

**Danger**



### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Trade name : Boron trichloride  
 SDS no : SDS-006-CLP  
 Chemical description : Boron trichloride  
 CAS No : 10294-34-5  
 EC no : 233-658-4  
 EC index no : 005-002-00-5  
 Registration-No. : 01-2119962197-29  
 Chemical formula : BCl<sub>3</sub>

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.  
 Test gas/Calibration gas.  
 Laboratory use.  
 Chemical reaction / Synthesis.  
 Use for manufacture of electronic/photovoltaic components.  
 Contact supplier for more information on uses.  
 Uses advised against : Consumer use.

#### 1.3. Details of the supplier of the safety data sheet

Company identification : Air Liquide UK Ltd.  
 Station Road, Coleshill  
 B46 1JY Birmingham United Kingdom  
 01675462424  
 genenq.aluk@airliquide.com

#### 1.4. Emergency telephone number

Emergency telephone number : 01675 462695

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Gases under pressure : Liquefied gas	H280
Health hazards	Acute toxicity (oral), Category 2	H300
	Acute toxicity (inhalation:gas) Category 2	H330
	Skin corrosion/irritation, Category 1B	H314
	Serious eye damage/eye irritation, Category 1	H318
	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335
Environmental hazards	Hazardous to the aquatic environment — Acute Hazard, Category 1	H400

##### Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified as dangerous substance / mixture.

## 2.2. Label elements

### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS04

GHS05

GHS06

GHS09

Signal word (CLP) :

Danger

Hazard statements (CLP) :

H335 - May cause respiratory irritation.  
 H280 - Contains gas under pressure; may explode if heated.  
 H300 - Fatal if swallowed.  
 H314 - Causes severe skin burns and eye damage.  
 H330 - Fatal if inhaled.  
 H400 - Very toxic to aquatic life.  
 EUH014 - Reacts violently with water.

Precautionary statements (CLP)

- Prevention : P264 - Wash ... thoroughly after handling.  
 P270 - Do not eat, drink or smoke when using this product.  
 P271 - Use only outdoors or in a well-ventilated area.  
 P273 - Avoid release to the environment.  
 P280 - Wear protective gloves, protective clothing, eye protection, face protection.  
 P284 - [In case of inadequate ventilation] wear respiratory protection .  
 P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
- Response : P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P321 - Specific treatment (see ... on this label).  
 P330 - Rinse mouth.  
 P391 - Collect spillage.  
 P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting.  
 P320 - Specific treatment is urgent (see ... on this label).  
 P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
 P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
 P310 - Immediately call a POISON CENTER/doctor/....  
 P312 - Call a POISON CENTER/doctor/... if you feel unwell.  
 P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER/doctor/....
- Storage : 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.
- Disposal considerations : P501 - Dispose of contents/container to ....

## 2.3. Other hazards

: None.

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Name	Product identifier	%	Classification according to Directive 67/548/EEC	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Boron trichloride	(CAS No) 10294-34-5 (EC no) 233-658-4 (EC index no) 005-002-00-5 (Registration-No.) 01-2119962197-29	100	Not classified	Press. Gas (Liq.), H280 Acute Tox. 2 (Oral), H300 Acute Tox. 2 (Inhalation:gas), H330 Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335 Aquatic Acute 1, H400

Contains no other components or impurities which will influence the classification of the product.

Full text of R-phrases see section 16. Full text of H-statements see section 16.

**3.2. Mixture** : Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects, both acute and delayed

- : May cause chemical burns to skin and cornea (with temporary disturbance to vision). Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. Refer to section 11.

### 4.3. Indication of any immediate medical attention and special treatment needed

- : Treat with corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

### 5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None that are more toxic than the product itself.

### 5.3. Advice for fire-fighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.  
If possible, stop flow of product.  
Use water spray or fog to knock down fire fumes if possible.  
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.  
EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

- : Try to stop release.  
Evacuate area.  
Monitor concentration of released product.  
Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.  
Ensure adequate air ventilation.  
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.  
Act in accordance with local emergency plan.  
Stay upwind.

#### **6.2. Environmental precautions**

- : Try to stop release.  
Reduce vapour with fog or fine water spray.

#### **6.3. Methods and material for containment and cleaning up**

- : Hose down area with water.  
Ventilate area.  
Wash contaminated equipment or sites of leaks with copious quantities of water.

#### **6.4. Reference to other sections**

- : See also sections 8 and 13.

## **SECTION 7: Handling and storage**

#### **7.1. Precautions for safe handling**

##### Safe use of the product

- : The substance must be handled in accordance with good industrial hygiene and safety procedures.  
Only experienced and properly instructed persons should handle gases under pressure.  
Consider pressure relief device(s) in gas installations.  
Ensure the complete gas system was (or is regularly) checked for leaks before use.  
Do not smoke while handling product.  
Avoid exposure, obtain special instructions before use.  
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.  
Installation of a cross purge assembly between the cylinder and the regulator is recommended.  
Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.  
Avoid suck back of water, acid and alkalis.  
Do not breathe gas.  
Avoid release of product into atmosphere.

##### Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.  
Do not allow backfeed into the container.  
Protect cylinders from physical damage; do not drag, roll, slide or drop.  
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.  
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.  
If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.  
Never attempt to repair or modify container valves or safety relief devices.  
Damaged valves should be reported immediately to the supplier.  
Keep container valve outlets clean and free from contaminants particularly oil and water.  
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.  
Close container valve after each use and when empty, even if still connected to equipment.  
Never attempt to transfer gases from one cylinder/container to another.  
Never use direct flame or electrical heating devices to raise the pressure of a container.  
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

#### **7.2. Conditions for safe storage, including any incompatibilities**

- : Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

### 7.3. Specific end use(s)

: None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

OEL (Occupational Exposure Limits) : No data available.

<b>Boron trichloride (10294-34-5)</b>	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	16 ppm
Long-term - systemic effects, inhalation	16 mg/m <sup>3</sup>

<b>Boron trichloride (10294-34-5)</b>	
PNEC: Predicted no effect concentration	
Aqua (freshwater)	0.039 mg/l
Aqua (marine water)	0.039 mg/l
Aquatic, intermittent releases	0.048 mg/l
Sediment, freshwater	0.039 mg/kg dwt
Sediment, marine water	0.039 mg/kg dwt
Soil, agricultural	11 mg/kg dwt
Micro-organisms or PNEC sewage treatment plant (STP)	0.039 mg/l

### 8.2. Exposure controls

#### 8.2.1. Appropriate engineering controls

- : Product to be handled in a closed system and under strictly controlled conditions. Provide adequate general and local exhaust ventilation. Preferably use only permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. Ensure exposure is below occupational exposure limits (where available). Gas detectors should be used when toxic gases may be released. Consider work permit system e.g. for maintenance activities.

#### 8.2.2. Individual protection measures, e.g. personal protective equipment

- : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:  
Protect eyes, face and skin from liquid splashes.  
PPE compliant to the recommended EN/ISO standards should be selected.

#### • Eye/face protection

- : Wear safety glasses with side shields.  
Wear goggles and a face shield when transfilling or breaking transfer connections.  
Standard EN 166 - Personal eye-protection.  
Provide readily accessible eye wash stations and safety showers.

#### • Skin protection

- Hand protection : Wear working gloves when handling gas containers.  
Standard EN 388 - Protective gloves against mechanical risk.  
Wear chemically resistant protective gloves.  
Standard EN 374 - Protective gloves against chemicals.  
Chloroprene rubber (CR)  
Consult glove manufacturer's product information on material suitability and material thickness.  
The breakthrough time of the selected gloves must be greater than the intended use period.
- Other : Wear safety shoes while handling containers.  
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.  
Keep suitable chemically resistant protective clothing readily available for emergency use.  
Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.
- Respiratory protection : Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.  
Use gas filters and full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers.  
Recommended: Filter B (grey).  
Consult respiratory device supplier's product information for the selection of the appropriate device.  
Gas filters do not protect against oxygen deficiency.  
Standard EN 14387 - Gas filter(s), combined filter(s) and full face mask - EN 136.  
Keep self contained breathing apparatus readily available for emergency use.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.  
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- Thermal hazards : None necessary.

### 8.2.3. Environmental exposure controls

- : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

#### Appearance

- Physical state at 20°C / 101.3kPa : Gas.
- Colour : Gives off white fumes in moist air. Colourless.

Odour : Pungent.

Odour threshold : Odour threshold is subjective and inadequate to warn of overexposure.

pH value : If dissolved in water pH-value will be affected.

Molar mass : 117 g/mol

Melting point : -107 °C

Boiling point : 12.5 °C

Flash point : Not applicable for gases and gas mixtures.

Critical temperature [°C] : 181.9 °C

Evaporation rate (ether=1) : Not applicable for gases and gas mixtures.

Flammability range : Non flammable.

Vapour pressure [20°C] : 1.6 bar(a)

Vapour pressure [50°C] : 3.2 bar(a)

Relative density, gas (air=1) : 4

Relative density, liquid (water=1) : 1.3

Solubility in water : Completely soluble.

Partition coefficient n-octanol/water [log Kow] : Not applicable for inorganic gases.  
 Auto-ignition temperature : Not applicable.  
 Viscosity [20°C] : Not applicable.  
 Explosive Properties : Not applicable.  
 Oxidising Properties : None.

## 9.2. Other information

Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

: No reactivity hazard other than the effects described in sub-sections below.

### 10.2. Chemical stability

: Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

: Reacts violently with water

### 10.4. Conditions to avoid

: Avoid moisture in installation systems.

### 10.5. Incompatible materials

: Reacts with most metals in the presence of moisture, liberating hydrogen, an extremely flammable gas.  
 With water causes rapid corrosion of some metals.  
 Reacts with water to form corrosive acids.  
 May react violently with alkalis.  
 Moisture.  
 For additional information on compatibility refer to ISO 11114.

### 10.6. Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Acute toxicity** : Delayed fatal pulmonary oedema possible.

LC50 inhalation rat (ppm)	1270 ppm/4h
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**Skin corrosion/irritation** : Severe corrosion to skin at high concentrations.

**Serious eye damage/irritation** : Severe corrosion to the eyes at high concentrations.

**Respiratory or skin sensitisation** : No known effects from this product.

**Germ cell mutagenicity** : No known effects from this product.

**Carcinogenicity** : No known effects from this product.

**Toxic for reproduction : Fertility** : No known effects from this product.

**Toxic for reproduction : unborn child** : No known effects from this product.

**STOT-single exposure** : Severe corrosion to the respiratory tract at high concentrations.

**Target organ(s)** : Respiratory tract.

**STOT-repeated exposure** : No known effects from this product.

**Aspiration hazard** : Not applicable for gases and gas mixtures.

**SECTION 12: Ecological information****12.1. Toxicity**

Assessment : No data available.

EC50 48h - Daphnia magna [mg/l] 0.49 mg/l  
EC50 72h - Algae [mg/l] 0.73 mg/l  
LC50 96 h - Fish [mg/l] 22 mg/l

**12.2. Persistence and degradability**

Assessment : Not applicable for inorganic gases.

**12.3. Bioaccumulative potential**

Assessment : No data available.

**12.4. Mobility in soil**

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.

**12.5. Results of PBT and vPvB assessment**

Assessment : No data available.

**12.6. Other adverse effects**

: May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None.

Effect on the global warming : No known effects from this product.

**SECTION 13: Disposal considerations****13.1. Waste treatment methods**

Contact supplier if guidance is required.  
Must not be discharged to atmosphere.  
Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction.  
Ensure that the emission levels from local regulations or operating permits are not exceeded.  
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.

List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

**13.2. Additional information**

: None.

**SECTION 14: Transport information****14.1. UN number**

UN-No. : 1741

**14.2. UN proper shipping name**

Transport by road/rail (ADR/RID) : BORON TRICHLORIDE

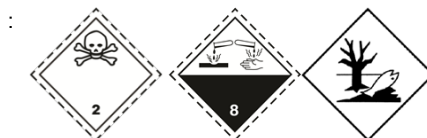
Transport by air (ICAO-TI / IATA-DGR) : Boron trichloride

Transport by sea (IMDG) : BORON TRICHLORIDE



### 14.3. Transport hazard class(es)

#### Labelling



2.3 : Toxic gases  
8 : Corrosive substances

#### Transport by road/rail (ADR/RID)

Class : 2  
 Classification code : 2TC  
 Hazard identification number : 268  
 Tunnel Restriction : C/D - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category D and E

#### Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) :

#### Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.3 (8)  
 Emergency Schedule (EmS) - Fire : F-C  
 Emergency Schedule (EmS) - Spillage : S-U

### 14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable  
 Transport by air (ICAO-TI / IATA-DGR) : Not applicable  
 Transport by sea (IMDG) : Not applicable

### 14.5. Environmental hazards

Transport by road/rail (ADR/RID) : Environmentally hazardous substance / mixture.  
 Transport by air (ICAO-TI / IATA-DGR) : None.  
 Transport by sea (IMDG) : None.

### 14.6. Special precautions for user

#### Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200  
 Transport by air (ICAO-TI / IATA-DGR)  
     Passenger and Cargo Aircraft : Forbidden  
     Cargo Aircraft only : Forbidden  
 Transport by sea (IMDG) : P200

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.  
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.  
 Before transporting product containers:  
 - Ensure there is adequate ventilation.  
 - Ensure that containers are firmly secured.  
 - Ensure cylinder valve is closed and not leaking.  
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.  
 - Ensure valve protection device (where provided) is correctly fitted.

#### 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable

### **SECTION 15: Regulatory information**

#### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

##### **EU-Regulations**

Restrictions on use : None.  
 Seveso directive 96/82/EC : Covered.

##### **National regulations**

National legislation : Ensure all national/local regulations are observed.  
 Water hazard class (WGK) : -

#### 15.2. Chemical safety assessment

: A CSA has been carried out.

### **SECTION 16: Other information**

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.  
 Training advice : Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard.  
 Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of R-, H- and EUH-phrases

Acute Tox. 2 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 2
Acute Tox. 2 (Oral)	Acute toxicity (oral), Category 2
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
Skin Corr. 1B	Skin corrosion/irritation, Category 1B
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H280	Contains gas under pressure; may explode if heated
H300	Fatal if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H335	May cause respiratory irritation
H400	Very toxic to aquatic life
EUH014	Reacts violently with water



DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.  
Details given in this document are believed to be correct at the time of going to press.  
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.