1 Identification of substance:

Product details:

Product name: Bromobenzene

Stock number:
A11407
L02607

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#)
Bromobenzene (CAS# 108-86-1), 100%

Identification number(s):
EINECS Number: 203-623-8
Index number: 602-060-00-9

3 Hazards identification

Hazard description:

\[ \begin{array}{c}
\text{Xi Irritant} \\
\text{N Dangerous for the environment}
\end{array} \]

Information pertaining to particular dangers for man and environment
R 10 Flammable.
R 38 Irritating to skin.
R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Classification system

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

\begin{array}{c|c|c|c}
\text{HEALTH} & 1 & \text{Health (acute effects)} = 1 \\
\text{FIRE} & 2 & \text{Flammability} = 2 \\
\text{REACTIVITY} & 1 & \text{Reactivity} = 1 \\
\end{array}

GHS label elements

Warning

2.6/3 - Flammable liquid and vapour.

Warning

3.2/2 - Causes skin irritation.

4.1/2 - Toxic to aquatic life with long lasting effects.

Prevention:
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/ equipment.
Use only non-sparking tools.

(Contd. on page 2)
4 First aid measures

**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**
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**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/collecting:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
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.

**Information about protection against explosions and fires:**
Keep ignition sources away.
Protect against electrostatic charges.
Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 06/11/2009 Reviewed on 02/18/2009

Product name: Bromobenzene

(Contd. of page 2)

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:
Do not store together with oxidizing and acidic materials.
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: Not required.

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 skin.
Avoid contact with the eyes and skin.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands: Impervious gloves
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form:</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color:</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor:</td>
<td>Aromatic</td>
</tr>
<tr>
<td>Melting point/Writing range:</td>
<td>-31°C (-24°F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range:</td>
<td>155-156°C (311-313°F)</td>
</tr>
<tr>
<td>Sublimation temperature / start:</td>
<td>Not determined</td>
</tr>
<tr>
<td>Flash point:</td>
<td>51°C (124°F)</td>
</tr>
<tr>
<td>Ignition temperature:</td>
<td>565°C (1049°F)</td>
</tr>
<tr>
<td>Decomposition temperature:</td>
<td>Not determined</td>
</tr>
<tr>
<td>Explosion limits:</td>
<td></td>
</tr>
<tr>
<td>Lower:</td>
<td>0.5 Vol %</td>
</tr>
<tr>
<td>Upper:</td>
<td>2.5 Vol %</td>
</tr>
<tr>
<td>Vapor pressure at 20°C (68°F):</td>
<td>4 hPa (3 mm Hg)</td>
</tr>
<tr>
<td>Density at 20°C (68°F):</td>
<td>1.492 g/cm³</td>
</tr>
<tr>
<td>Solubility in / Miscibility with</td>
<td></td>
</tr>
<tr>
<td>Water at 20°C (68°F):</td>
<td>0.36 g/l</td>
</tr>
<tr>
<td>Viscosity: dynamic at 20°C (68°F):</td>
<td>1.124 mPas</td>
</tr>
</tbody>
</table>

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:
Oxidizing agents
Alkali metals

Dangerous reactions: No dangerous reactions known

Dangerous products of decomposition:
Carbon monoxide and carbon dioxide

(Contd. on page 4)
11 Toxicological information

Acute toxicity:

**LD/LC50 values that are relevant for classification:**

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50/LC50 (mg/kg/m3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>2700 mg/kg (mam)</td>
</tr>
<tr>
<td></td>
<td>2700 mg/kg (mouse)</td>
</tr>
<tr>
<td></td>
<td>2383 mg/kg (rat)</td>
</tr>
<tr>
<td></td>
<td>3300 mg/kg (rabbit)</td>
</tr>
<tr>
<td>Inhalative</td>
<td>14400 mg/m3 (mam)</td>
</tr>
<tr>
<td></td>
<td>20411 mg/m3 (rat)</td>
</tr>
<tr>
<td></td>
<td>21000 mg/m3/2H (mouse)</td>
</tr>
</tbody>
</table>

**Primary irritant effect:**

- on the skin: Irritant to skin and mucous membranes.
- on the eye: May cause irritation

**Sensitization:** No sensitizing effects known.

**Other information (about experimental toxicology):**

- Bacterial mutagenicity test: Ames Salmonella Typhimurium: Negative.

**Subacute to chronic toxicity:**

Bromobenzene is irritating to the skin, eyes and mucous membranes. Exposure may cause stomach pains, vomiting and diarrhea. Chronic exposure may cause damage to the liver and kidneys.

**Additional toxicological information:**

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:

**Ecotoxicological effects:**

- Remark: Toxic for fish

**General notes:**

- Do not allow product to reach ground water, water course or sewage system.
- Danger to drinking water if even small quantities leak into the ground.
- Also poisonous for fish and plankton in water bodies.
- Do not allow material to be released to the environment without proper governmental permits.
- Toxic for aquatic organisms

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.

14 Transport information

**DOT regulations:**

- **Hazard class:** 3
- **Identification number:** UN2514
- **Packing group:** III
- **Proper shipping name (technical name):** BROMOBENZENE
- **Label:** 3
Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 06/11/2009 Reviewed on 02/18/2009

Product name: Bromobenzene

Land transport ADR/RID (cross-border)

ADR/RID class: 3 (Fl) Flammable liquids
Danger code (Kemler): 30
UN-Number: 2514
Packaging group: III
Description of goods: 2514 BROMOBENZENE

Maritime transport IMDG:

IMDG Class: 3
UN Number: 2514
Label 3
Packaging group: III
Proper shipping name: BROMOBENZENE

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class: 3
UN/ID Number: 2514
Label 3
Packaging group: III
Proper shipping name: BROMOBENZENE

UN "Model Regulation": UN2514, BROMOBENZENE, 3, III
Environmental hazards: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID

15 Regulations

Product related hazard informations:

Hazard symbols:
Xi Irritant
N Dangerous for the environment

Risk phrases:
10 Flammable.
38 Irritating to skin.
51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Safety phrases:
61 Avoid release to the environment. Refer to special instructions/Safety data sheets

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use: For use only by technically qualified individuals.

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: Zachariah Holt

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Product name: Bromobenzene

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent