1 Identification of substance:

Product details:
Product name: Oxalic acid dihydrate
Stock number: 33262

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours call the Health, Safety and Environmental Department. After normal hours call CHEMTREC at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:
Description: (CAS#)
Oxalic acid dihydrate
Identification number(s):
EINECS Number: 205-634-3
Index number: 607-006-00-8

3 Hazards identification

Hazard description:

Xn Harmful

Information pertaining to particular dangers for man and environment
R 21/22 Harmful in contact with skin and if swallowed.

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FIRE</th>
<th>REACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Health (acute effects) = 2
Flammability = 0
Reactivity = 0

GHS label elements

Danger
3.2/1C - Causes severe skin burns and eye damage.

Warning
3.1/4 - Harmful if swallowed.
3.1/4 - Harmful in contact with skin.

Prevention:
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: Oxalic acid dihydrate

Immediately call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment (see on this label).
Specific measures (see on this label).
Rinse mouth.
Wash contaminated clothing before reuse.

Storage:
Store locked up.

Disposal:
Dispose of contents/container in accordance with local/regional/national/international regulations.

4 First aid measures

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide

Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation

Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:
Dispose contaminated material as waste according to item 13.

Additional information:
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling
Information for safe handling:
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.

Information about protection against explosions and fires: No special measures required.

Storage
Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility:
Store away from oxidizing agents.
Store away from strong bases.

Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Oxalic acid</th>
<th>mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>1; 2-STEL</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>1</td>
</tr>
<tr>
<td>Belgium TWA</td>
<td>1; 2-STEL</td>
</tr>
<tr>
<td>Denmark TWA</td>
<td>1</td>
</tr>
<tr>
<td>Finland TWA</td>
<td>1; 3-STEL</td>
</tr>
<tr>
<td>France VME</td>
<td>1</td>
</tr>
<tr>
<td>Ireland TWA</td>
<td>1; 2-STEL</td>
</tr>
<tr>
<td>Korea TLV</td>
<td>1; 2-STEL</td>
</tr>
<tr>
<td>Netherlands MAC-TGG</td>
<td>1</td>
</tr>
<tr>
<td>Norway TWA</td>
<td>0.01 (Ag)</td>
</tr>
<tr>
<td>Poland TWA</td>
<td>1; 2-STEL</td>
</tr>
<tr>
<td>Sweden NGV</td>
<td>1; 2-KTV</td>
</tr>
<tr>
<td>Switzerland MAK-W</td>
<td>1</td>
</tr>
<tr>
<td>United Kingdom TWA</td>
<td>1; 0.2-STEL</td>
</tr>
<tr>
<td>USA PEL</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional information: No data

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves

Eye protection:
Safety glasses
Tightly sealed goggles
Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties:

<table>
<thead>
<tr>
<th>General Information</th>
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<tbody>
<tr>
<td><strong>Form:</strong></td>
</tr>
<tr>
<td><strong>Color:</strong></td>
</tr>
<tr>
<td><strong>Odor:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change in condition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Melting point/Melting range:</strong></td>
</tr>
<tr>
<td><strong>Boiling point/Boiling range:</strong></td>
</tr>
<tr>
<td><strong>Sublimation temperature / start:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flash point:</th>
<th>Not determined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignition temperature:</td>
<td>Not determined</td>
</tr>
<tr>
<td>Decomposition temperature:</td>
<td>Not determined</td>
</tr>
<tr>
<td>Danger of explosion:</td>
<td>Product does not present an explosion hazard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explosion limits:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lower:</strong></td>
</tr>
<tr>
<td><strong>Upper:</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Vapor pressure:</th>
<th>Not determined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density at 20°C (68°F):</td>
<td>1.65 g/cm³</td>
</tr>
<tr>
<td>Solubility in / Miscibility with Water at 20°C (68°F):</td>
<td>143 g/l</td>
</tr>
</tbody>
</table>
10 Stability and reactivity

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.

Materials to be avoided:
- Oxidizing agents
- Bases

Dangerous reactions: Reacts with oxidizing agents

Dangerous products of decomposition: Carbon monoxide and carbon dioxide

11 Toxicological information

Acute toxicity:

<table>
<thead>
<tr>
<th>LD/LC50 values that are relevant for classification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
</tr>
<tr>
<td>Dermal</td>
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</tbody>
</table>

Primary irritant effect:

on the skin:
- Irritant to skin and mucous membranes.
- May cause corrosive effect.

on the eye:
- May cause corrosive effect.

Sensitization:
- No sensitizing effects known.

Subacute to chronic toxicity:

- Oxalic acid may cause burns, nausea, severe gastroenteritis, shock and convulsions. May injure kidneys. Skin and eye contact may cause burns. Chronic effects include gastrointestinal disturbances, weight loss, weakness, nervous system complaints and respiratory system inflammation.

Additional toxicological information:

- Danger through skin absorption.
- To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
- No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:

General notes:

- Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- Do not allow material to be released to the environment without proper governmental permits.
- Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.

13 Disposal considerations

Product:

Recommendation: Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

DOT regulations:

- Hazard class: 8
- Identification number: UN3261
- Packing group: III
- Proper shipping name (technical name): CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (Oxalic acid dihydrate)
Product name: Oxalic acid dihydrate

15 Regulations

Product related hazard informations:

Hazard symbols:
Xn Harmful

Risk phrases:
21/22 Harmful in contact with skin and if swallowed.

Safety phrases:
24/25 Avoid contact with skin and eyes.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

Information about limitation of use: For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Zachariah Holt
<table>
<thead>
<tr>
<th>Abbreviations and acronyms:</th>
</tr>
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<tbody>
<tr>
<td>ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)</td>
</tr>
<tr>
<td>RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)</td>
</tr>
<tr>
<td>IMDG: International Maritime Code for Dangerous Goods</td>
</tr>
<tr>
<td>DOT: US Department of Transportation</td>
</tr>
<tr>
<td>IATA: International Air Transport Association</td>
</tr>
<tr>
<td>IATA-DGR: Dangerous Goods Regulations by the &quot;International Air Transport Association&quot; (IATA)</td>
</tr>
<tr>
<td>ICAO: International Civil Aviation Organization</td>
</tr>
<tr>
<td>ICAO-TI: Technical Instructions by the &quot;International Civil Aviation Organization&quot; (ICAO)</td>
</tr>
<tr>
<td>GHS: Globally Harmonized System of Classification and Labelling of Chemicals</td>
</tr>
<tr>
<td>EINECS: European Inventory of Existing Commercial Chemical Substances</td>
</tr>
<tr>
<td>CAS: Chemical Abstracts Service (division of the American Chemical Society)</td>
</tr>
<tr>
<td>HMIS: Hazardous Materials Identification System (USA)</td>
</tr>
<tr>
<td>LC50: Lethal concentration, 50 percent</td>
</tr>
<tr>
<td>LD50: Lethal dose, 50 percent</td>
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</tbody>
</table>