Material Safety Data Sheet
Date Printed: 06/29/2004
Date Updated: 03/26/2004
Version 1.60

Section 1 - Product and Company Information

Product Name: Benzaldehyde, anhydrous, 99.5+%.
Product Number: 316010
Brand: Aldrich Chemical
Company: Sigma-Aldrich
Street Address: 5050 Spruce Street
City, State, Zip, Country: SAINT LOUIS, MO 63103 US
Technical Phone: 314 771 5795
Fax: 800 325 5052
Emergency Phone: 414 273 3650 Ext. 5996

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
<th>EC No</th>
<th>Annex Index Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BENZALDEHYDE</td>
<td>100-62-7</td>
<td>No</td>
<td>202-699-4</td>
<td>605-012-00-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Formula</th>
<th>Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td>C7H6O</td>
<td>Almond artificial essential oil, Artificial almond oil, Artificial essential oil of almond, Benzaldehyde, FrC, Benzene carbaldhyde, Benzene carbonal, Benzol aldehyd, NCI-C66133, Phenymethanal</td>
</tr>
</tbody>
</table>

Section 3 - Hazards Identification

Emergency Overview
Harmful in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact. Combustible liquid. Readily absorbed through skin. Target organ(s): Central nervous system. Liver.

HMIS Rating
Health: 3
Flammability: 2
Reactivity: 1

NFPA Rating
Health: 3
Flammability: 2
Reactivity: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

Dermal Exposure
In case of contact, immediately wash skin with soap and copious amounts of water.

Section 5 - Fire Fighting Measures

Flash Point: 147.2 °F
Autoignition Temp: 190 °C
Extinguishing Media
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s): Combustible liquid.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

Procedure(s) of Personal Precaution(s)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage
Suitable: Keep tightly closed. Keep away from heat and open flame. Store under nitrogen.

Special Requirements
Air, light, and moisture sensitive.

Section 8 - Exposure Controls / PPE

Engineering Controls
Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment
Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.
Section 9 - Physical/Chemical Properties

**Appearance**
- **Physical State**: Liquid
- **Color**: Colorless

**Molecular Weight**: 106.12 AMU

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>pH</td>
<td>5.9</td>
</tr>
<tr>
<td>BP/MP Range</td>
<td>177 - 179 °C</td>
</tr>
<tr>
<td>MP/MPR Range</td>
<td>-26 °C</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>4 mm Hg</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>3.7 g/l</td>
</tr>
<tr>
<td>Saturated Vapor Concentration</td>
<td>1.05 g/cm³</td>
</tr>
<tr>
<td>SG/Density</td>
<td>1.05 g/cm³</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>N/A</td>
</tr>
<tr>
<td>Volatility%</td>
<td>N/A</td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>Log Kow: 1.5</td>
</tr>
<tr>
<td>Decomposition Temp.</td>
<td>N/A</td>
</tr>
<tr>
<td>Flash Point °F</td>
<td>147.2 °F</td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>64 °C</td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>Lower: 1.4 %</td>
</tr>
<tr>
<td></td>
<td>Upper: 8.5 %</td>
</tr>
<tr>
<td>Flammability</td>
<td>N/A</td>
</tr>
<tr>
<td>Autoignition Temp</td>
<td>190 °C</td>
</tr>
<tr>
<td>Refractive Index</td>
<td>1.545</td>
</tr>
<tr>
<td>Solubility</td>
<td>N/A</td>
</tr>
</tbody>
</table>
  - Solubility in Water: Slightly

N/A = not available

Section 10 - Stability and Reactivity

**Stability**
- Stable

**Conditions to Avoid**
- Sensitive to moisture. Sensitive to air. Sensitive to light.

**Materials to Avoid**
- Strong oxidizing agents, Strong reducing agents, Strong bases.

**Hazardous Decomposition Products**
- Carbon monoxide, Carbon dioxide.

Section 11 - Toxicological Information

**Route of Exposure**
- **Skin Contact**: Causes skin irritation.
- **Skin Absorption**: Harmful if absorbed through skin. Readily absorbed through skin.
- **Eye Contact**: Causes eye irritation.
- **Inhalation**: May be harmful if inhaled.
- **Ingestion**: Harmful if swallowed.

**Sensitization**
- Respiratory: May cause allergic respiratory reaction.
- Skin: May cause allergic skin reaction.

**Target Organ(s) or System(s)**
- Central nervous system. Liver. Kidneys.

**Signs and Symptoms of Exposure**
- Exposure can cause: Narcotic effect. CNS depression. Prolonged or repeated exposure to skin causes defatting and dermatitis.

**RTECS Number**: CU4376000

**Toxicity Data**
- **Skin**: Rabbit: 1,250 mg/kg (LD50)
- **Oral - Rat**: 1300 mg/kg (LD50)
  - Remarks: Behavioral; Somnolence (general depressed activity), Behavioral; Coma
- **Oral - Mouse**: 28 mg/kg (LD50)
  - Remarks: Behavioral; Somnolence (general depressed activity), Behavioral; Tremor, Lung, Thorax, or Respiration; Other changes.
- **Intrapertoneal - Mouse**: 9 MG/KG (LD50)
  - Remarks: Behavioral; Somnolence (general depressed activity), Behavioral; Tremor, Lung, Thorax, or Respiration; Other changes.
- **Subcutaneous - Rabbit**: 5 GM/KG (LD50)
- **Oral - Guinea pig**: 1000 mg/kg (LD50)
  - Remarks: Behavioral; Tremor, Gastric/Intestinal; Ulceration or bleeding from small intestine, Kidney, Urinary; Bladder; Urine volume increased.
- **Oral - Mammal**: 2620 mg/kg (LD50)

**Irritation Data**
- **Eyes - Rabbit**: Remarks: Mild irritation effect
- **Skin - Rabbit**: 500 mg 24H
  - Remarks: Moderate irritation effect

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www.sigma-aldrich.com

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Chronic Exposure - Carcinogen

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Mouse - Oral: 154 GAG/kg, 21 C.

Result: Tumorigenic-Necrotic by RTECS criteria. Gastrointestinal Tumors.

NTF Carcinogen List

<table>
<thead>
<tr>
<th>Species</th>
<th>Route</th>
<th>Mutagenic Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>Gavage</td>
<td></td>
</tr>
<tr>
<td>Rat</td>
<td>Gavage</td>
<td></td>
</tr>
</tbody>
</table>

Chronic Exposure - Mutagen

<table>
<thead>
<tr>
<th>Species</th>
<th>Dose</th>
<th>Cell Type</th>
<th>Mutation Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td>1 MMOL/L</td>
<td>lymphocyte</td>
<td>Sister chromatid exchange</td>
</tr>
<tr>
<td>Mouse</td>
<td>400 MG/L</td>
<td>lymphocyte</td>
<td>specific locus test</td>
</tr>
<tr>
<td>Mouse</td>
<td>400 MG/L</td>
<td>lymphocyte</td>
<td>Mutation in mammalian somatic cells</td>
</tr>
<tr>
<td>Hamster</td>
<td>1 GML</td>
<td>liver</td>
<td>Cytogetic analysis</td>
</tr>
<tr>
<td>Hamster</td>
<td>50 MG/L</td>
<td>kidney</td>
<td>Sister chromatid exchange</td>
</tr>
</tbody>
</table>

Section 12 - Ecological Information

Acute Ecotoxicity Tests

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Species</th>
<th>Leuciscus idus</th>
<th>Value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 Fish</td>
<td></td>
<td>48.0 h</td>
<td>62 mg/L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Species</th>
<th>Value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 Daphnia</td>
<td>Daphnia magna</td>
<td>24.0 h</td>
</tr>
</tbody>
</table>

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

| Proper Shipping Name: Benzaldehyde |
| UIN: 1990 |
| Class: 9 |
| Packing Group: Packung Group III |
| Hazard Label: Class 9 |
| PHN: Not PHN |

IATA

| Proper Shipping Name: Benzaldehyde |
| IATA UN Number: 1990 |
| Hazard Class: 9 |
| Packing Group: III |

Section 15 - Regulatory Information

EU Directives Classification

Symbol of Danger: Xn

Indication of Danger

Harmful.

Risk Statements

R: 22

Harmful if swallowed.

Safety Statements

S: 24

Avoid contact with skin.

US Classification and Label Text

Indication of Danger

Harmful.

Risk Statements

Harmful in contact with skin and if swallowed. Instruct to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact.

Safety Statements

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

US Statements

Combustible liquid. Readily absorbed through skin. Target organ(s): Central nervous system. Liver.

United States Regulatory Information

SARA Listed: No

TSCA Inventory Item: Yes

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CIRP, and the MSDS contains all the information required by the CIRP.

DSL: Yes

NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.