SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

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

1.1 Product identifiers
   Product name: Diethyl ether
   Product Number: 309966
   Brand: SIGALD
   Index-No.: 603-022-00-4
   REACH No.: 01-2119535785-29-XXXX
   CAS-No.: 60-29-7

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
   Company: Sigma-Aldrich Inc.
   3050 SPRUCE ST
   ST. LOUIS MO 63103
   UNITED STATES
   Telephone: +1 314 771-5765
   Fax: +1 800 325-5052

1.4 Emergency telephone
   Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
   Classification according to Regulation (EC) No 1272/2008
   Flammable liquids (Category 1), H224
   Acute toxicity, Oral (Category 4), H302
   Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
   For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements
   Labelling according Regulation (EC) No 1272/2008
   Pictogram

The life science business of Merck operates as MilliporeSigma in the US and Canada
The life science business of Merck operates as MilliporeSigma in the US and Canada

Signal word                                                                                                      Danger
Hazard statement(s)
H224                                                                   Extremely flammable liquid and vapor.
H302                                                                   Harmful if swallowed.
H336                                                                   May cause drowsiness or dizziness.
Precautionary statement(s)
P210                                                                   Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233                                                                   Keep container tightly closed.
P240                                                                   Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P301 + P312                                                             IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell.
P403 + P233                                                             Store in a well-ventilated place. Keep container tightly closed.
Supplemental Hazard information (EU)
EUH019                                                                  May form explosive peroxides.
EUH066                                                                  Repeated exposure may cause skin dryness or cracking.

Reduced Labeling (<= 125 ml)

Pictogram

Signal word                                                                                                      Danger
Hazard statement(s)
H224                                                                   Extremely flammable liquid and vapor.
Precautionary statement(s)
P210                                                                   Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233                                                                   Keep container tightly closed.
P240                                                                   Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P403 + P233                                                             Store in a well-ventilated place. Keep container tightly closed.
Supplemental Hazard information (EU)
EUH019                                                                  May form explosive peroxides.
EUH066                                                                  Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>( C_{4}H_{10}O )</td>
<td></td>
</tr>
<tr>
<td>Molecular weight</td>
<td>74,12 g/mol</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>60-29-7</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>200-467-2</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-022-00-4</td>
<td></td>
</tr>
</tbody>
</table>

The life science business of Merck operates as MilliporeSigma in the US and Canada
 SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.
5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.
Test for peroxide formation periodically and before distillation.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.
SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

**Skin protection**
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact
Material: Viton®
Minimum layer thickness: 0,7 mm
Break through time: 30 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

**Body Protection**
Flame retardant antistatic protective clothing.

**Respiratory protection**
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type AX

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Control of environmental exposure**
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>a) Appearance</th>
<th>Form: liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color: colorless</td>
</tr>
<tr>
<td>b) Odor</td>
<td>sweet, ether-like</td>
</tr>
<tr>
<td>c) Odor Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>d) pH</td>
<td>No data available</td>
</tr>
<tr>
<td>e) Melting point/freezing point</td>
<td>Melting point: -116 °C</td>
</tr>
</tbody>
</table>
f) Initial boiling point and boiling range  
34.6 °C at 1.013 hPa

g) Flash point  
-40 °C - closed cup - DIN 51755 Part 1

h) Evaporation rate  
No data available

i) Flammability (solid, gas)  
No data available

j) Upper/lower flammability or explosive limits  
Upper explosion limit: 36 % (V)  
Lower explosion limit: 1.7 % (V)

k) Vapor pressure  
189 hPa at 0 °C  
389 hPa at 10 °C  
563 hPa at 20 °C  
863 hPa at 30 °C  
1.228 hPa at 40 °C  
2.311 hPa at 60 °C

l) Vapor density  
2.56 - (Air = 1.0)

m) Density  
0.71 g/cm³ at 20 °C  
Relative density  
No data available

n) Water solubility  
65 g/l at 20 °C - completely soluble

o) Partition coefficient: n-octanol/water  
log Pow: 1.1 - Bioaccumulation is not expected.

p) Autoignition temperature  
175 °C  
at 1.013,25 hPa

q) Decomposition temperature  
No data available

r) Viscosity  
Viscosity, kinematic: No data available  
Viscosity, dynamic: 0.195 mPa.s at 40 °C

s) Explosive properties  
No data available

t) Oxidizing properties  
No data available

9.2 Other safety information

Relative vapor density  
2.56 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity  
Formation of peroxides possible.  
Vapors may form explosive mixture with air.

10.2 Chemical stability  
The product is chemically stable under standard ambient conditions (room temperature).  
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions  
No data available

10.4 Conditions to avoid  
Light. Heat. Air
Warming.
Moisture.

10.5 **Incompatible materials**
rubber, various plastics

10.6 **Hazardous decomposition products**
Peroxides
In the event of fire: see section 5

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**SECTION 11: Toxicological information**

11.1 **Information on toxicological effects**

**Acute toxicity**
LD50 Oral - Rat - 1.211 mg/kg
Remarks: (RTECS)
Symptoms: Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.
LC50 Inhalation - Mouse - 4 h - 97.5 mg/l
Remarks: (RTECS)
Symptoms: mucosal irritations
LD50 Dermal - Rabbit - male - > 20.000 mg/kg
(OECD Test Guideline 402)
Remarks: (ECHA)

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)
Dermatitis

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

**Respiratory or skin sensitization**
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

**Germ cell mutagenicity**
Test Type: Micronucleus test
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Test Type: Micronucleus test
Species: Mouse

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Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
May cause drowsiness or dizziness. - Central nervous system

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

### 11.2 Additional Information
Repeated dose toxicity - Rat - male and female - Oral - 13 Weeks - NOAEL (No observed adverse effect level) - 500 mg/kg - LOAEL (Lowest observed adverse effect level) - 2.000 mg/kg
Remarks: (ECHA)

RTECS: KI5775000
Inhalation may provoke the following symptoms:
Cough, chest pain, Difficulty in breathing, Dizziness, Drowsiness, Contact with eyes can cause:; Redness, Provokes tears., Blurred vision, Prolonged or repeated exposure to skin causes defatting and dermatitis.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Liver - Ingestion may provoke the following symptoms:; Irregularities - Based on Human Evidence

### SECTION 12: Ecological information

#### 12.1 Toxicity

**Toxicity to fish**
LC50 - Leuciscus idus (Golden orfe) - 2.840 mg/l - 48 h
Remarks: (ECOTOX Database)

**Toxicity to daphnia and other aquatic invertebrates**
EC50 - Daphnia magna (Water flea) - 1.380 mg/l - 48 h
Remarks: (IUCLID)

**Toxicity to algae**
static test ErC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h
(OECD Test Guideline 201)

**Toxicity to bacteria**
static test EC50 - activated sludge - 21.000 mg/l - 3 h
(OECD Test Guideline 209)
static test NOEC - activated sludge - 42 mg/l - 3 h
(OECD Test Guideline 209)
12.2 Persistence and degradability
Not readily biodegradable.

12.3 Bioaccumulative potential
No bioaccumulation is to be expected (log Pow <= 4).

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Product
See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 1155
IMDG: 1155
IATA: 1155

14.2 UN proper shipping name
ADR/RID: DIETHYL ETHER
IMDG: DIETHYL ETHER
IATA: Diethyl ether

14.3 Transport hazard class(es)
ADR/RID: 3
IMDG: 3
IATA: 3

14.4 Packaging group
ADR/RID: I
IMDG: I
IATA: I

14.5 Environmental hazards
ADR/RID: no
IMDG Marine pollutant: no
IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

National legislation
major-accident hazards involving dangerous substances.

Other regulations
Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.
EUH019 May form explosive peroxides.
EUH066 Repeated exposure may cause skin dryness or cracking.
H224 Extremely flammable liquid and vapor.
H302 Harmful if swallowed.
H336 May cause drowsiness or dizziness.

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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