

SAFETY DATA SHEET

SECTION 1: IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier:

Bromine

IUPAC name: Bromine

CAS number: 7726-95-6

EC number: 231-778-1

Pre-registration number: 05-2114520826-48-0000

1.2. Relevant identified uses of the substance and uses advised against:

Reagent in organic synthesis. It is used in the pharmaceutical industry for intermediate production. For industrial use.

1.3. Details of the supplier of the safety data sheet:

Vinyl Kft

Headquarters:

3524 Miskolc, Adler K. u. 19.

Telefonszám: +36 46 432 633

Branch office:

1097 Budapest, Illatos u. 19-23.

Telefonszám: +36 1 282-6768

1.3.1. Responsible person: -

E-mail: ehsq@vinyl.hu

1.4. Emergency telephone number: 06 80 201 199 (0-24H) / +36 46 432 633

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance:

Classification according to Regulation 1272/2008/EC (CLP):

Acute toxicity 2 (inhalation) – H330

Skin corrosion 1A – H314

Hazardous to the aquatic environment, Acute 1 – H400

Warning H statements:

H314 – Causes severe skin burns and eye damage.

H330 – Fatal if inhaled.

H400 – Very toxic to aquatic life.

2.2. Label elements:

IUPAC name: Bromine

CAS number: 7726-95-6

EC number: 231-778-1

GHS05



GHS06



DANGER

GHS09



Warning H statements:**H314** – Causes severe skin burns and eye damage.**H330** – Fatal if inhaled.**H400** – Very toxic to aquatic life.**Precautionary P statements:****P260** – Do not breathe gas/mist/vapours/spray.**P273** – Avoid release to the environment.**P280** – Wear protective gloves/protective clothing/eye protection/face protection.**P284** – Wear respiratory protection.**P304 + P340** – IF INHALED: Remove person to fresh air and keep comfortable for breathing.**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.**P403 + P233** – Store in a well-ventilated place. Keep container tightly closed.**P405** – Store locked up.**P501** – Dispose of contents/container as hazardous waste, in accordance with the relevant regulations.2.3. Other hazards:

No other known specific hazards for human or environment.

Results of PBT and vPvB assessment: Not applicable.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS3.1. Substance:

IUPAC name: Bromine

CAS number: 7726-95-6

EC number: 231-778-1

Index number: 035-001-00-5

Formula: Br₂

Molar mass: 79,9 g/mol

Purity: 99 - 100 %

SECTION 4: FIRST AID MEASURES4.1. Description of first aid measures:IN CASE OF INGESTION:

Measures:

- Rinse mouth with water.
- Do NOT induce vomiting.
- Give 1-2 glasses of water to drink.
- Obtain medical help.

IN CASE OF INHALATION:

Measures:

- Take the victim into fresh air and place him in a comfortable half-sitting position.
- If necessary, administer artificial respiration - do not perform mouth-to-mouth ventilation.
- Obtain medical help.

IN CASE OF SKIN CONTACT:

Measures:

- Wash the skin surface with plenty of water.
- Remove the contaminated clothes and continue rinsing.
- Obtain medical help.

IN CASE OF EYE CONTACT:

Measures:

- In case of contact with eyes flush with plenty of flowing water holding eyelids apart and moving the eyeballs (for at least 10-15 minutes).
- Obtain medical help.

4.2. Most important symptoms and effects, both acute and delayed:

Lachrymation. The substance is corrosive to the eyes, the skin and the respiratory system. Inhalation of vapor may cause asthma or lung edema. Exposure may result in death. The effects may be delayed, therefore medical observation is indicated. Corrosive if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed:

See section 4.1.

SECTION 5: FIRE-FIGHTING MEASURES5.1. Extinguishing media:

5.1.1. Suitable extinguishing media:

Water spray, water fog.

5.1.2. Unsuitable extinguishing media:

Carbon-dioxide.

5.2. Special hazards arising from the substance or mixture:

In case of fire, dangerous gases may be formed, the inhalation of such combustion products can have serious adverse effects on health. Not combustible but enhances combustion of other substances. Many reactions may cause a fire or explosion. Vapours spread in the lower air layers. Heating increases the risk of explosion.

5.3. Advise for fire fighters:

Wear full protective clothing and self-contained breathing apparatus.

The danger area must be separated, keep unauthorized people away.

The container should be cooled with water and, if possible, removed from the hazardous area.

The water used must be prevented from entering sewers.

SECTION 6: ACCIDENTAL RELEASE MEASURES6.1. Personal precautions, protective equipment and emergency procedures:

6.1.1. For non-emergency personnel:

Keep unprotected people away, allow only well trained experts wearing suitable protective clothing to abide in the field of accident.

6.1.2. For emergency responders:

Wear appropriate personal protective equipment (see section 8).

6.2. Environmental precautions:

Dispose of spillage and waste (product/packaging) in accordance with all applicable environmental laws. Do not allow the substance and the resulting waste to enter sewers/soil/surface or ground water. Notify the respective authorities in accordance with local law in the case of environmental pollution immediately.

6.3. Methods and material for containment and cleaning up:

Immediately call a safety specialist. The area must be enclosed. Access to the contaminated area must be prevented. Leakage must be stopped. Collect the spilled material with non-combustible absorbent (e.g. sand, ground limestone), then place into a suitable, closed, properly labelled chemical waste container for removal/disposal. Do not use sawdust! Neutralize the spilled material with potassium or sodium carbonate, bicarbonate. Clean contaminated surfaces thoroughly with plenty of water.

6.4. Reference to other sections:

For further and detailed information see section 8 and 13.

SECTION 7: HANDLING AND STORAGE7.1. Precautions for safe handling:

Observe conventional hygiene precautions.

Work carefully to avoid spreading, inhalation, skin and eye contact, or ingestion.

Wash hands often during work, and wash thoroughly after work.

Technical measures:

No special measures required.

Precautions against fire and explosion:

No special measures required.

7.2. Conditions for safe storage, including any incompatibilities:

Technical measures and storage condition:

Keep the material in a tight container. If package is fragile, keep it in a closed, unbreakable container, protected from sunlight, in a dry, cool place designed for this purpose.

Keep away from foodstuff, feed and incompatible materials.

Keep in a well-ventilated place.

Incompatible materials: see section 10.5.

Packaging material: no special prescriptions.

7.3. Specific end use(s):

No specific instructions available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION8.1. Control parameters:

Occupational exposure limit values (Regulation 2006/15/EC):

Bromine (CAS number: 7726-95-6): 8 hours: 0,1 ppm; 0,7 mg/m³

DNEL		Routes of exposure	Exposure frequency	Remarks:
Worker	Consumer			
no data available	no data available	Dermal	Short term (acute) Long term (repeated)	no data available
no data available	no data available	Inhalative	Short term (acute) Long term (repeated)	no data available
no data available	no data available	Oral	Short term (acute) Long term (repeated)	no data available

PNEC			Exposure frequency:	Remarks:
Water	Soil	Air		
no data available	no data available	no data available	Short term (single use) Long term (continuous)	no data available
no data available	no data available	no data available	Short term (single use) Long term (continuous)	no data available
no data available	no data available	no data available	Short term (single use) Long term (continuous)	no data available

8.2. Exposure controls:

In case of a hazardous material with no controlled concentration limit it is the employer's duty to keep concentration levels down to a minimum achievable by existing scientific and technological means, where the hazardous substance poses no harm to workers.

8.2.1 Appropriate engineering controls:

In pursuance of work is proper foresight needed to avoid spilling onto clothes and floors and to avoid contact with eyes and skin.

Local and general ventilation should be provided to remove the pollutants so that the concentration in the air does not exceed the permitted exposure limits.

Avoid mist formation.

Do not eat or smoke during work.

Wash hands during breaks and after work.

Immediately remove contaminated clothes.

Wash contaminated skin with water.

Ensure safety showers and eyewash stations at the workplace.

8.2.2 Individual protection measures, such as personal protective equipment:

1. Eye/face protection: use appropriate tightly fitting protective glasses/face shield (EN 166).

2. Skin protection:

a. Hand protection: use appropriate protective gloves (89/686/EEC and EN 374).

b. Other: the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

3. Respiratory protection: where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

4. Thermal hazard: None known.

8.2.3 Environmental exposure controls:

A risk assessment must be carried out at the place of use.

The requirements detailed in Section 8 assume skilled work under normal conditions and usage of the product for appropriate aims. If conditions differ from normal or work is carried out under extreme conditions an expert's advice should be sought out before deciding upon further protective measures.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES9.1. Information on basic physical and chemical properties:

Parameter		Test method:	Remarks:
1. Appearance:	red-brown smoking liquid		
2. Odour:	pungent		
3. Odour threshold:	no data available*		
4. pH value:	no data available*		
5. Melting point/ freezing point:	-7,2 °C		
6. Initial boiling point/boiling range:	58,8 °C		
7. Flash point:	no data available*		
8. Evaporation rate:	no data available*		
9. Flammability (solid, gas):	no data available*		
10. Upper/lower flammability or explosive limits:	no data available*		
11. Vapour pressure:	23,3 kPa	20 °C	
12 Vapour density:	5,5	20 °C	
13. Relative density:	no data available*		
14. Solubility(ies):	water: 35,8 g/l	20 °C	
15. Partition coefficient: n-octanol/water:	no data available*		
16. Self-ignition temperature:	no data available*		
17. Degradation temperature:	no data available*		
18. Viscosity:	no data available*	20 °C	
19. Explosive properties:	no data available*		
20. Oxidizing properties:	no data available*		

9.2. Other information:Density at 20 °C: 3,1 kg/dm³

*: The manufacturer did not carry out any tests on this parameter for the product or the results of the examinations at the time of issue of the data sheet.

SECTION 10: STABILITY AND REACTIVITY10.1. Reactivity:

Reacts violently with ammonia, azides, ozone.

10.2. Chemical stability:

At normal temperature and general conditions of work stable.

10.3. Possibility of hazardous reactions:

See section 10.5.

10.4. Conditions to avoid:

The substance is non-combustible, but many materials may burn in the same way as oxygen in the presence of bromine. Explosive mixtures may be formed in the presence of hydrogen and air in certain concentrations.

10.5. Incompatible materials:

The substance is a strong oxidant and reacts violently with combustible and reducing substances. Reacts violently with aqueous ammonia, metals, organic materials and phosphorus, causing fire and explosion hazard.

10.6. Hazardous decomposition products:

Toxic fumes are generated in case of heating. Hydrogen bromide gas is generated in the event of fire.

SECTION 11: TOXICOLOGICAL INFORMATION11.1. Information on toxicological effects:

Acute toxicity: Fatal if inhaled.

Skin corrosion/irritation: Causes severe skin burns.

Serious eye damage/eye irritation: Causes serious eye damage.

Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.

Germ cell mutagenicity: Based on available data, the classification criteria are not met.

Carcinogenicity: Based on available data, the classification criteria are not met.

Reproductive toxicity: Based on available data, the classification criteria are not met.

STOT-single exposure: Based on available data, the classification criteria are not met.

STOT-repeated exposure: Based on available data, the classification criteria are not met.

Aspiration hazard: Based on available data, the classification criteria are not met.

11.1.1. For substances subject to registration, brief summaries of the information derived from the test conducted:

No data available.

11.1.2. Relevant toxicological properties of the hazardous substances:

Acute toxicity: Toxic, corrosive, may cause serious damage to health by ingestion, inhalation, in contact with skin.

LD50 (oral, rat): 2600 mg/kg

LC50 (inhalative, rat): 2.7 mg/l

Not carcinogenic according to IARC.

Local effects: Causes burns on the mucous membranes of the eyes and airways. Target organs: eye, skin, respiratory system, central nervous system.

Chronic effects: coughing, severe chest pain, asthma, pulmonary edema.

11.1.3. Information on likely routes of exposure:

Ingestion, inhalation, skin contact, eye contact.

11.1.4. Symptoms related to the physical, chemical and toxicological characteristics:

Inhalation: May be fatal if inhaled. The substance is extremely destructive to the mucous membranes and upper respiratory tract tissues.

Ingestion: Harmful if swallowed. Causes severe burns.

Skin: May be harmful if absorbed through the skin. It causes severe burns on the skin.

Eyes: May cause severe burns to the eye.

Symptoms and Effects: Burning sensation, cough, difficulty in breathing, laryngitis, respiratory failure, headache, nausea, vomiting, cyanosis, cardiovascular effects, respiratory disorders, tearing, nosebleeds, dizziness, sensitivity to irritation, loss of appetite, joint pain, abdominal pain, voice changes.

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

Causes severe skin burns and eye damage.

Fatal if inhaled.

11.1.6. Interactive effects:

No data available.

11.1.7. Absence of specific data:

No information.

11.1.8. Other information:

No data available.

SECTION 12: ECOLOGICAL INFORMATION12.1. Toxicity:

Very toxic to aquatic life.

The gas damages the ozone layer.

Aquatic toxicity:

LC100 (fish): 10 to 20 mg/l

EC100 (Daphnia magna): 10 mg/l

Alga (96 h) 12% reduction: 0.18 mg/l

Alga (96 h) 22% reduction: 0.24 mg/l

Alga (96 h) 100% reduction: 0.42 mg/l

Acute toxicity:

Toxic to bees, fish, algae.

12.2. Persistence and degradability:

Unstable in water.

12.3. Bioaccumulation potential:

No data available.

12.4. Mobility in soil:

No data available.

12.5. Results of PBT and vPvB assessment:

Not applicable (inorganic).

12.6. Other adverse effects:

No data available.

SECTION 13: DISPOSAL CONSIDERATIONS13.1. Waste treatment methods:

Disposal according to the local regulations.

13.1.1. Information regarding the disposal of the product:

Neutralize with reducing substances and dispose of in a waste collector according to the relevant regulations.

Must not be disposed of with household waste.

European Waste Code:

No appropriate EWC code can be given for the substance, since the identification of the proper code can be done with the method of use defined by the user of the substance. The European waste code number has to be determined after a discussion with a specialist dealing with waste disposal.

13.1.2. Information regarding the disposal of the packaging:

If the packaging becomes waste, it is classified as hazardous waste based on its health hazards.

Dispose according to the relevant regulations.

- 13.1.3. Physical/chemical properties that may affect waste treatment options shall be specified:
None known.
- 13.1.4. Sewage disposal:
None known.
- 13.1.5. Special precautions for any recommended waste treatment:
No data available.

SECTION 14: TRANSPORT INFORMATION

- 14.1. UN Number:
UN 1744
- 14.2. UN proper shipping name:
BROMINE
- 14.3. Transport hazard class(es):
Class: 8
Kemler number 886
Label: 8 + 6.1
Classification code: CT1
- 14.4. Packaging group:
I
- 14.5. Environmental hazard:
The transport of the material may only take place in the packaging material specified in the Packaging Ordinance P 804 prescribed in ADR.
- 14.6. Special precautions for user:
No relevant information available.
- 14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code:
Not applicable.

SECTION 15: REGULATORY INFORMATION

- 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture:
REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC
- REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- 15.2. Chemical safety assessment: no information available.

SECTION 16: OTHER INFORMATION

Information regarding the revision of the safety data sheet: none.

Full text of the abbreviations in the safety data sheet:

DNEL: Derived no effect level. PNEC: Predicted no effect concentration. CMR effects: carcinogenicity, mutagenicity and toxicity for reproduction. PBT: Persistent, bioaccumulative and toxic. vPvB: Very Persistent, Very Bioaccumulative. n.d.: not defined. n.a.: not applicable.

Key literature references and sources for data:

safety data sheet (dated 09. 08. 2017, version 3) issued by the manufacturer.

Relevant H-Phrases (number and full text) of Section 2 and 3:

H314 – Causes severe skin burns and eye damage.

H330 – Fatal if inhaled.

H400 – Very toxic to aquatic life.

Training advice: no data available.

This safety data sheet had been prepared on the basis of information provided by the manufacturer/supplier and conform to the relevant regulations.

The information, data and recommendations contained herein are provided in good faith, obtained from reliable sources and believed to be true and accurate as of the date issued; however, no representation is made as to the comprehensiveness of the information. The SDS shall be used only as a guide for handling the product; in the course of handling and using the product other considerations may arise or be required.

Users are cautioned to determine the appropriateness and applicability of the above information to their particular circumstances and purposes and assume all risk associated with the use of this product. It is the responsibility of the user to fully comply with local, national and international regulations concerning the use of this product.

Safety data sheet was prepared by: ToxInfo Kft. msds-europe.com

Professional help regarding the explanation of the safety data sheet:

+36 70 335 8480;

info@msds-europe.com