



# DL-MALIC ACID (2,3,3-D3, 98%)

## Safety Data Sheet

according to Regulation (EC) No. 453/2010 and according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 08/03/2012

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Supersedes: 08/03/2012

Version: 2.0

**DLM-9045**

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product form : Substance  
Substance name : DL-MALIC ACID (2,3,3-D3, 98%)  
EC no : 230-022-8 (Unlabeled)  
CAS No : 104596-63-6  
Product code : DLM-9045  
Formula : HOCCD2CD(OH)COOH  
Synonyms : (+/-)-2-Hydroxysuccinic acid / DL-Hydroxybutanedioic acid

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

##### 1.2.1. Relevant identified uses

Main use category : Professional use  
Industrial/Professional use spec : For professional use only.

##### 1.2.2. Uses advised against

No additional information available

#### 1.3. Details of the supplier of the safety data sheet

Cambridge Isotope Laboratories, Inc.  
50 Frontage Road  
Andover, MA 01810  
USA

USA: 1-800-322-1174 Int: 1-978-749-8000  
[cilsales@isotope.com](mailto:cilsales@isotope.com) [www.isotope.com](http://www.isotope.com)

#### Emergency telephone number

Emergency numbers:

Chemtrec: 1-800-424-9300 (24 hours)  
International: 1-703-741-5970 (24 hours)

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Eye Irrit. 2 H319

Full text of H-phrases: see section 16

##### Classification according to Directive 67/548/EEC or 1999/45/EC

Xi; R36

Full text of R-phrases: see section 16

##### Classification (GHS-US)

Eye Irrit. 2A H319

##### Adverse physicochemical, human health and environmental effects

No additional information available

#### 2.2. Label elements

##### Labeling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS07

Signal word (CLP) : Warning

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Hazard statements (CLP)	: H319 - Causes serious eye irritation
Precautionary statements (CLP)	: P264 - Wash Both hands thoroughly after handling P280 - Wear protective clothing, protective gloves P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P337+P313 - If eye irritation persists: Get medical advice/attention

### GHS-US labeling

Hazard pictograms (GHS-US)



GHS07

Signal word (GHS-US)	: Warning
Hazard statements (GHS-US)	: H319 - Causes serious eye irritation

Precautionary statements (GHS-US)	: P264 - Wash Both hands thoroughly after handling P280 - Wear protective clothing, protective gloves P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P337+P313 - If eye irritation persists: Get medical advice/attention
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### 2.3. Other hazards

No additional information available

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name	Product identifier	%	Classification according to Directive 67/548/EEC
DL-MALIC ACID (2,3,3-D3, 98%) (Main constituent)	(CAS No) 104596-63-6 (EC no) 230-022-8 (Unlabeled) (EC index no)	100	Xi; R36

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
DL-MALIC ACID (2,3,3-D3, 98%) (Main constituent)	(CAS No) 104596-63-6 (EC no) 230-022-8 (Unlabeled) (EC index no)	100	Eye Irrit. 2, H319

Full text of R-, H- and EUH-phrases: see section 16

Name	Product identifier	%	Classification (GHS-US)
DL-MALIC ACID (2,3,3-D3, 98%) (Main constituent)	(CAS No) 104596-63-6	100	Eye Irrit. 2A, H319

Full text of H-phrases: 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	: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
First-aid measures after ingestion	: Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation	: May be harmful if inhaled. May cause respiratory tract irritation.
Symptoms/injuries after skin contact	: May be harmful if absorbed through skin. May cause skin irritation.
Symptoms/injuries after eye contact	: May cause eye irritation.

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Symptoms/injuries after ingestion : May be harmful if swallowed.

### 4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

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

### 5.2. Special hazards arising from the substance or mixture

Reactivity : Not available.

### 5.3. Advice for firefighters

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.

## 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 dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

#### 6.1.2. For emergency responders

No additional information available

### 6.2. Environmental precautions

Do not let product enter drains.

### 6.3. Methods and material for containment and cleaning up

For containment : Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

### 6.4. Reference to other sections

No additional information available

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Additional hazards when processed : Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Precautions for safe handling : Provide appropriate exhaust ventilation at places where dust is formed.

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 at room temperature away from light and moisture.

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

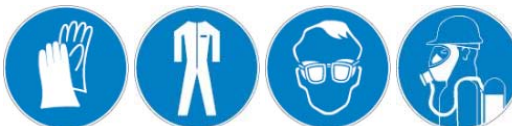
### 8.1. Control parameters

No additional information available

### 8.2. Exposure controls

Appropriate engineering controls : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

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

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Solid.
Molecular mass	: 137.11 g/mol (Labeled)
Color	: white.
Odor	: No data available
Odor threshold	: No data available
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: 131 - 133 °C (268 - 271 °F) - lit.
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Self ignition temperature	: 340 °C (644 °F)
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: < 0.1 hPa (<0.1 mmHg) at 20 °C (68 °F)
Relative vapor density at 20 °C	: No data available
Relative density	: 1.6 g/cm <sup>3</sup> at 20 °C (68 °F)
Solubility	: Water: 646.6 g/l at 20 °C (68 °F) - OECD Test Guideline 105 - soluble
Log Pow	: -1.259
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: No data available

#### 9.2. Other information

No additional information available

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Not available.

#### 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.

#### 10.5. Incompatible materials

Bases. Strong oxidizing agent. Reducing agents. Alkali metals.

#### 10.6. Hazardous decomposition products

Carbon oxides.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

#### DL-MALIC ACID (2,3,3-D3, 98%) (104596-63-6)

LD50 oral rat	3500 mg/kg male and female (OECD Test Guideline 401)
	LD50 Intraperitoneal - Rat - 100 mg/kg

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DL-MALIC ACID (2,3,3-D3, 98%) (104596-63-6)	
	LD50 Intraperitoneal - Mouse - 50 mg/kg
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Eyes - Rabbit Result: Severe eye irritaiton
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Ames test. Salmonella typhimurium. Result: Negative
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified
Potential Adverse human health effects and symptoms	: Symptoms of exposure include: Burning sensation. Cough. Wheezing. Laryngitis. Shortness of breath. Headache. Nausea. Vomiting. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Symptoms/injuries after inhalation	: May be harmful if inhaled. May cause respiratory tract irritation.
Symptoms/injuries after skin contact	: May be harmful if absorbed through skin. May cause skin irritation.
Symptoms/injuries after eye contact	: May cause eye irritation.
Symptoms/injuries after ingestion	: May be harmful if swallowed.

## SECTION 12: Ecological information

### 12.1. Toxicity

DL-MALIC ACID (2,3,3-D3, 98%) (104596-63-6)	
EC50 Daphnia 1	240 mg/l Immobilization LC50 - Daphnia magna (Water flea) - 48 h (OECD Test Guideline 202)

### 12.2. Persistence and degradability

No additional information available

### 12.3. Bioaccumulative potential

DL-MALIC ACID (2,3,3-D3, 98%) (104596-63-6)	
Log Pow	-1.259

### 12.4. Mobility in soil

No additional information available

### 12.5. Results of PBT and vPvB assessment

No additional information available

### 12.6. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Regional legislation (waste)	: Waste materials should be disposed of under conditions which meet Federal, State, and Local environmental control regulations.
Waste 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.

## SECTION 14: Transport information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

### 14.1. UN number

Not applicable

### 14.2. UN proper shipping name

Not applicable

### 14.3. Additional information

Other information : No supplementary information available.

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Special transport precautions : Not dangerous goods.

### Overland transport

No additional information available

### Transport by sea

No additional information available

### Air transport

No additional information available

## 14.4. Environmental hazards

Other information : No supplementary information available.

## 14.5. Special precautions for user

Special transport precautions : Not dangerous goods.

## 14.6. 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

#### DL-MALIC ACID (2,3,3-D3, 98%) (104596-63-6)

SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard
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### 15.2. International regulations

#### CANADA

#### DL-MALIC ACID (2,3,3-D3, 98%) (104596-63-6)

Listed on the Canadian DSL (Domestic Substances List) inventory.

#### 15.2.1. National regulations

No additional information available

### 15.3. US State regulations

#### DL-MALIC ACID (2,3,3-D3, 98%)(104596-63-6)

State or local regulations	U.S. - Pennsylvania - RTK (Right to Know) List U.S. - New Jersey - Right to Know Hazardous Substance List This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
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## SECTION 16: Other information

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 R-, H- and EUH-phrases::

Eye Irrit. 2	Serious eye damage/eye irritation Category 2
H319	Causes serious eye irritation
R36	Irritating to eyes
Xi	Irritant

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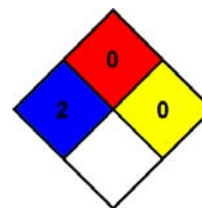
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NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



### HMIS III Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

### CIL Multi-Solvent Mixture SDS

*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*