

## Safety Data Sheet



### Section 1: Identification

#### Product identifier

- Product Name** • **Reno Jet Clean 18Z**  
**Product Code** • 168800

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

- Recommended use** • Refractory applications

#### Details of the supplier of the safety data sheet

- Manufacturer** • Reno Refractories, Inc.  
P O Box 201  
Morris, AL 35116  
United States  
www.renorefractories.com  
sales@renorefractories.com  
**Telephone (General)** • 205-647-0240

#### Emergency telephone number

- Manufacturer** • 1-800-262-8200 - CHEMTREC

### Section 2: Hazard Identification

#### United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

#### Classification of the substance or mixture

- OSHA HCS 2012** • Skin Irritation 2  
Eye Irritation 2  
Carcinogenicity 1A  
Specific Target Organ Toxicity Repeated Exposure 1

#### Label elements

**OSHA HCS 2012**

#### DANGER



- Hazard statements** • Causes skin irritation  
Causes serious eye irritation  
May cause cancer.  
Causes damage to organs through prolonged or repeated exposure.

#### Precautionary statements

- Prevention** • Obtain special instructions before use.  
 Do not handle until all safety precautions have been read and understood.  
 Do not breathe dust.  
 Wash thoroughly after handling.  
 Do not eat, drink or smoke when using this product.  
 Wear protective gloves, clothing, and eye/face protection, .

- Response** • If on skin: Wash with plenty of water .  
 Take off contaminated clothing and wash before reuse.  
 Specific treatment, see supplemental first aid information.  
 If skin irritation occurs: Get medical advice/attention.  
 IF IN EYES: 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.  
 IF exposed or concerned: Get medical advice/attention.

- Storage/Disposal** • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**Other hazards**

- OSHA HCS 2012** • Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

**Canada**

According to: WHMIS

**Classification of the substance or mixture**

- WHMIS** • Other Toxic Effects - D2A  
 Other Toxic Effects - D2B  
 Corrosive - E

**Label elements**

- WHMIS** • 

- WHMIS** • Other Toxic Effects - D2A  
 Other Toxic Effects - D2B  
 Corrosive - E

**Other hazards**

- WHMIS** • In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

**Section 3 - Composition/Information on Ingredients**

**Substances**

- Material does not meet the criteria of a substance.

**Mixtures**

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments

Aluminum oxide	CAS:1344-28-1	13.38% TO 24.9%	Inhalation-Rat LC50 • 0.2 mg/L 5 Hour(s) 28 Week(s)	OSHA HCS 2012: Not Classified	NDA
Mullite	CAS:1302-93-8	21.56% TO 23.87%	NDA	OSHA HCS 2012: STOT RE 2 (Lungs)	NDA
Zirconium	CAS:7440-67-7	12.4% TO 20.4%	NDA	OSHA HCS 2012: Not Classified	NDA
Zirconium(IV) silicate (1:1)	CAS:14940-68-2	9.8% TO 14%	NDA	OSHA HCS 2012: Not Classified	Comment: Contains trace amounts of naturally occurring radioactive materials Uranium, Thorium, Radium and Hafnium.
Zirconium oxide	CAS:1314-23-4	0.93% TO 13.6%	NDA	OSHA HCS 2012: Not Classified	NDA
Aluminum(III) silicate (2:1)	CAS:1302-76-7	7.65% TO 11.4%	NDA	OSHA HCS 2012: STOT RE 2 (Lungs)	NDA
Silica, amorphous	CAS:7631-86-9	0.01% TO 8.78%	NDA	OSHA HCS 2012: Not Classified	NDA
Cement, alumina, chemicals	CAS:65997-16-2	6% TO 8%	NDA	OSHA HCS 2012: Not Classified	NDA
Amorphous silica fume	CAS:69012-64-2	2.4% TO 6%	NDA	OSHA HCS 2012: STOT RE 1 (Lungs)	NDA
Amorphous/fused silica	CAS:60676-86-0	0.93% TO 5.1%	NDA	OSHA HCS 2012: Not Classified	NDA
Silicon carbide	CAS:409-21-2	0.9% TO 3%	NDA	OSHA HCS 2012: STOT RE 2 (Lungs)	NDA
Quartz	CAS:14808-60-7	0.46% TO 1.631%	NDA	OSHA HCS 2012: Carc. 1A; STOT RE 1 (Lungs)	NDA
Dispersing Agent	Proprietary	0% TO 1.5%	Ingestion/Oral-Rat LD50 • 3053 mg/kg	OSHA HCS 2012: Not Classified	NDA
Sodium hydroxide	CAS:1310-73-2	0.31% TO 1.02%	NDA	OSHA HCS 2012: Skin Corr. 1B; Eye Corr. 1	NDA
Titanium dioxide	CAS:13463-67-7	0.09% TO 0.77%	NDA	OSHA HCS 2012: Carc. 2	NDA
Hafnium oxide	CAS:12055-23-1	< 0.34%	NDA	OSHA HCS 2012: Not Classified	NDA
Iron oxide	CAS:1309-37-1	< 0.17%	NDA	OSHA HCS 2012: Not Classified	NDA
Cristobalite	CAS:14464-46-1	0.084% TO 0.105%	NDA	OSHA HCS 2012: Carc. 1A	NDA

## Section 4: First-Aid Measures

### Description of first aid measures

#### Inhalation

- Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Get medical attention immediately.

#### Skin

- In case of contact with substance, immediately flush skin with running water for at least 20 minutes. If skin irritation occurs: Get medical advice/attention.

#### Eye

- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.

#### Ingestion

- Rinse mouth. Do not give anything by mouth to an unconscious person. Get medical attention immediately.

### Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

## Indication of any immediate medical attention and special treatment needed

### Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to material other than this product may have occurred.

## Section 5: Fire-Fighting Measures

### Extinguishing media

**Suitable Extinguishing Media** • Material is non-combustible. In case of fire use media as appropriate for surrounding fire.

**Unsuitable Extinguishing Media** • None known.

### Special hazards arising from the substance or mixture

**Unusual Fire and Explosion Hazards** • None known.

**Hazardous Combustion Products** • None known.

### Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.

## Section 6 - Accidental Release Measures

### Personal precautions, protective equipment and emergency procedures

**Personal Precautions** • Isolate hazard area and deny entry to unauthorized and/or unprotected personnel. Do not touch or walk through spilled material. Ensure adequate ventilation to remove vapors, fumes, dust etc.

**Emergency Procedures** • Ventilate closed spaces before entering. Isolate hazard area and deny entry to unauthorized and/or unprotected personnel.

### Environmental precautions

- No specific actions or treatments recommended related to exposure to this material.

### Methods and material for containment and cleaning up

**Containment/Clean-up Measures** • Avoid generating dust.  
 FOR SMALL SPILLS: Clean with a vacuum with a filtration system sufficient to remove and prevent recirculation of crystalline silica (a vacuum equipped with a high-efficiency particulate air (HEPA) filter is recommended).  
 FOR LARGE SPILLS: Use a fine spray or mist to control dust creation and carefully scoop or shovel into clean dry container for later reuse or disposal.  
 If, an appropriate vacuum is unavailable, only wet-clean-up methods should be used (i.e. misting). Moisture should be added as necessary to reduce exposure to airborne respirable silica dust.

## Section 7 - Handling and Storage

### Precautions for safe handling

#### Handling

- Do not breathe dust. Avoid contact with skin, eyes, and clothing. Minimize dust generation and accumulation. Use good safety and industrial hygiene practices. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Wear long sleeves and/or protective coveralls. Contaminated clothing must

be vacuumed before removal. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Wash thoroughly after handling. Do not use in areas without adequate ventilation.

**Conditions for safe storage, including any incompatibilities**

**Storage**

- Store in a covered location. Keep container closed. Store in a cool, dry place. Keep from freezing. Storage and work area should be periodically cleaned to minimize dust accumulation.

**Section 8 - Exposure Controls/Personal Protection**

**Control parameters**

Exposure Limits/Guidelines						
	Result	ACGIH	Canada Ontario	Canada Quebec	Mexico	NIOSH
Silica, amorphous (7631-86-9)	TWAs	Not established	Not established	Not established	Not established	6 mg/m3 TWA
Cristobalite (14464-46-1)	TWAs	0.025 mg/m3 TWA (respirable fraction)	0.05 mg/m3 TWA (designated substances regulation, respirable, listed under Silica, crystalline)	0.05 mg/m3 TWAEV (respirable dust)	0.05 mg/m3 TWA LMPE-PPT (respirable fraction)	0.05 mg/m3 TWA (respirable dust)
Titanium dioxide (13463-67-7)	STELs	Not established	Not established	Not established	20 mg/m3 STEL [LMPE-CT] (as Ti)	Not established
	TWAs	10 mg/m3 TWA	10 mg/m3 TWA	10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, total dust)	10 mg/m3 TWA LMPE-PPT (as Ti)	Not established
Iron oxide (1309-37-1)	STELs	Not established	Not established	Not established	10 mg/m3 STEL [LMPE-CT] (as Fe)	Not established
	TWAs	5 mg/m3 TWA (respirable fraction)	5 mg/m3 TWA (respirable)	5 mg/m3 TWAEV (dust and fume, as Fe); 10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, regulated under Rouge, total dust)	5 mg/m3 TWA LMPE-PPT	5 mg/m3 TWA (dust and fume, as Fe)
Sodium hydroxide (1310-73-2)	Ceilings	2 mg/m3 Ceiling	2 mg/m3 Ceiling	2 mg/m3 Ceiling	2 mg/m3 Ceiling	2 mg/m3 Ceiling
Hafnium oxide	TWAs	0.5 mg/m3 TWA (as Hf) <i>as Hafnium compounds</i>	0.5 mg/m3 TWA (as Hf) <i>as Hafnium compounds</i>	Not established	Not established	0.5 mg/m3 TWA (as Hf) <i>as Hafnium compounds</i>
Quartz (14808-60-7)	TWAs	0.025 mg/m3 TWA (respirable fraction)	0.10 mg/m3 TWA (designated substances regulation, respirable, listed under Silica, crystalline)	0.1 mg/m3 TWAEV (respirable dust)	0.1 mg/m3 TWA LMPE-PPT (respirable fraction)	0.05 mg/m3 TWA (respirable dust)
	STELs	Not established	Not established	Not established	20 mg/m3 STEL [LMPE-CT]	Not established

Silicon carbide (409-21-2)	TWAs	10 mg/m3 TWA (nonfibrous, inhalable fraction, particulate matter containing no asbestos and <1% crystalline silica); 3 mg/m3 TWA (nonfibrous, respirable fraction, particulate matter containing no asbestos and <1% crystalline silica); 0.1 fiber/cm3 TWA (as determined by the membrane filter method at 400-450X magnification (4-mm objective), using phase-contrast illumination., respirable fibers, including whiskers, length >5 µm, aspect ratio >=3:1)	10 mg/m3 TWA (non-fibrous, containing no Asbestos and <1% Crystalline silica, inhalable); 3 mg/m3 TWA (non-fibrous, containing no Asbestos and <1% Crystalline silica, respirable); 0.1 fibre/cm3 TWA (fibrous, including whiskers, fibres >5 µm in length and an aspect ratio >=3:1 as determined by the membrane filter method at 400-450 times magnification (4 -mm objective), using phase-contrast illumination, respirable)	10 mg/m3 TWAEV (non fibrous, containing no Asbestos and <1% Crystalline silica, total dust)	10 mg/m3 TWA LMPE-PPT	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)
Zirconium oxide	STELs	10 mg/m3 STEL (as Zr) <i>as Zirconium compounds</i>	10 mg/m3 STEL (as Zr) <i>as Zirconium compounds</i>	10 mg/m3 STEV (as Zr) <i>as Zirconium compounds</i>	10 mg/m3 STEL [LMPE-CT] (as Zr) <i>as Zirconium compounds</i>	10 mg/m3 STEL (except Zirconium tetrachloride, as Zr) <i>as Zirconium compounds</i>
	TWAs	5 mg/m3 TWA (as Zr) <i>as Zirconium compounds</i>	5 mg/m3 TWA (as Zr) <i>as Zirconium compounds</i>	5 mg/m3 TWAEV (as Zr) <i>as Zirconium compounds</i>	5 mg/m3 TWA LMPE-PPT (as Zr) <i>as Zirconium compounds</i>	5 mg/m3 TWA (except Zirconium tetrachloride, as Zr) <i>as Zirconium compounds</i>
Amorphous/fused silica (60676-86-0)	TWAs	Not established	0.1 mg/m3 TWA (respirable)	0.1 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, respirable dust)	0.1 mg/m3 TWA LMPE-PPT; 10 mg/m3 TWA LMPE-PPT (inhalable particulate); 3 mg/m3 TWA LMPE-PPT (respirable particulate)	Not established
Amorphous silica fume (69012-64-2)	TWAs	Not established	2 mg/m3 TWA (respirable, listed under Silica fume)	2 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, respirable dust)	2 mg/m3 TWA LMPE-PPT; 10 mg/m3 TWA LMPE-PPT (inhalable particulate); 3 mg/m3 TWA LMPE-PPT (respirable particulate)	Not established
		10 mg/m3 TWA		10 mg/m3 TWAEV (including dust, inert		

Cement, alumina, chemicals	TWAs	(inhalable particles, recommended); 3 mg/m3 TWA (respirable particles, recommended)  <i>as Particulates not otherwise classified (PNOC)</i>	10 mg/m3 TWA (inhalable); 3 mg/m3 TWA (respirable)  <i>as Particulates not otherwise classified (PNOC)</i>	or nuisance particulates; containing no Asbestos and <1% Crystalline silica, total dust)  <i>as Particulates not otherwise classified (PNOC)</i>	Not established	Not established
Zirconium(IV) silicate (1:1)	STELs	10 mg/m3 STEL (as Zr)  <i>as Zirconium compounds</i>	10 mg/m3 STEL (as Zr)  <i>as Zirconium compounds</i>	10 mg/m3 STEV (as Zr)  <i>as Zirconium compounds</i>	10 mg/m3 STEL [LMPE-CT] (as Zr)  <i>as Zirconium compounds</i>	10 mg/m3 STEL (except Zirconium tetrachloride, as Zr)  <i>as Zirconium compounds</i>
	TWAs	5 mg/m3 TWA (as Zr)  <i>as Zirconium compounds</i>	5 mg/m3 TWA (as Zr)  <i>as Zirconium compounds</i>	5 mg/m3 TWAEV (as Zr)  <i>as Zirconium compounds</i>	5 mg/m3 TWA LMPE-PPT (as Zr)  <i>as Zirconium compounds</i>	5 mg/m3 TWA (except Zirconium tetrachloride, as Zr)  <i>as Zirconium compounds</i>
Zirconium	STELs	10 mg/m3 STEL	10 mg/m3 STEL	10 mg/m3 STEV	10 mg/m3 STEL [LMPE-CT] (as Zr)  <i>as Zirconium compounds</i>	10 mg/m3 STEL
	TWAs	5 mg/m3 TWA	5 mg/m3 TWA	5 mg/m3 TWAEV	5 mg/m3 TWA LMPE-PPT (as Zr)  <i>as Zirconium compounds</i>	5 mg/m3 TWA
Aluminum oxide (1344-28-1)	TWAs	1 mg/m3 TWA (respirable fraction)  <i>as Aluminum insoluble compounds</i>	1 mg/m3 TWA (respirable)  <i>as Aluminum insoluble compounds</i>	10 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, total dust, as Al)	10 mg/m3 TWA LMPE-PPT	Not established

**Exposure Limits/Guidelines (Con't.)**

	Result	OSHA
Titanium dioxide (13463-67-7)	TWAs	15 mg/m3 TWA (total dust)
Iron oxide (1309-37-1)	TWAs	10 mg/m3 TWA (fume); 15 mg/m3 TWA (total dust, listed under Rouge); 5 mg/m3 TWA (respirable fraction, listed under Rouge)
Sodium hydroxide (1310-73-2)	TWAs	2 mg/m3 TWA
Silicon carbide (409-21-2)	TWAs	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Zirconium oxide	TWAs	5 mg/m3 TWA (as Zr)  <i>as Zirconium compounds</i>
Cement, alumina, chemicals	TWAs	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)  <i>as Particulates not otherwise classified (PNOC)</i>
		5 mg/m3 TWA (as Zr)

Zirconium(IV) silicate (1:1)	TWAs	as Zirconium compounds
Zirconium	TWAs	5 mg/m <sup>3</sup> TWA (as Zr) as Zirconium compounds
Aluminum oxide (1344-28-1)	TWAs	15 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable fraction)

## Exposure Control Notations

### Mexico

- Aluminum oxide (1344-28-1): **Carcinogens:** (A4 - Not classifiable as a human carcinogen)
- Zirconium as Zirconium compounds: **Carcinogens:** (A4 - Not classifiable as a human carcinogen)
- Zirconium oxide as Zirconium compounds: **Carcinogens:** (A4 - Not classifiable as a human carcinogen)
- Titanium dioxide (13463-67-7): **Carcinogens:** (A4 - Not classifiable as a human carcinogen)
- Iron oxide (1309-37-1): **Carcinogens:** (A4 - Not classifiable as a human carcinogen)
- Zirconium(IV) silicate (1:1) as Zirconium compounds: **Carcinogens:** (A4 - Not classifiable as a human carcinogen)
- Silicon carbide (409-21-2): **Carcinogens:** (A4 - Not classifiable as a human carcinogen)

### Canada Ontario

- Quartz (14808-60-7): **Designated Substances:** (0.10 mg/m<sup>3</sup> TWA (respirable fraction, listed under Silica, crystalline))
- Cristobalite (14464-46-1): **Designated Substances:** (0.05 mg/m<sup>3</sup> TWA (respirable fraction, listed under Silica, crystalline))

### Canada Quebec

- Quartz (14808-60-7): **Carcinogens:** (C2 carcinogen - effect suspected in humans)

### ACGIH

- Aluminum oxide as Aluminum insoluble compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Zirconium (7440-67-7): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Zirconium as Zirconium compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Zirconium oxide as Zirconium compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Quartz (14808-60-7): **Carcinogens:** (A2 - Suspected Human Carcinogen)
- Titanium dioxide (13463-67-7): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Iron oxide (1309-37-1): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Zirconium(IV) silicate (1:1) as Zirconium compounds: **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen)
- Silicon carbide (409-21-2): **Carcinogens:** (A2 - Suspected Human Carcinogen (fibrous, including whiskers))
- Cristobalite (14464-46-1): **Carcinogens:** (A2 - Suspected Human Carcinogen)

## Exposure Limits Supplemental

### OSHA

- Amorphous/fused silica (60676-86-0): **Mineral Dusts:** ((80)/(% SiO<sub>2</sub>) mg/m<sup>3</sup> TWA; 20 mppcf TWA)
- Quartz (14808-60-7): **Mineral Dusts:** ((30)/(%SiO<sub>2</sub> + 2) mg/m<sup>3</sup> TWA, total dust; (250)/(%SiO<sub>2</sub> + 5) mppcf TWA, respirable fraction; (10)/(%SiO<sub>2</sub> + 2) mg/m<sup>3</sup> TWA, respirable fraction)
- Silica, amorphous (7631-86-9): **Mineral Dusts:** (20 mppcf TWA; (80)/(% SiO<sub>2</sub>) mg/m<sup>3</sup> TWA)
- Cristobalite (14464-46-1): **Mineral Dusts:** ((1/2)(30)/(%SiO<sub>2</sub> + 2) mg/m<sup>3</sup> TWA, total dust; (1/2)(250)/(%SiO<sub>2</sub> + 5) mppcf TWA, respirable fraction; (1/2)(10)/(%SiO<sub>2</sub> + 2) mg/m<sup>3</sup> TWA, respirable fraction)

### ACGIH

- Aluminum oxide as Aluminum insoluble compounds: **TLV Basis - Critical Effects:** (pneumoconiosis; lower respiratory tract irritation; neurotoxicity)
- Quartz (14808-60-7): **TLV Basis - Critical Effects:** (lung cancer; pulmonary fibrosis)
- Sodium hydroxide (1310-73-2): **TLV Basis - Critical Effects:** (eye, skin and upper respiratory tract irritation)
- Hafnium oxide as Hafnium compounds: **TLV Basis - Critical Effects:** (eye and upper respiratory tract irritation; liver damage)
- Titanium dioxide (13463-67-7): **TLV Basis - Critical Effects:** (lower respiratory tract irritation) | **Notice of Intended Changes (TLVs):** (1 mg/m<sup>3</sup> TWA (respirable fraction); A3 - confirmed animal carcinogen with unknown relevance to humans; TLV basis: lower respiratory tract irritation, pneumoconiosis)
- Iron oxide (1309-37-1): **TLV Basis - Critical Effects:** (pneumoconiosis)
- Silicon carbide (409-21-2): **TLV Basis - Critical Effects:** (upper respiratory tract irritation (nonfibrous); cancer (fibrous, including whiskers); mesothelioma (fibrous, including whiskers))
- Cristobalite (14464-46-1): **TLV Basis - Critical Effects:** (lung cancer; pulmonary fibrosis)



## Exposure controls

### Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is not leakage from the equipment). Collection systems must be designed and maintained to prevent the accumulation and recirculation of respirable silica into the workplace.

### Personal Protective Equipment

#### Respiratory

- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

#### Eye/Face

- Wear protective eyewear (goggles, face shield, or safety glasses).

#### Hands

- Wear appropriate gloves.

#### Skin/Body

- Wear long sleeves and/or protective coveralls.

### General Industrial Hygiene Considerations

- Avoid breathing dust. Avoid contact with skin, eyes or clothing. Do not remove dusts from clothing by blowing or shaking. Do not eat, drink or smoke during work. Wash hands before eating, drinking, or smoking. Wash thoroughly after handling. Handle in accordance with good industrial hygiene and safety practice.

### Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Dispose of in an approved landfill.

#### Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

STEL = Short Term Exposure Limits are based on 15-minute exposures

STEV = Short Term Exposure Value

TWAEV = Time-Weighted Average Exposure Value

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

## Section 9 - Physical and Chemical Properties

### Information on Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	Gray granular dry powder with an earthy odor.
Color	Gray	Odor	Earthy
Particulate Size	600 µ	Odor Threshold	No data available
General Properties			
Boiling Point	No data available	Melting Point/Freezing Point	No data available
Decomposition Temperature	No data available	pH	No data available
Specific Gravity/Relative Density	= 2.53 Water=1	Water Solubility	Negligible < 0.1 %
Viscosity	No data available		
Volatility			
Vapor Pressure	No data available	Vapor Density	No data available
Evaporation Rate	No data available	VOC (Wt.)	0 %
VOC (Vol.)	0 %		

**Flammability**

Flash Point	No data available	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	No data available		

**Environmental**

Octanol/Water Partition coefficient	No data available		
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**Section 10: Stability and Reactivity****Reactivity**

- No dangerous reaction known under conditions of normal use.

**Chemical stability**

- Stable under normal temperatures and pressures.

**Possibility of hazardous reactions**

- Hazardous polymerization not indicated.

**Conditions to avoid**

- None known.

**Incompatible materials**

- None known.

**Hazardous decomposition products**

- None known.

**Section 11 - Toxicological Information****Information on toxicological effects**

Components		
Zirconium (12.4% TO 20.4%)	7440-67-7	<b>Multi-dose Toxicity:</b> Inhalation-Rat TCLO • 30 mg/m <sup>3</sup> 48 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosis (interstitial)</i>
Sodium hydroxide (0.31% TO 1.02%)	1310-73-2	<b>Irritation:</b> Eye-Rabbit • 50 µg 24 Hour(s) • Severe irritation; Skin-Rabbit • 500 mg 24 Hour(s) • Severe irritation
Titanium dioxide (0.09% TO 0.77%)	13463-67-7	<b>Irritation:</b> Skin-Human • 300 µg 3 Day(s)-Intermittent • Mild irritation
Silica, amorphous (0.01% TO 8.78%)	7631-86-9	<b>Irritation:</b> Eye-Rabbit • 25 mg 24 Hour(s) • Mild irritation
Cristobalite (0.084% TO 0.105%)	14464-46-1	<b>Acute Toxicity:</b> Inhalation-Human TCLO • 16 mppcf 8 Hour(s) 17.9 Year(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Cough; Lungs, Thorax, or Respiration:Dyspnea;</i> <b>Multi-dose Toxicity:</b> Inhalation-Mouse TCLO • 43 mg/m <sup>3</sup> 5 Hour(s) 9 Day(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Pleural effusion; Lungs, Thorax, or Respiration:Other changes</i>

GHS Properties	Classification
<b>Acute toxicity</b>	OSHA HCS 2012 • No data available
<b>Skin corrosion/Irritation</b>	OSHA HCS 2012 • Skin Irritation 2
<b>Serious eye damage/Irritation</b>	OSHA HCS 2012 • Eye Irritation 2
<b>Skin sensitization</b>	OSHA HCS 2012 • No data available

<b>Respiratory sensitization</b>	OSHA HCS 2012 • No data available
<b>Aspiration Hazard</b>	OSHA HCS 2012 • No data available
<b>Carcinogenicity</b>	OSHA HCS 2012 • Carcinogenicity 1A
<b>Germ Cell Mutagenicity</b>	OSHA HCS 2012 • No data available
<b>Toxicity for Reproduction</b>	OSHA HCS 2012 • No data available
<b>STOT-SE</b>	OSHA HCS 2012 • No data available
<b>STOT-RE</b>	OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1

**Route(s) of entry/exposure**

- Inhalation, Skin, Eye, Ingestion

**Medical Conditions Aggravated by Exposure**

- Any pre-existing conditions of the lungs. Disorders of the lungs.

**Potential Health Effects**

**Inhalation**

**Acute (Immediate)**

- Exposure to dust may cause irritation.

**Chronic (Delayed)**

- Chronic overexposure to dust containing respirable sized crystalline silica can cause delayed lung injury (silicosis). Inhalation of dust containing crystalline silica pulmonary diseases such as asthma and lung disorder associated with smoking.

**Skin**

**Acute (Immediate)**

- Causes skin irritation. Exposure to dust may cause irritation.

**Chronic (Delayed)**

- No data available.

**Eye**

**Acute (Immediate)**

- Causes serious eye irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

**Chronic (Delayed)**

- No data available.

**Ingestion**

**Acute (Immediate)**

- Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.

**Chronic (Delayed)**

- No data available.

**Carcinogenic Effects**

- May cause cancer. IARC studies have shown sufficient evidence from animal studies to categorize crystalline silica as a group 1 carcinogen.

<b>Carcinogenic Effects</b>			
	<b>CAS</b>	<b>IARC</b>	<b>NTP</b>
Cristobalite	14464-46-1	Group 1-Carcinogenic	Not Listed
Titanium dioxide	13463-67-7	Group 2B-Possible Carcinogen	Not Listed
Quartz	14808-60-7	Group 1-Carcinogenic	Known Human Carcinogen

**Key to abbreviations**

TC = Toxic Concentration

**Section 12 - Ecological Information**

**Toxicity**

- Material data lacking.

**Persistence and degradability**

- Material data lacking.

**Bioaccumulative potential**

- Material data lacking.

**Mobility in Soil**

- Material data lacking.

**Other adverse effects**

- No studies have been found.

**Section 13 - Disposal Considerations**

**Waste treatment methods**

**Product waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**Packaging waste**

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

**Section 14 - Transport Information**

	UN number	UN proper shipping name	Transport hazard class (es)	Packing group	Environmental hazards
DOT	NDA	Not Regulated	NDA	NDA	NDA
TDG	NDA	Not Regulated	NDA	NDA	NDA
IATA/ICAO	NDA	Not Regulated	NDA	NDA	NDA

**Special precautions for user**

- None specified.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

- No data available

**Section 15 - Regulatory Information**

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

**SARA Hazard Classifications**

- Acute, Chronic

State Right To Know				
Component	CAS	MA	NJ	PA
Aluminum oxide	1344-28-1	Yes	Yes	Yes
Amorphous/fused silica	60676-86-0	Yes	Yes	No
Cristobalite	14464-46-1	Yes	Yes	Yes
Quartz	14808-60-7	Yes	Yes	Yes
Silica, amorphous	7631-86-9	Yes	Yes	Yes
Sodium hydroxide	1310-73-2	Yes	Yes	Yes
Titanium dioxide	13463-67-7	Yes	Yes	Yes
Zirconium	7440-67-7	Yes	Yes	Yes
Zirconium(IV) silicate (1:1)	14940-68-2	No	No	No

Inventory			
Component	CAS	Canada DSL	TSCA
Aluminum oxide	1344-28-1	Yes	Yes
Amorphous/fused silica	60676-86-0	Yes	Yes
Cristobalite	14464-46-1	Yes	Yes
Quartz	14808-60-7	Yes	Yes
Silica, amorphous	7631-86-9	Yes	Yes
Sodium hydroxide	1310-73-2	Yes	Yes
Titanium dioxide	13463-67-7	Yes	Yes
Zirconium	7440-67-7	Yes	Yes
Zirconium(IV) silicate (1:1)	14940-68-2	Yes	Yes

**Canada**

**Labor**

**Canada - WHMIS - Classifications of Substances**

• Zirconium(IV) silicate (1:1)	14940-68-2	Uncontrolled product according to WHMIS classification criteria
• Sodium hydroxide	1310-73-2	E (including 0.04% in aqueous solution, 0.08%, 0.4% in aqueous solution, 2%, 2.5%, 4% in aqueous solution, 5%, 10%, 16%, 20%, 40%, 50% in aqueous solution, 8.7N) D2A (In certain cases, this classification does not apply. For more information, consult the section Substance Specific Issues - Titanium dioxide, mixture containing on Health Canada's WHMIS Division website.)
• Titanium dioxide	13463-67-7	Uncontrolled product according to WHMIS classification criteria
• Zirconium	7440-67-7	Uncontrolled product according to WHMIS classification criteria
• Aluminum oxide	1344-28-1	D2A (In certain cases, this classification does not apply. For more information, consult the section Substance Specific Issues - Silica, crystalline, encapsulated on Health Canada's WHMIS Division website.)
• Cristobalite	14464-46-1	Uncontrolled product according to WHMIS classification criteria
• Silica, amorphous	7631-86-9	Uncontrolled product according to WHMIS classification criteria
• Amorphous/fused silica	60676-86-0	Uncontrolled product according to WHMIS classification criteria

• Quartz	14808-60-7	D2A (In certain cases, this classification does not apply. For more information, consult the section Substance Specific Issues - Silica, crystalline, encapsulated on Health Canada's WHMIS Division website.)
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**Canada - WHMIS - Ingredient Disclosure List**

• Zirconium(IV) silicate (1:1)	14940-68-2	1 %
• Sodium hydroxide	1310-73-2	1 %
• Titanium dioxide	13463-67-7	Not Listed
• Zirconium	7440-67-7	1 %
• Aluminum oxide	1344-28-1	1 %
• Cristobalite	14464-46-1	1 %
• Silica, amorphous	7631-86-9	1 %
• Amorphous/fused silica	60676-86-0	1 %
• Quartz	14808-60-7	1 %

**United States**

**Environment**

**U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities**

• Zirconium(IV) silicate (1:1)	14940-68-2	Not Listed
• Sodium hydroxide	1310-73-2	1000 lb final RQ; 454 kg final RQ
• Titanium dioxide	13463-67-7	Not Listed
• Zirconium	7440-67-7	Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Cristobalite	14464-46-1	Not Listed
• Silica, amorphous	7631-86-9	Not Listed
• Amorphous/fused silica	60676-86-0	Not Listed
• Quartz	14808-60-7	Not Listed

**U.S. - CERCLA/SARA - Section 313 - Emission Reporting**

• Zirconium(IV) silicate (1:1)	14940-68-2	Not Listed
• Sodium hydroxide	1310-73-2	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Zirconium	7440-67-7	Not Listed
• Aluminum oxide	1344-28-1	1.0 % de minimis concentration (fibrous forms)
• Cristobalite	14464-46-1	Not Listed
• Silica, amorphous	7631-86-9	Not Listed
• Amorphous/fused silica	60676-86-0	Not Listed
• Quartz	14808-60-7	Not Listed

**United States - California**

**Environment**

**U.S. - California - Proposition 65 - Carcinogens List**

• Zirconium(IV) silicate (1:1)	14940-68-2	Not Listed
• Sodium hydroxide	1310-73-2	Not Listed
• Titanium dioxide	13463-67-7	carcinogen, initial date 9/2/11 (airborne, unbound particles of respirable size)
• Zirconium	7440-67-7	Not Listed

• Aluminum oxide	1344-28-1	Not Listed
• Cristobalite	14464-46-1	Not Listed
• Silica, amorphous	7631-86-9	Not Listed
• Amorphous/fused silica	60676-86-0	Not Listed
• Quartz	14808-60-7	carcinogen, initial date 10/1/88 (airborne particles of respirable size)

## United States - Pennsylvania

### Labor

#### U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

• Zirconium(IV) silicate (1:1)	14940-68-2	Not Listed
• Sodium hydroxide	1310-73-2	
• Titanium dioxide	13463-67-7	Not Listed
• Zirconium	7440-67-7	Not Listed
• Aluminum oxide	1344-28-1	
• Cristobalite	14464-46-1	Not Listed
• Silica, amorphous	7631-86-9	Not Listed
• Amorphous/fused silica	60676-86-0	Not Listed
• Quartz	14808-60-7	Not Listed

## Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer.

## Section 16 - Other Information

<b>Revision Date</b>	• 30/April/2018
<b>Last Revision Date</b>	• 01/April/2015
<b>Preparation Date</b>	• 01/June/2013
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### Key to abbreviations

NDA = No data available