1. Identification

Product identifier Halothane

Other means of identification
Catalog number 1303501
Chemical name Ethane, 2-bromo-2-chloro-1,1,1-trifluoro-, (+-)

Recommended use Specified quality tests and assay use only.
Recommended restrictions Not for use as a drug. Not for administration to humans or animals.

Manufacturer/Importer/Supplier/Distributor information
Company name U. S. Pharmacopeia
Address 12601 Twinbrook Parkway
Rockville
MD 20852-1790
US
Telephone RS Technical Services 301-816-8129
Website RS Technical Services www.usp.org
E-mail RSTECH@usp.org

Emergency phone number CHEMTREC within US & Canada 1-800-424-9300
CHEMTREC outside US & Canada +1 703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards
- Serious eye damage/eye irritation Category 2A
- Reproductive toxicity Category 2
- Specific target organ toxicity, single exposure Category 3 narcotic effects

OSHA hazard(s) Not classified.

Label elements

Signal word Danger

Hazard statement Causes serious eye irritation. May cause drowsiness or dizziness. Suspected of damaging fertility or the unborn child.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing mist or vapor. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. If exposed or concerned: Get medical advice/attention.

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

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) Not classified.

3. Composition/information on ingredients

Substance
Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halothane</td>
<td></td>
<td>151-67-7</td>
<td>100</td>
</tr>
</tbody>
</table>

4. First-aid measures

Inhalation
Move to fresh air. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact
Rinse skin with water/shower. Get medical attention if irritation develops and persists.

Eye contact
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion
Rinse mouth thoroughly. If ingestion of a large amount does occur, call a poison control center immediately.

Most important symptoms/effects, acute and delayed
Irritation of eyes and mucous membranes. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea.

Indication of immediate medical attention and special treatment needed
Treatment of halogenated hydrocarbon anesthetic overdose may include the following: Induced vomiting is NOT recommended. Perform gastric lavage soon after ingestion (within 1 hour). Administer activated charcoal as a slurry. For circulatory depression or severe hypotension, infuse isotonic fluids and place in Trendelenburg position. If hypotension persists, administer dopamine or norepinephrine. For bradycardia, administer atropine. For respiratory depression, establish a clear airway and administer 100% oxygen. For malignant hyperthermia, administer 100% oxygen and dantrolene sodium, and reduce body temperature with external cooling methods, if needed. For metabolic acidosis, administer sodium bicarbonate. For hyperkalemia, administer oxygen, bicarbonate, and glucose and insulin. For bronchospasms and wheezing, administer a bronchodilator. For seizures, administer a benzodiazepine. If seizures persist, administer phenobarbital or propofol. (Mexitext) (Poisondex)

General information
Remove from exposure. Remove contaminated clothing. For treatment advice, seek guidance from an occupational health physician or other licensed health-care provider familiar with workplace chemical exposures. In the United States, the national poison control center phone number is 1-800-222-1222. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen if available. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention.

5. Fire-fighting measures

Suitable extinguishing media
Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical
No unusual fire or explosion hazards noted.

Special protective equipment and precautions for firefighters
Wear suitable protective equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Avoid inhalation of vapors. Wear appropriate personal protective equipment.

Methods and materials for containment and cleaning up
Absorb spillage with suitable absorbent material. For waste disposal, see section 13 of the SDS. Clean surface thoroughly to remove residual contamination.

7. Handling and storage

Precautions for safe handling
As a general rule, when handling USP Reference Standards, avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Clean equipment and work surfaces with suitable detergent or solvent after use. After removing gloves, wash hands and other exposed skin thoroughly.

Conditions for safe storage, including any incompatibilities
Store in tight container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

8. Exposure controls/personal protection

Occupational exposure limits
U.S. - NIOSH

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halothane (CAS 151-67-7)</td>
<td>Ceiling</td>
<td>2 ppm</td>
<td>Waste anesthetic gas</td>
</tr>
</tbody>
</table>
**US. ACGIH Threshold Limit Values**

<table>
<thead>
<tr>
<th>Material (CAS 151-67-7)</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halothane</td>
<td>TWA</td>
<td>50 ppm</td>
</tr>
</tbody>
</table>

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Appropriate engineering controls**

Airborne exposure should be controlled primarily by engineering controls such as general dilution ventilation, local exhaust ventilation, or process enclosure. Local exhaust ventilation is generally preferred to general exhaust because it can control the contaminant at its source, preventing dispersion into the work area. An industrial hygiene survey involving air monitoring may be used to determine the effectiveness of engineering controls. Effectiveness of engineering controls intended for use with highly potent materials should be assessed by use of nontoxic surrogate materials. Local exhaust ventilation such as a laboratory fume hood or other vented enclosure is recommended, particularly for aerosol-generating procedures.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection**
Safety glasses with sideshields are recommended. Face shields or goggles may be required if splash potential exists or if corrosive materials are present. Approved eye protection (e.g., bearing the ANSI Z87 or CSA stamp) is preferred. Maintain eyewash facilities in the work area.

**Skin protection**

**Hand protection**
Chemically compatible gloves. For handling solutions, ensure that the glove material is protective against the solvent being used. Use handling practices that minimize direct hand contact. Employees who are sensitive to natural rubber (latex) should use nitrile or other synthetic nonlatex gloves. Use of powdered latex gloves should be avoided due to the risk of latex allergy.

**Other**
For handling of laboratory scale quantities, a cloth lab coat is recommended. Where significant quantities are handled, work clothing may be necessary to prevent take-home contamination.

**Respiratory protection**
Where respirators are deemed necessary to reduce or control occupational exposures, use NIOSH-approved respiratory protection and have an effective respirator program in place (applicable U.S. regulation OSHA 29 CFR 1910.134).

**Thermal hazards**
Not available.

**General hygiene considerations**
Handle in accordance with good industrial hygiene and safety practice.

### 9. Physical and chemical properties

**Appearance**
Colorless, heavy liquid.

**Physical state**
Liquid.

**Form**
Liquid.

**Odor**
Characteristic, sweet odor resembling chloroform.

**Odor threshold**
33 ppm

**pH**
Not available.

**Melting point/freezing point**
-180.4 °F (-118 °C)

**Initial boiling point and boiling range**
122.36 °F (50.2 °C)

**Flash point**
Not available.

**Evaporation rate**
Not available.

**Flammability (solid, gas)**
Not applicable.

**Upper/lower flammability or explosive limits**

- Flammability limit - lower (%)
  Not available.
- Flammability limit - upper (%)
  Not available.
- Explosive limit - lower (%)
  Not available.
- Explosive limit - upper (%)
  Not available.

**Vapor pressure**
40.26264 kPa at 25 °C
232.65 - 243 mm Hg at 20 °C

**Vapor density**
Not available.

**Relative density**
Not available.

**Solubility in water**
3 g/l
Slightly soluble.

**Partition coefficient (n-octanol/water)**
2.3

**Auto-ignition temperature**
Not available.

**Viscosity**
Not available.
Other information

- Chemical family: Halogenated hydrocarbon.
- Molecular formula: C2-H-Br-Cl-F3
- Molecular weight: 197.39 g/mol
- Percent volatile: 100 %
- Solubility (other): Miscible with alcohol, with chloroform, with acetone, with benzene, with ether, with petroleum ether, with trichloroethylene, and with fixed oils.
- Specific gravity: 1.871 at 20 °C

10. Stability and reactivity

- Reactivity: No reactivity hazards known.
- Chemical stability: Stable at normal conditions.
- Possibility of hazardous reactions: No dangerous reaction known under conditions of normal use.
- Conditions to avoid: None known.
- Incompatible materials: Strong oxidizing agents.
- Some plastics and rubber deteriorate rapidly in contact with halothane vapor or liquid; halothane vapor also reacts with some metals.
- Hazardous decomposition products: Cl-, Br-, F-. Irritating and/or toxic fumes or gases. Emits toxic fumes under fire conditions.

11. Toxicological information

Information on likely routes of exposure

- Ingestion: Based on available data, the classification criteria are not met.
- Inhalation: Due to lack of data the classification is not possible. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea.
- Skin contact: Due to lack of data the classification is not possible.
- Eye contact: Causes serious eye irritation.

Symptoms related to the physical, chemical, and toxicological characteristics


Delayed and immediate effects of exposure


Cross sensitivity

- Persons sensitive to one halogenated hydrocarbon anesthetic may be sensitive to this material also.

Medical conditions aggravated by exposure


Acute toxicity

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halothane (CAS 151-67-7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD50</td>
<td>Guinea pig</td>
<td>6000 mg/kg</td>
</tr>
<tr>
<td>Rat</td>
<td>5680 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Due to lack of data the classification is not possible.</td>
<td></td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Causes serious eye irritation.</td>
<td></td>
</tr>
<tr>
<td>Local effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eye irritancy (Standard Draize test)</td>
<td>Result: Severe irritation.</td>
<td></td>
</tr>
<tr>
<td>Species: Rabbit</td>
<td>Organ: Eyes</td>
<td></td>
</tr>
<tr>
<td>Respiratory sensitization</td>
<td>Due to lack of data the classification is not possible.</td>
<td></td>
</tr>
<tr>
<td>Skin sensitization</td>
<td>Due to lack of data the classification is not possible.</td>
<td></td>
</tr>
</tbody>
</table>
Germ cell mutagenicity

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

**Mutagenicity**

- Ames test in S. typhimurium
  Result: Negative.
- Chinese hamster lung fibroblast assay
  Result: Negative.
- DNA inhibition in mouse cells
  Result: Positive.
- In vitro chromosomal aberration assay in Chinese hamster ovary cells
  Result: Negative.
- In vivo chromosomal aberration and micronucleus assays in rodents
  Result: Negative.
- In vivo dominant lethal mutation test in rodents
  Result: Negative.
- In vivo sister chromatid exchange assay in human lymphocytes
  Result: Positive.
- Sister chromatid exchange assay in Chinese hamster ovary cells
  Result: Negative.
- Unscheduled DNA synthesis in rat cells
  Result: Positive.

**Carcinogenicity**

Due to lack of data the classification is not possible.

This material is not considered to be a carcinogen by IARC, NTP, or OSHA.

IARC: Group 3; this material is not classifiable as to its carcinogenicity in humans.

- Carcinogenicity study, low levels administered by inhalation.
  Result: No evidence of carcinogenicity.
- Species: Rat
  Long-term carcinogenicity study, 0.05% administered by inhalation 3 times per week.
  Result: No evidence of carcinogenicity.
- Species: Mouse
  Test Duration: 78 weeks

**Reproductive toxicity**

Suspected of damaging fertility or the unborn child.

This material inhibits uterine contractions during delivery, prolonging labor and increasing blood loss.

Epidemiological studies have shown birth defects, reproductive effects, and fertility effects in people directly exposed to this material and/or in the wives of males exposed to this material.

For halogenated hydrocarbon anesthetics: Some epidemiological studies have shown higher than normal incidences of miscarriage following exposure.

- Reproductivity
  1 - 1.5 % Reproductivity and development study, administered 3 hours per day during 4 gestation days.
  Result: Cleft palate and skeletal malformations in offspring.
  Species: Mouse

**Specific target organ toxicity - single exposure**

Narcotic effects.

**Specific target organ toxicity - repeated exposure**

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

**Aspiration hazard**

Due to lack of data the classification is not possible.

**12. Ecological information**

**Ecotoxicity**

No ecotoxicity data noted for the ingredient(s).

**Persistence and degradability**

No data is available on the degradability of this product.

**Bioaccumulative potential**

Not available.

**Mobility in soil**

Not available.

**Other adverse effects**

Not available.

**13. Disposal considerations**

**Disposal instructions**

Dispose in accordance with all applicable regulations. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

**Local disposal regulations**

Not available.

**Hazardous waste code**

Not available.
Waste from residues / unused products
Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging
Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

**DOT**
- **UN number**: UN3334
- **UN proper shipping name**: Aviation regulated liquid, n.o.s. (Halothane)
- **Transport hazard class(es)**: 9
- **Subsidiary class(es)**: Not available.
- **Packing group**: III

**IATA**
- **UN number**: UN3334
- **UN proper shipping name**: Aviation regulated liquid, n.o.s. (Halothane)
- **Transport hazard class(es)**: 9
- **Subsidiary class(es)**: -
- **Packing group**: III

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
- **DOT; IATA**: No information available.

15. Regulatory information

**US federal regulations**
- CERCLA/SARA Hazardous Substances - Not applicable.
- One or more components are not listed on TSCA.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**
- **Hazard categories**
  - Immediate Hazard - Yes
  - Delayed Hazard - Yes
  - Fire Hazard - No
  - Pressure Hazard - No
  - Reactivity Hazard - No
- **SARA 302 Extremely hazardous substance**: No
- **SARA 311/312 Hazardous chemical**: No

**Other federal regulations**
- **Safe Drinking Water Act (SDWA)**: Not regulated.
- **Food and Drug Administration (FDA)**: Not regulated.

**US state regulations**
- WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**International Inventories**

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>No</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Country(s) or region</td>
<td>Inventory name</td>
<td>On inventory (yes/no)*</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
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<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(PICCS)</td>
<td></td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>No</td>
</tr>
</tbody>
</table>

* A ”Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last revision

Issue date 11-18-2005
Revision date 08-20-2014
Version # 03
Further information Not available.
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Revision Information
This document has undergone significant changes and should be reviewed in its entirety.