



Material Safety Data Sheet

NFPA 	HMIS <table border="1" style="margin: auto;"> <tr><td style="background-color: #00FFFF;">Health Hazard</td><td style="text-align: center; border: 1px solid black;">3</td></tr> <tr><td style="background-color: #FFCCCC;">Fire Hazard</td><td style="text-align: center; border: 1px solid black;">0</td></tr> <tr><td style="background-color: #FFFF00;">Reactivity</td><td style="text-align: center; border: 1px solid black;">0</td></tr> </table>	Health Hazard	3	Fire Hazard	0	Reactivity	0	Personal Protective Equipment  See Section 15.
Health Hazard	3							
Fire Hazard	0							
Reactivity	0							

Section 1. Chemical Product and Company Identification		Page Number: 1
Common Name/Trade Name	Bromine	Catalog Number(s). B1145, B1146 CAS# 7726-95-6 RTECS EF9100000 TSCA TSCA 8(b) inventory: Bromine CI# Not available.
Manufacturer	SPECTRUM LABORATORY PRODUCTS INC. 14422 S. SAN PEDRO STREET GARDENA, CA 90248	<u>IN CASE OF EMERGENCY</u> <u>CHEMTREC (24hr) 800-424-9300</u> CALL (310) 516-8000
Commercial Name(s)	Not available.	
Synonym	Not available.	
Chemical Name	Bromine	
Chemical Family	Not available.	
Chemical Formula	Br ₂	
Supplier	SPECTRUM LABORATORY PRODUCTS INC. 14422 S. SAN PEDRO STREET GARDENA, CA 90248	

Section 2. Composition and Information on Ingredients					
Name	CAS #	Exposure Limits			% by Weight
		TWA (mg/m ³)	STEL (mg/m ³)	CEIL (mg/m ³)	
1) Bromine	7726-95-6	0.1	0.2		100
Toxicological Data on Ingredients	Bromine: ORAL (LD50): Acute: 3100 mg/kg [Mouse]. 4160 mg/kg [Rabbit]. 2600 mg/kg [Rat]. VAPOR (LC50): Acute: 750 ppm 0.15 hours [Mouse].				

Section 3. Hazards Identification	
Potential Acute Health Effects	Very hazardous in case of skin contact (corrosive). Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death.
Potential Chronic Health Effects	CARCINOGENIC EFFECTS: Classified 4 (No evidence.) by NTP, None. by OSHA, None. by NIOSH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to mucous membranes. The substance may be toxic to kidneys, liver, cardiovascular system, central nervous system (CNS), thyroid. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Serious Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Serious Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Serious Ingestion	Not available.

Section 5. Fire and Explosion Data

Flammability of the Product	Non-flammable.
Auto-Ignition Temperature	Not applicable.
Flash Points	Not applicable.
Flammable Limits	Not applicable.
Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	Flammable in presence of combustible materials of reducing materials of organic materials of aluminum
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	Not applicable.

Special Remarks on Fire Hazards

Flammable in the form of liquid or vapor by spontaneous chemical reaction with reducing materials. May cause fire in contact with wood, sawdust, cotton, straw, etc.
 FLAMMABLE WITH ANTIMONY, BORON, CESIUM ACETYLENE CARBIDE, CHLOROTRIFLUOROETHYLENE, COPPER HYDRIDE, CUPROUS ACETYLIDE, FLUORINE, GERMANIUM, LITHIUM CARBIDE, MAGNESIUM PHOSPHIDE, PHOSPHINE, PHOSPHORUS, PHOSPHORUS OXIDE, PHOSPHORUS TRIOXIDE, RUBIDIUM ACETYLENE CARBIDE, RUBIDIUM CARBIDE, & SODIUM ACETYLENE CARBIDE, STRONTIUM PHOSPHIDE & ZIRCONIUM DICARBIDE.
 IT COMBINES READILY WITH POTASSIUM, PHOSPHORUS & TIN, & REACTION MAY BE ACCOMPANIED BY SPONTANEOUS IGNITION.
 Warm germanium ignites in bromine vapor and antimony ignites in bromine vapor and reacts explosively with the liquid halogen.

Special Remarks on Explosion Hazards

REACTS EXPLOSIVELY WITH ACETYLENE, ACRYLONITRILE, AMMONIA, DIMETHYL FORMAMIDE, ETHYL PHOSPHINE, HYDROGEN, ISOBUTYROPHENONE, NICKEL CARBONYL, NITROGEN TRIIODIDE, OZONE, OXYGEN DIFLUORIDE, PHOSPHORUS, POTASSIUM, SILVER AZIDE, SODIUM, & SODIUM CARBIDE.
 Lithium is stable in contact with dry bromine, but heavy impact will initiate explosion, while sodium in contact with bromine needs only moderate impact for initiation. Potassium ignites in bromine vapor and explodes violently in contact with liquid bromine and rubidium ignites in bromine vapor.
 During preparation of praseodymium bromide, accidental contact of liquid bromine with small particles of praseodymium led to a violent explosion.

Section 6. Accidental Release Measures

Small Spill	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill	Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7. Handling and Storage

Precautions	Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as reducing agents, combustible materials, organic materials.
Storage	Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	TWA: 0.66 STEL: 1.3 (mg/m ³) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 0.2 (ppm) from ACGIH (TLV) [United States] TWA: 0.1 from OSHA (PEL) [United States] TWA: 0.7 (mg/m ³) from OSHA (PEL) [United States] TWA: 0.66 STEL: 2 (mg/m ³) [United Kingdom (UK)] TWA: 1 STEL: 0.3 (ppm) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Liquid.	Odor	Pungent. Suffocating. (Strong.)
Molecular Weight	159.808 g/mole	Taste	Not available.
pH (1% soln/water)	Not available.	Color	Red-Brown (Dark.)
Boiling Point	58.78°C (137.8°F)		
Melting Point	-7.25°C (18.9°F)		
Critical Temperature	315°C (599°F)		
Specific Gravity	3.11 (Water = 1)		
Vapor Pressure	23.3 kPa (@ 20°C)		
Vapor Density	7.1 (Air = 1)		
Volatility	Not available.		
Odor Threshold	0.05 ppm		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water, diethyl ether.		

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Solubility	Easily soluble in diethyl ether. Very slightly soluble in cold water. Freely soluble in alcohol, chloroform, carbon disulfide, carbon tetrachloride, concentrated hydrochloric acid, and aqueous solution of bromides.
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Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Incompatible materials
Incompatibility with various substances	Highly reactive with reducing agents, combustible materials, organic materials.
Corrosivity	Extremely corrosive in presence of aluminum, of zinc, of stainless steel(304), of stainless steel(316). Highly corrosive in presence of copper. Non-corrosive in presence of glass.
Special Remarks on Reactivity	Incompatible with organic compounds containing active hydrogen atoms adjacent to the carbonyl group (aldehydes, ketones, carboxylic acids). They may react violently in unmoderated contact with bromine. Also incompatible with diethyl zinc, potassium, germanium, rubidium, aluminum, mercury, titanium, liquid halogen, silane, acetylene, acrylonitrile, ammonia, dimethyl formamide, ethyl phosphine, hydrogen, isobutyrophenone, nickel carbonyl, nitrogen triiodide, ozone, oxygen difluoride, phosphorous, potassium, silver azide, sodium, sodium carbide, alkali hydroxides, arsenites, ferrous, mercurous salts, hypophosphites, and other oxidizable materials, saw dust, antimony, tin, boron, cesium acetylene carbide, chlorotrifluoroethylene, copper hydride, cuprous, acetylide, fluorine, lithium carbide, magnesium phosphide, phosphine, phosphorous oxide, phosphorus trioxide, rubidium acetylene carbide, rubidium carbide, sodium acetylene carbide, strontium phosphide, zirconium dicarbide, wood, cotton, straw. Bromine reacts violently in contact with natural rubber, but more slowly with some synthetic rubbers. Aluminum, mercury, or titanium react violently with dry bromine.
Special Remarks on Corrosivity	Corrodes iron, stainless steel and copper. Severe corrosive effect on bronze.
Polymerization	Will not occur.

Section 11. Toxicological Information

Routes of Entry	Absorbed through skin. Dermal contact. Inhalation. Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 2600 mg/kg [Rat]. Acute toxicity of the vapor (LC50): 750ppm 0.15 hours (9 minutes) [Mouse].
Chronic Effects on Humans	CARCINOGENIC EFFECTS: Classified 4 (No evidence.) by NTP, None. by OSHA, None. by NIOSH. Causes damage to the following organs: mucous membranes. May cause damage to the following organs: kidneys, liver, cardiovascular system, central nervous system (CNS), thyroid.
Other Toxic Effects on Humans	Extremely hazardous in case of eye contact (corrosive), of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive). Hazardous in case of skin contact (irritant, permeator), of ingestion, .
Special Remarks on Toxicity to Animals	Not available.
Special Remarks on Chronic Effects on Humans	Not available.
Special Remarks on other Toxic Effects on Humans	Acute Potential Health Effects: Skin: Contact with liquid is corrosive and causes ulceration and skin burns. In milder cases, it might cause skin rash, pustles, measles-like eruptions, furuncles, and cold and clammy skin with cyanosis or pale color. Eyes: It is a lacrymator and causes eye irritation, eyelid inflammation at low concentration. At higher concentrations it may cause blepharospasm, photophobia, conjunctivitis, and burns. Inhalation: Inhalation of smaller amounts may cause severe irritation of the respiratory tract with coughing, chest tightness, shortness of breath, and nosebleed. Inhalation of larger amounts may cause pulmonary edema, chemical pneumonitis, bronchospasm, pneumomediastinum, glottal spasm, glottal edema, inflammatory lesions in the mucous membranes, inflamed tongue and palate, chemical burns of the lungs, asthmatic bronchitis, and severe choking. Death may occur due to circulatory collapse, asphyxiation from edema of the glottis, aspiration pneumonia, or pulmonary edema. It may also affect behavior/central nervous system and gastrointestinal tract, cardiovascular system, thyroid, Symptoms may include dizziness, headache, fatigue, disturbances of sleep and sexual function, feeling of oppression, vertigo,

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anxiety, depression, muscle incoordination, emotional instability, delirium, stupor, vomiting, diarrhea, abdominal pain, tachycardia, hypotension.

Ingestion: May cause severe and permanent damage to the digestive tract. It may cause gastrointestinal tract burns, burning pain of the mouth and esophagus, corrosive gastroenteritis with vomiting, abdominal pain, diarrhea, and possible bloody feces. It may cause kidney damage (hemorrhagic nephritis with oliguria or anuria, and liver damage, brownish discoloration of lips, tongue and mucous membranes. It may also affect the cardiovascular system (tachycardia, hypotension, and cyanosis and behavior/central nervous system (symptoms similar to inhalation)

Chronic Potential Health Effects:

Inhalation and Ingestion: Prolonged or repeated exposure may affect respiration and endocrine system (thyroid), metabolism, behavior/central nervous system, and cardiovascular system, and cause kidney and liver damage. Effects may be delayed.



Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.
Special Remarks on the Products of Biodegradation	Not available.

Section 13. Disposal Considerations

Waste Disposal	Waste must be disposed of in accordance with federal, state and local environmental control regulations.
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Section 14. Transport Information

DOT Classification	Class 8: Corrosive material CLASS 6.1: Poisonous material.
Identification	UNNA: 1744 : Bromine PG: I
Special Provisions for Transport	Poison-inhalation hazard, Zone A
DOT (Pictograms)	 

Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations	<p>Connecticut hazardous material survey.: Bromine Illinois toxic substances disclosure to employee act: Bromine Illinois chemical safety act: Bromine New York release reporting list: Bromine Rhode Island RTK hazardous substances: Bromine Pennsylvania RTK: Bromine Minnesota: Bromine Massachusetts RTK: Bromine Massachusetts spill list: Bromine New Jersey: Bromine New Jersey spill list: Bromine Louisiana RTK reporting list: Bromine California Director's list of Hazardous Substances: Bromine TSCA 8(b) inventory: Bromine SARA 302/304/311/312 extremely hazardous substances: Bromine SARA 313 toxic chemical notification and release reporting: Bromine</p>
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California Proposition 65 Warnings
 California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: No products were found.
 California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: No products were found.

Other Regulations
 OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
 EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances (EINECS No. 231-778-1).
 Canada: Listed on Canadian Domestic Substance List (DSL).
 China: Listed on National Inventory.
 Japan: Not listed on National Inventory (ENCS).
 Korea: Listed on National Inventory (KECI).
 Philippines: Listed on National Inventory (PICCS).
 Australia: Listed on AICS.

Other Classifications

WHMIS (Canada)	CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.	
DSCL (EEC)	R26- Very toxic by inhalation. R35- Causes severe burns. R50- Very toxic to aquatic organisms.	S1/2- Keep locked up and out of the reach of children. S7/9- Keep container tightly closed and in a well-ventilated place. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.)

Health Hazard	3
Fire Hazard	0
Reactivity	0
Personal Protection	0

National Fire Protection Association (U.S.A.)

Health	3	0	Flammability
		OXY	Reactivity
			Specific hazard

WHMIS (Canada) (Pictograms)



DSCL (Europe) (Pictograms)



TDG (Canada) (Pictograms)



ADR (Europe) (Pictograms)



Protective Equipment



Gloves.



Full suit.



Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.



Face shield.

Section 16. Other Information

MSDS Code B3870

References Not available.

Other Special Considerations Not available.

Validated by Sonia Owen on 8/21/2009.

Verified by Sonia Owen.

Printed 8/21/2009.

CALL (310) 516-8000

Notice to Reader

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Quality Products, Inc. assumes no responsibility for the completeness or accuracy of the information contained herein.