1 Identification

GHS Product Identifier

Other means of identification
- Reinforced Alumina Composites.

Recommended use of the chemical and restriction on use
- Used primarily in industrial high temperature insulating applications. Examples include heat shields, induction equipment, heat containment, industrial furnaces, ovens, kilns, boilers and other process equipment and applications.

Supplier's details
ZIRCAR Refractory Composites, Inc.
P.O. Box 489
Florida, NY 10921
1-845-651-2200 (Monday - Friday 8:00 a.m. - 4:30 p.m. EST)

Homepage, [http://www.zrci.com](http://www.zrci.com) or email sales@zrci.com

Emergency phone number
CHEMTREC will provide assistance for chemical emergencies. Call 1-800-424-9300.

2 Hazard(s) identification

Classification of the substance or mixture
- While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

- Not classified as to its carcinogenicity by the International Agency for Research on Cancer (IARC).

GHS label elements
- Causes mild skin irritation

Other hazards which do not result in classification

Precautionary statements
- Do not handle until all safety instructions have been read and understood.
- Use respiratory protection as required; see section 8 of the Safety Data Sheet.

- If concerned about exposure, get medical advice.
- Store in a manner to minimize airborne dust.
- Dispose of waste in accordance with local, state and federal regulations.

Supplementary Information

Date of Preparation: 03/16/2020 10:32:02 AM  Revision: 2
May cause temporary mechanical irritation to exposed eyes, skin or respiratory tract. Minimize exposure to airborne dust when machining.

Mild mechanical irritation to skin, eyes and upper respiratory system may result from exposure. Effects are usually temporary.

3 Composition/information on ingredients

<table>
<thead>
<tr>
<th>Description</th>
<th>CAS Number</th>
<th>EINECS Number</th>
<th>%</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium Oxide</td>
<td>1344-28-1</td>
<td>215-691-6</td>
<td>65 - 82</td>
<td></td>
</tr>
<tr>
<td>Glass filament</td>
<td>65997-17-3</td>
<td>266-046-0</td>
<td>18 - 45</td>
<td></td>
</tr>
</tbody>
</table>

4 First-aid measures

Description of necessary first-aid measures

SKIN
Handling of this material may generate mild mechanical temporary skin irritation. If this occurs, rinse affected areas with water and wash gently. Do not rub or scratch exposed skin.

EYE
In case of eye contact flush abundantly with water; have eye bath available. Do not rub eyes.

NOSE AND THROAT
If these become irritated move to a dust free area, drink water and blow nose. If symptoms persist, seek medical advice.

Gastrointestinal
If gastrointestinal tract irritation develops, move the person to a dust free environment.

Most important symptoms/effects, acute and delayed
Mild mechanical irritation to skin, eyes and upper respiratory system may result from exposure. These effects are usually temporary.

Indication of immediate medical attention and special treatment needed, if necessary

NOTES TO PHYSICIANS Skin and respiratory effects are the result of temporary, mild mechanical irritation; exposure does not result in allergic manifestations.

5 Fire-fighting measures

Suitable extinguishing media
Non-combustible products, class of reaction to fire is zero. Packaging and surrounding materials may be combustible. Use extinguishing agent suitable for surrounding combustible materials.

Specific hazards arising from the chemical
Non-combustible products, class of reaction to fire is zero. Packaging and surrounding materials may be combustible. Use extinguishing agent suitable for surrounding combustible materials.

Special protective actions for fire-fighters

NFPA Codes: Flammability: 0 Health: 1 Reactivity: 0 Special: 0

6 Accidental release measures
Personal precautions, protective equipment and emergency procedures

Minimize airborne dust. Compressed air or dry sweeping should not be used for cleaning. See Section 8 "Exposure Controls / Personal Protection" for exposure guidelines.

Environmental precautions

None.

Methods and materials for containment and cleaning up

Frequently clean the work area with HEPA filtered vacuum or wet sweeping to minimize the accumulation of debris. Do not use compressed air for clean-up.

7 Handling and storage

Precautions for safe handling

Handle fiber carefully to minimize airborne dust. Limit use of power tools unless in conjunction with local exhaust ventilation. Use hand tools whenever possible. (See section 8)

Service significantly above the product design temperature may increase friability and the possibility of generating airborne fibers or particulates. Not considered problematic during use, airborne fibers may complicate removal activities. Is recommended that product use be carefully matched to design parameters.

After Service: AS MANUFACTURED THIS PRODUCT IS COMPRISED OF ALUMINA AND SILICA WHICH MAY TRANSFORM UPON HEATING (TEMPERATURES GREATER THAN 1000°C FOR EXTENDED PERIODS OF TIME) TO NON-HAZARDOUS MULLITE AND CRISTOBALITE (CAS # 14464-46-1), A FORM OF CRYSTALLINE SILICA. OF THIS PRODUCT AFTER USE MY GENERATE DUSTS. OR REPEATED INHALATION OF RESPIRABLE FREE CRYSTALLINE SILICA DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS). THE IARC WORKING GROUP CONCLUDED THAT CRYSTALLINE SILICA, IN THE FORM OF QUARTZ OR CRISTOBALITE, FROM OCCUPATIONAL SOURCES POSED A CARCINOGENIC RISK TO HUMANS (CATEGORY 1). IS SUFFICIENT EVIDENCE OF CARCINOGENICITY IN ANIMALS, BUT LIMITED EVIDENCE IN HUMANS. ’S FINAL RULE LIMIT AND ACGIH’S TLV FOR RESPIRABLE CRISTOBALITE IS 0.05 MG/M³. VENTILATION AND RESPIRATORY PROTECTION SHOULD BE PROVIDED IN COMPLIANCE WITH OSHA STANDARDS. ADHERENCE TO RECOMMENDED SAFE WORK PRACTICES IS ADVISED. PRODUCT REMOVAL MUST CONSIDER THE POSSIBILITY OF USAGE ABOVE DESIGN TEMPERATURES.

Product removal must consider the possibility of usage above design temperatures. Section 8 for appropriate respiratory protection during removal.

Conditions for safe storage, including any incompatibilities

Store in a manner to minimize airborne dust.

EMPTY CONTAINERS

Product packaging may contain residue. Do not reuse.

8 Exposure controls/personal protection

Control parameters

OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.
<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>MANUFACTURER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>5 mg/m³ (Respirable Fraction)</td>
<td>1 mg/m³ (respirable fraction)</td>
<td>None Established</td>
</tr>
<tr>
<td></td>
<td>15 mg/m³ (Total Dust)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass, Oxide</td>
<td>2 TWA: 15 mg/m³</td>
<td>TWA: 1 f/cc Form: Continuous filament glass</td>
<td>None Established</td>
</tr>
<tr>
<td></td>
<td>TWA: 5 mg/m³ Form: Respirable</td>
<td>glass fibers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA: 15 mg/m³ Form: Total dust</td>
<td>Continuous filament glass fibers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 5 mg/m³, (Inhalable) Form: Continuous</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>filament glass fibers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 3 mg/m³ Form: Respirable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 10 mg/m³ Form: Total dust.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>ACGIH TLV (United States, 6/2013).</strong> TWA:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 mg/m³ 8 hours. Form: Inhalable fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 1 f/cc 8 hours. Form: Respirable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>fibers: length greater than 5 uM; aspect ratio</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>equal to or greater than 3:1 as determined by</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>the membrane filter method at 400-450X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>magnification (4-mm objective) phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>contrast illumination.</td>
<td></td>
</tr>
</tbody>
</table>

As with most industrial materials, it is prudent to minimize unnecessary exposure to respirable dusts. Note that Industrial hygiene standards and occupational exposure limits differ between countries and local jurisdictions. Check with your employer to identify any "respirable dust", "total dust" or "fiber" exposure standards to follow in your area. If no regulatory dust or fiber control standard apply, a qualified industrial hygiene professional can assist with a specific evaluation of workplace conditions and the identification of appropriate respiratory protection practices. In the absence of other guidance, the supplier has found that it is generally feasible to control occupational fiber exposure to 0.5 f/cc or less.

The evaluation of occupational exposure limits and determining their relative applicability to the workplace is best performed, on a case-by-case basis, by a qualified Industrial Hygienist.

**Appropriate engineering controls**

Use engineering controls such as local exhaust ventilation, point of generation dust collection, down draft work stations, emission controlling tool designs, and materials handling equipment designed to minimize airborne fiber emissions.

**Individual protection measures**

**Skin Protection**

Wear gloves, head coverings and full body clothing as necessary to prevent skin irritation. Washable or disposable clothing may be used. If possible, do not take unwashed clothing home. If soiled work clothing must be taken home, employers should ensure employees are thoroughly trained on the best practices to minimize non-work dust exposure (e.g., vacuum clothes before leaving the work area, wash work clothing separately, rinse washer before washing other household clothes, etc.).

**Eye Protection**
As necessary, wear goggles or safety glasses with side shields.

**Respiratory Protection**
When engineering and/or administrative controls are insufficient to maintain workplace concentrations below the applicable level, the use of appropriate respiratory protection, pursuant to the requirements of OSHA Standards 29 CFR 1910.134 and 29 CFR 1926.103, is recommended. A NIOSH certified respirator with a filter efficiency of at least 95% should be used. The 95% filter efficiency recommendation is based on NIOSH respirator selection logic sequence for exposure to particulates. Selection of filter efficiency (i.e. 95%, 99% or 99.97%) depends on how much filter leakage can be accepted and the concentration of airborne contaminants. Other factors to consider are the NIOSH filter series N, R or P. (N)Not resistant to oil, (R)Resistant to oil and (P) oilProof. These recommendations are not designed to limit informed choices, provided that respiratory protection decisions comply with 29 CFR 1910.134.

The evaluation of workplace hazards and the identification of appropriate respiratory protection is best performed, on a case by case basis, by a qualified Industrial Hygienist.

### 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Physical and chemical properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Appearance</td>
<td>White to tan</td>
</tr>
<tr>
<td>(b) Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>(c) Odor threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(d) pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(e) Melting point</td>
<td>1760° C (3200° F)</td>
</tr>
<tr>
<td>(f) Initial boiling point and boiling range</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(g) Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(h) Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(i) Flammability</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(j) Upper/lower flammability or explosive limits</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(k) Vapor pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(l) Vapor density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(m) Relative density</td>
<td>1.9 to 2.3</td>
</tr>
<tr>
<td>(n) Solubility</td>
<td>Insoluble</td>
</tr>
<tr>
<td>(o) Partition coefficient: n-octanol/water</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(p) Auto-ignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(q) Decomposition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>(r) Viscosity</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### 10 Stability and reactivity

**Reactivity**

Non-reactive.

**Chemical stability**

Stable and Inert.

**Possibility of hazardous reactions**

None.

**Conditions to avoid**
Please refer to handling and storage advice in Section 7.

Incompatible materials
Powerful oxidizers; fluorine, chlorine trifluoride, manganese trioxide; oxygen difluoride, etc.

Hazardous decomposition products
None.

11 Toxicological information

Toxicological (health) effects
There are no known health effects from the long term use or contact with nonrespirable continuous filament fibers reinforcement. Nonrespirable fibers cannot reach the deep lung because they have a diameter of greater than 3.5 micrometers. Fibers of this diameter cannot penetrate the narrow, bending passages of the human respiratory tract to reach the lower regions of the lung and thus, have no possibility of causing serious pulmonary damage. Instead, they deposit on the surfaces of the upper respiratory tract, nose, or pharynx. These fibers are then cleared through normal physiological mechanisms.

Animal Study: In 2000, the Institute of Occupational Medicine (IOM) in Scotland published the results of a long term inhalation study in animals exposed to fibers that were manufactured to be RESPIRABLE. Animals were exposed to a very high concentration of these RESPIRABLE fibers (1022 fibers/cc for 5 hours/day, 7 days/week for 52 weeks). Exposure to these microfibers resulted in the development of fibrosis, lung cancer and mesothelioma as a result of the fibers being able to reach the lower regions of the lung.
Chopped, crushed or severely mechanically processed fiberglass may contain a very small amount of respirable fibers that could reach the deep lung. The measured airborne concentration of these respirable fibers in areas where severe processing of fiberglass occurred has been shown to be extremely low and well below the TLV. Repeated or prolonged exposure to respirable glass fibers may cause fibrosis, lung cancer and mesothelioma. fiberglass, in the form supplied, does not contain respirable fibers.

Epidemiology Studies: Two major studies in the US (performed by the University of Pittsburgh) and Europe (performed by the International Agency for Research on Cancer) showed no increase in lung cancer or respiratory disease among people working in production facilities producing NONRESPIRABLE continuous filament fiberglass. An additional smaller study performed in Canada also did not.

Information on the likely routes of exposure
Not Applicable.

Symptoms related to the physical, chemical and toxicological characteristics
Not Applicable.

Delayed and immediate effects and also chronic effects from short and long term exposure
Not Applicable.

Numerical measures of toxicity (such as acute toxicity estimates)
Not Applicable.

Interactive effects
Not Applicable.
Where specific chemical data are not available
  Not Applicable.

Mixtures
  Not Applicable.

Mixture versus ingredient information
  Not Applicable.

Other information
  Not classified by OSHA.

12 Ecological information

Toxicity
  No known aquatic toxicity.

Persistence and degradability
  These products are insoluble materials that remain stable over time and are chemically identical to inorganic compounds found in the soil and sediment; they remain inert in the natural environment.

Bioaccumulative potential
  No bioaccumulative potential.

Mobility in soil
  No mobility in soil.

Other adverse effects
  No adverse effects of this material on the environment are anticipated.

13 Disposal considerations

Disposal methods

**WASTE MANAGEMENT**
  To prevent waste materials from becoming airborne during waste storage, transportation and disposal, a covered container or plastic bagging is recommended.

**DISPOSAL**
  This product, as manufactured, is not classified as a hazardous waste according to Federal regulations (40 CFR 261). Any processing, use, alteration or chemical additions to the product, as purchased, may alter the disposal requirements. Under Federal regulations, it is the waste generator's responsibility to properly characterize a waste material, to determine if it is a "hazardous" waste. Check local, regional, state or provincial regulations to identify all applicable disposal requirements.

14 Transport information

UN Number
  Not Applicable.

UN Proper Shipping Name
Transport hazard class(es)
Not Applicable.

Packing group, if applicable
Not Applicable.

Environmental hazards
Not a marine pollutant.

Special precautions for user
Not Applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Canadian TDG Hazard Class & PIN: Not regulated
Not classified as dangerous goods under ADR (road), RID (train) or IMDG (ship).

15 Regulatory information

Safety, health and environmental regulations specific for the product in question

EPA: Superfund Amendments and Reauthorization Act (SARA) Title III- This product does not contain toxic chemicals reportable under Section 313 (40 CFR 372). Sections 311 and 312 (40 CFR 370) apply (delayed hazard).

Toxic Substances Control Act (TSCA)- Not required to be listed on the TSCA inventory

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) the Clean Air Act (CAA)- This product contains fibers with an average diameter greater than one micron and thus is not considered a hazardous air pollutant.


California: Product is NOT listed in Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986a chemical known to the State of California to cause cancer.

Other States: These products are not known to be regulated by states other than New Jersey; however, state and local OSHA and EPA regulations may apply to these products. If in doubt, contact your local regulatory agency.

New Jersey Right to Know Act: Aluminum oxide (CAS No. 1344-28-1) and Silica (amorphous) (CAS No. 60676-86-0), are found on the New Jersey Hazardous Substance list and are subject to reporting under SARA and the New Jersey Worker and Community Tight to Know Act.

Canada: Canadian Workplace Hazardous Materials Information System (WHMIS)- Aluminum oxide (CAS No. 1344-28-1), Silica (amorphous) (CAS No. 60676-86-0), and Calcium Oxide (CAS No. 1305-78-8) are subject to disclosure under the Hazardous Products Act.

Canadian Environmental Protection Act (CEPA)- All substances in this product are listed, as required, on the Domestic Substance List (DSL)

Europe: The assessment of all available toxicological test data during the REACH registration process resulted in a "no classification" conclusion.

16 Other information
The HTIW Coalition and the U.S. Occupational Safety and Health Administration (OSHA) are partners in PSP HTW, a comprehensive, multi-faceted risk management program designed to control and reduce workplace exposures to high temperature insulation wools (HTIW). For more information regarding PSP HTW, please visit [http://www.htiwcoalition.org](http://www.htiwcoalition.org)

**DEFINITIONS**

ACGIH: American Conference of Governmental Industrial Hygienists

ADR: Carriage of Dangerous Goods by Road (International Regulation)

CAA: Clean Air Act

CAS: Chemical Abstracts Service

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act

DSL: Domestic Substances List

EPA: Environmental Protection Agency

EU: European Union

f/cc: Fibers per cubic centimeter

HEPA: High Efficiency Particulate Air

HMIS: Hazardous Materials Identification System

IARC: International Agency for Research on Cancer

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods Code

mg/m³: Milligrams per cubic meter of air

mmpcf: Million particles per cubic meter

NFPA: National Fire Protection Association

NIOSH: National Institute for Occupational Safety and Health

OSHA: Occupational Safety and Health Administration

29 CFR 1910.134 & 1926.103: OSHA Respiratory Protection Standards


PEL: Permissible Exposure Limit (OSHA)
PIN: Product Identification Number

PNOC: Particulates Not Otherwise Classified

PNOR: Particulates Not Otherwise Regulated

PSP: Product Stewardship Program

RCRA: Resource Conservation and Recovery Act

REL: Recommended Exposure Limit (NIOSH)

RID: Carriage of Dangerous Goods by Rail (International Regulations)

SARA: Superfund Amendments and Reauthorization Act

SARA Title III: Emergency Planning and Community Right to Know Act

SARA Section 302: Extremely Hazardous Substances

SARA Section 304: Emergency Release

SARA Section 311: MSDS/List of Chemicals and Hazardous Inventory

SARA Section 312: Emergency and Hazardous Inventory

SARA Section 313: Toxic Chemicals and Release Reporting

STEL: Short Term Exposure Limit

SVF: Synthetic Vitreous Fiber

TDG: Transportation of Dangerous Goods

TLV: Threshold Limit Value (ACGIH)

TSCA: Toxic Substances Control Act

TWA: Time Weighted Average

WHMIS: Workplace Hazardous Materials Information System (Canada)

Revision Summary: Updated SDS to align with OSHA HCS 2012. Replaces all previous MSDS.

Revision Date: 4-10-17

SDS Prepared By: ZIRCAR Refractory Composites, Inc.

DISCLAIMER

The information presented herein is presented in good faith and believed to be accurate as of the effective date of this Safety Data Sheet. Employers may use this SDS to supplement other information gathered by them in their efforts to assure the health and safety of their employees and the proper use of the product. This summary
of the relevant data reflects professional judgment; employers should note that information perceived to be less relevant has not been included in this SDS. Therefore, given the summary nature of this document, ZIRCAR Refractory Composites, Inc. does not extend any warranty (expressed or implied), assume any responsibility, or make any representation regarding the completeness of this information or its suitability for the purposes envisioned by the user.