

## SAFETY DATA SHEET

Version 5.9  
Revision Date 09/21/2017  
Print Date 12/11/2017

### 1. PRODUCT AND COMPANY IDENTIFICATION

#### 1.1 Product identifiers

Product name : Bromine

Product Number : 207888  
Brand : Sigma-Aldrich  
Index-No. : 035-001-00-5

CAS-No. : 7726-95-6

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

Identified uses : Laboratory chemicals, Synthesis of substances

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

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

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052

#### 1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

### 2. HAZARDS IDENTIFICATION

#### 2.1 Classification of the substance or mixture

##### GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Inhalation (Category 2), H330  
Skin corrosion (Category 1A), H314  
Serious eye damage (Category 1), H318  
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

#### 2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H314 Causes severe skin burns and eye damage.  
H318 Causes serious 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.  
P264 Wash skin thoroughly after handling.  
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

|                           |   |
|---------------------------|---|
| P284                      | protection.   |
| P301 + P330 + P331        | Wear respiratory protection.  |
| P303 + P361 + P353        | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  |
|                           | IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.  |
| P304 + P340 + P310        | IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.                   |
| P305 + P351 + P338 + P310 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. |
| P363                      | Wash contaminated clothing before reuse.  |
| P391                      | Collect spillage.   |
| P403 + P233               | Store in a well-ventilated place. Keep container tightly closed.  |
| P405                      | Store locked up.  |
| P501                      | Dispose of contents/ container to an approved waste disposal plant.   |

## 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

|                  |                   |
|------------------|-------------------|
| Formula          | : Br <sub>2</sub> |
| Molecular weight | : 159.81 g/mol    |
| CAS-No.          | : 7726-95-6       |
| EC-No.           | : 231-778-1       |
| Index-No.        | : 035-001-00-5    |

#### Hazardous components

| Component      | Classification   | Concentration |
|----------------|--|---------------|
| <b>Bromine</b> |  |               |
|                | Acute Tox. 2; Skin Corr. 1A;<br>Eye Dam. 1; Aquatic Acute 1;<br>H314, H330, H400 | 90 - 100 %    |

For the full text of the H-Statements mentioned in this Section, see Section 16.

### 4. FIRST AID MEASURES

#### 4.1 Description of 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.

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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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

No data available

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### 5. FIREFIGHTING MEASURES

#### 5.1 Extinguishing media

##### Suitable extinguishing media

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

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

Container explosion may occur under fire conditions.

#### 5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

#### 5.4 Further information

May intensify fire; oxidizer.

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### 6. ACCIDENTAL RELEASE MEASURES

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

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

For personal protection see section 8.

#### 6.2 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.

#### 6.3 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.

#### 6.4 Reference to other sections

For disposal see section 13.

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### 7. HANDLING AND STORAGE

#### 7.1 Precautions for safe handling

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

For precautions see section 2.2.

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

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.

#### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1 Control parameters

##### Components with workplace control parameters

| Component | CAS-No.   | Value   | Control parameters | Basis                                   |
|-----------|-----------|---|--------------------|---|
| Bromine   | 7726-95-6 | TWA   | 0.100000 ppm       | USA. ACGIH Threshold Limit Values (TLV) |
|           | Remarks   | Upper Respiratory Tract irritation<br>Lower Respiratory Tract irritation<br>Lung damage |                    |   |
|           |           | TWA   | 0.1 ppm            | USA. ACGIH Threshold Limit Values (TLV) |
|           |           | Upper Respiratory Tract irritation<br>Lower Respiratory Tract irritation                |                    |   |

|  |  |   |                                |   |
|--|--|---|--------------------------------|---|
|  |  | Lung damage   |                                |   |
|  |  | STEL  | 0.200000 ppm                   | USA. ACGIH Threshold Limit Values (TLV)   |
|  |  | Upper Respiratory Tract irritation<br>Lower Respiratory Tract irritation<br>Lung damage |                                |   |
|  |  | STEL  | 0.2 ppm                        | USA. ACGIH Threshold Limit Values (TLV)   |
|  |  | Upper Respiratory Tract irritation<br>Lower Respiratory Tract irritation<br>Lung damage |                                |   |
|  |  | TWA   | 0.100000 ppm<br>0.700000 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants        |
|  |  | The value in mg/m3 is approximate.  |                                |   |
|  |  | TWA   | 0.100000 ppm<br>0.700000 mg/m3 | USA. NIOSH Recommended Exposure Limits  |
|  |  | ST  | 0.300000 ppm<br>2.000000 mg/m3 | USA. NIOSH Recommended Exposure Limits  |
|  |  | C   | 0.1 ppm<br>0.7 mg/m3           | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

## 8.2 Exposure controls

### Appropriate engineering controls

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

### Personal protective equipment

#### Eye/face 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 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.

#### 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.

### 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).

### Control of environmental exposure

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

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

- |   |  |
|---|--|
| a) Appearance                                   | Form: liquid<br>Colour: brown  |
| b) Odour  | suffocating  |
| c) Odour Threshold                              | No data available  |
| d) pH   | No data available  |
| e) Melting point/freezing point                 | Melting point/range: 7.2 °C (45.0 °F) - lit.   |
| f) Initial boiling point and boiling range      | 58.8 °C (137.8 °F) - lit.  |
| g) Flash point                                  | No data available  |
| h) Evaporation rate                             | No data available  |
| i) Flammability (solid, gas)                    | No data available  |
| j) Upper/lower flammability or explosive limits | No data available  |
| k) Vapour pressure                              | 233 hPa (175 mmHg) at 20 °C (68 °F)<br>895 hPa (671 mmHg) at 55 °C (131 °F)<br>301.307 hPa (225.999 mmHg) at 25 °C (77 °F) |
| l) Vapour density                               | 5.52 - (Air = 1.0)   |
| m) Relative density                             | 3.119 g/mL at 25 °C (77 °F)  |
| n) Water solubility                             | 36.5 g/l at 20 °C (68 °F)  |
| o) Partition coefficient: n-octanol/water       | No data available  |
| p) Auto-ignition temperature                    | No data available  |
| q) Decomposition temperature                    | No data available  |
| r) Viscosity                                    | 1 mm <sup>2</sup> /s at 20 °C (68 °F) -  |
| s) Explosive properties                         | No data available  |
| t) Oxidizing properties                         | No data available  |

### 9.2 Other safety information

Relative vapour density 5.52 - (Air = 1.0)

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## 10. STABILITY AND REACTIVITY

### 10.1 Reactivity

No data available

## 10.2 Chemical stability

Stable under recommended storage conditions.

## 10.3 Possibility of hazardous reactions

No data available

## 10.4 Conditions to avoid

No data available

## 10.5 Incompatible materials

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

## 10.6 Hazardous decomposition products

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

Other decomposition products - No data available

In the event of fire: see section 5

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# 11. TOXICOLOGICAL INFORMATION

## 11.1 Information on toxicological effects

### Acute toxicity

LD50 Oral - Rat - 2,600 mg/kg

Inhalation: No data available

Dermal: No data available

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

in vitro assay

S. typhimurium

Result: negative

Mouse - male and female

Result: negative

### 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.

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

No data available

### Specific target organ toxicity - single exposure

No data available

### Specific target organ toxicity - repeated exposure

No data available

**Aspiration hazard**

No data available

**Additional Information**

RTECS: EF9100000

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

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

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**12. ECOLOGICAL INFORMATION****12.1 Toxicity**

Toxicity to daphnia and other aquatic invertebrates LC50 - Daphnia magna (Water flea) - 1 mg/l - 48 h

**12.2 Persistence and degradability**

No data available

**12.3 Bioaccumulative potential**

No data available

**12.4 Mobility in soil**

No data available

**12.5 Results of PBT and vPvB assessment**

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

**12.6 Other adverse effects**

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

Very toxic to aquatic life.

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**13. DISPOSAL CONSIDERATIONS****13.1 Waste treatment methods****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.

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

UN number: 1744 Class: 8 (6.1) Packing group: I  
Proper shipping name: Bromine  
Reportable Quantity (RQ):  
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: yes

**IATA**

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

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## 15. REGULATORY INFORMATION

### 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    |

### 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

|         | CAS-No.   | Revision Date |
|---------|-----------|---------------|
| Bromine | 7726-95-6 | 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.

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## 16. OTHER INFORMATION

### Full text of H-Statements referred to under sections 2 and 3.

|               |  |
|---------------|--|
| Acute Tox.    | Acute toxicity                           |
| Aquatic Acute | Acute aquatic toxicity                   |
| Eye Dam.      | Serious eye damage                       |
| H314          | Causes severe skin burns and eye damage. |
| H318          | Causes serious eye damage.               |
| H330          | Fatal if inhaled.                        |
| H400          | Very toxic to aquatic life.              |
| Skin Corr.    | Skin corrosion                           |

### HMIS Rating

|                        |   |
|------------------------|---|
| Health hazard:         | 4 |
| Chronic Health Hazard: | * |
| Flammability:          | 0 |
| Physical Hazard        | 0 |

### NFPA Rating

|                    |   |
|--------------------|---|
| Health hazard:     | 4 |
| Fire Hazard:       | 0 |
| Reactivity Hazard: | 0 |

### Further information

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**Preparation Information**

Sigma-Aldrich Corporation  
Product Safety – Americas Region  
1-800-521-8956

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