

## 1 Identification

### Product identifier

**Product name:** Boron trifluoride-tetrahydrofuran complex

**Stock number:** L17593

**CAS Number:**

462-34-0

**EC number:**

207-325-9

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

**Identified use:** SU24 Scientific research and development

### Details of the supplier of the safety data sheet

#### Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

#### Information Department:

Product Safety Department

Health, Safety and Environmental Department

#### Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

## 2 Hazard(s) identification

### Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)



GHS08 Health hazard

STOT RE 1 H372 Causes damage to the kidneys through prolonged or repeated exposure. Route of exposure: Inhalation.



GHS05 Corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

Acute Tox. 4 H332 Harmful if inhaled.

Flam. Liq. 4 H227 Combustible liquid.

**Hazards not otherwise classified** No information known.

### Label elements

**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

### Hazard pictograms



GHS05 GHS07 GHS08

### Signal word

Danger

### Hazard statements

H227 Combustible liquid.

H332 Harmful if inhaled.

H314 Causes severe skin burns and eye damage.

H372 Causes damage to the kidneys through prolonged or repeated exposure. Route of exposure: Inhalation.

### Precautionary statements

P210 Keep away from flames and hot surfaces. No smoking.

P260 Do not breathe dusts or mists.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

### WHMIS classification

B3 - Combustible liquid

D2A - Very toxic material causing other toxic effects

E - Corrosive material



### Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 3 Health (acute effects) = 3

FIRE 2 Flammability = 2

REACTIVITY 1 Physical Hazard = 1

### Other hazards

### Results of PBT and vPvB assessment

PBT: Not applicable.

**Product name:** Boron trifluoride-tetrahydrofuran complex

**vPvB:** Not applicable.

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### 3 Composition/information on ingredients

**Chemical characterization:** Substances

**CAS# Description:**

462-34-0 Boron trifluoride-tetrahydrofuran complex

**Concentration:** ≤100%

**Identification number(s):**

**EC number:** 207-325-9

### 4 First-aid measures

**Description of first aid measures**

**General information** Immediately remove any clothing soiled by the product.

**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** Seek medical treatment.

**Information for doctor**

**Most important symptoms and effects, both acute and delayed**

Causes severe skin burns.

Harmful if inhaled.

Causes serious eye damage.

Causes damage to the kidneys through prolonged or repeated exposure. Route of exposure: Inhalation.

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

### 5 Fire-fighting measures

**Extinguishing media**

**Suitable extinguishing agents** Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.

**Special hazards arising from the substance or mixture**

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Hydrogen fluoride (HF)

Boron oxide

**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:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

**Prevention of secondary hazards:** Keep away from ignition sources.

**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.

**Protective Action Criteria for Chemicals**

**PAC-1:** Substance is not listed.

**PAC-2:** Substance is not listed.

**PAC-3:** Substance is not listed.

### 7 Handling and storage

**Handling**

**Precautions for safe handling**

Handle under dry protective gas.

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:** Keep ignition sources away.

**Conditions for safe storage, including any incompatibilities**

**Storage**

**Requirements to be met by storerooms and receptacles:** No special requirements.

**Information about storage in one common storage facility:**

Store away from water/moisture.

Store away from strong bases.

Store away from oxidizing agents.

Store away from metals.

**Further information about storage conditions:**

Store under dry inert gas.

This product is moisture sensitive.

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Protect from humidity and water.

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

**Product name:** Boron trifluoride-tetrahydrofuran complex

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**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:**

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

**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.

Do not inhale dust / smoke / mist.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

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

**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:**

Impervious gloves

Check protective gloves prior to each use for their proper condition.

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

**Material of gloves** Latex/chloroprene

**Penetration time of glove material (in minutes)**

Not determined

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**Glove thickness:** 0.6 mm

**Eye protection:**

Tightly sealed goggles

Full face protection

Safety glasses with side shields / NIOSH (US) or EN 166(EU)

**Body protection:** Protective work clothing.

**9 Physical and chemical properties**

**Information on basic physical and chemical properties**

**General Information**

**Appearance:**

**Form:** Liquid  
**Odor:** Pungent  
**Odor threshold:** Not determined.

**pH-value (50 g/l) at 20 °C (68 °F):** 1

**Change in condition**

**Melting point/Melting range:** 8-9 °C (46-48 °F)  
**Boiling point/Boiling range:** 180 °C (356 °F)  
**Sublimation temperature / start:** Not determined

**Flash point:** 92 °C (198 °F)  
**Flammability (solid, gaseous):** Not determined.  
**Ignition temperature:** 250 °C (482 °F)  
**Decomposition temperature:** Not determined  
**Auto igniting:** Not determined.

**Danger of explosion:** Product does not present an explosion hazard.

**Explosion limits:**

**Lower:** 2.3 Vol %  
**Upper:** 17.7 Vol %  
**Vapor pressure:** Not determined  
**Density at 20 °C (68 °F):** 1.268 g/cm<sup>3</sup> (10.581 lbs/gal)  
**Relative density:** Not determined.  
**Vapor density:** Not determined.  
**Evaporation rate:** Not determined.  
**Solubility in / Miscibility with**  
**Water:** Hydrolyzes  
**Partition coefficient (n-octanol/water):** Not determined.  
**Viscosity:**  
**dynamic:** Not determined.  
**kinematic:** Not determined.  
**Other information** No further relevant information available.

**10 Stability and reactivity**

**Reactivity** No information known.

**Chemical stability** Stable under recommended storage conditions.

**Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.

**Possibility of hazardous reactions** Reacts with strong oxidizing agents

**Conditions to avoid** No further relevant information available.

**Incompatible materials:**

Oxidizing agents

Bases

Metals




Water/moisture

**Hazardous decomposition products:**

Carbon monoxide and carbon dioxide

Boron oxide




(Contd. on page 4)  
USA

Product name: <b>Boron trifluoride-tetrahydrofuran complex</b>	
Hydrogen fluoride	
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<b>11 Toxicological information</b>	
<b>Information on toxicological effects</b> <b>Acute toxicity:</b> Harmful if inhaled. Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach. <b>LD/LC50 values that are relevant for classification:</b> No data <b>Skin irritation or corrosion:</b> Causes severe skin burns. <b>Eye irritation or corrosion:</b> Causes serious eye damage. <b>Sensitization:</b> No sensitizing effects known. <b>Germ cell mutagenicity:</b> No effects known. <b>Carcinogenicity:</b> EPA-I: Data are inadequate for an assessment of human carcinogenic potential. <b>Reproductive toxicity:</b> No effects known. <b>Specific target organ system toxicity - repeated exposure:</b> Causes damage to the kidneys through prolonged or repeated exposure. Route of exposure: Inhalation. <b>Specific target organ system toxicity - single exposure:</b> No effects known. <b>Aspiration hazard:</b> No effects known. <b>Subacute to chronic toxicity:</b> No effects known. <b>Additional toxicological information:</b> To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.	
<b>12 Ecological information</b>	
<b>Toxicity</b> <b>Aquatic toxicity:</b> No further relevant information available. <b>Persistence and degradability</b> No further relevant information available. <b>Bioaccumulative potential</b> No further relevant information available. <b>Mobility in soil</b> No further relevant information available. <b>Additional ecological information:</b> <b>General notes:</b> Do not allow material to be released to the environment without proper governmental permits. Do not allow undiluted product or large quantities to reach ground water, water course or sewage system. Avoid transfer into the environment. <b>Results of PBT and vPvB assessment</b> <b>PBT:</b> Not applicable. <b>vPvB:</b> Not applicable. <b>Other adverse effects</b> No further relevant information available.	
<b>13 Disposal considerations</b>	
<b>Waste treatment methods</b> <b>Recommendation</b> Consult state, local or national regulations to ensure proper disposal. <b>Uncleaned packagings:</b> <b>Recommendation:</b> Disposal must be made according to official regulations.	
<b>14 Transport information</b>	
<b>UN-Number</b> <b>DOT, IMDG, IATA</b>	UN3265
<b>UN proper shipping name</b> <b>DOT</b> <b>ADR</b>	Corrosive liquid, acidic, organic, n.o.s. (Boron trifluoride-tetrahydrofuran complex) 3265 Corrosive liquid, acidic, organic, n.o.s. (Boron trifluoride-tetrahydrofuran complex) CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Boron trifluoride-tetrahydrofuran complex)
<b>IMDG, IATA</b>	
<b>Transport hazard class(es)</b> <b>DOT</b> 	
<b>Class</b> <b>Label</b> <b>ADR</b>	8 Corrosive substances 8
	
<b>Class</b> <b>Label</b> <b>IMDG, IATA</b>	8 (C3) Corrosive substances 8
	
<b>Class</b> <b>Label</b>	8 Corrosive substances 8
<b>Packing group</b> <b>DOT, ADR, IMDG, IATA</b>	II
<b>Environmental hazards:</b>	Not applicable.
<b>Special precautions for user</b> <b>EMS Number:</b> <b>Segregation groups</b> <b>Stowage Category</b> <b>Stowage Code</b>	Warning: Corrosive substances F-A, S-B Acids B SW2 Clear of living quarters.

<b>Product name:</b> <b>Boron trifluoride-tetrahydrofuran complex</b>	
(Contd. of page 4)	
<b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b> Not applicable.	
<b>Transport/Additional information:</b>	
<b>DOT</b>	
<b>Quantity limitations</b>	On passenger aircraft/rail: 1 L On cargo aircraft only: 30 L
<b>Marine Pollutant (DOT):</b>	No
<b>IMDG</b>	
<b>Limited quantities (LQ)</b>	1L
<b>Excepted quantities (EQ)</b>	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
<b>UN "Model Regulation":</b>	UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (BORON TRIFLUORIDE-TETRAHYDROFURAN COMPLEX), 8, II

**15 Regulatory information**

**Safety, health and environmental regulations/legislation specific for the substance or mixture**  
**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)  
**Hazard pictograms**



GHS05 GHS07 GHS08

**Signal word** Danger

**Hazard statements**  
H227 Combustible liquid.  
H332 Harmful if inhaled.  
H314 Causes severe skin burns and eye damage.  
H372 Causes damage to the kidneys through prolonged or repeated exposure. Route of exposure: Inhalation.

**Precautionary statements**  
P210 Keep away from flames and hot surfaces. No smoking.  
P260 Do not breathe dusts or mists.  
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P405 Store locked up.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

**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 Non-Domestic Substances List (NDSL).  
**SARA Section 313 (specific toxic chemical listings)** Substance is not listed.  
**California Proposition 65**  
**Prop 65 - Chemicals known to cause cancer** Substance is not listed.  
**Prop 65 - Developmental toxicity** Substance is not listed.  
**Prop 65 - Developmental toxicity, female** Substance is not listed.  
**Prop 65 - Developmental toxicity, male** Substance is not listed.  
**Information about limitation of use:** For use only by technically qualified individuals.  
**Other regulations, limitations and prohibitive regulations**  
**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.  
**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 Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing SDS:** Global Marketing Department  
**Date of preparation/Revision:** Print date, revision date and version number are in the header of each page.

**Abbreviations and acronyms:**  
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)  
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)  
ICAO: International Civil Aviation Organisation  
ICAO-TI: Technical Instructions by the "International Civil Aviation Organisation" (ICAO)  
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  
DOT: US Department of Transportation  
IATA: International Air Transport Association  
EINECS: European Inventory of Existing Commercial Chemical Substances  
CAS: Chemical Abstracts Service (division of the American Chemical Society)  
HMIS: Hazardous Materials Identification System (USA)  
WHMIS: Workplace Hazardous Materials Information System (Canada)  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent  
PBT: Persistent, Bioaccumulative and Toxic  
SVHC: Substances of Very High Concern  
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)  
Flam. Liq. 4: Flammable liquids – Category 4  
Acute Tox. 4: Acute toxicity – Category 4  
Skin Corr. 1B: Skin corrosion/irritation – Category 1B  
Eye Dam. 1: Serious eye damage/eye irritation – Category 1  
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1