



# Material Safety Data Sheet

## 1. Product and Company Identification

Product name : **Boron Trichloride**

Chemical formula : BCl<sub>3</sub>

Synonyms : Trichloroborane

Company : Specialty Gases of America, Inc  
6055 Brent Dr.  
Toledo, OH 43611

Telephone : 419-729-7732

Emergency : 800-424-9300

## 2. Composition/Information on Ingredients

Components	CAS Number	% Volume
Boron Trichloride	10294-34-5	100%

## 3. Hazards Identification

### Emergency Overview

Colorless poison gas with acidic odor. Nonflammable.  
Irritating and corrosive to the eyes, skin and respiratory system.  
Exposure to high concentrations may result in burns to mucous membranes.  
Inhalation into the deep lung may result in dangerous retention of body fluid and swelling in the lungs (pulmonary edema) and chemical pneumonitis.  
Hydrolyzes into hydrochloric and boric acid in the presence of water or moisture.  
Contents under pressure. Use and store below 125 F.

### Potential Health Effects

Inhalation : Boron trichloride hydrolyzes very rapidly into hydrochloric acid and boric acid in the presence of moisture. Slight exposure results in irritation of the upper respiratory tract and cough. Higher concentrations may cause inflammation and congestion of the lungs. Inhalation into the deep lung may result in difficulty breathing, chest pain, chemical pneumonitis and fluid retention with swelling in the lungs (edema). May cause shock, coma and death.

Eye contact : Eye contact will cause severe irritation, inflammation, and painful burns. Burns may result in lesions and blindness. PERSONS WITH POTENTIAL EXPOSURE TO BORON TRICHLORIDE SHOULD NOT WEAR CONTACT LENSES.

Skin contact : Low concentrations may cause "stinging" of the skin. Severe burns may result at higher concentrations. Inorganic acid-like burns and corrosive action will occur at high concentrations resulting in lesions and early necrosis.

Ingestion : None known. Ingestion is unlikely.

Chronic Health Hazard : None.

## 4. First Aid Measures

- General advice : None.
- Eye contact : Flush contaminated eye(s) with copious amounts of water. Part eyelids with fingers to assure complete flushing. Continue flushing for a minimum of 30 minutes. Seek immediate medical attention.
- Skin contact : Flush affected area with copious amounts of water while removing contaminated clothing. Seek immediate medical attention.
- Ingestion : None normally required.
- Inhalation : PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO BORON TRICHLORIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is essential. Unconscious persons should be moved to an uncontaminated area and given mouth-to-mouth resuscitation and supplemental oxygen. Keep victim warm and quiet. Treat for shock as indicated. Assure that mucous or vomited material does not obstruct the airways by use of positional drainage. Delayed pulmonary edema may occur. Keep patient under medical observation for at least 24 hours.

## 5. Fire-Fighting Measures

- Suitable extinguishing media : Nonflammable gas. Use media appropriate for surrounding fire. Do not use water directly on gas. Water spray may be used to knock-down vapor. Use water cautiously as boron trichloride reacts violently with water to product hydrochloric and boric acid.
- Specific hazards : Nonflammable gas. Cylinder may vent rapidly or rupture violently from pressure when involved in a fire situation.
- Fire fighting : Firefighters should wear respiratory protection (SCBA) and full turnout or Bunker gear. Additional chemical protective clothing should be worn to prevent skin contact. Special personnel decontamination procedures may be required. Consult HAZMAT specialist. Continue to cool fire exposed cylinders until well after flames are extinguished.

## 6. Accidental Release Measures

- Personal precautions : None.
- Environmental precautions : None.
- Methods for cleaning up : Evacuate all personnel from affected area. Deny entry to unauthorized and unprotected individuals. Prevent entry into waterways and sewers. Appropriate protective equipment is essential to prevent exposure. Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. Ventilate closed areas. Boron trichloride will react vigorously with water or steam to form toxic and corrosive fumes. Use water spray with caution to knock down fumes and vapors. Consult HAZMAT specialist, and your supplier. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs.
- Additional advice : None.

## 7. Handling and Storage

### Handling

Any materials suitable for use with anhydrous hydrogen chloride may be used with boron trichloride. Keep equipment scrupulously dry. Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a pressure reducing regulator when connecting the cylinder to lower pressure piping or systems. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Do not insert any object (i.e. screwdriver) into valve cap openings as this can damage the

valve causing leakage. Never carry a compressed gas cylinder or a container of gas in cryogenic liquid form in an enclosed space such as car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

#### Storage

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits and separate from incompatible materials. Do not allow the temperatures where cylinders are stored to exceed 125 F (52 C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

### **8. Exposure Controls / Personal Protection**

#### Engineering measures

Use enclosures and mechanical exhaust ventilation to limit concentrations to below current exposure limits.

#### Personal protective equipment

Respiratory protection	:	For emergency release and conditions with exposures above the applicable exposure limits use a positive pressure NIOSH approved air-supplying respirator systems using a full-face mask and at a minimum Grade D air.
Hand protection	:	Wear appropriate protective and chemical-resistant gloves.
Eye protection	:	Gas-tight safety glasses with full faceshield, or full-face respirator. Eyewash fountain and safety shower should be available in the immediate work area.
Skin and body protection	:	Wear appropriate protective and chemical-resistant boots, clothing and splash protection, or full encapsulating vapor protective clothing. (Teflon™ and Responder™ provide adequate protection for exposures to hydrogen chloride and boron trichloride greater than 8 hours but consult with protective clothing manufacturer's specific information).
Ventilation	:	None.
Remarks	:	None.

### **9. Physical and Chemical Properties**

Form	:	Gas.
Color	:	Colorless.
Odor	:	Acidic odor.
Molecular weight	:	Not available.
Vapor pressure	:	20.6 psia @ 70 F
Vapor density	:	4.03 (air = 1)
Specific gravity	:	Not available.
Boiling point	:	-54.5 F (12.5 C)
Freezing point	:	-161 F (-107 C)
Water solubility	:	Hydrolyzes

### **10. Stability and Reactivity**

Stability	:	Stable under normal conditions.
Conditions to avoid	:	Not available.
Materials to avoid	:	Reacts rigorously with water, steam, or moist air to produce heat and toxic or corrosive fumes. Incompatible with hexafluoroisopropylidene amino lithium, nitrogen dioxide, grease, organic matter, and oxygen. Reacts vigorously with fat or grease, oxygen (on sparking), nitrogen peroxide, aniline, and phosphine.
Hazardous	:	Hydrolysis yields hydrochloric and boric acids. Thermal decomposition may

decomposition products produce toxic hydrogen chloride gas.

## 11. Toxicological Information

### Acute Health Hazard

- Ingestion : Not available.
- Inhalation : Seven hour LCLo: 20 ppm (rat and mouse). Boron affects the central nervous system (CNS) causing CNS depression as well as shock and coma. The one hour LC<sub>50</sub> for boron trichloride is 2,541 ppm (rat).
- Skin and Eye : Contact can cause severe or corrosive burns with early necrosis and scarring.
- Other : Boron may cause kidney damage due to high concentrations reached during excretion.

## 12. Ecological Information

Product does not contain Class I or Class II ozone depletion substances. See Section 3 for ecotoxicity information. Bioconcentration data was unavailable. Boron trichloride is listed as an extremely hazardous substance (EHS) with a threshold planning quantity (TPQ) and reportable quantity (RQ) of 500 pounds. Boron trichloride is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 5,000 pounds.

## 13. Disposal Considerations

- Waste from residues / unused products : Do not attempt to dispose of residual or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to the supplier.
- Contaminated packaging : Return cylinder to supplier.

## 14. Transport Information

### DOT (US only)

- Proper shipping name : Boron Trichloride
- Class : 2.3 (8)
- UN/ID No. : UN1741
- Labeling : Poison Gas, Corrosive
- Additional marking requirement : "Inhalation Hazard"
- Additional shipping paper description requirement : "Poison-Inhalation Hazard, Zone C"

### Further information

Cylinders should be transported in a secure upright position in a well ventilated truck.

## 15. Regulatory Information

OSHA Process Safety (29 CFR 1910.119) Hazard Class(es)  
2500 lbs TQ.

### TCSA

Material is not listed in TSCA inventory.

SARA Title III Sections 302/304 Extremely Hazardous Substances (40 CFR 355.30)

Threshold Planning Quantity (TPQ): 500 lbs

Reportable Quantity (RQ): 500 lbs

SARA Title III SARA Sections 311/312 Hazardous Categories (40 CFR 370.21)

Acute: Yes

Chronic: No

Fire: No

Reactive: Yes

Sudden Release: Yes

SARA Title III Section 313 (40 CFR 372.65)

Boron Trichloride

**16. Other Information**

Prepared by : Specialty Gases of America, Inc.

For additional information, please visit our website at [www.americangasgroup.com](http://www.americangasgroup.com).