SAFETY DATA SHEET

Preparation Date: No data available **Revision Date:** 04/28/2015 **Revision Number:** G1

Product identifier

Product code: B-160
Product Name: BROMINE WATER, SATURATED SOLUTION

Other means of identification

Synonyms: No information available
CAS #: Mixture
RTECS # Not available
CI#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: No information available.
Uses advised against No information available

Supplier:
Spectrum Chemicals and Laboratory Products, Inc.
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000

Order Online At: https://www.spectrumchemical.com

Emergency telephone number Chemtrec 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Ibad Tirmiz (East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Inhalation (Gases)	Category 3
Acute toxicity - Inhalation (Dusts/Mists)	Category 3
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1

Label elements

Danger

Hazard statements
Toxic if inhaled
Causes severe skin burns and eye damage

Hazards not otherwise classified (HNOC)
Not Applicable

Other hazards
Toxic to aquatic life

Precautionary Statements - Prevention
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response
Specific treatment (see .? on this label)
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see .? on this label)
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 or doctor/physician.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
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.
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Precautionary Statements - Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Weight %	Trade Secret
Water 7732-18-5	7732-18-5	96.5	*
Bromine 7726-95-6	7726-95-6	3.5	*

4. FIRST AID MEASURES

First aid measures

General Advice: Poison information centers in each State capital city can provide additional assistance for scheduled poisons (13 1126)

Skin Contact: Wash off immediately with soap and plenty of water. Continue flushing with plenty of water for at least 15 minutes. Remove all contaminated clothes and shoes. Immediate medical attention is required. Call a physician or Poison Control Centre immediately.

Eye Contact: Flush eye with water for 15 minutes. Immediate medical attention is required. Call a physician immediately.

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. WARNING! It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled or ingested material is toxic, infectious or corrosive. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Immediate medical attention is required.

Most important symptoms and effects, both acute and delayed

Symptoms Causes severe skin burns. Causes eye damage. Toxic by inhalation.

Indication of any immediate medical attention and special treatment needed

Notes to Physician: Treat symptomatically

Protection of first-aiders

First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste

5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: The product is not flammable.

Unsuitable Extinguishing Media: No information available.

Specific hazards arising from the chemical

Hazardous Combustion Products: No information available.

Specific 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.
(Bromine)

Special Protective Actions for Firefighters

Specific Methods: No information available.

Special Protective Equipment for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions: Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Remove all sources of ignition.

Environmental precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Absorb spill with inert material (e.g. vermiculite, dry sand or earth). Use appropriate tools to put the spilled material in a suitable chemical waste disposal container.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. Keep away from incompatible materials.

Safe Handling Advice:
Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Do not ingest. Do not breathe vapors or spray mist. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Technical Measures/Storage Conditions:
Keep container tightly closed in a dry and well-ventilated place. Store away from incompatible materials. Keep refrigerated. Sensitive to light. Store in light-resistant containers.

Incompatible Materials:
Combustible materials. Organic materials. Reducing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

Components	OSHA	NIOSH	ACGIH	AIHA WHEEL
Water - 7732-18-5	None	None	None	None
Bromine - 7726-95-6	0.1 ppm TWA 0.7 mg/m^3 TWA	= 0.1 ppm TWA	= 0.2 ppm STEL	None

Canada

Components	Alberta	British Columbia	Ontario	Quebec
Water - 7732-18-5	None	None	None	None
Bromine - 7726-95-6	= 0.1 ppm TWA = 0.7 mg/m^3 TWA	= 0.1 ppm TWA	0.1 ppm TWA	0.1 ppm TWAEV 0.66 mg/m^3 TWAEV 0.2 ppm STEV 1.3 mg/m^3 STEV

Australia and Mexico

Components	Australia	Mexico
Water 7732-18-5	None	None
Bromine 7726-95-6	2 mg/m^3 STEL 0.3 ppm STEL 0.1 ppm TWA 0.66 mg/m^3 TWA	= 0.1 ppm TWA = 0.7 mg/m^3 TWA

Appropriate engineering controls

Engineering measures to reduce exposure: Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Goggles. Safety glasses with side-shields.

Skin and body protection: Chemical resistant apron. Gloves. Long sleeved clothing.

Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:
Liquid

Appearance:
No information available

Color:
Brownish-red.

Odor:
No information available

Taste
No information available

Molecular/Formula weight:
No information available

Formula:
No information available

Flash point (°C):
No data available

Flashpoint (°C/°F):
No information available.

Flash Point Tested according to:
Not available

Lower Explosion Limit (%):
No information available

Upper Explosion Limit (%):
No information available

Autoignition Temperature (°C/°F):
No information available

pH:
Neutral

Melting point/range(°C/°F):
May start to solidify at -7.25°C/18.9°F based on data for Bromine

Boiling point/range(°C/°F):
The lowest known value is 58.78°C/137.8°F (bromine). Weighted average: 98.56°C/209.4°F

Decomposition temperature(°C/°F):
No information available

Bulk density:
No information available

Specific gravity:
Weighted average: 1.02

Density (g/cm3):
No information available

Vapor pressure @ 20°C (kPa):
The highest known value is 23.3 kPa (Bromine). Weighted average: 3.04 kPa

Evaporation rate:
No information available

Vapor density:
The highest known value is 7.1 (Bromine). Weighted average: 0.85

VOC content (g/L):
No information available

Odor threshold (ppm):
The highest known value is 0.05 ppm (Bromine)

Partition coefficient (n-octanol/water):
No information available

Viscosity:
No information available

Miscibility:
No information available

Solubility:
Easily soluble in cold water
Easily soluble in diethyl ether

10. STABILITY AND REACTIVITY

Reactivity

Reactive with reducing agents, combustible materials, organic materials.
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, bromine, 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, potassiuml, 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, megnesium 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.
(Bromine)

Chemical stability

Stability: Sensitive to light. Exposure to light accelerates decomposition. Stable at normal conditions.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur

Conditions to avoid: Heat. Ignition sources. Incompatible materials. Exposure to light.

Incompatible Materials: Combustible materials. Organic materials. Reducing agents.

Hazardous decomposition products: No information available

Other Information

Corrosivity:
Highly corrosive in the presense of aluminum, of zinc
Highly corrosive in the presence of stainless steel (304)
Corrosive in presence of copper
Severe corrosive effect on Bronze
Corrodes iron, stainless steel, and copper

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:
Eyes. Ingestion. Inhalation. Skin.

Acute Toxicity

Component Information

Water - 7732-18-5

LD50/oral/rat = > 90 mL/kg Oral LD50 Rat

LD50/oral/mouse = No information available
LD50/dermal/rat = No information available
LD50/dermal/rabbit = No information available
LC50/inhalation/rat = No information available
LC50/inhalation/mouse = No infomation available
Other LD50 or LC50information = No information available

Bromine - 7726-95-6

LD50/oral/rat = 1700 mg/kg Oral LD50 Rat
LD50/oral/mouse = 3100 mg/kg Oral LD50 Mouse
LD50/dermal/rat = No information available
LD50/dermal/rabbit = No information available
LC50/inhalation/rat = 2700 mg/m^3 Inhalation LC50
LC50/inhalation/mouse = 2900 mg/m^3 Inhalation LC50 Mouse
Other LD50 or LC50information = No information available

Product Information

LD50/oral/rat =
VALUE- Acute Tox Oral = 74286mg/kg

LD50/oral/mouse =
Value - Acute Tox Oral = No information available

LD50/dermal/rabbit
VALUE-Acute Tox Dermal = No information available

LD50/dermal/rat

VALUE -Acute Tox Dermal = No information available

LC50/inhalation/rat
VALUE-Vapor = No information available
VALUE-Gas = No information available
VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse
VALUE-Vapor = No information available
VALUE - Gas = No information available
VALUE - Dust/Mist = No information available

Symptoms

Skin Contact:	Contact with liquid is corrosive and causes ulceration and skin burns. In milder cases, it might cause skin rash, pustles, measle-like erruptions, furuncles, and cold and clammy skin with cyanosis or pale color.
Eye Contact:	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	Toxic by 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, pneumomidiastinum, glottal spasm, glottal edema, inflammatory lesions in the mucous membranes, inflammed 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 opression, vertigo, anxiety, depression, muscle incoordination, emotional instabililty, 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 esphagous, corrosive gastroenteritis with vomiting, abdominal pain, diarrhea, and possible bloody feces. It may cause kidney damage (hemmorrhagic 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).
Aspiration hazard	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity	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. (Bromine).
Sensitization:	No information available
Mutagenic Effects:	No information available
Carcinogenic effects:	Not considered carcinogenic

Components	ACGIH - Carcinogens	IARC	NTP	OSHA HCS - Carcinogens	Australia - Prohibited Carcinogenic Substances	Australia - Notifiable Carcinogenic Substances
Water	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Bromine	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed

Reproductive toxicity No data is available

Reproductive Effects: No information available
Developmental Effects: No information available
Teratogenic Effects: No information available

Specific Target Organ Toxicity

STOT - single exposure No information available
STOT - repeated exposure No information available
Target Organs: No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Not applicable.

Persistence and degradability: No information available

Bioaccumulative potential: No information available

Mobility: No information available

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Waste from residues / unused products:
Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:
Empty containers should be taken for local recycling, recovery or waste disposal

Components	RCRA - F Series Wastes	RCRA - K Series Wastes	RCRA - P Series Wastes	RCRA - U Series Wastes
Water	None	None	None	None
Bromine	None	None	None	None

14. TRANSPORT INFORMATION

DOT

UN-No: UN1744
Proper Shipping Name: Bromine solutions
Hazard Class: 8
Subsidiary Risk: 6.1

14. TRANSPORT INFORMATION

Packing Group: I
ERG No: 154
Marine Pollutant No data available
DOT RQ (lbs): No information available
Symbol(s): +

TDG (Canada)

UN-No: UN1744
Proper Shipping Name: Bromine
Hazard Class: 8
Subsidiary Risk: (6.1)
Packing Group: I
Description: No information available

ADR

UN-No: UN1744
Proper Shipping Name: Bromine
Hazard Class: 8
Packing Group: I
Subsidiary Risk: 6.1
Classification Code: No information available
Description: No information available
CEFIC Tremcard No: No information available

IMO / IMDG

UN-No: UN1744
Proper Shipping Name: Bromine
Hazard Class: 8
Subsidiary Risk: 6.1
Packing Group: I
Description: No information available
IMDG Page: No information available
Marine Pollutant No information available
EMS: F-A
MFAG: No information available
Maximum Quantity: No information available

RID

UN-No: UN1744
Proper Shipping Name: Bromine
Hazard Class: 8
Subsidiary Risk: 6.1
Packing Group: I
Classification Code: No information available
Description: No information available

ICAO

UN-No: UN1744
Proper Shipping Name: Bromine solution
Hazard Class: 8
Subsidiary Risk: 6.1
Packing Group: No information available
Description: No information available

IATA

UN-No: UN1744

14. TRANSPORT INFORMATION

Proper Shipping Name: Bromine solution
Hazard Class: 8
Subsidiary Risk: 6.1
Packing Group: No information available
ERG Code: 8P
Description: No information available

15. REGULATORY INFORMATION

International Inventories

Components	U.S. TSCA	KOREA KECL	Philippines (PICCS)	Japan ENCS	CHINA	Australia (AICS)	EINECS-No.
Water	Present	Present KE-35400	Present	Not present	Present	Present	Present 231-791-2
Bromine	Present	Present KE-03605	Present	Not present	Present	Present	Present 231-778-1

U.S. Regulations

Bromine

Massachusetts RTK: Present
New Jersey RTK Hazardous Substance List: 0252
New Jersey (EHS) List: 0252 500 lb TPQ
New Jersey - Discharge Prevention - List of Hazardous Substances: Present
New Jersey TCPA - EHS: =1000lbTQ
Pennsylvania RTK: Environmental hazard
Pennsylvania RTK - Environmental Hazard List Present
Pennsylvania RTK - Special Hazardous Substances Present
RI RTK - Hazardous Substances List: Present
Minnesota - Hazardous Substance List: Present
New York Release Reporting - List of Hazardous Substances:
= 1 lb RQ
California Directors List of Hazardous Substances: Present

California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.

Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Components	Carcinogen	Developmental Toxicity	Male Reproductive Toxicity	Female Reproductive Toxicity:
Water	Not Listed	Not Listed	Not Listed	Not Listed
Bromine	Not Listed	Not Listed	Not Listed	Not Listed

CERCLA/SARA

Components	CERCLA - Hazardous Substances and their Reportable Quantities	Section 302 Extremely Hazardous Substances and TPQs	Section 302 Extremely Hazardous Substances and RQs	Section 313 - Chemical Category	Section 313 - Reporting *de minimis*
Water	None	None	None	None	None
Bromine	None	500 lb TPQ 500	None	None	1.0 % de minimis concentration

U.S. TSCA

Components	TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)	TSCA 8(d) -Health and Safety Reporting
Water	Not Applicable	Not Applicable
Bromine	Not Applicable	Not Applicable

Canada

WHMIS hazard class:
D1A Very toxic materials
E Corrosive material

Water

Uncontrolled product according to WHMIS classification criteria

Bromine

D1A E

Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Components	WHMIS Ingredient Disclosure List -
Bromine	1 %

Inventory

Components	Canada (DSL)	Canada (NDSL)
Water	Present	Not Listed
Bromine	Present	Not Listed

Components	CEPA Schedule I - Toxic Substances	CEPA - 2010 Greenhouse Gases Subject to Manditory Reporting
Water	Not listed	Not listed
Bromine	Not listed	Not listed

EU Classification

R-phrase(s)

R23 - Toxic by inhalation.
R34 - Causes burns.

S -phrase(s)

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.

Components	Classification	Concentration Limits:	Safety Phrases
Water		No information	
Bromine	T+; R26 C; R35 N; R50	No information	S1/2 S7/9 S26 S45 S61

The product is classified in accordance with Annex VI to Directive 67/548/EEC

Indication of danger:
C - Corrosive.
T+ - Very toxic.

16. OTHER INFORMATION

Revision Date: 04/28/2015
Prepared by: Sonia Owen

Disclaimer: All chemicals may pose unknown hazards and should be used with caution. This Safety Data Sheet (SDS) 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 SDS. The physical properties reported in this SDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. 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 SDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

End of Safety Data Sheet