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CHEMETALL FOOTE CORPORATION
MATERIAL SAFETY DATA SHEET

LITHIUM NITRATE

CFM 016

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SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUPPLIER/MANUFACTURER'S NAME AND ADDRESS:

CHEMETALL FOOTE CORPORATION
 348 HOLIDAY INN DRIVE
 KINGS MOUNTAIN, NC 28086
 704-739-2501 (8 AM - 5 PM M-F)

FOR EMERGENCY TRANSPORTATION
 INFORMATION, CALL CHEMTREC: 1-
 800-424-9300

SUBSTANCE: LITHIUM NITRATE

TRADE NAMES/SYNONYMS: NITRIC ACID, LITHIUM SALT; L-132; CFM12927; UN2722

PRODUCT USE: Used for a variety of industrial and research applications.

CHEMICAL FAMILY: Inorganic Salt

FORMULAS: LiNO₃

CREATION DATE: 5/3/95

REVISION DATE: 10/23/98

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

Component	CAS #	% w/w	Exposure Limits in Air				
			ACGIH		OSHA		OTHER
			TLV	STEL	PEL	STEL	
Lithium Nitrate	7790-69-4	99	10 mg/m ³ ; Inhalable Particulate; 3 mg/m ³ , Respirable Particulate (Particulates not Otherwise Classified)	NE	5 mg/m ³ ; Respirable fraction 15 mg/m ³ ; Total Dust (Particulates not Otherwise Classified)	NE	NE

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

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

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product consists of colorless, deliquescent crystals, granules or powder. This product poses a slight health hazard (in terms of irritation of contaminated skin and eyes) during typical emergency response situations. This product is not flammable. This product is strong oxidizer. Contact with combustible materials, flammable materials or powdered metals can cause fire or explosion. Emergency responders must wear adequate personal protective equipment for the situations to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most serious health consequences reported for lithium compounds, such as Lithium Nitrate, are adverse effects on the central nervous system from over-exposures via ingestion. In terms of anticipated occupational over-exposure situations for employees, the main health effect from over-exposure would be irritation or burns of contaminated skin and eyes.

INHALATION: Inhalation of dusts or particulates of this product may irritate the eyes, nose, and respiratory system. Inhalation of relatively large doses of this product may produce symptoms similar to those described for other lithium compounds (i.e. ringing in the ears, nausea, vomiting, diarrhea, drowsiness, twitching and blurred vision).

CONTACT WITH SKIN or EYES: Over-exposure of the skin to this product can lead to itching, pain, and reddening. Prolonged or repeated skin exposures can lead to dermatitis (inflammation of the outer layer of the skin). This product can cause eye irritation, symptoms of such over-exposure would be pain and reddening of the eye tissue. Prolonged eye contact may result in damage to eye tissues.

SKIN ABSORPTION: Skin absorption is not a significant route of exposure for the components of this product.

INGESTION: Though not anticipated to occur during normal circumstances of occupational use, ingestion of large doses can impact the central nervous system, which can produce symptoms similar to those described for other lithium compounds. Such exposure symptoms can include "drunkenness" (i.e. drowsiness, stumbling, dizziness, personality change). Repeated ingestion of this product may cause also rash, ringing in the ears, nausea, vomiting, diarrhea, difficulty speaking, drowsiness, twitching, visual disturbances, nerve damage, and coma. Ingestion of relatively large quantities of this product can result in kidney damage. Additionally, this product may also irritate or burn the mouth, throat, esophagus, and other tissues of the gastro-intestinal tract.

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SECTION 3 HAZARDS IDENTIFICATION (Continued)

INJECTION: Over-exposure via injection of this product can lead to pain and irritation at the point of injection, additionally, symptoms such as those described for "Ingestion" may develop.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms.

ACUTE: In terms of occupational use situations, the chief health effect anticipated after over-exposure would be irritation of contaminated skin and eyes. In the event of prolonged over-exposures, burns may occur to contaminated tissues.

CHRONIC: Dermatitis (cracking and reddening of the skin) may develop after prolonged or repeated skin contact with this product. Long-term over-exposure via inhalation or ingestion can produce symptoms similar to those described for other lithium compounds (i.e. rash, ringing in the ears, nausea, vomiting, diarrhea, difficulty speaking, drowsiness, twitching, visual disturbances and coma). Additionally, long term over-exposures to this product by ingestion can cause metallic taste, hair loss, stomach pains, involuntary defecation and urination, headaches, bluish skin color, and brain damage. Refer to Section 11 (Toxicological Information) for additional information on this compound.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATING: Health Hazard = 2; Fire Hazard = 0; Reactivity Hazard Rating = 0; PPE Rating = C

SECTION 4 FIRST-AID MEASURES

SKIN EXPOSURE: If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victims must seek immediate medical attention.

EYE EXPOSURE: If this product contaminates 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. Victims must seek immediate medical attention.

INHALATION: If dusts or particulates of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, induce vomiting (only if victim is conscious and is not having convulsions). Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow.

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

SECTION 5 FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): Not flammable.

AUTOIGNITION TEMPERATURE, °C: Not applicable.

FLAMMABLE LIMITS (in air by volume): Not applicable

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

Water Spray: YES Carbon Dioxide: YES Foam: YES Dry Chemical: YES Halon: YES Other: Any "ABC" Class.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Lithium nitrate is a strong oxidizer. Contact with combustible materials, flammable materials, or powdered metals can cause fire or explosion. This product can react violently with shock, friction or heat. When involved in a fire, this material may decompose and produce irritating vapors and toxic gases (lithium compounds, oxides of nitrogen).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. If possible, fire-fighters should control run-off water to prevent environmental contamination.

NFPA RATING: Health Hazard = 2; Fire Hazard = 0; Reactivity Hazard Rating = 0. Special Hazard: OX.

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SECTION 6 ACCIDENTAL RELEASE MEASURES

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.

The minimum Personal Protective Equipment recommended for response to non-incident releases should be **Level C: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and air-purifying respiratory with high-efficiency particulate filter. Self-Contained Breathing Apparatus would be worn in situations where the oxygen level is below 19.5 % or is unknown.**

Sweep-up, or vacuum, spilled solid. Avoid the generation of dusts of this product. If necessary, rinse residue with water, and neutralize remaining material with a 5% sodium thiosulfate solution. Use Starch Iodide paper to confirm the area has been decontaminated thoroughly. Place all spill residue in a suitable container and seal. Dispose of in accordance with Federal, State, and local solid waste disposal regulations (see Section 13, Disposal Considerations).

SECTION 7 HANDLING AND STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash hands after handling this product. Do not eat, drink, or smoke while handling this product. Remove contaminated clothing immediately. Use ventilation and other engineering controls to minimize potential exposure to this product.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid breathing dusts or particulates generated by this product. Always use this product in well-ventilated areas. Ensure containers of this product are properly labeled. Open containers slowly, on a stable surface. Close containers tightly after use. Wash thoroughly after using this material.

Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity). Periodically inspect containers of this product for leaks or damage. Read instructions provided with the product prior to use. Empty containers may contain residual material; therefore, empty containers must be handled with care.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely, as applicable. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment using soapy water before maintenance begins. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation, to ensure exposures are below limits provided in Section 2 (Composition and Information on Ingredients). Mechanical exhaust may be needed. Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

RESPIRATORY PROTECTION: Respiratory protection is not generally needed when using this product. Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134, or applicable State regulations. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown.

EYE PROTECTION: Splash goggles or safety glasses.

HAND PROTECTION: Wear neoprene gloves for routine industrial use.

BODY PROTECTION: Use body protection appropriate for task (i.e. Apron or Tyvek suit).

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

VAPOR DENSITY: 2.4.

SPECIFIC GRAVITY: 1.6

SOLUBILITY IN WATER: 47.4% @ 28 °C.

VAPOR PRESSURE, mm Hg @ 20 °C: Not available.

ODOR THRESHOLD: Not applicable.

LOG of OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not available.

APPEARANCE AND COLOR: Colorless, odorless crystals, granules or powder.

HOW TO DETECT THIS SUBSTANCE (warning properties): The product does not have any unique warning properties.

EVAPORATION RATE (nBuAc=1): Not applicable.

FREEZING/MELTING POINT: 254 °C, (507 °F).

BOILING POINT: 600 °C, (1112 °F).

pH: 6-7 in solution.

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SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Thermal decomposition of the components of this product include nitrogen oxides and lithium compounds

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Lithium Nitrate is a strong oxidizer, contact with combustible materials, flammable materials, strong reducing agents, or powdered metals can cause fire or explosion.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid mixing this product with incompatible chemicals.

SECTION 11 TOXICOLOGICAL INFORMATION

TOXICITY DATA: Currently, there is no specific toxicological information available for Lithium Nitrate.

SUSPECTED CANCER AGENT: Lithium Nitrate is not found on the following lists: NTP, IARC, Federal OSHA, and CAL-OSHA, and therefore is not considered to be, nor suspected to be, a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: This product is expected to cause irritancy to the skin. Eye irritation can occur if this product gets into the eyes.

SENSITIZATION TO THE PRODUCT: Lithium Nitrate is not known to be a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components 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 produce teratogenic effects in humans.

Reproductive Toxicity: This product is not reported to produce adverse 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.*

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently there are no Biological Exposure Indices (BEIs) associated with Lithium Nitrate.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory, skin, central nervous system, and kidney conditions can be aggravated by over-exposure to this product. Persons with significant cardiovascular or renal disease, sodium and water imbalance, and pre-existing hypothyroidism may also be at increased risk. Tasks requiring alertness may be impaired.

RECOMMENDATIONS TO PHYSICIANS: Additional detailed toxicology information related to lithium salts, such as Lithium Nitrate, is presented in the sections below. This information is intended to give physicians additional background information in the event on ingestion over-exposures to this product

LITHIUM SALTS:

ACUTE EXPOSURE: Ingestion of a large dose of lithium salts may cause severe gastroenteritis and effects on the central nervous system, renal function and fluid and electrolyte balance. Symptoms, possibly delayed, may include nausea, vomiting, thirst, anorexia, diarrhea, blurred vision, drowsiness, weakness, tremor, staggering, bradycardia and coma. More unusual reactions may include delirium with EEG changes, action myoclonus, rhabdomyolysis, ECG changes, glycosuria, and allergic erythema. A painful discoloration of the fingers and toes and coldness of the extremities within 1 day of therapeutic use has been reported. In severe cases, death may occur due to renal failure or cardiac or pulmonary complications. Some survivors may have long-lasting or permanent sequelae, mostly of cerebellar nature but, sometimes with peripheral neuropathy or parkinsonism

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SECTION 11 TOXICOLOGICAL INFORMATION (Continued)

CHRONIC EXPOSURE: Repeated or prolonged ingestion of lithium salts may cause symptoms as detailed in acute ingestion. In addition, a metallic taste, dry mouth, excessive thirst, abdominal pain and incontinence of urine and feces may occur. Nervous system effects may include a dazed feeling, confusion, giddiness, mental lapses, dyspraxia, drowsiness, vertigo, headache, apathy, restlessness, anxiety, some suppression of the REM phases of sleep, positive Romberg sign, blackout spells, stupor, tinnitus, unconsciousness and coma. Neurologic asymmetry, psychomotor retardation, slurred speech, nystagmus, changes in the EEG and epileptiform seizures may occur. Pseudotumor cerebri (increased intracranial pressure and papilledema) has been reported and may possibly result in enlargement of the blind spot, constriction of visual fields and eventual blindness due to optic atrophy. Photophobia has been reported. Muscular effects may include tremors, ataxia, muscular and reflex hyperirritability with fasciculations, twitching and spastic or choreo-athetotic movements, cogwheel rigidity, parkinsonism and dystonia. Two cases involving severe generalized sensorimotor peripheral neuropathy have been reported. ECG changes, cardiac arrhythmias, hypotension, peripheral circulatory collapse, and interstitial myocarditis are possible. Leukocytosis is fairly common. Endocrine effects may include disturbed iodine metabolism, stimulation of antithyroidal auto-antibodies, hypothyroidism with myxedema, or rarely hyperthyroidism. Osteoporosis, an increase in serum total calcium, ionized calcium and parathyroid hormone and independently functioning parathyroid adenomas have been reported. Transitory nephrotic syndrome and acquired nephrogenic diabetes insipidus may occur. Transient hyperglycemia, lowered urinary concentrating ability leading to hyponatremia and hyperosmolality, sodium depletion, polyuria, glycosuria, oliguria, anuria, and azotemia are possible. Morphologic changes with glomerular and interstitial fibrosis and nephron atrophy have been reported. However, a causal relationship has not been established. Dermatologic effects may include cutaneous hyperalgesia or anesthesia, xerosis cutis, chronic folliculitis, generalized pruritus with or without rash, development or exacerbation of acne or psoriasis, cutaneous ulcers and alopecia. Hyper- or hypothermia, weight gain, edema of the ankles and wrists and sexual dysfunction have been reported. Death may occur due to renal failure, brain damage or pulmonary complications. Lithium readily crosses the placental barrier and is excreted in breast milk. The use of lithium during pregnancy has been associated with neonatal goiter, cardiac anomalies, especially Ebstein's, central nervous system depression and hypotonia. Marked functional and structural changes in the kidneys of newborn rats exposed to lithium via their mother's milk have been reported. Adverse effects on nidation in rats and embryo viability in mice have been attributed to lithium, as have teratogenicity in submammalian species and cleft palates in mice. However, studies in rats, rabbits and monkeys have shown no evidence of lithium-induced developmental defects. Leukemia has been reported during lithium treatment. However, an epidemiologic study involving a population of 173,000 persons yielded negative results.

NITRATES:

Nitrate causes methemoglobinemia. Methemoglobinemia, like carbon monoxide, interferes with the oxygenating capacity of the blood resulting in an under supply of oxygen to the tissues. In adults, cyanosis to lips and mucous membranes occurs at a level of 1.5 g/dL (10 percent saturation in an adult with normal hemoglobin levels). Levels between 30 percent and 50 percent saturation in adults produce depression of the cardiovascular and central nervous systems; levels between 50 percent and 70 percent cause stupor, convulsions and respiratory depression and levels above 70 percent are usually fatal. Because of increased requirement for oxygen in growing tissue and because of decreased blood volume in infants, they are much more sensitive to nitrate ion toxicity than adults. Infants have a lower activity of methemoglobin reductase and thus are more susceptible. Consequently adverse effects are seen at much lower levels in infants than in adults. Irreversible damage to organs such as the heart or brain, and the development of coronary artery disease or pulmonary disease are more likely to develop in infants because the anoxia caused by methemoglobinemia can occur more rapidly and have more devastating effects in growing tissue than in the "static" tissue of the adult body.

NOTE TO PHYSICIAN

ANTIDOTE: The following antidote has been recommended. However, the decision as to whether the severity of poisoning requires administration of any antidote and actual dose required should be made by qualified medical personnel.

NITRATE POISONING:

- 1) Emergency measures: Delay absorption of ingested nitrates by giving milk, water or activated charcoal and then remove by gastric lavage or emesis. Remove poison from skin by scrubbing with soap and water.
- 2) General Measures: Treat severe methemoglobinemia with dyspnea by methylene blue injection. (Dreisbach, Handbook of Poisoning).

LITHIUM/LITHIUM SALT POISONING:

- 1) In single ingestion episodes, give syrup of ipecac and/or perform gastric lavage if productive vomiting has not already occurred.
- 2) Fluid and electrolyte replacement for the correction of dehydration and acid-base imbalances. Overhydration may precipitate pulmonary edema.
- 3) Infusion of urea or mannitol, alkalinization of the urine and, aminophylline increase lithium excretion in patients with good renal function.
- 4) Extracorporeal or peritoneal hemodialysis to decrease lithium levels and control uremia in severe intoxications. If a massive overdose is known with certainty to have been ingested, it may be prudent to institute these measures even in the absence of positive clinical findings because of severe delayed toxicity.
- 5) Diazepam for the suppression of abnormal motor activity.
- 6) Support treatment for central nervous system depression.
- 7) Frequent electrocardiograms to assess cardiac status. (Gosselin, Smith, Hodge - Clinical Toxicology of Commercial Products, Fifth Edition).

Activated charcoal does not bind lithium effectively and is not useful in isolated lithium toxicity. (Groleau, Lithium Toxicity, Emergency Medicine Clinics of North America, Volume 12, Number 2, May, 1994).

Raising the sodium intake does not increase lithium clearance (Thomsen, K. Renal lithium elimination in man and active treatment of lithium poisoning. Acta Psychiatr. Scand., Suppl. No. 207:83-84, 1969).

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SECTION 12 ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this product are stable in the environment.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: The effects on exposed animals would be primarily irritation of contaminated tissue (see Section 11, Toxicological Information). The main effect on plants would be the increase in salinity of contaminated soils if large volumes of this product are released. As with all chemicals, work practices should be aimed at eliminating environmental releases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: Releases of large quantities of this product can be detrimental to an aquatic environment, by altering the salinity of a body of water. As with all chemicals, work practices should be aimed at eliminating environmental releases.

ACUTE AQUATIC TOXICITY: No data available.

DEGRADABILITY: No data available.

LOG BIOCONCENTRATION FACTOR (BCF): No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

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

EPA WASTE NUMBER: D001(Characteristic, ignitable waste), applicable to wastes consisting only of this product.

SECTION 14 TRANSPORT INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Lithium Nitrate

HAZARD CLASS NUMBER and DESCRIPTION: 5.1 (Oxidier)

UN IDENTIFICATION NUMBER: UN2722

PACKING GROUP: III

DOT LABEL(S) REQUIRED: Oxidizer

NORTH AMERICAN EMERGENCY RESPONSE GUIDE NUMBER (1996): 140.

QUANTITY LIMITATIONS: Passenger Aircraft = 25 kg; Cargo Aircraft =100 kg.

SPECIAL PROVISIONS: Single packagings are not permitted on passenger aircraft.

MARINE POLLUTANT: Lithium Nitrate is not designated as a Marine Pollutant by the DOT (per 49 CFR 172.101, Appendix B).

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

EMERGENCY RESPONSE CONTACT FOR AN INCIDENT DURING TRANSPORTATION:

CHEMTREC 1-800-424-9300 or 1-703-527-3887

SECTION 15 REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act as follows:

- CERCLA SECTION 103 (40 CFR 302.4): Yes (100 lbs.)
- SARA SECTION 302 (40 CFR 355.30): No
- SARA SECTION 304 (40 CFR 355.40): No
- SARA SECTION 313 (40 CFR 372.65): Yes (as Nitrate compounds)

SARA Threshold Planning Quantity: Not applicable.

TSCA INVENTORY STATUS: Lithium Nitrate is listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RO): Not applicable.

OTHER FEDERAL REGULATIONS: Not applicable.

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SECTION 15 REGULATORY INFORMATION (Continued)

STATE REGULATORY INFORMATION: This product is covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No	New Jersey - Right to Know Hazardous Substance List: Lithium Nitrate.
California - Permissible Exposure Limits for Chemical Contaminants: No.	North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Florida - Substance List: No	Pennsylvania - Hazardous Substance List: No
Illinois - Toxic Substance List: No.	Rhode Island - Hazardous Substance List: No.
Kansas - Section 302/313 List: No	Texas - Hazardous Substance List: No
Massachusetts - Substance List: No.	West Virginia - Hazardous Substance List: No.
Minnesota - List of Hazardous Substances: No	Wisconsin - Toxic and Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.	

CALIFORNIA PROPOSITION 65: The components of this product are not on the California Proposition 65 lists.

LABELING (Precautionary Statements): **DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CAUSES SKIN AND EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED. CAN CAUSE CENTRAL NERVOUS SYSTEM EFFECTS AND KIDNEY DAMAGE.** Keep from contact with clothing and other combustible materials. Avoid contact with skin, eyes, and clothing. Use in well-ventilated area. Wash thoroughly after handling. Store in tightly closed container. Wear gloves, goggles, and appropriate body protection. **FIRST-AID:** In case of skin or eye contact, flush skin with water for 15 minutes. Remove contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If ingested, do not induce vomiting. Seek medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Sweep-up or vacuum spilled material. Place in a suitable container. Consult Material Safety Data Sheet before use.

TARGET ORGANS: Eyes, skin, (via inhalation or ingestion: central nervous system, kidneys).

WHMIS SYMBOLS: C (Oxidizer); D2B (Other Toxic Effects). See Section 16, Other Information.

SECTION 16 OTHER INFORMATION

REVISIONS - Corporation name change, Section 14

The information in this Material Safety Data Sheet is based on data that Chemetall Foote Corporation believes to be reliable as of the MSDS's date of revision. Chemetall Foote Corporation makes no warranty or representation of any kind that the MSDS does not contain errors. The data in this MSDS relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside the control of Chemetall Foote Corporation, there are no warranties, expressed or implied, and Chemetall Foote Corporation assumes no liability in connection with the use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe on any patents. Any use of these data and information must be determined by the user to be in accordance with Federal, State and local laws and regulations.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302

DEFINITIONS OF TERMS

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

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

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**. Skin adsorption 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.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). **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.

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SECTION 16 OTHER INFORMATION (Continued)

TOXICOLOGICAL INFORMATION:




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: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - 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/m³** 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. Data from several sources are used to evaluate the cancer-causing potential of the material. 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 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 death. **BEI** - 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.

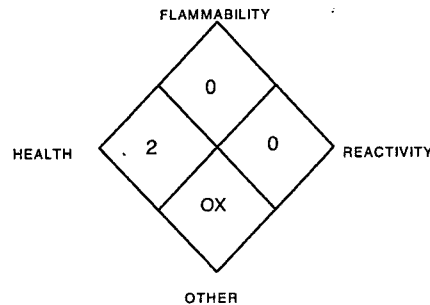
REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and Transport Canada, respectively. The following laws are pertinent to the information presented in the MSDS: **Superfund Amendments and Reauthorization Act (SARA)**; the **Toxic Substance Control Act (TSCA)**; Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)**. This section also includes information on the precautionary warnings which appear on the materials package label.

GRAPHICAL REPRESENTATION OF HAZARDS

HAZARDOUS MATERIAL INFORMATION SYSTEM RATING NATIONAL FIRE PROTECTION SYSTEM RATING

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	2
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			C
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		
For routine industrial applications			



WHMIS SYMBOL

