1 Identification of substance:

Product details:
Product name: Magnesium fluoride
Stock number: 11021

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 the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:
Description: (CAS#)
Magnesium fluoride (CAS# 7783-40-6), 100%
Identification number(s):
EINECS Number: 231-995-1

3 Hazards identification

Hazard description:

Xi Irritant

Information pertaining to particular dangers for man and environment
R 36/37/38 Irritating to eyes, respiratory system and skin.

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>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

GHS label elements

Warning

3.2/2 - Causes skin irritation.
3.3/2A - Causes serious eye irritation.
3.8/3 - May cause respiratory irritation.

Prevention:
Avoid breathing dust/fume/gas/mist/vapours/spray.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove 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 do to. Continue rinsing.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment (see label).
If skin irritation occurs: Get medical advice/attention.
If eye irritation persists: Get medical advice/attention.
Take off contaminated clothing and wash before reuse.

Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: Magnesium fluoride

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
CO₂, extinguishing powder or water spray. Fight larger fires with water spray.

Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Hydrogen fluoride (HF)

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:
Ensure adequate ventilation.

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:
Do not store together with oxidizing and acidic materials.

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>Fluorides (as F)</th>
<th>mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>2.5</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>2.5</td>
</tr>
<tr>
<td>Belgium TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>Finland TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>France TWA</td>
<td>2.5</td>
</tr>
<tr>
<td>Germany MAK</td>
<td>2.5</td>
</tr>
</tbody>
</table>
9 Physical and chemical properties:

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form: Chunks</td>
</tr>
<tr>
<td>Color: Off-white</td>
</tr>
<tr>
<td>Odor: Odorless</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change in condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point/Melting range: 1261°C (2302°F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range: 2239°C (4062°F)</td>
</tr>
<tr>
<td>Sublimation temperature / start: Not determined</td>
</tr>
</tbody>
</table>

| Flash point: Not applicable |
| Ignition temperature: Not determined |
| Decomposition temperature: Not determined |
| Danger of explosion: Product does not present an explosion hazard |

<table>
<thead>
<tr>
<th>Explosion limits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower: Not determined</td>
</tr>
<tr>
<td>Upper: Not determined</td>
</tr>
</tbody>
</table>

| Vapor pressure: Not determined |
| Density: Not determined |

| Solubility in / Miscibility with Water at 18°C (64°F): 0.076 g/l |

10 Stability and reactivity

<table>
<thead>
<tr>
<th>Thermal decomposition / conditions to be avoided:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decomposition will not occur if used and stored according to specifications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials to be avoided:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acids</td>
</tr>
<tr>
<td>Oxidizing agents</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dangerous reactions: No dangerous reactions known</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dangerous products of decomposition:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen fluoride</td>
</tr>
<tr>
<td>Metal oxide fume</td>
</tr>
</tbody>
</table>

11 Toxicological information

<table>
<thead>
<tr>
<th>Acute toxicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD/ LC50 values that are relevant for classification:</td>
</tr>
<tr>
<td>Oral LDLo 1000 mg/kg (guinea pig)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary irritant effect:</th>
</tr>
</thead>
<tbody>
<tr>
<td>on the skin: Irritant to skin and mucous membranes.</td>
</tr>
</tbody>
</table>
12 Ecological information:

General notes:
Do not allow undiluted product or large quantities of it to reach groundwater, watercourse or sewage system.
Do not allow material to be released to the environment without proper governmental permits.

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.

14 Transport information

Not a hazardous material for transportation.

DOT regulations:
Hazard class: None

Land transport ADR/RID (cross-border)
ADR/RID class: None

Maritime transport IMDG:
IMDG Class: None

Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class: None

Transport/Additional information: Not dangerous according to the above specifications.

15 Regulations

Product related hazard informations:

Hazard symbols:
Xi Irritant

Risk phrases:
36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
37 Wear suitable gloves.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

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

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par route (European Agreement concerning the International
Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning
the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent