

## SAFETY DATA SHEET

Version 6.4  
Revision Date 06/07/2021  
Print Date 06/18/2022**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifiers**

Product name : Diethyl ether

Product Number : 296082

Brand : Sigma-Aldrich

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

**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  
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 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/ 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 dust/ fume/ gas/ mist/ vapors/ spray.
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.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Synonyms	: Ether Ethyl ether
Formula	: C <sub>4</sub> H <sub>10</sub> O
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,	<= 100 %

	H336 Concentration limits: >= 20 %: STOT SE 3, H336;	
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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.

Risk of dust explosion.

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. Chemizorb®). 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 (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

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## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Ingredients with workplace control parameters

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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)

## 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 EN374 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

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 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) 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	No data available

### 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):  
butyl hydroxytoluene (BHT) (1 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.

Moisture.

### **10.5 Incompatible materials**

rubber, various plastics

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## 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 - 1,211 mg/kg

(Calculation method)

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)

No data available

#### 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

Application Route: Intraperitoneal

Method: OECD Test Guideline 474

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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**

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

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

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## **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

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

#### 12.6 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): 100 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**

No components are subject to the Massachusetts Right to Know Act.

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**SECTION 16: Other information****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](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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Version: 6.4

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