SAFETY DATA SHEET

Following Regulation 1910.1200

SDS Number: TR108           Date of first issue: 16 November 1993           Date of last revision: 01 June 2015

1 - Identification of product

a - Product identifier used on the label

Tradenames: Therm-O-Hot Patch,

b - Other means of identification

REFRACTORY COATING

c - Recommended use of the chemical and restrictions on use

Refractory coating, patching

d - Name, address, and telephone number

<table>
<thead>
<tr>
<th>Morgan Advanced Materials</th>
<th>Morgan Advanced Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 E. Mound Street</td>
<td>P. O. Box 923; Dept. 300</td>
</tr>
<tr>
<td>Girard, IL 62640</td>
<td>Augusta, GA 30903-0923</td>
</tr>
<tr>
<td>Telephone: 217-627-2101</td>
<td>Telephone: 706-796-4200</td>
</tr>
</tbody>
</table>

e - Emergency Phone Number

For Product Stewardship and Emergency Information:
Hotline - 1-800-722-5681
Fax - 706-560-4054

For additional MSDSs and to confirm this is the most current MSDS for the product, visit our web page www.morganthermalceramics.com or send a request to MT.NorthAmerica@morganplc.com
2 - Hazard Identification

a - Classification of the chemical in accordance with paragraph (d) of §1910.1200

The U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS) 2012 indicates that IARC Group 1 corresponds to OSHA HCS 2012 Category 1A carcinogen classification (see, e.g., §1910.1200, Appendix F, Part D).

b - Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200

Under OSHA HCS 2012, crystalline silica (inhaled in the form of quartz or cristobalite from occupational sources) is classified as a GHS category 1A - Known human carcinogen.

Hazard Pictograms

Signal Words
Danger

Hazard Statements
May cause cancer by inhalation.

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.

Emergency Overview
Respirable dust from these products may contain crystalline silica, which is known to cause respiratory disease.
(See Section 11 for more information)

c - Describe any hazards not otherwise classified that have been identified during the classification process

Prolonged/repeated inhalation of respirable crystalline silica may cause delayed lung injury (e.g.: silicosis, lung cancer).

d - Mixture Rule

Not applicable.

3 - Composition / Information On Ingredients

a - Composition table

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>CAS NUMBER</th>
<th>% BY WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>65 – 80</td>
</tr>
<tr>
<td>Particulate Not Otherwise</td>
<td>NONE</td>
<td>10 – 15</td>
</tr>
<tr>
<td>Regulated</td>
<td>1332-58-7</td>
<td>2 – 10</td>
</tr>
<tr>
<td>Clay, Alumino-silicate</td>
<td>14808-60-7</td>
<td>0.5 – 0.9</td>
</tr>
<tr>
<td>Crystalline Silica (Quartz)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b - Common Name

(See Section 8 "Exposure Controls / Personal Protection" for exposure guidelines)

d - Impurities and Stabilizing Additives

Not applicable.
4 - First-Aid measures

a - Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion

Eyes
Flush with large amounts of water for at least 15 minutes. Do not rub eyes.

Skin
Wash affected area gently with soap and water. Skin cream or lotion after washing may be helpful.

Respiratory Tract
Remove affected person to dust free location. See Section 8 for additional measures to reduce or eliminate exposure.

Gastrointestinal
Unlikely route of exposure.

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

5 - Fire-fighting measures

a - Suitable (and unsuitable) extinguishing media and
Use extinguishing media suitable for type of surrounding fire

c - Special Protective Equipment and Precautions for Firefighters
NFPA Codes: Flammability: 0 Health: 1 Reactivity: 0 Special: 0

b - Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products):
None

6 - Accidental Release Measures

a - Personal precautions, protective equipment, and emergency procedures
Avoid creating airborne dust. Follow routine housekeeping procedures. Vacuum only with HEPA filtered equipment. If sweeping is necessary, use a dust suppressant and place material in closed containers. Do not use compressed air for clean-up. Personnel should wear gloves, goggles and approved respirator.

b - Methods and materials for containment and cleaning up
Pick up large pieces and dispose in a closed container. Follow precaution stated in above section for clean up.

7 - Handling and storage

a - Precautions for safe handling
Limit the use of power tools unless in conjunction with local exhaust. Use hand tools whenever possible. 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.

b - Conditions for safe storage, including any incompatibilities
Store in a manner to minimize airborne dust.

c - empty containers
Product packaging may contain residue. Do not reuse.
8 - Risk Management Measures / Exposures Controls / Personal Protection

a - 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>MAJOR COMPONENT</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>MANUFACTURER’S REG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline Silica</td>
<td>See below(1)</td>
<td>0.025 mg/m³ (respirable dust)</td>
<td>NONE</td>
</tr>
</tbody>
</table>

(1) Depending on the percentage and type(s) of silica in the mineral, the OSHA Permissible Exposure Limit (PEL) for respirable dust containing crystalline silica (8 HR TWA) is based on the formula listed in 29 CFR 1910.1000, “Air Contaminants” under Table Z-3, “Mineral Dust”. For quartz containing mineral dust, the PEL = 10 mg/m³ / (% of silica + 2); for cristobalite or tridymite, the PEL = 5 mg/m³ / (% of silica + 2); for mixtures, the PEL = 10 mg/m³ / (% of quartz + 2 % of cristobalite) + 2 (% of tridymite) + 2).

b - Appropriate Engineering Controls

Use engineering controls, such as ventilation and dust collection devices, to reduce airborne particulate concentrations to the lowest attainable level.

c - Individual protection measures, such as personal protective equipment

**PPE - Skin**

Wear full body clothing, gloves, hat, and eye protection as necessary to prevent skin irritation. Washable or disposable clothing may be used. If possible, do not take unwashed work clothing home. If soiled work clothing must be taken home, employers should ensure employees are trained on the best practices to minimize or avoid 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.).

**PPE - Eye**

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

**PPE – Respiratory**

When it is not possible or feasible to reduce airborne crystalline silica or particulate levels below the appropriate PEL/OEL through engineering controls, or until they are installed, employees are encouraged to use good work practices together with respiratory protection. Before providing respirators to employees (especially negative pressure type), employers should 1) monitor for airborne crystalline silica and/or dust concentrations using appropriate NIOSH analytical methods and select respiratory protection based upon the results of that monitoring, 2) have the workers evaluated by a physician to determine the workers’ ability to wear respirators, and 3) implement respiratory protection training programs. Use NIOSH-certified particulate respirators (42 CFR 84), in compliance with OSHA Respiratory Protection Standard 29 CFR 1910.134 and 29 CFR 1926.103, for the particular hazard or airborne concentrations to be encountered in the work environment. For the most current information on respirator selection, contact your supplier.
**9 - Physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a - Appearance</td>
<td>Metallic grey, liquid, slight odor</td>
</tr>
<tr>
<td>b - Odor</td>
<td>Not applicable</td>
</tr>
<tr>
<td>c - Odor Threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>e - pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>d - Melting Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>f - Initial Boiling Point/Range</td>
<td>Not applicable</td>
</tr>
<tr>
<td>g - Flashpoint</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 - Solubility</td>
<td>Not soluble in water</td>
</tr>
<tr>
<td>n - Relative Density</td>
<td>0.9 - 1.2</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**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a - Reactivity</td>
<td>None</td>
</tr>
<tr>
<td>b - Chemical Stability</td>
<td>This is a stable material.</td>
</tr>
<tr>
<td>c - Possibility of Hazardous Reaction</td>
<td>Will not occur.</td>
</tr>
<tr>
<td>d - Conditions to Avoid</td>
<td>None</td>
</tr>
<tr>
<td>e - Incompatible Materials</td>
<td>Not known</td>
</tr>
<tr>
<td>f - Hazardous decomposition products</td>
<td>None</td>
</tr>
</tbody>
</table>
11 - Toxicological information

a - TOXICOKINETICS, METABOLISM AND DISTRIBUTION
Dust samples from these products have not been tested. They may contain respirable crystalline silica.

b - Acute Toxicity
No studies have been undertaken on humans exposed to these products in occupational environments.

c - Epidemiology
Crystalline silica
Exposure to crystalline silica can cause silicosis, and exacerbate pulmonary tuberculosis and bronchitis. IARC (Monograph vol. 68, 1997) concluded that "crystalline silica from occupational sources inhaled in the form of quartz or cristobalite is carcinogenic to humans (Group 1)"., and noted that "carcinogenicity in humans was not detected in all industrial circumstances studied" and "may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity".

d - Toxicology
Crystalline silica
Some samples of crystalline silica administered to rats by inhalation and intratracheal instillation have caused fibrosis and lung cancer. Mice and hamsters, similarly exposed, develop inflammatory disease including fibrosis but no lung cancer.

International Agency for Research on Cancer and National Toxicology Program
IARC, in 1997, Monograph v.68, classified crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to human (group 1).
The Ninth Annual Report on Carcinogens (2000), prepared by the National Toxicology Program (NTP), classified silica, crystalline (respirable size), as a substance known to be a human carcinogen.

12 - Ecological information

a - Ecotoxicity (aquatic and terrestrial, where available)
These products are not reported to have any ecotoxicity effects.

c - Bioaccumulative potential
No bioaccumulative potential.

d - Mobility in soil
No information for the product.

e - Other adverse effects (such as hazardous to the ozone layer)
No adverse effects of this material on the environment are anticipated.

13 - Disposal Considerations

Waste Management and Disposal
To prevent waste materials from becoming airborne during waste storage, transportation and disposal, a covered container or plastic bagging is recommended. Comply with federal, state and local regulations.

Additional information
This product, as manufactured, is not classified as a listed or characteristic hazardous waste according to U. S. Federal regulations (40 CFR 261). Any processing, use, alteration or chemical additions to the product, as purchased, may alter the disposal requirements. Under U. S. 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

a - UN number.

Hazard Class: Not Regulated United Nations (UN) Number: Not Applicable
Labels: Not Applicable North America (NA) Number: Not Applicable
Placards: Not Applicable Bill of Lading: Product Name

b - UN proper shipping name

Not applicable.

c - Transport hazard class(es)

Not applicable.

d - Packing group, if applicable

Not applicable.

e - Environmental hazards (e.g., Marine pollutant (Yes/No))

No.

f - Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)

Not regulated.

g - Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises

Not applicable.

International

INTERNATIONAL

Canadian TDG Hazard Class & PIN: Not regulated
Not classified as dangerous goods under ADR (road), RID (train), IATA (air) or IMDG (ship).

15 - Regulatory information

15.1 - United States Regulations

UNITED STATES REGULATIONS

SARA Title III: This product does not contain any substances reportable under Sections 302, 304, 313 (40 CFR 372). Sections 311 and 312 apply.
TSCA: All substances contained in this product are listed, if required, in the TSCA Chemical Inventory.
California: "Silica, crystalline (airborne particles of respirable size)" is listed in Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986 as a chemical known to the State of California to cause cancer.
Other States: Crystalline silica products are not known to be regulated by states other than California; however, state and local OSHA and EPA regulations may apply to these products. Contact your local agency if in doubt.

15.2 - International Regulations

INTERNATIONAL REGULATIONS

Canadian WHMIS: Class D-2A Materials Causing Other Toxic Effects
Canadian EPA: All substances in this product are listed, as required, on the Domestic Substance List (DSL).
Revision Summary

In May 2015 this SDS has been updated to GHS format in conformance with US OSHA HCS 2012 (29CFR 1910.1200) and Canada Hazardous Products Act and the Hazardous Products Regulations.

MSDS prepared by

SDS Prepared By: MORGAN THERMAL CERAMICS ENVIRONMENTAL, HEALTH & SAFETY DEPARTMENT

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, Morgan Thermal Ceramics 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.