

SAFETY DATA SHEET

Version 6.6
Revision Date 12/08/2022
Print Date 03/11/2023

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Diethyl ether

Product Number : 346136
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

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
Short-term (acute) aquatic hazard (Category 3), H402
Long-term (chronic) aquatic hazard (Category 3), H412

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

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Hazard statement(s)	
H224	Extremely flammable liquid and vapor.
H302	Harmful if swallowed.
H336	May cause drowsiness or dizziness.
H412	Harmful to aquatic life with long lasting effects.
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 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.
P273	Avoid release to the environment.
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 ₄ H ₁₀ 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
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Diethyl ether		
	Flam. Liq. 1; Acute Tox. 4; STOT SE 3; H224, H302, H336 Concentration limits: >= 20 %: STOT SE 3, H336;	<= 100 %
butyl hydroxytoluene (BHT)		
	Aquatic Acute 1; Aquatic Chronic 1; H400, H410 M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 1	>= 1 - < 5 %

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

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.

Light sensitive. Heat sensitive. Air sensitive. 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 ³	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	500 ppm 1,500 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	400 ppm 1,200 mg/m ³	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
butyl hydroxytoluene (BHT)	128-37-0	TWA	2 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		TWA	10 mg/m ³	USA. NIOSH Recommended Exposure Limits
		PEL	10 mg/m ³	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).

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.

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/range: -116 °C (-177 °F) - lit.
f) Initial boiling point and boiling range	34.6 °C 94.3 °F - lit.
g) Flash point	-40 °C (-40 °F)
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	0.706 g/mL at 25 °C (77 °F) - lit.
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):
butyl hydroxytoluene (BHT) (<=11 %)

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

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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

10.6 Hazardous decomposition products

Peroxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute toxicity estimate Oral - 1,224 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
Acute toxicity estimate Dermal - > 5,000 mg/kg
(Calculation method)
LD50 Dermal - Rabbit - male - > 20,000 mg/kg (Diethyl ether)
(OECD Test Guideline 402)
Remarks: (ECHA)
No data available

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: Mouse
Test system: Embryo
Remarks: DNA inhibition
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
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
(Diethyl ether)
Test Type: Micronucleus test
Species: Mouse

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

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

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

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)

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

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

(Diethyl ether)

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Leuciscus idus (Golden orfe) - 2,840 mg/l - 48 h (Diethyl ether) Remarks: (ECOTOX Database)
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)
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 toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - > 100 mg/l - 21 d (Diethyl ether) (OECD Test Guideline 211)

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

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 for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 1155 Class: 3 Packing group: I
Proper shipping name: Diethyl ether
Reportable Quantity (RQ): 101 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

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

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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.

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 and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.6

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