

**BORON TRIFLUORIDE ETHERATE**

Safety Data Sheet INBO060

Date of issue: 03/03/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Product form	: Substance
Physical state	: Liquid
Substance name	: BORON TRIFLUORIDE ETHERATE
Product code	: INBO060
Formula	: C4H10BF3O
Synonyms	: BORON TRIFLUORIDE DIETHYL ETHERATE (1:1)
Chemical family	: BORON COMPOUND

1.2. Relevant identified uses of the substance or mixture and uses advised against**1.2.1. Relevant identified uses**

Use of the substance/mixture : Chemical intermediate

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet**GELEST, INC.**11 East Steel Road
Morrisville, PA 19067**USA**

T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST

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info@gelestde.com - www.gelestde.com**1.4. Emergency telephone number**

Emergency number : CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

Flammable liquids, Category 3	H226
Acute toxicity (oral), Category 4	H302
Skin corrosion/irritation, Category 1A	H314
Serious eye damage/eye irritation, Category 1	H318
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335
Full text of H statements : see section 16	

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements**Labelling according to Regulation (EC) No. 1272/2008 [CLP]**

Hazard pictograms (CLP) :



GHS02



GHS05



GHS07

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Signal word (CLP)	: Danger
Hazard statements (CLP)	: H226 - Flammable liquid and vapour. H302 - Harmful if swallowed. H314 - Causes severe skin burns and eye damage. H335 - May cause respiratory irritation.
Precautionary statements (CLP)	: P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P240 - Ground/bond container and receiving equipment. P260 - Do not breathe vapours. P264 - Wash hands thoroughly after handling. P310 - Immediately call a POISON CENTER or doctor/physician
EUH-statements	: EUH019 - May form explosive peroxides.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance type	: Multi-constituent
Name	: BORON TRIFLUORIDE ETHERATE
CAS-No.	: 109-63-7
EC-No.	: 203-689-8

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Boron trifluoride etherate	(CAS-No.) 109-63-7 (EC-No.) 203-689-8	> 97	Flam. Liq. 3, H226 Acute Tox. 4 (Oral), H302 Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT SE 3, H335
Ethyl ether	(CAS-No.) 60-29-7 (EC-No.) 200-467-2 (EC Index-No.) 603-022-00-4	< 1	Flam. Liq. 1, H224 Acute Tox. 4 (Oral), H302 STOT SE 3, H336
Hydrogen fluoride	(CAS-No.) 7664-39-3 (EC-No.) 231-634-8 (EC Index-No.) 009-002-00-6		Acute Tox. 2 (Oral), H300 Acute Tox. 1 (Dermal), H310 Acute Tox. 2 (Inhalation), H330 Skin Corr. 1A, H314

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general	: Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.
First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention.
First-aid measures after skin contact	: Wash with plenty of water/.... Get immediate medical advice/attention.
First-aid measures after eye contact	: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.
First-aid measures after ingestion	: Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects	: Causes severe skin burns and eye damage.
Symptoms/effects after inhalation	: May cause respiratory irritation.
Symptoms/effects after skin contact	: Causes (severe) skin burns.
Symptoms/effects after eye contact	: Causes serious eye damage.
Symptoms/effects after ingestion	: Harmful if swallowed. Swallowing a small quantity of this material will result in serious health hazard.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Alcohol-resistant foam. Carbon dioxide. Dry chemical. Use of high expansion foam (100:1) is recommended to cover flames.

Unsuitable extinguishing media : Water.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid and vapour. Irritating fumes of hydrogen fluoride and organic acid vapors may develop when material is exposed to water or open flame.

5.3. Advice for firefighters

Firefighting instructions : Use only dry media to extinguish flames. Water spray or fog should only be used to knock down hydrogen fluoride vapors in areas downwind from the fire.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapour and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Remove ignition sources. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. Use only non-sparking tools.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapour and mist. Provide good ventilation in process area to prevent formation of vapour. Ground/bond container and receiving equipment. Bottles may develop pressure on storage; open slowly. Take precautionary measures against static discharge. Use only non-sparking tools.

Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container tightly closed. Store in sealed corrosion resistant containers.

Incompatible materials : Acids. alcohols. Oxidizing agent.

Storage area : Store in a well-ventilated place. Store away from heat.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Boron trifluoride etherate (109-63-7)		
USA OSHA	OSHA PEL (TWA) (ppm)	1 ppm BF3
Ethyl ether (60-29-7)		
EU	IOELV TWA (mg/m ³)	308 mg/m ³
EU	IOELV TWA (ppm)	100 ppm
EU	IOELV STEL (mg/m ³)	616 mg/m ³
EU	IOELV STEL (ppm)	200 ppm
Austria	MAK (mg/m ³)	300 mg/m ³
Austria	MAK (ppm)	100 ppm
Austria	MAK Short time value (mg/m ³)	600 mg/m ³
Austria	MAK Short time value (ppm)	200 ppm
Belgium	Limit value (mg/m ³)	308 mg/m ³

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Ethyl ether (60-29-7)		
Belgium	Limit value (ppm)	100 ppm
Belgium	Short time value (mg/m ³)	616 mg/m ³
Belgium	Short time value (ppm)	200 ppm
Bulgaria	OEL TWA (mg/m ³)	308 mg/m ³
Bulgaria	OEL TWA (ppm)	100 ppm
Bulgaria	OEL STEL (mg/m ³)	616 mg/m ³
Bulgaria	OEL STEL (ppm)	200 ppm
Cyprus	OEL TWA (mg/m ³)	308 mg/m ³
Cyprus	OEL TWA (ppm)	100 ppm
Cyprus	OEL STEL (mg/m ³)	616 mg/m ³
Cyprus	OEL STEL (ppm)	200 ppm
France	VLE (mg/m ³)	616 mg/m ³ (restrictive limit)
France	VLE (ppm)	200 ppm (restrictive limit)
France	VME (mg/m ³)	308 mg/m ³ (restrictive limit)
France	VME (ppm)	100 ppm (restrictive limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m ³)	1200 mg/m ³
Germany	TRGS 900 Occupational exposure limit value (ppm)	400 ppm
Gibraltar	Eight hours mg/m ³	308 mg/m ³
Gibraltar	Eight hours ppm	100 ppm
Gibraltar	Short-term mg/m ³	616 mg/m ³
Gibraltar	Short-term ppm	200 ppm
Greece	OEL TWA (mg/m ³)	1200 mg/m ³
Greece	OEL TWA (ppm)	400 ppm
Greece	OEL STEL (mg/m ³)	1500 mg/m ³
Greece	OEL STEL (ppm)	500 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	400 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	500 ppm
Italy	OEL TWA (mg/m ³)	308 mg/m ³
Italy	OEL TWA (ppm)	100 ppm
Italy	OEL STEL (mg/m ³)	616 mg/m ³
Italy	OEL STEL (ppm)	200 ppm
Latvia	OEL TWA (mg/m ³)	308 mg/m ³
Latvia	OEL TWA (ppm)	100 ppm
USA IDLH	US IDLH (ppm)	1900 ppm (10% LEL)
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1200 mg/m ³
USA OSHA	OSHA PEL (TWA) (ppm)	400 ppm
Spain	VLA-ED (mg/m ³)	308 mg/m ³ (indicative limit value)
Spain	VLA-ED (ppm)	100 ppm (indicative limit value)
Spain	VLA-EC (mg/m ³)	616 mg/m ³
Spain	VLA-EC (ppm)	200 ppm
Switzerland	KZGW (mg/m ³)	1200 mg/m ³
Switzerland	KZGW (ppm)	400 ppm
Switzerland	MAK (mg/m ³)	1200 mg/m ³
Switzerland	MAK (ppm)	400 ppm
Netherlands	Grenswaarde TGG 8H (mg/m ³)	308 mg/m ³
Netherlands	Grenswaarde TGG 15MIN (mg/m ³)	616 mg/m ³
United Kingdom	WEL TWA (mg/m ³)	310 mg/m ³
United Kingdom	WEL TWA (ppm)	100 ppm
United Kingdom	WEL STEL (mg/m ³)	620 mg/m ³
United Kingdom	WEL STEL (ppm)	200 ppm
Czech Republic	Expoziční limity (PEL) (mg/m ³)	300 mg/m ³
Denmark	Grænseværdie (langvarig) (mg/m ³)	309 mg/m ³
Denmark	Grænseværdie (langvarig) (ppm)	100 ppm
Finland	HTP-arvo (8h) (mg/m ³)	310 mg/m ³
Finland	HTP-arvo (8h) (ppm)	100 ppm

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Ethyl ether (60-29-7)		
Finland	HTP-arvo (15 min)	620 mg/m ³
Finland	HTP-arvo (15 min) (ppm)	200 ppm
Hungary	AK-érték	308 mg/m ³
Hungary	CK-érték	616 mg/m ³
Ireland	OEL (8 hours ref) (mg/m ³)	308 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	100 ppm
Ireland	OEL (15 min ref) (mg/m ³)	616 mg/m ³
Ireland	OEL (15 min ref) (ppm)	200 ppm
Lithuania	IPRV (mg/m ³)	900 mg/m ³
Lithuania	IPRV (ppm)	300 ppm
Lithuania	TPRV (mg/m ³)	1200 mg/m ³
Lithuania	TPRV (ppm)	400 ppm
Malta	OEL TWA (mg/m ³)	308 mg/m ³
Malta	OEL TWA (ppm)	100 ppm
Malta	OEL STEL (mg/m ³)	616 mg/m ³
Malta	OEL STEL (ppm)	200 ppm
Norway	Grenseverdier (AN) (mg/m ³)	300 mg/m ³
Norway	Grenseverdier (AN) (ppm)	100 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m ³)	300 mg/m ³
Norway	Grenseverdier (Korttidsverdi) (ppm)	100 ppm
Poland	NDS (mg/m ³)	300 mg/m ³
Poland	NDSCh (mg/m ³)	600 mg/m ³
Romania	OEL TWA (mg/m ³)	300 mg/m ³ 308 mg/m ³ (regulated under Diethyl oxide)
Romania	OEL TWA (ppm)	99 ppm 100 ppm (regulated under Diethyl oxide)
Romania	OEL STEL (mg/m ³)	800 mg/m ³ 616 mg/m ³ (regulated under Diethyl oxide)
Romania	OEL STEL (ppm)	264 ppm 200 ppm (regulated under Diethyl oxide)
Slovakia	NPHV (priemerná) (mg/m ³)	308 mg/m ³
Slovakia	NPHV (priemerná) (ppm)	100 ppm
Slovakia	NPHV (Hraničná) (mg/m ³)	616 mg/m ³
Sweden	nivågränsvärde (NVG) (mg/m ³)	900 mg/m ³
Sweden	nivågränsvärde (NVG) (ppm)	300 ppm
Sweden	kortidsvärde (KTV) (mg/m ³)	1200 mg/m ³
Sweden	kortidsvärde (KTV) (ppm)	400 ppm
Canada (Quebec)	VECD (mg/m ³)	1520 mg/m ³
Canada (Quebec)	VECD (ppm)	500 ppm
Canada (Quebec)	VEMP (mg/m ³)	1210 mg/m ³
Canada (Quebec)	VEMP (ppm)	400 ppm
Australia	TWA (mg/m ³)	1210 mg/m ³
Australia	TWA (ppm)	400 ppm
Australia	STEL (mg/m ³)	1520 mg/m ³
Australia	STEL (ppm)	500 ppm
Portugal	OEL TWA (mg/m ³)	308 mg/m ³ (indicative limit value)
Portugal	OEL TWA (ppm)	100 ppm (indicative limit value)
Portugal	OEL STEL (mg/m ³)	616 mg/m ³ (indicative limit value)
Portugal	OEL STEL (ppm)	200 ppm (indicative limit value)
Hydrogen fluoride (7664-39-3)		
EU	IOELV TWA (mg/m ³)	1.5 mg/m ³
EU	IOELV TWA (ppm)	1.8 ppm
EU	IOELV STEL (mg/m ³)	2.5 mg/m ³

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Hydrogen fluoride (7664-39-3)		
EU	IOELV STEL (ppm)	3 ppm
Austria	MAK (mg/m ³)	1.5 mg/m ³
Austria	MAK (ppm)	1.8 ppm
Austria	MAK Short time value (mg/m ³)	2.5 mg/m ³
Austria	MAK Short time value (ppm)	3 ppm
Bulgaria	OEL TWA (mg/m ³)	1.5 mg/m ³
Bulgaria	OEL TWA (ppm)	1.8 ppm
Bulgaria	OEL STEL (mg/m ³)	2.5 mg/m ³
Bulgaria	OEL STEL (ppm)	3 ppm
Cyprus	OEL TWA (mg/m ³)	1.5 mg/m ³
Cyprus	OEL TWA (ppm)	1.8 ppm
Cyprus	OEL STEL (mg/m ³)	2.5 mg/m ³
Cyprus	OEL STEL (ppm)	3 ppm
France	VLE (mg/m ³)	2.5 mg/m ³ (restrictive limit)
France	VLE (ppm)	3 ppm (restrictive limit)
France	VME (mg/m ³)	1.5 mg/m ³ (restrictive limit)
France	VME (ppm)	1.8 ppm (restrictive limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m ³)	0.83 mg/m ³ (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	1 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 903 Biological limit value	7 mg/g (Medium: urine - Time: end of shift - Parameter: Fluoride (measured as mg/g Creatinine) 4 mg/g (Medium: urine - Time: before beginning of next shift - Parameter: Fluoride (measured as mg/g Creatinine))
Gibraltar	Eight hours mg/m ³	1.5 mg/m ³
Gibraltar	Eight hours ppm	1.8 ppm
Gibraltar	Short-term mg/m ³	2.5 mg/m ³
Gibraltar	Short-term ppm	3 ppm
Greece	OEL TWA (mg/m ³)	2.5 mg/m ³
Greece	OEL TWA (ppm)	3 ppm
Greece	OEL STEL (mg/m ³)	2.5 mg/m ³
Greece	OEL STEL (ppm)	3 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	0.5 ppm
Italy - Portugal - USA ACGIH	ACGIH Ceiling (ppm)	2 ppm
Italy	OEL TWA (mg/m ³)	1.5 mg/m ³
Italy	OEL TWA (ppm)	1.8 ppm
Italy	OEL STEL (mg/m ³)	2.5 mg/m ³
Italy	OEL STEL (ppm)	3 ppm
Latvia	OEL TWA (mg/m ³)	1.5 mg/m ³
Latvia	OEL TWA (ppm)	1.8 ppm
USA IDLH	US IDLH (ppm)	30 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	2.5 mg/m ³
USA NIOSH	NIOSH REL (TWA) (ppm)	3 ppm
USA NIOSH	NIOSH REL (ceiling) (mg/m ³)	5 mg/m ³
USA NIOSH	NIOSH REL (ceiling) (ppm)	6 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	3 ppm
Spain	VLA-ED (mg/m ³)	1.5 mg/m ³ (indicative limit value)
Spain	VLA-ED (ppm)	1.8 ppm (indicative limit value)
Spain	VLA-EC (mg/m ³)	2.5 mg/m ³
Spain	VLA-EC (ppm)	3 ppm
Switzerland	KZGW (mg/m ³)	1.66 mg/m ³
Switzerland	KZGW (ppm)	2 ppm
Switzerland	MAK (mg/m ³)	0.83 mg/m ³
Switzerland	MAK (ppm)	1 ppm

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Hydrogen fluoride (7664-39-3)		
Netherlands	Grenswaarde TGG 15MIN (mg/m ³)	1 mg/m ³
United Kingdom	WEL TWA (mg/m ³)	1.5 mg/m ³
United Kingdom	WEL TWA (ppm)	1.8 ppm
United Kingdom	WEL STEL (mg/m ³)	2.5 mg/m ³
United Kingdom	WEL STEL (ppm)	3 ppm
Czech Republic	Expoziční limity (PEL) (mg/m ³)	1.5 mg/m ³
Denmark	Grænseværdie (langvarig) (mg/m ³)	1.5 mg/m ³
Denmark	Grænseværdie (langvarig) (ppm)	1.8 ppm
Finland	HTP-arvo (8h) (mg/m ³)	1.5 mg/m ³
Finland	HTP-arvo (8h) (ppm)	1.8 ppm
Finland	HTP-arvo (15 min)	2.5 mg/m ³
Finland	HTP-arvo (15 min) (ppm)	3 ppm
Hungary	AK-érték	1.5 mg/m ³
Hungary	CK-érték	2.5 mg/m ³
Ireland	OEL (8 hours ref) (mg/m ³)	1.5 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	1.8 ppm
Ireland	OEL (15 min ref) (mg/m ³)	2.5 mg/m ³ (inhalable)
Ireland	OEL (15 min ref) (ppm)	3 ppm
Lithuania	IPRV (mg/m ³)	1.5 mg/m ³
Lithuania	IPRV (ppm)	1.8 ppm
Lithuania	TPRV (mg/m ³)	2.5 mg/m ³
Lithuania	TPRV (ppm)	3 ppm
Malta	OEL TWA (mg/m ³)	1.5 mg/m ³
Malta	OEL TWA (ppm)	1.8 ppm
Malta	OEL STEL (mg/m ³)	2.5 mg/m ³
Malta	OEL STEL (ppm)	3 ppm
Norway	Grenseverdier (AN) (mg/m ³)	0.5 mg/m ³
Norway	Grenseverdier (Korttidsverdi) (mg/m ³)	0.5 mg/m ³
Poland	NDS (mg/m ³)	0.5 mg/m ³
Poland	NDSch (mg/m ³)	2 mg/m ³
Romania	OEL TWA (mg/m ³)	1.5 mg/m ³
Romania	OEL TWA (ppm)	1.8 ppm
Romania	OEL STEL (mg/m ³)	2.5 mg/m ³
Romania	OEL STEL (ppm)	3 ppm
Slovakia	NPHV (priemerná) (mg/m ³)	1.5 mg/m ³ 2.5 mg/m ³ (activated)
Slovakia	NPHV (priemerná) (ppm)	1.8 ppm
Slovakia	NPHV (Hraničná) (mg/m ³)	2.5 mg/m ³
Sweden	takgränsvärde (TGV) (mg/m ³)	1.7 mg/m ³
Sweden	takgränsvärde (TGV) (ppm)	2 ppm
Canada (Quebec)	PLAFOND (mg/m ³)	2.6 mg/m ³
Canada (Quebec)	PLAFOND (ppm)	3 ppm
Portugal	OEL TWA (mg/m ³)	1.5 mg/m ³ (indicative limit value)
Portugal	OEL TWA (ppm)	0.5 ppm (indicative limit value)
Portugal	OEL STEL (mg/m ³)	2.5 mg/m ³ (indicative limit value)
Portugal	OEL STEL (ppm)	3 ppm (indicative limit value)
Portugal	OEL - Ceilings (ppm)	2 ppm

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8.2. Exposure controls

Appropriate engineering controls:

Provide local exhaust or general room ventilation.

Personal protective equipment:

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection:

Neoprene or nitrile rubber gloves

Eye protection:

Chemical goggles or face shield. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

NIOSH-certified combination organic vapor/acid gas (yellow cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid.
Molecular mass	: 141.94 g/mol
Colour	: Straw.
Odour	: Acrid. Hydrogen fluoride.
Odour threshold	: No data available
Refractive index	: 1.348
pH	: No data available
Relative evaporation rate (butylacetate=1)	: ~ 1
Melting point	: No data available
Freezing point	: -58 °C
Boiling point	: 126 °C
Flash point	: 48 °C
Auto-ignition temperature	: 160 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Flammable liquid and vapour.
Vapour pressure	: 4.2 mm Hg @ 20°C
Relative vapour density at 20 °C	: 4.9
Relative density	: 1.12
% Volatiles	: 100 %
Solubility	: Reacts violently with water.
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: 1.9 - 36 vol % (lower; upper)

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable in sealed corrosion resistant containers stored under a dry inert atmosphere.

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10.3. Possibility of hazardous reactions

Reacts with water and moisture in air, liberating boron trifluoride and hydrogen fluoride.

10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Acids. alcohols. Oxidizing agent.

10.6. Hazardous decomposition products

Organic acid vapors. Hydrogen fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Harmful if swallowed.

BORON TRIFLUORIDE ETHERATE (109-63-7)

ATE CLP (oral)	369.072 mg/kg bodyweight
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Boron trifluoride etherate (109-63-7)

LD50 oral rat	358 mg/kg
LC50 inhalation rat	1180 mg/m ³ (For BF ₃ @ 4H)
ATE CLP (oral)	358 mg/kg bodyweight

Ethyl ether (60-29-7)

LD50 oral rat	1215 mg/kg
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Hydrogen fluoride (7664-39-3)

LC50 inhalation rat (mg/l)	0.79 mg/l (Exposure time: 1 h)
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Skin corrosion/irritation	: Causes severe skin burns and eye damage.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: May cause respiratory irritation.
STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified
Potential adverse human health effects and symptoms	: Animal data indicates that chronic exposure to BF ₃ may cause dental fluorosis (mottling of teeth) and hypocalcemia as well as damage to kidneys and lungs.
Symptoms/effects after inhalation	: May cause respiratory irritation.
Symptoms/effects after skin contact	: Causes (severe) skin burns.
Symptoms/effects after eye contact	: Causes serious eye damage.
Symptoms/effects after ingestion	: Harmful if swallowed. Swallowing a small quantity of this material will result in serious health hazard.
Reason for classification	: Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity : Not classified
Chronic aquatic toxicity : Not classified

Ethyl ether (60-29-7)

LC50 fish 1	2560 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
LC50 fish 2	> 10000 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

Hydrogen fluoride (7664-39-3)

EC50 Daphnia 1	270 mg/l (Exposure time: 48 h - Species: Daphnia species)
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12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Ethyl ether (60-29-7)

Log Pow	0.82 (at 23 °C)
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Hydrogen fluoride (7664-39-3)

BCF fish 1	(no bioaccumulation)
Log Pow	-1.4

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

Other adverse effects : This substance may be hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (ADR)	: 2604
UN-No. (IMDG)	: 2604
UN-No. (IATA)	: 2604
UN-No. (ADN)	: 2604
UN-No. (RID)	: 2604

14.2. UN proper shipping name

Proper Shipping Name (ADR)	: BORON TRIFLUORIDE DIETHYL ETHERATE
Proper Shipping Name (IMDG)	: BORON TRIFLUORIDE DIETHYL ETHERATE
Proper Shipping Name (IATA)	: Boron trifluoride diethyl etherate
Proper Shipping Name (ADN)	: BORON TRIFLUORIDE DIETHYL ETHERATE
Proper Shipping Name (RID)	: BORON TRIFLUORIDE DIETHYL ETHERATE
Transport document description (ADR)	: UN 2604 BORON TRIFLUORIDE DIETHYL ETHERATE, 8 (3), I, (D/E)
Transport document description (IMDG)	: UN 2604 BORON TRIFLUORIDE DIETHYL ETHERATE, 8 (3), I (59°C c.c.)
Transport document description (IATA)	: UN 2604 Boron trifluoride diethyl etherate, 8 (3), I
Transport document description (ADN)	: UN 2604 BORON TRIFLUORIDE DIETHYL ETHERATE, 8 (3), I
Transport document description (RID)	: UN 2604 BORON TRIFLUORIDE DIETHYL ETHERATE, 8 (3), I

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR) : 8 (3)
Danger labels (ADR) : 8, 3



IMDG

Transport hazard class(es) (IMDG) : 8 (3)
Danger labels (IMDG) : 8, 3



IATA

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Transport hazard class(es) (IATA) : 8 (3)

Hazard labels (IATA) : 8, 3



ADN

Transport hazard class(es) (ADN) : 8 (3)

Danger labels (ADN) : 8, 3



RID

Transport hazard class(es) (RID) : 8 (3)

Danger labels (RID) : 8, 3



14.4. Packing group

Packing group (ADR) : I

Packing group (IMDG) : I

Packing group (IATA) : I

Packing group (ADN) : I

Packing group (RID) : I

14.5. Environmental hazards

Dangerous for the environment : No

Marine pollutant : No

Other information : No supplementary information available

14.6. Special precautions for user

- Overland transport

Classification code (ADR) : CF1

Limited quantities (ADR) : 0

Excepted quantities (ADR) : E0

Packing instructions (ADR) : P001

Mixed packing provisions (ADR) : MP8, MP17

Portable tank and bulk container instructions (ADR) : T10

Portable tank and bulk container special provisions (ADR) : TP2

Tank code (ADR) : L10BH

Vehicle for tank carriage : FL

Transport category (ADR) : 1

Special provisions for carriage - Operation (ADR) : S2, S14

Hazard identification number (Kemler No.) : 883

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Orange plates

: **883**
2604

Tunnel restriction code (ADR) : D/E
EAC code : 4WE
APP code : A(fl)

- Transport by sea

Limited quantities (IMDG) : 0
Excepted quantities (IMDG) : E0
Packing instructions (IMDG) : P001
Special packing provisions (IMDG) : PP31
Tank instructions (IMDG) : T10
Tank special provisions (IMDG) : TP2
EmS-No. (Fire) : F-E
EmS-No. (Spillage) : S-C
Stowage category (IMDG) : D
Stowage and handling (IMDG) : SW2
Flash point (IMDG) : 59°C c.c.
Properties and observations (IMDG) : Colourless fuming flammable liquid. Flashpoint: 59°C c.c. The flashpoint will be lower when free ether is present. Reacts vigorously with oxidizing substances. Decomposes in contact with water, evolving toxic, corrosive and flammable vapours. Causes burns to skin, eyes and mucous membranes. Inhalation of small quantities of vapour can cause breathing difficulties.

- Air transport

PCA Excepted quantities (IATA) : E0
PCA Limited quantities (IATA) : Forbidden
PCA limited quantity max net quantity (IATA) : Forbidden
PCA packing instructions (IATA) : 850
PCA max net quantity (IATA) : 0.5L
CAO packing instructions (IATA) : 854
CAO max net quantity (IATA) : 2.5L
ERG code (IATA) : 8F

- Inland waterway transport

Classification code (ADN) : CF1
Limited quantities (ADN) : 0
Excepted quantities (ADN) : E0
Equipment required (ADN) : PP, EP, EX, A
Ventilation (ADN) : VE01
Number of blue cones/lights (ADN) : 1

- Rail transport

Classification code (RID) : CF1
Limited quantities (RID) : 0
Excepted quantities (RID) : E0
Packing instructions (RID) : P001
Mixed packing provisions (RID) : MP8, MP17
Portable tank and bulk container instructions (RID) : T10
Portable tank and bulk container special provisions (RID) : TP2
Tank codes for RID tanks (RID) : L10BH
Special provisions for RID tanks (RID) : TU38, TE22
Transport category (RID) : 1
Hazard identification number (RID) : 883

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

Not applicable

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SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

BORON TRIFLUORIDE ETHERATE is not on the REACH Candidate List

BORON TRIFLUORIDE ETHERATE is not on the REACH Annex XIV List

BORON TRIFLUORIDE ETHERATE is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

BORON TRIFLUORIDE ETHERATE is not subject to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC

% Volatiles : 100 %

15.1.2. National regulations

Germany

Reference to AwSV : Water hazard class (WGK) 1, Slightly hazardous to water (Classification according to VwVwS, Annex 3; ID No. 9090)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : BORON TRIFLUORIDE ETHERATE is listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

Denmark

Class for fire hazard : Class II-1

Store unit : 5 liter

Classification remarks : R10 <H226;H302;H314;H335>; Emergency management guidelines for the storage of flammable liquids must be followed

Danish National Regulations : Young people below the age of 18 years are not allowed to use the product

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Abbreviations and acronyms:

	Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor
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Other information : Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

Acute Tox. 1 (Dermal)	Acute toxicity (dermal), Category 1
Acute Tox. 2 (Inhalation)	Acute toxicity (inhal.), Category 2
Acute Tox. 2 (Oral)	Acute toxicity (oral), Category 2
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Flam. Liq. 1	Flammable liquids, Category 1
Flam. Liq. 3	Flammable liquids, Category 3
Skin Corr. 1A	Skin corrosion/irritation, Category 1A
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation

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STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
H224	Extremely flammable liquid and vapour.
H226	Flammable liquid and vapour.
H300	Fatal if swallowed.
H302	Harmful if swallowed.
H310	Fatal in contact with skin.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
EUH019	May form explosive peroxides.

SDS EU (REACH Annex II) - Custom

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