SAFETY DATA SHEET

Eastman(TM) Acetaldehyde

SECTION 1. IDENTIFICATION

Product name: Eastman(TM) Acetaldehyde

Product code: 00160-00, P0016000, P0016001, E0016002, E0016001

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 1

Acute toxicity (Oral): Category 4

Eye irritation: Category 2A

Carcinogenicity: Category 2

Specific target organ systemic toxicity - single exposure: Category 3 (Respiratory system)

GHS label elements

Hazard pictograms:

Signal Word: Danger

Hazard Statements:
H224 Extremely flammable liquid and vapor.
H302 Harmful if swallowed.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary Statements:

**Prevention:**
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- 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.
- P261 Avoid breathing 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.

**Response:**
- P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308 + P313 IF exposed or concerned: Get medical advice/attention.
- P337 + P313 If eye irritation persists: Get medical advice/attention.
- 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**
May polymerize resulting in hazardous condition.
May form peroxides of unknown stability.
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>acetaldehyde</td>
<td>75-07-0</td>
<td>100</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

If inhaled: Move to fresh air. Treat symptomatically. If symptoms persist, call a physician.

In case of skin contact: Wash off with soap and water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

In case of eye contact: Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

If swallowed: Seek medical advice.

Most important symptoms and effects, both acute and delayed: Harmful if swallowed. Causes serious eye irritation. May cause respiratory irritation. Suspected of causing cancer.

Notes to physician: Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Alcohol-resistant foam 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: Highly flammable liquid and vapor. Use water spray to cool unopened containers.

Special protective equipment for fire-fighters: Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.
Personal precautions, protective equipment and emergency procedures: Wear appropriate 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: None known.

Advice on safe handling: Do not get in eyes. Avoid contact with skin, eyes and clothing. Do not swallow. 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. Store locked up.

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>acetaldehyde</td>
<td>75-07-0</td>
<td>C</td>
<td>25 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>200 ppm 360 mg/m3</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>100 ppm 180 mg/m3</td>
<td>OSHA P0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>150 ppm 270 mg/m3</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 : Wear safety glasses with side shields (or goggles).
   Face-shield
   Always wear eye protection when the potential for inadvertent
   eye contact with the product cannot be excluded.
Protective measures : 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 : pungent
Odor Threshold : 0.05 ppm
pH : not determined
Melting point/range : -189 °F / -123 °C
Boiling point/boiling range : 70 °F / 21 °C
Flash point : -38 °F / -39 °C
   Method: Tag closed cup
Evaporation rate : not determined
Vapor pressure : 532 mbar (41 °F / 5 °C)
Relative vapor density : 1.5
Relative density : 0.788 (68 °F / 20 °C)
Solubility(ies) Water solubility : completely soluble
Partition coefficient: n-octanol/water : Pow: 2.7
   log Pow: 0.43
Autoignition temperature : 300 °F / 149 °C
   Method: ASTM D2155
Decomposition temperature: Thermal stability not tested. Low stability hazard expected at normal operating temperatures.

Viscosity
- Viscosity, dynamic: not determined
- Viscosity, kinematic: not determined

Explosive properties: No data available

Oxidizing properties: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Stable

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Stable

Conditions to avoid: Heat, flames and sparks.

Incompatible materials: Strong oxidizing agents

Hazardous decomposition products: Carbon dioxide (CO2) Carbon monoxide

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity
Harmful if swallowed.

Product:
- Acute oral toxicity: Remarks: No data available
- Acute inhalation toxicity: Remarks: No data available
- Acute dermal toxicity: Remarks: No data available

Ingredients:
- acetaldehyde:
  - Acute oral toxicity: LD50 Oral (Rat): 1,930 mg/kg
  - LD50 Oral (Rat): 661 mg/kg
  - Acute inhalation toxicity: LC50 (Rat): 13300 ppm
    Exposure time: 4 h
  - Acute dermal toxicity: LD50 Dermal (Rabbit): 3,540 mg/kg
Skin corrosion/irritation
Not classified based on available information.

Product:
Remarks : No data available

Ingredients:
Acetaldehyde:
Species : Rabbit
Exposure time : 24 h
Result : slight

Serious eye damage/eye irritation
Causes serious eye irritation.

Product:
Remarks : No data available

Ingredients:
Acetaldehyde:
Species : Rabbit
Result : Moderate

Respiratory or skin sensitization
Skin sensitization
Not classified based on available information.

Product:
Remarks : No data available

Ingredients:
Acetaldehyde:
Species : Guinea pig
Result : negative

Germ cell mutagenicity
Not classified based on available information.

Carcinogenicity
Suspected of causing cancer.
IARC Group 2B: Possibly carcinogenic to humans
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
Reasonably anticipated to be a human carcinogen
acetaldehyde
75-07-0

Reproductive toxicity
Not classified based on available information.

Product:
Effects on fertility
Remarks: No data available

STOT-single exposure
May cause respiratory irritation.

Product:
Remarks: No data available

STOT-repeated exposure
Not classified based on available information.

Product:
Remarks: No data available

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: Irritating to respiratory system.

Skin contact
Remarks: None known.

Eye contact
Remarks: Causes serious eye irritation.

Ingestion
Remarks: Harmful if swallowed.

Further information

Product:
Remarks: None known.
SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

acetaldehyde:
Toxicity to fish:
LC50 (Lepomis macrochirus (Bluegill sunfish)): 53 mg/l
Exposure time: 96 h
LC50 (golden orfe): 124 - 140 mg/l
Exposure time: 48 h

Toxicity to daphnia and other aquatic invertebrates:
EC50 (daphnid): 57.4 mg/l
Exposure time: 48 h

Toxicity to algae:
EC50 (Pseudokirchneriella subcapitata (algae)): > 100 mg/l
Exposure time: 72 h

Persistence and degradability

Ingredients:

acetaldehyde:
Biochemical Oxygen Demand (BOD):
127 - 130 mg/g
Incubation time: 5 d

Bioaccumulative potential
No data available

Mobility in soil
No data available

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
Not permitted for transport

IMDG-Code
UN number: UN 1089
Proper shipping name: ACETALDEHYDE
SAFETY DATA SHEET

Eastman(TM) Acetaldehyde

Class: 3
Packing group: I
Labels: 3
EmS Code: F-E, S-D
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 1089
Proper shipping name: Acetaldehyde

Class: 3
Packing group: I
Labels: Class 3 - Flammable Liquid
ERG Code: 129
Marine pollutant: no

Special precautions for user
The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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>acetaldehyde</td>
<td>75-07-0</td>
<td>1000</td>
<td>1000</td>
</tr>
</tbody>
</table>

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)
Acute toxicity (any route of exposure)
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)
Carcinogenicity

SARA 313: The following components are subject to reporting levels established by SARA Title III, Section 313:

acetaldehyde 75-07-0
California Prop. 65
WARNING: This product can expose you to chemicals including acetaldehyde, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

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

TSCA : On TSCA Inventory
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

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

The following substance(s) is/are subject to TSCA 12(b) export notification requirements: acetaldehyde 75-07-0

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:

HMIS® IV:

Flammability

HEALTH

PHYSICAL HAZARD

Special hazard.

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.

Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
SAFETY DATA SHEET

Eastman(TM) Acetaldehyde

Version 2.2
Revision Date: 02/20/2019
SDS Number: 150000000122
Date of last issue: 11/26/2018
Date of first issue: 09/06/2016
SDSUS / Z8 / 0001

OSHA P0 : USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
OSHA Z-1 : USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / C : Ceiling limit
OSHA P0 / TWA : 8-hour time weighted average
OSHA P0 / STEL : Short-term exposure limit
OSHA Z-1 / TWA : 8-hour time weighted average

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; ERO - 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; IECS - 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

Revision Date : 02/20/2019

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.

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