

33265-1002**Thermal Ceramics****MATERIAL SAFETY DATA SHEET**

MSDS No: TR503

Date Prepared: 11/09/1998

Current Date: 2/25/2004

Last Revised: (10/30/2003)

1. PRODUCT AND COMPANY IDENTIFICATION

Product Group: REFRACTORY BLOCK; REFRACTORY COATING
 Chemical Name: Vermiculite Product
 Intended Use: Thermal Insulation
 Trade Names: TR-19; TR-19HS; TR-19N; V-19 Block Insulation
 (ALL GRADES)

Manufacturer/Supplier: Thermal Ceramics
 THERMIC REFRACTORIES Plant (PHONE: 217-627-2101)
 P. O. Box 138
 1st & Mound Streets
 Girard, IL 62640

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.thermalceramics.com] or call our automated
 FaxBack: 1-800-329-7444

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENT & CAS NUMBER</u>	<u>% BY WEIGHT</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Vermiculite 01318-00-9	40 - 60	15 mg/m ³ (total dust); 5 mg/m ³ (respirable dust)	10 mg/m ³ (inhalable dust); 3 mg/m ³ (respirable dust)
Cement, alumina, chemicals 65997-16-2	30 - 40	15 mg/m ³ (total dust); 5 mg/m ³ (respirable dust)	10 mg/m ³ (inhalable dust); 3 mg/m ³ (respirable dust)
Crystalline silica 14808-60-7 or 14464-46-1	Up to 3	See notes ⁽¹⁾	0.05 mg/m ³ (respirable dust)
Fibrous glass filament 65997-17-3	0 - 2	15 mg/m ³ (total dust); 5 mg/m ³ (respirable dust)	1 f/cc, 5 mg/m ³

NOTES:

⁽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 TVVA) 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).

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

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3. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW****WARNING!**

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

POSSIBLE HEALTH EFFECTS

Target Organs: Eyes, skin, nose and/or throat
Primary Entry Route: Inhalation
Acute effects: May cause temporary, mild mechanical irritation to the eyes, skin, nose and/or throat. Pre-existing skin and respiratory conditions may be aggravated by exposure.
Chronic effects: Prolonged/repeated inhalation of respirable crystalline silica may cause delayed lung injury (e.g.: silicosis, lung cancer).

HAZARD CLASSIFICATION

Dust samples from these products have not been tested for their specific toxicity, but may contain more than 0.1% crystalline silica, for which the following apply:

The **International Agency for Research on Cancer (IARC)** has classified crystalline silica inhaled in the form of quartz or cristobalite from occupational sources as carcinogenic to humans (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.

The **American Conference of Governmental Industrial Hygienists (ACGIH)** has classified crystalline silica (quartz) as "A2-Suspected Human Carcinogen."

The **State of California**, pursuant to Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986, has listed "silica, crystalline (airborne particles of respirable size)" as a chemical known to the State of California to cause cancer.

The **Canadian Workplace Hazardous Materials Information System (WHMIS)** – Crystalline silica [quartz and cristobalite] is classified as Class D2A - Materials Causing Other Toxic Effects.

The **Hazardous Materials Identification System (HMIS)** –

Health: 1* Flammability: 0 Reactivity: 0 Personal Protection Index: X (Employer determined)
 (* denotes potential for chronic effects)

4. FIRST AID MEASURES**EYE IRRITATION:**

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

SKIN IRRITATION:

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

INGESTION:

Unlikely route of exposure.

INHALATION:

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

- If symptoms persist, seek medical attention. -

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5. FIRE FIGHTING MEASURES

NFPA CODES: Flammability: 0, Health: 1, Reactivity: 0, Special: 0
NFPA Unusual Hazards: None
Flash Point: None
Extinguishing Media: Use extinguishing media suitable for type of surrounding fire.
Explosion Hazards: None
Hazardous Decomposition Products: None

6. ACCIDENTAL RELEASE MEASURES**SPILL/LEAK 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.

7. HANDLING AND STORAGE**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.

STORAGE

Store in original factory container in a dry area. Keep container closed when not in use.

EMPTY CONTAINERS

Product packaging may contain residue. Do not reuse.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**ENGINEERING CONTROLS**

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

RESPIRATORY PROTECTION

When it is not possible or feasible to reduce airborne crystalline silica or particulate levels below the PEL 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.

PROTECTIVE CLOTHING

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.).

EYE PROTECTION

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Wear safety glasses with side shields or other forms of eye protection in compliance with appropriate OSHA standards to prevent eye irritation. The use of contact lenses is not recommended, unless used in conjunction with appropriate eye protection. Do not touch eyes with soiled body parts or materials. If possible, have eye-washing facilities readily available where eye irritation can occur.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR AND APPEARANCE:	Brown or gray odorless powder or blocks
CHEMICAL FAMILY:	Refractory block; Refractory coating
BOILING POINT:	Not applicable
WATER SOLUBILITY (%):	Not soluble in water
MELTING POINT:	> 2500°F
SPECIFIC GRAVITY:	Not applicable
VAPOR PRESSURE:	Not applicable
pH:	Not applicable
VAPOR DENSITY:	Not applicable
VOLATILE BY VOLUME (%):	Not applicable
MOLECULAR FORMULA:	Not Applicable

10. STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION:	Will not occur
CHEMICAL INCOMPATIBILITIES:	Powerful oxidizers; fluorine, manganese trioxide, oxygen disulfide
HAZARDOUS DECOMPOSITION PRODUCTS:	None

11. TOXICOLOGICAL INFORMATION

TOXICOLOGY

Dust samples from these products have not been tested. They may contain respirable crystalline silica.

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.

EPIDEMIOLOGY

No studies have been undertaken on humans exposed to these products in occupational environments.

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".

12. ECOLOGICAL INFORMATION

Adverse effects of this material on the environment are not anticipated.

13. DISPOSAL INFORMATION

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

DISPOSAL

If discarded in its purchased form, this product would not be a hazardous waste under 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**U.S. DEPARTMENT OF TRANSPORTATION (DOT)**

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

INTERNATIONAL

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

15. REGULATORY INFORMATION**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.
OSHA:	Comply with Hazard Communication Standards 29 CFR 1910.1200 and 29 CFR 1926.59 and Respiratory Protection Standards 29 CFR 1910.134 and 29 CFR 1926.103.
TSCA:	All substances contained in this product are listed 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.

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).

16. OTHER INFORMATION**SARA TITLE III HAZARD CATEGORIES**

Acute Health:	No	Pressure Hazard:	No
Chronic Health:	Yes	Reactivity Hazard:	No
Fire Hazard:	No		

DEFINITIONS:

ACGIH:

American Conference of Governmental Industrial Hygienists

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ADR:	Carriage of Dangerous Goods by Road (International Regulation)				
CAA:	Clean Air Act				
CAS:	Chemical Abstracts Service Registry Number				
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act				
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/m ³ :	Milligrams per cubic meter of air				
mppcf:	Million particles per cubic meter				
MSHA:	Mine Safety and Health Administration				
NFPA:	National Fire Protection Association				
NIOSH:	National Institute for Occupational Safety and Health				
OSHA:	Occupational Safety and Health Administration				
PEL:	Permissible Exposure Limit				
PNOC:	Particulates Not Otherwise Classified				
PNOR:	Particulates Not Otherwise Regulated				
RCRA:	Resource Conservation and Recovery Act				
RID:	Carriage of Dangerous Goods by Rail (International Regulation)				
SARA:	Superfund Amendments and Reauthorization Act				
Title III:	Emergency Planning and Community Right to Know Act				
...Section 302:	Extremely Hazardous Substances				
...Section 304:	Emergency Release				
...Section 311:	MSDS/List of Chemicals				
...Section 312:	Emergency and Hazardous Inventory				
...Section 313:	Toxic Chemicals Release Reporting				
STEL:	Short-Term Exposure Limit				
TCLP:	Toxicity Characteristics Leaching Procedures (EPA)				
TLV:	Threshold Limit Values (ACGIH)				
TSCA:	Toxic Substance Control Act				
WHMIS:	Workplace Hazardous Materials Information System (Canada)				
29 CFR 1910.134 & 1926.103:	OSHA Respiratory Protection Standards				
29 CFR 1910.1200 & 1926.59:	OSHA Hazard Communication Standards				

Revision Summary: Product name "TR-19HS" added under Section 1, Trade Names.

MSDS Prepared By: 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 Material Safety Data Sheet. Employers may use this MSDS 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 MSDS. Therefore, given the summary nature of this document, 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.

Original data written: September 8th, 1998
Revised date: October 25th, 2005

Material Safety Data Sheet

1. Product and Company Identification

Product name: Art Clay Silver Basic series
Clay type, Paper type and Slow Dry type
Art Clay Silver 650 series
Clay type, Paste type, Syringe type, Slow Dry type and Overlay Silver Paste
Art Clay Silver ST series
Clay type, Paste type and Syringe type

Manufacturer: Aida Chemical Industries Co., Ltd.
Address: 6-15-13 Minami-cho, Fuchu-shi, Tokyo
Contact Department: Product Development Department
Telephone: +81 (0) 42 334 6319
Fax number: +81 (0) 42 224 6359
Emergency contact: +81 (0) 42 366 8751 (DAC Overseas Division)
Office hours: 9:00am – 18:00 pm

2. Composition, Information on Ingredients

Classification of Product: Mixture
Chemical Nature: Silver (Ag) and Binder (Organic materials)
Ingredients (% by wt.): Silver 80-95% and Binder 5-20%
Official Reference Number: Silver: N/A, and Binder: N/D
CAS Registry Number: Silver: 7440 – 22 – 4, and Binder: N/D
Dangerous Possibility: N/D

3. Hazardous Identification

Toxicity: Possible irritation to the skin and mucous membrane, irritation of upper respiratory depending on the working environment.
Environmental Effects: N/D
Physical and Chemical Hazard: Avoid contact with a strong acid and strong base.
Adverse Human Health Effects: Possible color change on mucous membrane for eye(s), nose and throat, and chronic irritation of respiratory organs, caused by long period use depending on the working environment.
Classification system: N/D (Japan Standard Classification)

4. First Aid Measures

Inhalation: Blow nose and gargle. If signs / symptoms occur, remove person to fresh air. If signs / symptoms continue, call a physician.
Skin Contact: Wash well with soap and water.
Eye Contact: Immediately flush eye(s) with plenty of water until no foreign body is felt. Get immediate medical attention.
Ingestion: Wash your mouth well with water and gargle. Get medical attention if necessary.

5. Fire-Fighting Measures

Extinguishing media: Water, Dry chemicals, CO2
Specified method: In case of a small scale fire, use water, dry chemicals or CO2. In case of a larger scale fire, wear protective gas mask and use water spray method.

6. Accidental Release Measures

Health measures: Put on dust protection mask, goggle and gloves if necessary.
Environmental measures: In case of large release, do not release to a sewer or natural environment.
Removal method: Remove by vacuuming or mop with a cloth, and then wash.

7. Handling and Storage

Handling: Wash well with soap and water after skin contact. Put on dust protection mask, goggle and gloves if necessary.
Storage: Keep in cool and dark place avoiding direct sunlight.

8. Measures for Protecting Exposure

Measure to Install: Install ventilation system near the working area if dust occurs.
Protections: Put on protection mask, glasses, and gloves.
Hygienic Practice: Wash thoroughly after handling.

Original data written: September 8th, 1998
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9. Physical / Chemical Characteristics

Appearance: Color / white, Order / none
Boiling Point: Silver / 2155°C / 3911°F
Melting Point: Silver / 961°C / 1761.8°F
Solubility: Silver / insoluble in water / soluble in nitric acid
Binder / soluble in water
Flash Point: Silver / none
Binder / 300-400°C / 572-752°F
Combustible: Silver / incombustible
Binder / combustible

10. Stability and Reactivity

Stability: Stable
Hazardous Reaction: Silver reacts with acetylene to form sensitive chemical compound, reacts with acid to cause high heat, and reacts to condensed hydrogen peroxide to form gaseous oxygen. Dry silver clay reacts with ammonia to form explosive compound.
Condition to avoid: High temperature / high humidity
Hazardous decomposition: None

11. Health Hazard

Acute Toxicity: None
Skin Corrosion: Possible irritation to the skin and mucous membrane.
Inhalation: Possible irritation of upper respiratory including soreness of nose and throat, coughing and sneezing.

12. Ecological Information

Mobility: May release in dust form in the air depending on the working environment.
Contamination: N/D
Decomposition: N/D
Bioaccumulation: N/D

13. Disposal Consideration

Disposal method: Following the handling of general industrial waste according to the instruction of the local authority.

14. Transportation Information

International Regulation: Transport in accordance with federal, state and/or local regulations.
Transportation Consideration: Avoid high temperature, high humidity and shock on the container.

15. Regulatory Information

Laws of Labor, Safety and Health: Silver / reporting material (#138 / silver and its water-soluble compound – under 1% inclusion)
Pollutant Release and Transfer Register: Silver / Category 1, Designated Chemical Material (#64 silver and its water-soluble compound – over 1% inclusion)
Ordinance Review for Regulation of Dangerous Substance, Chapter 1-12: Binder / Designated combustibility synthetic resins (other category)
*Ensure this product in compliance with federal requirements and ensure deformity to local regulation and law.

Other Information

Reference: Chemical Encyclopedia (KYORITSU SHUPPAN CO., LTD.)
Chemical Merchandise of 12394 (THE CHEMICAL DAILY CO., LTD.)
Website of Japan Chemical Industry Association(JCIA) <http://www.nikkakyo.org/> National Institute of Technology and Evaluation (NITE) <http://www.nite.go.jp/>
JIS Z 7250 (Japanese Industrial Standards Z-7250)
Fire Precedent: None

This Material Safety Data Sheet is compiled with JIS Z 7250 and formatted as same as ISO11014-1. These data are based on our present state of knowledge and experience, and correct as of the date issued. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship. User is responsible for determining whether above mentioned product is fit for a particular purpose and suitable for user's method of use or application.