

Material Safety Data Sheet

Bromine

ACC# 03340

Section 1 - Chemical Product and Company Identification

MSDS Name: Bromine**Catalog Numbers:** S79926, S79926-1, S799261, S799263, S799264, B385 250, B385 50, B385-250, B385-50, B385250, B38550, S79926MF**Synonyms:** Br₂.**Company Identification:**

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7726-95-6	Bromine	100%	231-778-1

Hazard Symbols: T+ C N**Risk Phrases:** 26 35 50

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: dark red-brown. **Danger!** Strong oxidizer. Contact with other material may cause a fire. Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. Lachrymator (substance which increases the flow of tears). May cause central nervous system effects. May cause cardiac disturbances. May cause liver and kidney damage.

Target Organs: Kidneys, central nervous system, liver, cardiovascular system.

Potential Health Effects

Eye: Causes eye burns. Lachrymator (substance which increases the flow of tears). May cause permanent corneal opacification. May cause chemical conjunctivitis and corneal damage.**Skin:** Contact with liquid is corrosive and causes severe burns and ulceration. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.**Ingestion:** May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract

burns. May cause liver and kidney damage. May cause perforation of the digestive tract. May cause cardiac disturbances. May cause central nervous system effects. May cause systemic effects. May cause nausea, vomiting, and diarrhea, possibly with blood.

Inhalation: Irritation may lead to chemical pneumonitis and pulmonary edema. May cause liver and kidney damage. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Causes chemical burns to the respiratory tract. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability. May cause cardiac abnormalities. May cause systemic effects. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema.

Chronic: May cause liver and kidney damage. Effects may be delayed.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

Skin: Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with combustible materials may cause a fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water with caution and in flooding amounts. Containers may explode in the heat of a fire. Will react with water to form toxic and corrosive fumes. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Non-combustible, substance itself does not burn but may decompose upon heating to produce irritating, corrosive and/or toxic fumes.

Extinguishing Media: Do NOT get water inside containers. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill with an alkaline material such as soda ash or lime.

Carefully scoop up and place into appropriate disposal container. Provide ventilation. Do not get water inside containers.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Do not breathe dust, vapor, mist, or gas. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Avoid ingestion and inhalation. Discard contaminated shoes.

Storage: Keep away from heat, sparks, and flame. Do not store near combustible materials. Do not store in direct sunlight. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Keep away from reducing agents. Loosen closure cautiously before opening.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Bromine	0.1 ppm TWA; 0.2 ppm STEL	0.1 ppm TWA; 0.7 mg/m ³ TWA 3 ppm IDLH	0.1 ppm TWA; 0.7 mg/m ³ TWA

OSHA Vacated PELs: Bromine: 0.1 ppm TWA; 0.7 mg/m³ TWA; 0.3 ppm STEL; 2 mg/m³ STEL

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear a chemical apron. Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: dark red-brown

Odor: Pungent odor.

pH: Not available.

Vapor Pressure: 175 mm Hg @ 20

Vapor Density: 7.1 (air=1)

Evaporation Rate: Not available.

Viscosity: 0.99cP @ 19.5C

Boiling Point: 59 deg C

Freezing/Melting Point: Not available.

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Decomposition Temperature:Not available.
NFPA Rating: (estimated) Health: 4; Flammability: 0; Reactivity: 1
Explosion Limits, Lower:Not available.
Upper: Not available.
Solubility: Partially soluble.
Specific Gravity/Density:3.1200g/cm³
Molecular Formula:Br₂
Molecular Weight:159.81

Section 10 - Stability and Reactivity

Chemical Stability: Stable.
Conditions to Avoid: Incompatible materials, ignition sources, dust generation, contact with water, combustible materials, organic materials, reducing agents.
Incompatibilities with Other Materials: Not available.
Hazardous Decomposition Products: Irritating and toxic fumes and gases, hydrogen bromide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7726-95-6: EF9100000
LD50/LC50:
CAS# 7726-95-6:
Inhalation, mouse: LC50 = 750 ppm/9M;
Inhalation, rat: LC50 = 2700 mg/m³;
Oral, mouse: LD50 = 3100 mg/kg;
Oral, rabbit: LD50 = 4160 mg/kg;
Oral, rat: LD50 = 2600 mg/kg;
Carcinogenicity:
CAS# 7726-95-6: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Neurotoxicity: No data available.
Mutagenicity: No data available.
Other Studies: No data available.

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous

waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	BROMINE SOLUTIONS POISON INHALATION HAZARD ZONE A				BROMINE
Hazard Class:	8				8(6.1)
UN Number:	UN1744				UN1744
Packing Group:	I				I

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7726-95-6 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

None of the chemicals in this material have an RQ.

Section 302 (TPQ)

CAS# 7726-95-6: TPQ = 500 pounds; RQ = 500 pounds (does not meet toxicity criteria but because of high production volume and recognized toxicity is considered a chemical of concern)

SARA Codes

CAS # 7726-95-6: acute.

Section 313

This material contains Bromine (CAS# 7726-95-6, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1

Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

CAS# 7726-95-6 is considered highly hazardous by OSHA.

STATE

CAS# 7726-95-6 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+ C N

Risk Phrases:

R 26 Very toxic by inhalation.

R 35 Causes severe burns.

R 50 Very toxic to aquatic organisms.

Safety Phrases:

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

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7/9 Keep container tightly closed and in a well-ventilated place.

S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)

CAS# 7726-95-6: 3

Canada

CAS# 7726-95-6 is listed on Canada's DSL List. CAS# 7726-95-6 is listed on Canada's DSL List. This product has a WHMIS classification of C, D1A, E.

CAS# 7726-95-6 is listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 7726-95-6: OEL-ARAB Republic of Egypt:TWA 0.1 ppm (0.7 mg/m³)
 OEL-AUSTRALIA:TWA 0.1 ppm (0.7 mg/m³);STEL 0.3 pp (2 mg/m³) OEL-AUSTR
 IA:TWA 0.1 ppm (0.7 mg/m³) OEL-BELGIUM:TWA 0.1 ppm (0.66 mg/m³);STEL
 0.3 ppm (2 mg/m³) OEL-DENMARK:TWA 0.1 ppm (07 mg/m³) OEL-FINLAND:STE
 L 0.1 ppm (0.7 mg/m³);Skin OEL-FRANCE:STEL 0.1 ppm (0.7 mg/m³) OEL-G
 ERMANY:TWA 0.1 ppm (0.7 mg/m³) OEL-HUNGARY:STEL 0.7 mg/m³;Skin OEL-I
 NDIA:TWA 0.1 ppm (0.7 mg/m³);STEL 0.3 ppm (2 mg/m³) OEL-JAPAN:TWA 0.1
 ppm (0.65 mg/m³) OEL-THE NETHERLANDS:TWA 0.1 ppm (0.7 mg/m³) OEL-TH
 E PHILIPPINES:TWA 0.1 ppm (0.7 mg/m³) OEL-POLAND:TWA 0.7 mg/m³ OEL-R
 USSIA:TWA 0.1 ppm;STEL 0.5 mg/m³ OEL-SWEDEN:TWA 0.1 ppm (0.7 mg/m³);S
 TEL 0.3 ppm (mg/m³) OEL-SWITZERLAND:TWA 0.1 ppm (0.7 mg/m³);STEL 0.2
 ppm (1.4 mg/m³) OEL-TURKEY:TWA 0.1 ppm (0.7 mg/m³) OEL-UNITED KINGD
 OM:TWA 0.1 ppm (0.7 mg/m³);STEL 0.3 ppm OEL IN BULGARIA, COLOMBIA, JO
 RDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM ch
 eck ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997

Revision #6 Date: 11/28/2001

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