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## SECTION 1: Identification

### 1.1 GHS Product identifier

**Product name** Bromine pentafluoride

### 1.2 Other means of identification

**Product number** -

**Other names** BrF<sub>5</sub>; EINECS 232-157-8; Bromine fluoride (BrF<sub>5</sub>)

### 1.3 Recommended use of the chemical and restrictions on use

**Identified uses** Industrial and scientific research uses.

**Uses advised against** no data available

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## SECTION 2: Hazard identification

### 2.1 Classification of the substance or mixture

no data available

### 2.2 GHS label elements, including precautionary statements

**Pictogram(s)** no data available

**Signal word** no data available

**Hazard statement(s)** no data available

**Precautionary statement(s)**

**Prevention** no data available

**Response** no data available

**Storage** no data available

**Disposal** no data available

### 2.3 Other hazards which do not result in classification

no data available

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## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Bromine pentafluoride	Bromine pentafluoride	7789-30-2	232-157-8	100%

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## SECTION 4: First-aid measures

### 4.1 Description of necessary first-aid measures

#### If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.

#### Following skin contact

Wear protective gloves when administering first aid. Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

#### Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

#### Following ingestion

Do NOT induce vomiting. Refer for medical attention .

### 4.2 Most important symptoms/effects, acute and delayed

Chemical is highly corrosive and toxic. Inhalation causes severe burns of mucous membrane. Ingestion causes severe burns of mouth. Contact with eyes or skin causes severe burns. (USCG, 1999)

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

Keep unconscious victims warm and on their sides to avoid choking if vomiting occurs. Immediately initiate the following emergency procedures, continuing them as appropriate en route to the emergency medical facility. 1. Eye Exposure: Tissue destruction and blindness may result from exposure to concentrated solutions, vapors, mists or aerosols of bromine pentafluoride! Immediately but gently flush the eyes with large amounts of water for at least 15 min, occasionally lifting the upper and lower eyelids. 2. Skin exposure: Severe burns, skin corrosion, and absorption of toxic amounts may result! Immediately remove all contaminated clothing! Immediately and gently wash skin for at least 15 min. Use soap and water if skin is intact; use only water if skin is not intact. 3. Inhalation exposure: If vapors, mists, or aerosols of bromine pentafluoride are inhaled, move the victim to fresh air immediately. If the victim is not breathing, clean any chemical contamination from the victim's lips and perform cardiopulmonary resuscitation; if breathing is difficult, give oxygen. 4. Ingestion exposure: Take the following steps if several pentafluoride or a solution containing it is ingested: Do not induce vomiting. Have the victim rinse the contaminated mouth cavity several times with a fluid such as water. Immediately after rinsing, have the victim drink

one cup (8 oz) of fluid and no more. Do not permit the victim to drink milk or carbonated beverages! Do not permit the victim to drink any fluid if more than 60 min have passed since initial ingestion.

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## **SECTION 5: Fire-fighting measures**

### **5.1 Suitable extinguishing media**

If material involved in fire: Do not use water on material itself. Use dry chemical or carbon dioxide. Cool all affected containers with flooding quantities of water. If large quantities of combustibles are involved, use water in flooding quantities as spray and fog. Use water spray to knock-down vapors.

### **5.2 Specific hazards arising from the chemical**

Special Hazards of Combustion Products: Toxic and irritating fumes of hydrogen fluoride and bromine may form in fires. Behavior in Fire: Containers may burst when exposed to heat of fire. (USCG, 1999)

### **5.3 Special protective actions for fire-fighters**

In case of fire in the surroundings, use appropriate extinguishing media. NO hydrous agents. In case of fire: keep drums, etc., cool by spraying with water. NO direct contact with water. Combat fire from a sheltered position.

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## **SECTION 6: Accidental release measures**

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

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in vermiculite, earth, dry sand or inert absorbent. Then store and dispose of according to local regulations. Do NOT wash away into sewer. Do NOT absorb in saw-dust or other combustible absorbents. NEVER direct water jet on liquid.

### **6.2 Environmental precautions**

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in vermiculite, earth, dry sand or inert absorbent. Then store and dispose of according to local regulations. Do NOT wash away into sewer. Do NOT absorb in saw-dust or other combustible absorbents. NEVER direct water jet on liquid.

### **6.3 Methods and materials for containment and cleaning up**

Isolate the area until the release is under full control. Use water spray to cool and disperse vapors and protect personnel.

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

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

NO contact with flammables. NO contact with water, combustible substances or organic materials. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

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

Separated from food and feedstuffs and all other substances. See Chemical Dangers. Dry. Well closed. Keep in a well-ventilated room. Separate from acids, alkalies, halogens, salts, metals, organic matter. Store in a cool, dry, well-ventilated location. Keep cylinders restrained ...

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## **SECTION 8: Exposure controls/personal protection**

### **8.1 Control parameters**

#### **Occupational Exposure limit values**

TLV: 0.1 ppm as TWA

#### **Biological limit values**

no data available

### **8.2 Appropriate engineering controls**

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### **8.3 Individual protection measures, such as personal protective equipment (PPE)**

#### **Eye/face protection**

Wear safety goggles or eye protection in combination with breathing protection.

#### **Skin protection**

Protective gloves. Protective clothing.

#### **Respiratory protection**

Use closed system or ventilation.

## Thermal hazards

no data available

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## SECTION 9: Physical and chemical properties and safety characteristics

<b>Physical state</b>	Bromine pentafluoride is a colorless, fuming liquid with a pungent odor. Used to make other chemicals and in rockets. Very toxic by inhalation. Corrosive to metals and tissue. Will accelerate the burning of combustible material. If the containers are involved in a fire they may rupture violently and rocket.
<b>Colour</b>	Liquid
<b>Odour</b>	Pungent odor
<b>Melting point/freezing point</b>	-62.5Â°C
<b>Boiling point or initial boiling point and boiling range</b>	40,3Â°C
<b>Flammability</b>	Noncombustible Liquid, but a very powerful oxidizer.
<b>Lower and upper explosion limit/flammability limit</b>	no data available
<b>Flash point</b>	no data available
<b>Auto-ignition temperature</b>	no data available
<b>Decomposition temperature</b>	no data available
<b>pH</b>	no data available
<b>Kinematic viscosity</b>	no data available
<b>Solubility</b>	Reacts with water violently (NIOSH, 2016)
<b>Partition coefficient n-octanol/water</b>	no data available
<b>Vapour pressure</b>	328 mm Hg (NIOSH, 2016)
<b>Density and/or relative density</b>	2.48 g/cm3
<b>Relative vapour density</b>	6.05 (Air = 1)
<b>Particle characteristics</b>	no data available

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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Decomposes above 460Â°C . Decomposes on contact with acids or acid fumes. This produces very toxic fumes of hydrogen fluoride(see ICSC 0283) and hydrogen bromide(see ICSC 0282). Reacts with fuels and organic compounds. This generates fire and explosion hazard. Reacts with water and steam. This produces toxic and corrosive fumes of hydrogen fluoride and hydrogen bromide. Reacts with all known elements, except nitrogen, oxygen and rare gases.

### 10.2 Chemical stability

no data available

### 10.3 Possibility of hazardous reactions

Not combustible ...The vapour is heavier than air.BROMINE PENTAFLUORIDE an oxidizing agent. Is decomposed exothermically by water to hydrofluoric acid and other materials. Reacts with these other hydrogen-containing substances (among others) vigorously enough to cause a fire or explosion: acetic acid, ammonia, benzene, ethanol, hydrogen, hydrogen sulfide, methane, cork, grease paper, wax. Mixtures with acids, halogens, metal halides, metals, nonmetals, or metal oxides at ambient or slightly above ambient temperatures have resulted in violent reaction (nitric acid, sulfuric acid, chlorine, iodine, ammonium chloride, potassium iodide, boron powder, selenium, tellurium, aluminum powder, bismuth, cobalt powder, iron powder, arsenic, nickel powder, chromium trioxide, charcoal, red phosphorus, sulfur dioxide, magnesium oxide. Solutions of acetonitrile and 9% bromine pentafluoride have been found to decompose violently at ambient temperatures. Mixtures of perchloryl perchlorate and bromine pentafluoride form shock sensitive explosives. [Bretherick, 5th ed., 1995, p. 640].

### 10.4 Conditions to avoid

no data available

### 10.5 Incompatible materials

Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements except inert gases, nitrogen and oxygen.]

### 10.6 Hazardous decomposition products

If involved in a fire decomposes to produce toxic gases.

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## SECTION 11: Toxicological information

### Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

### Skin corrosion/irritation

no data available

**Serious eye damage/irritation**

no data available

**Respiratory or skin sensitization**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

no data available

**Reproductive toxicity**

no data available

**STOT-single exposure**

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema. See Notes. Exposure could cause death.

**STOT-repeated exposure**

May cause fluorosis due to formation of hydrogen fluoride. Further see ICSC 0283.

**Aspiration hazard**

A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20Â°C.

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## SECTION 12: Ecological information

### 12.1 Toxicity

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

### 12.2 Persistence and degradability

no data available

### 12.3 Bioaccumulative potential

Bromine pentafluoride decomposes, sometimes explosively, on contact with water to yield hydrofluoric acid and other materials(1). Therefore, bioconcentration in fish is not expected to be an important fate process(SRC).

### 12.4 Mobility in soil

Bromine pentafluoride decomposes, sometimes explosively, on contact with water(1). It also explodes or ignites on contact with hydrogen-containing materials (e.g. acetic acid, ammonia, benzene, ethanol, hydrogen, hydrogen sulfide, methane, grease, paper, wax)(2).

### 12.5 Other adverse effects

no data available

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## SECTION 13: Disposal considerations

### 13.1 Disposal methods

**Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

**Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

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## SECTION 14: Transport information

### 14.1 UN Number

ADR/RID: UN1745 (For reference only, please check.)      IMDG: UN1745 (For reference only, please check.)      IATA: UN1745 (For reference only, please check.)

### 14.2 UN Proper Shipping Name

ADR/RID: BROMINE PENTAFLUORIDE  
(For reference only, please check.)

IMDG: BROMINE PENTAFLUORIDE (For  
reference only, please check.)

IATA: BROMINE PENTAFLUORIDE (For  
reference only, please check.)

### 14.3 Transport hazard class(es)

ADR/RID: 5.1 (For reference only, please  
check.)

IMDG: 5.1 (For reference only, please  
check.)

IATA: 5.1 (For reference only, please  
check.)

### 14.4 Packing group, if applicable

ADR/RID: I (For reference only, please check.) IMDG: I (For reference only, please check.) IATA: I (For reference only, please check.)

### 14.5 Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

### 14.6 Special precautions for user

no data available

### 14.7 Transport in bulk according to IMO instruments

no data available

## SECTION 15: Regulatory information

### 15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Bromine pentafluoride	Bromine pentafluoride	7789-30-2	232-157-8
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Not Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

## SECTION 16: Other information

#### Information on revision

Creation Date July 15, 2019

Revision Date July 15, 2019

#### Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

#### References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

#### Other Information

Reacts violently with fire extinguishing agents such as water. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by

physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home.