

MATERIAL SAFETY DATA SHEET

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: Machined Graphite Shapes (Extruded, Vibrated, Molded & Isostatic Graphite materials)

Supplier Name:

CeraMaterials
226 Route 209
Port Jervis, NY 12771
(518) 701-6722

Emergency Telephone:

518-701-6722

Intended Use: Molds/crucibles/sidewall
blocks/heating elements

Contact Person: Dr. Jerry Weinstein

2 HAZARDS IDENTIFICATION

Emergency Overview

Physical State: Solid, various geometrical shapes

Color: Black

Odor: Odorless

In its manufactured and shipped state, this product is considered to present low hazard. Processing may generate graphite dusts and fumes with the below listed potential health effects.

Potential Health Effects

Inhalation: No inhalation hazard in manufactured and shipped state. Dust and fumes generated from the material can enter the body by inhalation. High concentrations of dust and fumes may irritate the throat and respiratory system and cause coughing. Frequent inhalation of fume/dust over a long period of time increases the risk of developing lung diseases.

Eye Contact: Dust in the eyes will cause irritation. Exposed individuals may experience eye tearing, redness, and discomfort.

Skin Contact: Under normal conditions of intended use, this material does not pose a risk to health. Dust may irritate skin.

Ingestion: Not relevant, due to the form of the product in its manufactured and shipped state. However, ingestion of dusts generated during working operations may cause nausea and vomiting.

Chronic Health Effects: Prolonged and repeated overexposure to dust can lead to pneumoconiosis. Pre-existing pulmonary disorders, such as emphysema, may possibly be aggravated by prolonged exposure to high concentrations of graphite dusts.

Target Organ(s): | Skin | Lung |

Potential Physical / Chemical Effects: Bulk material is non-combustible. The material may form dust and can accumulate electrostatic charges, which may cause an electrical spark (ignition source). High dust levels may create potential for explosion.

OSHA Regulatory Status: Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200.

3 COMPOSITION / INFORMATION ON INGREDIENTS

| Chemical Name | CAS-No. | Concentration* |
|---------------------|-----------|----------------|
| †Synthetic graphite | 7782-42-5 | > 99% |

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
† This chemical is hazardous according to OSHA/WHMIS criteria.

4 FIRST AID MEASURES

Inhalation: Move injured person into fresh air and keep person calm under observation. For breathing difficulties, oxygen may be necessary. Get medical attention.

Eye Contact: Flush thoroughly with water for at least 15 minutes. Do not rub eye. If irritation occurs, get medical assistance.

Skin Contact: Wash skin with soap and water. If skin irritation or an allergic skin reaction develops, get medical attention.

Ingestion: Rinse mouth thoroughly if dust is ingested. Get medical attention if any discomfort continues.

5 FIRE-FIGHTING MEASURES

Extinguishing Media: Dust: Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable Extinguishing Media: None.

Special Fire Fighting Procedures: Cool material exposed to heat with water spray and remove it if no risk is involved.

Unusual Fire & Explosion Hazards: Thermal decomposition may produce smoke, oxides of carbon and lower molecular weight organic compounds whose composition have not been characterized.

Hazardous Combustion Products: Carbon Oxides, Unidentified organic compounds

Protective Measures: Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

Flammability Class: NFPA Rating Fire = 1. Materials that must be preheated before ignition can occur.

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| 6 ACCIDENTAL RELEASE MEASURES |
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Personal Precautions: Avoid generation and spreading of dust. Avoid inhalation of dust and contact with skin and eyes. Remove sources of ignition. Wear suitable protective clothing and gloves. See Section 8 of the MSDS for Personal Protective Equipment.

Spill Cleanup Methods: Collect dust using a vacuum cleaner equipped with HEPA filter. If not possible, gently moisten dust with water fog before it is collected with shovel, broom or the like. Collect in approved containers and seal securely. Containers must be labeled. For waste disposal, see section 13 of the MSDS.

Environmental Precautions: No specific precautions. Do not allow material to enter storm or sanitary sewers, groundwater or soil.

Notification Procedures: In the event of accidental release, notify relevant authorities in accordance with all applicable regulations.

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| 7 HANDLING AND STORAGE |
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Handling: Risk of being struck by rolling or falling product. Use work methods which minimize dust production. Avoid inhalation of dust and contact with skin and eyes. Wear appropriate personal protective equipment. Take precautionary measures against static discharges when there is a risk of dust explosion. Keep away from heat, spark, open flames and other sources of ignition. Use explosion-proof electrical equipment if airborne dust levels are high. Observe good industrial hygiene practices. Keep the workplace clean.

Storage: Keep away from heat, spark, open flames and other sources of ignition. Keep container closed. Store away from: Oxidizing agents. Reducing agents. Store away from incompatible materials.

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| 8 EXPOSURE CONTROLS / PERSONAL PROTECTION |
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Exposure Limits:

| Chemical Name | Source | Type | Exposure Limits | Notes |
|-------------------------------------------|---------------------|------|----------------------|-------|
| Synthetic graphite (Respirable fraction.) | ACGIH | TWA | 2 mg/m ³ | |
| Synthetic graphite (Respirable fraction.) | U.S. OSHA Table Z-1 | TWA | 5 mg/m ³ | |
| Synthetic graphite (Total dust.) | U.S. OSHA Table Z-1 | TWA | 10 mg/m ³ | |

Consult Canadian Provincial Regulations and/or Mexican Regulations on exposure limits, if applicable.

Engineering Controls: Provide adequate ventilation. Mechanical ventilation or local exhaust ventilation may be required. Provide explosion-proof ventilation for high dust concentrations. Observe occupational exposure limits and minimize the risk of inhalation of dust and fumes. Provide access to washing facilities including soap, skin cleanser and fatty cream.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Use a NIOSH-approved respirator if there is a potential for exposure to dust exceeding exposure limits (See 29 CFR 1910.134, respiratory protection standard). Seek advice from supervisor on the company's respiratory protection standards.

Eye Protection: Wear safety glasses with side shields (or goggles).

Hand Protection: Wear suitable protective gloves to prevent cuts and abrasions. Suitable gloves can be recommended by the glove supplier.

Skin Protection: Wear appropriate clothing to prevent repeated or prolonged skin contact.

Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental Exposure Controls: Environmental manager must be informed of all significant spillages.

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| 9 | PHYSICAL AND CHEMICAL PROPERTIES |
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Color: Black

Odor: Odorless

Odor Threshold: Not applicable.

Physical State: Solid, various geometrical shapes

pH: Not applicable

Melting Point: >2760°C (5000°F)

Freezing Point: Not applicable.

Boiling Point: Not applicable.

Flash Point: Not applicable.

Evaporation Rate: Not applicable.

Flammability Limit - Upper (%): Not applicable.

Flammability Limit - Lower (%): Not applicable.

Vapor Pressure: Not applicable.

Vapor Density (Air=1): Not applicable.

Specific Gravity: 2 (Approximate)

Solubility in Water: Insoluble

Solubility (Other): No data available.

Partition Coefficient (n-Octanol/water): No data available.

Autoignition Temperature: Not applicable.

Decomposition Temperature: >2760°C (5000°F)

Bulk Density: 1.55 g/cc - 1.85 g/cc

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| 10 | STABILITY AND REACTIVITY |
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Stability: Material is stable under normal conditions.

Conditions to Avoid: Dust is combustible, avoid sources of ignition and strong oxidizing agents.

Incompatible Materials: Strong oxidizing agents. Strong reducing agents.

Hazardous Decomposition Products:

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| At Elevated Temperatures: | Carbon Oxides, Unidentified organic compounds |
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Possibility of Hazardous Reactions: Will not occur.

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| 11 | TOXICOLOGICAL INFORMATION |
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Listed Carcinogens: None.

Product Information

Acute Toxicity:

Test Results

Oral LD50 (Mouse): 5000 mg/kg

Dermal LD50 (Mouse): 5000 mg/kg

Acute Toxicity: High concentrations of dust may irritate throat and respiratory system and cause coughing. No additional adverse health effects noted.

Chronic Toxicity: No data available. Frequent inhalation of fume/dust over a long period of time increases the risk of developing lung diseases. Prolonged and repeated overexposure to dust can lead to pneumoconiosis. Pre-existing pulmonary disorders, such as emphysema, may possibly be aggravated by prolonged exposure to high concentrations of graphite dusts.

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| 12 | ECOLOGICAL INFORMATION |
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Ecotoxicity: The product is not expected to be hazardous to the environment.

Mobility: Not relevant, due to the form of the product.

Persistence and Degradability: The degradability of the product has not been stated.

Bioaccumulation Potential: No data available on bioaccumulation.

Other Adverse Effects: None known.

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| 13 | DISPOSAL CONSIDERATIONS |
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General Information: Dispose of waste and residues in accordance with local authority requirements.

Disposal Methods: Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal. Recover and reclaim or recycle, if practical.

Container: Since emptied containers retain product residue, follow label warnings even after container is emptied.

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| 14 | TRANSPORT INFORMATION |
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DOT Not regulated.

IDG Not regulated.

IATA Not regulated.

IMDG Not regulated.

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| 15 | REGULATORY INFORMATION |
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Canadian Controlled Products Regulations: This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

WHMIS Classification: This is not a WHMIS controlled product.

Mexican Dangerous Statement: Under some use conditions, this material may be considered to be hazardous in accordance with Mexican regulations.

Inventory Status

This product or all components are listed or exempt from listing on the following inventory: CHINA, DSL, PICCS, TSCA, EINECS, NZIoC, KECL, AICS

US Regulations

CERCLA Hazardous Substance List (40 CFR 302.4): Not regulated.

SARA Title III

Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A): Not regulated.

Section 311/312 (40 CFR 370):

Acute (Immediate) Chronic (Delayed) Fire Reactive Pressure Generating

Section 313 Toxic Release Inventory (40 CFR 372): Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
Not regulated.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): Not regulated.

Drug Enforcement Act: Not regulated.

TSCA

TSCA Section 4(a) Final Test Rules & Testing Consent Orders: Not regulated.

TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E): Not regulated.

TSCA Section 5(e) PMN-Substance Consent Orders: Not regulated.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated.

State Regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Not regulated.

Massachusetts Right-To-Know List: Not regulated.

Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)): Not regulated.

Minnesota Hazardous Substances List: Synthetic graphite

New Jersey Right-To-Know List: Not regulated.

Pennsylvania Right-To-Know List: Synthetic graphite

Rhode Island Right-To-Know List: Not regulated.

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| 16 | OTHER INFORMATION |
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HAZARD RATINGS

| | Health Hazard | Fire Hazard | Instability | Special Hazard |
|-------------|---------------|-------------|-------------|----------------|
| NFPA | 1 | 1 | 0 | -- |

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

| | Health Hazard | Flammability | Physical Hazard | Personal Protection |
|-------------|---------------|--------------|-----------------|---------------------|
| HMIS | 1* | 1 | 0 | B |

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe * - Chronic Health Effect

Personal Protection codes: B - Safety Glasses, Gloves

HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special