SECTION 1: Identification

Product identifier

<table>
<thead>
<tr>
<th>Product name</th>
<th>Unfired Alumina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance name</td>
<td>Aluminum Oxide</td>
</tr>
<tr>
<td></td>
<td>Al$_2$O$_3$</td>
</tr>
<tr>
<td>Other names / synonyms</td>
<td>Unfired Alumina; (AL 74, AL 85, AL 94, AL 95, AL 96, AL 96P, AL 98, AL 98P, AL 995, AL 998, AL 9980, AL999)</td>
</tr>
</tbody>
</table>

Recommended use of the chemical and restrictions on use
Raw material for technical ceramic components.

Supplier’s details

<table>
<thead>
<tr>
<th>Name</th>
<th>Superior Technical Ceramics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>600 Industrial Park Road</td>
</tr>
<tr>
<td></td>
<td>St. Albans, Vermont 05478</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Telephone</td>
<td>802-527-7726</td>
</tr>
<tr>
<td>Fax</td>
<td>802-527-1181</td>
</tr>
</tbody>
</table>

Emergency phone number(s)
802-527-7726

SECTION 2: Hazard identification

This product is considered an article and does not pose any health hazard under normal use. The health effects listed below may be relevant when dust is generated during machining or other processing conditions.

Classification of the substance or mixture
- Carcinogenicity (chapter 3.6), Cat. 1
- Specific target organ toxicity, repeated exposure (chapter 3.9), Cat. 1

GHS label elements, including precautionary statements

Pictogram

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Danger</th>
</tr>
</thead>
</table>

Hazard statement(s)
- H335 May cause respiratory irritation
- H350i May cause cancer by inhalation.
- H372 Causes damage to organs through prolonged or repeated exposure

Precautionary statement(s)
Other hazards which do not result in classification

This product has the potential of generating respirable dust during machining. Dust may contain respirable crystalline silica. Prolonged inhalation of respirable crystalline silica dust may cause lung fibrosis, commonly referred to as silicosis. Principal symptoms of lung fibrosis are cough and breathlessness. Control and monitor occupational exposure to respirable crystalline silica dust in accordance to federal, state and local laws.

SECTION 3: Composition/information on ingredients

Components

1. Aluminum oxide
   Concentration 74 - 96.7 %
   Other names / synonyms activated Alumina; alpha-Alumina; Alumina; Aluminum oxide; Aluminum oxide (fibrous forms); Aluminum oxide (Powder or Fiber); ALUMINUMOXIDE
   CAS no. 1344-28-1

2. Silica, crystalline (airborne particles of respirable size)
   Concentration 0.1 - 15 % (Weight)
   Other names / synonyms Quartz; Sand; Silica, crystalline (airborne particles of respirable size); Silicon (IV) oxide
   CAS no. 14808-60-7
   H335 May cause respiratory irritation
   H350i May cause cancer by inhalation.
   H372 Causes damage to organs through prolonged or repeated exposure

3. Organic Binders
   Concentration 3 - 10 %
   Other names / synonyms Organic Binders

4. Secondary Oxides
   Concentration 0.2 - 2.6 %
   Other names / synonyms Secondary Oxides

SECTION 4: First-aid measures

Description of necessary first-aid measures
Safety Data Sheet
Unfired Alumina

General advice
Organic portion may be combustible. Dust may cause irritation to eyes, nose, throat, and/or skin.

If inhaled
Move to fresh air and consult with local medical personnel if discomfort persists.

In case of skin contact
Wash affected area with soap and water and consult with local medical personnel if irritation persists.

In case of eye contact
Flush with tepid water for a minimum of 15 minutes and consult with local medical personnel if discomfort persists.

If swallowed
Administer water to dilute, but not if person is unconscious. Consult with local medical personnel if discomfort persists.

SECTION 5: Fire-fighting measures

Suitable extinguishing media
Use any means suitable for extinguishing surrounding fire.

Specific hazards arising from the chemical
Possible Class A fire hazard – combustible vapors can develop in the headspace over the product. Flash point is 220°C (428°F).

Special protective actions for fire-fighters
Use protective clothing and breathing equipment appropriate for the surrounding fire and to protect against the aluminum oxide dust that may be dispersed in the air.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures
Any dust from machining should be wet mopped or dry vacuumed.

Methods and materials for containment and cleaning up
Any dust from machining should be wet mopped or dry vacuumed.

SECTION 7: Handling and storage

Precautions for safe handling
Store in a cool dry place. Any dust should be sponge mopped.

SECTION 8: Exposure controls/personal protection

Control parameters

1. alpha-Alumina (CAS: 1344-28-1)
   PEL (Inhalation): see PNOR (Cal/OSHA)
   OSHA Annotated Table Z-1, www.osha.gov

2. alpha-Alumina (CAS: 1344-28-1)
   REL (Inhalation): See Appendix D (NIOSH)
   OSHA Annotated Table Z-1, www.osha.gov
3. alpha-Alumina, Total dust (CAS: 1344-28-1)
PEL (Inhalation): 15 mg/m³ (OSHA)
OSHA Annotated Table Z-1, www.osha.gov

4. alpha-Alumina, Total dust (CAS: 1344-28-1)
PEL (Inhalation): 10 mg/m³ (Cal/OSHA)
OSHA Annotated Table Z-1, www.osha.gov

5. alpha-Alumina, Respirable fraction (CAS: 1344-28-1)
PEL (Inhalation): 5 mg/m³ (OSHA)
OSHA Annotated Table Z-1, www.osha.gov

6. alpha-Alumina, Respirable fraction (CAS: 1344-28-1)
PEL (Inhalation): 5 mg/m³ (Cal/OSHA)
OSHA Annotated Table Z-1, www.osha.gov

7. Silica, crystalline quartz, respirable dust (CAS: 14808-60-7)
PEL (Inhalation): See Annotated Z-3 ppm (OSHA)
OSHA Annotated Table Z-1, www.osha.gov

8. Silica, crystalline quartz, respirable dust (CAS: 14808-60-7)
PEL (Inhalation): See Annotated Z-3 mg/m³ (OSHA)
OSHA Annotated Table Z-1, www.osha.gov

9. Silica, crystalline quartz, respirable dust (CAS: 14808-60-7)
PEL (Inhalation): See Annotated Z-3 (Cal/OSHA)
OSHA Annotated Table Z-1, www.osha.gov

10. Silica, crystalline quartz, respirable dust (CAS: 14808-60-7)
REL (Inhalation): See Annotated Z-3 (NIOSH)
OSHA Annotated Table Z-1, www.osha.gov

Appropriate engineering controls
Local or general exhaust ventilation recommended.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection
Safety goggles in the presence of airborne dust.

Skin protection
Polymer gloves for prolonged dust exposure.

Respiratory protection
NIOSH/MSHA approved respirator for dust when exposure limit is exceeded.

Thermal hazards
CO and CO₂ in a fire and at temperatures >220°C (428°F).

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance/form</td>
<td>White or Colored Chalky Solid</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>N/A</td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
</tr>
<tr>
<td>Melting point</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Initial boiling point and boiling range: N/A
Flash point: N/A
Evaporation rate: N/A
Flammability (solid, gas): N/A
Upper/lower flammability limits: N/A
Upper/lower explosive limits: N/A
Vapor pressure: N/A
Vapor density: N/A
Relative density: >1.9 g/cc
Solubility(ies): Organic Portion Soluble in Water
Partition coefficient: n-octanol/water: N/A
Auto-ignition temperature: N/A
Decomposition temperature: N/A
Viscosity: N/A
Explosive properties: N/A
Oxidizing properties: N/A

SECTION 10: Stability and reactivity

Chemical stability
Stable

Hazardous decomposition products
CO and CO2 in a fire and at temperatures >220°C (428°F).

SECTION 11: Toxicological information

Information on toxicological effects

Respiratory or skin sensitization
See Section 2.

Carcinogenicity
See Section 2

STOT-repeated exposure
See Section 2

SECTION 12: Ecological information

No Applicable Information Found

SECTION 13: Disposal considerations

Disposal of the product
This material is not hazardous per 40 CFR 261. Consultation with federal, state and local officials is recommended before disposal.

SECTION 14: Transport information

DOT (US)
SECTION 15: Regulatory information

US FEDERAL

TSCA
CAS# 1344-28-1 is listed on the TSCA inventory.
CAS# 14808-60-7 is listed on the TSCA inventory.

SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.

Section 313
CAS# 1344-28-1 is reported under Section 313.

OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

US STATE

CAS# 1344-28-1 can be found on the following state right to know lists:
Illinois, Minnesota, Massachusetts, New Jersey, Pennsylvania, Texas.

CAS# 14808-60-7 can be found on the following state right to know lists:
Massachusetts, Pennsylvania, Texas.
Consult your state and local resources for further information.

California Prop 65
Crystalline Silica (airborne particles of respirable size) is classified as a substance known to the state of California to be a carcinogen.

SECTION 16: Other information

Further information/disclaimer
Although reasonable care has been taken to provide accurate and current information in preparation of this document, Superior Technical Ceramics extends no warranties, makes no representation and assumes no responsibility for any loss, damage, or injury of any kind which may result from reliance of information provided in this document by any person.

Preparation Information
Prepared by: Superior Technical Ceramics
1-802-527-7726
lab@ceramics.net

Prepared on: June 1, 2015
Last Revision: --