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

1.1 Product identifier
Trade name Lithium fluoride

Stock number: A11632, L15085
CAS Number: 7789-24-4
EC number: 232-152-0

1.2 Relevant identified uses of the substance or mixture and uses advised against.
Identified use: SU24 Scientific research and development

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier: Thermo Fisher (Kandel) GmbH
Zeppelinstr. 7b
76185 Karlsruhe / Germany
Tel: +49 (0) 721 84007 280
Fax: +49 (0) 721 84007 300
Email: tech@alfa.com
www.alfa.com
Informing department: Product safety Tel + +049 (0) 7275 988687-0

1.4 Emergency telephone number:
Carechem 24: +44 (o) 1235 239 670 (Multi-language emergency number)
Poison Information Center Mainz
www.giftinfo.uni-mainz.de Telephone: +49(0)6131/19240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
GHS06 skull and crossbones
Acute Tox. 3 H301 Toxic if swallowed.

GHS07
Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2 H319 Causes serious eye irritation.
STOT SE 3 H335 May cause respiratory irritation.

Other hazards that do not result in classification No information known.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labelled according to the CLP regulation.

Hazard pictograms

GHS06
Signal word Danger
Hazard statements
H301 Toxic if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statements
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P260 Wear protective gloves/protective clothing/eye protection/face protection.
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 victim to fresh air and keep at rest in a position comfortable for breathing.
P362 Take off contaminated clothing and wash before reuse.
P321 Specific treatment (see on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

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

SECTION 3: Composition/information on ingredients

3.1 Substances
CAS# Designation: 7789-24-4 Lithium fluoride
Identification number(s): EC number: 232-152-0

SECTION 4: First aid measures

4.1 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. Consult doctor if symptoms persist.
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 doctor.

After swallowing
Do not induce vomiting; instantly call for medical help.

4.2 Most important symptoms and effects, both acute and delayed
Causes skin irritation.
Causes serious eye irritation. Toxic if swallowed. May cause respiratory irritation.

4.3 Indication of any immediate medical attention and special treatment needed No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents Product is not flammable. Use fire-fighting measures that suit the surrounding fire.

5.2 Special hazards arising from the substance or mixture
If this product is involved in a fire, the following can be released:
Hydrogen fluoride (HF)
Lithium oxide

5.3 Advice for firefighters
Protective equipment:
Wear self-contained breathing apparatus.
Wear full protective suit.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.

6.2 Environmental precautions: Do not allow product to reach sewage system or water bodies.

6.3 Methods and material for containment and cleaning up:
Dislodge contaminated material as waste according to section 13.
Ensure adequate ventilation.

Prevention of secondary hazards: No special measures required.

6.4 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 information on disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Keep containers tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure adequate ventilation.

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

7.2 Conditions for safe storage, including any incompatibilities
Storage Requirements to be met by storerooms and containers: No special requirements.

Information about storage in one common storage facility: Store away from oxidising agents.

Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Store in a locked cabinet or with access restricted to technical experts or their assistants.

7.3 Specific end use(s)
No further relevant information available.

SECTION 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.

8.1 Control parameters
Components with critical values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Component</th>
<th>AGW (Germany)</th>
<th>PEL (USA)</th>
<th>REL (USA)</th>
<th>TLV (USA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7789-24-4 Lithium fluoride (100,0%)</td>
<td>Long-term value: 1E mg/m³</td>
<td>Long-term value: 2,5 mg/m³</td>
<td>Long-term value: 2,5 mg/m³</td>
<td>Long-term value: 2,5 mg/m³</td>
</tr>
</tbody>
</table>

Ingredients with biological limit values:

<table>
<thead>
<tr>
<th>Component</th>
<th>BzW (Germany)</th>
<th>BEI (USA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7789-24-4 Lithium fluoride (100,0%)</td>
<td>7,0 mg/g Kreatinin</td>
<td>2 mg/L</td>
</tr>
<tr>
<td>Untersuchungsmaterial: Urin</td>
<td>Parameter: Fluorid</td>
<td>Medium: urine</td>
</tr>
<tr>
<td>Probenannahmezeitpunkt: Expositionende bzw. Schichtende</td>
<td>4,0 mg/g Kreatinin</td>
<td>Time: prior to shift</td>
</tr>
<tr>
<td>Untersuchungsmaterial: Urin</td>
<td>Parameter: Fluorid</td>
<td>Parameter: Fluoride (background, nonspecific)</td>
</tr>
<tr>
<td>Probenannahmezeitpunkt: vor nachfolgender Schicht</td>
<td>2 mg/L</td>
<td>Medium: urine</td>
</tr>
<tr>
<td></td>
<td>3 mg/L</td>
<td>Time: end of shift</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures should be adhered to in handling the chemicals.

Keep away from foodstuffs, beverages and food. Instantly remove any soiled and impregnated garments.
Wash hands during breaks and at the end of the work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.

Breathing equipment: Use breathing protection with high concentrations.
Recommended filter device for short term use:
Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.

Protection of hands:
Check protective gloves prior to each use for their proper condition. The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Material of gloves: Nitrile rubber, NBR
Penetration time of glove material (in minutes) 480
Glove thickness 0.11 mm

Eye protection:

Safety glasses
Face protection

Body protection: Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:
Various forms (powder/flake/crystalline/beads, etc.)

Smell: Odourless
Odour threshold: Not determined.

pH-value: Not applicable.

Change in condition
Melting point/Melting range: 845 °C
Boiling point/Boiling range: 1680 °C
Sublimation temperature / start: Not determined

Inflammability (solid, gaseous) Not determined.
Ignition temperature: Not determined.
Decomposition temperature: Not determined.
Self-inflammability: Not determined.

Danger of explosion: Not determined.

Critical values for explosion:

Lower: Not determined.
Upper: Not determined.
Steam pressure: Not applicable.
Density at 20 °C 2,635 g/cm³
Relative density Not determined.
Vapour density Not applicable.
Evaporation rate Not applicable.

Solubility in/ Miscibility with
Water at 20 °C: 1,3 g/l
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not applicable.
kinematic: Not applicable.

9.2 Other information

No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity
No information known.

10.2 Chemical stability
Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: No decomposition if used and stored according to specifications.

10.3 Possibility of hazardous reactions
Reacts with strong oxidising agents

10.4 Conditions to avoid
No further relevant information available.

10.5 Incompatible materials:
Oxidising agents

10.6 Hazardous decomposition products:
Hydrogen fluoride
Lithium oxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity:
Toxic if swallowed.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD50/LC50 values that are relevant for classification:

Oral LD50 143 mg/kg (rat)

Skin irritation or corrosion: Causes skin irritation.
Eye irritation or corrosion: Causes serious eye irritation.
Sensitization: No sensitizing effect known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: ACGIH A9: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: May cause respiratory irritation.
Aspiration hazard: No effects known.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity: No further relevant information available.

12.2 Persistence and degradability
No further relevant information available.

12.3 Bioaccumulative potential
No further relevant information available.

12.4 Mobility in soil
No further relevant information available.

Additional ecological information:

General notes:
Water hazard class 1 (Self-assessment): slightly hazardous for water.
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.

12.5 Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.
12.6 Other adverse effects No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Recommendation
Hand over to disposers of hazardous waste.
Must be specially treated under adherence to official regulations.
Consult state, local or national regulations for proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

SECTION 14: Transport information

UN-Number
ADR, IMDG, IATA UN3288

14.2 UN proper shipping name
ADR 3288 TOXIC SOLID, INORGANIC, N.O.S. (Lithium fluoride)
IMDG, IATA TOXIC SOLID, INORGANIC, N.O.S. (Lithium fluoride)

14.3 Transport hazard class(es)
ADR
Class 6.1 (T5) Toxic substances.
Label 6.1
IMDG, IATA
Class 6.1 Toxic substances.
Label 6.1

14.4 Packing group
ADR, IMDG, IATA III

14.5 Environmental hazards:
Not applicable.

14.6 Special precautions for user
Kemler Number:
Warning: Toxic substances.
EMS Number:
F,A,S-A

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

Transport/Additional information:

ADR
Excepted quantities (EQ): E1
Limited quantities (LQ) 5 kg
Transport category 2
Tunnel restriction code E

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

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Australian Inventory of Chemical Substances Substance is listed.

Standard for the Uniform Scheduling of Medicines and Poisons Substance is not listed.

National regulations
Information about limitation of use:
Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.

Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.

Other regulations, limitations and prohibitive regulations
ELINCS (European List of Notified Chemical Substances) Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 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 SDS: Global Marketing Department

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)
ADR, IMDG, IATA, IATA, International Maritime Code for Dangerous Goods
IATA, International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)
ATSDR: Agency for Toxic Substances and Disease Registry
HSE: Health and Safety Executive (UK)
Health Canada (HC), Health Canada (Canada)
HDS: Hazardous Substance (Canada)
SDS: Safety Data Sheet
STOT: Serious toxic effect
STOT SE: Serious toxic effect - Single exposure
STOT RE: Serious toxic effect - Repeated exposure
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3
STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2
STOT RE 3: Specific target organ toxicity - Repeated exposure, Hazard Category 3