1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers
Product name: Boron trichloride
Product Number: 295019
Brand: Aldrich
Index-No.: 005-002-00-5
CAS-No.: 10294-34-5

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone: +1 800-325-5832
Fax: +1 800-325-5052

1.4 Emergency telephone number
Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Gases under pressure (Compressed gas), H280
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 2), H330
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word
Danger

Hazard statement(s)
H280  Contains gas under pressure; may explode if heated.
H300 + H330  Fatal if swallowed or if inhaled
H314  Causes severe skin burns and eye damage.
H335  May cause respiratory irritation.

Precautionary statement(s)
P260  Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264  Wash skin thoroughly after handling.
P270  Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 Wear respiratory protection.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.
P320 Specific treatment is urgent (see supplemental first aid instructions on this label).
P363 Wash contaminated clothing before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
This substance is not considered to be persistent, bioaccumulating and toxic (PBT).
Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Substance</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>BCl₃</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>117.17 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>10294-34-5</td>
</tr>
<tr>
<td>EC-No.</td>
<td>233-658-4</td>
</tr>
<tr>
<td>Index-No.</td>
<td>005-002-00-5</td>
</tr>
<tr>
<td>Registration number</td>
<td>01-2119962197-29-XXXX</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.
If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES
5.1 Extinguishing media
Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas, Borane/boron oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES
6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Do not flush with water.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE
7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Never allow product to get in contact with water during storage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
8.1 Control parameters
Components with workplace control parameters
Contains no substances with occupational exposure limit values.

Derived No Effect Level (DNEL)

<table>
<thead>
<tr>
<th>Application Area</th>
<th>Exposure routes</th>
<th>Health effect</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers</td>
<td>Inhalation</td>
<td>Acute systemic effects</td>
<td>16 mg/m3</td>
</tr>
<tr>
<td>Workers</td>
<td>Inhalation Long-term local effects</td>
<td>8 mg/m³</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Workers</td>
<td>Inhalation Long-term systemic effects</td>
<td>16 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

**Predicted No Effect Concentration (PNEC)**

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.048 mg/l</td>
</tr>
<tr>
<td>Soil</td>
<td>0.011 mg/kg</td>
</tr>
<tr>
<td>Air</td>
<td>0.016 mg/l</td>
</tr>
<tr>
<td>Marine water</td>
<td>0.039 mg/l</td>
</tr>
<tr>
<td>Fresh water</td>
<td>0.039 mg/l</td>
</tr>
<tr>
<td>Marine sediment</td>
<td>0.039 mg/kg</td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>0.039 mg/kg</td>
</tr>
<tr>
<td>Onsite sewage treatment plant</td>
<td>0.039 mg/l</td>
</tr>
</tbody>
</table>

### 8.2 Exposure controls

**Appropriate engineering controls**
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Personal protective equipment**

**Eye/face protection**
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

- **Full contact**
  - Material: Fluorinated rubber
  - Minimum layer thickness: 0.7 mm
  - Break through time: 480 min
  - Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

- **Splash contact**
  - Material: Fluorinated rubber
  - Minimum layer thickness: 0.7 mm
  - Break through time: 480 min
  - Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

**Body Protection**
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Compressed gas
b) Odour No data available
c) Odour Threshold No data available
d) pH No data available
e) Melting point/freezing point Melting point/range: -107 °C (-161 °F) - lit.
f) Initial boiling point and boiling range 12.5 °C (54.5 °F) - lit.
g) Flash point Not applicable
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available
j) Upper/lower flammability or explosive limits No data available
k) Vapour pressure 1,900 hPa (1,425 mmHg) at 30 °C (86 °F)
   3,200 hPa (2,400 mmHg) at 50 °C (122 °F)
   1,317.0 hPa (987.8 mmHg) at 21.1 °C (70.0 °F)
l) Vapour density 4.05 - (Air = 1.0)
m) Relative density No data available
n) Water solubility No data available
o) Partition coefficient: n-octanol/water No data available
p) Auto-ignition temperature No data available
q) Decomposition temperature No data available
r) Viscosity No data available
s) Explosive properties No data available
t) Oxidizing properties No data available

9.2 Other safety information

Relative vapour density 4.05 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Strong oxidizing agents
10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - 4 h - 945 mg/m3
Remarks: Extremely corrosive and destructive to tissue. Hydrogen chloride

Dermal: No data available

No data available

Skin corrosion/irritation
Causes skin burns.

Serious eye damage/eye irritation
Risk of serious damage to eyes.

Respiratory or skin sensitisation
Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity
Did not show carcinogenic or mutagenic effects in animal experiments.

Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Damage to fetus unlikely if the occupational exposure limit values are not exceeded.

Damage to fertility unlikely if the occupational exposure limit values are not exceeded.

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No aspiration toxicity classification

Additional Information
RTECS: ED1925000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish
NOEC - Marine species - > 0.01 mg/l
Remarks: May be harmful to aquatic organisms due to the shift of the pH.
12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
Bioaccumulation is unlikely.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

12.6 Other adverse effects
May be harmful to aquatic organisms due to the shift of the pH.
Stability in water DT50 at 25 °C - < 0.016 h
(OCED Test Guideline 111)
Remarks: Hydrolyses on contact with water. Converted in the aquatic environment into the following: Boric acid and Hydrogen chloride

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1741 Class: 2.3 (8)
Proper shipping name:
Reportable Quantity (RQ):
Marine pollutant: No
Poison Inhalation Hazard: Hazard zone C

IMDG
UN number: 1741 Class: 2.3 (8)
EMS-No: F-C, S-U

IATA
UN number: 1741 Class: 2.3 (8)
Proper shipping name:
IATA Passenger: Not permitted for transport
IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron trichloride</td>
<td>10294-34-5</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron trichloride</td>
<td>10294-34-5</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards
Sudden Release of Pressure Hazard, Acute Health Hazard
Massachusetts Right To Know Components
Boron trichloride
CAS-No. 10294-34-5
Revision Date 1993-04-24

Pennsylvania Right To Know Components
Boron trichloride
CAS-No. 10294-34-5
Revision Date 1993-04-24

New Jersey Right To Know Components
Boron trichloride
CAS-No. 10294-34-5
Revision Date 1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.   Acute toxicity
Eye Dam.   Serious eye damage
H280   Contains gas under pressure; may explode if heated.
H300   Fatal if swallowed.
H300 + H330   Fatal if swallowed or if inhaled
H314   Causes severe skin burns and eye damage.
H318   Causes serious eye damage.
H330   Fatal if inhaled.
H335   May cause respiratory irritation.

HMIS Rating
Health hazard: 4
Chronic Health Hazard:
Flammability: 1
Physical Hazard 1

NFPA Rating
Health hazard: 4
Fire Hazard: 0
Reactivity Hazard: 0

Further information
Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.7   Revision Date: 09/08/2014   Print Date: 10/28/2015