

**MATERIAL SAFETY DATA SHEET**

PRODUCT NAME: BORON TRIFLUORIDE
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**1. Chemical Product and Company Identification**

**BOC Gases,**  
**Division of**  
**The BOC Group, Inc.**  
**575 Mountain Avenue**  
**Murray Hill, NJ 07974**

**BOC Gases**  
**Division of**  
**BOC Canada Limited**  
**5975 Falbourne Street, Unit 2**  
**Mississauga, Ontario L5R 3W6**

**TELEPHONE NUMBER:** (908) 464-8100  
**24-HOUR EMERGENCY TELEPHONE NUMBER:**  
**CHEMTREC (800) 424-9300**

**TELEPHONE NUMBER:** (905) 501-1700  
**24-HOUR EMERGENCY TELEPHONE NUMBER:**  
**(905) 501-0802**  
**EMERGENCY RESPONSE PLAN NO:** 20101

**PRODUCT NAME:** BORON TRIFLUORIDE  
**CHEMICAL NAME:** Boron Fluoride  
**COMMON NAMES/SYNONYMS:** Boron Fluoride  
**TDG (Canada) CLASSIFICATION:** 2.3  
**WHMIS CLASSIFICATION:** A, D1A, E, D2B, F

**PREPARED BY:** Loss Control (908)464-8100/(905)501-1700  
**PREPARATION DATE:** 6/1/95  
**REVIEW DATES:** 6/7/96

**2. Composition, Information on Ingredients**

INGREDIENT	% VOLUME	PEL-OSHA <sup>1</sup>	TLV-ACGIH <sup>2</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Boron Fluoride FORMULA: BF <sub>3</sub> CAS: 7637-07-2 RTECS #: ED2275000	100.0	1 ppm Ceiling	1 ppm Ceiling	LC <sub>50</sub> 1180 mg/m <sup>3</sup> /4H (rat)

<sup>1</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>2</sup> As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

**3. Hazards Identification****EMERGENCY OVERVIEW**

Irritating to the eyes, skin and respiratory system. Exposure to high concentrations may result in burns to mucous membranes. Levels as low as 50 ppm may result in cardiac collapse, pulmonary edema, and chemical pneumonitis.

**ROUTE OF ENTRY:**

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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PRODUCT NAME: BORON TRIFLUORIDE

**HEALTH EFFECTS:**

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None Reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

**EYE EFFECTS:**

Eye contact will cause severe irritation and inflammation. Painful burns may result in lesions and loss of vision. PERSONS WITH POTENTIAL EXPOSURE TO BORON TRIFLUORIDE SHOULD NOT WEAR CONTACT LENSES.

**SKIN EFFECTS:**

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 EFFECTS:**

None known. Ingestion is unlikely.

**INHALATION EFFECTS:**

Slight exposure results in irritation of the upper respiratory tract and cough. Higher concentrations may cause inflammation and congestion of the lungs. Concentrations as low as 50 ppm may be fatal, due to cardiac collapse and complications of pulmonary edema and chemical pneumonitis.

**NFPA HAZARD CODES**

Health: 4  
Flammability: 0  
Reactivity: 1

**HMS HAZARD CODES**

Health: 4  
Flammability: 0  
Reactivity: 1

**RATINGS SYSTEM**

0 = No Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

**4. First Aid Measures**

**EYES:**

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 medical attention as soon as possible.

**SKIN:**

Flush affected area with copious amounts of water. Remove contaminated clothing as soon as possible. Dermal burns may be treated with calcium gluconate gel or slurry in water or glycerine. This compound binds the active fluorides in an insoluble form and limits burn extension and limits pain.

**INGESTION:**

None normally required.

**INHALATION:**

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO BORON TRIFLUORIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF CONTAINED

MSDS: G-16

Revised: 6/7/96

**PRODUCT NAME: BORON TRIFLUORIDE**

**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 mucus or vomited material does not obstruct the airway by use of positional drainage. Delayed pulmonary edema may occur. Keep patient under medical observation for at least 24 hours. It has been reported that inhalation of 100% oxygen for half hour periods for the first 6-8 hours is beneficial.

## 5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL(%): None	UEL(%): None	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

### **FIRE AND EXPLOSION HAZARDS:**

Nonflammable gas.

### **EXTINGUISHING MEDIA:**

Nonflammable gas.

### **FIRE FIGHTING INSTRUCTIONS:**

None required.

## 6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

## 7. Handling and Storage

### **Electrical Classification:**

Non-hazardous

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Dry Boron Trifluoride may be used with mild steel, copper, copper-zinc and copper-silicon alloys, nickel or Monel ®. The moist (water) gas is best handled in Monel ®. Fluoride "passivation" is also recommended. Kel-F ® and Teflon ® are the preferred gasketing materials. Mercury containing manometers should not be used since Boron trifluoride is soluble in mercury. Keep equipment scrupulously dry. Many of the metal fluorides are water soluble so that the passive film corrosion protection may be destroyed if wetted with water.

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 cylinder to lower pressure (<3000 psig) piping or systems. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperatures where cylinders are stored to exceed 130°F (54°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.

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

## 8. Exposure Controls, Personal Protection

### EXPOSURE LIMITS<sup>1</sup>:

INGREDIENT	% VOLUME	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Boron Fluoride FORMULA: BF <sub>3</sub> CAS: 7637-07-2 RTECS #: ED2275000	100.0	1 ppm Ceiling	1 ppm Ceiling	LC <sub>50</sub> 1180 mg/m <sup>3</sup> /4H (rat)

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>3</sup> As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

### ENGINEERING CONTROLS:

Hood with forced ventilation. Use local exhaust to prevent accumulation above the ceiling limit.

### EYE/FACE PROTECTION:

Safety goggles or glasses.

### SKIN PROTECTION:

Plastic or rubber.

### RESPIRATORY PROTECTION:

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

### OTHER/GENERAL PROTECTION:

Safety shoes, safety shower, eyewash "fountain".

## 9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Not Available	
Vapor density (Air = 1)	: 2.38	
Evaporation point	: Not Available	
Boiling point	: -148.54	°F
	: -100.3	°C
Freezing point	: -199.7	°F
	: -128.7	°C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Very soluble	
Odor threshold	: Not Available	
Odor and appearance	: Acrid suffocating odor; Colorless gas forming thick acidic fumes in moist air.	

## 10. Stability and Reactivity

### STABILITY:

Stable.

### INCOMPATIBLE MATERIALS:

Moist gas is corrosive to most metallic materials and some plastics. Hot or warm water. Product will decompose.

### HAZARDOUS DECOMPOSITION PRODUCTS:

Decomposes in hot water yielding hydrogen fluoride.

### HAZARDOUS POLYMERIZATION:

Will not occur.

## 11. Toxicological Information

LC<sub>50</sub> (Rat), Inhalation 1180 mg/m<sup>3</sup> for 4 hours.

## 12. Ecological Information

No data given.

## 13. Disposal Considerations

Do not attempt to dispose of residual waste 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 BOC Gases or authorized distributor for proper disposal.

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## 14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Boron Trifluoride	Boron Trifluoride
HAZARD CLASS:	2.3	2.3
IDENTIFICATION NUMBER:	UN 1008	UN 1008
SHIPPING LABEL:	POISON GAS	POISON GAS

**Additional Marking Requirement:** "Inhalation Hazard"

**Additional Shipping Paper Description Requirement:** "Poison-Inhalation Hazard, Zone B"

## 15. Regulatory Information

### SARA TITLE III NOTIFICATIONS AND INFORMATION

Boron trifluoride is listed as an extremely hazardous substance (EHS) subject to state and local reporting under Section 304 of SARA Title III (EPCRA) with a reportable quantity (RQ) of 1 pound.

The presence of boron trifluoride in quantities in excess of the threshold planning quantity (TPQ) of 500 pounds requires certain emergency planning activities to be conducted.

### SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Chronic Health Hazard

Sudden Release of Pressure Hazard

### SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY VOLUME
7637-07-2	Boron trifluoride	100.0

This information must be included on all MSDSs that are copied and distributed for this material.

## 16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

### DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).