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.harrisproductsgroup.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® ALUMINUM FLUX**
CHEMICAL NAME/CLASS: Organic Amine Mixture
SYNONYMS: Not Applicable
PRODUCT USE: Soldering Operations
DOCUMENT NUMBER: 0138
SUPPLIER/MANUFACTURER'S NAME: **HARRIS PRODUCTS GROUP.**
ADDRESS: 4501 Quality Place, Mason, Ohio 45140
EMERGENCY PHONE: CHEMTREC: 1-800-424-9300
BUSINESS PHONE: 513-754-2000 **FAX** 513-754-8778
DATE OF PREPARATION: July 12, 2007

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
			TWA mg/m^3	STEL mg/m^3	TWA mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Triethanolamine	102-71-6	30-60	5	NE	NE	NE	NE	NE
Aminoethylethanolamine	111-41-1	35	NE	NE	NE	NE	NE	NE
Ammonium Fluoborate Exposure limits are for inorganic, solid Fluoride compounds, as F	13826-83-0	20	2.5	NE	2.5	NE	250	DFG MAKs: TWA = 2.5 (Inhalable Fraction) PEAK = 5•MAK 30 min., average value Carcinogen: IARC-3, TLV-A4
Tin, Metal	7440-31-5	10	2	NE	2	NE	100 (as Sn)	NIOSH REL: TWA = 2

NE = Not Established. See Section 16 for Definitions of Terms Used. Single values are maximum, unless otherwise noted.

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		NIOSH	OTHER
			TWA mg/m^3	STEL mg/m^3	PEL mg/m^3	STEL mg/m^3	IDLH mg/m^3	mg/m^3
Zinc Oxide Exposure limits given are for dust and fume.	1314-13-2	10	5 (fume) 10 (dust)	10 (fume)	5 (fume) 5 (total dust) 15 (dust, respirable dust) 5 (dust, respirable dust, Vacated 1989 PEL)	10 (fume, Vacated 1989 PEL)	500	NIOSH RELs: TWA = 5 (fume & dusts) STEL = 10 (fume), 15 (ceiling, 15 minutes, dusts) DFG MAKs: TWA = 1.5 (Respirable fraction, fume) Carcinogen: EPA-D
Zinc (exposure limits are for zinc oxide, fume & dust)	7440-66-6	5	5 (fume) 10 (dust)	10 (fume)	5 (fume) 5 (total dust) 15 (dust, respirable dust) 5 (dust, respirable dust, Vacated 1989 PEL)	10 (fume, Vacated 1989 PEL)	500	NIOSH RELs: TWA = 5 (fume & dusts) STEL = 10 (fume), 15 (ceiling, 15 minutes, dusts) DFG MAKs: TWA = 1.5 (Respirable fraction, fume) Carcinogen: EPA-D

NE = Not Established. See Section 16 for Definitions of Terms Used. Single values are maximum, unless otherwise noted.

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 viscous, amber liquid with a strong ammonia odor. This product is a primary irritant and can be mildly to moderately irritating to contaminated tissue (depending on the concentration and duration of contact); prolonged contact may result in tissue damage and skin sensitization. This product must be substantially pre-heated before ignition can occur. Thermal decomposition of this product will produce toxic fumes and vapors or zinc oxides, fluoride compounds, carbon monoxide, carbon dioxide and oxides of nitrogen and tin. This product is not reactive. Emergency responders must wear 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 inhalation of fumes generated during use and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

INHALATION: Inhalation of large amounts of particulates generated by these products during soldering operations may be physically irritating and cause deposits of dust in nasal passages. Heating of this product during soldering operations will result in irritating fumes from the Triethanolamine component of this product. Symptoms of exposure to these fumes may include coughing, and irritation of throat and nose. In addition, metal fume fever can be caused by inhalation of zinc oxide fumes formed in air from soldering or heating of zinc metal and zinc oxide. Symptoms of metal fume fever include flu-like symptoms, metallic taste, fever, chills, cough, weakness, chest pain, muscle pain, cardiac abnormalities, and increased white blood cell count. Damage to lungs can occur. Some workers develop a short-term resistance after continuous, repeated exposure to zinc oxide fumes and subsequent symptoms of metal fume fever. This resistance to the effects of metal fume fever produced by Zinc Oxide is quickly lost after short absence from exposure. Thermal decomposition of the Ammonium Fluoborate component of this product can evolve fluoride compounds, which are potentially damaging to tissues of the respiratory system, and in high concentration can cause hypercalcmia, a condition of excess calcium in the blood.

3. HAZARD IDENTIFICATION (Continued)

CONTACT WITH SKIN or EYES: This product is mildly to moderately irritating to the skin. Prolonged skin contact can result in tissue damage. Triethanolamine, a component of this product, is a skin sensitizer. When heated to decomposition, this product can evolve fluoride compounds, which, in high concentration can cause burns, penetrating to bone. Repeated or prolonged exposures to the flux, especially in high concentrations, can cause allergy-like symptoms (e.g., rashes, welts) and dermatitis (dry, red, cracked skin). If the flux enters the eyes, mild irritation may occur and result in redness and watering. Severe contact exposures may result in damage to the cornea and other eye tissue. Note: If the product is heated before use, and the temperature of the heated product will be above 37°C (100°F); skin or eye contact with the heated product can result in thermal burns.

SKIN ABSORPTION: Skin absorption is not anticipated to be a significant route of over-exposure to the components of this product; however, thermal decomposition of this product can result in the production of fluoride compounds, which can penetrate intact skin. In cases of serious contamination with residue from thermal decomposition, burns that penetrate to the bone can occur.

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, shock, cardiac disturbances, vasomotor depression (depression of the contraction and dilation of blood vessels) hypocalcemia, and death.

INJECTION: Though not a likely route of occupational exposure for this product, injection of this product (via punctures or lacerations in the skin) may cause local reddening, tissue swelling, and discomfort.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	(BLUE)	2
FLAMMABILITY	(RED)	1
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		C/D

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For routine applications.

See Section 16 for Definition of Ratings

OTHER HEALTH EFFECTS: Repeated or chronic exposure to this product via inhalation and ingestion may result in damage to the kidneys and liver (based on animal studies), due to the presence of Triethanolamine.

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

ACUTE: The chief acute health hazards associated with this product would be the potential for mild to moderate irritation of contaminated skin and eyes. Prolonged contact to product or to decomposition products may cause burns and in extreme cases, may result in fluoride poisoning (hypercalcemia). Though unlikely to occur during occupational use, ingestion of large quantities may be fatal.

CHRONIC: Chronic skin over-exposure to this product during soldering operations may produce dermatitis (red, inflamed skin). The product contains a skin sensitizer; repeated or prolonged exposures to the flux, especially in large quantities can cause allergy-like symptoms (i.e., rashes, welts). Chronic overexposure to this product via ingestion or inhalation may result in damage to the kidneys and liver. Refer to Section 11 (Toxicological Information) for additional data on the components of this product.

TARGET ORGANS: ACUTE: Eyes, skin, respiratory system. CHRONIC: Skin, liver, kidneys, bones.

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, or if skin contact has resulted in a thermal burn.

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, or if eye contact has resulted in a thermal burn.

INHALATION: If this product is inhaled, remove victim to fresh air. Have victim blow nose.

4. FIRST-AID MEASURES (Continued)

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. If victim vomits naturally, position head lower than chest to prevent aspiration into the lungs. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin disorders and other conditions of the Target Organs (see Section 3, Hazard Identification) may be aggravated by prolonged over-exposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure. If exposure has resulted in hypercalcemia, treatment with calcium gluconate should be administered.

5. FIRE-FIGHTING MEASURES

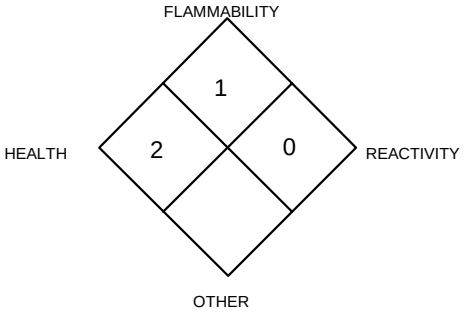
FLASH POINT (Closed Cup): 179-185°C (354-365°F) [for Triethanolamine]
AUTOIGNITION TEMPERATURE: Not determined.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not applicable.
Upper (UEL): Not applicable.
FIRE EXTINGUISHING MATERIALS:

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 a primary irritant and presents a potential contact hazard to firefighters. This product must be substantially preheated before ignition can occur. During a fire, irritating and toxic gases (i.e. carbon monoxide, carbon dioxide, fluoride and zinc compounds, oxides of tin and nitrogen) 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. Move fire-exposed containers if it can be done without risk to firefighters. If possible, firefighters should control run-off water to prevent environmental contamination. Rinse contaminated equipment with soapy water before returning such equipment to service.

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 large, uncontrolled release, clear the affected area and protect people. In the event of a non-incidental release of this product, minimum Personal Protective Equipment should be **Level D: gloves (rubber gloves over latex gloves), safety goggles, face-shield, and appropriate body protection. Level C (which includes an air-Purifying Respirator with an organic vapor cartridge) should be worn in the event excessive splashes or sprays will be generated. Level B Protection (which includes Self-Contained Breathing Apparatus) during spill response situations in which the oxygen level is below 19.5% or is unknown.** Absorb spilled flux with polypads or other suitable absorbent. Rinse residue with soap and water solution. If the heated product has been spilled, allow the material to cool before clean-up procedures begin. Decontaminate the area thoroughly. Place all spilled residues in a suitable container and seal. DO NOT STORE THIS PRODUCT IN GLASS, OR EXPOSE IT TO OTHER SILICATE BASED MATERIAL. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, or the appropriate Standards of Canada and its Provinces (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 using this product. Do not eat, drink, smoke, or apply cosmetics while handling this product.
STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Standard safety practices associated with soldering operations should be followed when using this product. Open containers slowly, on a stable surface. Avoid the accidental exposure of this material to open flames, hot surfaces, or other sources of ignition. (continued on following page)

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES (continued): Store this product in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. This product should not be stored in glass or other silicate-based containers, due to the presence of Ammonium Fluoborate. Store away from incompatible chemicals (see Section 10, Stability and Reactivity). Keep container tightly closed when not in use. Inspect all incoming containers before storage to ensure they are properly labeled and not damaged.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are normally required when using this product. Prudent practice is to ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: No respiratory protection is normally required when using this product. 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).For additional information the NIOSH recommended respiratory protection guidelines for Ammonium Fluoborate (as Fluoride Compounds) are provided, as follows:

CONCENTRATION	**RESPIRATORY PROTECTION**
Up to 12.5 mg/m^3:	Dust and mist respirator.
Up to 25 mg/m^3:	Dust and mist respirator except single-use and quarter-mask respirator; or SAR
Up to 62.5 mg/m^3:	SAR operated in a continuous-flow mode; or powered air- purifying respirator with dust and mist filters. UP TO 125 mg/m3: Full-facepiece respirator with high-efficiency particulate filter(s); or full-facepiece SCBA; or full-facepiece SAR. UP TO 250 mg/m3: Positive pressure, 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; or escape-type SCBA.

EYE PROTECTION: Safety glasses or goggles. In the event, the heated product is used, or operations involve potential splashes and sprays, a face-shield is recommended. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or appropriate Canadian Standards. If necessary, refer to U.S. OSHA 29 CFR 1910.138, or appropriate Standards of Canada.

HAND PROTECTION: Wear butyl rubber, nitrile rubber, or polyfluorinated polyethylene gloves for routine industrial use. If necessary, refer to U.S. OSHA 29 CFR 1910.138, or appropriate Standards of Canada.

BODY PROTECTION: None normally needed for normal circumstances of use. Use body protection appropriate for task (i.e. apron, coveralls, chemically resistant boots). If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): > 1.0
EVAPORATION RATE (nBuAc = 1): > 1
SPECIFIC GRAVITY (water = 1): Not established.
FREEZING/MELTING POINT: Not established.
SOLUBILITY IN WATER: Complete solubility.
BOILING POINT: Not established.
VAPOR PRESSURE, mm Hg @ 24°C: Not applicable.
pH: Not applicable.
ODOR THRESHOLD: Not applicable.
COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable.
APPEARANCE AND COLOR: This product is a viscous, amber liquid with a strong ammonia odor.
HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance and odor may act as distinguishing characteristics of this product in event of accidental release.

10. STABILITY and REACTIVITY

STABILITY: Stable.
DECOMPOSITION PRODUCTS: Carbon oxides, a variety organic molecules, tin compounds, zinc oxides, nitrogen oxides and ammonia.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is not compatible with strong oxidizing agents, strong acids, and strong bases. Due to the presence of Ammonium Fluoborate, this product is incompatible with glass or other silicate-based substances.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Avoid exposing this product to incompatible materials.

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

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following human toxicological data are available for the components of this product. Other data for animals are available but are not presented in this Material Safety Data Sheet.

ZINC:
Skin Irritancy (human) = 300 mg/ 3 days/ intermittent; mild
TCLo (inhalation, human) = 124 mg/m^3/ 50 minutes; pulmonary system effects, skin

ZINC OXIDE:
LDLo (oral, human) = 500 mg/kg
TCLo (inhalation, human) = 6000 mg/m^3; pulmonary system effects

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

AMMONIUM FLUORBORATE (as a Barium Compound): EPA-D (Not Classifiable as to Human Carcinogenicity); EPA-NL (Not Likely to be Carcinogenic in Humans); ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen)

ZINC: EPA-D (Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available)

ZINC OXIDE: EPA-D (Not Classifiable as to Human Carcinogenicity (inadequate human and animal evidence of carcinogenicity or no data available)

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

IRRITANCY OF PRODUCT: This product is mildly to moderately irritating to contaminated tissue.

SENSITIZATION TO THE PRODUCT: The Triethanolamine component of the product is a skin sensitizer; subsequent contact with very small amounts of this product may result in allergic reaction in susceptible individuals, causing symptoms such as rashes, redness and welts.

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

Mutagenicity: This product is not reported to produce mutagenic effects in humans.
Embryotoxicity This product is not reported to produce embryotoxic effects in humans.
Teratogenicity: This product is not reported to cause teratogenic effects in humans.
Reproductive Toxicity: This product is not reported to cause reproductive effects in humans.

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 an ACGIH Biological Exposure Index (BEIs) determined for Ammonium Fluoborate (as a fluoride).

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
FLUORIDES		
• Fluorides in urine	• Prior to shift • End of shift	• 3 mg/g creatinine • 10 mg/g creatinine

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: Metal components of this product will react with water and air to form a variety of stable metal oxides. Environmental data are available for the components of this product as follows:

AMINOETHYLETHANOLAMINE: K_{OW} = -1.39 (est.). Water Solubility: Miscible. BOD > 30%, 2 weeks. BCF = 0.05 (est). Aminoethylethananolamine does not bioconcentrate significantly in most aquatic organisms. Aminoethylethanolamine should be readily degraded by natural bacteria.

AMMONIUM FLUOBORATE: Water Solubility: 25 g/100 cc at 16°C; 97 g/100 cc at 100°C; 23.592 lb/100 lb at 80°C. BOD > 30%, 2 weeks. BCF = 0.05 (est). Ammonium Fluoborate compounds are biodegradable and will not accumulate in the food chain.

ZINC: Solubility: Insoluble in water. Biological Half-Life for normal humans 162-500 days. Bioconcentration: The Bioconcentration Factor in edible portions of *Crassostrea virgina,* adult oyster) is 16,700 (total zinc).

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product may be harmful to plant and animals, depending on the quantity and duration of over-exposure.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product may be harmful to aquatic lifeforms, depending on the quantity and duration of over-exposure. The following aquatic toxicity data are available for the components of this product:

AMMONIUM FLUOBORATE:
TLM (Mosquito fish) = 500 ppm/ 96 hours

ZINC:
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.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, or the appropriate standards 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: Wastes of this product should be tested for D002 (Characteristic/Corrosivity).

14. TRANSPORTATION INFORMATION

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

PROPER SHIPPING NAME: Corrosive liquids, n.o.s.(Aminoethylethanolamine, Ammonium Fluoborate)
HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive)
UN IDENTIFICATION NUMBER: UN 1760
PACKING GROUP: PG III
DOT LABEL(S) REQUIRED: 8 (Corrosive)

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.

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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 product is considered as dangerous goods, per regulations of Transport Canada. Use the above U.S. DOT 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, and are listed 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 Fluoborate	NO	YES	NO
Zinc	NO	YES	YES (fume or dust)
Zinc Oxide	NO	NO	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 Fluoborate = 5000 lb (2270 kg); Zinc = 1000 lb (454 kg) (Applicable only to particles of zinc which are 100 micrometers in diameter or less)

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: Components of this product are covered under specific State regulations, as denoted below:

Alaska-Designated Toxic and Hazardous Substances: No.
California-Permissible Exposure Limits for Chemical Contaminants: Tin.
Florida-Substance List: Zinc, Tin, (2-aminoethyl) ethanolamine, Triethanolamine.
Illinois-Toxic Substance List: Zinc, Tin, Ammonium Fluoborate.
Kansas-Section 302/313 List: Zinc.
Massachusetts-Substance List: Zinc, Tin, (2-aminoethyl) ethanolamine, Triethanolamine.
Michigan - Critical Materials Register: Zinc.
Minnesota-List of Hazardous Substances: Tin.
Missouri-Employer Information/Toxic Substance List: Tin.
New Jersey-Right to Know Hazardous Substance List: Zinc, Tin, Aminoethylethanolamine.
North Dakota-List of Hazardous Chemicals, Reportable Quantities: Zinc, Ammonium Fluoborate.
Pennsylvania-Hazardous Substance List: Zinc, Tin, Aminoethylethanolamine, Triethanolamine.
Rhode Island-Hazardous Substance List: Zinc, Tin, Triethanolamine.
Texas-Hazardous Substance List: No.
West Virginia-Hazardous Substance List: Ammonium Fluoborate.
Wisconsin-Toxic and Hazardous Substances: Ammonium Fluoborate.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 lists. The State of California requires the following information: WARNING: This product may contain chemicals, and when used may produce fumes or gases containing chemicals, known to the State of California to cause cancer, and/or birth defects (or other reproductive harm.)

15. REGULATORY INFORMATION (Continued)

ADDITIONAL CANADIAN REGULATIONS:

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

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: Ammonium Fluoborate (as an Inorganic Fluoride) is classified as Toxic on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS SYMBOLS: **Class E:** Corrosive Material

Class D2B: Other Toxic Effects-Sensitization

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
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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.

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 (**REL**s). 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.