TRIETHYL ORTHOFORMATE FOR SYNTHESIS MSDS

CAS-No.: 122-51-0 MSDS

MATERIAL SAFETY DATA SHEET (MSDS)

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form: Substance
CAS-No.: 122-51-0
Product code: 00349
Chemical structure:

\[
\text{H}_3\text{C} - \text{O} - \text{O} - \text{O} - \text{CH}_3
\]

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

1.2.1. Relevant identified uses

Industrial/Professional use spec: Industrial
For professional use only

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

LOBA CHEMIE PVT.LTD.
107 Wode House Road, Jehangir Villa, Colaba
400005 Mumbai - INDIA
T +91 22 6663 6663 - F +91 22 6663 6699
info@lobachemie.com - www.lobachemie.com

1.4. Emergency telephone number

Emergency number: + 91 22 6663 6663 (9:00am - 6:00 pm)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Flammable liquids, Category 3
H226

Full text of H statements: see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]
F: R10
Full text of R-phrases: see section 16
2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP): [GHS02]

Signal word (CLP): Warning

Hazard statements (CLP): H226 - Flammable liquid and vapour.


2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRIETHYL ORTHOFORMATE FOR SYNTHESIS</td>
<td>(CAS-No.) 122-51-0</td>
<td>100</td>
</tr>
</tbody>
</table>

Full text of R- and H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation: Assure fresh air breathing. If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

First-aid measures after skin contact: Wash with plenty of water/.... Get medical advice/attention.

First-aid measures after eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion: Rinse mouth. Do not induce vomiting. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available
4.3. Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Unsuitable extinguishing media : Do not use extinguishing media containing water.

5.2. Special hazards arising from the substance or mixture
Fire hazard : Flammable liquid and vapour.
Explosion hazard : May form flammable/explosive vapour-air mixture.

5.3. Advice for firefighters
Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
General measures : Remove ignition sources. Use special care to avoid static electric charges. No open flames. No smoking.

6.1.1. For non-emergency personnel
Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders
Protective equipment : Use personal protective equipment as required.
Emergency procedures : Ventilate area.

6.2. Environmental precautions
Avoid release to the environment.

6.3. Methods and material for containment and cleaning up
Methods for cleaning up : On land, sweep or shovel into suitable containers. Collect spillage.

6.4. Reference to other sections
No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Additional hazards when processed : Handle empty containers with care because residual vapours are flammable.
Precautions for safe handling : Keep away from sources of ignition - No smoking. Avoid contact with skin and eyes. Do not breathe vapours. Provide good ventilation in process area to prevent formation of vapour.
Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures : Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment.
Storage conditions : Keep in fireproof place. Store in a well-ventilated place.
Incompatible materials : Heat sources.

7.3. Specific end use(s)
No additional information available
SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters
No additional information available

### 8.2. Exposure controls

<table>
<thead>
<tr>
<th>Protection</th>
<th>Protection Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand protection</td>
<td>Protective gloves</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Chemical goggles or safety glasses</td>
</tr>
<tr>
<td>Skin and body protection</td>
<td>Wear suitable protective clothing</td>
</tr>
<tr>
<td>Respiratory protection</td>
<td>[In case of inadequate ventilation] wear respiratory protection.</td>
</tr>
</tbody>
</table>

SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>148.2 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>Clear Colorless</td>
</tr>
<tr>
<td>Odour</td>
<td>Amine-like</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>12.7 at 100 g/l at 15 °C</td>
</tr>
<tr>
<td>Relative evaporation rate</td>
<td>5.6</td>
</tr>
<tr>
<td>Melting point</td>
<td>-115 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>88.8 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>-15 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>312 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Flammable</td>
</tr>
<tr>
<td></td>
<td>Flammable solid</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>68.99 hPa at 20 °C</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>3.5</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Density</td>
<td>0.73 g/cm³</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: 5.5 g/100ml at 20 °C</td>
</tr>
<tr>
<td>Log Pow</td>
<td>1.15</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
</tbody>
</table>
Explosive properties : No data available
Oxidising properties : No data available
Explosive limits : 0.012 - 0.08 vol %

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
No additional information available

10.4. Conditions to avoid
Open flame. Heat. Sparks.

10.5. Incompatible materials
No additional information available

10.6. Hazardous decomposition products
May release flammable gases.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified

Skin corrosion/irritation : Not classified
pH: 12.7 at 100 g/l at 15 °C

Serious eye damage/irritation : Not classified
pH: 12.7 at 100 g/l at 15 °C

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : Not classified

Aspiration hazard : Not classified
SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
TRIETHYL ORTHOFORMATE FOR SYNTHESIS (122-51-0)

<table>
<thead>
<tr>
<th>Log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.15</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment
No additional information available

12.6. Other adverse effects
No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Additional information : Handle empty containers with care because residual vapours are flammable.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

<table>
<thead>
<tr>
<th>UN-No. (ADR)</th>
<th>2524</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN-No. (IMDG)</td>
<td>2524</td>
</tr>
<tr>
<td>UN-No. (IATA)</td>
<td>2524</td>
</tr>
<tr>
<td>UN-No. (ADN)</td>
<td>2524</td>
</tr>
<tr>
<td>UN-No. (RID)</td>
<td>2524</td>
</tr>
</tbody>
</table>

14.2. UN proper shipping name

<table>
<thead>
<tr>
<th>Proper Shipping Name (ADR)</th>
<th>ETHYL ORTHOFORMATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name (IMDG)</td>
<td>ETHYL ORTHOFORMATE</td>
</tr>
<tr>
<td>Proper Shipping Name (IATA)</td>
<td>Ethyl orthoformate</td>
</tr>
<tr>
<td>Proper Shipping Name (ADN)</td>
<td>ETHYL ORTHOFORMATE</td>
</tr>
<tr>
<td>Proper Shipping Name (RID)</td>
<td>ETHYL ORTHOFORMATE</td>
</tr>
<tr>
<td>Transport document description (ADR)</td>
<td>UN 2524 ETHYL ORTHOFORMATE, 3, III, (D/E)</td>
</tr>
<tr>
<td>Transport document description (IMDG)</td>
<td>UN 2524 ETHYL ORTHOFORMATE, 3, III (30°C c.c.)</td>
</tr>
<tr>
<td>Transport document description (IATA)</td>
<td>UN 2524 Ethyl orthoformate, 3, III</td>
</tr>
<tr>
<td>Transport document description (ADN)</td>
<td>UN 2524 ETHYL ORTHOFORMATE, 3, III</td>
</tr>
<tr>
<td>Transport document description (RID)</td>
<td>UN 2524 ETHYL ORTHOFORMATE, 3, III</td>
</tr>
</tbody>
</table>
### 14.3. Transport hazard class(es)

<table>
<thead>
<tr>
<th></th>
<th>ADR</th>
<th>IMDG</th>
<th>IATA</th>
<th>ADN</th>
<th>RID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport hazard class(es) (ADR)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Danger labels (ADR)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

### 14.4. Packing group

| Packing group (ADR)            | III                             |
| Packing group (IMDG)           | III                             |
| Packing group (IATA)           | III                             |
| Packing group (ADN)            | III                             |
| Packing group (RID)            | III                             |
## 14.5. Environmental hazards

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangerous for the environment</td>
<td>No</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>No</td>
</tr>
<tr>
<td>Other information</td>
<td>No supplementary information available</td>
</tr>
</tbody>
</table>

## 14.6. Special precautions for user

### - Overland transport

- **Classification code (ADR)**: F1
- **Limited quantities (ADR)**: 5l
- **Excepted quantities (ADR)**: E1
- **Packing instructions (ADR)**: P001, IBC03, LP01, R001
- **Mixed packing provisions (ADR)**: MP19
- **Portable tank and bulk container instructions (ADR)**: T2
- **Portable tank and bulk container special provisions (ADR)**: TP1
- **Tank code (ADR)**: LGBF
- **Vehicle for tank carriage**: FL
- **Transport category (ADR)**: 3
- **Special provisions for carriage - Packages (ADR)**: V12
- **Special provisions for carriage - Operation (ADR)**: S2
- **Hazard identification number (Kemler No.)**: 30
- **Orange plates**: 30
  - **Tunnel restriction code (ADR)**: D/E
  - **EAC code**: •3Y

### - Transport by sea

- **Packing instructions (IMDG)**: P001, LP01
- **IBC packing instructions (IMDG)**: IBC03
- **Tank instructions (IMDG)**: T2
- **Tank special provisions (IMDG)**: TP1
- **EmS-No. (Fire)**: F-E
- **EmS-No. (Spillage)**: S-D
- **Stowage category (IMDG)**: A
- **Flash point (IMDG)**: 30°C c.c.
- **Properties and observations (IMDG)**: Colourless liquid with an ethereal odour. Flashpoint: 30°C c.c. Immiscible with water.
- **MFAG-No**: 129

### - Air transport

- **PCA Excepted quantities (IATA)**: E1
- **PCA Limited quantities (IATA)**: Y344
- **PCA limited quantity max net quantity (IATA)**: 10L
- **PCA packing instructions (IATA)**: 355
- **PCA max net quantity (IATA)**: 60L
- **CAO packing instructions (IATA)**: 366
- **CAO max net quantity (IATA)**: 220L
- **ERG code (IATA)**: 3L
- Inland waterway transport
  
  Classification code (ADN) : F1
  Limited quantities (ADN) : 5 L
  Excepted quantities (ADN) : E1
  Equipment required (ADN) : PP, EX, A
  Ventilation (ADN) : VE01
  Number of blue cones/lights (ADN) : 0

- Rail transport
  
  Classification code (RID) : F1
  Excepted quantities (RID) : E1
  Packing instructions (RID) : P001, IBC03, LP01, R001
  Mixed packing provisions (RID) : MP19
  Portable tank and bulk container instructions (RID) : T2
  Portable tank and bulk container special provisions (RID) : TP1
  Tank codes for RID tanks (RID) : LGBF
  Transport category (RID) : 3
  Special provisions for carriage – Packages (RID) : W12
  Colis express (express parcels) (RID) : CE4
  Hazard identification number (RID) : 30

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions
TRIETHYL ORTHOFORMATE FOR SYNTHESIS is not on the REACH Candidate List
TRIETHYL ORTHOFORMATE FOR SYNTHESIS is not on the REACH Annex XIV List

15.1.2. National regulations

Germany
Reference to AwSV : Water hazard class (WGK) 1, low hazard to water (Classification according to AwSV; ID No. 1195)

Netherlands
SZW-lijst van kankerverwekkende stoffen : The substance is not listed
SZW-lijst van mutagene stoffen : The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid: The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling: The substance is not listed

**Denmark**
Classification remarks: Emergency management guidelines for the storage of flammable liquids must be followed

### 15.2. Chemical safety assessment
No additional information available

### SECTION 16: Other information

<table>
<thead>
<tr>
<th>Full text of R-, H- and EUH-statements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flam. Liq. 3</td>
</tr>
<tr>
<td>H226</td>
</tr>
<tr>
<td>R10</td>
</tr>
<tr>
<td>F</td>
</tr>
</tbody>
</table>

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*