

SAFETY DATA SHEET

Lith**Li₂CO₃**
LITHIUM FLUORIDE

ASG Chemical Holdings, LLC. (ASG Chemie)

Chemwatch: 13598 • Version No: 4.1

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 27/06/2017

Print Date: 07/03/2022

S.GHS.USA.EN

SECTION 1. Identification**Product Identifier**

Product name	LITHIUM FLUORIDE
Chemical Name	lithium fluoride
Synonyms	LiF; soldering and welding flux
Proper shipping name	Toxic solid, inorganic, n.o.s. (contains lithium fluoride)
Chemical formula	FLi
Other means of identification	Not Available
CAS number	7789-24-4

Recommended use of the chemical and restrictions on use

Relevant identified uses	As flux for soldering and welding aluminium, in the manufacture of vitreous enamels and glazes. Lithium fluoride prisms are used in infra-red spectrophotometers.
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Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	ASG Chemical Holdings (ASG Chemie)
Address	2603 NW 13th St. Florida 32609 United States
Telephone	+1 (833) ASG.CHEM (833.274-2436)
Fax	+1 352.430.7442
Website	www.asgchemie.com
Email	compliance@asgchemie.com

Emergency phone number

Association / Organisation	ASG CHEMICAL HOLDINGS, LLC
Emergency telephone numbers	+1 833.274.2436
Other emergency telephone numbers	+1904.347.1807

*Once connected and if the message is not in your preferred language then please dial 01
Una vez conectado y si el mensaje no está en su idioma preferido, por favor marque 02*

SECTION 2. Hazard(s) identification

Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification Acute Toxicity (Oral) Category 3, Acute Toxicity (Dermal) Category 3, Acute Toxicity (Inhalation) Category 3, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3

Label elements

Hazard pictogram(s)



Signal word

Danger**Hazard statement(s)**

H301 Toxic if swallowed.
 H311 Toxic in contact with skin.
 H331 Toxic if inhaled.
 H315 Causes skin irritation.
 H319 Causes serious eye irritation.
 H335 May cause respiratory irritation.

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

P264 Wash all exposed external body areas thoroughly after handling.
 P270 Do not eat, drink or smoke when using this product.
 P271 Use only outdoors or in a well-ventilated area.
 P280 Wear protective gloves, protective clothing, eye protection and face protection.
 P261 Avoid breathing dust/fumes.

Precautionary statement(s) Response

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
 P330 Rinse mouth.
 P302+P352 IF ON SKIN: Wash with plenty of water and soap.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P311 Call a POISON CENTER/doctor/physician/first aider.
 P312 Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
 P337+P313 If eye irritation persists: Get medical advice/attention.
 P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
 P332+P313 If skin irritation occurs: Get medical advice/attention.
 P362+P364 Take off contaminated clothing and wash it before reuse.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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SECTION 3. Composition / information on ingredients**Substances**

CAS No	%[weight]	Name
7789-24-4	>=98	lithium fluoride

Mixtures

See section above for composition of Substances

SECTION 4. First-aid measures

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> • Immediately hold eyelids apart and flush the eye continuously with running water. • Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. • Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. • Transport to hospital or doctor without delay. • Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> • Quickly but gently, wipe material off skin with a dry, clean cloth. • Immediately remove all contaminated clothing, including footwear. • Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. • Transport to hospital, or doctor.
Inhalation	<ul style="list-style-type: none"> • If fumes or combustion products are inhaled remove from contaminated area. • Lay patient down. Keep warm and rested. • Prosthesis such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. • Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. • Transport to hospital, or doctor, without delay
Ingestion	<ul style="list-style-type: none"> • Give a slurry of activated charcoal in water to drink. NEVER GIVE AN UNCONSCIOUS PATIENT WATER TO DRINK. • At least 3 tablespoons in a glass of water should be given. • Although induction of vomiting may be recommended (IN CONSCIOUS PERSONS ONLY), such a first aid measure is dissuaded due to the risk of aspiration of stomach contents. (i) It is better to take the patient to a doctor who can decide on the necessity and method of emptying the stomach. (ii) Special circumstances may however exist; these include non-availability of charcoal and the ready availability of the doctor. <p>NOTE: If vomiting is induced, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</p> <p>NOTE: Wear protective gloves when inducing vomiting.</p> <ul style="list-style-type: none"> • REFER FOR MEDICAL ATTENTION WITHOUT DELAY. • In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. • If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. • If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. (ICSC20305/20307)

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposures to fluorides:

- Fluoride absorption from gastro-intestinal tract may be retarded by calcium salts, milk or antacids.
- Fluoride particulates or fume may be absorbed through the respiratory tract with 20-30% deposited at alveolar level.
- Peak serum levels are reached 30 mins. post-exposure; 50% appears in the urine within 24 hours.
- For acute poisoning (endotracheal intubation if inadequate tidal volume), monitor breathing and evaluate/monitor blood pressure and pulse frequently since shock may supervene with little warning. Monitor ECG immediately; watch for arrhythmias and evidence of Q-T prolongation or T-wave changes. Maintain monitor. Treat shock vigorously with isotonic saline (in 5% glucose) to restore blood volume and enhance renal excretion.
- Where evidence of hypocalcaemic or normocalcaemic tetany exists, calcium gluconate (10 ml of a 10% solution) is injected to avoid tachycardia.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Fluorides in urine	3 mg/gm creatinine	Prior to shift	B, NS
	10mg/gm creatinine	End of shift	B, NS

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other exposures.

Clinical effects of lithium intoxication appear to relate to duration of exposure as well as to level.

- Lithium produces a generalised slowing of the electroencephalogram; the anion gap may increase in severe cases.
- Emesis (or lavage if the patient is obtunded or convulsing) is indicated for ingestions exceeding 40 mg (Li)/Kg.
- Overdose may delay absorption; decontamination measures may be more effective several hours after cathartics.
- Charcoal is not useful. No clinical data are available to guide the administration of catharsis.
- Haemodialysis significantly increases lithium clearance; indications for haemodialysis include patients with serum levels above 4 meq/L.
- There are no antidotes.

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5. Fire-fighting measures

Extinguishing media	<ul style="list-style-type: none"> • Water spray or fog. • Foam. • Dry chemical powder. • BCF (where regulations permit).
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Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Special protective equipment and precautions for fire-fighters

Fire Fighting	<ul style="list-style-type: none"> • Alert Fire Brigade and tell them location and nature of hazard. • Wear full body protective clothing with breathing apparatus. • Prevent, by any means available, spillage from entering drains or water course. • Use fire fighting procedures suitable for surrounding area.
Fire/Explosion Hazard	<ul style="list-style-type: none"> • Non combustible. • Not considered a significant fire risk, however containers may burn. Decomposition may produce toxic fumes of: hydrogen fluoride metal oxides May emit poisonous fumes.

SECTION 6. Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

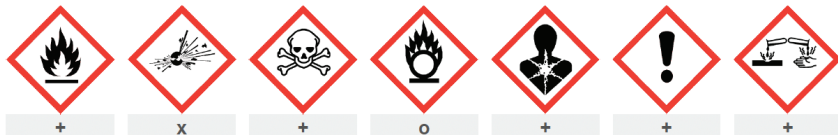
Minor Spills	<ul style="list-style-type: none"> • Clean up waste regularly and abnormal spills immediately. • Avoid breathing dust and contact with skin and eyes. • Wear protective clothing, gloves, safety glasses and dust respirator. • Use dry clean up procedures and avoid generating dust.
Major Spills	<ul style="list-style-type: none"> • Clear area of personnel and move upwind. • Alert Fire Brigade and tell them location and nature of hazard. • Wear full body protective clothing with breathing apparatus. • Prevent, by any means available, spillage from entering drains or water course.

SECTION 7. Handling and storage**Precautions for safe handling**

Safe handling	<ul style="list-style-type: none"> • Avoid all personal contact, including inhalation. • Wear protective clothing when risk of exposure occurs. • Use in a well-ventilated area. • Prevent concentration in hollows and sumps.
Other information	<ul style="list-style-type: none"> • Store in original containers. • Keep containers securely sealed. • Store in a cool, dry, well-ventilated area. • Store away from incompatible materials and foodstuff containers.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> • Lined metal can, lined metal pail/ can. • Plastic pail. • Polyliner drum. • Packing as recommended by manufacturer. <p>For low viscosity materials</p> <ul style="list-style-type: none"> • Drums and jerricans must be of the non-removable head type. • Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> • Removable head packaging; • Cans with friction closures and low pressure tubes and cartridges may be used.
Storage incompatibility	<ul style="list-style-type: none"> • Avoid strong acids, acid chlorides, acid anhydrides and chloroformates. <p>Salts of inorganic fluoride:</p> <ul style="list-style-type: none"> • react with water forming acidic solutions. • are violent reactive with boron, bromine pentafluoride, bromine trifluoride, calcium disilicide, calcium hydride, oxygen difluoride, platinum, potassium. • in aqueous solutions are incompatible with sulfuric acid, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, isocyanates, nitromethane, organic anhydrides, vinyl acetate. • corrode metals in presence of moisture • may be incompatible with glass and porcelain • Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride. • These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. • The state of subdivision may affect the results.



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8. Exposure controls / personal protection**Control parameters****Occupational Exposure Limits (OEL)**

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Limits (PELs) Table Z-3	lithium fluoride	Inert or Nuisance Dust: Respirable fraction	5 mg/m ³ / 15 mppcf	NA	NA	NA
S OSHA Permissible Exposure Limits (PELs) Table Z-3	lithium fluoride	Inert or Nuisance Dust: Total Dust	15 mg/m ³ / 50 mppcf	NA	NA	NA
S OSHA Permissible Exposure Limits (PELs) Table Z-1	lithium fluoride	Particulates Not Otherwise Regulated (PNOR)-Respirable fraction	5 mg/m ³	NA	NA	NA
S OSHA Permissible Exposure Limits (PELs) Table Z-1	lithium fluoride	Fluorides (as F)	2.5 mg/m ³	NA	NA	NA
S OSHA Permissible Exposure Limits (PELs) Table Z-1	lithium fluoride	Particulates Not Otherwise Regulated (PNOR)-Total dust	15 mg/m ³	NA	NA	NA
S OSHA Permissible Exposure Limits (PELs) Table Z-2	lithium fluoride	Fluoride as dust	2.5 mg/m ³	NA	NA	(Z37.28-1969)
US NIOSH Recommended Exposure Limits (RELs)	lithium fluoride	Particulates not otherwise regulated	NA	NA	NA	See Appendix D
US ACGIH Threshold Limit Values (TLV)	lithium fluoride	Fluorides, as F	2.5 mg/m ³ / 50 mppcf	NA	NA	A4; BEI

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
lithium fluoride	10 mg/m ³	110 mg/m ³	680 mg/m ³
Ingredient	Original IDLH	Revised IDLH	
lithium fluoride	Not Available	Not Available	

Exposure controls**Appropriate engineering controls**

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Personal protection**Eye and face protection**

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.

Skin protection

See Hand protection below

Hands/feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber
- The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> • Overalls. • Eyewash unit. • Barrier cream. • Skin cleansing cream.
Respiratory protection	<ul style="list-style-type: none"> • Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures. • The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option). • Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended. • Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program. • Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU) • Use approved positive flow mask if significant quantities of dust becomes airborne. • Try to avoid creating dust conditions.

SECTION 9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance	White fluffy powder; does not mix well with water (0.13g/100ml).		
Physical state	Divided Solid	Relative density (Water = 1)	2.64
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Applicable
pH (as supplied)	Not Applicable	Decomposition temperature (°C)	1300
Melting point / freezing point (°C)	848	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	1681	Molecular weight (g/mol)	25.94
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Applicable	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	Negligible
Vapour pressure (kPa)	Negligible	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Applicable	VOC g/L	Not Available

SECTION 10. Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> Unstable in the presence of incompatible materials. Product is considered stable. Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11. Toxicological information**Information on toxicological effects**

Inhaled	<p>Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects. The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.</p> <p>Effects on lungs are significantly enhanced in the presence of respirable particles.</p> <p>Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort. A single acute over-exposure may even cause nose bleed.</p> <p>Severe inhalation exposure may result in tremors, convulsions, collapse, respiratory and cardiac failure even death.</p>	
Ingestion	<p>Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>Lithium, in large doses, can cause dizziness and weakness. If a low salt diet is in place, kidney damage can result. Fluoride causes severe loss of calcium in the blood, with symptoms appearing several hours later including painful and rigid muscle contractions of the limbs. Cardiovascular collapse can occur and may cause death with increased heart rate and other heart rhythm irregularities. Contact with acids liberates very toxic gases.</p>	
Skin Contact	<p>Skin contact with the material may produce toxic effects; systemic effects may result following absorption.</p> <p>This material can cause inflammation of the skin on contact in some persons.</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction. Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. Dusts may be corrosive leaving large boil-like open sores.</p>	
Eye	This material can cause eye irritation and damage in some persons.	
Chronic	<p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>Lithium compounds can affect the nervous system and muscle. This can cause tremor, inco-ordination, spastic jerks and very brisk reflexes.</p> <p>Overexposure to the breathable dust may cause coughing, wheezing, difficulty in breathing and impaired lung function. Chronic symptoms may include decreased vital lung capacity and chest infections. Repeated exposures in the workplace to high levels of fine-divided dusts may produce a condition known as pneumoconiosis, which is the lodgement of any inhaled dusts in the lung, irrespective of the effect. This is particularly true when a significant number of particles less than 0.5 microns (1/50000 inch) are present.</p> <p>Extended exposure to inorganic fluorides causes fluorosis, which includes signs of joint pain and stiffness, tooth discolouration, nausea and vomiting, loss of appetite, diarrhoea or constipation, weight loss, anaemia, weakness and general unwellness. There may also be frequent urination and thirst.</p>	
Lithium Fluoride	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg[1]	Eye: adverse effect observed (irritating)[1]
	Inhalation(Rat) LC50; >5.57 mg/l4h[1]	Skin: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50; 143 mg/kg[2]	

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

Lithium Fluoride

Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.

Acute Toxicity	✓	Carcinogenicity	✗
Skin Irritation/Corrosion	✓	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ -Data either not available or does not fill the criteria for classification

✓ -Data available to make classification

SECTION 12. Ecological information**Toxicity**

Lithium Fluoride	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	504h	Crustacea	>1.7mg/l	2
	LC50	96h	Fish	51mg/l	2
	EC50	72h	Algae or other aquatic plants	112mg/l	2
	EC50	48h	Crustacea	97mg/l	2
	EC50	96h	Algae or other aquatic plants	43mg/l	2

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

For Fluorides: Small amounts of fluoride have beneficial effects however; excessive intake over long periods may cause dental and/or skeletal fluorosis. Fluorides are absorbed by humans following inhalation of workplace and ambient air that has been contaminated, ingestion of drinking water and foods and dermal contact. Populations living in areas with high fluoride levels in groundwater may be exposed to higher levels of fluorides in their drinking water or in beverages prepared with the water. Among these populations, outdoor labourers, people living in hot climates, and people with excessive thirst will generally have the greatest daily intake of fluorides because they consume greater amounts of water.

For lithium (Anion): Environmental Fate: Lithium hypochlorite is an algaecide, disinfectant, fungicide and food contact surface sanitizer. Its primary use is as a pesticide to control algae, bacteria and mildew in swimming pool water systems, hot tubs and spas. Lithium is an element that occurs naturally at low levels in food and drinking water. Compounds of lithium that would most likely enter freshwater environments are from mining, refining, and fabrication.

DO NOT discharge into sewer or waterways

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
lithium fluoride	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
lithium fluoride	LOW (LogKOW = -0.7741)

Mobility in soil

Ingredient	Mobility
lithium fluoride	LOW (KOC = 14.3)

SECTION 13. Disposal considerations**Waste treatment methods**

Product / Packaging disposal

- Containers may still present a chemical hazard/ danger when empty.
 - Return to supplier for reuse/ recycling if possible.
- Otherwise:
- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
 - Where possible retain label warnings and SDS and observe all notices pertaining to the product.
- Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
- A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction
 - Reuse
 - Recycling
 - Disposal (if all else fails)
- This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.
- DO NOT allow wash water from cleaning or process equipment to enter drains.**
- It may be necessary to collect all wash water for treatment before disposal.
 - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
 - Where in doubt contact the responsible authority.
- For small quantities:
- Cautiously dissolve in water
 - Neutralise with sodium carbonate or if product does not dissolve completely add a small quantity of hydrochloric acid followed by sodium carbonate
 - Add excess calcium chloride to precipitate the fluoride and/ or carbonate
 - Remove solids to site approved for hazardous waste
 - Recycle wherever possible or consult manufacturer for recycling options.
 - Consult State Land Waste Management Authority for disposal.
 - Bury residue in an authorised landfill.
 - Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14. Transport information**Labels Required****Marine Pollutant**

NO

Shipping container and transport vehicle placarding and labeling may vary from the below information. Products that are regulated for transport will be packaged and marked as Dangerous Goods in Limited Quantities according to US DOT, IATA and IMDG regulations. In case of reshipment, it is the responsibility of the shipper to determine the appropriate labels and markings in accordance with applicable transport regulations.

Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Land transport (DOT)

UN number 3288

UN proper shipping name Toxic solid, inorganic, n.o.s. (contains lithium fluoride)

Transport hazard class(es)

Class	6.1
Subrisk	Not Applicable

Packing group III

Environmental hazard Not Available

Special precautions for user

Hazard Label	6.1
Special provisions	IB8, IP3, T1, TP33

Air transport (ICAO-IATA / DGR)

UN number	3288						
UN proper shipping name	Toxic solid, inorganic, n.o.s. (contains lithium fluoride)						
Transport hazard class(es)	<table border="1"> <tr> <td>ICAO/IATA Class</td> <td>6.1</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>6L</td> </tr> </table>	ICAO/IATA Class	6.1	ICAO / IATA Subrisk	Not Applicable	ERG Code	6L
ICAO/IATA Class	6.1						
ICAO / IATA Subrisk	Not Applicable						
ERG Code	6L						
Packing group	III						
Environmental hazard	Not Applicable						
Special provisions	A3 A5						
Cargo Only Packing Instructions	677						
Cargo Only Maximum Qty / Pack	200 kg						
Passenger and Cargo Packing Instructions	670						
Passenger and Cargo Maximum Qty / Pack	100 kg						
Passenger and Cargo Limited Quantity Packing Instructions	Y645						
Passenger and Cargo Limited Maximum Qty / Pack	10 kg						

Sea transport (IMDG-Code / GGVSee)

UN number	3288						
UN proper shipping name	Toxic solid, inorganic, n.o.s. (contains lithium fluoride)						
Transport hazard class(es)	<table border="1"> <tr> <td>IMDG Class</td> <td>6.1</td> </tr> <tr> <td>IMDG Subrisk</td> <td>Not Applicable</td> </tr> </table>	IMDG Class	6.1	IMDG Subrisk	Not Applicable		
IMDG Class	6.1						
IMDG Subrisk	Not Applicable						
Packing group	III						
Environmental hazard	Not Applicable						
Special precautions for user	<table border="1"> <tr> <td>EMS Number</td> <td>F-A, S-A</td> </tr> <tr> <td>Special provisions</td> <td>223 274</td> </tr> <tr> <td>Limited Quantities</td> <td>5 kg</td> </tr> </table>	EMS Number	F-A, S-A	Special provisions	223 274	Limited Quantities	5 kg
EMS Number	F-A, S-A						
Special provisions	223 274						
Limited Quantities	5 kg						

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
lithium fluoride	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
lithium fluoride	Not Available

SECTION 15. Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****lithium fluoride is found on the following regulatory lists**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
 US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens
 US DOE Temporary Emergency Exposure Limits (TEELs)
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Limits (PELs) Table Z-1
 US OSHA Permissible Exposure Limits (PELs) Table Z-2
 US OSHA Permissible Exposure Limits (PELs) Table Z-3
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
 US TSCA Chemical Substance Inventory - Interim List of Active Substances

Federal Regulations**Superfund Amendments and Reauthorization Act of 1986 (SARA)****Section 311/312 hazard categories**

Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	Yes
Reproductive toxicity	No
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

None Reported

State Regulations**US. California Proposition 65**

None Reported

National Inventory Status

National Inventory	Status
Australia - AHC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (lithium fluoride)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
<i>Legend:</i>	<i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration)</i>

SECTION 16. Other information

Revision Date	27/06/2017
Initial Date	Not Available
SDS Version Summary	Version 3.1 Date of Update 12/05/2005 Sections Updated Classification, Physical Properties

Other information Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC-TWA:	Permissible Concentration-Time Weighted Average
PC-STEL:	Permissible Concentration-Short Term Exposure Limit
IARC:	International Agency for Research on Cancer
ACGIH:	American Conference of Governmental Industrial Hygienists
STEL:	Short Term Exposure Limit
TEEL:	Temporary Emergency Exposure Limit
IDLH:	Immediately Dangerous to Life or Health Concentrations
ES:	Exposure Standard
OSF:	Odour Safety Factor
NOAEL :	No Observed Adverse Effect Level
LOAEL:	Lowest Observed Adverse Effect Level
TLV:	Threshold Limit Value
LOD:	Limit Of Detection
OTV:	Odour Threshold Value
BCF:	BioConcentration Factors
BEI:	Biological Exposure Index
AIIC:	Australian Inventory of Industrial Chemicals
DSL:	Domestic Substances List
NDSL:	Non-Domestic Substances List
IECSC:	Inventory of Existing Chemical Substance in China
EINECS:	European Inventory of Existing Commercial chemical Substances
ELINCS:	European List of Notified Chemical Substances
NLP:	No-Longer Polymers
ENCs:	Existing and New Chemical Substances Inventory
KECI:	Korea Existing Chemicals Inventory
NZIoC:	New Zealand Inventory of Chemicals
PICCS:	Philippine Inventory of Chemicals and Chemical Substances
TSCA:	Toxic Substances Control Act
TCSI:	Taiwan Chemical Substance Inventory
INSQ:	Inventario Nacional de Sustancias Químicas
NCI:	National Chemical Inventory
FBEPH:	Russian Register of Potentially Hazardous Chemical and Biological Substances

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