SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier
Product name: Eastman(TM) Isobutyraldehyde, Dry

Product No.: EAN 900652. P039870Q

Synonyms, Trade Names: 03987-00

Additional identification
Chemical name: isobutyraldehyde
CAS-No.: 78-84-2

Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Chemical Intermediate
Uses advised against: None known.

Details of the supplier of the safety data sheet
Manufacturer / Supplier
Eastman Chemical Company
200 South Wilcox Drive
Kingsport, TN 37660-5280 US
+14232292000

Visit our website at www.EASTMAN.com or email emnmsds@eastman.com

Emergency telephone number:
For emergency health, safety, and environmental information, call 1-423-229-4511 or 1-423-229-2000.

For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

SECTION 2: Hazards identification

Hazard Classification:

Physical Hazards
Flammable liquids Category 2

Health Hazards
Acute toxicity (Oral) Category 4
Skin Corrosion/Irritation Category 2
Serious Eye Damage/Eye Irritation Category 2A
Specific Target Organ Toxicity - Single Exposure Category 3

OSHA Specified Hazards: not applicable

Warning label items including precautionary statement:

Pictogram:
Signal Words: DANGER!

Hazard Statement(s):
- H225: Highly flammable liquid and vapor.
- H302: Harmful if swallowed.
- H315: Causes skin irritation.
- H319: Causes serious eye irritation.
- H336: May cause drowsiness or dizziness.

Precautionary Statement:

**Prevention:**
- P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P233: Keep container tightly closed.
- P240: Ground/bond container and receiving equipment.
- P241: Use explosion-proof electrical/ventilating/lighting/equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
- P270: Do not eat, drink or smoke when using this product.
- P271: Use only outdoors or in a well-ventilated area.
- P264: Wash hands thoroughly after handling.

**Response:**
- P370 + 378: In case of fire: Use water spray, carbon dioxide, dry chemical or foam for extinction.
- P303+P361+P353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- P332+P313: If skin irritation occurs: Get medical advice/attention.
- P363: Wash contaminated clothing before reuse.
- P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P330: Rinse mouth.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337+P313: If eye irritation persists: Get medical advice/attention.
- P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P312: Call a POISON CENTER or doctor/physician if you feel unwell.

**Storage:**
- P403+P235: Store in a well-ventilated place. Keep cool.
- P233: Keep container tightly closed.
- P405: Store locked up.

**Disposal:**
- P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.
Hazard(s) not otherwise classified (HNOC): Peroxide former. Readily polymerizes.

SECTION 3: Composition/information on ingredients

Substances / Mixtures

General information:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Concentration</th>
<th>Additional identification</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>isobutyraldehyde</td>
<td>&gt;99%</td>
<td>CAS-No.: 78-84-2</td>
<td>#</td>
</tr>
<tr>
<td>water</td>
<td>&lt;1%</td>
<td>CAS-No.: 7732-18-5</td>
<td></td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
# This substance has workplace exposure limit(s).

SECTION 4: First aid measures

Description of first aid measures

Inhalation: Move to fresh air. Treat symptomatically. Get medical attention if symptoms persist.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Seek medical advice.

Most important symptoms and effects, both acute and delayed: Narcotic effect. May irritate and cause redness and pain.

Indication of any immediate medical attention and special treatment needed

Hazards: Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea.

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

General Fire Hazards: Flammable liquid and vapor.

Extinguishing media


Unsuitable extinguishing media: None known.
Special hazards arising from the substance or mixture:

Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations. Forms peroxides of unknown stability. Fire or excessive heat may result in rupture of container due to bulk polymerization. Heating may cause an explosion.

Advice for firefighters

Special fire fighting procedures: Fight fire from a protected location. Water may be ineffective in fighting the fire. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: Wear appropriate personal protective equipment.

Environmental Precautions: Avoid release to the environment.

Methods and material for containment and cleaning up: Eliminate sources of ignition. Absorb in vermiculite, dry sand or earth and place into containers. Large Spillages: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

Notification Procedures: In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

SECTION 7: Handling and storage:

Precautions for safe handling: Do not get in eyes and avoid contact with skin and clothing. Avoid breathing high vapor concentrations. Use only with adequate ventilation. Wash thoroughly after handling. Minimize exposure to air. After opening, purge container with nitrogen before reclosing. Periodically test for peroxide formation on long-term storage. Do not allow to evaporate to near dryness. Do not distill to near dryness. Addition of water or appropriate reducing materials will lessen peroxide formation.

Conditions for safe storage, including any incompatibilities: Keep container tightly closed and in a well-ventilated place. Store in a cool place. Store away from heat and light. Protect from contamination.

Specific end use(s): Chemical Intermediate

SECTION 8: Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Country specific exposure limits have not been established or are not applicable unless listed below.
### Chemical name
- **isobutyraldehyde**

### Type
- TWA

### Exposure Limit Values
- **25 ppm**

### Source
- US. AIHA Workplace Environmental Exposure Level (WEEL) Guides (2009)

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**Exposure controls**

**Appropriate engineering controls:**  
Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

**Individual protection measures, such as personal protective equipment**

**General information:**  

**Eye/face Protection:**  
Wear safety glasses with side shields (or goggles) and a face shield. Wear a full-face respirator, if needed.

**Skin protection**

**Hand Protection:**  
Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.

**Other:**  
No data available.

**Respiratory Protection:**  
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

**Hygiene measures:**  
Observe good industrial hygiene practices.

**Environmental Controls:**  
No data available.

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### SECTION 9: Physical and chemical properties

**Information on basic physical and chemical properties**

**Appearance**

- **Physical State:** Liquid
- **Form:** Liquid
- **Color:** Colorless
- **Odor:** Pungent
- **Odor Threshold:** 0.2 ppm
- **pH:** No data available.
- **Melting Point:** -66 °C
- **Boiling Point:** 64 °C
Flash Point: -18 °C (Tag closed cup)
Evaporation Rate: 9.6
Flammability (solid, gas): No data available.
Flammability Limit - Upper (%)--: No data available.
Flammability Limit - Lower (%)--: No data available.
Vapor pressure: 166 mbar (20 °C)
Vapor density (air=1): 2.5
Specific Gravity: 0.792 (20 °C)
Solubility(ies)
   Solubility in Water: 110 g/l
   Solubility (other): No data available.
Partition coefficient (n-octanol/water): No data available.
Autoignition Temperature: No data available.
Decomposition Temperature: No exotherm to 500°C
Dynamic Viscosity: 0.55 mPa.s (20 °C)
Kinematic viscosity: 0.694 mm²/s (20 °C)
Explosive properties: No data available.
Oxidizing properties: No data available.

Other information
Minimum ignition temperature: 196 °C (ASTM D2155)

SECTION 10: Stability and reactivity

Reactivity: None known.
Chemical Stability: Stable
Possibility of Hazardous Reactions: Forms peroxides of unknown stability. Elevated temperatures can cause hazardous polymerization.
Conditions to Avoid: Avoid heat, sparks, flame and high pressure.
Incompatible Materials: Initiators. Contamination. Polymerization initiators. accelerators
Hazardous Decomposition Products: Carbon Dioxide. Carbon Monoxide.

SECTION 11: Toxicological information

Information on likely routes of exposure
Inhalation: High vapor concentrations may cause drowsiness and irritation.
Ingestion: None known.
Skin Contact: Causes skin irritation.
Eye contact: Causes eye burns.
Information on toxicological effects

**Acute Toxicity**

**Oral**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - Oral LD-50: (Rat): 1,600 - 3,200 mg/kg
  - No data available.

**Dermal**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - Dermal LD-50: (Guinea Pig): > 20,000 mg/kg
  - No data available.

**Inhalation**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - LC50 (Rat, 4 h): > 23.9 mg/l
  - No data available.

**Repeated Dose Toxicity**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - No data available.

**Skin Corrosion/Irritation:**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - (Rabbit, 24 h): moderate irritation
  - No data available.

**Serious Eye Damage/Eye Irritation:**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - (Rabbit, 24 h): Severe
  - No data available.

**Respiratory or Skin Sensitization:**
- **Product:** No data available.
- **Specified substance(s)**
  - isobutyraldehyde
  - water
  - No data available.
  - No data available.
Mutagenicity

In vitro
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

In vivo
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

Carcinogenicity
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

Reproductive Toxicity
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

Specific Target Organ Toxicity - Single Exposure
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

Specific Target Organ Toxicity - Repeated Exposure
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

Aspiration Hazard
Product: No data available.
Specified substance(s)
isobutyraldehyde No data available.
water No data available.

Other Adverse Effects: No data available.

SECTION 12: Ecological information

Toxicity

Acute toxicity
Fish

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

LC-50 (Fathead Minnow, 96 h): 23 mg/l
No data available.

Aquatic Invertebrates

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

No data available.

Chronic Toxicity

Fish

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

No data available.

Aquatic Invertebrates

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

No data available.

Toxicity to Aquatic Plants

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

No data available.

Persistence and Degradability

Biodegradation

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

No data available.

Biological Oxygen Demand:

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

1,600 mg/g
No data available.

Chemical Oxygen Demand:

Product: No data available.

Specified substance(s)
isobutyraldehyde
water

No data available.

No data available.
**BOD/COD Ratio**

- **Product:** No data available.
- **Specified substance(s):**
  - isobutyraldehyde: No data available.
  - water: No data available.

**Bioaccumulative Potential**

- **Product:** No data available.
- **Specified substance(s):**
  - isobutyraldehyde: No data available.
  - water: No data available.

**Mobility in Soil:**

- No data available.

**Known or predicted distribution to environmental compartments**

- **isobutyraldehyde:** No data available.
- **water:** No data available.

**Results of PBT and vPvB assessment:**

- **isobutyraldehyde:** No data available.
- **water:** No data available.

**Other Adverse Effects:**

- No data available.

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**SECTION 13: Disposal considerations**

**Waste treatment methods**

- **General information:** No data available.
- **Disposal methods:** Dispose of waste and residues in accordance with local authority requirements. Mix with compatible chemical which is less flammable and incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied. Residual vapors may explode on ignition; do not cut, drill, grind, or weld on or near this container.

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**SECTION 14: Transport information**

*Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company’s Hazardous Materials/Dangerous Goods expert for information specific to your situation.*

**DOT**

- **Possible Shipping Description(s):**
  - UN 2045 Isobutyraldehyde 3 II

**IMDG - International Maritime Dangerous Goods Code**
Possible Shipping Description(s):

UN 2045  ISOBUTYRALDEHYDE  3   II

IATA

Possible Shipping Description(s):

UN 2045  Isobutyraldehyde  3   II

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture:

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.
WHMIS (Canada) Status: controlled
WHMIS (Canada) Hazard Classification:  B/2, D/2/B

SARA 311-312 Hazard Classification(s):
  immediate (acute) health hazard
  fire hazard

US EPCRA (SARA Title III) Section 313 - Toxic Chemical List
ISOBUTYRALDEHYDE

OSHA: hazardous
TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): This product is listed on the DSL. Any impurities present in this product are exempt from listing.

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): This product is listed on AICS or otherwise complies with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): This product is listed in the Handbook or has been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.

Philippines Inventory (PICCS): This product is listed on the Philippine Inventory or otherwise complies with PICCS.

Inventory of Existing Chemical Substances in China: All components of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC).

SECTION 16: Other information

HMIS® Hazard Ratings: Health - 3, Flammability - 3, Chemical Reactivity - 1

*HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.*

Revision Information: Not relevant.

Key literature references and sources for data: No data available.

Training Information: No data available.

Issue Date: 12/03/2014

SDS No.: 

Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.