SAFETY DATA SHEET

Eastman(TM) Acetic Anhydride, Reagent Grade

SECTION 1. IDENTIFICATION

Product name : Eastman(TM) Acetic Anhydride, Reagent Grade
Product code : 18160-00, E1816001, P1816006, P1816007

Manufacturer or supplier's details
Company name of supplier : Eastman Chemical Company
Address : 200 South Wilcox Drive
           Kingsport TN 37660-5280
Telephone : (423) 229-2000
Emergency telephone : CHEMTREC: +1-800-424-9300, +1-703-527-3887 CCN7321

Recommended use of the chemical and restrictions on use
Recommended use : Chemical intermediate
Restrictions on use : None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Flammable liquids : Category 3
Acute toxicity (Oral) : Category 4
Acute toxicity (Inhalation) : Category 2
Skin corrosion : Category 1B
Serious eye damage : Category 1

GHS label elements
Hazard pictograms :

Signal Word : Danger
Hazard Statements : H226 Flammable liquid and vapor.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H330 Fatal if inhaled.
Precautionary Statements:

**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.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P284 Wear respiratory protection.

**Response:**
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310 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/doctor.
P363 Wash contaminated clothing before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

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

**Disposal:**
P501 Dispose of contents/container to an approved waste disposal plant.

**Other hazards**
Water Reactive

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance name: 18160-00
**SAFETY DATA SHEET**

Eastman(TM) Acetic Anhydride, Reagent Grade

**Version** 2.1  
**SDS Number:** 150000016156  
**Date of last issue:** -  
**Date of first issue:** 09/06/2016

### Ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>108-24-7</td>
<td>94 - 100</td>
</tr>
<tr>
<td>acetic acid</td>
<td>64-19-7</td>
<td>0 - 6</td>
</tr>
</tbody>
</table>

### SECTION 4. FIRST AID MEASURES

**If inhaled:**  
Move to fresh air.  
If breathing is difficult, give oxygen.  
If not breathing, give artificial respiration.  
Call a physician or poison control center immediately.

**In case of skin contact:**  
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.  
Wash contaminated clothing before re-use.  
Call a physician or poison control center immediately.  
Thoroughly clean shoes before reuse.

**In case of eye contact:**  
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.  
If easy to do, remove contact lens, if worn.  
Call a physician or poison control center immediately.

**If swallowed:**  
Seek medical advice.

**Most important symptoms and effects, both acute and delayed:**  
Irritation  
Pain  
Redness  
Harmful if swallowed.  
Causes severe skin burns and eye damage.  
Fatal if inhaled.  
Causes serious eye damage.

**Notes to physician:**  
Treat symptomatically.

### SECTION 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing media:**  
Carbon dioxide (CO2)  
Dry chemical  
Water spray

**Unsuitable extinguishing media:**  
Water spray jet

**Specific hazards during fire fighting:**  
Water may be ineffective.  
The product will float on water and can be reignited on surface water.

**Further information:**  
Use water spray to cool unopened containers.

**Special protective equipment:**  
Wear an approved positive pressure self-contained breathing
for fire-fighters apparatus in addition to standard fire fighting gear.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protective equipment and emergency procedures**: Use personal protective equipment. Local authorities should be advised if significant spillages cannot be contained.

**Environmental precautions**: Avoid release to the environment.

**Methods and materials for containment and cleaning up**: Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). After cleaning, flush away traces with water. Eliminate all ignition sources if safe to do so.

**SECTION 7. HANDLING AND STORAGE**

**Advice on protection against fire and explosion**: Keep away from combustible material.

**Advice on safe handling**: Do not breathe vapors or spray mist. Do not get on skin or clothing. Do not get in eyes. Do not swallow. Ensure adequate ventilation. Wash thoroughly after handling. Keep away from fire (No Smoking). Keep away from fire, sparks and heated surfaces. Do not use sparking tools.

**Conditions for safe storage**: Keep container closed when not in use.

**Materials to avoid**: Keep container tightly closed and dry.

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Ingredients with workplace control parameters**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic anhydride</td>
<td>108-24-7</td>
<td>TWA</td>
<td>1 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>3 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>5 ppm 20 mg/m3</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>5 ppm 20 mg/m3</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>5 ppm</td>
<td>OSHA P0</td>
</tr>
</tbody>
</table>
Engineering measures: Ensure adequate ventilation.

Personal protective equipment:

Respiratory protection: Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Hand protection

Remarks: Wear suitable gloves.

Eye protection: Safety glasses

Protective measures: PPE selections vary based on potential exposure conditions such as application, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material is based upon intended, normal usage. Remove respiratory and skin/eye protection only after vapors have been cleared from the area. Ensure that eye flushing systems and safety showers are located close to the working place. Use personal protective equipment as required.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: liquid

Color: colorless

Odor: strong

Odor Threshold: 0.117 ppm

pH: not determined
Melting point/freezing point: -73 °C
Boiling point/boiling range: 139.5 °C
Flash point: 49 °C
Evaporation rate: not determined
Flammability (solid, gas): Flammable.
Self-ignition: 316 °C
Upper explosion limit: 10.3 %(V)
Lower explosion limit: 2.7 %(V)
Vapor pressure: 0.68 kPa (25 °C)
Relative vapor density: 3.5
Relative density: 1.082 (20 °C)
Solubility(ies)
Water solubility: 0.12 g/l (20 °C)
Partition coefficient: n-octanol/water: \( \log \text{Pow} = -0.58 \) (20 °C)
Autoignition temperature: not determined
Decomposition temperature: not determined
Viscosity
Viscosity, dynamic: 0.842 mPa.s (25 °C)
Viscosity, kinematic: 0.77 mm²/s (25 °C)
Explosive properties: Not classified
Oxidizing properties: Not classified
Surface tension: 31.93 mN/m, 25 °C

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Stable
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions: Stable
  Hazardous decomposition products formed under fire
Conditions to avoid: Heat, flames and sparks.
Incompatible materials: Oxidizing agents
Hazardous decomposition products: Carbon dioxide (CO2), Carbon monoxide

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity
Harmful if swallowed.
Fatal if inhaled.

Product:

Acute oral toxicity: Acute toxicity estimate: 651.1 mg/kg
Method: Calculation method
Remarks: Harmful if swallowed.

Acute inhalation toxicity: Acute toxicity estimate: 0.52 mg/l
Exposure time: 4 h
Test atmosphere: vapor
Method: Calculation method
Remarks: Irritating to respiratory system.

Acute dermal toxicity: Remarks: No data available
Acute toxicity estimate: 4,167 mg/kg
Method: Calculation method

Ingredients:

Acetic anhydride:
Acute oral toxicity: LD50 Oral (Rat): 630 mg/kg
Acute inhalation toxicity: LC50 (Rat): 1.25 mg/l
Exposure time: 4 h
Acute dermal toxicity: LD50 Dermal (Rabbit): 4,000 mg/kg

Acetic acid:
Acute oral toxicity: LD50 Oral (Rat): 3,320 mg/kg
Acute inhalation toxicity: LC50 (Rat): > 16000 ppm
Exposure time: 4 h
Acute dermal toxicity: LD50 Dermal (Rabbit): 1,060 mg/kg
Skin corrosion/irritation
Causes severe burns.

**Product:**
Remarks: Causes severe skin burns.

**Ingredients:**

**Acetic anhydride:**
Species: Rabbit
Exposure time: 24 h
Result: Corrosive

**Acetic acid:**
Species: Rabbit
Exposure time: 24 h
Result: Corrosive

Serious eye damage/eye irritation
Causes serious eye damage.

**Product:**
Remarks: Causes serious eye damage.

**Ingredients:**

**Acetic anhydride:**
Species: Rabbit
Result: Corrosive

**Acetic acid:**
Species: Rabbit
Result: Corrosive

Respiratory or skin sensitization

**Skin sensitization**
Not classified based on available information.

**Respiratory sensitization**
Not classified based on available information.

**Product:**
Remarks: No data available
Ingredients:

**Acetic anhydride:**
Remarks: There is no data available to indicate sensitizing potential for this substance.

Germ cell mutagenicity
Not classified based on available information.

**Ingredients:**

**Acetic anhydride:**
Genotoxicity in vitro: Test Type: Salmonella typhimurium assay (Ames test)
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

Genotoxicity in vivo: Test Type: Mutagenicity - Mammalian
Species: Rat
Application Route: inhalation (vapor)
Method: Mammalian Bone Marrow Chromosome Aberration Test
Result: negative
Remarks: Read-across from a similar material

**acetic acid:**
Genotoxicity in vitro: Test Type: Salmonella typhimurium assay (Ames test)
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

: Test Type: Chromosome aberration test in vitro
Metabolic activation: +/- activation
Method: In vitro Mammalian Chromosome Aberration Test
Result: negative

Genotoxicity in vivo: Test Type: Micronucleus test
Species: Rat
Application Route: inhalation (vapor)
Result: negative
Remarks: Read-across from a similar material

Carcinogenicity
Not classified based on available information.

Product:
Remarks: This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

IARC
No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA
No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
Not classified based on available information.

Product:
Effects on fertility : Remarks: No data available

STOT-single exposure
Not classified based on available information.

Product:
Remarks: No data available

Ingredients:
Acetic anhydride:
Routes of exposure: inhalation (dust/mist/fume)
Target Organs: respiratory tract irritation

STOT-repeated exposure
Not classified based on available information.

Product:
Remarks: No data available

Repeated dose toxicity

Ingredients:
Acetic anhydride:
Species: Rat
: 25 ppm
Application Route: Inhalation study:
Exposure time: 14 d

acetic acid:
Species: Rat
NOAEL: 290 mg/kg
Application Route: Oral Study

Species: Rat
NOAEL: 30 mg/kg
Application Route: Dermal Study

**Aspiration toxicity**
Not classified based on available information.

**Product:**
No data available
No aspiration toxicity classification

**Information on likely routes of exposure**

**Product:**
Inhalation : Remarks: Fatal if inhaled.
Skin contact : Remarks: Causes severe skin burns.
Eye contact : Remarks: Causes serious eye damage.
Ingestion : Remarks: Harmful if swallowed.

**Further information**

**Product:**
Remarks: None known.

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**SECTION 12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

**Ingredients:**

**Acetic anhydride:**
Toxicity to fish : LC50 (Fish): 300.82 mg/l
Exposure time: 96 h
Remarks: Read-across from a similar material

Toxicity to daphnia and other aquatic invertebrates : EC50 (daphnid): 300.82 mg/l
Exposure time: 48 h
Remarks: Read-across from a similar material

Toxicity to algae : EC50 (Chlorella pyrenoidosa): 300.82 mg/l
Exposure time: 72 h
Remarks: Read-across from a similar material

**acetic acid:**
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 300.82 mg/l
Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates: EC50 (daphnid): > 300.82 mg/l
Exposure time: 48 h

Toxicity to algae: EC50 (Chlorella pyrenoidosa): 300.82 mg/l
Exposure time: 72 h

Persistence and degradability

Ingredients:

Acetic anhydride:

Biodegradability: Result: Readily biodegradable.
Biodegradation: 96 %
Exposure time: 20 d
Remarks: Read-across from a similar material

Acetic acid:

Biodegradability: Result: Readily biodegradable.
Biodegradation: 96 %
Exposure time: 20 d

Biochemical Oxygen Demand (BOD):
BOD-5: 340 - 880 mg/g
BOD-20: 900 mg/g

Chemical Oxygen Demand (COD): 1,030 mg/g

Bioaccumulative potential

Ingredients:

Acetic acid:

Bioaccumulation: Bioconcentration factor (BCF): 3.16

Partition coefficient: n-octanol/water: Pow: 0.49
log Pow: -0.31

Mobility in soil

Product:

Distribution among environmental compartments: log Koc: 0.146
Method: QSAR model
Remarks: Read-across from a similar material

Ingredients:

Acetic anhydride:
Distribution among environmental compartments: log Koc: 0.146
Method: QSAR model
Remarks: Read-across from a similar material

**acetic acid:**
Distribution among environmental compartments: log Koc: 0.062
Method: QSAR model

**Other adverse effects**
No data available

### SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**
Waste from residues: Dispose of in accordance with local regulations.

### SECTION 14. TRANSPORT INFORMATION

**International Regulations**

**IATA-DGR**
- UN/ID No.: UN 1715
- Proper shipping name: Acetic anhydride
- Class: 8
- Subsidiary risk: 3
- Packing group: II
- Labels: Corrosive, Flammable Liquids
- Packing instruction (cargo aircraft): 855
- Packing instruction (passenger aircraft): 851

**IMDG-Code**
- UN number: UN 1715
- Proper shipping name: ACETIC ANHYDRIDE
- Class: 8
- Subsidiary risk: 3
- Packing group: II
- Labels: 8 (3)
- EmS Code: F-E, S-C
- Marine pollutant: no

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not applicable for product as supplied.

**Domestic regulation**

**49 CFR**
- UN/ID/NA number: UN 1715
- Proper shipping name: Acetic anhydride
SAFETY DATA SHEET

Eastman(TM) Acetic Anhydride, Reagent Grade

Version 2.1

Revision Date: 03/28/2018
SDS Number: 15000016156
Date of last issue: -
SDSUS / 28 / 0001
Date of first issue: 09/06/2016

Class: 8
Subsidiary risk: 3
Packing group: II
Labels: Class 8 - Corrosive, Class 3 - Flammable Liquid
ERG Code: 137
Marine pollutant: no

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetanhydride</td>
<td>108-24-7</td>
<td>5000</td>
<td>*</td>
</tr>
</tbody>
</table>

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards
Flammable (gases, aerosols, liquids, or solids)
Hazard not otherwise classified (physical hazards)
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

The ingredients of this product are reported in the following inventories:

DSL: All components of this product are on the Canadian DSL
AICS: On the inventory, or in compliance with the inventory
ENCS: On the inventory, or in compliance with the inventory
ISHL: On the inventory, or in compliance with the inventory
KECI: On the inventory, or in compliance with the inventory
PICCS: On the inventory, or in compliance with the inventory
IECSC: On the inventory, or in compliance with the inventory

14 / 16
TCSI : On the inventory, or in compliance with the inventory

TSCA : On the inventory, or in compliance with the inventory

**TSCA list**
No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

### SECTION 16. OTHER INFORMATION

**Full text of other abbreviations**

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50% of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RG - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative
Further information

**NFPA:**

- **Health:** 3
- **Flammability:** 2
- **Instability:** 1
- **Special hazard:**

**HMIS® IV:**

- **HEALTH:** / 3
- **FLAMMABILITY:** 2
- **PHYSICAL HAZARD:** 1

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "***" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Revision Date: 03/28/2018

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.