1. Product and Company Identification

Material name: CALCIUM ALUMINATE CEMENT
Revision date: 01-26-2012
Version #: 01
CAS #: Mixture
Product use: Ceramics and Refractory.
Synonym(s): EL-60, EL-61, EL-70, EL-81
Manufacturer/Supplier: ELFUSA GERAL DE ELETROFUSÃO LTDA
JULIO MICHELAZZO, 501 - SÃO JOÃO DA BOA VISTA - SP -BRAZIL
ZIP CODE 13872-900
SPAIN
qualidade@elfusa.com.br
Contact Person: RUBEN SINATO
Telephone: (+5519) 3634-2300
Emergency: 1-866-519-4752
1-760-476-3962
Access Code: 333691

2. Hazards Identification

Physical state: Solid.
Appearance: White and gray powder.
Emergency overview: Low hazard under normal conditions. Product may become alkaline when exposed to moisture. This may cause an increased irritation hazard potential when handling.
OSHA regulatory status: This product is not hazardous according to OSHA 29CFR 1910.1200.
Potential health effects: Inhalation. Ingestion. Skin contact. Eye contact.
Eyes: Dust may irritate the eyes.
Skin: Dust may irritate skin.
Inhalation: Dust may irritate the respiratory system.
Ingestion: Ingestion may cause irritation and malaise.
Target organs: Eyes. Skin. Reproductive system.
Chronic effects: Prolonged and repeated overexposure to dust can lead to pneumoconiosis.
Signs and symptoms: Irritation of eyes and mucous membranes. Irritation of nose and throat.
POTENTIAL ENVIRONMENTAL EFFECTS: Ecological injuries are not known or expected under normal use.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialuminium calcium tetraoxide</td>
<td>12042-68-1</td>
<td>50-70</td>
</tr>
<tr>
<td>Calcium aluminate</td>
<td>65997-16-2</td>
<td>16-36</td>
</tr>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>5-20</td>
</tr>
<tr>
<td>Impurities: SiO2+Fe2O3+Na2O+CaO+MgO+TiO2</td>
<td>N/A</td>
<td>≤ 5</td>
</tr>
</tbody>
</table>

Composition comments: All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. For more detailed chemical composition, refer to the certificate of analysis.

4. First Aid Measures

First aid procedures:
Eye contact: Flush eyes thoroughly with water for at least 15 minutes. Get medical attention if irritation develops or persists.
Skin contact: Wash with soap and water. Get medical attention if irritation develops or persists.
Inhalation
Move to fresh air. Get medical attention if any discomfort continues.

Ingestion
Immediately rinse mouth and drink plenty of water. Get medical attention if irritation develops and persists.

Notes to physician
Treat symptomatically.

General advice
Get medical attention if any discomfort develops.

5. Fire Fighting Measures
Flammable properties
The product is not flammable.

Extinguishing media
Suitable extinguishing media
Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media
No restrictions known.

Protection of firefighters
Specific hazards arising from the chemical
None known.

Protective equipment and precautions for firefighters
Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions
Move containers from fire area if you can do it without risk.

6. Accidental Release Measures
Personal precautions
Ensure adequate ventilation. Avoid inhalation of dust and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet.

Environmental precautions
Avoid release to the environment. Prevent further leakage or spillage if safe to do so.

Methods for cleaning up
Recover and recycle, if practical. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not vacuum clean unless vacuum cleaners are equipped with HEPA filter.

7. Handling and Storage
Handling
Provide adequate ventilation. Use work methods which minimize dust production. Avoid inhalation of dust and contact with skin and eyes. Wear appropriate personal protective equipment. Do not add wet alumina to electrolysis cells. Observe good industrial hygiene practices.

Storage
Store in a dry place.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>US. ACGIH Threshold Limit Values</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALCIUM ALUMINATE CEMENT (Mixture)</td>
<td>TWA</td>
<td>1 mg/m3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Components</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum oxide (1344-28-1)</td>
<td>TWA</td>
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<tr>
<td>Dialuminium calcium tetraoxide (12042-68-1)</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CALCIUM ALUMINATE CEMENT (Mixture)</td>
<td>PEL</td>
<td>5 mg/m3</td>
<td>Respirable fraction.</td>
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<td>Components</td>
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<td></td>
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<td>Aluminum oxide (1344-28-1)</td>
<td>PEL</td>
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</tr>
<tr>
<td>Most harmful component</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
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Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

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Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

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Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

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Canada. Quebec OELS. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

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</thead>
<tbody>
<tr>
<td>CALCIUM ALUMINATE CEMENT (Mixture)</td>
<td>TWA</td>
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</tr>
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</table>

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Mexico. Occupational Exposure Limit Values

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</table>

Exposure guidelines

No exposure standards allocated.

Engineering controls

Provide sufficient ventilation for operations causing dust formation. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn.

Personal protective equipment

Eye / face protection

Wear goggles/face shield.

Skin protection

Wear suitable gloves. Suitable gloves can be recommended by the glove supplier. Wear suitable protective clothing.

Respiratory protection

Seek advice from local supervisor.

General hygiene considerations

Wash hands after handling. Routinely wash work clothing and protective equipment to remove contaminants. Handle in accordance with good industrial hygiene and safety practice. Follow up on any medical surveillance requirements.

9. Physical & Chemical Properties

Appearance

White and gray powder.

Color

White and gray.

Odor

Odorless.
**Chemical Stability & Reactivity Information**

**Chemical stability**
Stable at normal conditions.

**Conditions to avoid**
Moisture. Contact with incompatible materials.

**Incompatible materials**
None known.

**Hazardous decomposition products**
No hazardous decomposition products are known.

**Possibility of hazardous reactions**
Hazardous polymerization does not occur. Hazardous reactions do not occur.

**Toxicological Information**

**Toxicological data**

<table>
<thead>
<tr>
<th>Components</th>
<th>Test Results</th>
</tr>
</thead>
</table>
| Aluminum oxide (1344-28-1) | Acute Inhalation LC50 Rat: > 2.3 mg/l 4 hours  
| | Acute Oral LD50 Rat: > 5000 mg/kg |

**Acute effects**
Dust may cause eye, skin and respiratory tract irritation. Product may become alkaline when exposed to moisture. This may cause an increased irritation hazard potential when handling.

**Local effects**
May cause irritation through mechanical abrasion.

**Sensitization**
No sensitizing effects known.

**Chronic effects**
Prolonged and repeated overexposure to dust can lead to pneumoconiosis.

**Carcinogenicity**
Test data conclusive but not sufficient for classification.

**ACGIH Carcinogens**
Aluminum oxide (CAS 1344-28-1)  
Dialuminium calcium tetraoxide (CAS 12042-68-1)  
A4 Not classifiable as a human carcinogen.

**Mutagenicity**
Test data conclusive but not sufficient for classification.

**Reproductive effects**
Test data conclusive but not sufficient for classification.

**Symptoms and target organs**
Irritation of eyes and mucous membranes. Irritation of nose and throat.

**Further information**
Prolonged and repeated overexposure to dust can lead to pneumoconiosis.
### Ecotoxicological data

<table>
<thead>
<tr>
<th>Components</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum oxide (1344-28-1)</td>
<td>EC50 Daphnia magna: &gt; 100 mg/l 48 hours&lt;br&gt;EC50 Green algae (Selenastrum capricornutum): &gt; 100 mg/l 72 hours&lt;br&gt;LC50 Salmo trutta: &gt; 100 mg/l 96 hours</td>
</tr>
</tbody>
</table>

#### Ecotoxicity
This product has no known eco-toxicological effects. The product is not expected to be hazardous to the environment.

#### Environmental effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

#### Aquatic toxicity
Not expected to be harmful to aquatic organisms.

#### Persistence and degradability
The product is not biodegradable.

#### Bioaccumulation / Accumulation
The product is not bioaccumulating.

#### Partition coefficient (n-octanol/water)
Not applicable.

#### Mobility in environmental media
The product is insoluble in water. Aluminum oxide is not mobile in the environment, unless it comes into contact with an aqueous environment with a pH below 5.5 or above 8.5.

### Disposal Considerations

#### Disposal instructions
Dispose in accordance with all applicable regulations.

#### Waste from residues / unused products
Recover and recycle, if practical. Dispose of in accordance with local regulations.

#### Contaminated packaging
Offer rinsed packaging material to local recycling facilities. Dispose of in accordance with local regulations.

### Transport Information

#### DOT
Not regulated as dangerous goods.

#### IATA
Not regulated as dangerous goods.

#### IMDG
Not regulated as dangerous goods.

#### TDG
Not regulated as dangerous goods.

### Regulatory Information

#### US federal regulations
This product is not hazardous according to OSHA 29CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**
Not regulated.

**US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration**
Aluminum oxide (CAS 1344-28-1) 1.0 %

**US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance**
Aluminum oxide (CAS 1344-28-1) Listed.

**CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)**
None

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

| Hazard categories   | Immediate Hazard - Yes<br>Delayed Hazard - Yes<br>Fire Hazard - No<br>Pressure Hazard - No<br>Reactivity Hazard - No |
Section 302 extremely hazardous substance (40 CRF 355, Appendix A) No
Section 311/312 (40 CFR 370) No
Drug Enforcement Administration (DEA) (21 CFR 1308.11-15) Not controlled
WHMIS status Controlled
WHMIS classification D2B - Other Toxic Effects-TOXIC

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>No</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance
- Aluminum oxide (CAS 1344-28-1) Listed.
- Dialuminium calcium tetraoxide (CAS 12042-68-1) Listed.

US - Massachusetts RTK - Substance: Listed substance
- Aluminum oxide (CAS 1344-28-1) Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold
- Aluminum oxide (CAS 1344-28-1) 500 LBS

US - New Jersey RTK - Substances: Listed substance
- Aluminum oxide (CAS 1344-28-1) Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance
- Aluminum oxide (CAS 1344-28-1) Listed.
- Dialuminium calcium tetraoxide (CAS 12042-68-1) Listed.

16. Other Information

Recommended restrictions

-HMIS® ratings
  - Health: 1
  - Flammability: 0
  - Physical hazard: 0

-NFPA ratings
  - Health: 1
  - Flammability: 0
  - Instability: 0

Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.

Issue date

01-25-2012