

Safety Data Sheet ENEM1700
Issue date: 07/21/2023 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product name : Maleic anhydride
Product code : ENEM1700
Product form : Substance
Physical state : Solid
Formula : C4H2O3

Synonyms : cis-BUTENEDIOC ANHYDRIDE

Chemical family : ORGANIC

1.2. Recommended use and restrictions on use

Recommended use : Chemical intermediate

1.3. Supplier

GELEST, INC.

11 East Steel Road Morrisville. PA 19067

USA

T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST

info@gelest.com - www.gelest.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Acute toxicity (oral) Category 4 H302 Harmful if swallowed

Skin corrosion/irritation Category 1B H314 Causes severe skin burns and eye damage

Serious eye damage/eye irritation Category 1 H318 Causes serious eye damage

Respiratory sensitization, Category 1 H334 May cause an allergy or asthma symptoms or breathing difficulties if inhaled

Skin sensitization, Category 1 H317 May cause an allergic skin reaction

Specific target organ toxicity (repeated exposure) H372 Causes damage to organs through prolonged or repeated exposure

Category 1

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) : H302 - Harmful if swallowed

H314 - Causes severe skin burns and eye damage

H317 - May cause an allergic skin reaction H318 - Causes serious eye damage

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Precautionary statements (GHS US)

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H334 - May cause an allergy or asthma symptoms or breathing difficulties if inhaled

H372 - Causes damage to organs through prolonged or repeated exposure

: P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.

P264 - Wash hands thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product.

P272 - Contaminated work clothing must not be allowed out of the workplace.

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

P284 - [In case of inadequate ventilation] wear respiratory protection.

P301+P312 - If swallowed: Call a poison center or doctor if you feel unwell.

P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting.

P303+P361+P353 - If on skin (or hair): take off immediately all contaminated clothing. rinse skin

with water/shower

P304+P341 - If inhaled: If breathing is difficult, remove person to fresh air and keep 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

P310 - Immediately call a doctor.

P321 - Specific treatment (see first aid instructions on this label).

P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.

P342+P311 - If experiencing respiratory symptoms: Call a poison center or doctor.

P363 - Wash contaminated clothing before reuse.

P405 - Store locked up.

P501 - Dispose of contents/container to licensed waste disposal facility...

2.3. Hazards not otherwise classified (HNOC)

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

: Mono-constituent Substance type Name Maleic anhydride CAS-No. : 108-31-6

Name	Product identifier	%	GHS US classification
Maleic anhydride	CAS-No.: 108-31-6	95 – 100	Acute Tox. 4 (Oral), H302 Skin Corr. 1B, H314 Eye Dam. 1, H318 Resp. Sens. 1, H334 Skin Sens. 1, H317 STOT RE 1, H372

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 : Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available

show packaging or label.

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First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel

unwell, seek medical advice.

First-aid measures after skin contact : Wash with plenty of soap and water. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if

present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Never give anything by mouth to an unconscious person. Get medical advice/attention.

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

Symptoms/effects : Causes severe skin burns and eye damage. Causes damage to organs through prolonged or

repeated exposure.

Symptoms/effects after inhalation : May cause irritation to the respiratory tract. May cause an allergy or asthma symptoms or

breathing difficulties if inhaled.

Symptoms/effects after skin contact : Causes (severe) skin burns. May cause an allergic skin reaction.

Symptoms/effects after eye contact : Causes serious eye damage.

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 : Alcohol-resistant foam. Carbon dioxide. Dry chemical.

Unsuitable extinguishing media : Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Specific hazards arising from the chemical

Fire hazard : Irritating fumes and organic acid vapors may develop when material is exposed to elevated

temperatures or open flame.

Reactivity : The product is stable and non-reactive under normal conditions of use, storage and transport.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Exercise caution when fighting any chemical fire. Use water spray to cool exposed surfaces.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid

contact with skin and eyes. Do not breathe dust.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment as described in Section 8.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. Equip cleanup crew with

proper protection. For further information refer to section 8: "Exposure controls/personal

protection".

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or

streams.

Methods for cleaning up : Sweep or shovel spills into appropriate container for disposal.

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6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid contact with skin and eyes. Avoid dust formation. Do not breathe dust. Provide local

exhaust or general room ventilation to minimize exposure to dust.

Hygiene measures : Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap

and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container tightly closed. Store locked up.

Incompatible materials : Strong oxidizing agents. Caustics.

Storage area : Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Maleic anhydride (108-31-6)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Maleic anhydride
ACGIH OEL TWA	0.01 mg/m³ (IFV - Inhalable fraction and vapor)
Remark (ACGIH)	TLV® Basis: Resp sens. Notations: DSEN; RSEN; A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2023
USA - OSHA - Occupational Exposure Limits	
Local name	Maleic anhydride
OSHA PEL (TWA) [1]	1 mg/m³
OSHA PEL (TWA) [2]	0.25 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

8.2. Appropriate engineering controls

Appropriate engineering controls : Provide local exhaust or general room ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection:

Neoprene or nitrile rubber gloves

Eye protection:

Chemical goggles or face shield. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified dust and mist (orange cartridge) respirator.

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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid
Appearance : Solid.
Molecular mass : 98.06 g/mol
Color : whitish.
Odor : Strong.

Odor threshold : No data available pH : No data available Relative evaporation rate (butyl acetate=1) : No data available Melting point : 51 – 56 °C Freezing point : No data available

Boiling point : 200 °C Flash point : 103 °C

Auto-ignition temperature : No data available

Decomposition temperature : > 150 °C

· No data available Flammability (solid, gas) No data available Vapor pressure Relative vapor density at 20°C No data available Relative density No data available Solubility No data available Partition coefficient n-octanol/water (Log Pow) No data available No data available Partition coefficient n-octanol/water (Log Kow) Viscosity, kinematic No data available Viscosity, dynamic No data available Explosive properties No data available Oxidizing properties No data available **Explosion limits** No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is stable and non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

The product is stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerization does not occur.

10.4. Conditions to avoid

Avoid temperaturs exceeding the decomposition temperature. Contact with incompatible materials.

10.5. Incompatible materials

Strong oxidizing agents. Caustics.

10.6. Hazardous decomposition products

No hazardous decomposition products known.

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Respiratory or skin sensitization

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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

Maleic anhydride (108-31-6)	
ATE US (oral)	1030 mg/kg body weight
Maleic anhydride (108-31-6)	
LD50 oral rat	1030 mg/kg Source: ECHA
LD50 dermal rabbit	2620 mg/kg Source: ECHA
Skin corresion/irritation	· Causes savara skin hurns

Skin corrosion/irritation : Causes severe skin burns.

Skin-Rabbit, Result: Corrosive -4 h (OECD test Guideline 404)

Serious eye damage/irritation : Causes serious eye damage.

Eye-Rabbit, Result: Corrosive

: May cause an allergy or asthma symptoms or breathing difficulties if inhaled. May cause an

allergic skin reaction.

Maximisation Test (GPMT)-Guinea pig, Result: The product is a skin sensitiser, sub-category 1B

(OECD test Guideline 406)

Germ cell mutagenicity : Not classified Carcinogenicity : Not classified

None of the components in this product at concentrations >0.1% are listed by IARC, NTP, OSHA

or ACGIH as a carcinogen.

Reproductive toxicity : Not classified STOT-single exposure : Not classified

STOT-repeated exposure : Causes damage to organs through prolonged or repeated exposure.

Maleic anhydride (108-31-6)	
NOAEL (oral,rat,90 days)	≈ 10 mg/kg body weight Animal: rat, Guideline: OECD Guideline 452 (Chronic Toxicity Studies)
NOAEC (inhalation,rat,vapor,90 days)	≈ 0.0033 mg/l air Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)
Aspiration hazard	: Not classified
Symptoms/effects after inhalation	: May cause irritation to the respiratory tract. May cause an allergy or asthma symptoms or breathing difficulties if inhaled.
Symptoms/effects after skin contact	: Causes (severe) skin burns. May cause an allergic skin reaction.

Symptoms/effects after eye contact : Causes serious eye damage. Symptoms/effects after ingestion : Harmful if swallowed.

SECTION 12: Ecological information

12.1. Toxicity

Maleic anhydride (108-31-6)	
LC50 - Fish [1]	75 mg/l Source: ECHA
EC50 - Crustacea [1]	330 mg/l Source: ECHA
LC50 - Fish [2]	75 mg/l Test organisms (species): Lepomis macrochirus
EC50 72h - Algae [1]	> 150 mg/l Source: ECHA

12.2. Persistence and degradability

No additional information available

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12.3. Bioaccumulative potential

Maleic anhydride (108-31-6)

Partition coefficient n-octanol/water (Log Pow) 1.62 Source: HSDB

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other adverse effects : This substance may be hazardous to the environment.

Effect on the ozone layer : No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Sewage disposal recommendations : Do not dispose of waste into sewer.

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of

contents/container to licensed waste disposal facility..

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

DOT	TDG	IMDG	IATA		
14.1. UN number					
2215	UN2215	2215	2215		
14.2. Proper Shipping Name					
Maleic anhydride	MALEIC ANHYDRIDE	MALEIC ANHYDRIDE, MOLTEN	Maleic anhydride		
Transport document description					
UN2215 Maleic anhydride, 8, III	UN2215 MALEIC ANHYDRIDE, 8 III	, UN 2215 MALEIC ANHYDRIDE, MOLTEN, 8, III	UN 2215 Maleic anhydride, 8, III		
14.3. Transport hazard class(es	14.3. Transport hazard class(es)				
8	8	8	8		
CORROSIVE	8	8	8		
Not applicable	Not applicable				
14.4. Packing group					
III	III	III	III		
14.5. Environmental hazards					
Dangerous for the environment: No	Dangerous for the environment: N	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No		
No supplementary information availab	le		I		

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14.6. Special precautions for user

DOT

UN-No.(DOT) : UN2215

DOT Special Provisions (49 CFR 172.102)

: IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3,

13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).

IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.

T1 - 1.5 178.274(d)(2) Normal...... 178.275(d)(2)

TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.

DOT Packaging Exceptions (49 CFR 173.xxx) : 154

DOT Packaging Non Bulk (49 CFR 173.xxx) : 213

DOT Packaging Bulk (49 CFR 173.xxx) : 240

DOT Quantity Limitations Passenger aircraft/rail (49 : 25 kg

CFR 173.27)

DOT Quantity Limitations Cargo aircraft only (49 : 100 kg

CFR 175.75)

DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a

passenger vessel.

DOT Vessel Stowage Other : 53 - Stow "separated from" alkaline compounds,58 - Stow "separated from" cyanides,95 - Stow

"separated from" foodstuffs,102 - Stow "separated from" all odor absorbing cargoes

TDG

UN-No. (TDG) : UN2215
Explosive Limit and Limited Quantity Index : 5 kg
Excepted quantities (TDG) : E1
Passenger Carrying Road Vehicle or Passenger : 25 kg

Carrying Railway Vehicle Index

Emergency Response Guide (ERG) Number : 156

IMDG

Limited quantities (IMDG) : 0

Excepted quantities (IMDG) : E0

Tank instructions (IMDG) : T4

Tank special provisions (IMDG) : TP3

EmS-No. (Fire) : F-A - FIRE SCHEDULE Alfa - GENERAL FIRE SCHEDULE
EmS-No. (Spillage) : S-B - SPILLAGE SCHEDULE Bravo - CORROSIVE SUBSTANCES

Stowage category (IMDG) : ...

Segregation (IMDG) : SGG1, SG36, SG49, SG50, SG57

Properties and observations (IMDG) : Melting point: about 53°C. The vapour of the molten substance has a flashpoint of 103°C c.c.

and forms a flammable atmosphere with explosive limits of 1.4% to 7.1%. Fumes are irritating to

skin, eyes and mucous membranes.

IATA

PCA Excepted quantities (IATA) : E1
PCA Limited quantities (IATA) : Y845
PCA limited quantity max net quantity (IATA) : 5kg

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PCA packing instructions (IATA) : 860
PCA max net quantity (IATA) : 25kg
CAO packing instructions (IATA) : 864
CAO max net quantity (IATA) : 100kg
Special provision (IATA) : A803
ERG code (IATA) : 8L

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

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
Maleic anhydride	108-31-6	Present	Active	

Maleic anhydride (108-31-6)

Subject to reporting requirements of United States SARA Section 313

Listed on EPA Hazardous Air Pollutant (HAPS)

CERCLA RQ 5000 lb

15.2. International regulations

CANADA

Maleic anhydride (108-31-6)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Maleic anhydride (108-31-6)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Maleic anhydride (108-31-6)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Listed on NZIoC (New Zealand Inventory of Chemicals)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Listed on KECL/KECI (Korean Existing Chemicals Inventory)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

Listed on the Japanese ENCS (Existing New Chemical Substances) inventory

Listed on CICR (Turkish Inventory and Control of Chemicals)

Listed on the TCSI (Taiwan Chemical Substance Inventory)

Listed on TECI (Thailand Existing Chemicals Inventory)

Listed on the NCI (Vietnam - National Chemical Inventory)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

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- 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

SECTION 16: Other information

Full text of H-phrases::

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
H334	May cause an allergy or asthma symptoms or breathing difficulties if inhaled
H372	Causes damage to organs through prolonged or repeated exposure

Abbreviations and acronyms

: Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemcial Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating Health

Flammability

Physical

- : 3 Serious Hazard Major injury likely unless prompt action is taken and medical treatment is given
- 1 Slight Hazard Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 F. (Class IIIB)
- : 1 Slight Hazard Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Prepared by safety and environmental affairs.

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SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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