SAFETY DATA SHEET

Product Name: 3-Methoxybutanol

Manufacturer or supplier's details

Celanese Sales Germany GmbH
Am Unisys-Park 1
65843 Sulzbach (Taunus)
Germany

Celanese Pte Ltd
60 Anson Road
Maple Tree Anson #13-02
Singapore 079914

Emergency telephone number
+(65) 62656917 (Operations Room direct dial)
or fax request to +(65) 62664696 (Facsimile to Operations Room)

In China Emergency Number: 86-532-83889090 (NRCC)

Identified uses
Solvent, Chemical intermediate

2. Hazards identification

GHS Classification

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquid</td>
<td>Category 4</td>
</tr>
<tr>
<td>Acute oral toxicity</td>
<td>Category 5</td>
</tr>
</tbody>
</table>

Labeling

Signal Word: Warning

Hazard Statements
H227 - Combustible liquid
H303 - May be harmful if swallowed
Precautionary Statements

P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P312 - Call a POISON PHYSICIAN/doctor/physician if you feel unwell.
P370 + P378 - In case of fire, use water/water spray/water jet/chemical powder for extinction
P403 - Store in a well-ventilated place
P501 - Dispose of contents/container in accordance with local regulations.

3. Composition/Information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Methoxybutan-1-ol</td>
<td>2517-43-3</td>
<td>&gt; 99.5</td>
</tr>
</tbody>
</table>

4. First aid measures

General Information
Remove contaminated, soaked clothing immediately and dispose of safely. Pay attention to own protection. In any case show the physician the Safety Data Sheet

Skin
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If symptoms persist, call a physician.

Eyes
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Inhalation
Move to fresh air. Keep at rest. Call a physician immediately.

Ingestion
If conscious, drink plenty of water. If swallowed, do not induce vomiting - seek medical advice.

5. Fire-fighting measures

NFPA:  Health: 2  Flammability: 2  Instability: 0

Suitable extinguishing media
Foam, Dry chemical, Carbon dioxide (CO2)

Extinguishing media which must not be used for safety reasons
Do not use a solid water stream as it may scatter and spread fire

Special exposure hazards arising from the substance or preparation itself, its combustion products, or released gases
Under conditions giving incomplete combustion, hazardous gases produced may consist of Carbon monoxide Carbon dioxide (CO2)
Combustion gases of organic materials must in principle be graded as inhalation poisons
Special protective equipment for fire-fighters
self-contained breathing apparatus (EN 133).

Environmental precautions
Water used to fight fire runoff can cause environmental damage. Dike and collect water used to fight fire.***

Other Information
Cool containers / tanks with water spray.***

6. Accidental release measures

Personal precautions
Avoid contact with the skin and the eyes. Keep away from heat and sources of ignition. Provide adequate ventilation.

Environmental precautions
Prevent further leakage or spillage. Do not discharge into the drains/surface waters/groundwater.

Methods for cleaning up
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Dispose of in accordance with local regulations***

7. Handling and storage

Advice on safe handling
Provide sufficient air exchange and/or exhaust in work rooms.

Incompatible products
None known

Protection - fire and explosion:
Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge. In case of fire, emergency cooling with water spray should be available.

Material storage
Keep in a dry, cool and well-ventilated place.

Incompatible products
None known

Technical measures/Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Handle an open container with care.

8. Exposure controls / personal protection

ACGIH Exposure Limits
No exposure limits established.

OSHA Exposure Limits
Exposure controls

Engineering measures

General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General advice

Avoid contact with skin and eyes. Do not breathe vapors or spray mist. Use only in an area equipped with a safety shower. Hold eye wash fountain available.

Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Respiratory protection

If aerosols or vapors are present, respiratory protection is required (gas filter A).

Eye protection

Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face. Equipment should conform to EN 166.

Skin protection

Impervious clothing

Hand protection

Chemicals resistant gloves

Suitable material

Butyl-rubber

Type

Butoject (Company KCL) or comparable article; or refer to glove manufacturer’s recommendation

Evaluation

According to EN 374: level 6

Material thickness

Approx. 0.3 mm

Break through time

480 min

9. Physical and chemical properties

Appearance

Form

Liquid

Color

Colourless

Odor

Mild

Odor threshold

Not determined

Molecular weight

104.15 g/mol

Flash point

67°C

Method

DIN EN ISO 2719

Ignition temperature

305°C

Method

DIN 51794

Decomposition temperature

Not determined

Lower explosion limit

Not determined

Upper explosion limit

Not determined

Flammability (solids)

Not applicable

Melting point/range

<-20°C
9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling point/range</td>
<td>157°C@ 1013 hPa***</td>
</tr>
<tr>
<td>Density</td>
<td>0.923 g/ml @ 23°C</td>
</tr>
<tr>
<td>pH</td>
<td>neutral</td>
</tr>
<tr>
<td>Viscosity</td>
<td>3.68 mPa<em>s @ 20°C</em>**</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>0.17 hPa @ 20°C***</td>
</tr>
<tr>
<td></td>
<td>4.6 hPa @ 50°C***</td>
</tr>
<tr>
<td>Vapor density</td>
<td>3.59 (Air=1)***</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not determined***</td>
</tr>
<tr>
<td>Water solubility</td>
<td>miscible</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>very soluble in, Ethanol, Acetone, soluble in, Diethyl ether***</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>0.002 (calculated)</td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>not applicable based on consideration of the structure</td>
</tr>
<tr>
<td>Oxidizing Properties</td>
<td>not applicable based on consideration of the structure</td>
</tr>
<tr>
<td>Surface Tension</td>
<td>not determined***</td>
</tr>
<tr>
<td>Dissociation constant</td>
<td>not determined***</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Reactivity
Stable under normal conditions of handling, use and transportation.***

Conditions to avoid
Avoid any source of ignition.. Avoid contact with heat, sparks, open flame, and static discharge.***

Incompatible Materials
None known

Hazardous Combustion or Decomposition Products:
Thermal decomposition products may include oxides of carbon.***
11. Toxicological information

Potential health effects

Routes of exposure
Skin, eyes, inhalation, ingestion.

Immediate effects

<table>
<thead>
<tr>
<th>Route</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>Prolonged or repeated contact may dry skin and cause irritation.</td>
</tr>
<tr>
<td>Eyes</td>
<td>May cause eye irritation.***</td>
</tr>
<tr>
<td>Inhalation</td>
<td>No adverse health effects have been observed.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>May cause gastrointestinal irritation.</td>
</tr>
</tbody>
</table>

Medical conditions which may be aggravated by exposure:

- Eyes

3-Methoxybutanal-1-ol

- Acute oral toxicity: LD50: >2000 mg/kg
- Acute inhalation toxicity: LC50 (6h): ~ 6200 mg/m³
- Skin corrosion/irritation:
  - Species: rabbit
  - Method: OECD 404
- Skin Sensitization:
  - Type: nonsensitizer
  - Test substance: n-Butyl acetate
- Serious eye damage/eye irritation:
  - Species: rabbit eye
  - Method: OECD 405***
- Carcinogenic effects: No evidence of carcinogenicity
- in vitro Mutagenicity:

Reproductive toxicity

- Routes of exposure: oral gavage
- Species: rat
- NOEL: 1000 mg/kg bw/day
- Repeated exposure: No teratogenic and embryotoxic effects (Reference substance: 3-Methoxybutyl acetate)
12. Ecological Information

3-Methoxybutan-1-ol

Acute fish toxicity
Species: Oncorhynchus mykiss (rainbow trout)
Method: OECD 203
LC50: > 100 mg/l (96h)

Acute daphnia toxicity
Species: Daphnia magna
Method: OECD 202
EC50: > 100 mg/l (48h)

Toxicity to aquatic plants
Species: Pseudokirchneriella subcapitata
Method: OECD 201
EC50: > 100 mg/l (72h)

Toxicity to bacteria
Species: in activated sludge
Method: OECD 209
EC50: > 1000 mg/l (3h)

Biodegradation
Species: activated sludge
Method: OECD 301 F
Readily biodegradable
> 70 % (28d)

Other potential hazards
The substance does not meet the criteria for PBT / vPvB according to REACH, Annex XIII

13. Disposal considerations

Product information
Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Uncleaned empty packaging
Contaminated empty packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

14. Transport information

US Department of Transportation
UN/NA Number: NA 1993
Proper Shipping Name: Combustible liquid, n.o.s.
Hazard Inducer: (3-Methoxybutanol)
Hazard class: 3
Packing Group: III
Emergency Resp. Guide: 127
14. Transport information

ADR/RID  Not regulated

ADN  ADN: Container  Not regulated

ADN Tanker
- UN/ID No.  ID 9003
- Proper Shipping Name  Substances with a flashpoint above 60°C and not more than 100°C, n.o.s.
- Hazard Inducer  (3-Methoxybutanol)
- Hazard Class  9
- Environmentally hazardous  no

ICAO/IATA  Not restricted

IMDG  Not regulated

15. Regulatory information

INTERNATIONAL REGULATIONS
This substance is classified as dangerous according to Chinese legislation

International Inventories
Listed on the chemical inventories of the following countries or qualifies for an exemption:
- Australia (AICS)
- Canada (DSL)
- China (IECSC)
- Europe (EINECS)
- Japan (ENCS)
- Japan (ISHL)
- Korea (KECI)
- New Zealand (NZIoC)
- Philippines (PICCS)
- United States (TSCA)

16. Other information

HMIS:  Health: 1  Flammability: 2  Physical Hazard: 0

Prepared By
Product Stewardship Department
Celanese

Other Information:
Observe national and local legal requirements***
Changes against the previous version are marked by ***
<table>
<thead>
<tr>
<th>Product Name</th>
<th>3-Methoxybutanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS number</td>
<td>80188</td>
</tr>
<tr>
<td>Revision Number</td>
<td>8****.01***</td>
</tr>
<tr>
<td>Revision Date</td>
<td>Sep.03.2015***</td>
</tr>
<tr>
<td>Issuing date</td>
<td>Feb.12.2019***</td>
</tr>
</tbody>
</table>

**Sources of key data used to compile the datasheet**

Information contained in this safety data sheet is based on Celanese owned data and public sources deemed valid or acceptable. The absence of data elements required by ANSI or 1907/2006/EC indicates that no data meeting these requirements is available.

**Further information**

This information is based on our present state of knowledge. It shall describe our products regarding safety requirements and shall not be construed as a guarantee or statement of condition and/or quality. For more information, other material safety data sheets or technical data sheets please consult the Celanese homepage (www.celanese.com)