

## SAFETY DATA SHEET

Version 6.9  
Revision Date 03/02/2024  
Print Date 05/12/2024**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifiers**

Product name : Diethyl ether

Product Number : 676845  
Brand : SIGALD  
Index-No. : 603-022-00-4  
CAS-No. : 60-29-7

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

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

**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****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 1), H224  
Acute toxicity, Oral (Category 4), H302  
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

SIGALD - 676845

Page 1 of 14

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H224

Extremely flammable liquid and vapor.

H302

Harmful if swallowed.

H336

May cause drowsiness or dizziness.

Precautionary Statements

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 mist or vapors.

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/ eye protection/ face protection.

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.

P370 + P378

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

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.

P501

Dispose of contents/ container to an approved waste disposal plant.

## 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

Repeated exposure may cause skin dryness or cracking.

May form explosive peroxides.

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## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Synonyms

: Ether  
Ethyl ether

Formula

: C<sub>4</sub>H<sub>10</sub>O

SIGALD - 676845

Page 2 of 14

Molecular weight : 74.12 g/mol  
 CAS-No. : 60-29-7  
 EC-No. : 200-467-2  
 Index-No. : 603-022-00-4

Component	Classification	Concentration
<b>Diethyl ether</b>		
	Flam. Liq. 1; Acute Tox. 4; STOT SE 3; H224, H302, H336 Concentration limits: >= 20 %: STOT SE 3, H336;	<= 100 %
<b>ethanol</b>		
	Flam. Liq. 2; Eye Irrit. 2A; H225, H319 Concentration limits: >= 50 %: Eye Irrit. 2A, H319;	>= 1 - < 5 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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## 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

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## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

Carbon dioxide (CO<sub>2</sub>) 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.

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## 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. Chemisorb® ).

Dispose of properly. Clean up affected area.

### 6.4 Reference to other sections

For disposal see section 13.

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## 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.

### Storage class

Storage class (TRGS 510): 3: Flammable liquids

## 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

Component	CAS-No.	Value	Control parameters	Basis
Diethyl ether	60-29-7	TWA	400 ppm	USA. ACGIH Threshold Limit Values (TLV)
		STEL	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	400 ppm 1,200 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	500 ppm 1,500 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	400 ppm 1,200 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	1,000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		

		TWA	1,000 ppm 1,900 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		PEL	1,000 ppm 1,900 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

## 8.2 Exposure controls

### Appropriate engineering controls

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

### 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 EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://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

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.

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.

#### Control of environmental exposure

Do not let product enter drains. Risk of explosion.

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## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

- |               |                                  |
|---------------|----------------------------------|
| a) Appearance | Form: liquid<br>Color: colorless |
|---------------|----------------------------------|

b) Odor	sweet, ether-like
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	Melting point: -116 °C (-177 °F)
f) Initial boiling point and boiling range	34.6 °C 94.3 °F at 1,013 hPa
g) Flash point	-40 °C (-40 °F) - 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 (32 °F) 389 hPa at 10 °C(50 °F) 563 hPa at 20 °C(68 °F) 863 hPa at 30 °C(86 °F) 1,228 hPa at 40 °C(104 °F) 2,311 hPa at 60 °C(140 °F)
l) Vapor density	2.56 - (Air = 1.0)
m) Density	0.71 g/cm <sup>3</sup> at 20 °C (68 °F)
Relative density	No data available
n) Water solubility	65 g/l at 20 °C (68 °F) - completely soluble
o) Partition coefficient: n-octanol/water	log Pow: 1.1 - Bioaccumulation is not expected.
p) Autoignition temperature	175 °C (347 °F) at 1,013.25 hPa
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	none

## 9.2 Other safety information

Relative vapor density	2.56 - (Air = 1.0)
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## **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) .  
Contains the following stabilizer(s):  
ethanol (2 %)  
butyl hydroxytoluene (BHT) (10 ppm)

### **10.3 Possibility of hazardous reactions**

Risk of ignition or formation of inflammable gases or vapours with:  
chromyl chloride  
Peroxides  
Risk of explosion with:  
azides  
halogens  
halogen-halogen compounds  
nonmetallic oxyhalides  
Strong oxidizing agents  
chromium(VI) oxide  
halogen oxides  
peroxi compounds  
perchloric acid  
perchlorates  
Nitric acid  
nitrating acid  
Oxygen  
Ozone  
turpentine oils and/or turpentine substitutes  
nitrates  
metallic chlorides  
salts of oxyhalogenic acids  
nitrogen oxides  
nonmetallic oxides  
chromosulfuric acid  
chlorates  
hydrogen peroxide  
permanganic acid  
sulfuric acid  
with  
Nitric acid  
sulfur  
Risk of explosion during distillation.  
Exothermic reaction with:  
acid halides

### **10.4 Conditions to avoid**

Light. Heat. Air  
Warming.

SIGALD - 676845

Page 8 of 14



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

Acute toxicity estimate Oral - 1,236 mg/kg  
(Calculation method)

LD50 Oral - Rat - 1,211 mg/kg (Diethyl ether)

Remarks: (RTECS)

Symptoms: Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.

LC50 Inhalation - Mouse - 4 h - 97.5 mg/l - vapor  
(Diethyl ether)

Remarks: (RTECS)

Symptoms: mucosal irritations

LD50 Dermal - Rabbit - male - > 20,000 mg/kg (Diethyl ether)  
(OECD Test Guideline 402)

Remarks: (ECHA)

#### Skin corrosion/irritation

Skin - Rabbit (Diethyl ether)

Result: No skin irritation - 4 h

(OECD Test Guideline 404)

Remarks: Dermatitis

#### Serious eye damage/eye irritation

Eyes - Rabbit (Diethyl ether)

Result: No eye irritation

(OECD Test Guideline 405)

#### Respiratory or skin sensitization

Local lymph node assay (LLNA) - Mouse (Diethyl ether)

Result: negative

(OECD Test Guideline 429)

#### Germ cell mutagenicity

Test Type: Micronucleus test  
(Diethyl ether)

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  
(Diethyl ether)

Test system: Mouse lymphoma test

SIGALD - 676845

Page 9 of 14

Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 476  
Result: negative  
Test Type: Ames test  
(Diethyl ether)  
Test system: Escherichia coli/Salmonella typhimurium  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: negative  
(Diethyl ether)  
Test Type: Micronucleus test  
Species: Mouse  
Cell type: Red blood cells (erythrocytes)  
Application Route: Intraperitoneal  
Method: OECD Test Guideline 474  
Result: negative

### **Carcinogenicity**

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

### **Reproductive toxicity**

No data available

### **Specific target organ toxicity - single exposure**

Oral - May cause drowsiness or dizziness. - Central nervous system (Diethyl ether)

### **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)  
(Diethyl ether)

RTECS: KI5775000

Inhalation may provoke the following symptoms: (Diethyl ether)

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. (Diethyl ether)

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. (Diethyl ether)

Narcotic!  
(Diethyl ether)

After absorption:

(Diethyl ether)

Salivation

ataxia (impaired locomotor coordination)

inebriation

Unconsciousness

Coma

(Diethyl ether)

Other dangerous properties can not be excluded.

(Diethyl ether)

Handle in accordance with good industrial hygiene and safety practice.

(Diethyl ether)

Liver - Ingestion may provoke the following symptoms:, Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

Liver - Ingestion may provoke the following symptoms:, Irregularities - Based on Human Evidence

(Diethyl ether)

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## SECTION 12: Ecological information

### 12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill sunfish) - > 10,000 mg/l - 96 h (Diethyl ether) Remarks: (IUCLID)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1,380 mg/l - 48 h (Diethyl ether) Remarks: (IUCLID)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h (Diethyl ether) (OECD Test Guideline 201)  static test NOEC - Desmodesmus subspicatus (green algae) - 100 mg/l - 72 h (Diethyl ether) (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - 21,000 mg/l - 3 h (Diethyl ether) (OECD Test Guideline 209)  static test NOEC - activated sludge - 42 mg/l - 3 h (Diethyl ether) (OECD Test Guideline 209)
Toxicity to daphnia and other aquatic invertebrates(Chronic	semi-static test NOEC - Daphnia magna (Water flea) - > 100 mg/l - 21 d (Diethyl ether) (OECD Test Guideline 211)

SIGALD - 676845

Page 11 of 14

toxicity)

#### **12.2 Persistence and degradability**

Not readily biodegradable.

#### **12.3 Bioaccumulative potential**

No bioaccumulation is to be expected ( $\log Pow \leq 4$ ).

#### **12.4 Mobility in soil**

No data available

#### **12.5 Results of PBT and vPvB assessment**

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

#### **12.6 Endocrine disrupting properties**

No data available

#### **12.7 Other adverse effects**

No data available

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### **SECTION 13: Disposal considerations**

#### **13.1 Waste treatment methods**

##### **Product**

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See [www.retrologistik.com](http://www.retrologistik.com) for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

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### **SECTION 14: Transport information**

#### **DOT (US)**

UN number: 1155 Class: 3 Packing group: I  
Proper shipping name: Diethyl ether  
Reportable Quantity (RQ): 102 lbs  
Reportable Quantity (RQ): 100 lbs  
Poison Inhalation Hazard: No

#### **IMDG**

UN number: 1155 Class: 3 Packing group: I EMS-No: F-E, S-D  
Proper shipping name: DIETHYL ETHER

#### **IATA**

UN number: 1155 Class: 3 Packing group: I  
Proper shipping name: Diethyl ether

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**SECTION 15: Regulatory information****SARA 302 Components**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 313 Components**

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Reportable Quantity** : F003 lbs

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
Diethyl ether	60-29-7	1993-02-16
ethanol	64-17-5	

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
Diethyl ether	60-29-7	1993-02-16
ethanol	64-17-5	

**California Prop. 65 Components**

, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a>	CAS-No.	Revision Date
ethanol	64-17-5	

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**SECTION 16: Other information****Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. 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](http://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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