

SAFETY DATA SHEET



Diethyl malonate

GHS HCS-2012 §1910.1200

Read the entire SDS for a complete hazard assessment.

Section 1. Product and Company Identification

1.1 Product Identifiers:

Product Names: Diethyl malonate
Synonyms: Ethyl malonate
Chemical Name: Propanedioic acid, diethyl ester
CAS Number 105-53-3 **EINECS Number:** 203-306-9

Recommended use: Flavor and fragrance agent
Restrictions on use: For manufacturing use only

1.2 Manufacturer and Supplier/Distributor:

Distributor

R.E. Carroll, Inc.
1570 North Olden Avenue
Trenton, NJ 08638-3204 USA
Phone: 609-695-6211
Fax: 609-695-0102
Responsible Party:
John Boruta Quality Assurance / Compliance Manager
Email: johnb@recarroll.com
Web Site: www.recarroll.com

1.4 Emergency telephone number:

In the US: For a transport accident or leak, fire or major spill, call CHEMTREC, (800) 424-9300.
For International CHEMTREC assistance, call 1-703-527-3887 (collect calls accepted).

Section 2. Hazards Identification

2.1 Globally Harmonized System (GHS) Hazard Classification:

OSHA Classification in accordance with 29 CFR 1910 (OSHA HCS): Hazardous.
This SDS meets the requirements of GHS Revision 3, HCS 2012 (29 CFR 1910.1200).

GHS Classifications:

Hazardous
Flammable liquids (Category 4), H227
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 3), H402

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2.2 GHS Label elements including precautionary statements:



Hazard pictograms:

GHS Signal Word: Warning

Hazard Statement:

Combustible liquid
Causes serious eye irritation
Harmful to aquatic life

Precautionary Statements:

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Wash skin after handling.
Avoid release to the environment.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.

If exposed or concerned, get medical advice/attention.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs, get medical attention.

IF IN EYES Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation occurs: Get medical advice/ attention.

IN CASE OF FIRE: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

STORAGE: Store in a well-ventilated place. Keep cool. Store in accordance with local/regional/national/international regulations.

DISPOSAL: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. See section 13 of this SDS for disposal instructions.

2.3 Other hazards which are not included in the classification criteria: None

May cause mild skin or respiratory irritation. Ingestion may cause gastric disturbances.

Section 3. Composition/Information on Ingredients

Chemical Name	CAS No.	EINECS No.	Weight percent
Diethyl malonate	105-53-3	203-306-9	99-100

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Section 4. First-Aid Measures

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area. Remove contaminated clothing.

4.1 Inhalation:

Move to fresh air. If breathing is difficult, give oxygen and continue to monitor. If not breathing, give artificial respiration. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. Call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

4.2 Skin contact:

Wash skin with plenty of soap and water. Remove contaminated clothing and shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before use.

4.3 Eye contact:

Immediately flush eyes thoroughly with water for several minutes. Remove contact lenses after one to two minutes and continue flushing for several more minutes. If redness, itching or burning sensation develops, seek medical attention.

4.4 Ingestion:

Give nothing by mouth. Call a poison center or physician. DO NOT INDUCE VOMITING. Never give anything by mouth to an unconscious person. Gently wipe or rinse the inside of the mouth with water. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

4.5 Most important acute and delayed symptoms/effects:

Eye Contact: May cause serious eye irritation.

Skin Contact: May cause redness and/or mild skin irritation.

Ingestion: May cause gastric disturbance.

Inhalation: May cause mild irritation.

Chronic health effects: None known.

Relevant routes of exposure: Eye, skin, inhalation.

4.6 Indication of immediate medical attention and notes for physicians:

Persons with pre-existing skin, eye, or respiratory conditions may be at an increased risk from the irritant properties of this material. Attending physician should treat exposed patients symptomatically

Protection of First Aiders: No action should be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

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Section 5. Fire-Fighting Measures

5.1 Flammable Properties:

Flash point: 93° C/ 199.4 °F

Lower explosion limit: No data

Upper explosion limit: No data

Auto ignition temperature: 424 ° C/ 795.2 °F

Thermal decomposition: When heated, hazardous gases may be released.

Fire and Explosion Hazard: Material will burn. When heated near Flash Point, combustible vapors may be produced.

5.2 Extinguishing media:

Suitable extinguishing media: Combustible material. Use CO₂, dry chemical, or foam. Water can be used to cool and protect product.

Unsuitable extinguishing media: Forceful application of fire extinguishing agents or water spray may spread burning material.

5.3 Special hazards arising from the chemical:

Unusual fire and explosion hazards: None known.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition, which may be toxic and/or irritating.

5.4 Special protective equipment and precautions for firefighters:

Fire Fighting Procedures: Keep personnel away. Isolate fire and deny unnecessary entry. Do not apply direct water stream. Use fine water spray or foam. Cool surroundings with water to localize fire zone.

Special Protective Equipment for Firefighters: No special protective equipment required. Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves) to protect against other burning material. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Section 6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Use personal protective equipment. Avoid breathing mists. Avoid skin and eye contact. Evacuate personnel to safe areas. Spilled material may cause a slipping hazard. Use appropriate safety equipment. See Section 8 for information on personal protection equipment.

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6.2 Environmental precautions and protective procedures:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains, sewers, waterways, and/or groundwater. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

6.3 Methods and material for containment and cleaning up:

Contain spilled material if possible. Eliminate all ignition sources including smoking, flares, sparks or flames in immediate area. All equipment used when handling the product must be grounded. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Section 7. Handling and Storage

7.1 Precautions for safe handling:

Avoid breathing process mists. Avoid contact with eyes, skin and clothing. Use with adequate ventilation. Do not eat, drink and/or smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage (including any incompatibilities):

Store in a cool place. Keep container tightly closed in a dry and well-ventilated place. Store in accordance with good manufacturing practices. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

Section 8. Exposure Controls and Personal Protection

Consult with a Health and Safety Professional for specific selections.

8.1 Control parameter: Occupational exposure limits - none listed.

8.2 Appropriate engineering controls: Use adequate general or local exhaust ventilation to control airborne concentrations.

8.3 Personal protective equipment:

Eye protection: Use safety glasses with side shields.

Body protection: Use protective clothing as needed.

Hand protection: Contact should be minimized. Protective gloves are recommended.

Respiratory protection: Concentration in air determines the level of respiratory protection needed. Wear respiratory protection if ventilation is inadequate. Use NIOSH certified respiratory equipment (NIOSH certified organic vapor/particulate respirator) as needed. Consult OSHA regulations for proper respiratory use (29 CFR 1910.134)

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Other: Remove contaminated clothing and wash before reuse. For non-fire emergencies, respiratory protection may be necessary and wear appropriate protective clothing to avoid contact with material. Have eyewash station, safety showers, and water supply in work area.

Do not consume or store food in the work area. Wash hands before smoking or eating.

Section 9. Physical and Chemical Properties**Section 10.**

Appearance:	
Physical state	Liquid
Color	Colorless
Odor	Fruity
Odor threshold	ND
pH	NA
Melting/freezing point	-51 to -50 °C (-60 to -58 °F)
Initial boiling point and range	197 °C @ 100.8 kPa
Flash point	90 °C (194 °F) - closed cup
Evaporation rate	ND
Flammability (solid, gas)	(vapor at elevated temperatures) Flammable category 4
Upper/lower flammability or explosive limits	ND
Vapor pressure	36 Pa @ 25 °C
Vapor density	5.53 (Air = 1)
Relative density/Specific gravity	1.049 - 1.055 @ 20 - 25 °C
Solubility(water)	23.2 g/L @ 37 °C
Partition coefficient n-octanol/water	0.96
Auto-ignition temperature	435 °C
Decomposition temperature	ND
Viscosity	ND

NA = Not applicable

ND = No data

Section 10. Stability and Reactivity

10.1 Chemical stability: Stable under normal temperature conditions and recommended use.

10.2 Possibility of hazardous reactions: No hazardous reactions if stored and handled as prescribed.

10.3 Conditions to avoid: Avoid heat, sparks, open flames, and other ignition sources.

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10.4 Incompatible materials: Strong oxidizers, acids, bases.

10.5 Hazardous decomposition products:

Decomposition products depend upon temperature, air supply and the presence of other materials. They are smoke and carbon monoxide. Processing may release fumes and other decomposition products. Fumes can be irritating.

10.6 Hazardous Polymerization: Will not polymerize.

Section 11. Toxicological Information

11.1 Information on the likely routes of exposure: Inhalation, ingestion, skin and eye contact.

11.2 Information on toxicological effects:

Acute toxicity

Human Experience:

4 % solution: no irritation or sensitization.

** SKIN IRRITATION DATA **

TYPE OF TEST:	Standard Draize test
ROUTE OF EXPOSURE:	Administration onto the skin
SPECIES OBSERVED:	Rodent - rabbit
DOSE/DURATION:	500 mg/24H
REACTION SEVERITY:	Mild

TYPE OF TEST:	LD50 - Lethal dose, 50 percent kill
ROUTE OF EXPOSURE:	Oral
SPECIES OBSERVED:	Rodent - rat
DOSE/DURATION:	14900 uL/kg

Skin corrosion/irritation: Causes mild skin irritation (Rabbit)
Classification: Not classified as irritant

Serious eye damage/irritation: Moderate to severe eye irritation (Rabbit)
Classification: Category 2 irritant

Inhalation: May cause mild respiratory tract irritation
Classification: Not classified

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Respiratory sensitization:	Did not cause sensitization on laboratory animals (mouse) Classification: Does not cause respiratory sensitization
Skin sensitization:	Did not cause sensitization on laboratory animals (guinea pig) Classification: Does not cause skin sensitization
Ingestion	May cause gastric disturbances Classification: Not toxic by ingestion.
Repeated dose toxicity	
Inhalation Rat:	No toxicologically significant effects were found.
Mutagenicity:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects
Reproductive Toxicity:	No known significant effects or critical hazards.
Teratogenicity:	No known significant effects or critical hazards.
Specific target organ toxicity (STOT):	
STOT-single exposure:	Classification: Not classified
STOT-repeated exposure:	Classification: Not classified
Aspiration Hazard:	Classification criteria not fulfilled.
Chronic effects:	Prolonged inhalation may be harmful

Symptoms related to the physical, chemical, and toxicological characteristics:

Eye contact: Pain or irritation, watering, redness.
Inhalation: irritation of respiratory tract, coughing, and difficulty breathing.
Skin contact: Irritation, redness.

11.3 Carcinogenicity: Not considered a carcinogen by IARC, NTP, OSHA, or ACGIH.

Section 12. Ecological Information

TOX DATA

Toxicity to fish
LC50 - Pimephales promelas (fathead minnow) - 10.8 mg/l - 96 h
Aquatic invertebrates
EC50 Daphna 202.3 mg/l; 48 hr. (IUCLID)

Aquatic plants
508.2 mg/L EC50 = 72 h (IUCLID)
Bacteria Toxicity:
3097 mg/l 16 hr.

Chronic toxicity: No Data

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- 12.1 Mobility:** Large volumes may penetrate soil and could contaminate groundwater.
- 12.2 Aquatic and terrestrial ecotoxicity:** No aquatic toxicity long-term. No data terrestrial toxicity data.
- 12.3 Persistence and degradability:** 99 % (28 d, Ready Biodegradability)
- 12.4 Bioaccumulative potential:** Expected to be low (log Pow < 1).
- 12.5 Other adverse effects:** none

Section 13. Disposal Considerations

13.1 Disposal methods:

Uncontaminated discarded product is not a hazardous waste under RCRA. Do not dump into any sewers, on the ground or into any body of water. All disposal practices must comply with all federal, state, and local laws and regulations. Offer surplus and non-recyclable material to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this.

13.2 Container disposal:

Empty container retains product residue. Observe all hazard precautions. Do not distribute, make available, furnish or reuse empty container except for storage and shipment of original product. Remove all product residue. Puncture or otherwise destroy empty container and dispose of in a facility permitted for nonhazardous waste.

Section 14. Transport Information

- 14.1 NA number:** 1993
- 14.2 UN proper shipping name:** Combustible liquid, n.o.s. (Diethyl malonate)
- 14.3 Transport hazard class:** Not regulated
- 14.4 Packing group (if applicable):** III
- 14.5 Marine Pollutant (Yes/No):** No
- 14.6 IMDG** Not dangerous goods.
- 14.7 IATA** Not dangerous goods.

Section 15. Regulatory Information

U.S. Regulations

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15.1 USA TSCA: Listed on the TSCA Inventory.

15.2 SARA Section 311/312 Hazard Categories:

Acute Hazard: Yes

Chronic Hazard: No

Fire Hazard: Yes

Reactive Hazard: No

Sudden Pressure Release: No

Clean Water Act This product does not contain any hazardous substances listed under the US Clean Water Act Section 311.

15.3 CERCLA Hazardous Substance SARA Section 304 Release Reporting:

<u>Component(s)</u>	<u>Reportable Quantity</u>
None	

15.4 SARA Section 302 Extremely Hazardous Substances:

<u>Component(s)/ CAS Number</u>	<u>Concentration</u>	<u>Min</u>	<u>Max</u>
None			

15.5 SARA Section 313 Toxic Chemicals:

<u>Component(s)/ CAS Number</u>	<u>Reporting Threshold</u>	<u>Concentration Min</u>	<u>Max</u>
None			

15.6 California Proposition 65: This product is not known to contain chemical(s) known to the State of California to cause cancer or reproductive harm.

15.7 Pennsylvania Worker and Community Right To Know Act:

Diethyl malonate CAS No. 105-53-3

15.8 New Jersey Worker and Community Right To Know Act

Diethyl malonate CAS No. 105-53-3

15.9 International Regulations:

Canadian Regulations:

WHMIS Statement: This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the SDS contains all the information required by the *Controlled Products Regulations*. This product is classified as controlled in accordance with the Canadian Controlled Products Regulations.

This product complies with RoHS (Restriction on Hazardous Substances).

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Other requirements: Inventory Listing

TSCA - <i>United States Toxic Substances Control Act Section 8(b) Inventory</i>	LISTED
DSL - <i>Canadian Domestic Substances List</i>	LISTED
NDSL - <i>Non-Domestic Substances List</i>	NOT LISTED
EINECS - <i>European Inventory of Existing Chemical Substances/European</i>	LISTED
ELINCS - <i>List of Notified Chemical Substances</i>	NOT LISTED
ENCS - <i>Japan Existing and New Chemical Substances</i>	LISTED
KECL - <i>Korean Existing and Evaluated Chemical Substances</i>	LISTED
AICS Australia - <i>Australian Inventory of Chemical Substances</i>	LISTED
PICCS - <i>Philippine Inventory</i>	LISTED
IECSC - <i>Inventory of Existing Chemical Substances Produced or Imported in China</i>	LISTED
NLP - <i>No Longer Polymers List</i>	LISTED

Section 16. Other Information

16.1 NFPA and HMIS Hazard Ratings:

We assigned NFPA and HMIS ratings to this product based on the hazards of its ingredient(s). Because the customer is most aware of the application of the product, the customer must ensure that the proper personal protective equipment (PPE) is provided consistent with information contained in the product SDS. This information is intended solely for the use of individuals trained in the particular hazard rating system.

Key: 0 = least, 1 = slight, 2 = moderate, 3 = high, 4 = extreme

NFPA (National Fire Protection Association) - Classification

Health	2 = moderate
Flammability	2 = moderate
Instability or Reactivity	0 minimal

HMIS® [Hazardous Materials Identification System (Paint & Coating)] - Classification

Health	2 = moderate
Flammability	2 = moderate
Reactivity	0 minimal

NFPA, HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this SDS must be considered. This information is supplied solely for the use of individuals trained in the particular hazard rating system.

16.2 Revision information:

Previous version:	11/25/2013 (Version 2)
Date of this revision:	02/09/2016 (Version 3)
Revision summary:	GHS/OSHA compliant SDS

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16.3 Training advice: Provide adequate information, instruction and training for operators. Additional references static charges include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

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

ACGIH	American Conference of Governmental Industrial Hygienists
BEI	Biological Exposure Index
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
NOAEL	No observed adverse effect level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
OECD	Organization for Economic Co-operation and Development
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
OEL	Occupational Exposure Limit
PEL	Permissible Exposure Limit
ppm	parts per million
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
Action Level	An exposure value set by OSHA that is lower than the PEL that will trigger the need for activities such as exposure monitoring and medical surveillance.
<i>DNEL</i>	<i>The derived no-effect level is the level of exposure to a substance above which humans should not be exposed. According to REACH</i>

Declare to reader:

The opinions expressed herein are those of qualified experts within R.E. Carroll, Inc. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

END OF SDS
