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

1.1 Product identifier

**Trade name:** Formic acid ethyl ester ≥99%

**Article number:** 3574

**CAS Number:** 109-94-4

**EC number:** 203-721-0

**Index number:** 607-015-00-7

**Registration number**

A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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

**Application of the substance / the mixture**

Laboratory chemical

1.3 Details of the supplier of the safety data sheet

**Manufacturer/Supplier:** Carl Roth GmbH + Co. KG

Schoemperlenstraße 3-5
76185 Karlsruhe
Germany

**Telefon:** +49/(0)721 5606-0

**Telefax:** +49/(0)721 5606-149

**E-Mail:** sicherheit@carlroth.de

**Further information obtainable from:** Department Health, Safety and Environment

**1.4 Emergency telephone number:**

Poison Centre Munich

**Telefon:** +49/(0)89 19240

---

**SECTION 2: Hazards identification**

2.1 Classification of the substance or mixture

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

Flam. Liq. 2 H225 Highly flammable liquid and vapour.

Acute Tox. 4 H302 Harmful if swallowed.

Acute Tox. 4 H332 Harmful if inhaled.

Eye Irrit. 2 H319 Causes serious eye irritation.

STOT SE 3 H335 May cause respiratory irritation.

**Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

Xn; Harmful

R20/22: Harmful by inhalation and if swallowed.

Xi; Irritant

R36/37: Irritating to eyes and respiratory system.

F; Highly flammable

R11: Highly flammable.

(Contd. on page 2)
2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008
The substance is classified and labelled according to the CLP regulation.

Hazard pictograms

- GHS02
- GHS07

Signal word Danger

Hazard statements
H225 Highly flammable liquid and vapour.
H302+H332 Harmful if swallowed or if inhaled.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261 Avoid breathing mist/vapours/spray.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.

Additional information:

2.3 Other hazards
All chemicals are potentially dangerous. They are therefore only be handled by specially trained personnel with the necessary care.

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Chemical characterization: Substances

CAS No. Description
109-94-4 ethyl formate

Identification number(s)
EC number: 203-721-0
Index Number: 607-015-00-7
Formula: C₃H₆O₂
Molar mass [g/mol]: 74,08

SECTION 4: First aid measures

(Contd. of page 3)
Trade name: Formic acid ethyl ester ≥99%

4.1 Description of first aid measures

**General information:**
Remove any clothing soiled by the product.

**After inhalation:**
Take affected persons into fresh air and keep quiet. Seek medical treatment in case of complaints.

**After skin contact:**
Immediately rinse with water. Seek medical treatment in case of complaints.

**After eye contact:**
Rinse opened eye for 10 minutes under running water. Then consult a doctor.

**After swallowing:**
Rinse out mouth and drink a glass of water. Do not induce vomiting. Call for a doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed
We have no description of any toxic symptoms.

4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

---

**SECTION 5: Firefighting measures**

5.1 Extinguishing media

Suitable extinguishing agents:
Use fire extinguishing methods suitable to surrounding conditions. CO2, powder, foam.

For safety reasons unsuitable extinguishing agents:
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

In the event of fire development of hazardous combustion gases or vapours possible. In case of fire, the following can be released:
Carbon monoxide and carbon dioxide

5.3 Advice for firefighters

Protective equipment:
Wear self-contained respiratory protective device. Wear fully protective suit.

Additional information Vapours heavier than air. Beware of reignition.

---

**SECTION 6: Accidental release measures**

6.1 Personal precautions, protective equipment and emergency procedures

Keep away from ignition sources.
Do not breathe vapour/spray.
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Evacuate the danger area, observe emergency procedures, consult an expert.

6.2 Environmental precautions

Avoid penetration into drainage system because of danger of explosion. Do not allow to enter sewers/ground water or penetrate the soil.
SECTION 7: Handling and storage

7.1 Precautions for safe handling
Work only in fume cupboard.
Ensure good ventilation/exhaustion at the workplace.

Information about fire - and explosion protection:

Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.

7.2 Conditions for safe storage, including any incompatibilities

Storage:

Requirements to be met by storerooms and receptacles:
Store in a cool location.

Information about storage in one common storage facility:
Store away from foodstuffs.

Further information about storage conditions:
Keep ignition sources away - Do not smoke.
Keep container tightly sealed.
Store in cool, dry conditions in well sealed receptacles.

Recommended storage temperature:
+4 °C

7.3 Specific end use(s)
No further relevant information available.

SECTION 8: Exposure controls/personal protection

Additional information about design of technical facilities:
No further data; see item 7.

8.1 Control parameters

Ingredients with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Short-term value</th>
<th>Long-term value</th>
</tr>
</thead>
<tbody>
<tr>
<td>109-94-4 ethyl formate</td>
<td>462 mg/m³, 150 ppm</td>
<td>308 mg/m³, 100 ppm</td>
</tr>
</tbody>
</table>

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

Personal protective equipment:

General protective and hygienic measures:
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.

Individual protection measures
Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Respiratory protection:

Required when vapours/aerosols are generated.
Filter AX (colour code: brown)

Protection of hands:

Protective gloves
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Material of gloves
Butylcaoutchouc, thickness: 0.7 mm
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
Value for the permeation: Level ≥ 4
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

As protection from splashes gloves made of the following materials are suitable:
Nitrile rubber, thickness: ≥ 0.4 mm

Eye protection:

Tightly sealed goggles

Body protection:
Protective work clothing
### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic 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>Fluid</td>
</tr>
<tr>
<td><strong>Form:</strong></td>
<td>Fluid</td>
</tr>
<tr>
<td><strong>Colour:</strong></td>
<td>Colourless</td>
</tr>
<tr>
<td><strong>Odour:</strong></td>
<td>Characteristic</td>
</tr>
<tr>
<td><strong>Odour threshold:</strong></td>
<td>No information available.</td>
</tr>
<tr>
<td><strong>pH-value (5 g/l) at 20 °C:</strong></td>
<td>~ 4</td>
</tr>
<tr>
<td><strong>Change in condition</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Melting point/Melting range:</strong></td>
<td>-80.5 °C</td>
</tr>
<tr>
<td><strong>Boiling point/Boiling range:</strong></td>
<td>54 °C</td>
</tr>
<tr>
<td><strong>Flash point:</strong></td>
<td>-20 °C</td>
</tr>
<tr>
<td><strong>Flammability (solid, gaseous):</strong></td>
<td>No information available.</td>
</tr>
<tr>
<td><strong>Ignition temperature:</strong></td>
<td>440 °C</td>
</tr>
<tr>
<td><strong>Decomposition temperature:</strong></td>
<td>No information available.</td>
</tr>
<tr>
<td><strong>Self-igniting:</strong></td>
<td>No information available.</td>
</tr>
<tr>
<td><strong>Danger of explosion:</strong></td>
<td>Product is not explosive. However, formation of explosive air/vapour mixtures is possible.</td>
</tr>
<tr>
<td><strong>Explosion limits:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lower:</strong></td>
<td>2.7 Vol %</td>
</tr>
<tr>
<td><strong>Upper:</strong></td>
<td>16.5 Vol %</td>
</tr>
<tr>
<td><strong>Oxidizing properties:</strong></td>
<td>No information available.</td>
</tr>
<tr>
<td><strong>Vapour pressure at 20 °C:</strong></td>
<td>266 hPa</td>
</tr>
<tr>
<td><strong>Density at 20 °C:</strong></td>
<td>0.92 g/cm³</td>
</tr>
<tr>
<td><strong>Relative density:</strong></td>
<td>No Information available.</td>
</tr>
<tr>
<td><strong>Vapour density:</strong></td>
<td>No information available.</td>
</tr>
<tr>
<td><strong>Evaporation rate:</strong></td>
<td>No information available.</td>
</tr>
</tbody>
</table>
| **Solubility in / Miscibility with water at 20 °C:** | 105 g/l  
Fully miscible. |
| **Partition coefficient (n-octanol/water):** | 0.23 log POW |
| **Viscosity:**                |                        |
| **Dynamic at 20 °C:**         | 0.39 mPas              |
| **Kinematic:**                | Not determined.        |
| **9.2 Other information**     | No further relevant information available. |

#### 9.2 Other information

No further relevant information available.

---

### SECTION 10: Stability and reactivity

#### 10.1 Reactivity

Fumes can combine with air to form an explosive mixture.

#### 10.2 Chemical stability

**Thermal decomposition / conditions to be avoided:**

No decomposition if used and stored according to specifications.
10.3 Possibility of hazardous reactions
Exothermic reaction with:
sodium
Risk of ignition or formation of inflammable gases or vapors with:
Oxidizing agents
Possible formation of peroxide.

10.4 Conditions to avoid
Heat, flames and sparks

10.5 Incompatible materials:
No information available.

10.6 Hazardous decomposition products:
In case of fire: see item 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity:
LD/LC50 values relevant for classification:

<table>
<thead>
<tr>
<th>Route</th>
<th>LD₅₀</th>
<th>LC₅₀</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>1850 mg/kg (rat) (GESTIS)</td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>&gt;18300 mg/kg (rabbit)</td>
<td></td>
</tr>
</tbody>
</table>

Specific symptoms in biological assay:
Eye irritation test (rabbit): Irritations.
Skin irritation test (rabbit): slight irritations.

Primary irritant effect:
on the skin:
Slight irritations.
Danger through skin adsorption.
on the eye:
Irritating effect.
after inhalation:
Pulmonary oedema
Irritations in the respiratory tract, coughing, dyspnoea.

Sensitization:
No sensitizing effects known.

CMR effects:
Germ cell mutagenicity:
No information available.
Carcinogenicity:
No information available.
Reproductive toxicity:
No information available.

Aspiration hazard:
No information available.

Specific target organ toxicity - single exposure May cause respiratory irritation.
Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
Trade name: Formic acid ethyl ester ≥99%

Additional toxicological information:
After inhalation:
- Dyspnoea
- Mucosal irritations
- Coughing

After swallowing:
- Gastrointestinal complaints
- Narcosis
- Damage of liver and kidneys.

Further information:
The product should be handled with the care usual when dealing with chemicals.

SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity:
Quantitative data on the ecological effect of this product are not available.

12.2 Persistence and degradability
Easily biodegradable

12.3 Bioaccumulative potential
Due to the distribution coefficient n-octanol/water a worth-mentioning accumulation in organisms is not expected.

12.4 Mobility in soil
No further relevant information available.

Ecotoxic effects:

Remark:
Do not allow to enter waters, waste water, or soil!

12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

12.6 Other adverse effects
No further relevant information available.

SECTION 13: Disposal considerations

Waste treatment methods

Recommendation:
This material and its container must be disposed of as hazardous waste.
The disposal is regionally differently regulated, therefore the kind of disposal is to be inquired at the responsible authorities.

Uncleaned packaging:

Recommendation:
Disposal according to official regulations.

Recommended cleansing agents: Water, if necessary together with cleansing agents.
SECTION 14: Transport information

<table>
<thead>
<tr>
<th>14.1 UN-Number</th>
<th>ADR, IMDG, IATA</th>
<th>UN1190</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2 UN proper shipping name</td>
<td>ADR</td>
<td>1190 ETHYL FORMATE</td>
</tr>
<tr>
<td></td>
<td>IMDG, IATA</td>
<td>ETHYL FORMATE</td>
</tr>
<tr>
<td>14.3 Transport hazard class(es)</td>
<td>ADR, IMDG, IATA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class 3 Flammable liquids.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Label 3</td>
</tr>
<tr>
<td>14.4 Packing group</td>
<td>ADR, IMDG, IATA</td>
<td>II</td>
</tr>
<tr>
<td>14.5 Environmental hazards:</td>
<td></td>
<td>Marine pollutant: No</td>
</tr>
<tr>
<td>14.6 Special precautions for user</td>
<td></td>
<td>Warning: Flammable liquids.</td>
</tr>
<tr>
<td>Danger code (Kemler):</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>EMS Number:</td>
<td></td>
<td>F-E,S-D</td>
</tr>
<tr>
<td>14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</td>
<td></td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

Transport/Additional information:

<table>
<thead>
<tr>
<th>ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited quantities (LQ)</td>
</tr>
<tr>
<td>Excepted quantities (EQ)</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
</tr>
<tr>
<td>Transport category</td>
</tr>
<tr>
<td>Tunnel restriction code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited quantities (LQ)</td>
</tr>
<tr>
<td>Excepted quantities (EQ)</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
</tr>
</tbody>
</table>

UN "Model Regulation": UN1190, ETHYL FORMATE, 3, II
Trade name: Formic acid ethyl ester ≥99%

### SECTION 15: Regulatory information

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

**National regulations:**

**Information about limitation of use:**
Employment restrictions concerning juveniles must be observed.
Employment restrictions concerning pregnant and lactating women must be observed.

**Breakdown regulations:**

**Waterhazard class:**
Water hazard class 1 (Assessment by list): slightly hazardous for water.

**15.2 Chemical safety assessment**
A Chemical Safety Assessment has not been carried out.

### SECTION 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.

**Department issuing MSDS:** Department: Health, Safety and Environment

**Contact:** Herr Heine

**Abbreviations and acronyms:**
- RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
- ICAO: International Civil Aviation Organization
- ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- IATA: International Air Transport Association
- GHS: Globally Harmonized System of Classification and Labelling of Chemicals
- 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
- LD50*: Lethal Dose, 50 percent (Not relevant for classification)
- LD50*: Lethal Concentration, 50 percent (Not relevant for classification)
- Flam. Liq. 2: Flammable liquids, Hazard Category 2
- Acute Tox. 4: Acute toxicity, Hazard Category 4
- Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
- STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

* Data compared to the previous version altered.