

## Praxair Material Safety Data Sheet

### 1. Chemical Product and Company Identification

<b>Product Name:</b> Boron trichloride	<b>Trade Name:</b> Boron trichloride
<b>Product Use:</b> Many	
<b>Chemical Name:</b> Boron trichloride	<b>Synonym:</b> Boron chloride, Trichloroborane.
<b>Chemical Formula:</b> BCl <sub>3</sub>	<b>Chemical Family:</b> Boron Halides
<b>Telephone:</b>	<b>Emergencies:</b> * 1-800-363-0042
	<b>Supplier /Manufacture:</b> Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2
	<b>Phone:</b> 905-803-1600
	<b>Fax:</b> 905-803-1682

*\*Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

### 2. Composition and Information on Ingredients

INGREDIENTS	% (VOL)	CAS NUMBER	LD <sub>50</sub> (Species & Routes)	LC <sub>50</sub> (Rat, 4 hrs.)	TLV-TWA (ACGIH)
Boron trichloride	100	10294-34-5	Not applicable.	1270 ppm	None currently established.

### 3. Hazards Identification



#### Emergency Overview



**DANGER:** Toxic, corrosive liquid and gas under pressure. Harmful or fatal if inhaled. Causes eye, skin, and respiratory tract burns. May cause liver, kidney, and respiratory system damage. Self-contained breathing apparatus must be worn by rescue workers. Odour: Pungent, irritating.

#### ROUTES OF EXPOSURE:

Inhalation. Swallowing. Skin absorption. Skin contact. Eye contact.

**THRESHOLD LIMIT VALUE:** TLV-TWA Data from 2004 Guide to Occupational Exposure Values (ACGIH). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

#### EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

**INHALATION:** Overexposure to vapour concentrations moderately above 5 ppm are irritating to the upper respiratory tract. Concentrations in the range of 50-100 ppm are intolerable. At higher concentration (e.g., greater than 50 ppm) causes choking, coughing, burning of the throat and severe irritation of the respiratory tract; additional there is the possibility of ulceration of the nose, throat, and larynx, laryngeal spasm, pulmonary edema.

#### SKIN CONTACT:

Boron trichloride gas may cause severe irritation, chemical burns with ulceration and scarring of the skin. Repeated exposure of skin to vapours may result in dermatitis.

**SKIN ABSORPTION:** Prolonged or widespread skin contact with the liquid may result in the absorption of harmful amounts of material.

**SWALLOWING:** May cause chemical burns of the mouth, throat, esophagus, and stomach with severe abdominal and chest pain. There may be nausea, vomiting, diarrhea, weakness, collapse and coma.

**EYE CONTACT:** Exposure to the eye causes immediate pain and irritation with excess tear production and closure of the eyelids. The severity of injury depends on the concentration and duration of contact and may range from slight redness and irritation of the conjunctiva to total corneal opacification and blindness.

#### **EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:**

Causes damage to the following organs: upper respiratory tract, skin, eyes. May cause damage to the following organs: kidneys, liver.

Prolonged or repeated exposure to vapour may cause discoloration or erosion of the teeth, bleeding of nose and gums and ulceration of the nasal mucosa.

#### **OTHER EFFECTS OF OVEREXPOSURE:**

None known.

#### **MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:**

Breathing of vapour (and/or mist) may aggravate asthma and inflammatory or fibrotic pulmonary disease. The skin irritating effects of the material may aggravate an existing dermatitis.

#### **SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:**

None currently known.

#### **CARCINOGENICITY:**

Not listed as carcinogen by OSHA, NTP or IARC.

### **4. First Aid Measures**

#### **INHALATION:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. Keep patient warm.

#### **SKIN CONTACT:**

In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Discard clothing and shoes.

#### **SWALLOWING:**

Rinse mouth with water. Give two glasses of water. Do not induce vomiting. Call a physician.

#### **EYE CONTACT:**

Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. See a physician, preferably an ophthalmologist, immediately.

#### **NOTES TO PHYSICIAN:**

*Victims of overexposure should be observed for at least 72 hours for delayed onset of pulmonary edema. The hazards of this material are mainly due to its severe irritant and corrosive properties on the skin and mucosal surfaces. There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.*

### 5. Fire Fighting Measures

**FLAMMABLE :** No. **IF YES, UNDER WHAT CONDITIONS?** Not applicable.

<b>FLASH POINT (test method)</b> Not applicable.	<b>AUTOIGNITION TEMPERATURE</b> Not applicable.
--	---

<b>FLAMMABLE LIMITS IN AIR, % by volume:</b>	<b>LOWER:</b> Not applicable.	<b>UPPER:</b> Not applicable.
--	-------------------------------	-------------------------------

**EXTINGUISHING MEDIA:**

This material cannot catch fire. Use media appropriate for surrounding fire.

**SPECIAL FIRE FIGHTING PROCEDURES:**

**DANGER:** Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool; then move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. If containers are leaking, reduce vapours with water spray or fog. Shut off leak if without risk. Move containers away from fire area if without risk.

**UNUSUAL FIRE AND EXPLOSION HAZARD:**

Nonflammable, toxic, corrosive gas. Heat of fire can build pressure in cylinder and cause it to rupture. Vapours are extremely irritating. Contact may cause burns to skin and eyes. No part of cylinder should be subjected to a temperature higher than 125°F (52°C). Most containers are equipped with a pressure relief device designed to vent contents when they are exposed to elevated temperatures.

**HAZARDOUS COMBUSTION PRODUCTS:**

None.

**SENSITIVITY TO IMPACT:**

Avoid impact against container.

**SENSITIVITY TO STATIC DISCHARGE:**

Not applicable.

### 6. Accidental Release Measures

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

**DANGER:** Corrosive, toxic gas. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing where needed. Reduce vapours with fog or fine water spray. Reverse flow into cylinder may cause rupture. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Prevent runoff from contaminating surrounding environment. Corrosive, toxic vapours may spread from spill. Before entering area, especially confined areas, check atmosphere with appropriate device.

**WASTE DISPOSAL METHOD:**

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

## 7. Handling and Storage

### PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

### PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. 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. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

### OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

**Toxic, corrosive high-pressure gas.** Do not breathe gas. Do not get vapour in eyes, on skin, or on clothing. Have safety showers and eyewash fountains immediately available. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

## 8. Exposure Controls/Personal Protection

### VENTILATION/ENGINEERING CONTROLS:

**LOCAL EXHAUST:** A corrosion-resistant system is acceptable.  
See SPECIAL.

**MECHANICAL (general):** Inadequate.  
See SPECIAL.

**SPECIAL:** Use only in a closed system.  
A corrosion-resistant, forced-draft fume hood is preferred.

**OTHER:** See SPECIAL.

### PERSONAL PROTECTION:

**RESPIRATORY PROTECTION:** Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

**SKIN PROTECTION:** Neoprene gloves.

**EYE PROTECTION:** Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

**OTHER PROTECTIVE EQUIPMENT:** Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

### 9. Physical and Chemical Properties

<b>PHYSICAL STATE:</b> Gas. (Compressed Gas)	<b>FREEZING POINT:</b> -107.3°C (-161.1°F)	<b>pH:</b>	Not applicable.
<b>BOILING POINT</b> 12.5°C (54.5°F)	<b>VAPOUR PRESSURE</b> 131.6 kPa (@ 20°C)	<b>MOLECULAR WEIGHT:</b>	117.17 g/mole
<b>SPECIFIC GRAVITY: LIQUID ( Water = 1)</b> 1.349	<b>SOLUBILITY IN WATER,</b> Reacts.		
<b>SPECIFIC GRAVITY: VAPOUR (air = 1)</b> 4.045	<b>EVAPORATION RATE (Butyl Acetate=1):</b> >1 compared to (Butyl Acetate=1)	<b>COEFFICIENT OF WATER/OIL DISTRIBUTION:</b>	Not available.
<b>VAPOUR DENSITY:</b> 0.00485 g/ml @ 21.1 C	<b>% VOLATILES BY VOLUME:</b> 100% (v/v).	<b>ODOUR THRESHOLD:</b>	Not available.
<b>APPEARANCE &amp; ODOUR:</b> Colourless		Odour: Pungent. Irritant. (Strong.)	

### 10. Stability and Reactivity

<b>STABILITY:</b>	Unstable.
<b>CONDITIONS OF CHEMICAL INSTABILITY:</b>	Not available.
<b>INCOMPATIBILITY (materials to avoid):</b>	Reacts with most substances including water, organics, hydrogen, ammonia, grease, oxygen, alcohols, nitrogen peroxide.
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Burning may produce toxic fumes of chlorides. Boron trichloride is hydrolyzed by water or moisture to form hydrochloric and boric acids.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur.
<b>CONDITIONS OF REACTIVITY:</b>	None.

### 11. Toxicological Information

See section 3.

### 12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

### 13. Disposal Considerations

**WASTE DISPOSAL METHOD:**

Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

### 14. Transport Information

**TDG/IMO SHIPPING NAME:**

Boron trichloride

**HAZARD CLASS:**

 CLASS 2.3: Poisonous gas.  
 Class 8: Corrosive material

**IDENTIFICATION #:**

UN1741

**PRODUCT RQ:**

All

**SHIPPING LABEL(s):**

Poison gas, Corrosive material

**PLACARD (when required):**

Poison gas, Corrosive material

**SPECIAL SHIPPING INFORMATION:**

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of vehicle can present serious safety hazards.

### 15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations.

**WHMIS (Canada)**

 CLASS A: Compressed gas.  
 CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).  
 CLASS E: Corrosive gas.

**International Regulations**
**EINECS**

Not available.

**DSCL (EEC)**

R20- Harmful by inhalation.

**International Lists**

No products were found.

### 16. Other Information

**MIXTURES:**

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to 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 make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

**HAZARD RATING SYSTEM:**
**HMIS RATINGS:**

HEALTH 1

FLAMMABILITY 0

PHYSICAL HAZARD 1

**STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:**

<b>THREADED:</b>	CGA-660
<b>PIN-INDEXED YOKE:</b>	Not available.
<b>ULTRA-HIGH-INTEGRITY CONNECTION:</b>	CGA-634

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1	Safe Handling and Storage of Compressed Gas
P-1	Safe Handling of Compressed Gases in Containers
V-1	Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7	Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
---	Handbook of Compressed Gases, Fourth Edition

**PREPARATION INFORMATION:**

<b>DATE:</b>	<b>10/15/2004</b>
<b>DEPARTMENT:</b>	<b>Safety and Environmental Services</b>
<b>TELEPHONE:</b>	<b>905-803-1600</b>

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

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

*Praxair* and the *Flowing Airstream* design are trademarks of  
Praxair Canada Inc.

Other trademarks used herein are trademarks or registered trademarks of their respective owners.



Praxair Canada Inc.  
1 City Centre Drive  
Suite 1200  
Mississauga, ON L5B 1M2