1. Product and company identification

Trade Name

Propionic anhydride

Celanese Chemicals Europe GmbH
Frankfurter Str. 111
D-61476 Kronberg/Ts.
Germany

Transportation emergency phone numbers:
In USA, call 800 424 9300
Outside USA, call 703 527 3887, collect calls accepted.

Identified uses
Chemical intermediate

2. Hazard 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>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
Combustible liquid
Causes severe skin burns and eye damage
Causes serious eye damage
Precautionary statements
Keep away from flames and hot surfaces - No smoking
In case of fire:
Use foam, dry chemical, carbon dioxide (CO2), water spray to extinguish.
Do not breathe dusts or mists
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Wash face, hands and any exposed skin thoroughly after handling.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
Wash contaminated clothing before reuse.
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.
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>
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</thead>
<tbody>
<tr>
<td>Propionic anhydride</td>
<td>123-62-6</td>
<td>min 98</td>
</tr>
<tr>
<td>Propionic acid</td>
<td>79-09-4</td>
<td>&lt; 2</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
If conscious, drink plenty of water. If swallowed, do not induce vomiting - seek medical advice.

5. Fire-fighting measures
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 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. Dike and collect water used to fight fire.

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:

7. Handling and storage

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

Protection - fire and explosion:
Keep away from sources of ignition - No smoking. 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.
Technical measures/Storage conditions
Keep tightly closed in a dry, cool and well-ventilated place. Never allow product to get in contact with water during storage.

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

Incompatible products
Keep away from: bases, amines, alcohols, water

8. Exposure controls / personal protection

OSHA Exposure Limits
No exposure limits established.

ACGIH Exposure Limits

<table>
<thead>
<tr>
<th>Components</th>
<th>TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propionic acid</td>
<td>10 PPM</td>
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</table>

Mexico National Exposure Limits
No exposure limits established

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.

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

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.
Respiratory protection
Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level. To estimate an occupational exposure level see Section 8 and Section 11.

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
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</tr>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>colourless</td>
</tr>
<tr>
<td>Odor</td>
<td>pungent</td>
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<tr>
<td>Molecular Weight</td>
<td>130.14</td>
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<tr>
<td>Flash point</td>
<td>63°C(145.4°F)</td>
</tr>
<tr>
<td>Method</td>
<td>EU Method A.9</td>
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<tr>
<td>Autoignition Temperature</td>
<td>282 °C</td>
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<tr>
<td>Method</td>
<td>EU A.15</td>
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<tr>
<td>Melting point/range</td>
<td>-43°C</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>168.4°C</td>
</tr>
<tr>
<td>Method</td>
<td>EU A.2 @ 1013 hPa</td>
</tr>
<tr>
<td>Density</td>
<td>1.0103 g/ml @ 20°C</td>
</tr>
<tr>
<td>Method</td>
<td>EU A.3</td>
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<tr>
<td>Viscosity</td>
<td>1.039 mPa*s @ 25°C</td>
</tr>
</tbody>
</table>
Method

OECD 114

Vapor pressure
168 Pa @ 20°C

Water solubility
hydrolyses

Partition coefficient
0.33 (data based on propionic acid)
(n-octanol/water)

10. Stability and reactivity

Chemical stability
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
Keep away from:
- amines
- bases
- alcohols
- water

Hazardous Combustion or Decomposition Products:
Thermal decomposition products may include oxides of carbon.

Possibility of hazardous reactions
Reacts violently with water.

11. Toxicological information

Potential health effects

Routes of exposure
Skin, eyes, inhalation, ingestion.

Immediate effects

Skin
Harmful if absorbed through skin. Causes skin burns.

Eyes
Causes eye burns.

Inhalation
May be harmful if inhaled. Causes respiratory tract burns.

Ingestion
May be harmful if swallowed. Causes digestive tract burns.

Acute oral toxicity
LD50: 3455 mg/kg
(Reference substance: Propionic acid)

Acute inhalation toxicity
LC50 (4h): > 20 mg/l
Safety Data Sheet

Propionic anhydride

Method
Similar to OECD 403

Skin corrosion/irritation
Corrosive
(Reference substance: Propionic acid)

Species
Rabbit

Serious eye damage/eye irritation
Corrosive
(Reference substance: Propionic acid)

Species
Rabbit eye

Carcinogenic effects
No evidence of carcinogenicity

Species
Rat male

Study
Oral gavage lifetime study

in vitro Mutagenicity
Ames Test: negative - with and without metabolic activation - Method: OECD 471 (Reference substance: Propionic acid)

in vivo Mutagenicity
In vitro mammalian chromosome aberration test in Chinese hamster cells: negative - with and without metabolic activation - OECD 473 (Reference substance: Propionic acid)

Developmental effects
Routes of exposure
Oral gavage

Species
Rat

NOAEL: 300 mg/kg bw/day (Maternal toxicity / teratogenicity)

Propionic acid

Acute oral toxicity
LD50: 960 - 2270 mg/kg, rat- not toxic to harmful

Acute dermal toxicity
LD50: 500 - 794 mg/kg, rabbit- Harmful to toxic

Acute inhalation toxicity
LC50 (4h): > 5.4 mg/l

Skin corrosion/irritation
Corrosive

Species
Rabbit

Method
Exposure time: 1 h occluded treatment

Skin Sensitization
Nonsensitizer

Species
Guinea pig

Method
Maximization

Serious eye damage/eye irritation
Considered to be corrosive

Species
Rats

Study
Oral dose-feed lifetime study

Carcinogenic effects
5 Papillomas of the forestomach mucosa were observed in 20 animals Significant hyperplasia and dysplasia of the forestomach mucosa were also observed

Species
Rats

Study
Oral dose-feed lifetime study

LOAEL: 2640 mg/kg/d

in vitro Mutagenicity
Negative for sister-Chromatid-exchange (SCE) Ames Test: negative - with and without metabolic activation - Method: OECD 471

in vivo Mutagenicity
Mouse micronucleus test for chromosome damage: - negative
12. Ecological Information

**Propionic anhydride**

**Developmental effects**
- **Routes of exposure**
  - Oral gavage
  - Rat, rabbit, mouse, hamster
- **LOAEL**: 300 mg/kg/day
- **Species**: Drosophila melanogaster

**Repeated exposure**
- **Routes of exposure**
  - Oral dose-feed
  - Dogs
- **NOAEL**: ~700 mg/kg bw/day

**Acute fish toxicity**
- **LC50**: > 10000 mg/l (96h)
- **Species**: Leuciscus idus (Golden orfe)
- **Method**: DIN 38412 T.15

**Acute daphnia toxicity**
- **EC50**: > 500 mg/l (48h)
- **Species**: Daphnia magna
- **Method**: EU C.2

**Toxicity to aquatic plants**
- **EC50**: > 500 mg/l (72h)
- **Species**: Desmodesmus subspicatus
- **Method**: OECD 201

**Toxicity to bacteria**
- **EC50**: 60 mg/l (17h)
- **Species**: Pseudomonas putida
- **Method**: According to OECD criteria

**Biodegradation**
- **Readily biodegradable**
- **Reference substance**: Propionic acid

**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.

14. Transport information

US Department of Transportation

<table>
<thead>
<tr>
<th>UN/NA Number:</th>
<th>UN 2496</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>Propionic anhydride</td>
</tr>
<tr>
<td>Hazard class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>III</td>
</tr>
<tr>
<td>Emergency Resp. Guide</td>
<td>156</td>
</tr>
</tbody>
</table>

ICAO/IATA

<table>
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IMDG

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<td>8</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Marine pollutant</td>
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</tr>
<tr>
<td>EmS Code</td>
<td>F-A, S-B</td>
</tr>
</tbody>
</table>

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):
Safety Data Sheet

<table>
<thead>
<tr>
<th>Product name</th>
<th>Propionic anhydride</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS number</td>
<td>80511</td>
</tr>
<tr>
<td>Revision Number</td>
<td>6</td>
</tr>
<tr>
<td>Revision Date</td>
<td>Oct.10.2014</td>
</tr>
<tr>
<td>Issuing date</td>
<td>Jun.29.2015</td>
</tr>
</tbody>
</table>

**Propionic anhydride 123-62-6**
- Pennsylvania: Listed
- New York: Listed
- New Jersey: Listed
- Massachusetts: Listed
- Rhode Island: Listed

**Propionic acid 79-09-4**
- 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:**

**Propionic anhydride 123-62-6**
- CERCLA Hazardous Substance: Listed

**Propionic acid 79-09-4**
- CERCLA Hazardous Substance: Listed

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

**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: 0

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.
Safety Data Sheet

<table>
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<tr>
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<th>Propionic anhydride</th>
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</table>

**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
- **NOAEC** = No Observed Adverse Effect Concentration
- **NOAEL** = No Observed Adverse 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)
- **R-Phrases** = Risk Phrases
- **S-Phrases** = Safety Phrases
- **STP** = Sewage Treatment Plant
- **vPvB** = very Persistent and very Bioaccumulative