1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Description</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>Maleic anhydride</td>
</tr>
<tr>
<td>Product Number</td>
<td>63200</td>
</tr>
<tr>
<td>Brand</td>
<td>Fluka</td>
</tr>
<tr>
<td>Supplier</td>
<td>Sigma-Aldrich</td>
</tr>
<tr>
<td>Supplier Address</td>
<td>3050 Spruce Street, SAINT LOUIS MO 63103 USA</td>
</tr>
<tr>
<td>Telephone</td>
<td>+1 800-325-5832</td>
</tr>
<tr>
<td>Fax</td>
<td>+1 800-325-5052</td>
</tr>
<tr>
<td>Emergency Phone #</td>
<td>(314) 776-6555</td>
</tr>
<tr>
<td>Preparation Information</td>
<td>Sigma-Aldrich Corporation</td>
</tr>
<tr>
<td></td>
<td>Product Safety - Americas Region</td>
</tr>
<tr>
<td></td>
<td>1-800-521-8956</td>
</tr>
</tbody>
</table>

2. HAZARDS IDENTIFICATION

**Emergency Overview**

**OSHA Hazards**
Toxic by ingestion, Skin and respiratory sensitizer, Corrosive

**Other hazards which do not result in classification**
Sternutator.

**GHS Classification**
- Acute toxicity, Dermal (Category 5)
- Acute toxicity, Oral (Category 4)
- Skin corrosion (Category 1B)
- Serious eye damage (Category 1)
- Respiratory sensitization (Category 1)
- Skin sensitization (Category 1)
- Acute aquatic toxicity (Category 3)

**GHS Label elements, including precautionary statements**

**Pictogram**

**Signal word**
Danger

**Hazard statement(s)**
- **H302** Harmful if swallowed.
- **H313** May be harmful in contact with skin.
- **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.
- **H402** Harmful to aquatic life.

**Precautionary statement(s)**
- **P261** Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
- **P280** Wear protective gloves/ protective clothing/ eye protection/ face protection.
- **P305 + P351 + P338** 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 or doctor/physician.

P310

HMIS Classification
- Health hazard: 3
- Chronic Health Hazard: *
- Flammability: 0
- Physical hazards: 0

NFPA Rating
- Health hazard: 3
- Fire: 0
- Reactivity Hazard: 0

Potential Health Effects
- Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
- Skin: May be harmful if absorbed through skin. Causes skin burns.
- Eyes: Causes eye burns.
- Ingestion: Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: 2,5-Furandione

Formula: C₄H₂O₃

Molecular Weight: 98.06 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maleic anhydride</td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>108-31-6</td>
</tr>
<tr>
<td>EC-No.</td>
<td>203-571-6</td>
</tr>
<tr>
<td>Index-No.</td>
<td>607-096-00-9</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

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

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

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

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

Special protective equipment for firefighters
Wear self-contained breathing apparatus for fire fighting if necessary.
Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

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

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.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maleic anhydride</td>
<td>108-31-6</td>
<td>TWA</td>
<td>0.1 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Remarks
Eye, skin, & Upper Respiratory Tract irritation
Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Not classifiable as a human carcinogen Sensitizer

<table>
<thead>
<tr>
<th>TWA</th>
<th>0.25 ppm</th>
<th>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>0.25 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
</tbody>
</table>

The value in mg/m3 is approximate.

<table>
<thead>
<tr>
<th>TWA</th>
<th>0.25 ppm</th>
<th>USA. NIOSH Recommended Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>0.25 ppm</td>
<td>1 mg/m3</td>
</tr>
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</table>

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) 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).

Hand protection
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.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested: Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 30 min
Material tested: Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form solid
Colour white

Safety data
pH no data available
Melting point/freezing point Melting point/range: 52 - 54 °C (126 - 129 °F)
Melting point/range: 51 - 56 °C (124 - 133 °F) - lit.
Boiling point 200 °C (392 °F) - lit.
Flash point no data available
Ignition temperature no data available
Autoignition temperature no data available
Lower explosion limit no data available
Upper explosion limit no data available
Vapour pressure no data available
Density no data available
Water solubility no data available
Partition coefficient: n-octanol/water no data available
Relative vapour density no data available
Odour no data available
Odour Threshold no data available
10. STABILITY AND REACTIVITY

**Chemical stability**
Stable under recommended storage conditions.

**Possibility of hazardous reactions**
no data available

**Conditions to avoid**
no data available

**Materials to avoid**
Strong oxidizing agents, Strong acids, Strong bases, Strong reducing agents, Alkali metals, Amines

**Hazardous decomposition products**
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

**Acute toxicity**

**Oral LD50**
LD50 Oral - rat - 400 mg/kg

**Inhalation LC50**
no data available

**Dermal LD50**
LD50 Dermal - rabbit - 2,620 mg/kg

**Other information on acute toxicity**
no data available

**Skin corrosion/irritation**

**Serious eye damage/eye irritation**
Eyes - rabbit - Severe eye irritation

**Respiratory or skin sensitization**
no data available

May cause allergic respiratory and skin reactions

**Germ cell mutagenicity**

Genotoxicity in vitro - Hamster - Lungs
Cytogenetic analysis

**Carcinogenicity**
Carcinogenicity - rat - Subcutaneous
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic: Tumors at site or application.

**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.

**NTP:** No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

**OSHA:** No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

**Reproductive toxicity**
Reproductive toxicity - rat - Oral
Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).
Reproductive toxicity - rat - Oral
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
no data available

**Teratogenicity**
Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**
o no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**
o no data available

**Aspiration hazard**
o no data available

**Potential health effects**

- **Inhalation**
  May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

- **Ingestion**
  Toxic if swallowed.

- **Skin**
  May be harmful if absorbed through skin. Causes skin burns.

- **Eyes**
  Causes eye burns.

**Signs and Symptoms of Exposure**
Cough, Shortness of breath, Headache, Nausea, Vomiting

**Synergistic effects**
o no data available

**Additional Information**
RTECS: ON3675000

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**12. ECOLOGICAL INFORMATION**

**Toxicity**

- **Toxicity to fish**
  LC50 - Gambusia affinis (Mosquito fish) - 230 mg/l - 96 h

- **Toxicity to daphnia and other aquatic invertebrates**
  EC50 - Daphnia magna (Water flea) - 88 mg/l - 24 h

- **Toxicity to algae**
  EC50 - Desmodesmus subspicatus (green algae) - 29 mg/l - 72 h

**Persistence and degradability**

- **Biodegradability**
  Biotic/Aerobic
  Result: 98 % - Readily biodegradable.

**Bioaccumulative potential**
o no data available

**Mobility in soil**
o no data available

**PBT and vPvB assessment**
o no data available

**Other adverse effects**
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life.

no data available

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**13. DISPOSAL CONSIDERATIONS**
Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2215  Class: 8  Packing group: III
Proper shipping name: Maleic anhydride
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 2215  Class: 8  Packing group: III  EMS-No: F-A, S-B
Proper shipping name: MALEIC ANHYDRIDE
Marine pollutant: No

IATA
UN number: 2215  Class: 8  Packing group: III
Proper shipping name: Maleic anhydride

15. REGULATORY INFORMATION

OSHA Hazards
Toxic by ingestion, Skin and respiratory sensitizer, Corrosive

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

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

<table>
<thead>
<tr>
<th>CAS-No.</th>
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</thead>
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<tr>
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<td>1993-04-24</td>
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SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.