SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers
Product name: Maleic anhydride
Product Number: 63200
Brand: Sigma-Aldrich
Index-No.: 607-096-00-9
REACH No.: 01-2119472428-31-XXXX
CAS-No.: 108-31-6

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES
Telephone: +1 314 771-5765
Fax: +1 800 325-5052

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

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin corrosion (Sub-category 1B), H314
Respiratory sensitization (Category 1), H334
Skin sensitization (Category 1), H317
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Respiratory system, H372

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

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal Word Danger

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 (Respiratory system) through prolonged or repeated exposure if inhaled.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard information (EU)
EUH071 Corrosive to the respiratory tract.

Reduced Labeling (<= 125 ml)

Pictogram

Signal Word Danger

Hazard statement(s)
H314 Causes severe skin burns and eye damage.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H372 Causes damage to organs through prolonged or repeated exposure if inhaled.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
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P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes.
Supplemental Hazard information (EU)
EUN071       Corrosive to the respiratory tract.

2.3 Other hazards
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Corrosive to the respiratory tract.
Sternutator.

SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms : 2,5-Furandione

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
<th>Concentration limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>maleic anhydride</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>108-31-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>203-571-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>607-096-00-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Tox. 4;</td>
<td>1B; Eye Dam. 1; Resp. Sens. 1; Skin Sens. 1A;</td>
<td>&gt;= 0,001 %</td>
<td></td>
</tr>
<tr>
<td>STOT RE 1; H302,</td>
<td>H314, H318, H334, H317, H372</td>
<td>&lt;= 100 %</td>
<td></td>
</tr>
<tr>
<td>H318, H334, H317,</td>
<td>Concentration limits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H317, H372</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.
If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

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

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 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 carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling
Work under hood. Do not inhale substance/mixture.

**Hygiene measures**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

**Storage conditions**
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Moisture sensitive.

**Storage class**
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

### 7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**

**Ingredients with workplace control parameters**

**8.2 Exposure controls**

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

**Skin 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.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer 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.

**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter A-(P2)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Control of environmental exposure**
Do not let product enter drains.

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**SECTION 9: Physical and chemical properties**

### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>solid</td>
</tr>
<tr>
<td>Color</td>
<td>white</td>
</tr>
<tr>
<td>Odor</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>Melting point/range: 52 - 54 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>200 °C - lit.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td>Upper explosion limit: 7,1 %(V)</td>
</tr>
<tr>
<td>Flash point</td>
<td>103 °C - c.c.</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Viscosity, kinematic: No data available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>407 g/l at 20 °C - OECD Test Guideline 105</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: -2,61 at 20 °C - Bioaccumulation is not expected.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Density</td>
<td>1,48 g/cm3 at 20 °C</td>
</tr>
</tbody>
</table>
Relative density 1,48 at 20 °C

q) Relative vapor density

r) Particle characteristics  No data available

s) Explosive properties  No data available

t) Oxidizing properties  none

9.2 Other safety information
Dissociation constant 0,01 at 25 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
Exothermic reaction with:
Alkali metals
alkali hydroxides
Amines
strong alkalis
pyridine
alkaline earth hydroxides
Alcohols
Water
Oxidizing agents
sodium carbonate
with
Heat.
Generates dangerous gases or fumes in contact with:
ammonium compounds

10.4 Conditions to avoid
Strong heating.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5
SECTION 11: Toxicological information

11.1 Information on toxicological effects

**Acute toxicity**
LD50 Oral - Rat - male and female - 1.090 mg/kg (OECD Test Guideline 401)
Inhalation: No data available
LD50 Dermal - Rabbit - female - 2.620 mg/kg
Remarks: (ECHA)

**Skin corrosion/irritation**
Skin - Rabbit
Result: Causes burns - 4 h
Remarks: (ECHA)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Corrosive
Remarks: (ECHA)

**Respiratory or skin sensitization**
Local lymph node assay (LLNA) - Mouse
Result: positive
(OECD Test Guideline 429)
- Rat
Result: May cause sensitization by inhalation.
Remarks: (ECHA)

**Germ cell mutagenicity**
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: Chromosome aberration test
Species: Rat
Cell type: Bone marrow
Application Route: Inhalation
Method: OECD Test Guideline 475
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
Corrosive to the respiratory tract.

**Specific target organ toxicity - repeated exposure**
Inhalation - Causes damage to organs through prolonged or repeated exposure.
- Respiratory system

**Aspiration hazard**
No data available
11.2 Additional Information

Repeated dose toxicity - Rat - male - Oral - 90 Days - LOAEL (Lowest observed adverse effect level) - 100 mg/kg
Remarks: (ECHA)

Repeated dose toxicity - Rat - male and female - Oral - 90 d - NOAEL (No observed adverse effect level) - 40 mg/kg
Remarks: Subchronic toxicity

RTECS: ON3675000
Cough, Shortness of breath, Headache, Nausea, Vomiting
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish
static test LC50 - Oncorhynchus mykiss (rainbow trout) - 75 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates
static test EC50 - Daphnia magna (Water flea) - 42,81 mg/l - 48 h
(OECD Test Guideline 202)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: maleic acid

Toxicity to algae
static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 74,35 mg/l - 72 h
(OECD Test Guideline 201)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: maleic acid

12.2 Persistence and degradability

Biodegradability
aerobic - Exposure time 28 d
Result: > 90 % - Readily biodegradable.
(OECD Test Guideline 301B)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: maleic acid

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties
No data available
12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

**Product**
See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 2215  
IMDG: 2215  
IATA: 2215

14.2 UN proper shipping name
ADR/RID: MALEIC ANHYDRIDE  
IMDG: MALEIC ANHYDRIDE  
IATA: Maleic anhydride

14.3 Transport hazard class(es)
ADR/RID: 8  
IMDG: 8  
IATA: 8

14.4 Packaging group
ADR/RID: III  
IMDG: III  
IATA: III

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

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

**Other regulations**
Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

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

EUH071  Corrosive to the respiratory tract.
H302  Harmful if swallowed.
The life science business of Merck operates as MilliporeSigma in the US and Canada.

H314 Causes severe skin burns and eye damage.
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.

Further information
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.

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