TATA CHEMICALS LIMITED

SAFETY DATA SHEET (SDS)

Name of chemical: BROMINE (Br_2)

1. PRODUCT IDENTIFICATION / COMPANY ADDRESS

Trade Name	Bromine	**Common Name**	Bromine	**Synonyms**	Bromine
Company Name / Address / Phone / Fax	**Tata Chemicals Limited,** Mithapur District: Devbhoomi Dwarka (Gujarat) 361 345 INDIA ***Contact in case of Emergency Only :*** +91(02892 675802 / 03) Contact Person :+91 9227676113 Mr. Devendra Thakur				
Chemical Name	Bromine				

2. HAZARD IDENTIFICATION

Hazard Classification	**Classification according to Regulation (EC) No 1272/2008:** Acute toxicity, Inhalation (Category 2), H330 Skin corrosion (Category 1A), H314 Acute aquatic toxicity (Category 1), H400
LABEL ELEMENTS	HAZARD PICTOGRAMS.  GHS05 GHS06 GHS09
Signal word	Danger
Hazard statement	**H314** Causes severe skin burns and eye damage. **H330** Fatal if inhaled. **H400** Very toxic to aquatic life.
Precautionary statement	**P260** Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. **P273** Avoid release to the environment. **P280** Wear protective gloves/ protective clothing/ eye protection / face protection. **P284** Wear respiratory protection. **P305 + P351 + P338** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. **P310** Immediately call a POISON CENTER/doctor.

3. COMPOSITION / INFORMATION AND INGREDIENTS

Structural Formula	Br-Br	**Chemical Family**	
		Molecular weight	159.808 g/mole
CAS No		**Molecular Formula**	Br_2
Name	**Product identifier**	**%**	**Classification**
Bromine	7726-95-6	100%	Acute Tox. 2; Skin Corr. 1A; Aquatic Acute 1; H330, H314, H400 M-Factor - Aquatic Acute: 10

4. FIRST AID MEASURE

Ingestion	• If inhaled, remove to fresh air. • f not breathing, give artificial respiration. • If breathing is difficult, give oxygen. • Get medical attention immediately.
Inhalation	• Do NOT induce vomiting unless directed to do so by medical personnel. • Never give anything by mouth to an unconscious person. • Loosen tight clothing • Get medical attention immediately.
Eyes	• Check for and remove any contact lenses. • In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. • Get medical attention immediately.
Skin	• In case of contact, immediately flush skin with plenty of water. • Get medical attention.
Antidote	

Most important symptoms/ effects, acute and or delayed	**Eye Contact-** • Causes eye burns. Lachrymator (substance which increases the flow of tears). • May cause permanent corneal opacification. • May cause chemical conjunctivitis and corneal damage. **Inhalation-** • May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. • 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 in coordination, and emotional instability. **Skin contact-** • 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.
Indication of immediate medical attention and special treatment needed	No data available.

5. FIRE FIGHTING MEASURES

Fire extinguishing media	• Use media suitable for surrounding materials.
Hazardous decomposition products	• Non-flammable.
Special firefighting procedure	• Firefighters should wear self-contained breathing apparatus and full protective gear.
Precaution to Fire Fighters	Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precaution	• Wear self-contained breathing apparatus • Avoid breathing vapors • Ensure adequate ventilation. • Evacuate personnel to safe areas.
Precautions for the environment	Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided
Clean up method	• Use water spray curtain to divert vapor drift, Use 4 % sodium thiosulphate solution on spilled bromine. • Do not touch spilled material. • Prevent entry into sewers, basements or confined areas, dike if needed.

7. HANDLING AND STORAGE

General precaution	• Avoid breathing of vapor. Avoid contact with skin and clothing. Use all required PPEs as mentioned in section 8. • Avoid contact with eyes.
Personal protection	Wear personal protective equipment as per Section-8.
Storage	• Keep container/bottle tightly closed. • Keep container/bottle in a cool, well-ventilated area.
Incompatibilities	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 wwith:mmonia, Azides, Ozone.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Personal protection			
			
Skin	• Wear chemical protective gloves & gum boot. • Wear full body chemical protective suit.	**Eyes**	• Wear chemical goggles and face shield.
Respiration	• Wear Airline respirator or self-contained breathing apparatus while dealing with product.	**Other**	

Exposure limits			
TLV-TWA	0.1 ppm	**TLV-STEL**	0.2 ppm
Appropriate Engineering Control	Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.		

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Red Brown (Dark) Liquid	**Molecular Weight**	159.808 g/mole	**Specific gravity**	No data available
Odour/Odor threshold	Pungent and Suffocating. (Strong)	**Flash Point °C**	Not Pertinent	**pH/ Acidity**	Not available.
Auto Ignition Temp. °C	Not Pertinent	**Boiling Point °C @ 760 mm Hg**	59°C	**Melting Point °C**	
Vapor Press. Mm Hg @ 20 °C		**Vapour Density**		**Water Solubility @ 20 °C**	36.5 g/l at 20 °C (68 °F)
LEL %	Not Pertinent	**UEL %**	Not Pertinent	**% Volatile**	
Evaporation rate		**Viscosity @ 25 °C**		**PH**	
Octanol / Water Partition Coefficient	No data Available			No data available	

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended storage conditions.	**Possibility of Hazardous reaction**	No data available
Hazardous Reactions/ Decomposition products	• Bromine gas, Hydrogen Bromide, Hydrogen Chloride,	**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.
Condition to avoid	• Confined spaces & contact with material mentioned in material to avoid section		

11. TOXICOLOGICAL INFORMATION

Routes of exposure	Ingestion, Eyes, Inhalation, Skin Absorption				
LD50 (oral / rats) mg/kg	2600 mg/kg	**LD50 (dermal/ rats)** mg/kg		**LC50 (inhalation / rats)**	750 1 hours
Target Organ Effects	Respiratory system				
Symptoms related to physical, chemical & toxicological characteristics					

12. ECOLOGICAL INFORMATION

Mobility in Soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Persistence and degradability	No data available.
Bio accumulative Potential	No data available
Effects on fish (Eco toxicity)	Waste must be disposed of in accordance with federal, state and local environmental control regulations.
Effects on birds	No data available
Effects on bees	No data available

13. DISPOSAL CONSIDERATIONS

- Dispose of waste and residues in accordance with local authority requirements.

14. TRANSPORT INFORMATION

UN No.	---	**IMDG No.**	---
Shipping Name	Bromine	**Hazard class**	---
Packing group	---	**Hazard Sub class**	---
Marine Pollutant	---	**Labels required**	----
Warning Statement	---		
Packaging / Precaution			
Shipping Marking			

15. REGULATORY INFORMATION

LABELING:

PHRASES R:

R 26 Very toxic by inhalation.

R 35 Causes severe burns.

R 50 Very toxic to aquatic organisms.

PHRASES S:

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.

16. OTHER INFORMATION

NFPA Classification:

Health Hazard: 3

Fire Hazard: 0

Reactive Hazard: 0

Special Hazard : OX

The information provided in this Material Safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication.The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with other materials