1. Product and company identification

Trade Name

Acetic anhydride

Manufacturer, importer, supplier
Celanese Ltd.
222 W. Las Colinas Blvd., Suite 900N
Irving, TX 75039
United States
Phone: 972 443 4000
Internet: www.celanese.com

Celanese Operations México, S. de R.L. de C.V:
Freeway Coatzacoalcos-Villahermosa Km. 12.3 C.P. 96400
Coatzacoalcos, Ver
Mexico
Phone: (921) 211-5000/211-5048
Fax: (921) 211-5003***

Transportation emergency phone numbers:
In USA, call 800 424 9300
Outside USA, call 703 527 3887, collect calls accepted.
In Mexico, call (921) 211-5048, 211-5000

Identified uses
Chemical intermediate

2. Hazard Identification

GHS Classification

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Category 4</td>
</tr>
<tr>
<td>Flammable liquid</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute inhalation toxicity</td>
<td>Category 2</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
</tbody>
</table>

Label elements

Signal Word
Danger***
Hazard Statements
Flammable liquid and vapor
Harmful if swallowed
Fatal if inhaled
Causes severe skin burns and eye damage
Causes serious eye damage

Precautionary statements
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
In case of fire:
Use foam, dry powder, carbon dioxide (CO2) to extinguish.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Wear respiratory protection
Wash face, hands and any exposed skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Do not breathe dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
Call a POISON CENTER or doctor if you feel unwell.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
Wash contaminated clothing before reuse.
Store locked up.
Store in a well-ventilated place. Keep cool.
Dispose of contents/ container to an approved waste disposal plant.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>108-24-7</td>
<td>min 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 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.

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

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

Notes to physician
Observe for latent pulmonary edema.

5. Fire-fighting measures

NFPA:    Health:  3    Flammability:  2    Instability:  1

Suitable extinguishing media
Foam, Dry powder, 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 run-off and vapor cloud may be corrosive. Dike and collect water used to fight fire***

Other Information
In the event of fire, cool tanks with water spray. Reacts violently with water

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.

Isolation
Keep unnecessary people away; isolate hazard area and deny entry. Isolate for 800 meters or 0.5 miles in all directions if tank, rail car, or tank truck is involved in fire. Evacuate downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases.***
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***

Authority Notification
Within the United States, call the National Response Center (800-424-8802) and appropriate state and local authorities if the quantity released over 24 hours is equal to or greater than the reportable quantity listed below:

5000 lb/2270kg

7. Handling and storage

Advice on safe handling
Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Store in a place accessible by authorized persons only.

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.

Technical measures/Storage conditions
Keep containers tightly closed in a dry, cool and well-ventilated place. Take measures to prevent the build up of electrostatic charge.

Material storage
Store locked up.. Keep in a dry, cool and well-ventilated place***

Incompatible products
Keep away from:, Bases, amines, water***

8. Exposure controls / personal protection

OSHA Exposure Limits

<table>
<thead>
<tr>
<th>Components</th>
<th>TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>5 PPM</td>
</tr>
</tbody>
</table>

ACGIH Exposure Limits

<table>
<thead>
<tr>
<th>Components</th>
<th>TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>5 PPM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>Celanese Workplace Exposure Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>1 ppm TWA</td>
</tr>
</tbody>
</table>
Components 2005 NIOSH IDLH
Acetic anhydride 200 ppm

Mexico National Exposure Limits

<table>
<thead>
<tr>
<th>Components</th>
<th>LMPE - PPT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>20 mg/m³</td>
<td>5 PPM</td>
</tr>
</tbody>
</table>

Exposure controls

Engineering measures
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred.

Personal protective equipment
Personal protective equipment

Protective equipment
A safety shower and eyewash should be readily available.

General advice
Use only in an area equipped with a safety shower. Avoid contact with skin and eyes. Do not breathe vapors or spray mist.

Respiratory protection
For concentrations > 1 and < 10 times the occupational exposure level: Use air-purifying respirator with full facepiece and organic vapor cartridge(s) or air-purifying full facepiece respirator with an organic vapor canister or a full facepiece powered air-purifying respirator fitted with organic vapor cartridge(s). The air purifying element must have an end of service life indicator, or a documented change out schedule must be established. Otherwise, use supplied air.

For concentrations more than 10 times the occupational exposure level and less than the lower of either 100 times the occupational exposure level or the IDLH: Use Type C full facepiece supplied-air respirator operated in positive-pressure or continuous-flow mode.

For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full facepiece in positive-pressure mode or Type C positive-pressure full facepiece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system.

For escape: Use self-contained breathing apparatus with full facepiece or any respirator specifically approved for escape.***

Skin protection:
Wear impervious clothing and gloves to prevent contact. Butyl rubber is recommended. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.
Eye/face protection:
Wear chemical goggles when there is a reasonable chance of eye contact. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

9. Physical and chemical properties

Appearance
- Form: liquid
- Color: colourless
- Odor: pungent, of vinegar

Molecular Weight: 102.09

Flash point: 49°C*** (120°F)
- Method: closed cup

Ignition temperature: 330°C*** (626°F)
- Method: DIN 51794

Lower explosion limit: ~2.0 Vol. %

Upper explosion limit: ~10.2 Vol. % (-99°F)

Boiling point/range: 140°C*** (284°F) @ 1013 hPa

Density: 1.08 g/ml @ 20°C***

Viscosity: 0.843 mPa*s @ 25°C

Vapor pressure:
- 5 hPa @ 20°C*** (4 mmHg)
- 29 hPa @ 50°C*** (22 mmHg)

Vapor density: 3.5 (Air=1)

Evaporation Rate: 0.46 (n-Butyl acetate = 1)

Water solubility: hydrolyses

Partition coefficient (n-octanol/water): -0.58 (calculated)

10. Stability and reactivity

Chemical stability
May react with evolution of heat and/or toxic gases on contact with water.

Conditions to avoid
Keep away from heat, sparks and flame. Avoid any source of ignition.***

Incompatible Materials
Keep away from:
- water
- steam
- alcohols
- Aqueous solution of alkali salts
- Acids
- peroxides
- amines
- strong oxidizing agents***
Hazardous Combustion or Decomposition Products:
Thermal decomposition products may include oxides of carbon.***

Possibility of hazardous reactions
Reacts violently with water, alkalies, alcohols, amines.

11. Toxicological information

Potential health effects

Routes of exposure
Skin, eyes, inhalation, ingestion.***

Immediate effects

Skin
Causes skin burns. Symptoms of overexposure include: Redness or discoloration, swelling, itching, burning or blistering of skin.***

Eyes
Exposure to liquid Causes severe eye burns, damage irreversible. Exposure to vapors Causes eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision.***

Inhalation
Causes respiratory tract irritation. Harmful if inhaled. Symptoms of exposure may include: Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty. Accumulation of fluid in the lungs (pulmonary edema); symptoms can be delayed for several hours.

Ingestion
Causes digestive tract burns. May be harmful if swallowed. Symptoms of exposure may include: Inflammation of mouth, throat, esophagus and/or stomach. Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea.***

Medical conditions which may be aggravated by exposure:
Significant exposure to this chemical may adversely affect people with acute or chronic disease of the:
Respiratory Tract
Skin
Eyes

Acetic anhydride

Acute oral toxicity
LD50: 630 mg/kg- harmful- Not toxic

Acute inhalation toxicity
LC100 (6h): 400 ppm - harmful
Method
Similar to OECD 412

Skin corrosion/irritation
Species
Corrosive
Humans

Skin Sensitization
Species
nonsensitizer

Serious eye damage/eye irritation
Species
Irritant
Method
OECD 413

Carcinogenic effects
No evidence of carcinogenicity
12. Ecological Information

Acetic anhydride

**Acute fish toxicity**
Species: Oncorhynchus mykiss (rainbow trout)
Method: OECD 471 In vitro Mammalian Chromosome aberrations in Chinese Hamster Cells

**Acute daphnia toxicity**
Species: Daphnia magna
Method: OECD 473 In vitro Mammalian Chromosome aberrations in Chinese Hamster Cells

**Toxicity to aquatic plants**
Species: Skeletonema costatum
Method: ISO 10253

**Toxicity to bacteria**
Species: Pseudomonas putida
Method: Readily biodegradable

**Biodegradation**
Method: BOD Standard Method

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

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**in vitro Mutagenicity**
Ames Test: negative - with and without metabolic activation - Method: OECD 471
In vitro Mammalian Chromosome aberrations in Chinese Hamster Cells: negative - with and without metabolic activation - Method: OECD 473

**in vivo Mutagenicity**
Did not cause chromosomal damage in rat bone marrow - Method: EU B.12

**Developmental effects**
no adverse developmental effects

**Repeated exposure**

**Species**
rat

**Method**
OECD 412
LOAEC: 104 mg/m³

**Acute fish toxicity**
Species: Oncorhynchus mykiss (rainbow trout)
Method: OECD 471 In vitro Mammalian Chromosome aberrations in Chinese Hamster Cells

**Acute daphnia toxicity**
Species: Daphnia magna
Method: OECD 473 In vitro Mammalian Chromosome aberrations in Chinese Hamster Cells

**Toxicity to aquatic plants**
Species: Skeletonema costatum
Method: ISO 10253

**Toxicity to bacteria**
Species: Pseudomonas putida
Method: Readily biodegradable

**Biodegradation**
Method: BOD Standard Method

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

Disposal considerations
Dispose of spilled material in accordance with state and local regulations for hazardous waste. Recommended methods are incineration or biological treatment at a federally or state-permitted disposal facility. Note that this information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete.

Note that this handling and disposal information may also apply to empty containers, liners and rinsate. State or local regulations or restrictions are complex and may differ from federal regulations. This information is intended as an aid to proper handling and disposal; the final responsibility for handling and disposal is with the owner of the waste. ***

EPA Hazardous Waste Code(s): D001, D002

14. Transport information

US Department of Transportation

| UN/NA Number: | UN 1715 |
| Proper Shipping Name | Acetic anhydride |
| Hazard class | 8 |
| Subsidiary hazard | 3 |
| Packing Group | II |
| Reportable Quantity (RQ) | 5000 lb/2270kg |
| Emergency Resp. Guide | 137 |

TDG

| UN/NA Number: | UN 1715 |
| Proper Shipping Name | ACETIC ANHYDRIDE |
| Class: | 8 |
| Subsidiary Risk: | 3 |
| Packing Group: | II |

Mexico Transport Information

| UN-No. | UN 1715 |
| Proper Shipping Name | Acetic anhydride |
| Hazard Class | 8 |
| Subsidiary Risk | 3 |
| Packing Group | II |

ICAO/IATA

| UN-No. | UN 1715 |
| Proper Shipping Name | Acetic anhydride |
| Hazard Class | 8 |
| Subsidiary Risk | 3 |
| Packing group | II |

IMDG

| UN/ID No. | UN 1715 |
| Proper Shipping Name | Acetic anhydride |
15. Regulatory Information

US State Regulations

Chemicals associated with the product which are subject to the state right-to-know regulations are listed along with the applicable state(s):

Acetic anhydride 108-24-7
Pennsylvania Listed
New York Listed
New Jersey Listed
Illinois Listed
Massachusetts Listed
Rhode Island Listed

U.S. FEDERAL REGULATIONS

TSCA Inventory:
We certify that all components are either on the TSCA inventory or qualify for an exemption.

Environmental Regulations:

Acetic anhydride 108-24-7
CERCLA Hazardous Substance Listed

SARA 311:
- Acute health: Yes
- Chronic health: No
- Fire: Yes
- Sudden release of pressure: No
- Reactive: Yes

INTERNATIONAL REGULATIONS
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

NFPA: Health: 3  Flammability: 2  Instability: 1
HMIS: Health: 3  Flammability: 2  Physical Hazard: 1

Prepared By
Product Stewardship Department
Celanese

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.

Other Information:
Observe national and local legal requirements***
Changes against the previous version are marked by ***

For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Celanese makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid, or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards. Material safety data sheets are provided on the Internet by Celanese as a service to its customers. Possession of an Internet MSDS does not indicate that the possessor of the MSDS was a purchaser or user of the subject product.***
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)
STP = Sewage Treatment Plant
vPvB = very Persistent and very Bioaccumulative