1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Brown Fused Alumina (BFA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>BFA (multiple mesh and grit sizes)</td>
</tr>
<tr>
<td>Trade Name</td>
<td>BFA-96 (Refractory), Virgin BFA – Abrasive, Fused Aluminum Oxide, Fused Alumina</td>
</tr>
<tr>
<td>General Use</td>
<td>Abrasives, Ceramics, Surface Treatment and Refractory</td>
</tr>
<tr>
<td>Chemical Family</td>
<td>Brown Fused Aluminum Oxide, Al₂O₃</td>
</tr>
<tr>
<td>CAS-No:</td>
<td>1344-28-1</td>
</tr>
<tr>
<td>EC-No:</td>
<td>215-691-6</td>
</tr>
</tbody>
</table>

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Raw material for various industrial applications

1.3 Details of the supplier of the safety data sheet

<table>
<thead>
<tr>
<th>Company</th>
<th>Great Lakes Minerals, LLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200 Port Road</td>
<td></td>
</tr>
<tr>
<td>Wurtland, Kentucky 41144-1635 USA</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td>+1 (606) 833-8383</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:CustomerService@glmin.com">CustomerService@glmin.com</a></td>
</tr>
</tbody>
</table>

1.4 Emergency telephone number

Emergency Phone #: (606) 833-8383 (Monday through Friday, 8:00AM – 4:30 PM EST)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Component Classified – None

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS) – Not Classified

Note: In its delivered state, the respirable particulate content of these products has been shown to be at de minimis levels and incapable of causing harm under normal or extreme upset handling conditions. Thus, these materials have been classified as non-hazardous for processing, shipping and handling purposes. Applications which serve to crush, pulverize, grind or fracture the material could, however, generate respirable particulate. As a result, and under these end use conditions or application scenarios, the user is cautioned to implement exposure controls and worker personal protective measures up to and until an exposure assessment is conducted, demonstrating that there is no human health risk and that occupational exposure levels are within regulatory limits for those respirable aerosols generated as a part of end use conditions.

2.2 GHS Label elements, including precautionary statements

| Pictogram | Not applicable |
| Signal word | No signal word |
| Hazard statement(s) | No known significant effects or critical hazards |
| Precautionary statement(s) | Not applicable |

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS – none
3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
   Synonyms: Brown Fused Alumina (BFA)

3.2 Ingredients

<table>
<thead>
<tr>
<th>Chemical Name, Formula</th>
<th>CAS Number</th>
<th>EINECS Number</th>
<th>% Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide (non-fibrous), Al₂O₃</td>
<td>1344-28-1</td>
<td>215-691-6</td>
<td>&gt;96 % WT</td>
</tr>
<tr>
<td>Magnesium Carbonate, MgCO₃</td>
<td>546-93-0</td>
<td>208-915-9</td>
<td>1-2 % WT</td>
</tr>
<tr>
<td>Titanium oxide, TiO₂ (non-respirable)</td>
<td>13463-67-7</td>
<td>236-675-5</td>
<td>2-5 % WT</td>
</tr>
<tr>
<td>Varies (Naturally Occurring)</td>
<td>-----</td>
<td>----</td>
<td>&lt;1.0 % WT</td>
</tr>
</tbody>
</table>

3.3 Hazardous Components
   These products may contain Respirable Titanium Dioxide (CAS # 13463-67-7) at trace concentration levels (<0.2% w/w). Per XRC(M) analysis, which combines the analytical capabilities of Inductively Coupled Plasma Optical Emissions Spectrometry, X-Ray Diffraction, Computer Controlled Scanning Electron Microscopy/Energy Dispersive Spectroscopy and Raman Spectroscopy to conduct particle-by-particle physicochemical/mineralogical analysis - naturally occurring trace level substances in these products, including Titanium Dioxide are inextricably bound, environmentally unavailable and at de minimis concentrations. Thus, in their delivered state, these products are believed to be incapable of causing harm under either normal handing conditions or in an extreme upset environment.

3.4 Additional Information
   Per the XRD Rietveld Method used to determine mixture components and content, there are no additional ingredients present within these products, including fibrous Al₂O₃ which, based on the best available information of this supplier, are not at concentration levels significant enough to trigger classification as hazardous and hence, require reporting within this section. Therefore, trace level components have been excluded from reporting and classification as either a health or environmental hazard.

4. FIRST AID MEASURES

4.1 Description of first aid measures
   - **Inhalation:** If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention
   - **Skin Contact:** Wash skin with soap and water. If necessary, seek medical attention
   - **Eye Contact:** Flush eyes with water. If necessary, seek medical attention
   - **Ingestion:** If a large amount is swallowed, get medical attention

4.2 Most Important Symptoms/Effects, Acute and Delayed: No data available; generated dust may result in irritation.

4.3 Indication of any immediate medical attention and special treatment needed
   No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media
   This product is not flammable. Use fire extinguishing media appropriate for surrounding materials.

5.2 Special hazards arising from the substance or mixture
   Hazardous combustion products: None under normal conditions

5.3 Advice for firefighters
   Special fire-fighting procedures: No specific fire-fighting procedures given
6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Follow precautions for safe handling described in this safety data sheet

6.2 Environmental precautions
The product should not be dumped in nature but collected and delivered according to agreement with the local authorities.

6.3 Methods and material for containment and cleaning up
Avoid excessive dust formation. Transfer to a container for disposal.

6.4 Reference to other sections
For personal protection see section 8. For waste disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities
Store in accordance with local regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure Limits:
ACGIH (TLV): 1 mg/m3 (TWA, respirable fraction, related to Aluminum insoluble compounds)
OSHA (PEL): 15 mg/m3 (TWA, total particulates, not otherwise regulated)
5 mg/m3 (TWA, respirable particulates, not otherwise regulated).

Engineering Controls: Provide adequate ventilation to control dusts. Observe occupational exposure limits and minimize the inhalation of dusts.

Respiratory Protection: No specific recommendation made, but respiratory protection must be used if the general dust level exceeds recommended occupational exposure limits. Wear appropriate dust masks in high dust conditions and affected work areas.

Eye/Face Protection: Wear dust resistant safety goggles where this is danger of eye contact. Provide eyewash station.

Skin and Body Protection: No specific hand protection noted, but gloves may still be advisable. Wash hands at the end of each work shift and before eating, smoking and using the toilet.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state:</th>
<th>Solid [Granular to Powder]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color:</td>
<td>Brown / Grey</td>
</tr>
<tr>
<td>Melting point:</td>
<td>2000°C (3632°F)</td>
</tr>
<tr>
<td>Odor:</td>
<td>Odorless</td>
</tr>
<tr>
<td>pH:</td>
<td>Neutral</td>
</tr>
<tr>
<td>Relative density:</td>
<td>3.9 g/cc at 20°C</td>
</tr>
<tr>
<td>Granulometry:</td>
<td>Varies (Generally &gt;1µm)</td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

10.1 Reactivity
Stable under normal temperature conditions.

10.2 Chemical stability
The product is stable.

10.3 Possibility of hazardous reactions
Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid
None known.

10.5 Incompatible materials
No specific, or groups of materials, are likely to react to produce a hazardous situation.

10.6 Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATION

11.1 Information on likely routes of exposure:
General: Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure to respirable TITANIUM DIOXIDE: When inhaled as a respirable dust over a long period of time, this ingredient may cause respiratory disease (lung fibrosis).

**Eyes:** Solid particles on the eye (powder/dust) may cause pain and be accompanied by irritation.

**Skin:** May cause skin irritation.

**Inhalation:** Dust inhalation may cause respiratory irritation.

**Ingestion:** Ingestion may cause irritation

**Acute toxicity information:** Not classified (based on available data, the classification criteria are not met). No toxicity studies have been conducted on this product.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Inhalation LC50</th>
<th>Species</th>
<th>Oral LD50</th>
<th>Species</th>
<th>Dermal LD50</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>&gt;6.82 mg/L (4 hours)</td>
<td>Rat/ adult</td>
<td>&gt;5000 mg/kg</td>
<td>Rat/ adult</td>
<td>&gt;10 g/kg</td>
<td>Rabbit/ adult</td>
</tr>
</tbody>
</table>

**Skin corrosion/irritation:** Not classified (based on available data, the classification criteria are not met).

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Skin irritation</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>Non-irritant</td>
<td>Human</td>
</tr>
</tbody>
</table>

**Serious eye damage/irritation:** Not classified (based on available data, the classification criteria are not met).

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Eye irritation</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>Slight irritant</td>
<td>Rabbit/ adult</td>
</tr>
</tbody>
</table>

**Respiratory or skin sensitization:** Not classified (based on available data, the classification criteria are not met).

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Skin sensitization</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>Non-sensitizer</td>
<td>Guinea Pig/ adult</td>
</tr>
</tbody>
</table>

**Carcinogenicity:** Not classified (based on available data, the classification criteria are not met). TITANIUM DIOXIDE: Titanium dioxide has been classified by IARC as possibly carcinogenic to humans (Group 2B) through inhalation. This classification is based on inadequate evidence for carcinogenicity in humans, but sufficient evidence of carcinogenicity in animals (rats). It should be noted that recent studies have demonstrated that the rat may be particularly sensitive to high levels of toxic dusts such as titanium dioxide. Epidemiology studies do not suggest an increased risk of cancer in humans from occupational exposure to titanium dioxide.
Germ cell mutagenicity: Not classified.
Reproductive toxicity: Not classified.
Specific target organ toxicity (STOT) - single exposure: Not classified (based on available data, the classification criteria are not met).
Specific target organ toxicity (STOT) - repeated exposure: Not classified.
Aspiration hazard: Not classified (technical impossibility to obtain the data).
Other toxicity information: No additional information available.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity: Not regarded as dangerous for the environment
12.2 Acute fish toxicity: Not considered toxic to fish
12.3 Persistence and degradability: The product is not readily biodegradable
12.4 Bioaccumulative potential: The product is not bioaccumulating
12.5 Mobility in soil: Not relevant, due to the form of the product
12.6 Results of PBT and vPvB assessment: This product does not contain any PBT or vPvB substances
12.7 Other adverse effects: None known

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
   Product
   Dispose of waste and residues in accordance with local authority requirements
   Contaminated packaging
   Dispose of as unused product

14. TRANSPORT INFORMATION

   Road transport notes: Not classified
   Rail transport notes: Not classified
   Sea transport notes: Not classified
   Air transport notes: Not classified

14.1 UN Number: The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID)
14.2 UN proper shipping name: Not classified for transportation
14.3 Transport and hazard class(es): Not classified for transportation
14.4 Packing group: Not classified for transportation
14.5 Environmental hazards: Not an environmentally hazardous substance / marine pollutant
14.6 Special precautions for user: Not classified for transportation
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable
15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

SARA 313 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 313

SARA 311/312 Hazards
Regulated per OSHA HAZCOM Standards

State and Local Right to Know
No investigation of State and Local requirements was performed. For details on regulatory requirements, contact the appropriate agencies within your region.

California Prop. 65 Components
This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm at levels above the “safe harbor” designation. Trace component concentrations are so low that they create no significant exposure risk of cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3. Not applicable

HMIS Rating
Health hazard: 1
Chronic Health Hazard: *
Flammability: 0
Physical Hazard: 0

NFPA Rating
Health hazard: 1
Fire Hazard: 0
Reactivity Hazard: 0

Further information
License granted to make unlimited paper copies for internal use only. 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 this product due to naturally occurring variation in the ore from time to time. Great Lakes Minerals, LLC and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product.

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