L |

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Dermatitis, other skin disorders, and respiratory conditions may be aggravated by over-exposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure. Provide oxygen, if necessary. Pulmonary function tests, chest X-rays, and nervous system evaluations may prove useful. Consultation with an ophthalmologist is recommended if eye exposure leads to tissue damage.

### 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product will decompose under normal environmental conditions. Additional environmental data are available as follows:

HYDROCHLORIC ACID: Water solubility: 56.6 g/100 cc (60°C); 62.3 g/100 cc (0°C).

METHANOL: Log  $K_{ow}$  = -0.77. Water Solubility = Miscible. BOD (g/g) = 0.76-1.12 standard dilution/sewage seed. Methanol occurs naturally as a plant volatile and during microbial degradation of biological wastes. When released on land or water, it is apt to volatilize and biodegrade. The estimated half-life in water is 5.3 hours to 2.6 days. Methanol is highly mobile in soil. The Bioconcentration Factor for Methanol is 2.0.

ZINC CHLORIDE: Water solubility: 432 g/100 mL (25°C), 614 g/100 mL (100°C). Zinc can persist indefinitely as a cation. Radioactive zinc ( $^{65}Zn$ ) has been found to concentrate in plants and milk. Acute Hazard Level Threshold: For vegetables and other crops - 760 ppm (Zn)

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product can be harmful to plant and animal life. Specific data on test animals are available, but are not presented in this Material Safety Data Sheet.

EFFECT OF CHEMICAL ON AQUATIC LIFE: Large releases of this product may be harmful or fatal to exposed aquatic life. Additional aquatic toxicity data are available as follows:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>HYDROCHLORIC ACID:</p> <p>LC<sub>100</sub> (trout) = 10 mg/L/24 hours</p> <p>LC<sub>50</sub> (shrimp) = 100-300 ppm/48 hours (salt water)</p> <p>LC<sub>50</sub> (starfish) = 100-300 mg/L/48 hours</p> <p>LC<sub>50</sub> (creeble) = 230-1000 mg/L/48 hours</p> <p>TLm (Gambusia affinis, mosquitto fish) = 282 ppm/96 hours/ fresh water</p> <p>LC<sub>50</sub> (Carassius auratus, goldfish) = 176 mg/L (1-2 hour survival time)</p> <p>LC<sub>50</sub> (shore crab) = 247 mg/L/48 hours</p> | <p>HYDROCHLORIC ACID (continued):</p> <p>LC (Lepomis macrochirus, bluegill sunfish) = 3.5 mg/L/48 hours</p> <p>LC<sub>50</sub> (Lepomis macrochirus/bluegill sunfish) = pH 3.0-3.5/96 hours</p> <p>TLm (sunfish) = 66 hours/ pH 3.6/ 20°C</p> <p>TLm (goldfish) = 95 hours/ pH 4/ 20°C</p> <p>TLm (stickleback) = 66 hours/ pH 4.5/ 20°C</p> <p>METHANOL:</p> <p>LC<sub>50</sub> (Pimephales promelas, fathead minnow) = 29.4 mg/L/96 hours</p> | <p>ZINC CHLORIDE:</p> <p>Acute Hazard Level Threshold: For fish - 0.1 ppm (Zn)</p> <p>Odorous zinc poisoning causes inflamed gills in fish.</p> <p>Laboratory studies of AUSRITE salmon, rainbow trout, carp, and goldfish have shown avoidance reactions by these fish to zinc in water.</p> <p>Radioactive zinc (<math>^{65}Zn</math>) has been found to concentrate in aquatic life.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada and its Provinces. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

U.S. EPA WASTE NUMBER: D002 (Characteristic/Corrosivity) applicable to wastes consisting only of this product.

### 14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS (Per 49 CFR 172.101) BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Corrosive liquids, n.o.s. (Zinc Chloride, Hydrochloric Acid)

HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive)

UN IDENTIFICATION NUMBER: UN 1760

PACKING GROUP: III

DOT LABEL(S) REQUIRED: CORROSIVE

NOTE: Consumer commodity shipments of this product 1 gallon or less in volume may be renamed "Consumer Commodity" and reclassified as ORM-D material. Refer to 49 CFR 173.154(c) for additional information.

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 154

MARINE POLLUTANT: The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian shipments.

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### 15. REGULATORY INFORMATION

**ADDITIONAL U.S. REGULATIONS:**

**U.S. SARA REPORTING REQUIREMENTS:** The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

| CHEMICAL NAME     | SARA 302<br>(40 CFR 355, Appendix A) | SARA 304<br>(40 CFR Table 302.4) | SARA 313<br>(40 CFR 372.65) |
|-------------------|--------------------------------------|----------------------------------|-----------------------------|
| Ammonium Chloride | No                                   | Yes                              | No                          |
| Hydrochloric Acid | No                                   | Yes                              | Yes                         |
| Methanol          | No                                   | Yes                              | Yes                         |
| Zinc Chloride     | No                                   | Yes                              | Yes (as Zinc Compound)      |

**U.S. SARA THRESHOLD PLANNING QUANTITY:** Not applicable.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** Ammonium Chloride = 5000 lb.; Hydrochloric Acid = 5000 lb.; Methanol = 6000 lb.; Zinc Chloride = 1000 lb.

**U.S. TSCA INVENTORY STATUS:** The components of this product are listed on the TSCA Inventory.

**OTHER U.S. FEDERAL REGULATIONS:** Not applicable.

**U.S. STATE REGULATORY INFORMATION:** The components of this product are covered under specific State regulations, as denoted below:

- Alaska - Designated Toxic and Hazardous Substances:** Ammonium Chloride Fume, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- California - Permissible Exposure Limits for Chemical Contaminants:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Florida - Substance List:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Illinois - Toxic Substances List:** Ammonium Chloride Vapor, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Kansas - Section 302/313 List:** Hydrochloric Acid, Methanol.
- Massachusetts - Substance List:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Minnesota - List of Hazardous Substances:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Michigan - Critical Materials Register:** Zinc Compounds.
- Missouri - Employer Information/Toxic Substance List:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride.
- New Jersey - Right to Know Hazardous Substance List:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride.
- North Dakota - List of Hazardous Chemicals, Reportable Quantities:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride.
- Pennsylvania - Hazardous Substance List:** Ammonium Chloride, Hydrochloric Acid, Methanol, Zinc Chloride.
- Rhode Island - Hazardous Substance List:** Ammonium Chloride Fume, Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Texas - Hazardous Substance List:** Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- West Virginia - Hazardous Substance List:** Hydrochloric Acid, Methanol, Zinc Chloride Fume.
- Wisconsin - Toxic and Hazardous Substances:** Hydrochloric Acid, Methanol, Zinc Chloride Fume.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** No component of this product is on the California Proposition 65 Lists.

**ANSI LABELING (Z129.1):** DANGER! CORROSIVE. MAY BE HARMFUL OR FATAL IF INHALED OR SWALLOWED. CAUSES SKIN OR EYE BURNS. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing vapors or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, face-shields, suitable body protection, and NIOSH/MSHA-approved respiratory protection, as appropriate. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO<sub>2</sub>, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with polypads or other suitable absorbent materials. Neutralize with agent suitable for acids. Place residue in suitable container and seal. Consult Material Safety Data Sheet for additional information.

**ADDITIONAL CANADIAN REGULATIONS:**

**CANADIAN DSL/NDSL INVENTORY STATUS:** The components of this product are on the DSL/NDSL Lists.

**OTHER CANADIAN REGULATIONS:** Not applicable.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this product are not on the CEPA Priorities Substances Lists.

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### 15. REGULATORY INFORMATION (Continued)

CANADIAN WHMIS SYMBOLS: D1B: Poisonous and Infectious Materials/Immediate and Serious Toxic Effects  
E: Corrosive Material.



### 16. OTHER INFORMATION

PREPARED BY:

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This Material 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. The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. To the best of the J.W. Harris Company, Inc.'s knowledge, the information and recommendations contained in this publication are reliable and accurate as the date of issue. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made by J.W. Harris Co., Inc. as to the absolute correctness or sufficiency of any representation contained in this and other publications; J.W. Harris Co., Inc. assumes no responsibility in connection therewith, nor can it be assumed that all acceptable safety measures may not be required under particular or exceptional conditions or circumstances. Data may be changed from time to time. Be sure to consult the latest edition.

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## DEFINITIONS OF TERMS

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

**CAS #:** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used as a unique identifier for the chemical.

**EXPOSURE LIMITS IN AIR:**

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (TWA), the 15-minute Short Term Exposure Limit, and the Instantaneous Ceiling Level (C). Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register, 58: 35938-35951 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order. **IDLH** - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. The DFG - MAK is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (OSHA). **NIOSH** issues exposure guidelines called Recommended Exposure Levels (RELs). When no exposure guidelines are established, an entry of NE is made for reference.

**HAZARD RATINGS:**

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:** This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards. **Health Hazard:** 0 (minimal acute or chronic exposure hazard); 1 (slight acute or chronic exposure hazard); 2 (moderate acute or significant chronic exposure hazard); 3 (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); 4 (extreme acute exposure hazard; onetime overexposure can be fatal). **Flammability Hazard:** 0 (minimal hazard); 1 (materials that require substantial pre-heating before burning); 2 (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); 3 (Class IB and IC flammable liquids with flash points below 38°C [100°F]); 4 (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 36°C [100°F]). **Reactivity Hazard:** 0 (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); 2 (materials that are unstable but do not detonate or which can react violently with water); 3 (materials that can detonate when inflated or which can react explosively with water); 4 (materials that can detonate at normal temperatures or pressures). **PPE Rating D:** Hand, eye, face, and body protection is required for routine chemical use.

**NATIONAL FIRE PROTECTION ASSOCIATION:** **Health Hazard:** 0 (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); 1 (materials that on exposure under fire conditions could cause irritation or minor residual injury); 2 (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); 3 (materials that can on short exposure could cause serious temporary or residual injury); 4 (materials that under very short exposure cause death or major residual injury). **Flammability Hazard and Reactivity Hazard:** Refer to definitions for "Hazardous Materials Identification System".

**FLAMMABILITY LIMITS IN AIR:**

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature:** The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

**TOXICOLOGICAL INFORMATION:**

**Human and Animal Toxicology:** Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; ppm concentration expressed in parts of material per million parts of air or water; mg/m<sup>3</sup> concentration expressed in weight of substance per volume of air; mg/kg quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TD<sub>01</sub>**, **LDLo**, and **LDo**, or **TC**, **TC<sub>01</sub>**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program; **RTECS** - the Registry of Toxic Effects of Chemical Substances. **OSHA** and **Cal/OSHA**. **IARC** and **NTP** rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B; etc.) are also used. Other information: **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **Ecological Information:** **EC** is the effect concentration in water. **BCF** - Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL<sub>m</sub>** = median threshold limit; Coefficient of Oil/Water Distribution is represented by log **K<sub>ow</sub>** or log **K<sub>oc</sub>** and is used to assess a substance's behavior in the environment.

**REGULATORY INFORMATION:**

This section explains the impact of various laws and regulations on the material. **U.S.:** **EPA** is the U.S. Environmental Protection Agency. **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA** (or Superfund) refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute (ANSI Z129.1). **CANADA:** **CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDSL** are the Canadian Domestic/Non-Domestic Substances Lists.

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