1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Vinyl bromide solution
Product Number : 434191
Brand : Aldrich
Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Carcinogen, Target Organ Effect, Toxic by ingestion, Irritant

Target Organs
Central nervous system, Liver, Kidney

GHS Classification
Flammable liquids (Category 2)
Acute toxicity, Oral (Category 4)
Acute toxicity, Dermal (Category 5)
Skin irritation (Category 3)
Serious eye damage (Category 1)
Carcinogenicity (Category 1B)
Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram
![Pictogram]

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H302 Harmful if swallowed.
H313 May be harmful in contact with skin.
H316 Causes mild skin irritation.
H318 Causes serious eye damage.
H335 + H336 May cause respiratory irritation, and drowsiness or dizziness.
H350 May cause cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wear protective gloves/ eye protection/ face protection.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/ attention.

May form explosive peroxides.

**HMIS Classification**
- Health hazard: 2
- Chronic Health Hazard: *
- Flammability: 3
- Physical hazards: 3

**NFPA Rating**
- Health hazard: 2
- Fire: 3
- Reactivity Hazard: 0

**Potential Health Effects**
- Inhalation: May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
- Skin: May be harmful if absorbed through skin. Causes skin irritation.
- Eyes: Causes eye irritation.
- Ingestion: Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms**: Bromoethylene

**Formula**: C₂H₃Br

**Molecular Weight**: 106.95 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrofuran</td>
<td>Flam. Liq. 2; Eye Irrit. 2; STOT SE 3; H225, H319, H335, EUH019</td>
<td>-</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>109-99-9</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>203-726-8</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-025-00-0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bromoethylene</th>
<th>Press. Gas ; Acute Tox. 4; Carc. 1B; H280, H302, H350</th>
<th>10 - 30 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>593-60-2</td>
<td></td>
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<tr>
<td>EC-No.</td>
<td>209-800-6</td>
<td></td>
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<tr>
<td>Index-No.</td>
<td>602-024-00-2</td>
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</tr>
</tbody>
</table>

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

**General advice**
Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.
5. FIREFIGHTING MEASURES

Conditions of flammability
Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen bromide gas

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
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.

Recommended storage temperature: 2 - 8 °C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrofuran</td>
<td>109-99-9</td>
<td>TWA</td>
<td>50 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td>Central Nervous System impairment Upper Respiratory Tract irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>100 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Central Nervous System impairment Upper Respiratory Tract irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>200 ppm 590 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>250 ppm</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants -</td>
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<tr>
<td>Substance</td>
<td>TWA</td>
<td>ST</td>
<td>Remarks</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>----------</td>
<td>---------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Bromoethylene</td>
<td>593-60-2</td>
<td>TWA 0.5 ppm</td>
<td>Suspected human carcinogen See Appendix A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Personal protective equipment
  
  **Respiratory protection**
  Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (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).

  **Hand protection**
  Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

  **Eye protection**
  Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

  **Skin and body protection**
  Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

  **Hygiene measures**
  Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

  **Appearance**
  - **Form**: clear, liquid
  - **Colour**: light brown

  **Safety data**
  - **pH**: no data available
  - **Melting point/freezing point**: no data available
  - **Boiling point**: no data available
  - **Flash point**: -17 °C (1 °F) - closed cup
  - **Ignition temperature**: no data available
  - **Autoignition temperature**: no data available
  - **Lower explosion limit**: no data available
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper explosion limit</td>
<td>no data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>858.839 hPa (644.182 mmHg) at 55 °C (131 °F)</td>
</tr>
<tr>
<td></td>
<td>248.14 hPa (186.12 mmHg) at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Density</td>
<td>0.927 g/cm³</td>
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<tr>
<td>Water solubility</td>
<td>no data available</td>
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<tr>
<td>Partition coefficient:</td>
<td>no data available</td>
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<tr>
<td>n-octanol/water</td>
<td></td>
</tr>
<tr>
<td>Relative vapour density</td>
<td>no data available</td>
</tr>
<tr>
<td>Odour</td>
<td>no data available</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>no data available</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

**Chemical stability**
Stable under recommended storage conditions.

**Possibility of hazardous reactions**
Vapours may form explosive mixture with air.

**Conditions to avoid**
Heat, flames and sparks. Extremes of temperature and direct sunlight.

**Materials to avoid**
Oxidizing agents, Oxygen

**Hazardous decomposition products**
Hazardous decomposition products formed under fire conditions.
- Carbon oxides
- Hydrogen bromide gas

### 11. TOXICOLOGICAL INFORMATION

**Acute toxicity**

- **Oral LD50**
  - no data available

- **Inhalation LC50**
  - no data available

- **Dermal LD50**
  - no data available

**Other information on acute toxicity**
no data available

- **Skin corrosion/irritation**
  - no data available

- **Serious eye damage/eye irritation**
  - Eyes: no data available

- **Respiratory or skin sensitization**
  - no data available

- **Germ cell mutagenicity**
  - no data available

**Carcinogenicity**
IARC: 2A - Group 2A: Probably carcinogenic to humans (Bromoethylene)
NTP: Reasonably anticipated to be a human carcinogen (Bromoethylene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Teratogenicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Ingestion Toxic if swallowed.

Skin May be harmful if absorbed through skin. Causes skin irritation.

Eyes Causes eye irritation.

Signs and Symptoms of Exposure
Central nervous system depression, narcosis, Cough, chest pain, Difficulty in breathing, Unconsciousness

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity
no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

Product
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.
14. TRANSPORT INFORMATION

DOT (US)
UN number: 1993  Class: 3  Packing group: I
Proper shipping name: Flammable liquids, n.o.s. (Bromoethylene, Tetrahydrofuran)
Reportable Quantity (RQ): 667 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1993  Class: 3  Packing group: I  EMS-No: F-E, S-E
Proper shipping name: FLAMMABLE LIQUID, N.O.S. (Bromoethylene, Tetrahydrofuran)
Marine pollutant: No

IATA
UN number: 1993  Class: 3  Packing group: I
Proper shipping name: Flammable liquid, n.o.s. (Bromoethylene, Tetrahydrofuran)

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Carcinogen, Target Organ Effect, Toxic by ingestion, Irritant

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromoethylene</td>
<td>593-60-2</td>
<td>1994-04-24</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrofuran</td>
<td>109-99-9</td>
<td>2007-03-01</td>
</tr>
<tr>
<td>Bromoethylene</td>
<td>593-60-2</td>
<td>1994-04-24</td>
</tr>
</tbody>
</table>

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrahydrofuran</td>
<td>109-99-9</td>
<td>2007-03-01</td>
</tr>
<tr>
<td>Bromoethylene</td>
<td>593-60-2</td>
<td>1994-04-24</td>
</tr>
</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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</thead>
<tbody>
<tr>
<td>Tetrahydrofuran</td>
<td>109-99-9</td>
<td>2007-03-01</td>
</tr>
<tr>
<td>Bromoethylene</td>
<td>593-60-2</td>
<td>1994-04-24</td>
</tr>
</tbody>
</table>

California Prop. 65 Components
WARNING! This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromoethylene</td>
<td>593-60-2</td>
<td>1988-10-01</td>
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</table>

16. OTHER INFORMATION

Text of H-code(s) and R-phrase(s) mentioned in Section 3

<table>
<thead>
<tr>
<th>H-code</th>
<th>R-phrase</th>
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<tbody>
<tr>
<td>Acute Tox.</td>
<td>Acute toxicity</td>
</tr>
<tr>
<td>Carc.</td>
<td>Carcinogenicity</td>
</tr>
<tr>
<td>EUH019</td>
<td>May form explosive peroxides.</td>
</tr>
</tbody>
</table>
Eye Irrit.  Eye irritation
Flam. Liq.  Flammable liquids
H225  Highly flammable liquid and vapour.
H280  Contains gas under pressure; may explode if heated.
H302  Harmful if swallowed.
H319  Causes serious eye irritation.
H335  May cause respiratory irritation.
H350  May cause cancer.
Press. Gas  Gases under pressure
STOT SE  Specific target organ toxicity - single exposure

Further information
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