SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 08/FEB/2005
Date Updated: 02/DEC/2004
Version 1.11
According to 91/155/EEC

1 - Product and Company Information

Product Name           ANTI-BUMPING GRANULES, ~1-3 MM
Product Number         85106
Company                Sigma-Aldrich Pty, Ltd
                       Unit 2, 14 Anella Avenue
                       Castle Hill NSW 1765
                       Australia
Technical Phone #      +61 2 9841 0555
Fax                    +61 2 9841 0500
Emergency Phone #      +61 2 9841 0566

2 - Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Product Name</th>
<th>CAS #</th>
<th>EC no</th>
<th>Annex I</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALUMINA ACTIVATED</td>
<td>1344-28-1</td>
<td>215-691-6</td>
<td>None</td>
</tr>
</tbody>
</table>

Formula            Al2O3
Molecular Weight    101.96 AMU
Synonyms


3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT

Not hazardous according to Directive 67/548/EC.

4 - First Aid Measures
AFTER INHALATION
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

AFTER SKIN CONTACT
In case of contact, immediately wash skin with soap and copious amounts of water.

AFTER EYE CONTACT
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

5 - Fire Fighting Measures

CONDITIONS OF FLAMMABILITY
Material may have an exothermic reaction above 200°C with halocarbon vapors and may produce toxic hydrochloric acid and phosgene.

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL RISKS
Specific Hazard(s): Emits toxic fumes under fire conditions.
SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING

Directions for Safe Handling: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Conditions of Storage: Keep tightly closed.

SPECIAL REQUIREMENTS: Very hygroscopic.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>2 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>16 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

EXPOSURE LIMITS - DENMARK

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEL</td>
<td>TWA</td>
<td>10 mg/m3</td>
</tr>
</tbody>
</table>

EXPOSURE LIMITS - GERMANY

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>TRGS 900</td>
<td>OEL</td>
<td>6 mg/m3, A</td>
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</tbody>
</table>

EXPOSURE LIMITS - NORWAY

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEL</td>
<td></td>
<td>10 mg/m3</td>
</tr>
</tbody>
</table>

Remarks: 1)

EXPOSURE LIMITS - SWEDEN

<table>
<thead>
<tr>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLV (Level5 mg/m3</td>
<td></td>
<td></td>
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</tbody>
</table>

EXPOSURE LIMITS - SWITZERLAND
EXPOSURE LIMITS

Source          Type   Value
OEL             OEL    6 mg/m³

Remarks: A

EXPOSURE LIMITS - UNITED KINGDOM

Source          Type   Value
OEL             TWA    4 mg/m³

Remarks: respirable dust

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Wear dust mask.
Hand Protection: Protective gloves.
Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance   Physical State: Solid

Property                           Value          At Temperature or Pressure
pH                                       9.4 - 10.1     20 °C
BP/BP Range                             2,980 °C
MP/MP Range                             2,038 °C
Flash Point                             N/A
Flammability                            N/A
Autoignition Temp                       N/A
Oxidizing Properties                   N/A
Explosive Properties                   N/A
Explosion Limits                        N/A
Vapor Pressure                          1 mmHg        2,158 °C
SG/Density                              4 g/cm³
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Partition Coefficient</td>
<td>N/A</td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
</tr>
<tr>
<td>Property</td>
<td>Value</td>
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<tr>
<td>----------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Saturated Vapor Conc.</td>
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</tr>
<tr>
<td>Evaporation Rate</td>
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</tr>
<tr>
<td>Bulk Density</td>
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<tr>
<td>Decomposition Temp.</td>
<td>N/A</td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
</tr>
<tr>
<td>Surface Tension</td>
<td>N/A</td>
</tr>
<tr>
<td>Conductivity</td>
<td>N/A</td>
</tr>
<tr>
<td>Miscellaneous Data</td>
<td>N/A</td>
</tr>
<tr>
<td>Solubility</td>
<td>Solubility in Water: Insoluble.</td>
</tr>
</tbody>
</table>

10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions to Avoid: Moisture.

Materials to Avoid: Strong acids, Strong bases, Chlorine trifluoride, Ethylene oxide, Halocarbons, Oxygen difluoride, Sodium nitrate, Vinyl acetate.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Aluminum oxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: BD1200000
IRRITATION DATA

Eyes
Rabbit
Remarks: No irritation effect

Skin
Rabbit
Remarks: No irritation effect

SIGNS AND SYMPTOMS OF EXPOSURE

Prolonged exposure can cause: Damage to the lungs. Exposure can cause: Coughing, chest pains, difficulty in breathing.
Gastrointestinal disturbances.

ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

TARGET ORGAN INFORMATION

Lungs. Bones.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Rat
Route of Application: Intrapleural
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Rat
Route of Application: Implant
Result: Tumorigenic:Neoplastic by RTECS criteria.
Tumorigenic:Tumors at site or application.

Rat
Route of Application: Implant
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

12 - Ecological Information

No data available.

13 - Disposal Considerations

SUBSTANCE DISPOSAL

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. Observe all federal, state, and local environmental regulations.

14 - Transport Information
RID/ADR
Non-hazardous for road transport.

IMDG
Non-hazardous for sea transport.

IATA
Non-hazardous for air transport.

15 - Regulatory Information

Not hazardous according to Directive 67/548/EC.

COUNTRY SPECIFIC INFORMATION

Germany
WGK: No hazard to waters.

SWITZERLAND
SWISS POISON CLASS: FREI

16 - Other Information

WARRANTY
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 Inc., shall not be held liable for any damage resulting from handling or
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