



MATERIAL SAFETY DATA SHEET

according to the Hazard Communication Standard (29 CFR 1910.1200)

Date of issue: 12/20/2012

Version 1.0

SECTION 1. Identification

Product identifier

Product number 800408
Product name Maleic anhydride for synthesis

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

Identified uses Chemical for synthesis

Details of the supplier of the safety data sheet

Company EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | SDS Phone Support: +1-978-715-1335 | General Inquiries: +1-978-751-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)

e-mail: mm_sds@merckgroup.com

Emergency telephone 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Acute toxicity, Category 4, Oral, H302
Skin corrosion, Category 1B, H314
Respiratory sensitization, Category 1, H334
Skin sensitization, Category 1, H317

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

GHS-Labeling

Hazard pictograms



Signal Word
Danger

Hazard Statements

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

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H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties 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.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P341 IF INHALED: If breathing is difficult, 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.

P309 + P310 IF exposed or if you feel unwell: Immediately call a POISON CENTER or doctor/physician.

OSHA Hazards

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other hazards

None known.

SECTION 3. Composition/information on ingredients

| | |
|------------|---|
| Formula | C ₄ H ₂ O ₃ (Hill) |
| CAS-No. | 108-31-6 |
| Molar mass | 98.06 g/mol |

Hazardous ingredients

Chemical Name (Concentration)

CAS-No.

maleic anhydride (>= 90 % - <= 100 %)

108-31-6

SECTION 4. First aid measures

Description of first-aid measures

Inhalation

After inhalation: fresh air. Call in physician.

Skin contact

After skin contact: wash off with plenty of water. Immediately remove contaminated clothing. If available swab with polyethylene glycol 400. Call a physician immediately.

Eye contact

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

Ingestion

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation!). Call a physician immediately. Do not attempt to neutralize.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

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Irritation and corrosion, Asthmatic appearance, Allergic reactions, Cough, Shortness of breath
Risk of blindness!

Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

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

Unsuitable extinguishing media

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

Special hazards arising from the substance or mixture

Combustible.

Risk of dust explosion.

Forms explosive mixtures with air on intense heating.

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

Advice for firefighters

Special protective equipment for fire-fighters

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

Prevent fire extinguishing water from contaminating surface water or the ground water system.
Suppress (knock down) gases/vapors/mists with a water spray jet. Remove container from danger zone and cool with water.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact.

Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

Environmental precautions

Do not empty into drains.

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 dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

Work under hood. Do not inhale substance/mixture.

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Conditions for safe storage, including any incompatibilities

Tightly closed. Dry. Keep locked up or in an area accessible only to qualified or authorized persons.

Store at +15°C to +25°C (+59°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

| Basis | Value | Threshold limits | Remarks |
|----------------------------------|-----------------------------------|---------------------------------|---------|
| <i>maleic anhydride 108-31-6</i> | | | |
| ACGIH | Time Weighted Average (TWA): | 0.01 mg/m ³ | |
| NIOSH/GUIDE | Recommended exposure limit (REL): | 0.25 ppm 1 mg/m ³ | |
| OSHA_TRANS | PEL: | 0.25 ppm 1 mg/m ³ | |
| Z1A | Time Weighted Average (TWA): | 0.25 ppm 1 mg/m ³ | |

Engineering measures

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

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

Eye/face protection

Tightly fitting safety goggles

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Other protective equipment:

protective clothing

Respiratory protection

required when dusts are generated.

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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SECTION 9. Physical and chemical properties

| | |
|--|---|
| Physical state | scales |
| Color | white |
| Odor | aromatic |
| Odor Threshold | No information available. |
| pH | 0.8 at 550 g/l 68 °F (20 °C) Hydrolyzis |
| Melting point | 124 - 127 °F (51 - 53 °C) |
| Boiling point/boiling range | 396 °F (202 °C) at 1,013 hPa |
| Flash point | 217 °F (103 °C) Method: c.c. |
| Evaporation rate | No information available. |
| Flammability (solid, gas) | No information available. |
| Lower explosion limit | 1.4 %(V) |
| Upper explosion limit | 7.1 %(V) |
| Vapor pressure | 1.33 hPa at 111 °F (44 °C) |
| Relative vapor density | 3.4 |
| Relative density | 1.32 g/cm ³ at 131 °F (55 °C) |
| Water solubility | at 68 °F (20 °C) soluble, (decomposition) |
| Partition coefficient: n-octanol/water | No information available. |
| Autoignition temperature | No information available. |
| Decomposition temperature | > 392 °F (> 200 °C) |
| Viscosity, dynamic | 1.6 mPa.s at 140 °F (60 °C) |

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| | |
|----------------------|-------------------------------|
| Explosive properties | Not classified as explosive. |
| Ignition temperature | 887 °F (475 °C) DIN 51794 |
| Bulk density | 700 - 800 kg/m ³ |

SECTION 10. Stability and reactivity

Reactivity

Risk of dust explosion.
Forms explosive mixtures with air on intense heating.

Chemical stability

sensitive to moisture

Possibility of hazardous reactions

Violent reactions possible with:

Exothermic reaction with:

Alkali metals, alkali hydroxides, Amines, strong alkalis, pyridine, alkaline earth hydroxides,
Alcohols

sodium carbonate, with

Heat.

Exothermic reaction with:

alkaline earth hydroxides, Oxidizing agents

Water, with

Heat.

Generates dangerous gases or fumes in contact with:

ammonium compounds

Conditions to avoid

Strong heating.

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

Incompatible materials

no information available

Hazardous decomposition products

no information available

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure

Eye contact, Skin contact, Ingestion

Target Organs

Eyes

Skin

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Respiratory system

Acute oral toxicity

LD50 rat: 1,090 mg/kg
OECD Test Guideline 401

absorption

Symptoms: Burns of: mouth, pharynx, oesophagus, Gastrointestinal tract

Acute inhalation toxicity

Symptoms: mucosal irritations, Cough, Shortness of breath, Asthmatic appearance, Lung edema, Possible damages: damage of respiratory tract

Corrosive to respiratory system

Acute dermal toxicity

LD50 rabbit: 2,620 mg/kg
(RTECS)

Skin irritation

rabbit

Result: Severe irritations
OECD Test Guideline 404

Causes burns.

Eye irritation

rabbit

Result: Causes burns.
OECD Test Guideline 405

Causes serious eye damage. Risk of blindness!

Sensitization

Sensitization test: guinea pig
Result: positive
Method: OECD Test Guideline 406

May cause an allergic skin reaction.

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

Genotoxicity in vitro

Ames test
Salmonella typhimurium
Result: negative
(National Toxicology Program)

Specific target organ systemic toxicity - single exposure

The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC No ingredient of this product present at levels greater than or

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| | |
|-------|---|
| | equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| OSHA | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA. |
| NTP | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
| ACGIH | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH. |

Further information

Decomposition of the substance with tissue moisture.

After absorption:

Headache, Nausea, Impairment of vision

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish

LC50 *Lepomis macrochirus* (Bluegill sunfish): 138 mg/l; 48 h (IUCLID)

Toxicity to daphnia and other aquatic invertebrates

EC50 *Daphnia magna* (Water flea): 88 mg/l; 24 h (IUCLID)

Toxicity to algae

IC50 *Desmodesmus subspicatus* (green algae): 29 mg/l; 72 h (IUCLID)

Toxicity to bacteria

EC10 *Pseudomonas putida*: 44.6 mg/l; 18 h (IUCLID)

Persistence and degradability

Biodegradability

98 %; 7 d

OECD Test Guideline 301E

Readily biodegradable.

Bioaccumulative potential

No information available.

Mobility in soil

No information available.

Other adverse effects

Additional ecological information

Discharge into the environment must be avoided.

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SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

| | |
|---------------------------|------------------|
| UN number | UN 2215 |
| Proper shipping name | MALEIC ANHYDRIDE |
| Class | 8 |
| Packing group | III |
| Environmentally hazardous | -- |

Air transport (IATA)

| | |
|------------------------------|------------------|
| UN number | UN 2215 |
| Proper shipping name | MALEIC ANHYDRIDE |
| Class | 8 |
| Packing group | III |
| Environmentally hazardous | -- |
| Special precautions for user | no |

Sea transport (IMDG)

| | |
|------------------------------|------------------|
| UN number | UN 2215 |
| Proper shipping name | MALEIC ANHYDRIDE |
| Class | 8 |
| Packing group | III |
| Environmentally hazardous | -- |
| Special precautions for user | yes |
| EmS | F-A S-B |

SECTION 15. Regulatory information

United States of America

OSHA Hazards

Harmful if swallowed.
Corrosive to skin
Skin sensitizer
Respiratory sensitizer
Corrosive by inhalation.
Target organ effects
Corrosive to eyes

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This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

SARA 311/312 Hazards

Acute Health Hazard
Chronic Health Hazard

SARA 313

The following components are subject to reporting levels established by SARA Title III, Section 313:

Ingredients
maleic anhydride 108-31-6

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

Ingredients
maleic anhydride

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

Ingredients
maleic anhydride

US State Regulations

Massachusetts Right To Know

Ingredients
maleic anhydride

Pennsylvania Right To Know

Ingredients
maleic anhydride

New Jersey Right To Know

Ingredients
maleic anhydride

California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

TSCA: On TSCA Inventory
DSL: All components of this product are on the Canadian DSL.

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

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Full text of H-Statements referred to under sections 2 and 3.

| | |
|------|--|
| H302 | Harmful if swallowed. |
| H314 | Causes severe skin burns and eye damage. |
| H317 | May cause an allergic skin reaction. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |

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.

Date of issue: 12/20/2012

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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