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**Safety Data Sheet****1. Chemical product and company identification****Product name** : Boron trioxide**SDS code** : A4-18**Company/undertaking identification** :

HAYASHI PURE CHEMICAL IND.,LTD.

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URL : <https://www.hpc-j.co.jp/>**Emergency number** : 06-6910-7305**Recommended use** : For research and experimental use only.**Restrictions on use** : Do not use on a human body or for animal medicines, foods, household products, cosmetics, etc.**2. Hazards identification****GHS classification**

Physical hazards	Explosives	No classification	
	Flammable gases	No classification	
	Aerosol	No classification	
	Oxidizing gases	No classification	
	Gases under pressure	No classification	
	Flammable liquids	No classification	
	Flammable solids	No classification	
	Self-reactive substances and mixtures	No classification	
	Pyrophoric liquids	No classification	
	Pyrophoric solids	No classification	
	Self-heating substances and mixtures	No classification	
	Substances and mixtures which in contact with water emit flammable gases	No classification	
	Oxidizing liquids	No classification	
	Oxidizing solids	classification not possible	
	Organic peroxides	No classification	
	Corrosive to metals	classification not possible	
	Desensitized explosives	classification not possible	
	Health hazards	Acute toxicity (oral)	No classification
		Acute toxicity (dermal)	classification not possible
		Acute toxicity (inhalation:gas)	No classification
Acute toxicity (inhalation:vapors)		No classification	
Acute toxicity (inhalation:dust/mist)		classification not possible	
Skin corrosion/irritation		No classification	
Serious eye damage/eye irritation		Category 2A	
Respiratory sensitization		classification not possible	
Skin sensitization		classification not possible	
Germ cell mutagenicity		classification not possible	
Carcinogenicity	classification not possible		
Reproductive toxicity	Category 1B		
Specific target organ toxicity (single exposure)	Category 3 (Respiratory tract irritation.)		

Environmental hazards	Specific target organ toxicity (repeated exposure)	classification not possible
	Aspiration hazard	classification not possible
	Hazardous to the aquatic environment, short-term (acute)	No classification
	Hazardous to the aquatic environment, long-term (chronic)	No classification
	Hazardous to the ozone layer	classification not possible

Hazard pictograms (GHS JP)



GHS07



GHS08

Signal word (GHS JP)	: Danger
Hazard statements (GHS JP)	: Causes serious eye irritation (H319) May cause respiratory irritation (H335) May damage fertility or the unborn child (H360)
Precautionary statements (GHS JP)	
Prevention	: Obtain special instructions before use. (P201) Do not handle until all safety precautions have been read and understood. (P202) Avoid breathing dust/fume/gas/mist/vapors/spray. (P261) Wash hands, forearms and face thoroughly after handling. (P264) Use only outdoors or in a well-ventilated area. (P271) Wear protective gloves/protective clothing/eye protection/face protection. (P280)
Response	: IF INHALED: Remove person to fresh air and keep comfortable for breathing (P304+P340) IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338) IF exposed or concerned: Get medical advice/attention. (P308+P313) Call a POISON CENTER or doctor if you feel unwell. (P312) If eye irritation persists: Get medical advice/attention. (P337+P313)
Storage	: Store in a well-ventilated place. Keep container tightly closed. (P403+P233) Store locked up. (P405)
Disposal	: Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. (P501)

### 3. Composition/information on ingredients

Distinction of substance or mixture	: Substance
Synonyms	: Diboron trioxide, Boric anhydride

Name	Concentration or Concentration range	Formula	Kanpo number		CAS RN
			CSCL no	ISHL no	
Boron trioxide	≥ 85.0%	B <sub>2</sub> O <sub>3</sub>	(1)-71,(9)-2403	Existing Chemical Substance	1303-86-2

The above concentration or concentration range are not product specification.  
All percentages listed in the above concentration or concentration range are wt%, unless otherwise specified.

### 4. First aid measures

#### First aid measures

First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice/attention.
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- First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing.  
Gently wash with plenty of soap and water.  
Get immediate medical advice/attention.
- First-aid measures after eye contact : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Get immediate medical advice/attention.
- First-aid measures after ingestion : Rinse mouth.  
Get immediate medical advice/attention.

## 5. Fire fighting measures

- Suitable extinguishing media : Use proper extinguishing media depending on peripheral fire.
- Unsuitable extinguishing media : Do not use a heavy water stream.
- Fire hazard : This product is unburnable.
- Hazardous decomposition products in case of fire : In case of fire, product may produce irritative or toxic fumes/gases.
- Firefighting instructions : If ignited, for the initial fire-fighting, cut off combustion sources, extinguish fire at a stroke using appropriate fire-extinguishers.  
In the case of peripheral fire, quickly remove movable containers to safe places.  
If unable to be moved containers, sprinkle water to containers and surrounding equipment, etc. to cool.
- Protection during firefighting : Wear appropriate fire-resistant clothing including self contained-compressed air breathing apparatus.

## 6. Accidental release measures

### Personal Precautions, Protective Equipment and Emergency Procedures

- General measures : Before entering, ventilate the area.  
Do not let unauthorized persons come close to the area.  
Immediately place the leakage area in isolation, with taking proper distances for all directions.  
Wear appropriate personal protective devices to prevent inhalation and contact with eye, skin, and clothing, and never attempt to work on the lee.

### Environmental precautions

- Environmental precautions : Avoid release to the environment.  
Prevent entry to sewers and public waters.

### Methods and Equipment for Containment and Cleaning up

- Methods for cleaning up : Take care not to generate dust, sweep it up as much as possible, collect it in an empty container that can be sealed, and move it to a safe place.  
Wash out the spilled area with large amounts of water.

## 7. Handling and storage

### Handling

- Technical measures : Work with appropriate personal protective equipment to prevent inhalation or contact to eyes, skin, and clothing.  
Handle with care to prevent leakage, overflowing, or scattering, minimize generation of mist or vapor, and thoroughly ventilate.
- Precautions for safe handling : Do not eat, drink or smoke when using this product.  
Thoroughly wash your hands and gargle after handling.  
Ensure good ventilation of the work station.  
Do not contact, breathe or swallow.
- Prevents handling of incompatible substances or mixtures : Avoid prolonged or repeated exposure.

### Storage

- Storage conditions : Store locked up.  
Store in a well-ventilated place, away from direct sunlight. Keep container tightly closed and keep away from fire and heat sources.

Material used in packaging/containers	: Airtight container.
Technical measures	: Comply with applicable regulations.
Storage temperature	: Cool and dark place

## 8. Exposure controls / Personal protection equipment

Exposure limit values	
Boron trioxide	
Exposure limits (ACGIH)	TWA 10 mg/m <sup>3</sup> , STEL -

Appropriate engineering controls : Cover up tightly the generation source at the handling place or install local exhaust equipment or overall ventilation equipment. Install safety showers and eye-fountains near a handling place. Clearly indicate the location.

### Protective equipment

Respiratory protection	: Dustproof mask
Hand protection	: Protective gloves
Eye protection	: Protective glasses (general glasses, glasses with side-shields, goggles)
Skin and body protection	: Protective clothing, Protective boots, Protective apron

## 9. Physical and chemical properties

Physical state	: Solid
Appearance	: Glassy pieces ~ Powder
Color	: colorless ~ white
Odor	: No data available
pH	: No data available
Melting point	: 450 °C
Freezing point	: No data available
Boiling point	: ≥ 1860 °C
Flash point	: Not inflammable
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: No data available
Relative density	: No data available
Density	: 1.85 g/cm <sup>3</sup>
Relative gas density	: No data available
Solubility	: Soluble in ethanol. Soluble in glycerol. Water: 3.2 % (20°C)
Partition coefficient n-octanol/water (Log Pow)	: No data available
Explosive limits (vol %)	: No data available
Viscosity, kinematic	: No data available
Particle characteristics	: No data available

## 10. Stability and reactivity

Reactivity	: No data available
Chemical stability	: Stable under normal handling conditions. Shows hygroscopicity.
Possibility of hazardous reactions	: It is hygroscopic and gradually reacts with water to produce boric acid. It is corrosive to metals in the presence of moist air. Reacts violently with fluorine to generate BF <sub>3</sub> and oxygen. It is reduced with alkali metals, magnesium, etc.
Conditions to avoid	: Sunlight, heat, moisture. Contact with fluorine, alkali metals, magnesium and reducing agents.
Incompatible materials	: Fluorine, Alkali metals, Magnesium, Reducing agents
Hazardous decomposition products	: Boron compounds

## 11. Toxicological information

The information in this section is based on the "GHS Classification Results" by NITE.

Boron trioxide	
Acute toxicity (oral)	No classification
Acute toxicity (dermal)	classification not possible
Acute toxicity (gas)	No classification
Acute toxicity (vapour)	No classification
Acute toxicity (inhalation:dust/mist)	classification not possible
Skin corrosion/irritation	No classification
Serious eye damage/irritation	Category 2A
Respiratory sensitization	classification not possible
Skin sensitization	classification not possible
Germ cell mutagenicity	classification not possible
Carcinogenicity	classification not possible
Reproductive toxicity	Category 1B
STOT-single exposure	Category 3 (Respiratory tract irritation.)
STOT-repeated exposure	classification not possible
Aspiration hazard	classification not possible

## 12. Ecological information

The information in this section is based on the "GHS Classification Results" by NITE.

Boron trioxide	
Hazardous to Aquatic Environment - Acute Hazard	No classification
Hazardous to Aquatic Environment - Chronic Hazard	No classification
Persistence and degradability	No data available
Bioaccumulative potential	No data available
Mobility in soil	No data available
Hazardous to the ozone layer	classification not possible

## 13. Disposal considerations

- Ecology - waste materials : With the detail information of the waste, subcontract its disposal to a waste disposer authorized by a Prefectural Governor.
- Contaminated container and packaging : Empty the packaging completely prior to disposal.  
Empty containers should be taken for recycle, recovery or waste in accordance with local regulation.

## 14. Transport information

### International Regulations

#### Transport by sea(IMDG)

- UN-No. (IMDG) : Not applicable
- Proper Shipping Name (IMDG) : Not applicable
- Packing group (IMDG) : Not applicable
- Transport hazard class(es) (IMDG) : Not applicable

#### Air transport(IATA)

- UN-No. (IATA) : Not applicable
- Proper Shipping Name (IATA) : Not applicable
- Packing group (IATA) : Not applicable
- Transport hazard class(es) (IATA) : Not applicable

- Marine pollutant : Not applicable

#### Regulations in Japan

- Regulatory information by sea : Not applicable
- Regulatory information by air : Not applicable

**Special transport precautions** : When transporting, load containers so that they do not tip over, damage, drop or collapse. Make sure there is no leak in containers.

## 15. Regulatory information

### National law

Industrial Safety and Health Law : Harmful Substances Whose Names Are to be Indicated on the Label (Law Art.57, Para.1, Enforcement Order Art.18 Item 1, Item 2, Attached Table No.9)  
Notifiable Substances (Law Art.57-2, Enforcement Order Art.18-2 Item 1, Item 2, Attached Table No.9)  
Diboron trioxide (Ordinance number : 196)

Japanese Poisonous and Deleterious Substances Control Law : Not applicable

Water Pollution Prevention Law : Hazardous Substances (Act, Art.2, Enforcement Order Art.2, Ministerial Ordinance to Provide for Effluent Standards, Art.1)

Fire Service Law : Not applicable

Air Pollution Control Law : Hazardous Air Pollutants (Central Environment Council Report No. 9)

Foreign Exchange and Foreign Trade Control Act : Export Trade Control Ordinance appendix 1-16

Waterworks Law : Hazardous Substances (Act Article 4 paragraph 2), Standard for Water Quality (Ministry Order No.101 of 2003)

Sewerage Law : Substances for Water Quality Standard (Act Art.12-2 Para.2, Enforcement Order Art.9-4)

Japanese Pollutant Release and Transfer Register Law (PRTR Law) : Class 1 Designated Chemical Substances (Act Art.2 para. 2, Enforcement Order Art.1 Appended Table No.1)  
Boron compounds as boron(31%)  
【After amendment of April 2023】  
Class 1 Designated Chemical Substances (Act, Art.2, Para.2, Enforcement Order, Art.1 Appended Table 1)  
Boron compounds as boron(31%)

Soil Contamination Countermeasures Law : Designated Hazardous Substances (Act Art.2 Para.3, Enforcement Order Art.1)

## 16. Other information

Data sources : Handbook of 17423 Chemical Products, The Chemical Daily Co, Ltd.  
International Chemical Safety Cards.  
National Institute of Technology and Evaluation (NITE).  
2020 Emergency Response Guidebook (ERG 2020).

Other information : The SDS is copyrighted material of Hayashi Pure Chemical Ind, Ltd. This Safety Data Sheet is intended to be provided for business operators who handle chemical substance products of the relevant product and is not intended to assure safety in any way. The Safety Data Sheet does not verify all the information on the applicable chemical substance in the present time. With the recognition in that unknown danger constantly exists in the relevant chemical substance, the product shall be used in the principle of self-responsibility of the user with the highest priority to safety from transport and unpacking to disposal. When the relevant chemical substance is used, the user him/herself shall collect safety information and shall investigate laws and regulations at the place, organizations, countries, etc. where the substance is actually used and give the highest priority to them. The Company shall take no responsibility for investigating state and local regulations and the user shall handle this problem on his/her own responsibility. In the event that SDS in Japanese and SDS translated into other languages exist, the document described in Japanese is prior to all other documents whether or not there is any difference in contents, and documents in other languages shall be references.