CATO Research Chemicals Inc.
3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Web: www.cato-chem.com
Tel: +86-20-81960175 Fax: +86-20-81717260 E-mail: info@cato-chem.com

SAFETY DATA SHEETS

According to the UN GHS revision 10

Version: 1.1
Creation Date: July 15, 2024
Revision Date: January 07, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Reference Material for Iodine Monobromide Titration Solution

1.2 Other means of identification

Product number CPRM5646
Other names -

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.
Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.
Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou
Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175
Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Skin corrosion, Sub-category 1A
Acute toxicity - Category 2, Inhalation
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word Danger

Hazard statement(s)
H314 Causes severe skin burns and eye damage
H330 Fatal if inhaled
H400 Very toxic to aquatic life

Precautionary statement(s)

Prevention
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash ... thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
P273 Avoid release to the environment.

Response
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P363 Wash contaminated clothing before reuse.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P320 Specific treatment is urgent (see ... on this label).
P391 Collect spillage.

Storage	P405 Store locked up. P403+P233 Store in a well-ventilated place. Keep container tightly closed.
Disposal	P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Reference Material for Iodine Monobromide Titration Solution	Bromine	7726-95-6	231-778-1	≈ 99%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer immediately for medical attention. See Notes.

Following skin contact

First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Put clothes in sealable container. Refer immediately for medical attention.

Following eye contact

Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Refer immediately for medical attention.

4.2 Most important symptoms/effects, acute and delayed

Inhalation exposure to 11-23 mg/m3 produces severe choking. 30-60 mg/m3 is extremely dangerous. 200 mg/m3 is fatal in a short time. Vapors can cause acute as well as chronic poisoning. It has cumulative properties. It is irritating to the eyes and respiratory tract. Poisoning is due to the corrosive action on the gastrointestinal tract. Nervous, circulatory and renal disturbances occur after ingestion. Ingestion of liquid can cause death due to circulatory collapse and asphyxiation from swelling of the respiratory tract. The lowest oral lethal dose reported for humans is 14 mg/kg. The lowest lethal inhalation concentration reported for humans is 1000 ppm. (EPA, 1998)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Bromine, methyl bromide, and related compounds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

If material involved in fire: Extinguish fire using agent suitable for type of surrounding fire. (Material itself does not burn or burns with difficulty). Use water in flooding quantities as fog. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use water spray to knock-down vapors.

5.2 Specific hazards arising from the chemical

Will cause ignition of organic materials spontaneous ignition possible when combined with potassium, phosphorus and tin and a wide variety of other chemicals. It reacts explosively with acetylene, acrylonitrile, ammonia, dimethyl formamide, ethyl phosphine, hydrogen, isobutyrophenone, nickel carbonyl, nitrogen triiodide, ozone, oxygen difluoride, phosphorus, potassium, silver azide, sodium and sodium carbide. When heated it emits highly toxic fumes and will react with water or steam to product toxic and corrosive fumes. Bromine is incompatible with a wide variety of materials including alkali hydroxides; arsenites; ferrous, mercurous salts; hypophosphites and other oxidizable substances. Vaporizes rapidly at room temperature. (EPA, 1998)

5.3 Special protective actions for fire-fighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep cylinder cool by spraying with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Do NOT let this chemical enter the environment. Remove vapour with fine water spray. Collect leaking liquid in sealable containers. Absorb remaining liquid in dry sand or inert absorbent. Do NOT absorb in saw-dust or other combustible absorbents. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Do NOT let this chemical enter the environment. Remove vapour with fine water spray. Collect leaking liquid in sealable containers. Absorb remaining liquid in dry sand or inert absorbent. Do NOT absorb in saw-dust or other combustible absorbents. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

1) ventilate area of spill or leak. 2) collect for reclamation or absorb in vermiculite, dry sand, earth, or a similar material or pour sodium thiosulfate or lime water over small spills.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO contact with incompatible materials: See Chemical Dangers Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. See Chemical Dangers. Cool. Dry. Well closed. Keep in a well-ventilated room. Store only in original container. Store in an area without drain or sewer access.Conditions for safe storage, including any incompatibilities: Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Do not store in polyethylene containers. Handle and open container with care.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.1 ppm as TWA; 0.2 ppm as STEL.EU-OEL: 0.7 mg/m3, 0.1 ppm as TWA

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear safety goggles, face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use breathing protection, closed system or ventilation.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Gaseous. Liquified gas.
Colour	Dark reddish-brown, volatile, diatomic liquid.
Odour	Suffocating odor
Melting point/freezing point	>= -7.25 °C. Atm. press.:No data provided.
Boiling point or initial boiling point and boiling range	>= 59.47 °C. Remarks:No information provided on atmospheric pressure, decomposition, or decomposition temperature.;>= 58.78 °C. Remarks:No information provided on atmospheric pressure, decomposition, or decomposition temperature.
Flammability	Noncombustible Liquid, but accelerates the burning of combustibles.
Lower and upper explosion limit/flammability limit	no data available
Flash point	79°C(lit.)
Auto-ignition temperature	Remarks:Bromine is flammable in the form of a liquid or vapor by spontaneous chemical reactions with reducing materials.
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	centistokes = 0.314. Temperature:20°C.;centistokes = 0.288. Temperature:30.0°C.;centistokes = 0.264. Temperature:40°C.
Solubility	Miscible with water

Partition coefficient n-octanol/water	log Pow = -1.49.
Vapour pressure	220 hPa. Temperature:20 °C. Remarks:Reported from MSDS.;340 hPa. Temperature:30 °C. Remarks:Reported from MSDS.;740 hPa. Temperature:50 °C. Remarks:Reported from MSDS.
Density and/or relative density	>= 3.102 Dimensionless. Temperature:25 °C.
Relative vapour density	7.14 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Upon heating, toxic fumes are formed. The substance is a strong oxidant. It reacts violently with combustible and reducing materials. The substance reacts with most organic and inorganic compounds, causing fire and explosion hazard. Attacks metal, some forms of rubber, plastic and coatings.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

The vapour is heavier than air.BROMINE is a powerful oxidizing agent. Reacts vigorously with reducing reagents. Can ignite a combustible material upon contact. If heated by itself or if mixed with water or steam, highly toxic and corrosive fumes are emitted. Reacts explosively with hydrogen, diethylzinc, dimethylformamide, ammonia, trimethylamine, nitromethane, metal azides (silver or sodium azide). Mixtures with lithium or sodium are shock-sensitive. Ignites on contact with germanium, trialkyl boranes, copper and alkali metal acetylides [Sax, 9th ed., 1996, p. 506]. Attacks most metals, including platinum and palladium [Hawley]. May react violently to form bromides upon contact with Mg, Sr, B, Al, Hg, Ti, Sn, Sb in powder or sheet form. Sodium, potassium, antimony and germanium ignite in bromine vapor and react explosively. Ignites on contact with germanium, trialkyl boranes, copper and alkali metal acetylides [Sax, 9th ed., 1996, p. 506]. Violent reaction with methanol, ethanol, aldehydes, ketones, carboxylic acids, diethyl ether, carbonyl compounds, tetrahydrofuran, acrylonitrile, ozone, phosphorus. Methyl acetylides or carbides ignite at room temperature on contact with bromine vapor. Explosive reaction with red phosphorus, metal azides, nitromethane, silane and its homologues [Bretherick, 5th ed., 1995, p. 109]. Reacts violently on contact with natural rubber [Pascal, 1960, vol. 16.1, 371].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

During bromination of acetone to bromoacetone, presence of a large excess of bromine must be avoided to prevent sudden and violent reaction.

10.6 Hazardous decomposition products

no data available

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Mouse oral 3100 mg/kg bw
- Inhalation: LC50 - mouse (female) - 174 ppm.
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

Lachrymation. The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation may cause asthma-like reactions. Inhalation may cause pneumonitis. Inhalation may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest. The effects may be delayed. Medical observation is indicated. See Notes. Exposure could cause death.

STOT-repeated exposure

The substance may have effects on the respiratory tract and lungs. This may result in impaired functions.

Aspiration hazard

A harmful contamination of the air will be reached very quickly on evaporation of this substance at 20°C.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 - Oncorhynchus mykiss (previous name: Salmo gairdneri) - ca. 310 µg/L - 24 h.
- Toxicity to daphnia and other aquatic invertebrates: LC50 - Daphnia magna - ca. 1 500 µg/L - 24 h.
- Toxicity to algae: Not reported - Chlorella sp. - >= 1 000 µg/L - 18 h.
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

Bromine will slowly be reduced to bromide by natural oxidizable materials(1).

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN1744 (For reference only, please check.)	IMDG: UN1744 (For reference only, please check.)	IATA: UN1744 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: BROMINE or BROMINE SOLUTION (For reference only, please check.)	IMDG: BROMINE or BROMINE SOLUTION (For reference only, please check.)	IATA: BROMINE or BROMINE SOLUTION (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 8 (For reference only, please check.)	IMDG: 8 (For reference only, please check.)	IATA: 8 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: I (For reference only, please check.)	IMDG: I (For reference only, please check.)	IATA: I (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: Yes	IMDG: Yes	IATA: Yes

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Bromine	Bromine	7726-95-6	231-778-1
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date	July 15, 2024
Revision Date	January 07, 2025

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

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