SAFETY DATA SHEET (SDS) – ILLINOIS VALLEY MINERALS LLC

**Section 1 - IDENTIFICATION**

**Material Name:** ALUMINUM OXIDE

**Synonyms:** ALUNDUM; ALUMINA; DIALUMINUM TRIOXIDE; ALUMINUM SESQUIOXIDE; ALPHA-ALUMINA; BETA-ALUMINA; GAMMA-ALUMINA; ALUMITE; ALMITE; MARTOXIN; BAIKALOX POLISHING CHEMICALS (BAIKOWSKI INTERNATIONAL CO.); TABULAR ALUMINA (ALCOA); ALUMINUM OXIDE (AL2O3); ALUMINUM TRIOXIDE; LINDE A,B,C (UNION CARBIDE CORPORATION); UCAR SF-6, SF-18, SF-2 (UNION CARBIDE CORPORATION); D ALUMINA POWDERS (UNION CARBIDE CORPORATION); 420003704; WESGO ALUMINA CERAMICS; AL2O3

**Chemical Family:** metal oxides

**Recommended Use:** commercial chemical

**Restrictions on Use:** None known.

**Section 2 - HAZARD(S) IDENTIFICATION**

**Classification in accordance with 29 CFR 1910.1200.**
- Specific Target Organ Toxicity - Single Exposure, Category 3 (respiratory tract)
- Specific Target Organ Toxicity - Repeated Exposure, Category 1 (lungs)

**GHS LABEL ELEMENTS**

**Symbol(s)**

[Diagram of hazard symbol]

**Signal Word**
DANGER

**Hazard Statement(s)**
- May cause respiratory irritation
- Causes damage to lungs through prolonged or repeated exposure.

**Precautionary Statement(s)**

**Prevention**
- Do not breathe dust or mist. Use only outdoors or in a well-ventilated area. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.

**Response**
- Get medical advice/attention if you feel unwell. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

**Storage**
- Store in a well-ventilated place. Keep container tightly closed. Store locked up.

**Disposal**
- Dispose in accordance with all applicable regulations.
**Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS**

<table>
<thead>
<tr>
<th>CAS</th>
<th>Component</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1344-28-1</td>
<td>Aluminum oxide</td>
<td>100</td>
</tr>
</tbody>
</table>

Component Related Regulatory Information
This product may be regulated, have exposure limits or other information identified as the following: Aluminium compounds, Aluminum insoluble compounds, Aluminium oxides, Aluminum Oxide (135152-65-7).

**Section 4 - FIRST-AID MEASURES**

Description of Necessary Measures

**Inhalation**
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

**Skin Contact**
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

**Eye Contact**
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

**Ingestion**
If swallowed, get medical attention.

**Most Important Symptoms/Effects**

**Acute**
respiratory tract irritation

**Delayed**
lung damage

**Indication of Immediate Medical Attention and Special Treatment Needed, If Needed**
Treat symptomatically and supportively.

**Section 5 - FIRE-FIGHTING MEASURES**

**Suitable Extinguishing Media**
Use extinguishing agents appropriate for surrounding fire.

**Unsuitable Extinguishing Media**
None known.

**Special Hazards Arising from the Chemical**
Negligible fire and explosion hazard in bulk form. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

**Hazardous Combustion Products**
Combustion: miscellaneous decomposition products

**Special Protective Equipment and Precautions for Firefighters**
Wear self-contained breathing apparatus and protective clothing.

**Fire Fighting Measures**
Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.
Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up
Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up residue with a high-efficiency particulate filter vacuum.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling
Observe good hygiene and safety practices when handling this product. Avoid creation of dust. Do not breathe dust. Use only outdoors or in a well-ventilated area. Do not eat, drink, or smoke when using this product. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Conditions for Safe Storage, including any Incompatibilities
Store and handle in accordance with all current regulations and standards. Store in a tightly closed container. Store in a well-ventilated area. Store locked up. Keep separated from incompatible substances.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits
Aluminum oxide (1344-28-1)
ACGIH: 1 mg/m³ TWA (respirable fraction, related to Aluminum insoluble compounds)
OSHA: 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)
Mexico 10 mg/m³ TWA LMPE-PPT

Biological Limit Values - Component Analysis
There are no biological limit values for any of this product’s components.

Appropriate Engineering Controls
Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eyes/Face Protection
Wear safety glasses with side shields. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection
Wear appropriate chemical resistant clothing.

Glove Recommendations
Wear appropriate chemical resistant gloves.

Respiratory Protection
Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100 or P100.
Any air-purifying full-facepiece respirator equipped with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100 or P100.
Any powered, air-purifying respirator with a high-efficiency particulate filter.
Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
For Unknown Concentrations or Immediately Dangerous to Life or Health –

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

**Section 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Physical State:</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>white to gray crystals or</td>
</tr>
<tr>
<td></td>
<td>powder</td>
</tr>
<tr>
<td>Color:</td>
<td>white to gray</td>
</tr>
<tr>
<td>Odor:</td>
<td>odorless</td>
</tr>
<tr>
<td>Melting Point:</td>
<td>2053 - 2072 °C</td>
</tr>
<tr>
<td>Boiling Point:</td>
<td>2980 °C</td>
</tr>
<tr>
<td>Flash Point:</td>
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<tr>
<td>LEL:</td>
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<tr>
<td>Vapor Pressure:</td>
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<tr>
<td>Density:</td>
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<tr>
<td>Water Solubility:</td>
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<tr>
<td>Coeff. Water/Oil Dist:</td>
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<tr>
<td>Viscosity:</td>
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<tr>
<td>Molecular Weight:</td>
<td>101.96</td>
</tr>
<tr>
<td>Flammability (solid, gas):</td>
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</tr>
<tr>
<td>Log KOW:</td>
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</tr>
<tr>
<td>Specific Gravity (water = 1):</td>
<td>3.965 @ 25 °C</td>
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<tr>
<td>Auto Ignition:</td>
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<tr>
<td>Volatility:</td>
<td>&lt;0.5 %</td>
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<tr>
<td>Molecular Formula:</td>
<td>AlZ-O3</td>
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<tr>
<td>Critical Temperature:</td>
<td>Not applicable</td>
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</tbody>
</table>

Other Property Information
No additional information is available.

Solvent Solubility
- Slightly Soluble: mineral acids, strong alkali
- Practically Insoluble: nonpolar organic solvents

**Section 10 - STABILITY AND REACTIVITY**

Reactivity
No reactivity hazard is expected.

Chemical Stability
Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions
Will not polymerize.

Conditions to Avoid
Avoid generating dust. Avoid contact with incompatible materials.

Incompatible Materials
- halo carbons, halogens, combustible materials, oxidizing materials

Hazardous Decomposition
- Combustion: miscellaneous decomposition products

**Section 11 - TOXICOLOGICAL INFORMATION**

Acute Toxicity

Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:
- Aluminum oxide (1344-28-1)
- Oral LD50 Rat >5000 mg/kg
Inhalation
irritation, difficulty breathing

Ingestion
no information on significant adverse effects

Skin Contact
irritation

Eye Contact
irritation

Immediate Effects
respiratory tract irritation

Delayed Effects
lung damage

Medical Conditions Aggravated by Exposure
respiratory disorders

Irritation/Corrosivity Data
respiratory tract irritation

Respiratory Sensitization
No information available for the product.

Dermal Sensitization
No information available for the product.

Germ Cell Mutagenicity
No information available for the product.

Carcinogenicity

Component Carcinogenicity
Aluminum oxide (1344-28-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (related to Aluminum insoluble compounds)

DFG: Category 2 (considered to be carcinogenic for man, fibre dust)

Reproductive Toxicity
No information available for the product.

Specific Target Organ Toxicity - Single Exposure
respiratory tract

Specific Target Organ Toxicity - Repeated Exposure
lungs

Aspiration Hazard
Not expected to be an aspiration hazard.

**Section 12 - ECOLOGICAL INFORMATION**

Persistence and Degradability
No information available for the product.

Bioaccumulation
No information available for the product.

Mobility
No information available for the product.

Other Toxicity
No additional information is available.

**Section 13 - DISPOSAL CONSIDERATIONS**

Disposal Methods
Dispose in accordance with all applicable regulations.

Disposal of Contaminated Packaging
Empty containers may contain product residue. Dispose in accordance with all applicable regulations.
Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

**Section 14 - TRANSPORT INFORMATION**

US DOT Information
No Classification assigned.

TDG Information
No Classification assigned.

IATA Information
No Classification assigned.

**Section 15 - REGULATORY INFORMATION**

U.S. Federal Regulations
This material contains one or more of the following chemicals required to be identified under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

*Aluminum oxide (1344-28-1)*
  SARA 313: 1.0 % de minimis concentration (fibrous forms)

SARA 311/312
Acute Health: Yes
Chronic Health: Yes
Fire: No
Pressure: No
Reactive: No

U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
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<tbody>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Not regulated under California Proposition 65

Canada
WHMIS CLASSIFICATION: D2B

Canada WHMIS
The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:
*Aluminum oxide (1344-28-1)*
1 %

Chemical Inventory Listing - US
Component Analysis - Inventory

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>US</th>
<th>CA</th>
<th>EU</th>
<th>AU</th>
<th>PH</th>
<th>JP</th>
<th>KR</th>
<th>CN</th>
<th>NZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>Yes</td>
<td>DSL</td>
<td>EIN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Summary of Changes
Updated: 1/29/2015

NFPA Ratings: Health: 2 Fire: 1 Reactivity: 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information
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Reviewed and Approved Jan 5, 2016

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