

# Boron trichloride

## Safety Data Sheet LIND-P009

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.  
Issue date: 03/02/2015 Revision date: 07/02/2024 Supersedes: 03/25/2022 SDS US Version: 3.3

### SECTION 1: Product and company identification

#### 1.1. Product identifier

Product form : Substance  
Substance name : Boron trichloride  
CAS-No. : 10294-34-5  
Formula : BCl<sub>3</sub>  
Other means of identification : Trichloroborane

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

Use of the substance/mixture : Industrial and professional use

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

Linde Inc.  
10 Riverview Drive  
Danbury, CT 06810-6268, USA  
www.lindeus.com

Electronics gas products 1-800-932-0624 or 1-908-329-9700  
Linde Inc. 1-844-44LINDE (1-844-445-4633)

For additional product information contact your local customer service.

#### 1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24 hr/day 7 days/week  
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887  
(collect calls accepted, Contract 17729)

### SECTION 2: Hazard identification

#### 2.1. Classification of the substance or mixture

##### GHS-US classification

Press. Gas (Liq.) H280  
Acute Tox. 3 (Inhalation:gas) H331  
Skin Corr. 1B H314  
Eye Dam. 1 H318  
STOT SE 3 H335

#### 2.2. Label elements

##### GHS US labelling

Hazard pictograms (GHS US) :



Signal word (GHS US) :

Danger

Hazard statements (GHS US) :

H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED  
H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE  
H331 - TOXIC IF INHALED  
CGA-HG22 - CORROSIVE TO THE RESPIRATORY TRACT.  
CGA-HG01 - MAY CAUSE FROSTBITE.

Precautionary statements (GHS US) :

P202 - Do not handle until all safety precautions have been read and understood.  
P260 - Do not breathe gas/vapours  
P262 - Do not get in eyes, on skin, or on clothing.  
P264 - Wash exposed skin thoroughly after handling  
P271+P403 - Use and store only outdoors or in a well-ventilated place.  
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection,

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and/or face protection.  
P405 - Store locked up.  
P501 - Dispose of contents/container in accordance with container supplier/owner instructions  
CGA-PG05 - Use a back flow preventive device in the piping.  
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure.  
CGA-PG12 - Do not open valve until connected to equipment prepared for use.  
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug.  
CGA-PG06 - Close valve after each use and when empty.  
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).  
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P311 - Call a poison center or doctor.  
P303+P361+P353 - IF ON SKIN OR (HAIR): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
P336 - Thaw frosted parts with lukewarm water. Do not rub affected area.  
P363 - Wash contaminated clothing before reuse.  
P310 - Immediately call a POISON CENTER/doctor.  
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P308+P313 - IF EXPOSED OR CONCERNED: Get medical advice/attention.

### 2.3. Other hazards

Other hazards which do not result in classification : None.

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name	Product identifier	%
Boron trichloride (Main constituent)	(CAS-No.) 10294-34-5	100

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. . WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.
- First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

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

- Symptoms/effects after inhalation : Overexposure to vapor concentrations moderately above 5 ppm irritates the upper respiratory tract. Intolerable concentrations range from 50-100 ppm. High concentrations (greater than 50 ppm) severely irritate the upper respiratory tract, causing the throat to burn and producing choking and coughing. Pulmonary edema; general lung injury; ulceration to the nose, throat, and larynx; and laryngeal spasm may also occur. Exposure to concentrations of 1500-2000 ppm for a few minutes is life-threatening. Liver and kidney injury have been reported after exposure to vapors. At higher concentrations, victim may suffocate from lack of oxygen.

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

Obtain medical assistance.

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### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.  
 Unsuitable extinguishing media : Reacts with water.

#### 5.2. Special hazards arising from the substance or mixture

- Reactivity : No reactivity hazard other than the effects described in sub-sections below.

#### 5.3. Advice for firefighters

- Firefighting instructions : **DANGER! Toxic, corrosive, liquefied gas.**  
 Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.  
 If leaking do not spray water (reacts violently).
- Other information : Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by TC.)

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- General measures : **Danger: Toxic. Corrosive.** Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE). (gas tight, chemical-protective) Evacuate personnel to a safe area. Approach suspected leak area with caution. Remove all sources of ignition. Toxic, corrosive vapor can spread from spill. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

##### 6.1.1. For non-emergency personnel

No additional information available

##### 6.1.2. For emergency responders

No additional information available

#### 6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with container supplier/owner instructions.

#### 6.3. Methods and material for containment and cleaning up

No additional information available

#### 6.4. Reference to other sections

See also sections 8 and 13.

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### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- Precautions for safe handling :
- Do not breathe gas/vapour. Avoid all contact with skin, eyes, or clothing. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- Wear leather safety gloves and safety shoes when handling cylinders. Protect containers from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

#### 7.2. Conditions for safe storage, including any incompatibilities

- Storage conditions :
- Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

**OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE:** When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

#### 7.3. Specific end use(s)

None.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

Boron trichloride (10294-34-5)		
ACGIH	ACGIH OEL C [ppm]	0.7 ppm
ACGIH	Not established	
USA OSHA	Not established	

#### 8.2. Exposure controls

- Appropriate engineering controls :
- Use corrosion-proof equipment. **USE ONLY IN A CLOSED SYSTEM.** An explosion-proof, corrosion-resistant, forced-draft fume hood is preferred.
- Eye protection :
- Wear safety glasses with side shields. Wear goggles and a face shield when transfilling or breaking transfer connections. Provide readily accessible eye wash stations and safety showers. Wear goggles when transfilling or breaking transfer connections.
- Skin and body protection :
- Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible.
- Respiratory protection :
- When workplace conditions warrant respirator use, follow a respiratory protection program that meets or exceeds the requirements of the appropriate Health and Safety Regulations. Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Gas
Molecular mass	: 117 g/mol
Colour	: Gives off white fumes in moist air.
Odour	: Pungent.
Odour threshold	: No data available
pH	: Not applicable.
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -107 °C
Freezing point	: No data available
Boiling point	: 12.4 °C
Flash point	: Not applicable.
Critical temperature	: 178.8 °C
Auto-ignition temperature	: Not applicable.
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: 1.317 bar , 19.1 psia (70°F/21.1°C)
Critical pressure	: 3870 kPa
Relative vapour density at 20°C	: No data available
Relative density	: 1.3
Relative gas density	: 4
Solubility	: Water: No data available
Partition coefficient n-octanol/water (Log Pow)	: Not applicable.
Partition coefficient n-octanol/water (Log Kow)	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosive limits	: Non flammable.

#### 9.2. Other information

Gas group	: Press. Gas (Liq.)
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

#### 10.2. Chemical stability

Stable under normal conditions.

#### 10.3. Possibility of hazardous reactions

May occur. REACTS VIOLENTLY WITH WATER.

#### 10.4. Conditions to avoid

Avoid moisture in installation systems.

#### 10.5. Incompatible materials

Water. Avoid all organic materials. Hydrogen. Ammonia. Oxygen. Alcohols. Nitrogen peroxide.

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### 10.6. Hazardous decomposition products

Thermal decomposition may produce : Toxic fumes. Chlorides. Hydrochloric acid. Boric acid. Grease. Reacts with water to form toxic and corrosive vapours.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified  
Acute toxicity (dermal) : Not classified  
Acute toxicity (inhalation) : TOXIC IF INHALED.

Boron trichloride ( f )10294-34-5	
LC50 Inhalation - Rat [ppm]	2541 ppm/1h
ATE US (gases)	1270.5 ppmv/4h

Skin corrosion/irritation : CAUSES SEVERE SKIN BURNS.  
pH: Not applicable.

Serious eye damage/irritation : CAUSES SERIOUS EYE DAMAGE.  
pH: Not applicable.

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

Symptoms/effects after inhalation : Overexposure to vapor concentrations moderately above 5 ppm irritates the upper respiratory tract. Intolerable concentrations range from 50-100 ppm. High concentrations (greater than 50 ppm) severely irritate the upper respiratory tract, causing the throat to burn and producing choking and coughing. Pulmonary edema; general lung injury; ulceration to the nose, throat, and larynx; and laryngeal spasm may also occur. Exposure to concentrations of 1500-2000 ppm for a few minutes is life-threatening. Liver and kidney injury have been reported after exposure to vapors. At higher concentrations, victim may suffocate from lack of oxygen.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

### 12.2. Persistence and degradability

Boron trichloride (10294-34-5)	
Persistence and degradability	Not applicable for inorganic products.

### 12.3. Bioaccumulative potential

Boron trichloride (10294-34-5)	
Partition coefficient n-octanol/water (Log Pow)	Not applicable.
Partition coefficient n-octanol/water (Log Kow)	Not applicable.
Bioaccumulative potential	No data available.

### 12.4. Mobility in soil

Boron trichloride (10294-34-5)	
Mobility in soil	No data available.

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Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
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### 12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.  
Effect on the ozone layer : None.  
Effect on global warming : No known effects from this product.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Product/Packaging disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

## SECTION 14: Transport information

In accordance with DOT

Transport document description (DOT) : UN1741 Boron trichloride, 2.3 (8)  
UN-No.(DOT) : UN1741  
Proper Shipping Name (DOT) : Boron trichloride  
Transport hazard class(es) (DOT) : 2.3 (8)  
Hazard labels (DOT) : Poison Gas  
2.3 - Poison gas  
8 - Corrosive



DOT Special Provisions (49 CFR 172.102) : 3 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone C (see 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.  
B9 - Bottom outlets are not authorized.  
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.

### Additional information

Emergency Response Guide (ERG) Number : 125  
Other information : No supplementary information available.  
Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:  
- Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

### Transport by sea

UN-No. (IMDG) : 1741  
Proper Shipping Name (IMDG) : BORON TRICHLORIDE  
Transport hazard class(es) (IMDG) : 2.3 (8)  
Division (IMDG) : 2.3 - Toxic gases  
Subsidiary hazard (IMDG) : 8  
EmS-No. (1) : F-C  
MFAG-No : 125  
EmS-No. (2) : S-U

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Other information : No supplementary information available.

### Air transport

UN-No. (IATA) : 1741  
 Proper Shipping Name (IATA) : Boron trichloride  
 Transport hazard class(es) (IATA) : 2.3 (8)  
 Subsidiary hazard (IATA) : 8  
 Civil Aeronautics Law : Gases under pressure/Gases toxic under pressure(Hazardous materials notice Appended Table 1 Article 194 of the Enforcement Regulations)

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Boron trichloride (10294-34-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Listed on the United States SARA Section 302

Subject to reporting requirements of United States SARA Section 313

CERCLA RQ	500 lb
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SARA Section 302 Threshold Planning Quantity (TPQ)	500 lb
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SARA Section 313 - Emission Reporting	1 %
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### 15.2. International regulations

#### CANADA

#### Boron trichloride (10294-34-5)

Listed on the Canadian DSL (Domestic Substances List)

#### EU-Regulations

#### Boron trichloride (10294-34-5)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

### 15.2.2. National regulations

#### Boron trichloride (10294-34-5)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)  
 Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
 Listed on the Japanese ENCS (Existing New Chemical Substances) inventory  
 Listed on the Japanese ISHL (Industrial Safety and Health Law)  
 Listed on KECL/KECI (Korean Existing Chemicals Inventory)  
 Listed on NZIoC (New Zealand Inventory of Chemicals)  
 Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
 Japanese Poisonous and Deleterious Substances Control Law  
 Japanese Pollutant Release and Transfer Register Law (PRTR Law)  
 Listed on the Canadian IDL (Ingredient Disclosure List)  
 Listed on INSQ (Mexican National Inventory of Chemical Substances)  
 Listed on the TCSI (Taiwan Chemical Substance Inventory)

### 15.3. US State regulations

#### Boron trichloride(10294-34-5)

U.S. - California - Proposition 65 - Carcinogens List	No
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U.S. - California - Proposition 65 - Developmental Toxicity	No
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Boron trichloride(10294-34-5)	
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

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### SECTION 16: Other information

#### Other information

: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Linde asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Linde Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Linde Inc, it is the user's obligation to determine the conditions of safe use of the product.

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#### NFPA health hazard

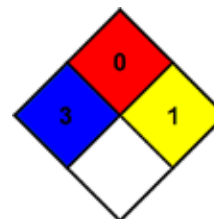
: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

#### NFPA fire hazard

: 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

#### NFPA instability

: 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures.



SDS US (GHS HazCom 2012) - Linde 2022

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*