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

1.1 Product identifier
Trade name **Boron trifluoride diethyl etherate**

**Stock number:** A15275, L02754

**CAS Number:** 109-63-7

**EC number:** 203-689-8

1.2 Relevant identified uses of the substance or mixture and uses advised against. No further relevant information available.

**Identified uses:** 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

**Informing department:** Product safety Tel + +049 (0) 7275 988687-0

1.4 Emergency telephone number:

**Carechenf:** 24: +44 (0) 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

- **GHS02 flame**
- **GHS05 skull and crossbones**
- **GHS06 skull and crossbones**
- **Acute Tox. 3 H331 Toxic if inhaled.**
- **GHS08 health hazard**
- **STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.**
- **GHS05 corrosion**
- **Skin Corr. 1A H314 Causes severe skin burns and eye damage.**
- **GHS07**

**Acute Tox. 4 H302 Harmful if swallowed.**

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**

- GHS02 flame
- GHS05 skull and crossbones
- GHS06 skull and crossbones
- GHS08 health hazard
- STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.
- GHS05 corrosion
- Skin Corr. 1A H314 Causes severe skin burns and eye damage.
- GHS07

- Acute Tox. 4 H302 Harmful if swallowed.

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:** 109-63-7 Boron trifluoride diethyl etherate

**Concentration:** ≤100%

**Identification number(s):**

**EC number:** 203-689-8
SECTION 4: First aid measures

4.1 Description of first aid measures
General information
Instantly remove any clothing soiled by the product. Remove breathing apparatus only after soiled clothing has been completely removed. 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
Seek medical treatment.

4.2 Most important symptoms and effects, both acute and delayed
Causes severe skin burns.
Harmful if swallowed.
Toxic if inhaled.
Causes damage to organs through prolonged or repeated exposure.

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 CO2, extinguishing powder or water jet. Fight larger fires with water jet or alcohol-resistant foam.

For safety reasons unsuitable extinguishing agents Water.

5.2 Special hazards arising from the substance or mixture
Reacts violently with water
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Hydrogen fluoride (HF)
Boron 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.
Ensure adequate ventilation
Keep away from ignition sources

6.2 Environmental precautions:
Do not allow material to be released to the environment without proper governmental permits.

6.3 Methods and material for containment and cleaning up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
Prevention of secondary hazards: Keep away from ignition sources.

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
Handle under dry protective gas.
Keep containers tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation/exhaustion at the workplace.
Open and handle container with care.

Information about protection against explosions and fires:
Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.
Keep ignition sources away - Do not smoke.

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 water.
Store away from oxidising agents.
Further information about storage conditions:
Store under dry inert gas.
This product is moisture sensitive.
Protect from humidity and keep away from water.
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:
109-63-7 Boron trifluoride diethyl etherate (100.0%)
AGW (Germany) Long-term value: 1 E mg/m³
4(II); als Fluor berechnet; DFG, Y, H

(Contd. on page 3)
Ingredients with biological limit values:

<table>
<thead>
<tr>
<th>Country</th>
<th>Limit Value</th>
<th>Medium</th>
<th>Time</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGW (Germany)</td>
<td>7.0 mg/g Kreatinin</td>
<td>Urin</td>
<td>Expositionsende</td>
<td>Fluorid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>bzw. Schichtende</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.0 mg/g Kreatinin</td>
<td>Urin</td>
<td>vor nachfolgender</td>
<td>Fluorid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Schicht</td>
<td></td>
</tr>
<tr>
<td>BEI (USA)</td>
<td>2 mg/L</td>
<td>urine</td>
<td>prior to shift</td>
<td>Fluoride (background, nonspecific)</td>
</tr>
<tr>
<td></td>
<td>3 mg/L</td>
<td>urine</td>
<td>end of shift</td>
<td>Fluoride (background, nonspecific)</td>
</tr>
</tbody>
</table>

Additional information: No data

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.
Store protective clothing separately.
Do not inhale dust / smoke / mist.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.

Breathing equipment: Use self-contained respiratory protective device in emergency situations.
Recommended filter device for short term use:
Use a respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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 such as NIOSH (USA) or CEN (EU).

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: Impervious gloves
Penetration time of glove material (in minutes): Not determined

Eye protection:
Tightly sealed safety glasses.
Full face protection
Safety glasses with side shields / NIOSH (US) or EN 166(EU)

Body protection:
Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information
Appearance: Liquid
Odour: Acrid
Odour threshold: Not determined.
pH-value: Not determined.

Change in condition
Melting point/freezing point: -60 °C
Initial boiling point and boiling range: 125-126 °C
Sublimation temperature / start: Not determined

Flash point: 47 °C
Inflammability (solid, gaseous): Not determined.
Ignition temperature: 185 °C
Decomposition temperature: Not determined
Self-inflammability: Not determined.

Explosive properties:
Critical values for explosion:
Lower: 5.1 Vol %
Upper: 18.2 Vol %

Steam pressure at 20 °C: 2.7 hPa
Density at 20 °C: 1.13 g/cm³
Relative density: Not determined.
Vapour density: Not determined.
Evaporation rate: Not determined.

Solubility in / Miscibility with Water:
Partition coefficient: n-octanol/water: Reacts violently
Viscosity:
dynamic: Not determined.
kineumatic: Not determined.

9.2 Other information
No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity
Reacts violently with water.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No decomposition if used and stored according to specifications.

10.4 Conditions to avoid
No further relevant information available.

10.5 Incompatible materials:
Oxidising agents
Water/moisture
Trade name Boron trifluoride diethyl etherate

10.6 Hazardous decomposition products:
- Carbon monoxide and carbon dioxide
- Hydrogen fluoride
- Boron oxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Harmful if swallowed.
Toxic if inhaled.
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach. Harmful if swallowed.
Toxic if inhaled.

LD/LC50 values that are relevant for classification: No data

Hazardous decomposition products:
- Carbon monoxide and carbon dioxide
- Hydrogen fluoride
- Boron oxide

11.2 Information on ecotoxicological effects

Aquatic toxicity:
No further relevant information available.

11.3 Information on persistence and degradability

No further relevant information available.

11.4 Information on bioaccumulative potential

No further relevant information available.

11.5 Information on mobility in soil

No further relevant information available.

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

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
UN2604

14.2 UN proper shipping name

ADR
IMDG, IATA
2604 BORON TRIFLUORIDE DIETHYL ETHERATE
BORON TRIFLUORIDE DIETHYL ETHERATE

14.3 Transport hazard class(es)

ADR

Class Label IMDG
8 (CF1) Corrosive substances. 8+3

Class Label IMDG
8 Corrosive substances. 8/3

Class Label IMDG
8 Corrosive substances. 8 (3)

Packaging group
ADR, IMDG, IATA
I

14.5 Environmental hazards:
Not applicable.

14.6 Special precautions for user
Kemler Number: Warning: Corrosive substances.
883 Acids

(Contd. on page 5)
Trade name **Boron trifluoride diethyl etherate**

<table>
<thead>
<tr>
<th>Stowage Category</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stowage Code</td>
<td>SW2 Clear of living quarters.</td>
</tr>
</tbody>
</table>

### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

**Not applicable.**

### Transport/Additional information:

<table>
<thead>
<tr>
<th>ADR</th>
<th>E0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited quantities (LQ)</td>
<td>0</td>
</tr>
<tr>
<td>Code: E0</td>
<td>Not permitted as Excepted Quantity</td>
</tr>
</tbody>
</table>

### Stowage Code

- STOW: D
- SW2: Clear of living quarters.

### Transport category

- Code: E0
- Not permitted as Excepted Quantity

### Tunnel restriction code

- Code: D/E

### IMDG

- Limited quantities (LQ) | 0 |
- Code: E0 | Not permitted as Excepted Quantity |

**UN "Model Regulation":**

- UN 2604 BORON TRIFLUORIDE DIETHYL ETHERATE, 8 (3), I

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### 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.
- **Directive 2012/18/EU:** Named dangerous substances - ANNEX I Substance is not listed.
- **Seveso category:** H2 ACUTE TOXIC
- **Qualifying quantity (tonnes) for the application of lower-tier requirements:** 50 t
- **Qualifying quantity (tonnes) for the application of upper-tier requirements:** 200 t
- **REGULATION (EC) No 1907/2006 ANNEX XVII:** Conditions of restriction: 3, 40
- **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**
  - EINCS (European List of Notified Chemical Substances) Substance is not listed.
  - Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. 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.

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### 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 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)
- IMDG: International Maritime Code for Dangerous Goods
- IATA: International Air Transport Association
- GHS: Globally Harmonised System of Classification and Labelling of Chemicals
- EINECS: European Inventory of Existing Commercial Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
- PBT: Persistent, Bioaccumulative and Toxic
- vPvB: very Persistent and very Bioaccumulative
- SVHC: Substance of Very High Concern
- OSHA: Occupational Safety and Health Administration (USA)
- TWA: Time Weighted Average
- TLV: Threshold Limit Value
- PEL: Permissible Exposure Limit
- REL: Recommended Exposure Limit
- NIOSH: National Institute for Occupational Safety
- USEPA: United States Environmental Protection Agency
- IARC: International Agency for Research on Cancer
- USNRC: United States Nuclear Regulatory Commission
- EPA: Environmental Protection Agency
- OSHA: Occupational Safety and Health Administration
- FDA: Food and Drug Administration
- WHO: World Health Organization
- OECD: Organisation for Economic Co-operation and Development
- OSHA: Occupational Safety and Health Administration
- FIP: Farm worker

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**Flam. Liq. 3:** Flammable liquids – Category 3

**Acute Tox. 4:** Acute toxicity – Category 4

**Acute Tox. 3:** Acute toxicity – Category 3

**Skin Corr. 1a:** Skin corrosion/irritation – Category 1A

**STOT RE 1:** Specific target organ toxicity (repeated exposure) – Category 1

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**DE**