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Prof. Talghader 7-27-05

MSDS

Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865



Mallinckrodt
CHEMICALS



24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

BROMINE

1. Product Identification

Synonyms: Brom
CAS No.: 7726-95-6
Molecular Weight: 159.8
Chemical Formula: Br₂
Product Codes:
J.T. Baker: 9760
Mallinckrodt: 0439, 0441

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Bromine	7726-95-6	98 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS RESPIRATORY SYSTEM, EYES, CENTRAL NERVOUS SYSTEM AND SKIN. STRONG OXIDIZER. CONTACT WITH OTHER

MATERIAL MAY CAUSE FIRE.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 3 - Severe (Oxidizer)

Contact Rating: 4 - Extreme (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT
HOOD; PROPER GLOVES

Storage Color Code: Yellow Stripe (Store Separately)

Potential Health Effects

Inhalation:

Both liquid and vapor are corrosive to all body tissues and may cause serious burns. Excessive inhalation of vapors may be very irritating and damaging to the respiratory tract and lungs. Symptoms include headache, cough, nosebleed, vertigo, pulmonary edema, and abdominal pain.

Ingestion:

Corrosive! Sore throat, vomiting and abdominal spasms may occur. Estimated lethal dose: 14 mg/kg.

Skin Contact:

Corrosive! Symptoms may include skin discoloration, pain, serious burns, blistering, and slow healing ulcers.

Eye Contact:

Corrosive. Can cause blurred vision, redness, pain, severe tissue burns and eye damage.

Chronic Exposure:

Pulmonary edema, pneumonia, diarrhea, and rashes may be delayed complications of severe exposures.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention

immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Highly toxic and dense fumes are emitted when bromine is heated. Vapors can flow along surfaces to low lying areas.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Establish prior plan and training for emergencies. Keep upwind. Ventilate and evacuate area. Clean-up personnel require protective clothing and respiratory protection from vapors. Allow only qualified personnel to handle the spill. Spills: Contain and recover spills when possible. Neutralize small spills with sodium thiosulfate solution. Contain larger spills using dikes of earth, sand, or inert solid. Cover with an inch of water using rain-like spray. Release anhydrous ammonia gas, with caution and control, to neutralize bromine vapors in the air. (Do not use aqueous ammonia, because violent reactions with liquid bromine may occur.) Neutralize liquid bromine with solutions of potassium carbonate, sodium carbonate or sodium bicarbonate. Do not flush to sewer.

7. Handling and Storage

Protect against physical damage. Store in cool dry area, out of direct sunlight. Separate from combustible, organic or other readily oxidizable materials. Keep above 20F to prevent freezing but avoid heating above atmospheric temperatures as vapor pressure increase could rupture container. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL): 0.1 ppm (TWA).

-ACGIH Threshold Limit Value (TLV): 0.1 ppm (TWA), 0.2 ppm (STEL).

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with an organic vapor/acid gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor/acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:

Allow only qualified personnel to work with Bromine.

9. Physical and Chemical Properties

Appearance:

Dark, reddish-brown fuming liquid.

Odor:

Pungent odor.

Solubility:

4 g/100 ml water @ 20C (68F).

Specific Gravity:

3.1

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

58C (136F)

Melting Point:

-7C (19F)

Vapor Density (Air=1):

5.51 @ 15C

Vapor Pressure (mm Hg):

100 @ 9.3C (48F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Emits fumes of Bromine and Bromides upon thermal decomposition. Hydrogen Bromide is a by-product of many bromine reactions.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Will react with steam or water to produce toxic and corrosive fumes of hypobromous acid and hydrogen bromide. Attacks most metals, reacting violently with aluminum, titanium, mercury, and potassium. Incompatible with reducing agents, combustibles, and many organic chemicals.

Conditions to Avoid:

Moisture, heat, flames, ignition sources and incompatibles. Avoid direct sunlight.

11. Toxicological Information

Oral rat LD50: 2600 mg/kg; Inhalation rat LC50: 2700 mg/m3.

-----\Cancer Lists\-----

---NTP Carcinogen---

Ingredient	Known	Anticipated	IARC Category
Bromine (7726-95-6)	No	No	None

12. Ecological Information

Environmental Fate:

When released into the air, this material is expected to adversely affect the ozone layer.

Environmental Toxicity:

This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: BROMINE

Hazard Class: 8, 6.1

UN/NA: UN1744

Packing Group: I

Information reported for product/size: 300ML

International (Water, I.M.O.)

Proper Shipping Name: BROMINE

Hazard Class: 8, 6.1

UN/NA: UN1744

Packing Group: I

Information reported for product/size: 300ML

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----
 Ingredient TSCA EC Japan Australia

 Bromine (7726-95-6) Yes Yes NE* Yes

-----\Chemical Inventory Status - Part 2\-----
 --Canada--
 Ingredient Korea DSL NDSL Phil.

 Bromine (7726-95-6) Yes Yes No Yes

-----\Federal, State & International Regulations - Part 1\-----
 -SARA 302- -----SARA 313-----
 Ingredient RQ TPQ List Chemical Catg.

 Bromine (7726-95-6) 500 500 Yes No

-----\Federal, State & International Regulations - Part 2\-----
 -RCRA- -TSCA-
 Ingredient CERCLA 261.33 8(d)

 Bromine (7726-95-6) 1 No No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
 Reactivity: Yes (Pure / Liquid)

Australian Hazchem Code: 2XE

Poison Schedule: S7

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 4 Flammability: 0 Reactivity: 0 Other: **Oxidizer**

Label Hazard Warning:

DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED OR INHALED.
 CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS
 RESPIRATORY SYSTEM, EYES, CENTRAL NERVOUS SYSTEM AND
 SKIN. STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY
 CAUSE FIRE.

Label Precautions:

Keep from contact with clothing and other combustible materials.
 Do not get in eyes, on skin, or on clothing.
 Do not breathe vapor or mist.
 Keep container closed.

Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Do not store near combustible materials.

Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes