



DIETHYL ETHER-D10 (D, 99%)

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Issue date: 1/18/2011 Revision date: 12/13/2022 Supersedes: 1/18/2011 Version: 2.1

SECTION 1: Identification

1.1. Identification

Product form	: Substance
Substance name	: DIETHYL ETHER-D10 (D, 99%)
Chemical name	: 1,1-Oxybisethane
CAS-No.	: 60-29-7
Product code	: DLM-1592
Formula	: C4H10O
Synonyms	: Ether / Ethyl ether

1.2. Recommended use and restrictions on use

No additional information available

1.3. Supplier

Cambridge Isotope Laboratories, Inc.
50 Frontage Rd
01810
ANDOVER, MA, 01810
USA
T 1-800-322-1174
cilsales@isotope.com - www.isotope.com

1.4. Emergency telephone number

Emergency number : 1-703-741-5970
Chemtrec 1-800-424-9300 24 hours

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable liquids Category 1	H224	Extremely flammable liquid and vapor
Acute toxicity (oral) Category 4	H302	Harmful if swallowed
Specific target organ toxicity – Single exposure, Category 3, Narcosis	H336	May cause drowsiness or dizziness
Full text of H statements : see section 16		

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) :

Danger

Hazard statements (GHS US) :

H224 - Extremely flammable liquid and vapor
H302 - Harmful if swallowed
H336 - May cause drowsiness or dizziness

Precautionary statements (GHS US) :

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. heat, hot surfaces, open flames, sparks
P233 - Keep container tightly closed.
P240 - Ground/Bond container and receiving equipment.

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P241 - Use explosion-proof electrical, lighting, ventilating equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P261 - Avoid breathing dust, fume, gas, mist, spray, vapors.
P264 - Wash Both hands 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 clothing, protective gloves.
P301+P312 - If swallowed: Call a poison center or doctor if you feel unwell.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P312 - Call a poison center or doctor if you feel unwell.
P330 - Rinse mouth.
P370+P378 - In case of fire: Use Alcohol resistant foam, Carbon dioxide, Dry chemical 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 Comply with applicable regulations.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name	Product identifier	%	GHS US classification
DIETHYL ETHER-D10 (D, 99%) (Main constituent)	CAS-No.: 60-29-7	100	Flam. Liq. 1, H224 Acute Tox. 4 (Oral), H302 STOT SE 3, H336

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

First-aid measures after inhalation : If breathed in, move person to fresh air. If not breathing, give artificial respiration. Consult a physician.

First-aid measures after skin contact : Wash with soap and plenty of water. Consult a physician.

First-aid measures after eye contact : Flush eyes with water as a precaution.

First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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4.2. Most important symptoms and effects (acute and delayed)

Potential Adverse human health effects and symptoms	: Cough. Chest pain. Dizziness. Drowsiness. Contact with eyes can cause damage. Redness of the eyes. Provokes tears. Blurred vision. Prolonged or repeated exposure to skin causes defatting and dermatitis. Liver - Ingestion may provoke the following symptoms: Liver - Irregularities - Based on Human Evidence.
Symptoms/effects	: Not available.
Symptoms/effects after inhalation	: Harmful if inhaled. Causes respiratory tract irritation. Vapors may cause drowsiness and dizziness.
Symptoms/effects after skin contact	: Toxic if absorbed through skin. Causes skin irritation.
Symptoms/effects after eye contact	: Causes eye irritation.
Symptoms/effects after ingestion	: Harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

5.2. Specific hazards arising from the chemical

Hazardous decomposition products in case of fire : Carbon oxides (CO, CO₂).

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	: Wear self contained breathing apparatus for fire fighting if necessary.
Protection during firefighting	: Do not enter fire area without proper protective equipment, including respiratory protection.
Other information	: Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3. Methods and material for containment and cleaning up

For containment : Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.

6.4. Reference to other sections

No additional information available

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed : Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Keep container tightly closed in a cool, dry and well-ventilated place.
- Storage conditions : Store refrigerated (-5 °C to 5 °C). Protect from light.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

DIETHYL ETHER-D10 (D, 99%) (60-29-7)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Ethyl ether
ACGIH OEL TWA [ppm]	400 ppm Central Nervous System impairment Upper Respiratory Tract irritation. USA. ACGIH Threshold Limit Values (TLV)
ACGIH OEL STEL [ppm]	500 ppm Central Nervous System impairment Upper Respiratory Tract irritation. USA. ACGIH Threshold Limit Values (TLV) See Appendix D - Substances with No Established RELs
Remark (ACGIH)	TLV® Basis: CNS impair; URT irr
ACGIH chemical category	No component of this product present at levels greater than or equal to 0.1% is identifiable as a carcinogen or potential carcinogen by ACGIH.
Regulatory reference	ACGIH 2022
USA - OSHA - Occupational Exposure Limits	
OSHA PEL TWA [1]	1200 mg/m ³ USA. OSHA Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
OSHA PEL TWA [2]	400 ppm USA. OSHA Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
OSHA PEL STEL [1]	1500 mg/m ³ USA. OSHA Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants - 1910.1000; California permissible exposure limits for chemical contaminants (Title 8, Article 107)
OSHA PEL STEL [2]	500 ppm USA. OSHA Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants - 1910.1000; California permissible exposure limits for chemical contaminants (Title 8, Article 107)
OSHA PEL C	1200 mg/m ³ California permissible exposure limits for chemical contaminants (Title 8, Article 107)
OSHA PEL C [ppm]	400 ppm California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2. Appropriate engineering controls

- Appropriate engineering controls : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
- Environmental exposure controls : Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Protective clothing. Protective goggles. Self-contained breathing apparatus.

Materials for protective clothing:

Wear suitable protective clothing and gloves

Hand protection:

Wear suitable protective clothing and gloves

Eye protection:

Wear safety glasses with side shields (or goggles) and a face shield.

Skin and body protection:

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Respiratory protection:

When appropriate, use NIOSH/CEN approved respirator.

Personal protective equipment symbol(s):



SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Liquid.
Color	: Colorless
Odor	: Sweet, penetrating, ether-like odor
Odor threshold	: No data available
pH	: No data available
Melting point	: -116 °C Source: HSDB
Freezing point	: No data available
Boiling point	: 35 °C Source: ICSC
Flash point	: -45 °C Source: ICSC
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: 538 mm Hg at 25°C Source: HSDB
Relative vapor density at 20°C	: 2.6 Source: ICSC
Relative density	: 0.713 Source: HSDB
Density	: 0.71 g/ml at 20 °C (68 °F)
Molecular mass	: 74.12 g/mol Source: HSDB
Solubility	: Water: 6.9 g/100ml
Partition coefficient n-octanol/water (Log Pow)	: 0.89 Source: HSDB
Auto-ignition temperature	: 160 °C Source: ICSC
Decomposition temperature	: -8.807 °C Source: HSDB
Viscosity, kinematic	: 0.345 mm ² /s
Viscosity, dynamic	: 0.245 cP Source: HSDB
Explosion limits	: 1.8 – 48 % (V) Upper explosion limit: 1.7 – 48 % Source: ICSC

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Explosive properties : No data available
Oxidizing properties : No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Vapors may form explosive mixture with air.

10.2. Chemical stability

Stable if stored under recommended conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Heat, flames and sparks.

10.5. Incompatible materials

Oxidizing agents, Strong acids.

10.6. Hazardous decomposition products

carbon oxides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Harmful if swallowed.
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

DIETHYL ETHER-D10 (D, 99%) (60-29-7)	
LD50 oral rat	1200 mg/kg Source: ECHA
LD50 dermal rabbit	> 20000 mg/kg Source: ECHA
LC50 Inhalation - Rat [ppm]	31000 ppm Source: ChemIDPlus
ATE US (oral)	1215 mg/kg body weight
ATE US (gases)	32000 ppmV/4h
Additional data	LC50 Inhalation - Mouse - 30 min - 31000 ppm Remarks: Behavioral: Convulsions or effect on seizure threshold.

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : May cause drowsiness or dizziness.

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STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified
Viscosity, kinematic	: 0.345 mm ² /s
Potential Adverse human health effects and symptoms	: Cough. Chest pain. Dizziness. Drowsiness. Contact with eyes can cause damage. Redness of the eyes. Provokes tears. Blurred vision. Prolonged or repeated exposure to skin causes defatting and dermatitis. Liver - Ingestion may provoke the following symptoms: Liver - Irregularities - Based on Human Evidence.
Symptoms/effects	: Not available.
Symptoms/effects after inhalation	: Harmful if inhaled. Causes respiratory tract irritation. Vapors may cause drowsiness and dizziness.
Symptoms/effects after skin contact	: Toxic if absorbed through skin. Causes skin irritation.
Symptoms/effects after eye contact	: Causes eye irritation.
Symptoms/effects after ingestion	: Harmful if swallowed.

SECTION 12: Ecological information

12.1. Toxicity

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LC50 - Fish [1]	2560 mg/l Source: ECHA
EC50 - Crustacea [1]	165 mg/l
NOEC chronic algae	> 100 mg/l <i>Desmodesmus subspicatus</i> (green algae) - 72 h (OECD Test Guideline 201)

12.2. Persistence and degradability

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

Persistence and degradability	Not available.
Biodegradation	Not readily biodegradable

12.3. Bioaccumulative potential

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

Partition coefficient n-octanol/water (Log Pow)	0.89 Source: HSDB
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12.4. Mobility in soil

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

Ecology - soil	Not available.
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12.5. Other adverse effects

Other adverse effects : Not available.

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional legislation (waste)	: Waste materials should be disposed of under conditions which meet Federal, State, and local environmental control regulations.
Product/Packaging disposal recommendations	: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
Ecology - waste materials	: Dispose of as unused product.

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SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

14.1. UN number

DOT NA No : UN1155
UN-No. (TDG) : UN1155
UN-No. (IMDG) : 1155
UN-No. (IATA) : 1155

14.2. UN proper shipping name

Proper Shipping Name (DOT) : Diethyl ether
Proper Shipping Name (TDG) : DIETHYL ETHER
Proper Shipping Name (IMDG) : DIETHYL ETHER (ETHYL ETHER)
Proper Shipping Name (IATA) : Diethyl ether

14.3. Transport hazard class(es)

DOT

Transport hazard class(es) (DOT) : 3
Hazard labels (DOT) : 3



TDG

Transport hazard class(es) (TDG) : 3
Hazard labels (TDG) : 3



IMDG

Transport hazard class(es) (IMDG) : 3
Hazard labels (IMDG) : 3



IATA

Transport hazard class(es) (IATA) : 3
Hazard labels (IATA) : 3



14.4. Packing group

Packing group (DOT) : I
Packing group (TDG) : I
Packing group (IMDG) : I

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Packing group (IATA) : I

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

DOT

UN-No.(DOT) : UN1155
DOT Special Provisions (49 CFR 172.102) : T11 - 6 178.274(d)(2) Normal..... 178.275(d)(3)
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
DOT Packaging Exceptions (49 CFR 173.xxx) : 150
DOT Packaging Non Bulk (49 CFR 173.xxx) : 201
DOT Packaging Bulk (49 CFR 173.xxx) : 243
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 30 L
DOT Vessel Stowage Location : E - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

TDG

UN-No. (TDG) : UN1155
Explosive Limit and Limited Quantity Index : 0
Excepted quantities (TDG) : E3
Passenger Carrying Ship Index : Forbidden
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 1 L
Emergency Response Guide (ERG) Number : 127

IMDG

Limited quantities (IMDG) : 0
Excepted quantities (IMDG) : E3
Packing instructions (IMDG) : P001
Tank instructions (IMDG) : T11
Tank special provisions (IMDG) : TP2
EmS-No. (Fire) : F-E - FIRE SCHEDULE Echo - NON-WATER-REACTIVE FLAMMABLE LIQUIDS
EmS-No. (Spillage) : S-D - SPILLAGE SCHEDULE Delta - FLAMMABLE LIQUIDS
Stowage category (IMDG) : E
Stowage and handling (IMDG) : SW2
Flash point (IMDG) : -40°C c.c.
Properties and observations (IMDG) : Colourless, volatile and mobile liquid with a pleasant aromatic odour. Flashpoint: -40°C c.c. Explosive limits: 1.7% to 48%. Boiling point: 34°C. Immiscible with water. In the presence of oxygen or on long standing or exposure to sunlight, unstable peroxides sometimes form; these may explode spontaneously or when heated. Strongly narcotic. Readily ignited by static electricity.
MFAG-No : 151

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IATA

PCA Excepted quantities (IATA)	: E3
PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: 351
PCA max net quantity (IATA)	: 1L
CAO packing instructions (IATA)	: 361
CAO max net quantity (IATA)	: 30L
ERG code (IATA)	: 3AH

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

Not subject to reporting requirements of the United States SARA Section 313

CERCLA RQ	100 lb
SARA Section 311/312 Hazard Classes	Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard

Commercial status of components according to the United States Environmental Protection Agency's Toxic Substances Control Act (TSCA):

Name	CAS-No.	Listing	Commercial status	Flags
DIETHYL ETHER-D10 (D, 99%)	60-29-7	Present	Active	

15.2. International regulations

CANADA

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on TECI (Thailand Existing Chemicals Inventory)

15.3. US State regulations

DIETHYL ETHER-D10 (D, 99%) (60-29-7)

State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
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SECTION 16: Other information

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Revision date : 12/13/2022

Other information : This product is not radioactive. The data given for this product are those of the corresponding unlabeled compound, unless specifically indicated otherwise. Health and safety data for labeled compounds are generally not available, but are assumed to be similar or identical to the corresponding unlabeled compound.

Full text of H-phrases	
H224	Extremely flammable liquid and vapor
H302	Harmful if swallowed
H336	May cause drowsiness or dizziness

NFPA health hazard

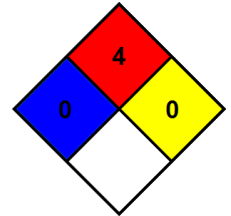
: 0 - Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard

: 4 - Materials that rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and burn readily.

NFPA reactivity

: 0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating

Health

: 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability

: 4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)

Physical

: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

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This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.