1 Identification of substance:

Product details:

Product name: Hydrobromic acid, 45% in acetic acid

Stock number:
A14475
L07060

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:

Description: (CAS#)
Hydrogen bromide (CAS# 10035-10-6): 45%
Acetic acid (CAS# 64-19-7): 55%

3 Hazards identification

Hazard description:

C Corrosive

Information pertaining to particular dangers for man and environment
R 10 Flammable.
R 35 Causes severe burns.

Classification system

NFPA Ratings (scale 0-4)

Health = 4
Fire = 0
Reactivity = 0

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH
3
Health (acute effects) = 3

FIRE
2
Flammability = 2

REACTIVITY
1
Reactivity = 1

4 First aid measures

General information
Immediately remove any clothing soiled by the product.
Material Safety Data Sheet  
acc. to OSHA and ANSI

Printing date 03/27/2007  Reviewed on 03/27/2007

Product name: Hydrobromic acid, 45% in acetic acid

(Contd. of page 1)

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents
Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.

Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide
Hydrogen bromide (HBr)

Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources

Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collection:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
Keep away from ignition sources.

Additional information:
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling

Information for safe handling:
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Prevent formation of aerosols.

(Contd. on page 3)
Product name: Hydrobromic acid, 45% in acetic acid

Information about protection against explosions and fires:
Keep ignition sources away.
Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.

Storage
Requirements to be met by storerooms and receptacles:
No special requirements.

Information about storage in one common storage facility:
Store away from strong bases.
Store away from oxidizing agents.

Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Hydrogen bromide

<table>
<thead>
<tr>
<th>Country</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>2-CEILING</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>3</td>
</tr>
<tr>
<td>Belgium TWA</td>
<td>2</td>
</tr>
<tr>
<td>Denmark TWA</td>
<td>3</td>
</tr>
<tr>
<td>Finland TWA</td>
<td>3</td>
</tr>
<tr>
<td>Germany MAK</td>
<td>2-STEKL</td>
</tr>
<tr>
<td>Ireland TWA</td>
<td>3</td>
</tr>
<tr>
<td>Netherlands MAC-TGG</td>
<td>2</td>
</tr>
<tr>
<td>Norway TWA</td>
<td>3</td>
</tr>
<tr>
<td>Poland TWA</td>
<td>7, 21-STEKL (mg/m3)</td>
</tr>
<tr>
<td>Russia TWA</td>
<td>2-STEKL (mg/m3)</td>
</tr>
<tr>
<td>Sweden NGV</td>
<td></td>
</tr>
<tr>
<td>Switzerland MAK-W</td>
<td>3; 6-KZG-W</td>
</tr>
<tr>
<td>United Kingdom TWA</td>
<td>3-STEKL</td>
</tr>
<tr>
<td>USA PEL</td>
<td>3</td>
</tr>
</tbody>
</table>
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: Hydrobromic acid, 45% in acetic acid

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Acetic acid</th>
<th>ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>10; 15-STEL</td>
</tr>
<tr>
<td>Australia TWA</td>
<td>10; 15-STEL</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>10</td>
</tr>
<tr>
<td>Belgium</td>
<td>10; 15-STEL</td>
</tr>
<tr>
<td>Denmark TWA</td>
<td>10</td>
</tr>
<tr>
<td>Finland TWA</td>
<td>10; 15-STEL (skin)</td>
</tr>
<tr>
<td>France VLE</td>
<td>10</td>
</tr>
<tr>
<td>Germany MAK</td>
<td>10</td>
</tr>
<tr>
<td>Hungary</td>
<td>4; 8-STEL</td>
</tr>
<tr>
<td>Japan OEL</td>
<td>10</td>
</tr>
<tr>
<td>Korea TLV</td>
<td>10; 15-STEL</td>
</tr>
<tr>
<td>Netherlands MAC-TGG</td>
<td>10</td>
</tr>
<tr>
<td>Norway TWA</td>
<td>10</td>
</tr>
<tr>
<td>Poland TWA</td>
<td>2; 14-STEL</td>
</tr>
<tr>
<td>Russia</td>
<td>2-STEL (skin)</td>
</tr>
<tr>
<td>Sweden NGV</td>
<td>5; 10-KTV</td>
</tr>
<tr>
<td>Switzerland MAK-W</td>
<td>10; 20-KZG-W</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10; 15-STEL</td>
</tr>
<tr>
<td>USA PEL</td>
<td>10</td>
</tr>
</tbody>
</table>

Additional information: No data

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.

Breathing equipment:
Use suitable respirator when high concentrations are present.

Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.

Material of gloves
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection:
Safety glasses
Tightly sealed goggles
Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties:

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form: Liquid</td>
</tr>
<tr>
<td>Color: Clear</td>
</tr>
<tr>
<td>Odor: Acidic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change in condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point/Melting range: Not determined</td>
</tr>
</tbody>
</table>
Product name: Hydrobromic acid, 45% in acetic acid

(Contd. of page 4)

- **Boiling point/Boiling range:** 126°C (259°F)
- **Sublimation temperature / start:** Not determined
- **Flash point:** Not determined
- **Ignition temperature:** Not determined
- **Decomposition temperature:** Not determined
- **Explosion limits:**
  - **Lower:** Not determined
  - **Upper:** Not determined
- **Vapor pressure:** Not determined
- **Density:** Not determined
- **Solubility in / Miscibility with Water:** Fully miscible

10 Stability and reactivity

**Thermal decomposition / conditions to be avoided:**
Decomposition will not occur if used and stored according to specifications.

**Materials to be avoided:**
- Bases
- Oxidizing agents

**Dangerous reactions** No dangerous reactions known

**Dangerous products of decomposition:**
- Carbon monoxide and carbon dioxide
- Hydrogen bromide

11 Toxicological information

**Acute toxicity:**
- **LD/LC50 values that are relevant for classification:**
  - Hydrogen bromide (CAS# 10035-10-6)
    - Inhalative: LC50/1H: 814 ppm/1H (mus)
    - LC50/1H: 2858 ppm/1H (rat)

**Primary irritant effect:**
- **on the skin:**
  - Strong corrosive effect on skin and mucous membranes.
  - Irritant to skin and mucous membranes.
- **on the eye:**
  - Strong corrosive effect.
  - Irritating effect.

**Sensitization:** No sensitizing effects known.

**Subacute to chronic toxicity:**
Hydrobromic acid is corrosive and irritating to skin, eye and mucous membranes. Eye contact may result in severe burns and inhalation of fumes may cause lung damage. Dilute solutions have a reduced effect. Acetic acid is corrosive and causes burns, lachrymation and conjunctivitis. It may cause skin ulcers and dermatitis. Inhalation or ingestion may cause irritation. Severity of symptoms is a function of concentration.

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Product name: Hydrobromic acid, 45% in acetic acid

Subacute to chronic toxicity:
Corrosive materials are acutely destructive to the respiratory tract, eyes, skin and digestive tract. Eye contact may result in permanent damage and complete vision loss. Inhalation may result in respiratory effects such as inflammation, edema, and chemical pneumonitis. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Ingestion may cause damage to the mouth, throat and esophagus. May cause skin burns or irritation depending on the severity of the exposure.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:
General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations
Product:
Recommendation
Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

DOT regulations:

Hazard class: 8
Identification number: UN2920
Packing group: II
Proper shipping name (technical name): CORROSIVE LIQUID, FLAMMABLE, N.O.S. (Hydrobromic acid, 45% in acetic acid)
Label 8+3
### Material Safety Data Sheet

**acc. to OSHA and ANSI**

**Product name:** Hydrobromic acid, 45% in acetic acid

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#### Land transport ADR/RID (cross-border)

<table>
<thead>
<tr>
<th>Details</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR/RID class</td>
<td>8 (CF1) Corrosive substances</td>
</tr>
<tr>
<td>Danger code (Kemler)</td>
<td>83</td>
</tr>
<tr>
<td>UN-Number</td>
<td>2920</td>
</tr>
<tr>
<td>Packaging group</td>
<td>II</td>
</tr>
<tr>
<td>Description of goods</td>
<td>2920 CORROSIVE LIQUID, FLAMMABLE, N.O.S. (Hydrobromic acid, 45% in acetic acid)</td>
</tr>
</tbody>
</table>

#### Maritime transport IMDG:

<table>
<thead>
<tr>
<th>Details</th>
<th>Description</th>
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<tbody>
<tr>
<td>IMDG Class</td>
<td>8</td>
</tr>
<tr>
<td>UN Number</td>
<td>2920</td>
</tr>
<tr>
<td>Label</td>
<td>8+3</td>
</tr>
<tr>
<td>Packaging group</td>
<td>II</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>CORROSIVE LIQUID, FLAMMABLE, N.O.S. (Hydrobromic acid, 45% in acetic acid)</td>
</tr>
</tbody>
</table>

#### Air transport ICAO-TI and IATA-DGR:

<table>
<thead>
<tr>
<th>Details</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAO/IATA Class</td>
<td>8</td>
</tr>
<tr>
<td>UN/ID Number</td>
<td>2920</td>
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<tr>
<td>Label</td>
<td>8+3</td>
</tr>
<tr>
<td>Packaging group</td>
<td>II</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>CORROSIVE LIQUID, FLAMMABLE, N.O.S. (Hydrobromic acid, 45% in acetic acid)</td>
</tr>
</tbody>
</table>

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### 15 Regulations

**Product related hazard informations:**

**Hazard symbols:**

C Corrosive

**Risk phrases:**

10 Flammable.
35 Causes severe burns.

**Safety phrases:**

20 When using do not eat or drink.
23 Do not breathe gas/fumes/vapour/spray.
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
45 In case of accident or if you feel unwell, seek medical advice immediately.
16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.
Contact: Paul V. Connolly