Material Safety Data Sheet
According to OSHA and ANSI

1 Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: Lithium fluoride

Stock number: 14463
CAS Number: 7789-24-4
EINECS Number: 232-152-0

2 Hazards identification

Classification of the substance or mixture

GHS06 Skull and crossbones

H301 Toxic if swallowed.

GHS07

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

T; Toxic

R25: Toxic if swallowed.

Xi; Irritant

R36/37/38: Irritating to eyes, respiratory system and skin.

Label elements

Labelling according to EU guidelines:

Code letter and hazard designation of product:
T Toxic

Risk phrases:
25 Toxic if swallowed.
36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37 Wear suitable protective clothing and gloves.
45 In case of accident or if you feel unwell, seek medical advice immediately.

Hazard description:

WHMIS classification

USA
Material Safety Data Sheet
According to OSHA and ANSI

Product name: Lithium fluoride

Classification system
HMIS ratings (scale 0-4) (Hazardous Materials Identification System)

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Health (acute effects) = 2
Flammability = 0
Reactivity = 1

Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients
Chemical characterization: Substances
(CAS#) Description:
Lithium fluoride (CAS# 7789-24-4): 100%
Identification number(s):
EINECS Number: 232-152-0

4 First aid measures
Description of first aid measures
General information
Immediately remove any clothing soiled by the product.
In case of irregular breathing or respiratory arrest provide artificial respiration.
After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing
Do not induce vomiting; immediately call for medical help.
Seek immediate medical advice.

5 Firefighting measures
Extinguishing media
Suitable extinguishing agents
Product is not flammable. Use fire fighting measures that suit the surrounding fire.
Special hazards arising from the substance or mixture
In case of fire, the following can be released:
Lithium oxide
Hydrogen fluoride (HF)
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures
Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Environmental precautions:
Do not allow material to be released to the environment without proper governmental permits.
Methods and material for containment and cleaning up:
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
7 Handling and storage

Handling
Precautions for safe handling
- Keep container tightly sealed.
- Store in cool, dry place in tightly closed containers.
- Ensure good ventilation at the workplace.

Information about protection against explosions and fires: The product is not flammable

Conditions for safe storage, including any incompatibilities

Storage
Requirements to be met by storerooms and receptacles:
- Unsuitable material for container: ceramic, glass

Information about storage in one common storage facility:
- Do not store together with acids.

Further information about storage conditions:
- Keep container tightly sealed.
- Store in cool, dry conditions in well sealed containers.

8 Exposure controls/personal protection

Additional information about design of technical systems:
- Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Fluorides (as F)</th>
<th>mg/m3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>2.5</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>2.5</td>
</tr>
<tr>
<td>Belgium TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>Finland TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>France TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>Germany MAK</td>
<td>2.5</td>
</tr>
<tr>
<td>Hungary TWA</td>
<td>1; 2-STEL</td>
</tr>
<tr>
<td>Netherlands MAC-K</td>
<td>3.5</td>
</tr>
<tr>
<td>Norway TWA</td>
<td>0.6</td>
</tr>
<tr>
<td>Poland TWA</td>
<td>1; 3-STEL</td>
</tr>
<tr>
<td>Sweden NGV</td>
<td>2</td>
</tr>
<tr>
<td>Switzerland MAK-W</td>
<td>1.5; 3-KZG-W</td>
</tr>
<tr>
<td>United Kingdom TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>Russia TWA</td>
<td>2</td>
</tr>
<tr>
<td>Denmark TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>USA PEL</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures
- The usual precautionary measures for handling chemicals should be followed.
- Keep away from foodstuffs, beverages and feed.
- Remove all soiled and contaminated clothing immediately.
- Wash hands before breaks and at the end of work.
- Avoid contact with the eyes and skin.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:
- Impervious gloves
- Check protective gloves prior to each use for their proper condition.

Material of gloves
- The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:
- Form: Powder
- Color: White
- Odor: Odorless

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### 10 Stability and reactivity

**Reactivity**

**Chemical stability**
- Thermal decomposition / conditions to be avoided:
  - Decomposition will not occur if used and stored according to specifications.
- Possibility of hazardous reactions
  - Reacts with strong mineral acids forming hydrogen fluoride
- Incompatible materials: Acids
- Hazardous decomposition products:
  - Lithium oxide
  - Hydrogen fluoride

### 11 Toxicological information

**Information on toxicological effects**

**Acute toxicity:**

<table>
<thead>
<tr>
<th>LD/LEC50 values that are relevant for classification:</th>
<th>Oral</th>
<th>LDB0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>119 mg/kg (mouse)</td>
<td>143 mg/kg (rat)</td>
</tr>
</tbody>
</table>

**Primary irritant effect:**
- on the skin: Irritant to skin and mucous membranes.
- on the eye: Irritating effect.

**Sensitization:** No sensitizing effects known.

**Subacute to chronic toxicity:**
- Large amounts of lithium compounds may cause vomiting, diarrhea, ataxia, intestinal irritation, kidney injury, central nervous system depression and a drop in blood pressure.
- Central nervous system effects may include slurred speech, blurred vision, dizziness, sensory loss, convulsions and stupor. Chronic intake may cause neuromuscular effects such as tremor, ataxia, weakness, clonus and hyperactive reflexes. Lithium can cause kidney damage, gastrointestinal disturbances, fatigue, dehydration, weight loss, dermatological effects and thyroid damage. Lithium ion has shown teratogenic effects in rats and mice.
Fluorides may cause salivation, nausea, vomiting, diarrhea and abdominal pain, followed by weakness, tremors, shallow respiration, convulsions and coma. May cause brain and kidney damage. Chronic fluoride poisoning can cause severe bone changes, loss of weight, anorexia, anemia and dental defects.

Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
- Kidney, Ureter, Bladder - urine volume increased.
- Kidney, Ureter, Bladder - proteinuria.
- Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information

Toxicity
Acquatic toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.

Behavior in environmental systems:
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.

Additional ecological information:
General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation: Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

DOT regulations:

Hazard class: 6.1
Identification number: UN3288
Packing group: III
Proper shipping name (technical name): TOXIC SOLID, INORGANIC, N.O.S.
Label 6.1

Land transport ADR/RID (cross-border):

ADR/RID class: 6.1 (T5) Toxic substances
Danger code (Kemler): 60
UN-Number: 3288
Packaging group: III

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Material Safety Data Sheet

According to OSHA and ANSI

Product name: Lithium fluoride

UN proper shipping name: 3288 TOXIC SOLID, INORGANIC, N.O.S.

Maritime transport IMDG:
- IMDG Class: 6.1
- UN Number: 3288
- Label: 6.1
- Packaging group: III
- Marine pollutant: No
- Proper shipping name: TOXIC SOLID, INORGANIC, N.O.S.

Air transport ICAO-TI and IATA-DGR:
- ICAO/IATA Class: 6.1
- UN/ID Number: 3288
- Label: 6.1
- Packaging group: III
- Proper shipping name: TOXIC SOLID, INORGANIC, N.O.S.

UN "Model Regulation": UN3288, TOXIC SOLID, INORGANIC, N.O.S., 6.1, III

Special precautions for user Warning: Toxic substances
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Product related hazard informations:
- Hazard symbols:
  - T Toxic
- Risk phrases:
  - 25 Toxic if swallowed.
  - 36/37/38 Irritating to eyes, respiratory system and skin.
- Safety phrases:
  - 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
  - 36/37 Wear suitable protective clothing and gloves.
  - 45 In case of accident or if you feel unwell, seek medical advice immediately.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
Information about limitation of use: For use only by technically qualified individuals.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact:
Zachariah C. Holt
Global EHS Manager

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
Product name: Lithium fluoride