**Kleen Kast**

*Safety Data Sheet*

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 11/05/2020

---

### SECTION 1: Identification

1. **Identification**
   - **Product form:** Mixture
   - **Trade name:** Kleen Kast
   - **Product code:** 270102

2. **Recommended use and restrictions on use**
   - **Recommended use:** Refractory Applications

3. **Supplier**
   - Reno Refractories, Inc.
   - 601 Reno Drive
   - P.O. Box 201
   - Morris, AL 35116 - United States
   - T 205-647-0240 - F 205-647-6854
   - sales@r-ref.com - www.renorefractories.com

4. **Emergency telephone number**
   - **Emergency number:** 1-800-262-8200 CHEMTREC

### SECTION 2: Hazard(s) identification

1. **Classification of the substance or mixture**
   - **GHS classification**
     - **Carcinogenicity Category 1A**
     - May cause cancer
     - **Specific target organ toxicity (repeated exposure)**
       - Category 1
       - Causes damage to organs through prolonged or repeated exposure

2. **GHS Label elements, including precautionary statements**
   - **GHS US labeling**
     - **Hazard pictograms (GHS US)**
     - ![Hazard Pictogram](image)
     - **Signal word (GHS US):** Danger
     - **Hazard statements (GHS US):**
       - May cause cancer
       - Causes damage to organs through prolonged or repeated exposure
     - **Precautionary statements (GHS US):**
       - Obtain special instructions before use.
       - Do not handle until all safety precautions have been read and understood.
       - Do not breathe dust/fume/gas/mist/vapors/spray.
       - Wash hands, forearms and face thoroughly after handling.
       - Do not eat, drink or smoke when using this product.
       - Wear protective gloves/protective clothing/eye protection/face protection.
       - If exposed or concerned: Get medical advice/attention.
     - Get medical advice/attention if you feel unwell.
     - Store locked up.
     - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

3. **Other hazards which do not result in classification**
   - No additional information available

4. **Unknown acute toxicity (GHS US)**
   - Not applicable

### SECTION 3: Composition/Information on ingredients

1. **Substances**
   - Not applicable

2. **Mixtures**
   - Not applicable
**Kleen Kast**

**Safety Data Sheet**

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon carbide</td>
<td>(CAS-No.) 409-21-2</td>
<td>4 – 11</td>
<td>Carc. 1B, H350</td>
</tr>
<tr>
<td>Zirconium oxide</td>
<td>(CAS-No.) 1314-23-4</td>
<td>1.9 – 6.3</td>
<td>Acute Tox. 4 (Inhalation:dust,mist), H332</td>
</tr>
<tr>
<td>Carbon*</td>
<td>(CAS-No.) Trade Secret</td>
<td>2 – 4</td>
<td>Carc. 1B, H350</td>
</tr>
<tr>
<td>Crystalline silica</td>
<td>(CAS-No.) 14808-60-7</td>
<td>&lt; 3.88</td>
<td>Carc. 1A, H350, STOT RE 1, H372</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>(CAS-No.) 13463-67-7</td>
<td>0.192 – 1.038</td>
<td></td>
</tr>
</tbody>
</table>

*Chemical name, CAS number and/or exact concentration have been withheld as a trade secret

Full text of hazard classes and H-statements : see section 16

**SECTION 4: First-aid measures**

4.1. **Description of first aid measures**

First-aid measures general:
- IF exposed or concerned: Get medical advice/attention. Call a poison center/doctor/physician if you feel unwell. Get medical advice/attention if you feel unwell.

First-aid measures after inhalation:
- Remove person to fresh air and keep comfortable for breathing.

First-aid measures after skin contact:
- Wash skin with plenty of water.

First-aid measures after eye contact:
- Rinse eyes with water as a precaution.

First-aid measures after ingestion:
- Call a poison center/doctor/physician if you feel unwell.

4.2. **Most important symptoms and effects (acute and delayed)**

4.3. **Immediate medical attention and special treatment, if necessary**

Treat symptomatically.

**SECTION 5: Fire-fighting measures**

5.1. **Suitable (and unsuitable) extinguishing media**

Suitable extinguishing media:
- Water spray. Dry powder. Foam.

5.2. **Specific hazards arising from the chemical**

Hazardous decomposition products in case of fire:
- Toxic fumes may be released.

5.3. **Special protective equipment and precautions for fire-fighters**

Protection during firefighting:
- Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

**SECTION 6: Accidental release measures**

6.1. **Personal precautions, protective equipment and emergency procedures**

6.1.1. **For non-emergency personnel**

Emergency procedures:
- Only qualified personnel equipped with suitable protective equipment may intervene. Do not breathe dust/fume/gas/mist/vapors/spray.

6.1.2. **For emergency responders**

Protective equipment:
- Do not attempt to take action without suitable protective equipment. For further information refer to section 8: “Exposure controls/personal protection”.

6.2. **Environmental precautions**

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. **Methods and material for containment and cleaning up**

Methods for cleaning up:
- Mechanically recover the product. Notify authorities if product enters sewers or public waters.

Other information:
- Dispose of materials or solid residues at an authorized site.

6.4. **Reference to other sections**

For further information refer to section 13.
SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Ensure good ventilation of the work station. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Floors, walls and other surfaces in the hazard area must be cleaned regularly. Do not breathe dust/fume/gas/mist/vapors/spray.

Hygiene measures: Separate working clothes from town clothes. Launder separately. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a well-ventilated place. Keep cool.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Kleen Kast
No additional information available

Carbon
No additional information available

Crystalline silica (14808-60-7)

USA - ACGIH - Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Local name</th>
<th>Silica crystalline - quartz</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TWA (mg/m³)</td>
<td>0.025 mg/m³ (Respirable fraction)</td>
</tr>
</tbody>
</table>

Remark (ACGIH)

TLV® Basis: Pulm fibrosis; lung cancer. Notations: A2 (Suspected Human Carcinogen)

Regulatory reference

ACGIH 2020

USA - OSHA - Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Local name</th>
<th>Quartz (Respirable) (Silica: Crystalline)</th>
</tr>
</thead>
</table>

Remark (OSHA)

Table Z-3. For OSHA PEL (TWA): Use formulas: (250 / (%SiO2+5)) for mppcf and (10 mg/m³ / (%SiO2+2)) for mg/m³. CAS No. source: eCFR Table Z-1.

Regulatory reference (US-OSHA)

OSHA Annotated Table Z-3 Mineral Dusts

Titanium dioxide (13463-67-7)

USA - ACGIH - Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Local name</th>
<th>Titanium dioxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TWA (mg/m³)</td>
<td>10 mg/m³</td>
</tr>
</tbody>
</table>

Remark (ACGIH)

TLV® Basis: LRT irr. Notations: A4 (Not classifiable as a Human Carcinogen)

Regulatory reference

ACGIH 2020

USA - OSHA - Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Local name</th>
<th>Titanium dioxide (Total dust)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA PEL (TWA) (mg/m³)</td>
<td>15 mg/m³</td>
</tr>
</tbody>
</table>

Regulatory reference (US-OSHA)

OSHA Annotated Table Z-1

Silicon carbide (409-21-2)

USA - ACGIH - Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Local name</th>
<th>Silicon carbide</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TWA (mg/m³)</td>
<td>3 mg/m³ (Respirable fraction. The value is for particulate matter containing no asbestos and &lt; 1% crystalline silica)</td>
</tr>
<tr>
<td></td>
<td>0.1 fibers/cm³ (Respirable fibers: length &gt; 5 μm; aspect ratio ≥ 3:1, as determined by the membrane filter method at 400-450X magnification (4-mm objective), using phase-contrast illumination)</td>
</tr>
<tr>
<td></td>
<td>10 mg/m³ (Inhalable fraction. The value is for particulate matter containing no asbestos and &lt; 1% crystalline silica)</td>
</tr>
</tbody>
</table>

Remark (ACGIH)

Non fibrous = TLV® Basis; URT irr
Fibrous (including whiskers) = TLV® Basis: Mesothelioma; cancer. Notations: A2 (Suspected Human Carcinogen)

Regulatory reference

ACGIH 2020
**Kleen Kast**

**Safety Data Sheet**

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>USA - OSHA - Occupational Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local name</td>
</tr>
<tr>
<td>OSHA PEL (TWA) (mg/m³)</td>
</tr>
<tr>
<td>Regulatory reference (US-OSHA)</td>
</tr>
</tbody>
</table>

Zirconium oxide (1314-23-4)

<table>
<thead>
<tr>
<th>USA - ACGIH - Occupational Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TWA (mg/m³)</td>
</tr>
<tr>
<td>ACGIH STEL (mg/m³)</td>
</tr>
</tbody>
</table>

### 8.2. Appropriate engineering controls

**Appropriate engineering controls**: Ensure good ventilation of the work station.

**Environmental exposure controls**: Avoid release to the environment.

### 8.3. Individual protection measures/Personal protective equipment

- **Hand protection**: Protective gloves
- **Eye protection**: Safety glasses
- **Skin and body protection**: Wear suitable protective clothing
- **Respiratory protection**: Wear respiratory protection.

**Personal protective equipment symbol(s):**

#### SECTION 9: Physical and chemical properties

**9.1. Information on basic physical and chemical properties**

- **Physical state**: Solid
- **Color**: Dark grey to black
- **Odor**: Characteristic odour
- **Odor threshold**: No data available
- **pH**: No data available
- **Melting point**: No data available
- **Freezing point**: Not applicable
- **Boiling point**: No data available
- **Flash point**: Not applicable
- **Relative evaporation rate (butyl acetate=1)**: No data available
- **Flammability (solid, gas)**: Non flammable.
- **Vapor pressure**: No data available
- **Relative vapor density at 20 °C**: No data available
- **Relative density**: 2.7 – 2.9
- **Solubility**: Water: < 0.1 %
- **Partition coefficient n-octanol/water (Log Pow)**: No data available
- **Auto-ignition temperature**: Not applicable
- **Decomposition temperature**: No data available
Kleen Kast
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>Viscosity, kinematic</th>
<th>No data available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information
VOC content: 0 %

SECTION 10: Stability and reactivity

10.1. Reactivity
The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid
None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials
No additional information available

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Toxicity (oral)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Acute dermal</td>
<td>Not classified</td>
</tr>
<tr>
<td>Acute inhalation</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

**Titanium dioxide (13463-67-7)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 Oral</td>
<td>&gt; 5000 mg/kg body weight (OECD 425: Acute Oral Toxicity: Up-and-Down Procedure, Rat, Female, Experimental value, Oral, 14 day(s))</td>
</tr>
<tr>
<td>LC50 Inhalation - Rat</td>
<td>&gt; 6.82 mg/l (Other, 4 h, Rat, Male, Experimental value, Inhalation (dust), 14 day(s))</td>
</tr>
</tbody>
</table>

**Silicon carbide (409-21-2)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 Oral</td>
<td>&gt; 2000 mg/kg body weight (OECD 423: Acute Oral Toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral)</td>
</tr>
<tr>
<td>LD50 Dermal rat</td>
<td>&gt; 2000 mg/kg body weight (OECD 402: Acute Dermal Toxicity, 24 h, Rat, Male / female, Experimental value, Dermal)</td>
</tr>
</tbody>
</table>

**Zirconium oxide (1314-23-4)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 Oral</td>
<td>&gt; 5000 mg/kg body weight (OECD 423: Acute Oral Toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral)</td>
</tr>
<tr>
<td>LC50 Inhalation - Rat</td>
<td>&gt; 4.3 mg/l (OECD 436: Acute inhalation toxicity-acute toxic class method, 4 h, Rat, Male / female, Experimental value, Inhalation (aerosol))</td>
</tr>
<tr>
<td>ATE US, dust, mist</td>
<td>1.5 mg/l/4h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>May cause cancer.</td>
</tr>
</tbody>
</table>

**Crystalline silica (14808-60-7)**

<table>
<thead>
<tr>
<th>IARC group</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 - Carcinogenic to humans</td>
</tr>
</tbody>
</table>

**Titanium dioxide (13463-67-7)**

<table>
<thead>
<tr>
<th>IARC group</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2B</td>
<td>Possibly carcinogenic to humans</td>
</tr>
</tbody>
</table>
### Kleen Kast Safety Data Sheet

accordin to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>Substance</th>
<th>IARC group</th>
<th>Reproductive toxicity</th>
<th>STOT-single exposure</th>
<th>STOT-repeated exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon carbide (409-21-2)</td>
<td>2A</td>
<td>Not classified</td>
<td>Not classified</td>
<td>Causes damage to organs through prolonged or repeated exposure.</td>
</tr>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td></td>
<td></td>
<td></td>
<td>Causes damage to organs through prolonged or repeated exposure.</td>
</tr>
</tbody>
</table>

#### Reproductive toxicity:

- **Not classified**

#### STOT:

- **Single exposure**: Not classified
- **Repeated exposure**: Causes damage to organs through prolonged or repeated exposure.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - general: The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

#### 12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>Substance</th>
<th>Persistence and degradability</th>
<th>Chemical oxygen demand (COD)</th>
<th>ThOD</th>
<th>BOD (% of ThOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon carbide (409-21-2)</td>
<td>Biodegradability: not applicable.</td>
<td>Not applicable</td>
<td></td>
<td>Not applicable</td>
</tr>
<tr>
<td>Titanium dioxide (13463-67-7)</td>
<td>Biodegradability: not applicable.</td>
<td>Not applicable</td>
<td></td>
<td>Not applicable</td>
</tr>
<tr>
<td>Zirconium oxide (1314-23-4)</td>
<td>Biodegradability: not applicable.</td>
<td>Not applicable</td>
<td></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
### 12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Substance</th>
<th>Bioaccumulative potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td>No bioaccumulation data available.</td>
</tr>
<tr>
<td>Titanium dioxide (13463-67-7)</td>
<td>Not bioaccumulative.</td>
</tr>
<tr>
<td>Silicon carbide (409-21-2)</td>
<td>Not bioaccumulative.</td>
</tr>
<tr>
<td>Zirconium oxide (1314-23-4)</td>
<td>Low potential for bioaccumulation (BCF &lt; 500).</td>
</tr>
</tbody>
</table>

### 12.4. Mobility in soil

<table>
<thead>
<tr>
<th>Substance</th>
<th>Ecology - soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td>No (test)data on mobility of the substance available.</td>
</tr>
<tr>
<td>Titanium dioxide (13463-67-7)</td>
<td>Low potential for mobility in soil.</td>
</tr>
<tr>
<td>Zirconium oxide (1314-23-4)</td>
<td>Not applicable (solid)</td>
</tr>
</tbody>
</table>

### 12.5. Other adverse effects

No additional information available

### SECTION 13: Disposal considerations

### 13.1. Disposal methods

Waste treatment methods: Dispose of contents/container in accordance with licensed collector’s sorting instructions.

### SECTION 14: Transport information

**Department of Transportation (DOT)**

In accordance with DOT

Not applicable

**Transportation of Dangerous Goods**

Not applicable

**Transport by sea**

Not applicable

**Air transport**

Not applicable

### SECTION 15: Regulatory information

### 15.1. US Federal regulations

- **Carbon**
  - Listed on the United States TSCA (Toxic Substances Control Act) inventory

- **Crystalline silica (14808-60-7)**
  - Listed on the United States TSCA (Toxic Substances Control Act) inventory

- **Titanium dioxide (13463-67-7)**
  - Listed on the United States TSCA (Toxic Substances Control Act) inventory
Kleen Kast
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

15.2. International regulations

CANADA

Carbon
Listed on the Canadian DSL (Domestic Substances List)

Crystalline silica (14808-60-7)
Listed on the Canadian DSL (Domestic Substances List)

Titanium dioxide (13463-67-7)
Listed on the Canadian DSL (Domestic Substances List)

Silicon carbide (409-21-2)
Listed on the Canadian DSL (Domestic Substances List)

Zirconium oxide (1314-23-4)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations
No additional information available

National regulations

Crystalline silica (14808-60-7)
Listed on IARC (International Agency for Research on Cancer)

Titanium dioxide (13463-67-7)
Listed on IARC (International Agency for Research on Cancer)

Silicon carbide (409-21-2)
Listed on IARC (International Agency for Research on Cancer)

15.3. US State regulations

<table>
<thead>
<tr>
<th>Component</th>
<th>State or local regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List</td>
</tr>
<tr>
<td>Titanium dioxide (13463-67-7)</td>
<td>U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List</td>
</tr>
<tr>
<td>Silicon carbide (409-21-2)</td>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List</td>
</tr>
</tbody>
</table>

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date : 11/05/2020

Full text of H-phrases:

- **H332**: Harmful if inhaled
- **H350**: May cause cancer
- **H351**: Suspected of causing cancer
- **H372**: Causes damage to organs through prolonged or repeated exposure

SDS US (GHS HazCom 2012)

The information provided in the Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of it's publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release. Reno Refractories, Inc. makes no warranties, expressed or implied, with respect to such information, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose or course of performance or usage of trade. User is responsible for determining whether the product is fit for a particular purpose and suitable for user's method of use or application. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

11/05/2020 EN (English US)