

**Material Safety Data Sheet**

acc. to OSHA and ANSI

Printing date 11/09/2010

Reviewed on 11/04/2010

**1 Identification of the substance/mixture and of the company/undertaking****Product identifier****Product name:** Boron trichloride, 1M solution in hexane**Stock number:** H32833**CAS Number:**

10294-34-5

**EINECS Number:**

263-658-4

**Relevant identified uses of the substance or mixture and uses advised against****Sector of Use** SU24 Scientific research and development**Details of the supplier of the safety data sheet****Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Emergency Phone: (978) 521-6300

CHEMTREC: (800) 424-9300

Web Site: [www.alfa.com](http://www.alfa.com)**Information Department:** Health, Safety and Environmental Department**Emergency telephone number:**

During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

**2 Hazards identification****Classification of the substance or mixture**

GHS02 Flame

H224 Extremely flammable liquid and vapour.



GHS06 Skull and crossbones

H300 Fatal if swallowed.

H330 Fatal if inhaled.

H336 May cause drowsiness or dizziness.



GHS08 Health hazard

H361 Suspected of damaging fertility or the unborn child.

H304 May be fatal if swallowed and enters airways.



GHS05 Corrosion

H314 Causes severe skin burns and eye damage.



GHS09 Environment

H411 Toxic to aquatic life with long lasting effects.

H401 Toxic to aquatic life.

**Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

T+; Very toxic

R26/28: Very toxic by inhalation and if swallowed.



C; Corrosive

R34: Causes burns.



Xn; Harmful

R62-65: Possible risk of impaired fertility. Harmful: may cause lung damage if swallowed.

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**F**; Highly flammable

R11: Highly flammable.

**N**; Dangerous for the environment

R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R14-67: Reacts violently with water. Vapours may cause drowsiness and dizziness.

**Information concerning particular hazards for human and environment:**

Causes a narcotic effect.

**Label elements****Labelling according to EU guidelines:****Code letter and hazard designation of product:**

T+ Very toxic

F Highly flammable

N Dangerous for the environment

**Risk phrases:**

11 Highly flammable.

14 Reacts violently with water.

26/28 Very toxic by inhalation and if swallowed.

34 Causes burns.

62 Possible risk of impaired fertility

51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

65 Harmful: may cause lung damage if swallowed.

67 Vapours may cause drowsiness and dizziness

**Safety phrases:**

23 Do not breathe fumes

26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

28 After contact with skin, wash immediately with plenty of water

36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

45 In case of accident or if you feel unwell, seek medical advice immediately.

57 Use appropriate container to avoid environmental contamination.

**Classification system****HMIS ratings (scale 0-4)****(Hazardous Materials Identification System)**

HEALTH	3
FIRE	3
REACTIVITY	2

Health (acute effects) = 3

Flammability = 3

Reactivity = 2

**Other hazards****Results of PBT and vPvB assessment**

PBT: Not applicable.

vPvB: Not applicable.

**3 Composition/information on ingredients****Chemical characterization: Substances****Description: (CAS#)**

Boron trichloride (CAS# 10294-34-5): 33.9%

n-Hexane (CAS# 110-54-3): Balance

**Identification number(s):**

EINECS Number: 263-658-4

**4 First aid measures****Description of first aid measures****General information**

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing has been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

**After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

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**After skin contact**

Immediately wash with water and soap and rinse thoroughly.  
Seek immediate medical advice.

**After eye contact**

Rinse opened eye for several minutes under running water. Then consult a doctor.

**After swallowing**

Do not induce vomiting; immediately call for medical help.  
Seek immediate medical advice.

### 5 Firefighting measures

**Extinguishing media**

Suitable extinguishing agents CO<sub>2</sub>, sand, extinguishing powder. Do not use water.

For safety reasons unsuitable extinguishing agents Water

**Special hazards arising from the substance or mixture**

In case of fire, the following can be released:

Carbon monoxide and carbon dioxide

Boron oxide

Hydrogen chloride (HCl)

Reacts violently with water

**Advice for firefighters****Protective equipment:**

Wear self-contained respirator.

Wear fully protective impervious suit.

### 6 Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

**Environmental precautions:**

Do not allow material to be released to the environment without proper governmental permits.

**Methods and material for containment and cleaning up:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Do not flush with water or aqueous cleansing agents

Keep away from ignition sources.

**Reference to other sections**

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

### 7 Handling and storage

**Handling****Precautions for safe handling**

Handle under dry protective gas.

Keep container tightly sealed.

Ensure good ventilation at the workplace.

Open and handle container with care.

**Information about protection against explosions and fires:**

Keep ignition sources away.

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

**Conditions for safe storage, including any incompatibilities****Storage**

Requirements to be met by storerooms and receptacles: Refrigerate

**Information about storage in one common storage facility:**

Store away from oxidizing agents.

Store away from strong bases.

Store in the dark.

Protect from heat.

Store away from water/moisture.

**Further information about storage conditions:**

Store under dry inert gas.

This product is moisture sensitive.

Keep container tightly sealed.

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Protect from humidity and water.  
Protect from exposure to light.  
Refrigerate

**8 Exposure controls/personal protection****Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

**Components with limit values that require monitoring at the workplace:**

n-Hexane

	ppm
ACGIH TLV	50 (skin)
Belgium TWA	50
France TWA	50
Germany TWA	50
Netherlands TWA	100
Switzerland TWA	50, 100-STEEL
United Kingdom TWA	100, 125-STEEL
Russia TWA	40
Denmark	50
Finland	50, 150-STEEL
Hungary TWA	100 mg/m <sup>3</sup> , 200 mg/m <sup>3</sup> -STEEL
Poland TWA	400 mg/m <sup>3</sup>
Sweden	25, 50-STEEL
USA PEL	500

**Control parameters****Components with limit values that require monitoring at the workplace:**

Additional information: No data

**Exposure controls****Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Do not inhale gases / fumes / aerosols.

Avoid contact with the eyes and skin.

**Breathing equipment:** Use suitable respirator when high concentrations are present.

**Protection of hands:**

Impervious gloves

Check protective gloves prior to each use for their proper condition.

**Material of gloves**

The selection of suitable gloves not only depends on the material, but also on quality.

Quality will vary from manufacturer to manufacturer.

**Eye protection:**

Safety glasses

Tightly sealed goggles

Full face protection

**Body protection:** Protective work clothing.

**9 Physical and chemical properties****Information on basic physical and chemical properties****General Information****Appearance:**

<b>Form:</b>	Liquid
<b>Color:</b>	Colorless
<b>Odor:</b>	Not determined
<b>Odour threshold:</b>	Not determined.

**pH-value:** Not determined.

**Change in condition**

<b>Melting point/Melting range:</b>	Not determined
<b>Boiling point/Boiling range:</b>	Not determined
<b>Sublimation temperature / start:</b>	Not determined

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<b>Ignition temperature:</b>	Not determined
<b>Decomposition temperature:</b>	Not determined
<b>Auto igniting:</b>	Not determined.
<b>Explosion limits:</b>	
Lower:	Not determined
Upper:	Not determined
<b>Vapor pressure:</b>	Not determined
<b>Density at 20°C (68°F):</b>	0.738 g/cm <sup>3</sup> (6.159 lbs/gal)
<b>Relative density</b>	Not determined.
<b>Vapour density</b>	Not determined.
<b>Evaporation rate</b>	Not determined.
<b>Solubility in / Miscibility with Water:</b>	Reacts violently
<b>Segregation coefficient (n-octanol/water):</b>	Not determined.
<b>Viscosity:</b>	
dynamic:	Not determined.
kinematic:	Not determined.
<b>Other information</b>	No further relevant information available.

**10 Stability and reactivity****Reactivity****Chemical stability****Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

**Possibility of hazardous reactions** Reacts violently with water**Incompatible materials:**

Heat

Water/moisture

Oxidizing agents

Bases

Light

**Hazardous decomposition products:**

Carbon monoxide and carbon dioxide

Boron oxide

Hydrogen chloride (HCl)

**11 Toxicological information****Information on toxicological effects****Acute toxicity:****Primary irritant effect:****on the skin:** Corrosive effect on skin and mucous membranes.**on the eye:** Strong corrosive effect.**Sensitization:** No sensitizing effects known.**Subacute to chronic toxicity:**

Boron affects the central nervous system. Boron poisoning causes depression of the circulation, persistent vomiting and diarrhea, followed by profound shock and coma. The temperature may become subnormal and a scarletina form rash may cover the entire body. Corrosive materials are acutely destructive to the respiratory tract, eyes, skin and digestive tract. Eye contact may result in permanent damage and complete vision loss. Inhalation may result in respiratory effects such as inflammation, edema, and chemical pneumonitis. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Ingestion may cause damage to the mouth, throat and esophagus. May cause skin burns or irritation depending on the severity of the exposure. Hexanes may cause skin irritation, CNS effects, lung irritation, headache, dizziness, drowsiness.

**Additional toxicological information:**

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

EPA-I: Data are inadequate for an assessment of human carcinogenic potential.

Possible risk of impaired fertility.

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**12 Ecological information****Toxicity****Acquatic toxicity:** No further relevant information available.**Persistence and degradability** No further relevant information available.**Behavior in environmental systems:****Bioaccumulative potential** No further relevant information available.**Mobility in soil** No further relevant information available.**Ecotoxicological effects:****Remark:** Toxic for aquatic organisms**Additional ecological information:****General notes:**

Do not allow product to reach ground water, water course or sewage system, even in small quantities.

Danger to drinking water if even extremely small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Do not allow material to be released to the environment without proper governmental permits.

Toxic for aquatic organisms

**Results of PBT and vPvB assessment****PBT:** Not applicable.**vPvB:** Not applicable.**Other adverse effects** No further relevant information available.**13 Disposal considerations****Waste treatment methods****Recommendation** Consult state, local or national regulations to ensure proper disposal.**Uncleaned packagings:****Recommendation:** Disposal must be made according to official regulations.**14 Transport information****DOT regulations:****Hazard class:**

3

**Identification number:**

UN3286

**Packing group:**

II

**Proper shipping name (technical name):** FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (boron trichloride/n-hexane)**Label**

3+6.1+8

**Land transport ADR/RID (cross-border)****ADR/RID class:**

3 (FTC) Flammable liquids

**Danger code (Kemler):**

368

**UN-Number:**

3286

**Packaging group:**

II

**Special marking:**

Symbol (fish and tree)

**UN proper shipping name:**

3286 FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (boron trichloride/n-hexane)

**Maritime transport IMDG:****IMDG Class:**

3

**UN Number:**

3286

**Label**

3+6.1+8

**Packaging group:**

II

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<b>Marine pollutant:</b>	No
<b>Proper shipping name:</b>	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (boron trichloride/n-hexane)

**Air transport ICAO-TI and IATA-DGR:**

<b>ICAO/IATA Class:</b>	3
<b>UN/ID Number:</b>	3286
<b>Label</b>	3+6.1+8
<b>Packaging group:</b>	II
<b>Proper shipping name:</b>	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (boron trichloride/n-hexane)

**UN "Model Regulation":** UN3286, FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S., 3 (6.1+8), II  
**Environmental hazards:** Environmentally hazardous substance, liquid; Marine Pollutant  
**Special precautions for user** Warning: Flammable liquids  
**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

**15 Regulatory information**

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

**Product related hazard informations:****Hazard symbols:**

T+ Very toxic  
 F Highly flammable  
 N Dangerous for the environment

**Risk phrases:**

11 Highly flammable.  
 14 Reacts violently with water.  
 26/28 Very toxic by inhalation and if swallowed.  
 34 Causes burns.  
 62 Possible risk of impaired fertility  
 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment  
 65 Harmful: may cause lung damage if swallowed.  
 67 Vapours may cause drowsiness and dizziness

**Safety phrases:**

23 Do not breathe fumes  
 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
 28 After contact with skin, wash immediately with plenty of water  
 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.  
 45 In case of accident or if you feel unwell, seek medical advice immediately.  
 57 Use appropriate container to avoid environmental contamination.

**National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.  
 All components of this product are listed on the Canadian Domestic Substances List (DSL).

**Information about limitation of use:**

For use only by technically qualified individuals.  
 This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.**16 Other information**

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing MSDS:** Health, Safety and Environmental Department.**Contact:** Ryan P. Wilson(Contd. on page 8)  
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**Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)

ICAO: International Civil Aviation Organization

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

USA