

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Bromine

Product Number : 277576
Brand : Sigma-Aldrich

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

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

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Target Organ Effect, Highly toxic by inhalation, Corrosive

Target Organs

Nerves., LungsNerves., Lungs

GHS Classification

Acute toxicity, Oral (Category 5)
Acute toxicity, Inhalation (Category 1)
Skin corrosion (Category 1A)
Serious eye damage (Category 1)
Acute aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H303 : May be harmful if swallowed.
H314 : Causes severe skin burns and eye damage.
H330 : Fatal if inhaled.
H400 : Very toxic to aquatic life.

Precautionary statement(s)

P260 : Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273 : Avoid release to the environment.
P280 : Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 : Wear respiratory protection.
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.

HMIS Classification

Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 3
Fire: 0
Reactivity Hazard: 0
Special hazard.: OX

Potential Health Effects

Inhalation May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin May be harmful if absorbed through skin. Causes skin burns.
Eyes Causes eye burns. Causes severe eye burns.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Br₂
Molecular Weight : 159.81 g/mol

| Component | Concentration |
|------------------------|---------------|
| Bromine | |
| CAS-No. 7726-95-6 | <=100% |
| EC-No. 231-778-1 | |
| Index-No. 035-001-00-5 | |

4. 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.

5. FIREFIGHTING MEASURES**Conditions of flammability**

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Specific hazards arising from the chemical

Container explosion may occur under fire conditions.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Hydrogen bromide gas
 Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
 Hazardous decomposition products formed under fire conditions. - Hydrogen bromide gas

Further information

May intensify fire; oxidiser.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Do not store in polyethylene containers. Handle and open container with care.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

| Components | CAS-No. | Value | Control parameters | Basis |
|------------|---|-------|----------------------------------|--|
| Bromine | 7726-95-6 | TWA | 0.1 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| Remarks | Upper Respiratory Tract irritation Lower Respiratory Tract irritation Lung damage | | | |
| | | STEL | 0.2 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | Upper Respiratory Tract irritation Lower Respiratory Tract irritation Lung damage | | | |
| | | TWA | 0.1 ppm 0.7 mg/m ³ | USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000 |
| | | STEL | 0.3 ppm 2 mg/m ³ | USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000 |
| | | TWA | 0.1 ppm 0.7 mg/m ³ | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | The value in mg/m ³ is approximate. | | | |
| | | TWA | 0.1 ppm 0.7 mg/m ³ | USA. NIOSH Recommended Exposure Limits |
| | | ST | 0.3 ppm 2 mg/m ³ | USA. NIOSH Recommended Exposure Limits |

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose 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).

Hand 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)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye 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 and body protection

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

Hygiene measures

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

| | |
|--------|-------------------|
| Form | liquid |
| Colour | no data available |

Safety data

| | |
|------------------------------|--|
| pH | no data available |
| Melting point/freezing point | Melting point/range: 7.2 °C (45.0 °F) - lit. |
| Boiling point | 58.8 °C (137.8 °F) - lit. |
| Flash point | no data available |
| Ignition temperature | no data available |
| Auto-ignition temperature | no data available |
| Lower explosion limit | no data available |
| Upper explosion limit | no data available |
| Vapour pressure | 233 hPa (175 mmHg) at 20 °C (68 °F) |

| | |
|---|---|
| | 895 hPa (671 mmHg) at 55 °C (131 °F) |
| | 301.307 hPa (225.999 mmHg) at 25 °C (77 °F) |
| Density | 3.119 g/mL at 25 °C (77 °F) |
| Water solubility | 36.5 g/l at 20 °C (68 °F) |
| Partition coefficient: n-octanol/water | no data available |
| Relative vapour density | 5.52 - (Air = 1.0) |
| Odour | no data available |
| Odour Threshold | no data available |
| Evaporation rate | no data available |

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Reducing agents, Alkali metals, Powdered metals, Aluminum, Stainless steel, Iron, Copper, Organic materials, Bromine will attack some types of plastics, rubber, and coatings, Aldehydes, Ketones, arsenic powder, Amines, Amides, phenols, Alcohol, reacts violently with:, Ammonia, Azides, Ozone

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Hydrogen bromide gas

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

Hazardous decomposition products formed under fire conditions. - Hydrogen bromide gas

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

LD50 Oral - rat - 2,600 mg/kg

Inhalation LC50

LC50 Inhalation - rat - 2,700 mg/m³

Remarks: Lungs, Thorax, or Respiration:Other changes.

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

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

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

- | | |
|-------------------|---|
| Inhalation | May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. |
| Ingestion | May be harmful if swallowed. |
| Skin | May be harmful if absorbed through skin. Causes skin burns. |
| Eyes | Causes eye burns. Causes severe eye burns. |

Signs and Symptoms of Exposure

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Cyanosis, Cardiovascular effects., Respiratory disorders, Lachrymation, Nose bleeding, Vertigo, Irritability, loss of appetite, joint pain, Abdominal pain, Diarrhoea, hoarseness

Synergistic effects

no data available

Additional Information

RTECS: EF9100000

12. ECOLOGICAL INFORMATION

Toxicity

- | | |
|---|---|
| Toxicity to fish | LC50 - Oncorhynchus mykiss (rainbow trout) - 0.31 mg/l - 24.0 h |
| Toxicity to daphnia and other aquatic invertebrates | LC50 - Daphnia magna (Water flea) - 1 mg/l - 48 h |
| | EC50 - Daphnia magna (Water flea) - 1.07 mg/l - 24 h |

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1744 Class: 8 (6.1) Packing group: I
 Proper shipping name: Bromine
 Reportable Quantity (RQ):
 Marine pollutant: No
 Poison Inhalation Hazard: Hazard zone A

IMDG

UN number: 1744 Class: 8 (6.1) Packing group: I EMS-No: F-A, S-B
 Proper shipping name: BROMINE
 Marine pollutant: No

IATA

UN number: 1744 Class: 8 (6.1)
 Proper shipping name: Bromine
 IATA Passenger: Not permitted for transport
 IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION**OSHA Hazards**

Target Organ Effect, Highly toxic by inhalation, Corrosive

SARA 302 Components

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

| | CAS-No. | Revision Date |
|---------|-----------|---------------|
| Bromine | 7726-95-6 | 2007-07-01 |

SARA 313 Components

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

| | CAS-No. | Revision Date |
|---------|-----------|---------------|
| Bromine | 7726-95-6 | 2007-07-01 |

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

| | CAS-No. | Revision Date |
|---------|-----------|---------------|
| Bromine | 7726-95-6 | 2007-07-01 |

Pennsylvania Right To Know Components

| | CAS-No. | Revision Date |
|---------|-----------|---------------|
| Bromine | 7726-95-6 | 2007-07-01 |

New Jersey Right To Know Components

Bromine

CAS-No.
7726-95-6

Revision Date
2007-07-01

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

Further information

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