

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 17.12.2015

Version 10.8

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

1.1 Product identifier

Catalogue No.	818758
Product name	Dimethyl dicarbonate for synthesis
REACH Registration Number	A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	4525-33-1

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

Identified uses	Chemical for synthesis For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com).
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1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 2, Inhalation, H330

Acute toxicity, Category 4, Oral, H302

Skin corrosion, Category 1B, H314

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

Classification (67/548/EEC or 1999/45/EC)

T	Toxic	R23
Xn	Harmful	R22
C	Corrosive	R34

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms



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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Signal word

Danger

Hazard statements

H302 Harmful if swallowed.

H314 Causes severe skin burns and eye damage.

H330 Fatal if inhaled.

Precautionary statements

Prevention

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Reduced labelling (≤125 ml)

Hazard pictograms



Signal word

Danger

Hazard statements

H314 Causes severe skin burns and eye damage.

H330 Fatal if inhaled.

Precautionary statements

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

CAS-No. 4525-33-1

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

Formula	(CH ₃ OCO) ₂ O	C ₄ H ₆ O ₅ (Hill)
EC-No.	224-859-8	
Molar mass	134,09 g/mol	

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical Name (Concentration)

CAS-No.	Registration number	Classification
dimethyl dicarbonate (<= 100 %)		
4525-33-1	*)	Acute toxicity, Category 2, H330 Acute toxicity, Category 4, H302 Skin corrosion, Category 1B, H314

*) A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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

Hazardous components (1999/45/EC)

Chemical Name (Concentration)

CAS-No.	Classification
dimethyl dicarbonate (<= 100 %)	
4525-33-1	T, Toxic; R23 Xn, Harmful; R22 C, Corrosive; R34

For the full text of the R-phrases mentioned in this Section, see Section 16.

3.2 Mixture

Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

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

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Pulmonary failure possible after aspiration of vomit. Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

Irritation and corrosion, Cough, Shortness of breath, Nausea, Headache
Risk of blindness!

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water, Foam, Carbon dioxide (CO₂), Dry powder

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Unsuitable extinguishing media

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

5.2 Special hazards arising from the substance or mixture

Combustible.

Vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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 vapours, 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.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

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 carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment 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.

Observe label precautions.

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

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

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

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Tightly fitting safety goggles

Hand protection

full contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm
Break through time:	> 480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0,40 mm
Break through time:	> 60 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 730 Camatril® -Velours (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

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).

Other protective equipment

Acid-resistant protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Recommended Filter type: Respirator.

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.

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Environmental exposure controls

Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	colourless
Odour	ester-like
Odour Threshold	No information available.
pH	No information available.
Solidification point	17 °C
Melting point	15 - 17 °C
Boiling point/boiling range	ca. 172 °C at 1.013 hPa decomposes
Flash point	ca. 85 °C Method: DIN 51758
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	3 %(V)
Upper explosion limit	29,9 %(V)
Vapour pressure	0,7 hPa at 20 °C
Relative vapour density	No information available.
Density	1,25 g/cm ³ at 20 °C
Relative density	No information available.
Water solubility	ca.35 g/l at 20 °C (decomposition)
Partition coefficient: n-octanol/water	log Pow: -0,86 (calculated) Bioaccumulation is not expected. (Lit.)

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

Catalogue No.	818758
Product name	Dimethyl dicarbonate for synthesis

Auto-ignition temperature	No information available.
Decomposition temperature	> 70 °C
Viscosity, dynamic	ca.2,1 mPa.s at 20 °C
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

Ignition temperature	ca. 465 °C Method: DIN 51794
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SECTION 10. Stability and reactivity

10.1 Reactivity

hydrolysable

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents, Strong bases

Exothermic reaction with:

Water

10.4 Conditions to avoid

Strong heating.

Exposure to moisture

10.5 Incompatible materials

no information available

10.6 Hazardous decomposition products

no information available

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

LD50 Rat: 335 mg/kg

(External MSDS)

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach., Risk of aspiration upon vomiting., Aspiration may cause pulmonary oedema and pneumonitis.
absorption

Acute inhalation toxicity

LC50 Rat: 0,711 mg/l; 4 h ; dust/mist

(External MSDS)

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
absorption

Acute dermal toxicity

LD50 Rat: > 1.250 mg/kg

(External MSDS)

Skin irritation

Rabbit

Result: Causes burns.

(External MSDS)

Causes burns.

Eye irritation

Rabbit

Result: Causes burns.

(External MSDS)

Causes serious eye damage.

Risk of blindness!

Sensitisation

Asthmatic reactions can occur in predisposed persons. - Asthmatics must not work with dimethyl dicarbonate.

Germ cell mutagenicity

This information is not available.

Carcinogenicity

This information is not available.

Reproductive toxicity

This information is not available.

Teratogenicity

This information is not available.

Specific target organ toxicity - single exposure

This information is not available.

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Specific target organ toxicity - repeated exposure

This information is not available.

Aspiration hazard

This information is not available.

11.2 Further information

After absorption:

Nausea, Headache

After absorption of large quantities:

Damage to:

Lungs

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

SECTION 12. Ecological information

12.1 Toxicity

Toxicity to fish

LC0 *Leuciscus idus* (Golden orfe): 50 mg/l; 48 h

(External MSDS)

12.2 Persistence and degradability

Biodegradability

> 90 %; 28 d

OECD Test Guideline 301D

Readily biodegradable

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: -0,86

(calculated)

Bioaccumulation is not expected. (Lit.)

12.4 Mobility in soil

No information 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

Additional ecological information

Discharge into the environment must be avoided.

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

SECTION 13. Disposal considerations

Waste treatment methods

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

Land transport (ADR/RID)

14.1 UN number	UN 2927
14.2 Proper shipping name	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S. (DIMETHYLDICARBONATE)
14.3 Class	6.1 (8)
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
Tunnel restriction code	D/E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 2927
14.2 Proper shipping name	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S. (DIMETHYLDICARBONATE)
14.3 Class	6.1 (8)
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

Sea transport (IMDG)

14.1 UN number	UN 2927
14.2 Proper shipping name	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S. (DIMETHYLDICARBONATE)
14.3 Class	6.1 (8)
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
EmS	F-A S-B

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Major Accident Hazard Legislation SEVESO III
ACUTE TOXIC
H2
Quantity 1: 50 t
Quantity 2: 200 t

Occupational restrictions Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer not regulated

Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC not regulated

Substances of very high concern (SVHC) This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of $\geq 0.1\%$ (w/w).

National legislation

Storage class 6.1A

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.

H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H330 Fatal if inhaled.

Full text of R-phrases referred to under sections 2 and 3

R22 Harmful if swallowed.
R23 Toxic by inhalation.
R34 Causes burns.

Training advice

Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms



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

Catalogue No. 818758
Product name Dimethyl dicarbonate for synthesis

Signal word

Danger

Hazard statements

H227 Combustible liquid.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H330 Fatal if inhaled.

Precautionary statements


Prevention

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response


P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Labelling (67/548/EEC or 1999/45/EC)

<i>Symbol(s)</i>	 T	Toxic
<i>R-phrases(s)</i>	22-23-34	Harmful if swallowed. Toxic by inhalation. Causes burns.
<i>S-phrases(s)</i>	18-26-28-36/37/39-38-45	Handle and open container with care. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water. Wear suitable protective clothing, gloves and eye/face protection. In case of insufficient ventilation, wear suitable respiratory equipment. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

EC-No. 224-859-8

Reduced labelling (≤125 ml)

<i>Symbol(s)</i>	 T	Toxic
<i>R-phrases(s)</i>	22-23-34	Harmful if swallowed. Toxic by inhalation. Causes burns.
<i>S-phrases(s)</i>	26-36/37/39-45	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.