Material Safety Data Sheet

Maleic anhydride

Section 1 - Product Identification

Synonyms : Furan-2,5-dione, Maleic anhydride, cis-Butenedioic anhydride, 2,5-Furanedione

Molecular Weight : 98.057 g/mol

Chemical Formula : $C_4H_2O_3$

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Recommended use of the chemical and restrictions on use:

Manufacturing

Section 2 – Composition/Information on Ingredients

Product Name	EC Code/CAS No	Concentration
Maleic Anhydride	203-571-6/108-31-6	>= 99.5%

Section 3 – Hazards Identification

3.1 GHS Classification

Acute toxicity, Oral (Category 4), H302

Skin corrosion/irritation (Category 1), H314

Serious eye damage/eye irritation (Category 1), H318

Respiratory sensitisation (Category 1), H334

Skin sensitisation (Category 1), H317

Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Respiratory system, H372

Specific target organ toxicity - repeated exposure, Oral (Category 2), Kidney, H373

3.2 Label elements

Hazard statement(s)

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.

H372 Causes damage to organs through prolonged or repeated exposure if inhaled.

H373 May cause damage to organs through prolonged or repeated exposure if swallowed.

Precautionary statement(s)

Prevention

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

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

P284 Wear respiratory protection.

Response

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 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.

P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

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

P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor

3.3 Other hazards

Corrosive to the respiratory tract. Sternutator.

Section 4 – First-Aid Measures

4.1. Description of first aid mesaures

Skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Inhalation

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

Ingestion

Do NOT induce vomiting. 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

Most important known symptoms and effects are described in the labelling (section 2.2) and/or in section 11.

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

N.A.

Section 5 – Fire Fighting Measures

5.1. Suitable Extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2. Specific hazards arising from the chemical

Carbon oxides.

5.3. Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4. Further information

Section 6 – Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3. Methods and material for containment and cleaning up

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

For disposal see section 13.

Section 7 – Handling and Storage

7.1. Precautions for safe Handling

Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry, cool and well-ventilated place.

Section 8 – Exposure Controls/Personal Protection

8.1. Control parameters

Maleic anhydride (CAS No: 108-31-6): PEL (long term) – 0.25ppm, 1mg/m^3. Basis: Singapore Workplace Safety and health act – First Schedule Permissible Exposure Limits of Toxic Substances.

8.2. Appropriate engineering controls

General industrial hygiene practice. Wash hands before breaks and at the end of workday.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Respirator:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Clothing:

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Gloves:

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection:

Wear safety goggles or face shield which are tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Section 9 – Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance : White Bars

Odour : N.A.

Odour threshold : N.A.

pH @ 25°C : N.A.

Melting point : 51-56°C – lit.

Boiling point : 200°C – lit.

Flash point : N.A.

Evaporation rate : N.A.

Flammability : N.A.

Upper/lower flammability or explosive limits : N.A.

Vapour pressure : 15.1 Pa at 22°C – OECD Test Guideline 104

Vapour density : N.A.

Relative density : 1.48g /cm^3 at 20°C

Solubility in water : 132g/L at 20°C – completely soluble

Partition coefficient, n-octanol/water: log Pow = -2.609 at 20°C – OECD Test Guideline 107

Auto-ignition temperature: N.A.

Decomposition Temperature: N.A

Section 10 – Stability and Reactivity

10.1. Reactivity

N.A.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

N.A.

10.4. Conditions to avoid:

N.A.

10.5. Incompatible materials

Strong oxidizing agents, Strong acids, Strong bases, Strong reducing agents, Alkali metals, Amines

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions – Carbon oxides.

Section 11 – Toxicological Information

Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - 1.090 mg/kg (Maleic anhydride) (OECD Test Guideline 401)

LC50 Inhalation - Rat - 1 h - > 4,35 mg/l (Maleic anhydride)

LD50 Dermal - Rabbit - female - 2.620 mg/kg (Maleic anhydride)

Skin corrosion/irritation

Skin - Rabbit

Result: Causes burns – 4h.

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Corrosive.

Respiratory or skin sensitisation

Rat (Maleic anhydride)

Result: May cause sensitisation by inhalation.

Buehler Test - Guinea pig (Maleic anhydride)

Result: May cause sensitisation by skin contact. (OECD Test Guideline 406)

Germ cell mutagenicity

Ames test (Maleic anhydride)

Salmonella typhimurium

Result: negative

OECD Test Guideline 475(Maleic anhydride)

Rat - male and female

Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Inhalation - Causes damage to organs through prolonged or repeated exposure. - Respiratory system

Oral - May cause damage to organs through prolonged or repeated exposure. - Kidney

Aspiration hazard

No data available

Additional Information

Repeated dose toxicity - Rat - male - Lowest observed adverse effect level - 250 mg/kg (Maleic anhydride)

RTECS: ON3675000

Cough, Shortness of breath, Headache, Nausea, Vomiting (Maleic anhydride)

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated (Maleic anhydride).

Section 12 – Ecological Information

12.1 Toxicity

Toxicity to fish static test LC50 - Oncorhynchus mykiss (rainbow trout) - 75 mg/l - 96 h (Maleic anhydride)

Toxicity to daphnia and other aquatic invertebrates static test EC50 - Daphnia magna (Water flea) - 330 mg/l - 48 h (Maleic anhydride)

Toxicity to algae Growth inhibition EC50 - Selenastrum capricornutum (green algae) - > 150 mg/l - 72 h (Maleic anhydride) (OECD Test Guideline 201)

Toxicity to bacteria EC10 - Pseudomonas putida – 44.6 mg/l - 18 h (Maleic anhydride) (DIN 38 412 Part 8)

12.2 Persistence and degradability

Biodegradability Biotic/Aerobic - Exposure time 28 d (Maleic anhydride)

Result: 73 - 81 % - Readily biodegradable.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available (Maleic anhydride)

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

Harmful to aquatic life.

Section 13 – Disposal Considerations

13.1. Disposal methods

Product:

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chem scrubber.

Contaminated packaging:

Dispose of as unused product.

Section 14 – Transport Information

14.1. UN number : ADR/RID: 2215 IMDG: 2215 IATA-DGR: 2215

14.2. UN proper shipping name: ADR/RID, IMDG, IATA-DGR – Maleic Anhydride

14.3. Transport of hazard classes : ADR/RID: 8 IMDG: 8 IATA-DGR: 8

14.4. Packing group : ADR/RID: III IMDG: III IATA-DGR: III

14.5. Environmental hazards : ADR/RID: no IMDG Marine pollutant: no IATA-DGR: no

14.6. Special precautions for user : No data available

14.7. Incompatible materials:

Section 15 – Regulatory Information

15.1. Safety, health and environmental regulations for the substance/mixture:

No data available.

Section 16 : Additional Information

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

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H317 May cause an allergic skin reaction.

H318 Causes serious eye damage.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H372 Causes damage to organs through prolonged or repeated exposure if inhaled.

H373 May cause damage to organs through prolonged or repeated exposure if swallowed.

16.2. Disclaimer of Liability

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