2-Acetoacetoxy ethyl methacrylate
(AAEM)

CAS No. 21282-97-3
HS Code 2916 14 00
EINECS No. 244-311-1
Synonyms 2-(Methacryloyloxy)ethyl acetoacetate
Acetoacetic acid, 2-hydroxy ethyl methacrylate ester;
Butanoic acid, 3-oxo, 2-[(2-methyl-1-oxo-2-propenyl)oxy]ethyl ester

Molecular Formula C_{10}H_{14}O_{5}

Chemical Structure

\[
\begin{align*}
\text{H}_2\text{C} & \quad \text{O} \\
\text{O} & \quad \text{O} \\
\text{O} & \quad \text{H}_2\text{C} \\
& \quad \text{CH}_3
\end{align*}
\]

Molecular Weight 214

Quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Colourless to pale yellow</td>
</tr>
<tr>
<td>Consistency</td>
<td>Clear Liquid</td>
</tr>
<tr>
<td>Moisture Content, %, max</td>
<td>0.2</td>
</tr>
<tr>
<td>2-Hydroxyethyl methacrylate (by HPLC), %, max</td>
<td>4</td>
</tr>
<tr>
<td>Purity (by HPLC), %, min</td>
<td>95</td>
</tr>
<tr>
<td>Colour value Hazen, max</td>
<td>50</td>
</tr>
<tr>
<td>Packaging</td>
<td>200kg HMHDPE Drums, ISO Tanks, IBCs</td>
</tr>
</tbody>
</table>
2-Acetoacetoxy ethyl methacrylate (AAEM)

Application
Co-monomer in polymerisation as a viscosity reducer for adhesives, varnishes, polyester and coatings; additive in polymers; acrylic monomer for polymers in coatings and adhesive applications; High-solids solution acrylic resins; Reactive monomer for UV cure applications

Primary Attributes
Lowering VOC emissions by resin viscosity reduction; Curing at room temperature, isocyanate-free crosslinking; Improved adhesion to metal substrates; Low glass transition temperature for improved coating flexibility; exceptional flexibility and corrosion resistance

Country of Origin
India

For further information please visit www.laxmiorganic.co.in or send an enquiry to info@laxmiorganic.co.in
01 Identification of the substance/mixture and of the company/undertaking

Product details: Trade name: 2-Acetoacetoxyethyl methacrylate Pre-registration number: 17-2119446874-28-0000

Relevant identified uses of the substance or mixture and uses advised against

Application of the substance / the preparation
It is a special methacrylic ester monomer with a reactive methylene group. It is suitable as comonomer for adhesives and coatings as well as copolymer for emulsion polymerisation.

02 Hazards Identification

Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Void

Classification according to Directive 67/548/EEC or Directive 1999/45/EC
Not applicable.

Information concerning particular hazards for human and environment: Not applicable
Labelling according to Regulation (EC) No 1272/2008

Hazard pictograms: Void
Signal Word: Void
Hazard-determining components of labelling: Void
Hazard statements: Void

Labelling according to EU guidelines:

The substance is not subject to classification according to EU lists and other sources of literature known to us.
Observe the general safety regulations when handling chemicals

03 Composition/Information on Ingredients

Chemical characterization: Substances

CAS No.: 21282-97-3
Description: 2-[(2-methyl-1-oxoallyl)oxy]ethylacetooacetate

Identification number(s)
EINECS Number: 244-311-1

Additional information:
Molecular formula: C10H14O5
Molecular Weight: 214.21
### 04 First Aid Measures

**General information:**
Seek medical treatment. Immediately remove any clothing soiled by the product.

**After inhalation:**
Remove to uncontaminated area, supply fresh air, if not breathing give artificial respiration. Get immediate medical attention.

**After skin contact:**
Remove contaminated clothing and wash exposed area thoroughly with soap and water. A physician may need to examine the area if irritation or pain persists.

**After eye contact:**
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**After swallowing:**
Rinse mouth immediately and then drink plenty of water, seek medical attention.

**Information for doctor:**
Treat symptomatically and supportively.

**The following symptoms may occur:**
- Skin - May cause eye irritation
- Ingestion - May cause severe digestive tract irritation with abdominal pain, nausea, vomiting and diarrhoea.

### 05 Firefighting Measures

**Suitable extinguishing agents:**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**For safety reasons unsuitable extinguishing agents:**
oxidizing agent

**Special hazards caused by the substance, its products of combustion or resulting gases:**
- Carbon dioxide (CO2)
- Carbon monoxide (CO)

**Protective equipment:**
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

### 06 Accidental Release Measures

**Person-related safety precautions:**
Avoid contact with the skin, eyes and clothing. Avoid breathing vapors, mist or gas. Remove all potential sources of ignition. Wear protective equipment. Keep unprotected persons away.

**Measures for environmental protection:**
Do not allow to enter sewers/surface or ground water.

**Measures for cleaning/collecting:**
Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

**Additional information:**
Refer to section 8 and 13 for additional information on personal protection equipment and disposal methods.
Handling and Storage

Handling

**Information for safe handling:**
Handle in well ventilated area. Handle away from excess heat. Wash thoroughly after handling. Avoid contact with eyes, skin and clothing. Avoid ingestion and inhalation.

**Information about fire - and explosion protection:**
Store away from heat, sparks, flame, combustible materials.

Storage

**Requirements to be met by storerooms and receptacles:**
Store in a cool, dry, well-ventilated area away from incompatible substances.

**Information about storage in one common storage facility:**
Store away from oxidizing agents.

**Further information about storage conditions:**
Store in cool and dry conditions in well sealed containers. Refrigerate. Store below 4°C/39°F

Specific end use(s)

It is a special methacrylic ester monomer with a reactive methylene group. It is suitable as comonomer for adhesives and coatings as well as copolymer for emulsion polymerisation.
Additional information about design of technical facilities: No further data; see item 7

Ingredients with limit values that require monitoring at the workplace:
Not required.

Additional information:
The lists valid during the making were used as basis.

Personal protective equipment:
General protective and hygienic measures:
The usual precautionary measures are to be adhered to when handling chemicals.

Respiratory protection:
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Protection of hands

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Material of gloves:
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Penetration time of glove material:
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection:
Tightly fitting safety goggles (splash goggles) (EN 166).

Body protection:
Wear a chemical apron.
### Physical and Chemical Properties

#### General Information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance:</strong></td>
<td>Clear liquid</td>
</tr>
<tr>
<td><strong>Form:</strong></td>
<td>Colorless to yellowish</td>
</tr>
<tr>
<td><strong>Odour:</strong></td>
<td>Characteristic</td>
</tr>
<tr>
<td><strong>Change in condition</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Melting point/Melting range:</strong></td>
<td>Undetermined</td>
</tr>
<tr>
<td><strong>Boiling point/Boiling range:</strong></td>
<td>100°C</td>
</tr>
<tr>
<td><strong>Flash point:</strong></td>
<td>106°C</td>
</tr>
<tr>
<td><strong>Danger of explosion:</strong></td>
<td>Product does not present an explosion hazard.</td>
</tr>
<tr>
<td><strong>Vapour pressure at 20°C:</strong></td>
<td>0.01 mm Hg</td>
</tr>
<tr>
<td><strong>Density:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Solubility in / Miscibility with water:</strong></td>
<td>Insoluble.</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Partition coefficient: n-octanol/water: Log Kow = 0.24.</td>
</tr>
</tbody>
</table>
10 Stability and reactivity

Reactivity

Chemical stability:

**Thermal decomposition / conditions to be avoided:**
Keep away from ignition sources, heat and naked flame.
Protect from light.

**Materials to be avoided:**
Strong oxidizing agents, polymerizing initiators.

**Dangerous reactions**
No dangerous reactions known.

**Dangerous decomposition products:**
Carbon monoxide, carbon dioxide.

11 Toxicological information

**Acute Toxicity**

**LD/LC50 values relevant for classification:**
Oral  LD50  > 5000 mg/kg (rat)

**Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.

**Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.
The substance is not subject to classification according to the latest version of the EU lists.

**Acute effects (acute toxicity, irritation and corrosivity):**
Skin - May cause eye irritation
Ingestion - May cause severe digestive tract irritation with abdominal pain, nausea, vomiting and diarrhoea.

**CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction):**
Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65
12 Ecological Information

Toxicity

Information about elimination (persistence and degradability):
Probability of Rapid Biodegradation (BIOWIN v4.10):
    Biowin1 (Linear Model): 1.0008
    Biowin2 (Non-Linear Model): 0.9995
Expert Survey Biodegradation Results:
    Biowin3 (Ultimate Survey Model): 2.9837 (weeks)
    Biowin4 (Primary Survey Model): 3.9744 (days)
MITI Biodegradation Probability:
    Biowin5 (MITI Linear Model): 1.0415
    Biowin6 (MITI Non-Linear Model): 0.9693
Anaerobic Biodegradation Probability:
    Biowin7 (Anaerobic Linear Model): 0.5597
    Ready Biodegradability Prediction: YES

Other information:
Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
    OVERALL OH Rate Constant = 22.1214x10(-12) cm3/molecule-sec
    Half-Life = 0.484 Days (12-hr day; 1.5x10(6) OH/cm3)
    Half-Life = 5.802 Hrs
Ozone Reaction:
    OVERALL Ozone Rate Constant = 1.137500x10(-17) cm3/molecule-sec
    Half-Life = 1.007 Days (at 7x10(11) mol/cm3)
    Half-Life = 24.179 Hrs
Fraction sorbed to airborne particulates (phi): 6.34x10(-005) (Junge,Mackay)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Behaviour in environmental systems:
Mobility and bioaccumulation potential:
Soil Adsorption Coefficient (PCKOCWIN v1.66):
    Koc : 10
    Log Koc: 1.000
Bioaccumulation Estimates from Log Kow (BCFWIN v2.17):
    Log BCF from regression-based method = 0.500 (BCF = 3.162)
    log Kow used: 0.24 (estimated).

Ecotoxical effects:
Other information:
Removal In Wastewater Treatment:
    Total removal: 1.85 percent
    Total biodegradation: 0.09 percent
    Total sludge adsorption: 1.76 percent
    Total to Air: 0.00 percent
    (using 10000 hr Bio P,A,S)

Additional ecological information:
General notes:
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Results of PBT and vPvB assessment The substance is not a PBT chemical.
13 Disposal considerations

Waste treatment methods

Recommendation:
Smaller quantities can be disposed of with household waste.

Uncleaned packaging:
Recommendation: Dispose off according to Federal, State and Local Regulations.
Recommended cleansing agents: Water

14 Transport Information

Maritime transport IMDG:

Marine pollutant: No

15 Regulatory Information

Labelling according to regulation (EC) No 1272/2008

Hazard pictograms Please refer section 2
Hazard statements Please refer section 2
Precautionary statements Please refer section 2

Labelling according to EU guidelines:
Risk phrases: Please refer section 2
Safety phrases: Please refer section 2
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

National regulations:
Other regulations, limitations and prohibitive regulations: Not applicable

Substances of very high concern (SVHC) according to REACH, Article 57:
The substance is not listed as SVHC.
16 Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Abbreviations and acronyms

IMDG : International Maritime Code for Dangerous Goods
EINECS : European Inventory of Existing Commercial Chemical Substances
CAS : Chemical Abstracts Service (division of the American Chemical Society)
LC50 : Lethal concentration, 50 percent
LD50 : Lethal dose, 50 percent
*Data compared to the previous version altered.*

Section 2  :  Hazard Identification  
Section 3  :  Composition/information of ingredients  
Section 4  :  First-aid measures.  
Section 5  :  Fire-fighting measures  
Section 6  :  Accidental Release measures  
Section 7  :  Handling and storage.  
Section 8  :  Exposure Controls/Personal protection.  
Section 9  :  Physical and Chemical properties.  
Section 10  :  Stability and Reactivity.  
Section 11  :  Toxicological Information.  
Section 12  :  Ecological Information.  
Section 13  :  Disposal consideration.