Section 5 - Fire Fighting Measures

**Flammable Hazards:** Yes

**Explosion Hazards**
- Vapor may travel considerable distance to source of ignition and flash back.
- Container explosion may occur under fire conditions.
- Forms explosive mixtures in air.

**Flash Point:**
- **23 °F**
- **-5 °C**

**Explosion Limits:**
- **Lower:** 2 %
- **Upper:** 11.8 %

**Autoignition Temp:**
- **199 °C**

**Flammability:** Yes

**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):** Flammable liquid. Emits toxic fumes under fire conditions.
  - **Specific Method(s) of Fire Fighting:** Use water spray to cool fire-exposed containers.

Section 6 - Accidental Release Measures

**Procedure to be Followed in Case of Leak or Spill**
- Evacuate area. Shut off all sources of ignition.

**Procedure(s) of Personal Precaution(s)**
- Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

**Methods for Cleaning Up**
- Cover with dry-tine, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

**Handling**
- **User Exposure**
  - Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

**Storage**
- **Suitable**
  - Keep container closed. Keep away from heat, sparks, and open flame. Store in a cool dry place.

**Special Requirements**
- May form peroxides on prolonged storage. Date container and periodically test for peroxides Stench.

Section 8 - Exposure Controls / PPE

**Engineering Controls**
- Safety shower and eye bath. Use non-sparking tools. Mechanical exhaust required.

**Personal Protective Equipment**
- **Respiratory**
  - Government approved respirator.
Materials to Avoid
Oxidizing agents, Strong bases, Strong reducing agents, Strong acids.

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

Hazardous Polymerization
Hazardous Polymerization
May undergo autopolymerization.

Section 11 - Toxicological information

Route of Exposure
Skin Contact
Causes skin irritation.

Skin Absorption
May be harmful if absorbed through the skin.

Eye Contact
Causes eye irritation.

Inhalation
May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion
May be harmful if swallowed.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: ES227500

Toxicity Data
Intraperitoneal - Rat: 800 MG/KG (LD50)
Subcutaneous - Rat: 10 MG/KG (LD50)
Remarks: Behavioral/General anesthetic.

Inhalation - Mouse: 44.610 mg/m3 (LC50)
Intraperitoneal - Mouse: 1140 MG/KG (LD50)
Subcutaneous - Mouse: 2700 MG/KG (LD50)
Remarks: Behavioral/General anesthetic.

Skin - Rabbit: 3560 UL/KG (LD50)
Inhalation - Mammal: 38,000 mg/m3 (LC50)

Irritation Data
Skin - Rabbit: 410 mg
Remarks: Open irritation test

Eyes - Rabbit: 20 mg 24H
Remarks: Moderate irritation effect

Chronic Exposure - Mutagen

<table>
<thead>
<tr>
<th>Species</th>
<th>Dose</th>
<th>Cell Type</th>
<th>Mutation test</th>
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<tbody>
<tr>
<td>Rat</td>
<td>30 MMOL/L</td>
<td>liver</td>
<td>Unscheduled DNA synthesis</td>
</tr>
<tr>
<td>Mouse</td>
<td>30 MG/KG</td>
<td>sperm</td>
<td></td>
</tr>
<tr>
<td>Mouse</td>
<td>15 MG/KG</td>
<td>ovary</td>
<td>Sister chromatid exchange</td>
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<td>Hamster</td>
<td>9 MG/L</td>
<td>lung</td>
<td>Mutation in mammalian somatic cells.</td>
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<tr>
<td>Hamster</td>
<td>3 MMOL/L</td>
<td>lymphocyte</td>
<td>DNA damage</td>
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<tr>
<td>Mammal</td>
<td>100 MMOL/L</td>
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<td></td>
</tr>
</tbody>
</table>

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Section 12 - Ecological Information

Physical Properties Affecting Ecotoxicity
BOD: BOD after 5 Days: 28 - 43 %

Acute Ecotoxicity Tests

Test Type
EC50 Algae
Time: Value:
24.0 h 380 mg/l

Test Type
EC50 Daphnia
Species: Daphnia magna
Time: Value:
24.0 h 195 mg/l

Test Type
LC50 Fish
Species: Leuciscus idus
Time: Value:
48.0 h 57 - 114 mg/l

Test Type
LC50 Fish
Species: Phoxinus promelas (Fathead minnow)
Time: Value:
96.0 h 13.0 - 33.6 mg/l

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
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.

Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Butyraldehyde
UN#: 1129
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PH: Not PH

IATA
Proper Shipping Name: Butyraldehyde
IATA UN Number: 1129
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU Directives Classification
Symbol of Danger: F
Indication of Danger
Highly Flammable.
Risk Statements R: 11
Highly flammable.
Safety Statements S: 9 29 33
Kept container in a well-ventilated place. Do not empty into drains. Take precautionary measures against static discharges.

US Classification and Label Text
Indication of Danger
Flammable (USA) Highly Flammable (EU). Irritant.
Risk Statements
Intact to eyes, respiratory system, and skin.
Safety Statements
Kept container in a well-ventilated place. Do not empty into drains. Take precautionary measures against static discharges.

United States Regulatory Information
SARA Listed: Yes

Demineral: 1 %

Notes: This product is subject to SARA section 313 reporting requirements.

TSCA Inventory Item: Yes Yes

Canada Regulatory Information
WHMIS Classification
This product has been classified in accordance with the hazard criteria of the CFR, and the MSDS contains all the information required by the CFR.
OSL: Yes
MSDS: 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. 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.