SAFETY DATA SHEET

Sid Harvey part # T720-50 SDS # Z0462

1. Identification

Product identifier **STAY CLEAN® LIQUID SOLDERING FLUX**

Other means of identification

SDS number 0099

Product Type Liquid flux

Recommended use Soldering of metal.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Harris Products Group
4501 Quality Place
Mason, Ohio 45040 US
custservmason@jwharris.com

Telephone number 513-754-2000

Emergency Telephone Numbers 1-888-609-1762 (US, Canada, Mexico only)

Please quote 333988

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Acute toxicity, oral	Category 4
Acute toxicity, inhalation	Category 4
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Specific target organ toxicity, single exposure	Category 1 (optic nerve)
Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Harmful if swallowed. Harmful if inhaled. Causes severe skin burns and eye damage. May cause respiratory irritation. Causes damage to organs (optic nerve).

Precautionary statement

Prevention Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Specific treatment (see this label). Wash contaminated clothing before reuse.

Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Ammonium chloride	12125-02-9	5-25
Zinc chloride	7646-85-7	<30
Hydrochloric acid	7647-01-0	<5
Methanol	67-56-1	<5

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed 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. 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.

Dermatitis, other skin disorders, and respiratory conditions may be aggravated by over-exposure to this product.

Indication of immediate medical attention and special treatment needed Keep victim under observation. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. 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. In case of shortness of breath, give oxygen. Symptoms may be delayed.

General information If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Halons.

Unsuitable extinguishing media None known.

Specific hazards arising from the chemical 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.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted. This product is neither flammable nor reactive under normal circumstances; however, it may generate flammable hydrogen gas upon contact with metals.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

This product is miscible in water. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling

Do not breathe mist or vapor. Provide adequate ventilation. Do not use in areas without adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Do not taste or swallow. When using, do not eat, drink or smoke. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Handle and open container with care. Observe good industrial hygiene practices. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store away from direct sunlight, sources of intense heat, or where freezing is possible. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS). Material should be stored in secondary containers or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Hydrochloric acid (CAS 7647-01-0)	Ceiling	7 mg/m3	
		5 ppm	
Methanol (CAS 67-56-1)	PEL	260 mg/m3	
		200 ppm	
Zinc chloride (CAS 7646-85-7)	PEL	1 mg/m3	Fume.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Ammonium chloride (CAS 12125-02-9)	STEL	20 mg/m3	Fume.
	TWA	10 mg/m3	Fume.
Hydrochloric acid (CAS 7647-01-0)	Ceiling	2 ppm	
Methanol (CAS 67-56-1)	STEL	250 ppm	
	TWA	200 ppm	
Zinc chloride (CAS 7646-85-7)	STEL	2 mg/m3	Fume.
	TWA	1 mg/m3	Fume.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Ammonium chloride (CAS 12125-02-9)	STEL	20 mg/m3	Fume.
	TWA	10 mg/m3	Fume.
Hydrochloric acid (CAS 7647-01-0)	Ceiling	7 mg/m3	
		5 ppm	
Methanol (CAS 67-56-1)	STEL	325 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
		250 ppm	
	TWA	260 mg/m3	
		200 ppm	
Zinc chloride (CAS 7646-85-7)	STEL	2 mg/m3	Fume.
	TWA	1 mg/m3	Fume.

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Methanol (CAS 67-56-1)	15 mg/l	Methanol	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Methanol (CAS 67-56-1) Skin designation applies.

US - Tennessee OELs: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US. NIOSH: Pocket Guide to Chemical Hazards

Methanol (CAS 67-56-1) Can be absorbed through the skin.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical respirator with organic vapor cartridge and full facepiece.

Skin protection

Hand protection Wear neoprene or rubber gloves for routine industrial use.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid. Liquid

Color Clear colorless.

Odor Slightly sweet.

Odor threshold Not available.

pH Acidic.

Melting point/freezing point Not available.

Initial boiling point and boiling range Not available.

Flash point Not flammable.

Evaporation rate > 1 (nBuAc = 1).

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	4 (air = 1).
Relative density	1.32 (water = 1).
Solubility(ies)	
Solubility (water)	Slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	Litmus paper will turn red upon contact with this product. The odor may also act as a distinguishing characteristic of this product.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Extreme temperatures.
Incompatible materials	Acid. alkalis and their carbonates, hydrogen cyanide, interhalogens, ammonium nitrate, potassium chlorate, lead and silver salts. Strong oxidizing agents. Amines. Do not mix with other chemicals. This product is neither flammable nor reactive under normal circumstances; however, it may generate flammable hydrogen gas upon contact with metals.
Hazardous decomposition products	Carbon dioxide (CO2). Nitrogen oxides (NOx). Ammonia. Hydrogen Chloride (HCl). Zinc oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause damage to organs by 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.
Skin contact	Causes severe skin burns. 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. 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.
Eye contact	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. Causes serious eye damage.
Ingestion	Harmful if swallowed. Causes digestive tract burns. If this flux is ingested, nausea, vomiting, and diarrhea may occur (depending on the amount of the product swallowed). Severe ingestion exposures may result in damage to the tissues of the gastrointestinal system, and death.

Symptoms related to the physical, chemical and toxicological characteristics

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. 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.

Dermatitis, other skin disorders, and respiratory conditions may be aggravated by over-exposure to this product.

Information on toxicological effects

Acute toxicity Harmful if inhaled. Harmful if swallowed. May cause respiratory irritation.

Components	Species	Test Results
Hydrochloric acid (CAS 7647-01-0)		
Acute		
Inhalation		
LC50	Rat	3124 mg/l, 1 Hours
Oral		
LD50	Rabbit	900 mg/kg
Methanol (CAS 67-56-1)		
Acute		
Inhalation		
LC50	Rat	22500 ppm, 8 hours
Oral		
LD50	Rat	6200 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes severe skin burns and eye damage.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

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).

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Hydrochloric acid (CAS 7647-01-0) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects. Clinical studies on test animals exposed to relatively high doses of Methanol and Zinc Chloride (components of this product) indicate teratogenic effects and adverse reproductive effects.

Specific target organ toxicity - single exposure Causes damage to organs (optic nerve). May cause respiratory irritation.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Components		Species	Test Results
Hydrochloric acid (CAS 7647-01-0)			
Aquatic			
Fish	LC50	Western mosquitofish (Gambusia affinis)	282 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Methanol (CAS 67-56-1)	-0.77

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number	UN1760
UN proper shipping name	Corrosive liquids, n.o.s. (Zinc Chloride, Hydrochloric Acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	IB3, T7, TP1, TP28
Packaging exceptions	154
Packaging non bulk	203
Packaging bulk	241

IATA

UN number	UN1760
UN proper shipping name	Corrosive liquids, n.o.s. (Zinc Chloride, Hydrochloric Acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1760
UN proper shipping name	Corrosive liquids, n.o.s. (Zinc Chloride, Hydrochloric Acid)

Transport hazard class(es)

Class	8
Subsidiary risk	-
Label(s)	8

Packing group III

Environmental hazards

Marine pollutant Yes

EmS Not available.

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

General information DOT Regulated Marine Pollutant. IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Ammonium chloride (CAS 12125-02-9)	LISTED
Hydrochloric acid (CAS 7647-01-0)	LISTED
Methanol (CAS 67-56-1)	LISTED
Zinc chloride (CAS 7646-85-7)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Hydrochloric acid	7647-01-0	5000	500		

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Ammonium chloride	12125-02-9	5-25
Zinc chloride	7646-85-7	<30
Hydrochloric acid	7647-01-0	<5
Methanol	67-56-1	<5

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Hydrochloric acid (CAS 7647-01-0)
Methanol (CAS 67-56-1)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Hydrochloric acid (CAS 7647-01-0)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Hydrochloric acid (CAS 7647-01-0) 6545

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Hydrochloric acid (CAS 7647-01-0) 20 %WV

DEA Exempt Chemical Mixtures Code Number

Hydrochloric acid (CAS 7647-01-0) 6545

US state regulations

US. Massachusetts RTK - Substance List

Ammonium chloride (CAS 12125-02-9)
Hydrochloric acid (CAS 7647-01-0)
Methanol (CAS 67-56-1)
Zinc chloride (CAS 7646-85-7)

US. New Jersey Worker and Community Right-to-Know Act

Ammonium chloride (CAS 12125-02-9)
Hydrochloric acid (CAS 7647-01-0)
Methanol (CAS 67-56-1)
Zinc chloride (CAS 7646-85-7)

US. Pennsylvania Worker and Community Right-to-Know Law

Ammonium chloride (CAS 12125-02-9)
Hydrochloric acid (CAS 7647-01-0)
Methanol (CAS 67-56-1)
Zinc chloride (CAS 7646-85-7)

US. Rhode Island RTK

Ammonium chloride (CAS 12125-02-9)
Hydrochloric acid (CAS 7647-01-0)
Methanol (CAS 67-56-1)
Zinc chloride (CAS 7646-85-7)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Methanol (CAS 67-56-1)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 18-February-2015
Revision date -
Version # 01

NFPA ratings

Disclaimer

Harris Products Group cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

MATERIAL SAFETY DATA SHEET

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

WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS MATERIAL SAFETY DATA SHEET (M.S.DS.). ALSO, FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES. This product may contain Chromium and/or Nickel which are listed by OSHA, NTP, or IARC as being a carcinogen or potential carcinogen. Use of this product may expose you or others to fumes and gases at levels exceeding those established by the American Conference of Governmental Industrial Hygienists (ACGIH) or the Occupational Safety and Health Administration (OSHA) The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. **BE SURE TO CONSULT THE LATEST VERSION OF THE MSDS. MATERIAL SAFETY DATA SHEETS ARE AVAILABLE FROM Harris Products Group** salesinfo@jwharris.com 513-754-2000 **www.jwharris.com**

STATEMENT OF LIABILITY-DISCLAIMER

To the best of the Harris Products Group knowledge, the information and recommendations contained in this publication are reliable and accurate as of the date prepared. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made by Harris Products Group. as to the absolute correctness or sufficiency of any representation contained in this and other publications; Harris Products Group assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this and other publications, or that other or additional measures may not be required under particular or exceptional conditions or circumstances . Data may be changed from time to time.

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-Soldering Operations
DOCUMENT NUMBER: 0099
SUPPLIER/MANUFACTURER'S NAME: **Harris Products Group.**
ADDRESS: 4501 Quality Place, Mason, Ohio 45040
EMERGENCY PHONE: CHEMTREC: 1-800-424-9300
BUSINESS PHONE: 513-754-2000 **FAX** 513-754-8778
DATE OF PREPARATION: July 13, 2007

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		IDLH	OTHER
			TWA mg/m³	STEL mg/m³	TWA mg/m³	STEL mg/m³	mg/m³	mg/m³
Zinc Chloride (exposure limits are for Zinc Chloride fume)	7646-85-7	< 30	1	2	1	2 (vacated 1989 PEL)	50	NIOSH RELs: TWA = 1 STEL = 2 Carcinogen: EPA-D
Ammonium Chloride (exposure limits are for Ammonium Chloride fume)	12125-02-9	5–25	10	20	10 (vacated 1989 PEL)	20 (vacated 1989 PEL)	NE	NIOSH RELs: TWA = 10 STEL = 20
Hydrochloric Acid (as Hydrogen Chloride)	7647-01-0	< 5	NE	7 ceiling	NE	7 ceiling	76	NIOSH REL: TWA = 7 ceiling DFG MAKs: TWA = 7 ceiling PEAK = 2•MAK 5 min., momentary value DFG MAK Pregnancy Risk Classification: C Carcinogen: IARC-3

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

2. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL			OTHER
			TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Methanol	67-56-1	< 5	262 (skin)	328	260	325 (vacated 1989 PEL)	7860	NIOSH REL: TWA = 260 (skin) STEL = 325 DFG MAKs: TWA = 260 (Danger of Cutaneous Absorption) PEAK = 2•MAK 30 min., average value DFG MAK Pregnancy Risk Classification: C
Water	7732-18-5	Balance	NE	NE	NE	NE	NE	NE

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

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 neither 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.

HAZARDOUS MATERIAL IDENTIFICATION 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

3. HAZARD IDENTIFICATION (Continued)

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: If this flux is ingested, nausea, vomiting, and diarrhea may occur (depending on the amount of the product swallowed). Severe ingestion exposures may result in damage to the tissues of the gastrointestinal system, and death.

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: ACUTE: Skin, eyes, respiratory system, central nervous system. CHRONIC: Skin, respiratory system, and gastrointestinal system.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

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

SKIN EXPOSURE: In the event of skin-over-exposure, rinse affected area with a soap and water solution. If skin contact results in irritation, the minimum flushing is for 15 minutes. Victim must seek medical attention if adverse health effects occur.

EYE EXPOSURE: If this product enters the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek medical attention if adverse health effects occur.

INHALATION: If this product is inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. Do not induce vomiting, unless directed by medical personnel. Have victim rinse mouth with water, if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration.

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.

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

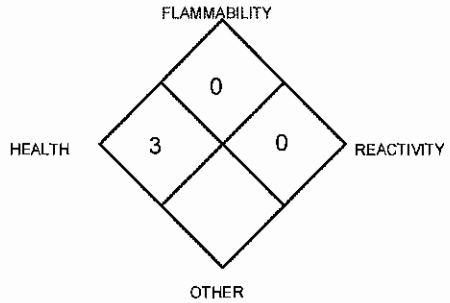
FIRE EXTINGUISHING MATERIALS: This material is not flammable. Use extinguishing media appropriate for surrounding fire.

Water Spray: YES (for cooling) Carbon Dioxide: YES
Halon: YES Foam: YES
Dry Chemical: 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.

NFPA RATING



See Section 16 for Definition of Ratings

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.

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 polypads 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 spilled residues 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).

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, U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Respiratory Protection is recommended to be worn during welding operations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following NIOSH respiratory selection guidelines are available for Zinc Chloride Fume:

CONCENTRATION	RESPIRATORY PROTECTION
Up to 10 mg/m^3:	Dust, mist, and fume respirator or Supplied-Air Respirator (SAR).
Up to 25 mg/m^3:	Powered air-purifying respirator with dust, mist and fume filter(s) or SAR operated in a continuous-flow mode.
Up to 50 mg/m^3:	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.
Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:	Positive pressure, full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
Escape:	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, and chemically resistant boots).

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): 4.0
SPECIFIC GRAVITY (water = 1): 1.32
SOLUBILITY IN WATER: Slightly soluble.
VAPOR PRESSURE: Not established.
ODOR THRESHOLD: Not established.
EVAPORATION RATE (nBuAc = 1): > 1
FREEZING/MELTING POINT: Not established.
BOILING POINT: Not established.
pH: Not applicable.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not established.
APPEARANCE, ODOR 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.

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:
LCLo (inhalation, human) = 1300 ppm/ 30 minutes

HYDROCHLORIC ACID (continued):
LCLo (inhalation, human) = 3000 ppm/ 5 minutes

HYDROCHLORIC ACID:
LDLo (unreported, man) = 81 mg/kg

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (continued):

METHANOL:
DNA Inhibition System (lymphocyte, human) 300 mmol/L
LDLo (oral, man) = 6422 mg/kg; central nervous system, pulmonary, gastrointestinal effects
TDLo (oral, man) = 3429 mg/kg; eye effects
LDLo (oral, human) = 428 mg; central nervous system, pulmonary effects

METHANOL (centinued):
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^3; eye, pulmonary effects

METHANOL (continued):
TCLo (inhalation, human) = 300 ppm; eye, central nervous system, pulmonary effects

ZINC CHLORIDE:
DNA Inhibition System (human, lymphocyte) = 0.360 mmol/L
TCLo (inhalation, man) = 4800 mg/m^3/ 30 minutes; pulmonary effects
TCLo (inhalation, human) = 4800 mg/m^3/ 3 hours

SUSPECTED CANCER AGENT: The components of this product are listed as follows:

HYDROCHLORIC ACID: IARC-3 (Not Classifiable as to Carcinogenicity to Humans)
ZINC CHLORIDE: 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.

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

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
METHANOL • Methanol in urine	• End of shift	• 15 mg/L

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: 56.5 g/ 100 cc (60°C); 82.3 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 - 750-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.

12. ECOLOGICAL INFORMATION (Continued)

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:

HYDROCHLORIC ACID:

LC_{100} (trout) = 10 mg/L/ 24 hours
LC_{50} (shrimp) = 100-330 ppm/ 48 hours(salt water)
LC_{50} (starfish) = 100-300 mg/L/ 48 hours
LC_{50} (cockle) = 330-1000 mg/L/ 48 hours
TLm (*Gambusia affinis*, mosquito fish) = 282 ppm/ 96 hours/ fresh water
LC_{50} (*Carassium auratus*, goldfish) = 178 mg/L (1-2 hour survival time)
LC_{50} (shore crab) = 240 mg/L/ 48 hours

HYDROCHLORIC ACID (continued):

LC (*Lepomis macrochirus*, bluegill sunfish) = 3.6 mg/L/ 48 hours
LC_{50} (*Lepomis macrochirus*/bluegill sunfish) = pH 3.0-3.5/ 96 hours
TLm (sunfish) = 96 hours/ pH 3.6/ 20°C
TLm (goldfish) = 96 hours/ pH 4/ 20°C
TLm (stickleback) = 96 hours/ pH 4.6/ 20°C

METHANOL:

LC_{50} (*Pimephales promelas*, fathead minnow) = 29.4 mg/L/ 96 hours

ZINC CHLORIDE:

Acute Hazard Level Threshold: For fish - 0.1 ppm (Zn)
Odorless zinc poisoning causes inflamed gills in fish.
Laboratory studies of Atlantic salmon, rainbow trout, carp, and goldfish have shown avoidance reactions by these fish to zinc in water.
Radioactive zinc (^{65}Zn) has been found to concentrate in aquatic life.

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 (Class 8)

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

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 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, per regulations of Transport Canada. Use the above information for the preparation of Canadian shipments.

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 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (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: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Ammonium Chloride = 5000 lb (2270 kg); Hydrochloric Acid = 5000 lb (2270 kg); Methanol = 5000 lb (2270 kg); Zinc Chloride = 1000 lb (454 kg).

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

15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

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, and Zinc Chloride Fume.

California - Permissible Exposure Limits for Chemical Contaminants: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Florida - Substance List: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Illinois - Toxic Substance List: Ammonium Chloride Vapor, Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Kansas - Section 302/313 List: Hydrochloric Acid, Methanol.

Massachusetts - Substance List: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Minnesota - List of Hazardous Substances: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Michigan-Critical Materials Register: Zinc Compounds.

Missouri - Employer Information/Toxic Substance List: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride.

New Jersey - Right to Know Hazardous Substance List: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride.

Pennsylvania - Hazardous Substance List: Ammonium Chloride, Hydrochloric Acid, Methanol, and Zinc Chloride.

Rhode Island - Hazardous Substance List: Ammonium Chloride Fume, Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Texas - Hazardous Substance List: Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

West Virginia - Hazardous Substance List: Hydrochloric Acid, Methanol, and Zinc Chloride Fume.

Wisconsin - Toxic and Hazardous Substances: Hydrochloric Acid, Methanol, and 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-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_2, 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

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

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
858/565-0302

DATE OF PRINTING: July 13, 2007

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.

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: 35338-35351 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: 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 38°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 initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

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 causes 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_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - 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^3** 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; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **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. Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** 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. **The CPR is the Canadian Product Regulations.** This section also includes information on the precautionary warnings, which appear, on the materials package label.