

MATERIAL SAFETY DATA SHEET

FOR Cement Kiln Dust

ROANOKECEMENT™
A TITAN AMERICA BUSINESS

Effective Date: February 2001

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1. PRODUCT/COMPANY IDENTIFICATION

Manufacturer's Name & Address:

Roanoke Cement
6071 Catawba Rd.
Troutville, VA 24175

Telephone Number for Information:
1.800.782.7622

Chemical Family:

Calcium Compounds

Chemical Name and Synonyms:

Cement Kiln Dust

Formula:

This product contains materials for producing portland cement clinker, that can be present in various stages of calcinations.

Trade Name and Synonyms:

Not Applicable

2. EMERGENCY AND FIRST AID

EMERGENCY INFORMATION:

Cement kiln dust is a gray or tan powder. When in contact with moisture in eyes or on skin, or when mixed with water, cement kiln dust becomes caustic (pH>11) and may damage or burn (as severely as third degree) the eyes or skin. Inhalation may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system or may cause, or may aggravate, certain lung diseases or conditions. Use exposure controls or personal protection methods described in Section 10.

EYES: Immediately flush eye thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

SKIN: Wash skin with cool water and pH-neutral soap or mild detergent and apply skin cream to help in replacing lost moisture. Seek medical treatment if irritation or inflammation develops or persists. Seek immediate medical treatment in the event of burns.

INHALATION: Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Seek medical help if coughing and other symptoms do not subside. Inhalation of large amounts of cement kiln dust requires immediate medical attention.

INGESTION: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

3. COMPOSITION INFORMATION

COMPOUNDS:

| | | |
|--|-----------------------------|------------------|
| 3CaO • SiO ₂ | Tricalcium silicate | CAS # 12168-85-3 |
| 2CaO • SiO ₂ | Dicalcium silicate | CAS # 10034-77-2 |
| 3CaO • Al ₂ O ₃ | Tricalcium aluminate | CAS # 12042-78-3 |
| 4CaO • Al ₂ O ₃ • Fe ₂ O ₃ | Tetracalcium aluminoferrite | CAS # 12068-35-8 |

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| Kiln Feed | Calcium carbonate | 001317-65-3 |
| | Lime (CaO) | 001305-78-8 |
| | Silica (SiO ₂) | 60676-86-0 |
| | Crystalline silica | 14808-60-7 |
| | Alumina (Al ₂ O ₃) | 1344-28-1 |
| | Ferric oxide (Fe ₂ O ₃) | 1309-37-1 |
| | Potassium oxide (K ₂ O) | 012136-45-7 |
| | Sodium oxide (Na ₂ O) | 012401-86-4 |
| | Sulfur trioxide (SO ₃) | 007446-11-9 |
| | Magnesia (MgO) | 001309-48-4 |

4. HAZARDOUS INGREDIENTS

EXPOSURE LIMITS

| COMPONENT | OSHA PEL (8-Hour TWA) | ACGIH TLV-TWA (2001) | NIOSH REL (8-Hour TWA) |
|--|---|---|--|
| Iron oxide (CAS # 1309-37-1) 0 to 15% by weight | 10mg/m ³ | 5 mg/m ³ | 5 mg/m ³ |
| Calcium carbonate (CAS31317-65-3) 0 to 5% by weight | 5 mg respirable dust/m ³ 15 mg total dust/m ³ | 10 mg total dust/m ³ | 5 mg respirable dust/m ³ 10 mg total dust/m ³ |
| Magnesium oxide (CAS # 1309-48-4) 0 to 5% by weight | 5 mg respirable dust/m ³ 15 mg total dust/m ³ | 10 mg (fume)/m ³ | |
| Calcium oxide (CAS # 1306-78-8) 0 to 5% by weight | 5 mg/m ³ | 2 mg/m ³ | 2 mg/m ³ |
| Crystalline silica (CAS # 14808-60-7) 0 to 0.1% by weight | <u>10 mg of respirable dust/m³</u> %SiO ₂ + 2 <u>30 mg of total dust/m³</u> %SiO ₂ + 2 | 0.05 mg respirable quartz/m ³ | 0.05 mg respirable quartz dust/m ³ |

TRACE INGREDIENTS:

Due to the use of substances mined from the earth's crust, trace amounts of naturally occurring, potentially harmful constituents may be detected during chemical analysis may contain up to 0.75% insoluble residue. A small amount of this residue includes free crystalline silica. Cement kiln dust also may contain trace (<0.05%) amounts of chromium salts or compounds (including hexavalent chromium) or other metals (including nickel compounds) found to be hazardous or toxic in some chemical forms. These metals are present mostly as trace substitutions within the principal minerals. Other trace constituents may include potassium and sodium sulfate compounds.

5. HAZARD IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

NOTE: Potential health effects may vary depending upon the duration and degree of exposure. To reduce or eliminate health hazards associated with this product, use exposure controls or personal protection methods as described in Section 10.

EYE CONTACT:

(Acute/Chronic) Exposure to airborne dust may cause immediate or delayed irritation or inflammation of the cornea. Eye contact by larger amounts of dry powder or splashes of wet cement kiln dust may cause effects ranging from moderate eye irritation to chemical burns and blindness.

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SKIN CONTACT: (Acute) Exposure to dry cement kiln dust may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure.

(Chronic) Dry cement kiln dust coming in contact with wet skin or exposure to wet cement kiln dust may cause more severe skin effects, including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of chemical (caustic) burns.

(Acute/Chronic) Some individuals may exhibit an allergic response upon exposure to cement kiln dust. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers.

INHALATION: (Acute) Exposure to cement kiln dust may cause irritation to the moist mucous membranes of the nose, throat and upper respiratory system. Pre-existing upper respiratory and lung diseases may be aggravated by inhalation of cement kiln dust.

(Chronic) Inhalation exposure to free crystalline silica may cause delayed lung injury including silicosis, a disabling and potentially fatal lung disease, and/or cause or aggravate other lung diseases or conditions.

INGESTION: (Acute/Chronic) Internal discomfort or ill effects are possible if large quantities are swallowed.

CARCINOGENIC POTENTIAL: Cement kiln dust is not recognized as a carcinogen by NTP, OSHA, or IARC. However, it may contain trace amounts of heavy metals recognized as carcinogens by these organizations. In addition, IARC classifies crystalline silica, a trace constituent, carcinogenic to humans (Group I). NTP has characterized respirable silica as "known to be a human carcinogen." (See also Section 13.)

6. PHYSICAL/CHEMICAL DATA

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|---|------------------------------|-----------------------------|------------------------------------|
| APPEARANCE/ODOR: | Gray to tan powder, odorless | PHYSICAL STATE: | Solid (Powder) |
| BOILING POINT: | > 1000 °C | MELTING POINT: | Not applicable |
| VAPOR PRESSURE: | Not applicable | VAPOR DENSITY: | Not applicable |
| pH (IN WATER): (ASTM D 1293-95) | 12 to 13 | SOLUBILITY IN WATER: | Slightly soluble (0.1% to 1.0%) |
| SPECIFIC GRAVITY: (H₂O = 1.0) | 2.70-3.00 | EVAPORATION RATE: | Not applicable |

7. FIRE AND EXPLOSION

| | | | |
|---|-----------------|--|------|
| FLASH POINT: | None | LOWER EXPLOSIVE LIMIT: | None |
| AUTO IGNITION TEMPERATURE: | Not combustible | UPPER EXPLOSIVE LIMIT: | None |
| FLAMMABLE LIMITS: | Not applicable | SPECIAL FIRE FIGHTING PROCEDURES: | None |
| EXTINGUISHING MEDIA: | Not combustible | UNUSUAL FIRE AND EXPLOSION HAZARDS: | None |
| HAZARDOUS COMBUSTION PRODUCTS: | None | | |

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8. STABILITY AND REACTIVITY DATA

- STABILITY:** Product is stable. Keep dry until used.
- CONDITIONS TO AVOID:** Unintentional contact with water. Contact with water will result in hydration and produces (caustic) calcium hydroxide.
- INCOMPATIBILITY:** Wet cement kiln dust is alkaline. As such, it is incompatible with acids, ammonium salts and aluminum metal.

9. PRECAUTIONS FOR HANDLING, STORAGE, AND DISPOSAL

- HAZARDOUS DECOMPOSITIONS:** Will not occur.
- HANDLING AND STORAGE:** Keep dry until used. Handle and store in a manner so that airborne dust does not exceed applicable exposure limits. Use adequate ventilation and dust collection. Use exposure control and personal protection methods as described in Section 10.
- SPILL:** Use dry clean-up methods that do not disperse dust into the air or entry into surface water. Material can be used if not contaminated. Place in an appropriate container for disposal or use. Avoid inhalation of dust and contact with skin and eyes. Use exposure control and personal protection methods as described in Section 10.
- DISPOSAL:** Comply with all applicable local, state, and federal regulations for disposal of unusable or contaminated materials. Dispose of packaging/containers according to local, state, and federal regulations.

10. EXPOSURE CONTROLS/PERSONAL PROTECTION

- RESPIRATORY PROTECTION:** Use local exhaust or general dilution ventilation to control dust levels below applicable exposure limits. Minimize dispersal of dust into the air.
- If local or general ventilation is not adequate to control dust levels below applicable exposure limits or when dust causes irritation or discomfort, use NIOSH approved respirators.
- EYE PROTECTION:** Wear safety glasses with side shields or goggles to avoid contact with the eyes. In extremely dusty environments and unpredictable environments, wear tight-fitting unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when handling cement or cement-containing products.
- SKIN PROTECTION:** Wear impervious abrasion-and alkali-resistant gloves, boots, long-sleeved shirt, long pants or other protective clothing to prevent skin contact. Promptly remove clothing dusty with dry cement kiln dust or clothing dampened with moisture mixed with cement kiln dust.

11. TRANSPORTATION DATA

Cement kiln dust is not hazardous under U.S. DOT or TDG regulations.

12. OTHER REGULATORY INFORMATION

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| Status under US OSHA Hazard Communication Rule 29 CFR 1910.1200: | Cement kiln dust is considered to be a hazardous chemical under this regulation and should be included in the employer's hazard communication program. |
| Status under CERCLA/Superfund, 40 CFR 117 and 302: | Not listed. |
| Hazard Category under SARA (Title III), Sections 311 and 312. | Cement kiln dust qualifies as a hazardous substance with delayed health effects. |
| Status under SARA (Title III), Section 313: | Not subject to reporting requirements under Section 313. |

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| Status under TSCA (as of May 1997): | Some substances in cement kiln dust are on the TSCA inventory list. |
| Status under the Federal Hazardous Substances Act: | Cement kiln dust is a hazardous substance subject to statutes promulgated under the subject act. |
| Status under Canadian Environmental Protection Act: | Not listed. |
| Status under Canadian WHMIS: | Cement kiln dust is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations (Class D2A, E – Corrosive Material) and subject to the requirements of WHMIS. |

13. OTHER INFORMATION

This MSDS provides information on various types of cement kiln dust products. A particular product's composition may vary from sample to sample. The information provided herein is believed by Roanoke Cement to be accurate at the time of preparation, or prepared from sources believed to be reliable. Health and safety precautions in this data sheet may not be adequate for all individuals or situations. Users have the responsibility to comply with all laws and procedures applicable to the safe handling and use of the product, to determine the suitability of the product for its intended use, and to understand possible hazards associated with mixing cement kiln dust with other materials. SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT, THE MERCHANTABILITY, OR THE FITNESS THEREOF FOR ANY PURPOSE, OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY ROANOKE CEMENT.

ABBREVIATIONS

| | |
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| ACGIH – American Conference of Governmental Industrial Hygienists | NIOSH – National Institute for Occupational Safety and Health |
| ASTM – American Society for Testing and Materials | NTP – National Toxicology Program |
| CAS – Chemical Abstract Service | OSHA – Occupational Safety and Health Administration |
| CERCLA – Comprehensive Environmental Response, Compensation and Liability Act | PEL – Permissible Exposure Limit |
| CFR – Code of Federal Regulations | REL – Recommended Exposure Limit |
| ft³ – Cubic Foot | SARA – Superfund Amendments and Reauthorization Act |
| IARC – International Agency for Research on Cancer | TDG – Transportation of Dangerous Goods |
| m³ – Cubic meter | TLV – Threshold Limit Value |
| mg – milligram | TSCA – Toxic Substance Control Act |
| MSHA – Mine Safety and Health Administration | TWA – Time Weighted Average |
| | WHMIS – Workplace Hazardous Materials Information System |