Section 1: Product and Company Identification

Product Name
Acetaldehyde

Manufacturer or supplier's details

Celanese (Shanghai) International Trading Co., Ltd.
Room 239, Xinmao Building
South Taizhong Road
Waigaoqiao Free Trade Zone
Shanghai, China

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

Product Information
HazCom@celanese.com

Emergency telephone
+86-532-83889090 (NRCC)

Identified uses
Chemical intermediate

Section 2: Hazard Identification

Emergency Overview
Extremely flammable liquid and vapor. Vapor may cause flash fire Causes eye irritation May be harmful if swallowed. May cause respiratory tract irritation. Possible cancer hazard. Contains material which may cause cancer based on animal data. Risk of cancer depends on duration and level of exposure.

GHS Classification

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable liquid</td>
<td>Category 1</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 2A</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Category 2</td>
</tr>
<tr>
<td>Specific target organ systemic toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute aquatic toxicity</td>
<td>Category 3</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET (GB/T 16483 and GB/T17519)

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Acetaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS number</td>
<td>80001</td>
</tr>
<tr>
<td>Revision Number</td>
<td>9.01</td>
</tr>
<tr>
<td>Revision Date</td>
<td>Aug.20.2018</td>
</tr>
<tr>
<td>Issuing Date</td>
<td>Feb.12.2019</td>
</tr>
<tr>
<td>Symbol(s)</td>
<td></td>
</tr>
<tr>
<td>Labeling</td>
<td></td>
</tr>
<tr>
<td>Signal Word</td>
<td>Danger</td>
</tr>
<tr>
<td>Hazard Statements</td>
<td>H224 - Extremely flammable liquid and vapor</td>
</tr>
<tr>
<td></td>
<td>H319 - Causes serious eye irritation</td>
</tr>
<tr>
<td></td>
<td>H351 - Suspected of causing cancer</td>
</tr>
<tr>
<td></td>
<td>H335 - May cause respiratory irritation</td>
</tr>
<tr>
<td></td>
<td>H402 - Harmful to aquatic life</td>
</tr>
<tr>
<td>Precautionary statements</td>
<td></td>
</tr>
<tr>
<td>Prevention</td>
<td>P201 - Obtain special instructions before use</td>
</tr>
<tr>
<td></td>
<td>P202 - Do not handle until all safety precautions have been read and understood</td>
</tr>
<tr>
<td></td>
<td>P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking</td>
</tr>
<tr>
<td></td>
<td>P233 - Keep container tightly closed</td>
</tr>
<tr>
<td></td>
<td>P240 - Ground/Bond container and receiving equipment</td>
</tr>
<tr>
<td></td>
<td>P242 - Use only non-sparking tools</td>
</tr>
<tr>
<td></td>
<td>P243 - Take precautionary measures against static discharge</td>
</tr>
<tr>
<td></td>
<td>P280 - Wear protective gloves/protective clothing/eye protection/face protection</td>
</tr>
<tr>
<td></td>
<td>P273 - Avoid release to the environment</td>
</tr>
<tr>
<td>Response</td>
<td>P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing</td>
</tr>
<tr>
<td></td>
<td>P337 + P313 - If eye irritation persists: Get medical advice/attention</td>
</tr>
<tr>
<td></td>
<td>P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower</td>
</tr>
<tr>
<td></td>
<td>P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing</td>
</tr>
<tr>
<td></td>
<td>P308 + P313 - IF exposed or concerned: Get medical attention/advice</td>
</tr>
<tr>
<td></td>
<td>P370 + P378 - In case of fire, use water/water spray/water jet/carbon dioxide/sand/foam/alcohol resistant foam/chemical powder for extinction</td>
</tr>
<tr>
<td>Storage</td>
<td>P403 + P235 - Store in a well-ventilated place. Keep cool</td>
</tr>
<tr>
<td></td>
<td>P405 - Store locked up</td>
</tr>
<tr>
<td>Disposal</td>
<td>P501 - Dispose of contents/container in accordance with local regulations.</td>
</tr>
<tr>
<td>Physical and chemical hazards</td>
<td>Extremely flammable liquid and vapor. Vapor may cause flash fire</td>
</tr>
<tr>
<td>Potential health effects</td>
<td></td>
</tr>
<tr>
<td>Routes of exposure</td>
<td>Skin, eyes, inhalation, ingestion.</td>
</tr>
</tbody>
</table>
Immediate effects

Skin
May cause skin irritation. Symptoms of overexposure include: Redness or discoloration, swelling, itching, burning or blistering of skin.

Eyes
Causes eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision.

Inhalation
May cause irritation of respiratory tract. Symptoms of exposure may include: Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty.

Ingestion
May be harmful if swallowed. Symptoms of exposure may include: Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea.

Delayed / long-term effects
No information available

Target organ effects
Overexposure (prolonged or repeated exposure) may cause:
Injury to the eyes
Irritation of the respiratory tract

Environmental hazards
Refer to Section 12

Section 3: Composition/information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaldehyde</td>
<td>75-07-0</td>
<td>&gt; 99.5</td>
</tr>
</tbody>
</table>

Section 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.

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

Skin
Wash off immediately with plenty of water for at least 15 minutes
Obtain medical attention

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

Ingestion
Rinse with plenty of water. If swallowed give 1-2 glasses of water to drink immediately. Call a physician immediately.

Main symptoms
Vapours may cause irritation to the eyes, respiratory system and the skin.

Treatment
Treat symptomatically. In case of lung irritation first treatment with dexametason aerosol (spray). In the case of absorption of large volumes, use gastroscopy with suction cleaning.

Section 5: Fire-fighting Measures
Section 5: Fire-fighting Measures

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

Extinguishing media which must not be used for safety reasons
Do not use water jet, to avoid propagation of a 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
Dike and collect water used to fight fire.

Other Information
Cool containers / tanks with water spray.

Section 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 Do not use rags, paper towels or combustible materials to clean up a spill, because spontaneous combustion can occur Keep in suitable, closed containers for disposal Dispose of in accordance with local regulations

Additional information
Consult trained personnel Consider the information for "Personal Protection" in chapter 8 of this Safety Data Sheet

Section 7: Handling and storage

Advice on safe handling
Vapors may form explosive mixtures with air The pressure in sealed containers can increase under the influence of heat Refill and handle product only in closed system Provide sufficient air exchange and/or exhaust in work rooms

Personal precautions
Avoid contact with the skin and the eyes Keep away from heat and sources of ignition Provide adequate ventilation
Protection - fire and explosion:
Keep away from sources of ignition - No smoking. Vapours are heavier than air and may spread along floors. Take necessary action to avoid static electricity discharge. Ground and bond containers when transferring material. In case of fire, emergency cooling with water spray should be available.

Temperature class
T4

Material storage
Store locked up. The product will oxidize in air and release heat. Oxidization creates acids and peroxides, that may lead to corrosive damages in storage and handling equipment.

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

Incompatible products
Keep away from: Acids Bases Amines Oxygen Oxidizing agents Reducing agents

German storage class
3A: Flammable liquids.

Section 8: Exposure controls/personal protection

ACGIH Exposure Limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Ceiling Limit Value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaldehyde</td>
<td>25 PPM</td>
</tr>
</tbody>
</table>

China National 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
respirator with AX filter. Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus. Equipment should conform to EN 136 or EN 140 and EN 143.
### 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
- **Reference substance**: Vinyl acetate
- **Type**: Butoject (Company KCL) or comparable article; or refer to glove manufacturer's recommendation
- **Evaluation**: according to EN 374: level 5
- **Material thickness**: Approx. 0.7 mm
- **Break through time**: approx. 240 min

### Section 9: Physical and Chemical Properties

- **Form**: liquid
- **Color**: colourless
- **Odor**: pungent
- **Odor Threshold**: 0.21 mg/l (gas in air)
- **Molecular Weight**: 44.05 g/mol
- **Flash point**: -39°C
- **Ignition temperature**: 155°C
- **Decomposition Temperature**: 420 °C
- **Lower explosion limit**: 4 Vol. %
- **Upper explosion limit**: 60 Vol. %
- **Flammability (solids)**: not applicable
- **Melting point/range**: -123°C
- **Boiling point/range**: 20°C @ 1013 hPa
- **Density**: 0.783 g/ml @ 18°C
- **pH**: Not determined
- **Viscosity**: 0.25 mPa*s @ 15°C
- **Vapor pressure**: 1203 hPa @ 25°C
- **Vapor pressure**: 2794 hPa @ 50°C
- **Vapor density**: 1.52 (Air=1)
- **Evaporation Rate**: Not determined
- **Water solubility**: miscible
- **Solubility in other solvents**: miscible with, Ethanol, Diethyl ether, Benzene
- **Partition coefficient (n-octanol/water)**: 0.45 (measured)
- **Explosive Properties**: not applicable based on consideration of the structure
- **Oxidizing Properties**: not applicable based on consideration of the structure
- **Surface Tension**: 20.50 mN/m @ 25°C
- **Dissociation constant**: 13.57 @ 25°C
Section 10: Stability and reactivity

Reactivity
Stable if protected from heat and exposure to air.

Possibility of hazardous reactions
May form explosive peroxides. Polymerization can occur. Polymerization is a highly exothermic reaction and may generate sufficient heat to cause thermal decomposition and/or rupture containers.

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

Incompatible Materials
Keep away from: Oxygen, Oxidizing agents, Reducing agents, Acids, Bases.

Section 11: Toxicological information

Acetaldehyde

Acute oral toxicity
Species: rat
LD50: 660-1930 mg/kg

Acute dermal toxicity
no data available

Acute inhalation toxicity
Species: rat
Method: OECD 403
LC50 (4h): 24040 mg/m³

Skin corrosion/irritation
Species: rabbit
Method: OECD 404
Slight irritant effect - does not require labelling

Serious eye damage/eye irritation
Species: Humans
Irritant

Skin Sensitization
Species: guinea pig, female
Method: OECD 406
Nonsensitizer

in vitro Mutagenicity
Ames Test: negative - with and without metabolic activation - Method: OECD 471
Cytotoxicity and micronucleus assay in human lymphoblastoid cells (TK6): positive - Method: OECD 487

Carcinogenic effects
Species: rat
Suspected of causing cancer

Developmental effects
Species: rat
No teratogenic, maternal or developmental effects
Routes of exposure: oral gavage
Method: OECD 414
NOAEL: > 400 mg/kg bw/day
Type of study: Prenatal Developmental Toxicity Study

Repeated exposure
Species: rat
Method: OECD 407
Caused slight hyperkeratosis in the forestomach
Routes of exposure: oral gavage
NOAEL: 125 mg/kg bw/day
Section 11: Toxicological information

**Product Name:** Acetaldehyde  
**MSDS number:** 80001  
**Revision Number:** 9.01  
**Revision Date:** Aug.20.2018  
**Issuing date:** Feb.12.2019

### Section 12: Ecological information

**Acetaldehyde**

**Acute fish toxicity**  
Species: *Leuciscus idus* (Golden orfe)  
Method: DIN 38412 T.15  
**LC50:** 124 mg/l (48h)

**Chronic fish toxicity**  
Species: *Poecilia reticulata* (guppy)  
Method: OECD 204  
**LC50 (14d):** 35 mg/l

**Acute daphnia toxicity**  
Species: *Daphnia magna*  
Method: OECD 202  
**EC50:** 57.4 mg/l (48h)

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

**Toxicity to bacteria**  
Species: *Chilomonas paramecium*  
Method: OECD 301 C  
**NOEC:** 82 mg/l

**Biodegradation**  
Method: Readily biodegradable

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

### Section 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 packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

### Section 14: Transport information

**ADR/RID**

**UN/ID No.:** UN 1089  
**Proper Shipping Name:** Acetaldehyde  
**Hazard Class:** 3
Section 14: Transport information

Packing group
I
Tunnel Restriction Code
(D/E)
Hazard Number
33

ADN
ADN: Container and Tanker
UN/ID No.
UN 1089
Proper Shipping Name
Acetaldehyde
Hazard Class
3
Packing group
I

ICAO/IATA
UN-No.
UN 1089
Proper Shipping Name
Acetaldehyde
Hazard Class
3
Packing group
I

IMDG
UN/ID No.
UN 1089
Proper Shipping Name
Acetaldehyde
Hazard Class
3
Packing group
I
Marine pollutant
no
EmS Code
F-E, S-D

Section 15. Regulatory information

The following laws, regulations, rules and standards provide appropriate provisions of the management of the chemical:

Occupational Disease Prevention Law:
Catalog of classification of occupational hazards: unlisted
Occupational disease catalog: unlisted

Regulations on Safe Management of Hazardous Chemicals:
Catalogue of Hazardous Chemicals: listed (31022) – 3.1 low flash point flammable liquid
GB 18218-2009 "major hazard identification of hazardous chemicals ": Acetaldehyde is extremely flammable liquid, flash point <0°C, boiling point<35 °C, critical volume (t): 10
List of first batch of hazardous chemicals under priority management: listed - Acetaldehyde
The Measures for Environmental Administration Registration of Hazardous Chemicals (Trial)

Labor protection regulations for use of toxic substances in workplaces:
Catalog of highly toxic goods: Not Listed

Provisions on the First Import of Chemicals and the Import and Export of Toxic Chemicals:
List of Toxic Chemicals Restricted to be Imported/Exported: listed - Acetaldehyde

List of Dangerous Goods (GB12268-2012):
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)
- Korea (KECI)
- New Zealand (NZIoC)
- Philippines (PICCS)
- United States (TSCA)

Remarks
Downstream users shall comply with local regulations concerning the chemicals

Section 16: Other information

Changes against the previous version are marked by ***

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).
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**Abbreviation and Acronym:**
- **ADR** = Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- **CAS** = Chemical Abstracts Service (division of the American Chemical Society)
- **CLP** = Classification, Labelling and Packaging
- **DNEL** = Derived No Effect Level
- **EINECS** = European Inventory of Existing Commercial Chemical Substances
- **GHS** = Globally Harmonized System of Classification and Labelling of Chemicals
- **IATA** = International Air Transport Association
- **ICAO** = International Civil Aviation Organization
- **IMDG** = International Maritime Code for Dangerous Goods
- **LC50** = Lethal Concentration
- **LD50** = Lethal Dose
- **LOAEC** = Low Observed Adverse Effect Concentration
- **LOAEL** = Low Observed Adverse Effect Level
- **LOEL** = Low Observed Effect Level
- **NOAEC** = No Observed Adverse Effect Concentration
- **NOAEL** = No Observed Adverse Effect Level
- **NOEC** = No Observed Effect Concentration
- **NOEL** = No Observed Effect Level
- **PBT** = Persistent, Bioaccumulative and Toxic
- **PNEC** = Predicted No Effect Concentration
- **RCR** = Risk Characterization Ratio
- **RID** = Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- **STOT SE** = Specific Target Organ Toxicity Single Exposure
- **STP** = Sewage Treatment Plant
- **vPvB** = very Persistent and very Bioaccumulative