SAFETY DATA SHEET

1. Identification
Product identifier CALCIUM ALUMINATE CEMENT
Other means of identification
Synonyms EL-60, EL-61, EL-70
Recommended use Ceramics and Refractory.
Recommended restrictions -
Manufacturer/Importer/Supplier/Distributor information
Company Identification ELFUSA GERAL DE ELETROFUSÃO LTDA
Telephone +55.19.3634.2300
Personal responsible for the SDS qualidade@elfusa.com.br
Commercial comercial@elfusa.com.br
Homepage www.elfusa.com.br
Contact person Mr. Ruben Sinato
Emergency telephone +55.11.99973.8421
E-mail ruben.sinato@grupocurimbaba.com.br

2. Hazard(s) identification
Physical hazards Not classified.
Health hazards Not classified.
OSHA defined hazards Not classified.
Label elements
Hazard symbol None.
Signal word None.
Hazard statement The product does not meet the criteria for classification.
Precautionary statement
Prevention Observe good industrial hygiene practices.
Response Wash hands after handling.
Storage Store away from incompatible materials.
Disposal Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC) None known.
Supplemental information None.

3. Composition/information on ingredients
Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Aluminate</td>
<td>-</td>
<td>12042-68-1</td>
<td>≥ 91</td>
</tr>
<tr>
<td>Constituents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alumimum Oxide</td>
<td>-</td>
<td>1344-28-1</td>
<td>58 – 73</td>
</tr>
<tr>
<td>Calcium Oxide</td>
<td>-</td>
<td>1305-78-8</td>
<td>26 – 36</td>
</tr>
<tr>
<td>Impurities: SiO2+Fe2O3+Na2O+CaO+MgO+TiO2</td>
<td>-</td>
<td>N/A</td>
<td>≤ 9</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
Inhalation Move to fresh air. Get medical attention if any discomfort continues.
Skin contact Wash with soap and water. Get medical attention if irritation develops or persists.
Eye contact Flush eyes thoroughly with water for at least 15 minutes. Get medical attention if irritation develops or persists.
Ingestion Immediately rinse mouth and drink plenty of water. Get medical attention if irritation develops or persists.
Most important symptoms/effects, acute and delayed Irritation of eyes and mucous membranes. Irritation of nose and throat.
Indication of immediate medical attention and special treatment needed. Treat symptomatically.
General information Get medical attention if any discomfort develops.
5. Fire-fighting measures

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

Unsuitable extinguishing media
No restrictions known.

Specific hazards arising from the chemical
Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Special protective equipment and precautions for firefighters
Move containers from fire area if you can do it without risk.

Firefighting equipment/instructions
The product is not flammable.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
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. 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.

Methods and materials for containment and cleaning up
Avoid release to the environment. Prevent further leakage or spillage if safe to do so.

Environmental precautions

7. Handling and storage

Precautions for safe 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.

Conditions for safe storage, including any incompatibilities
Store in a dry place.

8. Exposure controls/personal protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Aluminate Cement (CAS Mixture)</td>
<td>5 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Calcium Oxide (CAS 1305-78-8)</td>
<td>5 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Aluminum Oxide (CAS 1344-28-1)</td>
<td>5 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Aluminate Cement (CAS Mixture)</td>
<td>1 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Calcium Oxide (CAS 1305-78-8)</td>
<td>2 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Aluminum Oxide (CAS 1344-28-1)</td>
<td>1 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
</tbody>
</table>

US. NIOSH: Pocket Guide to Chemical Hazards

<table>
<thead>
<tr>
<th>Constituents Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Oxide (CAS 1305-78-8)</td>
<td>2 mg/m^3</td>
<td>Respirable fraction.</td>
</tr>
</tbody>
</table>

Biological limit values
No biological exposure limits noted for the ingredient(s).

Exposure guidelines
No exposure standards allocated

Appropriate 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.
Individual protection measures, such as personal protective equipment

Eye/face protection
- Wear goggles/face shield.

Skin protection

Hand protection
- Wear protective gloves. Suitable gloves can be recommended by the glove supplier.

Skin protection

Others
- Wear suitable protective clothing.

Respiratory protection
- Seek advice from local supervisor

Thermal hazards
- Wear appropriate thermal protective clothing, when necessary.

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 and chemical properties

Appearance

Physical state
- Solid.

Form
- Powder.

Color
- White and gray.

Odor
- Odorless.

Odor threshold
- Not available.

pH
- 11 – 11.5

Melting point/freezing point
- >2678 ºF (>1470 ºC)

Initial boiling point and boiling range
- Not available

Flash point
- Not available

Evaporation rate
- Not applicable

Flammability (solid, gas)
- Non flammable

Upper/lower flammability or explosive limits

Flammability limit-lower (%)
- Not available

Flammability limits-upper (%)
- Not available

Explosive limit-lower (%)
- Not available

Explosive limit-upper (%)
- Not available

Vapor pressure
- Not applicable

Vapor density
- Not applicable

Relative density
- Not applicable

Solubility (ies)

Solubility (water)
- Insoluble

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

Auto-ignition temperature
- Not applicable

Decomposition temperature
- Not available

Viscosity
- Not applicable

Other information

Bulk density
- Not applicable

Explosive properties
- Not explosive

Oxidizing properties
- Not oxidizing

10. Stability and reactivity

Reactivity
- Not available.

Chemical stability
- Stable at normal conditions.

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

Conditions to avoid
- Moisture. Contact with incompatible materials.

Incompatible materials
- None known.

Hazardous decomposition products
- No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation
- Dust may irritate respiratory system.

Skin contact
- Dust may irritate skin.

Eye contact
- Dust may irritate the eyes.

Ingestion
- Ingestion may cause irritation and malaise.

Symptoms related to the physical, chemical and toxicological characteristics
- Irritation of eyes and mucous membranes. Irritation of nose and throat.

Information on toxicological effects
Acute toxicity  
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.

Toxicological data

<table>
<thead>
<tr>
<th>Components</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum oxide (CAS 1344-28-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation</td>
<td>Rat</td>
<td>&gt; 2.3 mg/l, 4 hours</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>&gt; 5000 mg/kg</td>
</tr>
<tr>
<td><strong>Skin corrosion/irritation</strong></td>
<td>May cause irritation through mechanical abrasion.</td>
<td></td>
</tr>
<tr>
<td><strong>Serious eye damage/eye irritation</strong></td>
<td>May cause irritation through mechanical abrasion.</td>
<td></td>
</tr>
<tr>
<td><strong>Respiratory or skin sensitization</strong></td>
<td>Not classified.</td>
<td></td>
</tr>
<tr>
<td><strong>Respiratory sensitization</strong></td>
<td>Not a skin sensitizer.</td>
<td></td>
</tr>
<tr>
<td><strong>Skin sensitization</strong></td>
<td>Test data conclusive but not sufficient for classification.</td>
<td></td>
</tr>
<tr>
<td><strong>Germ cell mutagenicity</strong></td>
<td>Test data conclusive but not sufficient for classification.</td>
<td></td>
</tr>
<tr>
<td><strong>Carcinogenicity</strong></td>
<td>Test data conclusive but not sufficient for classification.</td>
<td></td>
</tr>
</tbody>
</table>

IARC Monographs. Overall Evaluation of Carcinogenicity  
Not listed.  
NTP Report on Carcinogens  
Not listed.  
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)  
Not regulated.  
Reproductive toxicity  
Test data conclusive but not sufficient for classification.  
Specific target organ toxicity-single exposure  
Test data conclusive but not sufficient for classification.  
Specific target organ toxicity-repeated exposure  
Test data conclusive but not sufficient for classification.  
Aspiration hazard  
Not classified.  
Further information  
Prolonged and repeated overexposure to dust can lead to pneumoconiosis.

12. Ecological information  
Ecotoxicity  
This product has known eco-toxicological effects. The product is not expected to be hazardous to the environment.  
Persistence and degradability  
The product is not biodegradable.  
Bioaccumulative potential  
The product is not bioaccumulating.  
Mobility in soil  
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.  
Mobility in general  
The product is insoluble in water.  
Other adverse effects  
Not expected to be harmful to aquatic organisms.

13. Disposal considerations  
Disposal instructions  
Dispose in accordance with all applicable regulations.  
Hazardous waste code  
Not regulated.  
Waste from residues / unsed 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.

14. Transport information  
DOT  
Not regulated as dangerous goods.  
IATA  
Not regulated as dangerous goods.  
IMDG  
Not regulated as dangerous goods.  
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code  
Not available.
15. 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.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)
Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
- Immediate Hazard - No
- Delayed Hazard - No
- Fire Hazard - No
- Pressure Hazard - No
- Reactivity Hazard - No

SARA 302 Extremely hazardous substance
Not listed.

SARA 311/312 Hazardous chemical – No

SARA 313 (TRI reporting)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>58 - 73</td>
</tr>
</tbody>
</table>

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Safe Drinking Water Act (SDWA)
Not regulated.

US 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. Massachusetts RTK - Substance List
- Aluminum oxide (CAS 1344-28-1)
- Calcium oxide (CAS 1305-78-8)

US. New Jersey Worker and Community Right-to-Know Act
- Aluminum oxide (CAS 1344-28-1)
- Calcium oxide (CAS 1305-78-8)

US. Pennsylvania Worker and Community Right-to-Know Law
- Aluminum oxide (CAS 1344-28-1)
- Calcium oxide (CAS 1305-78-8)

US. Rhode Island RTK
- Aluminum oxide (CAS 1344-28-1)

US. California Proposition 65
Not Listed.

International Inventories

<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>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
</tbody>
</table>
New Zealand Inventory: Yes
Philippine Inventory of Chemicals and Chemical Substances (PICCS): No
Toxic Substances Control Act (TSCA) Inventory: Yes

*"Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
"No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

- **Issue date**: 10-January-2012
- **Revision date**: 12-September-2017
- **Version**: 3
- **Disclaimer**: The information in the sheet was written based on the best knowledge and experience currently available.

**HMIS ratings**
- Health: 0
- Flammability: 0
- Physical Hazard: 0

**NFPA ratings**

- **References**: IUCLID
- Chemical safety report.

**List of Abbreviations**
- LD50: Lethal Dose, 50%.
- LC50: Lethal Concentration, 50%.