

## Praxair Material Safety Data Sheet

### 1. Chemical Product and Company Identification



<b>Product Name:</b> Boron trifluoride	<b>Trade Name:</b> Boron trifluoride
<b>Product Use:</b> Many	
<b>Chemical Name:</b> Boron trifluoride	<b>Synonym:</b> Boron fluoride, Trifluoroboron
<b>Chemical Formula:</b> BF <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 trifluoride	100	7637-07-2	Not available.	Not available.	1 ppm Ceiling.

### 3. Hazards Identification

	<b>Emergency Overview</b>	
<p><b>DANGER!</b> Toxic, corrosive high pressure gas. May be fatal if inhaled. Causes eye and skin burns. May cause kidney and respiratory system damage. Self-contained breathing apparatus must be worn by rescue workers.</p>		

**ROUTES OF EXPOSURE:** Inhalation. Skin absorption. Skin contact. Eye contact.

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

**INHALATION:** May be fatal if inhaled at high concentrations. Extremely irritating to the mucous membranes and respiratory tract. May cause coughing, choking sensation, chills, chest pain, pulmonary edema, and death. TLV ceiling: 1 ppm (OSHA, ACGIH).

**SKIN CONTACT:** Severly irritating and producing marked local redness and swelling; high concentrations may cause burns.

**SKIN ABSORPTION:** Skin burns may result in the absorption of potentially harmful amounts of material.

**SWALLOWING:** This product is a gas at normal temperature and pressure.

**EYE CONTACT:** Severly irritating and causing mild excess redness and swelling of the conjunctiva; high concentrations may cause burns of the cornea.

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

Repeated overexposure may cause dryness of the nasal membranes, nosebleed, dental fluorosis, bronchiolitis and pneumonitis

**OTHER EFFECTS OF OVEREXPOSURE:**

May cause kidney damage

**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:**

Not available .

**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 immediately.

**SKIN CONTACT:**

Immediately remove contaminated clothing and flush skin with plenty of water. Soak burned areas in an iced aqueous Epsom salt solution for at least 30 minutes. Call a physician. Wash clothing before reuse.

**SWALLOWING:**

This product is a gas at normal temperature and pressure.

**EYE CONTACT:**

Immediately flush eyes with water for a least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

**NOTES TO PHYSICIAN:**

*There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition. Keep under observation for 72 hours for delayed onset of pulmonary edema.*

#### 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.
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<b>FLAMMABLE LIMITS IN AIR, % by volume:</b>	<b>LOWER:</b> Not applicable.	<b>UPPER:</b> Not applicable.
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**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. Container may rupture due to heat of fire. Vapours are extremely irritating. Contact may cause burns to skin and eyes. No part of a container should be subjected to a temperature higher than 52 C. Forms hydrogen fluoride in the presence of moisture. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

**HAZARDOUS COMBUSTION PRODUCTS:**

Boron and fluorine.

**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. Electrical equipment must be non-sparking or explosion-proof. Leak check system with soapy water; never use a flame. 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:** For concentrations up to 10 times the applicable exposure limit any NIOSH/MSHA approved supplied air respirator is recommended. Up to 50 times the TLV, a NIOSH/MSHA approved respirator with a full face piece or self-contained breathing apparatus is recommended. For higher concentrations use only self contained breathing apparatus operated in the pressure demand mode. Select in accordance with the provincial regulations or guidelines

**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> -128°C (-198.4°F)	<b>pH:</b> Not applicable.
<b>BOILING POINT</b> -100.3°C (-148.5°F)	<b>VAPOUR PRESSURE</b>  Not applicable.	<b>MOLECULAR WEIGHT:</b> 67.81 g/mole
<b>SPECIFIC GRAVITY:</b> 1.57 @ -100.3 C <b>LIQUID ( Water = 1)</b>	<b>SOLUBILITY IN WATER,</b>  Appreciably soluble in cold water. Reacts with hot water.	

Product Name: Boron trifluoride

MSDS# E-4567-I

Date: Oct 15, 2016

<b>SPECIFIC GRAVITY:</b> VAPOUR (air = 1)	2.32	<b>EVAPORATION RATE</b> (Butyl Acetate=1):	Not applicable.	<b>COEFFICIENT OF WATER/OIL DISTRIBUTION:</b>	Not applicable.
<b>VAPOUR DENSITY:</b>	0.0038 g/ml @ 0 C	<b>% VOLATILES BY VOLUME:</b>	100% (v/v).	<b>ODOUR THRESHOLD:</b>	Not available.

**APPEARANCE & ODOUR:** Colourless. Odour: Pungent. Suffocating. (Strong.)

## 10. Stability and Reactivity

<b>STABILITY:</b>	Stable
<b>CONDITIONS OF CHEMICAL INSTABILITY:</b>	Not available.
<b>INCOMPATIBILITY (materials to avoid):</b>	Water, rubber, many plastics, organics, alkali metals, alkaline earth metals (except magnesium), calcium oxide, silver.
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Thermal decomposition may produce boron and fluorine. Reacts with water to form hydrates of boron trifluoride and other toxic fluorides.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur.
<b>CONDITIONS OF REACTIVITY:</b>	None known.

## 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 trifluoride, compressed

<b>HAZARD CLASS:</b>	CLASS 2.3(8): Toxic and Corrosive gas.	<b>IDENTIFICATION #:</b>	UN1008	<b>PRODUCT REPORTABLE QUANTITY (PRQ):</b>	Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.
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**SHIPPING LABEL(s):** Toxic gas, Corrosive material

**PLACARD (when required):** Toxic gas

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a 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.

<b>DSL (Canada)</b>	This product is on the DSL list
<b>WHMIS (Canada)</b>	CLASS A: Compressed gas. CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive gas.

### International Regulations

<b>EINECS</b>	Not available.
<b>DSCL (EEC)</b>	R23- Toxic 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	3
FLAMMABILITY	0
PHYSICAL HAZARD	2

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

<b>THREADED:</b>	CGA-330
<b>PIN-INDEXED YOKE:</b>	Not available.
<b>ULTRA-HIGH-INTEGRITY CONNECTION:</b>	CGA-642

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](http://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
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### PREPARATION INFORMATION:

<b>DATE:</b>	<b>Oct 15, 2016</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.

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