Product **FLUX BRIQUETTES** **Date Prepared** **February 1, 2002**

Miller and Company LLC
9700 West Higgins Road
Suite 1000
Rosemont, Illinois 60018

Emergency Telephone Number: **847-696-2677**
Other Information Calls: **847-696-2400**

The subject product is a mechanical blend of the following ingredients:

Component	% in Mixture
FLUORSPAR	50 – 80 %
LIMESTONE	10 – 40 %
CEMENT	5 – 20 %

Custom blended per chemical analysis of specific ingredients inventoried at time of blending so as to meet customer specifications.

Since the mixture presents no greater hazard than any of the individual components, and since the burden of information lies with the primary producer, the data sheets for the individual components are attached and will satisfy the requirements of the standard for a data sheet for the mixture. This interpretation comes from an OSHA field directive to compliance officers, "Appendix A, Clarifications and Interpretations of the Hazard Communication Standard (HCS)," OSHA CPL 2-2.38B, 15 August 1988.

MATERIAL SAFETY DATA SHEET

FLUORSPAR (FLUORITE) – ALL GRADES

Transportation Emergencies (U.S.): (800) 424-9300 (CHEMTREC)
Transportation Emergencies (Canada): (613) 996-6666 (Collect)(CANUTEC)

Section 1. Hazardous Ingredients	LD_{50}	%	CAS No.
Calcium fluoride, CaF_2	4250 mg/kg	85 – 98	7789-75-5
Crystalline Silica (Quartz, SiO_2)	None found	0.5 – 5	14808-60-7

Section 2. Preparation Information

Responsibility for MSDS Preparation: Oxbow Carbon & Minerals LLC
(412) 264-4311

Prepared November 15, 1989 Reviewed and Revised March 24, 2004 Supercedes March 8, 2002

Section 3. Product Information

Product Name: Fluorspar, Fluorite **CAS No.** 7789-75-5 **Use:** Flux. Raw material for fluorine values.

Manufacturer/Supplier: Metals Group
Oxbow Carbon & Minerals LLC
Suite 300, 1009 Beaver Grade Road
Coraopolis, PA 15108, U.S.A.
Phone (412) 264-4311 (8:00 a.m. – 5:00 p.m. Mon. – Fri. EST)
FAX (412) 264-4326

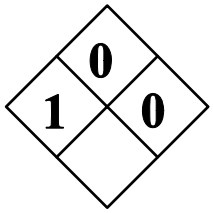
Section 4. Physical Data

Boiling Point:	Not applicable	**Solubility in Water:**	Negligible
Melting Point:	Approximately 2460 °F	**Specific Gravity (H_2O=1):**	3.2
pH:	Not applicable	**Vapor Pressure:**	Not applicable
Odor Threshold:	Not applicable	**Vapor Density:**	Not applicable
Odor and appearance:	White to off-white powder.	**Evaporation Rate:**	Not applicable

Coefficient of Water/Oil Distribution: Not applicable.

Section 5. Fire and Explosion Hazard Data

Flash Point: Not applicable
Flammable Limits: Not applicable
Lower Explosive Limit: Not applicable
Upper Explosive Limit: Not applicable
Autoignition Temperature: Not applicable
Extinguishing Media: Not applicable.
Conditions of Flammability: Not applicable.
Hazardous Combustion Products: Calcium oxide, fluorides if involved in a fire.
Explosion Data – Sensitivity to Impact: Not applicable
Explosion Data – Sensitivity to Static Discharge: Not applicable



NFPA Code

Section 6. Reactivity Data

Conditions Under Which Product is Chemically Unstable: None known.
Substance or Class of Substances With Which Product is Incompatible: Strong acids.
Conditions of Reactivity: None known.
Hazardous Decomposition Products: Contact with acids may cause evolution of highly irritating fumes of hydrogen fluoride (hydrofluoric acid).

Section 7. Health Hazard Data/Toxicological Properties

ACGIH TLV and OSHA PEL: 2.5 mg/m^3 as F (fluoride) **WHMIS CLASS (Canada):** D2

Routes of Entry: Lungs (breathing) - Yes Eyes – No Ingestion - Yes Skin – No

Carcinogen: OSHA - No NTP - Yes IARC – Yes ACGIH – A4, Not classifiable as a human carcinogen

Fluorspar contains up to 5% crystalline silica (quartz). The International Agency for Research on Cancer (IARC) has classified crystalline silica in the form of quartz or cristobalite as a Group I carcinogen (carcinogenic to human beings). The NTP Annual Report on Carcinogens includes respirable crystalline silica. The OSHA Hazard Communication Standard requires that any material containing over 0.1 % of a substance reported as a carcinogen in an IARC monograph or the most recent NTP Annual Report on Carcinogens must be identified as a carcinogen. Crystalline silica is known to cause silicosis. At dust levels below the recommended PEL exposure, the crystalline silica contained in Fluorspar should not present a health hazard.

Effects of Overexposure:

Short Term: High concentrations of dust may cause eye, nose or throat irritation. Ingestion (swallowing) of a large amount could cause vomiting, abdominal pain, and diarrhea.

Long Term: Long term exposure to dust concentrations higher than recommended exposure limits may cause bronchitis or silicosis, or severe lung damage. Due to the fluoride in fluorspar, swallowing or inhaling large amounts over a long period of time may cause increased bone density, fluorosis, digestive disturbances, loss of weight, anemia, diseases of the teeth.

Sensitization to Product: Not applicable **Toxicologically synergistic products:** None known.

Medical Conditions Aggravated: Workers with existing lung problems may be more susceptible to the effects of this material.

Toxicity Data: Rat, LD50 4250 mg/kg **Teratogenicity:** None found

Mutagenicity: None found **Reproductive Toxicity:** Mouse, intraperitoneal, TDLo 3200 mg/kg

Section 8. Preventive Measures

Respiratory Protection: If dust limits exceed recommended exposure limits, use of an approved dust respirator is recommended until feasible engineering controls are completed.

Ventilation: Local exhaust ventilation is recommended to control dust to below applicable exposure limits.

Eye Protection: If high dust concentrations exist wear tight-fitting goggles.

Other Protective Equipment: Rubber gloves and aprons are optional.

Steps To Be Taken In Case Material Is Released Or Spilled: If uncontaminated, sweep up or collect, and reuse as product. If contaminated, collect in a suitable container.

Waste Disposal Method: Can be disposed of in an approved disposal facility, in accordance with applicable federal, state or provincial, and local regulations. The nature and extent of contamination, if any, may require use of specialized disposal methods.

Storage Requirements: No special storage facilities or procedures are required.

Handling Procedures and Equipment: Optional.

DOT Identification: Not regulated by DOT **Transport Canada:** Not regulated.

Section 9. First Aid Measures

First Aid: **Eyes** - Flush thoroughly with running water. See a physician if irritation persists.

Skin - Wash thoroughly with soap and water.

Inhalation - Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Carmeuse North America
11 Stanwix Street, 11th Floor
Pittsburgh, PA 15222
Phone: 412-995-5500
Fax: 412-995-5594

Date of Origin:	06/05/02
Date of Revision:	3/31/06
Revision No.	11

Material Safety Data Sheet

Product Name:	HIGH CALCIUM QUICKLIME

INFOTRAC: 800-535-5053 [In case of an emergency call this number 24 HOURS a day 7 DAYS a week.]

1. IDENTIFICATION OF THE SUBSTANCE AND COMPANY

1.1. Identification of the substance:

Chemical name:	Calcium oxide
Product name(s):	Steel Grade-Large, Steel Grade-Large Rescreened, Steel Grade-Small, Steel Grade-Small Rescreened, Water Grade-Small, Water Grade-Small Rescreened, Mini Pebble, Rice, PCC Grade-Large Rescreened, PCC Grade-Small Rescreened, Hi Cal Fines, Pulverized Lime, Pulverized Lime w/ Flowaid, Thiosorbic
Formula:	CaO
CAS #:	1305-78-8
Molecular Weight:	56.08
Material Uses:	Water treatment, steel flux, caustic agent, pH adjustment, acid gas absorption, construction

1.2. Company:

Main Office:

Carmeuse North America
11 Stanwix Street, 11th Floor
Pittsburgh, PA 15222

Telephone: 412-995-5500
Fax: 412-995-5594

Canadian Office:

Carmeuse Lime (Canada) Limited
P.O. Box 190
Ingersoll, Ontario N5C 3K5

Telephone: 519-423-6283
Fax: 519-423-6545

2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	% by Weight	CAS #	Exposure Limits
Calcium oxide	>89	1305-78-8	OSHA PEL: 5 mg/m^3 ACGIH TLV: 2 mg/m O. Reg. 833 TWAEV: 2 mg/m^3
Magnesium oxide	<4	1309-48-4	OSHA PEL: 10 mg/m^3 ACGIH TLV: 10 mg/m^3 O. Reg. 833 TWAEV: 10 mg/m^3
Silica - crystalline quartz	<1	14808-60-7	OSHA PEL*: 10 mg/m^3 (total dust); 3.3 mg/m^3 (respirable) ACGIH TLV: 0.025 mg/m^3 (respirable) O. Reg. 845 TWAEV: 0.1 mg/m^3

*PEL (total dust) = (30 mg/m^3) / (% silica + 2) ; PEL (respirable) = (10 mg/m^3) / (% silica + 2)

Product Name:	HIGH CALCIUM QUICKLIME (continued)

3. HAZARDS IDENTIFICATION AND CLASSIFICATION

Overview: High Calcium Quicklime is in the form lumps, pebbles, granules or powder and is odorless, white or grayish-white in color. Contact can cause irritation to eyes, skin, respiratory system, and gastrointestinal tract. Contact may aggravate disorders of eyes, skin, gastrointestinal tract, and respiratory system.

Eyes: Can cause severe irritation or burning of eyes, including permanent damage.

Skin: Can cause severe irritation or burning of skin, especially in the presence of moisture.

Ingestion: Can cause severe irritation or burning of gastrointestinal tract if swallowed.

Inhalation: Can cause severe irritation or the respiratory system. Long-term exposure may cause permanent damage. This product is not listed by MSHA, OSHA, or IARC as a carcinogen, but this product may contain crystalline quartz silica, which has been classified by IARC as (Group I) carcinogenic to humans when inhaled. Inhalation of silica can also cause a chronic lung disorder, silicosis.

Irritant: Eyes, mucous membranes, moist skin, respiratory tract.

Flammability: This product is not flammable or combustible

Explosive: This product is not explosive in dust form

Reactivity: May react violently with strong acids producing heat and possible steam explosion in confined space

Symbols: WHMIS Symbol: “E” Corrosive Material; “D2A” Materials causing other toxic effects

4. HEALTH EFFECTS AND TREATMENTS

Health Effects:

Inhalation: Acute: irritation, sore throat, cough, sneezing. Chronic: persistent coughing and breathing problems. Long-term exposure to silica can cause a chronic lung disorder, silicosis.

Eyes: Acute: severe irritation, intense tearing, burns. Chronic: possible blindness when exposure is prolonged.

Skin: Acute: removes natural skin oils, blotches, itching and superficial burns in case of sweating. Chronic: no known effects.

Ingestion: Acute: sore throat, stomach aches, cramps, diarrhea, vomiting. Chronic: no known effects.

Treatments:

Inhalation: Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration.

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes. Pull back the eyelid to make sure all the lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.

Skin: Flush exposed area with large amounts of water. Seek medical attention immediately.

Ingestion: Give large quantities of water or fruit juice. Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth if victim is rapidly losing consciousness or is unconscious or convulsing.

Product Name:	HIGH CALCIUM QUICKLIME (continued)

5. FIRE FIGHTING MEASURES

Flash point:	Non-flammable
Autoignition temperature:	Non-flammable
Inflammability limits:	None
Explosion risk:	None by itself, but heat produced by reaction with strong acids can generate steam and pressure
Hazardous combustion products:	None
Extinguishing media:	Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of High Calcium Quicklime. Use appropriate extinguishing media for surrounding fire conditions.
Fire fighting instructions:	Keep personnel away from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (self-contained breathing apparatus).

6. ACCIDENT PREVENTION MEASURES

Individual and collective precautions:	Avoid creating conditions which release dust – use mechanical ventilation to remove dust from work spaces
Avoid inhalation of dust:	Wear respiratory protection - minimum NIOSH N-95 Dust Mask
Cleaning methods for spills:	Use personal protective equipment (eyes, skin and inhalation, see Section 8). Use dry methods (vacuuming, sweeping) to collect spilled materials. Avoid generating dust. For large spills, evacuate area downwind of clean-up area operations to minimize dust exposure. For small spills, store spilled materials in dry, sealed plastic or metal containers. Dust residue on surfaces may be washed with water.
Precautions for the protection of the environment:	May not be released into surface waters without controls (increases pH)
Waste Disposal:	Dispose according to federal, provincial/state and local environmental regulations

7. HANDLING AND STORAGE

Handling:	In open air or in ventilated places, avoid skin and eye contact, avoid creating airborne dust
Storage:	Store in dry places sheltered from humidity. Keep away from acids and incompatible substances Keep out of reach of children

Product Name:	HIGH CALCIUM QUICKLIME (continued)

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Limits: Calcium oxide: 5 mg/m^3 (OSHA); 2 mg/m^3 (ACGIH, O. Reg. 833));
Magnesium oxide: 15 mg/m^3 (OSHA); 10 mg/m^3 (ACGIH, O. Reg. 833)
Silica (crystalline quartz): 10 mg/m^3 (total dust); 3.3 mg/m^3 (respirable) (OSHA);
0.05 mg/m^3 (respirable - ACGIH); 0.1 mg/m^3 (O. Reg 845)

Engineering Controls: Use ventilation and dust collection to control exposure to below applicable limits.

Respiratory Protection: Wear NIOSH N-95 Dust Mask.

Eye Protection: Eye protection (chemical goggles, safety glasses and/or face shield) should be worn where there is a risk of lime exposure. Contact lenses should not be worn when working with lime products

Hand Protection: Use clean dry gloves

Skin Protection: Cover body with suitable clothes (long sleeves shirts and trousers). Use over the ankle waterproof caustic resistant footwear

Refer to Ontario Regulation 845: Designated Substance – Silica.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Odor & Appearance:	Odorless, white powder
pH:	12.4 in saturated water solution at 25°C
Melting point:	2580°C
Boiling point:	2850°C
Vapor pressure:	Non volatile
Vapor density:	Non volatile
Density:	3.34 g/cc
Solubility:	Reacts with water to produce $Ca(OH)_2$ with large amounts of heat. Soluble in acids, glycerin and sugar solutions

10. STABILITY AND REACTIVITY

Stability:	Reacts with water to form $Ca(OH)_2$ and heat.
Decomposition temperature:	None
Reactivity:	Reacts with acids to form calcium salts while generating heat. Reacts with carbon dioxide in air to form calcium carbonate.
Conditions to avoid:	Vicinity of incompatible materials
Incompatible materials:	Acids; reactive fluoridated, brominated or phosphorous compounds; aluminum (may form hydrogen gas), reactive powdered metals; organic acid anhydrides; nitro-organic compounds; interhalogenated compounds
Hazardous decomposition products:	None

Product Name:	HIGH CALCIUM QUICKLIME (continued)

11. TOXICOLOGICAL INFORMATION

Toxicity: This product is not listed by MSHA, OSHA, or IARC as a carcinogen, but this product may contain crystalline silica, which has been classified by IARC as (Group I) carcinogenic to humans when inhaled in the form of quartz or cristobalite. No reported Carcinogenicity, Reproductive Effects, Teratogenicity or Mutagenicity.

Exposure Limits: Refer to Section 8

Irritancy: Can cause severe irritation of eyes, skin, respiratory tract and gastrointestinal tract.

Chronic Exposure: Inhalation of silica can cause a chronic lung disorder, silicosis.

12. ECOLOGICAL INFORMATION

Alkaline substance that increases pH to a maximum of 12.4 in a saturated water solution at 25^{o}C
Calcium oxide gradually reacts with CO_2 in air to form calcium carbonate ($CaCO_3$)
Calcium carbonate is ecologically neutral
Uncontrolled spillage in surface waters should be avoided since the increase pH could be detrimental to fish
Harmful to aquatic life in high concentration

13. DISPOSAL CONSIDERATIONS

Dispose according to federal, provincial/state and local environmental regulations.

14. TRANSPORTATION INFORMATION

Classification:		
	TDG	Not listed for ground transportation
	HMR	Not listed for ground transportation

TDG: Transportation of Dangerous Goods Regulation (CAN)
HMR: Hazardous Materials Regulation (USA)

Product Name:	HIGH CALCIUM QUICKLIME (continued)

15. REGULATORY INFORMATION

Symbol:

WHMIS RATING
D2A, E
NFPA RATING
HEALTH – 3 SPECIFIC HAZARD - ALK FLASH POINTS – 0 REACTIVITY – 1
HMIS RATING
HEALTH – 2 SPECIFIC HAZARD - ALK FLASH POINTS – 0 REACTIVITY – 1

Risk Phases:

Risk of serious damage to the eyes
Keep out of reach of children

Safety Phases:

Keep storage container away from humidity
Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with water for at least 15 minutes

CPR (Canada):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) of Canada and this MSDS contains all information required by the CPR.

16. MISCELLANEOUS OTHER INFORMATION

Lime dust can be removed from objects (such as vehicles) using rags dampened with dilute vinegar. After applying dilute vinegar, vehicles (especially chrome surfaces) must be washed with water.

Material Safety Data Sheet

Section 1: PRODUCT AND COMPANY INFORMATION

Product Name(s): Lafarge Portland Cement (cement)

Product Identifiers: Cement, Portland Cement, Hydraulic Cement, Oil Well Cement, Trinity® White Cement, Antique White Cement, Portland Cement Type I, IA, IE, II, I/II, IIA, II L.A., III, IIIA, IV, IVA, V, VA, 10, 20, 30, 40, 50, GU, MS, MH, HE, LH, HS, OWH, OWG Cement, OW Class G HSR

Manufacturer:
Lafarge North America Inc.
12950 Worldgate Drive, Suite 500
Herndon, VA 20170

Information Telephone Number:
703-480-3600 (9am to 5pm EST)
Emergency Telephone Number:
1-800-451-8346 (3E Hotline)

Product Use: Cement is used as a binder in concrete and mortars that are widely used in construction. Cement is distributed in bags, totes and bulk shipment.

Note: This MSDS covers many types of Portland cement. Individual composition of hazardous constituents will vary between types of Portland cement.

Section 2: COMPOSITION/INFORMATION ON INGREDIENTS

Component	Percent (By Weight)	CAS Number	OSHA PEL -TWA (mg/m^3)	ACGIH TLV-TWA (mg/m^3)	LD_{50} (mouse, intraperitoneal)	LC_{50}
Portland Cement*	100	65997-15-1	15 (T); 5 (R)	10 (R)	NA	NA
Calcium Sulfate*	2-10	13397-24-5	15 (T); 5 (R)	10 (T)	NA	NA
Calcium Carbonate*	0-5	1317-65-3	15 (T); 5 (R)	10 (T)	NA	NA
Calcium Oxide	0-5	1305-78-8	5 (T)	2 (T)	3059 mg/kg	NA
Magnesium Oxide	0-4	1309-48-4	15 (T)	10 (T)	NA	NA
Crystalline Silica	0-0.2	14808-60-7	[(10) / (%SiO_2+2)] (R); [(30) / (%SiO_2+2)] (T)	0.05 (R)	NA	NA

Note: Exposure limits for components noted with an * contain no asbestos and <1% crystalline silica

Cement is made from materials mined from the earth and is processed using energy provided by fuels. Trace amounts of chemicals may be detected during chemical analysis. For example, cement may contain trace amounts of calcium oxide (also known as free lime or quick lime), free magnesium oxide, potassium and sodium sulfate compounds, chromium compounds, nickel compounds, and other trace compounds.

Section 3: HAZARD IDENTIFICATION

WARNING

Corrosive - Causes severe burns.
Toxic - Harmful by inhalation.
(Contains crystalline silica)

Use proper engineering controls, work practices, and personal protective equipment to prevent exposure to wet or dry product.

Read MSDS for details.

Section 3: HAZARD IDENTIFICATION (continued)

Emergency Overview: Cement is a solid, grey, off white, or white odorless powder. It is not combustible or explosive. A single, short-term exposure to the dry powder presents little or no hazard. Exposure of sufficient duration to wet cement, or to dry cement on moist areas of the body, can cause serious, potentially irreversible tissue (skin, eye, respiratory tract) damage due to chemical (caustic) burns, including third degree burns.

Potential Health Effects:

Eye Contact: Airborne dust may cause immediate or delayed irritation or inflammation. Eye contact with large amounts of dry powder or with wet cement can cause moderate eye irritation, chemical burns and blindness. Eye exposures require immediate first aid and medical attention to prevent significant damage to the eye.

Skin Contact: Cement may cause dry skin, discomfort, irritation, severe burns, and dermatitis.

Burns: Exposure of sufficient duration to wet cement, or to dry cement on moist areas of the body, can cause serious, potentially irreversible damage to skin, eye, respiratory and digestive tracts due to chemical (caustic) burns, including third degree burns. A skin exposure may be hazardous even if there is no pain or discomfort.

Dermatitis: Cement is capable of causing dermatitis by irritation and allergy. Skin affected by dermatitis may include symptoms such as, redness, itching, rash, scaling, and cracking.

Irritant dermatitis is caused by the physical properties of cement including alkalinity and abrasion.

Allergic contact dermatitis is caused by sensitization to hexavalent chromium (chromate) present in cement. The reaction can range from a mild rash to severe skin ulcers. Persons already sensitized may react to the first contact with cement. Others may develop allergic dermatitis after years of repeated contact with cement.

Inhalation (acute): Breathing dust may cause nose, throat or lung irritation, including choking, depending on the degree of exposure. Inhalation of high levels of dust can cause chemical burns to the nose, throat and lungs.

Inhalation (chronic): Risk of injury depends on duration and level of exposure.

Silicosis: This product contains crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica from this product can cause silicosis, a seriously disabling and fatal lung disease. See Note to Physicians in Section 4 for further information.

Carcinogenicity: Cement is not listed as a carcinogen by IARC or NTP; however, cement contains trace amounts of crystalline silica and hexavalent chromium which are classified by IARC and NTP as known human carcinogens.

Autoimmune Disease: Some studies show that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis may be associated with the increased incidence of several autoimmune disorders such as scleroderma (thickening of the skin), systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys.

Tuberculosis: Silicosis increases the risk of tuberculosis.

Renal Disease: Some studies show an increased incidence of chronic kidney disease and end-stage renal disease in workers exposed to respirable crystalline silica.

Section 3: HAZARD IDENTIFICATION (continued)

Ingestion: Do not ingest cement. Although ingestion of small quantities of cement is not known to be harmful, large quantities can cause chemical burns in the mouth, throat, stomach, and digestive tract.

Medical Conditions Aggravated by Exposure: Individuals with lung disease (e.g. bronchitis, emphysema, COPD, pulmonary disease) or sensitivity to hexavalent chromium can be aggravated by exposure.

Section 4: FIRST AID MEASURES

Eye Contact: Rinse eyes thoroughly with water for at least 15 minutes, including under lids, to remove all particles. Seek medical attention for abrasions and burns.

Skin Contact: Wash with cool water and a pH neutral soap or a mild skin detergent. Seek medical attention for rash, burns, irritation, dermatitis, and prolonged unprotected exposures to wet cement, cement mixtures or liquids from wet cement.

Inhalation: Move person to fresh air. Seek medical attention for discomfort or if coughing or other symptoms do not subside.

Ingestion: Do not induce vomiting. If conscious, have person drink plenty of water. Seek medical attention or contact poison control center immediately.

Note to Physician: The three types of silicosis include:

- Simple chronic silicosis – which results from long-term exposure (more than 20 years) to low amounts of respirable crystalline silica. Nodules of chronic inflammation and scarring provoked by the respirable crystalline silica form in the lungs and chest lymph nodes. This disease may feature breathlessness and may resemble chronic obstructive pulmonary disease (COPD).
- Accelerated silicosis – occurs after exposure to larger amounts of respirable crystalline silica over a shorter period of time (5-15 years). Inflammation, scarring, and symptoms progress faster in accelerated silicosis than in simple silicosis.
- Acute silicosis – results from short-term exposure to very large amounts of respirable crystalline silica. The lungs become very inflamed and may fill with fluid, causing severe shortness of breath and low blood oxygen levels.

Progressive massive fibrosis may occur in simple or accelerated silicosis, but is more common in the accelerated form. Progressive massive fibrosis results from severe scarring and leads to the destruction of normal lung structures.

Section 5: FIREFIGHTING MEASURES

Flashpoint & Method: Non-combustible

General Hazard: Avoid breathing dust. Wet cement is caustic.

Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Firefighting Equipment: Cement poses no fire-related hazard. A SCBA is recommended to limit exposures to combustion products when fighting any fire.

Combustion Products: None.

Section 6: ACCIDENTAL RELEASE MEASURES

General: Place spilled material into a container. Avoid actions that cause the cement to become airborne. Avoid inhalation of cement and contact with skin. Wear appropriate protective equipment as described in Section 8. Scrape wet cement and place in container. Allow material to dry or solidify before disposal. Do not wash cement down sewage and drainage systems or into bodies of water (e.g. streams).

Waste Disposal Method: Dispose of cement according to Federal, State, Provincial and Local regulations.

Section 7: HANDLING AND STORAGE

General: Keep bulk and bagged cement dry until used. Stack bagged material in a secure manner to prevent falling. Bagged cement is heavy and poses risks such as sprains and strains to the back, arms, shoulders and legs during lifting and mixing. Handle with care and use appropriate control measures.

Engulfment hazard. To prevent burial or suffocation, do not enter a confined space, such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains cement. Cement can buildup or adhere to the walls of a confined space. The cement can release, collapse or fall unexpectedly.

Properly ground all pneumatic conveyance systems. The potential exists for static build-up and static discharge when moving cement powders through a plastic, non-conductive, or non-grounded pneumatic conveyance system. The static discharge may result in damage to equipment and injury to workers.

Usage: Cutting, crushing or grinding hardened cement, concrete or other crystalline silica-bearing materials will release respirable crystalline silica. Use all appropriate measures of dust control or suppression, and Personal Protective Equipment (PPE) described in Section 8 below.

Housekeeping: Avoid actions that cause the cement to become airborne during clean-up such as dry sweeping or using compressed air. Use HEPA vacuum or thoroughly wet with water to clean-up dust. Use PPE described in Section 8 below.

Storage Temperature: Unlimited. **Storage Pressure:** Unlimited.

Clothing: Promptly remove and launder clothing that is dusty or wet with cement. Thoroughly wash skin after exposure to dust or wet cement.

Section 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls: Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits.

Personal Protective Equipment (PPE):

Respiratory Protection: Under ordinary conditions no respiratory protection is required. Wear a NIOSH approved respirator that is properly fitted and is in good condition when exposed to dust above exposure limits.

Eye Protection: Wear ANSI approved glasses or safety goggles when handling dust or wet cement to prevent contact with eyes. Wearing contact lenses when using cement, under dusty conditions, is not recommended.

Section 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION (continued)

Skin Protection: Wear gloves, boot covers and protective clothing impervious to water to prevent skin contact. Do not rely on barrier creams, in place of impervious gloves. Remove clothing and protective equipment that becomes saturated with wet cement and immediately wash exposed areas.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid (powder).	**Evaporation Rate:**	NA.
Appearance:	Gray, off white or white powder.	**pH (in water):**	12 – 13
Odor:	None.	**Boiling Point:**	>1000° C
Vapor Pressure:	NA.	**Freezing Point:**	None, solid.
Vapor Density:	NA.	**Viscosity:**	None, solid.
Specific Gravity:	3.15	**Solubility in Water:**	Slightly (0.1 - 1.0%)

Section 10: STABILITY AND REACTIVITY

Stability: Stable. Keep dry until use. Avoid contact with incompatible materials.

Incompatibility: Wet cement is alkaline and is incompatible with acids, ammonium salts and aluminum metal. Cement dissolves in hydrofluoric acid, producing corrosive silicon tetrafluoride gas. Cement reacts with water to form silicates and calcium hydroxide. Silicates react with powerful oxidizers such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride.

Hazardous Polymerization: None. **Hazardous Decomposition:** None.

Section 11 and 12: TOXICOLOGICAL AND ECOLOGICAL INFORMATION

For questions regarding toxicological and ecological information refer to contact information in Section 1.

Section 13: DISPOSAL CONSIDERATIONS

Dispose of waste and containers in compliance with applicable Federal, State, Provincial and Local regulations.

Section 14: TRANSPORT INFORMATION

This product is not classified as a Hazardous Material under U.S. DOT or Canadian TDG regulations.

Section 15: REGULATORY INFORMATION

OSHA/MSHA Hazard Communication: This product is considered by OSHA/MSHA to be a hazardous chemical and should be included in the employer's hazard communication program.

CERCLA/SUPERFUND: This product is not listed as a CERCLA hazardous substance.

EPCRA SARA Title III: This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 and is considered a hazardous chemical and a delayed health hazard.

EPRCA SARA Section 313: This product contains none of the substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Section 15: REGULATORY INFORMATION (continued)

RCRA: If discarded in its purchased form, this product would not be a hazardous waste either by listing or characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

TSCA: Portland cement and crystalline silica are exempt from reporting under the inventory update rule.

California Proposition 65: Crystalline silica (airborne particulates of respirable size) and Chromium (hexavalent compounds) are substances known by the State of California to cause cancer.

WHMIS/DSL: Products containing crystalline silica and calcium carbonate are classified as D2A, E and are subject to WHMIS requirements.

Section 16: OTHER INFORMATION

Abbreviations:

>	Greater than	NA	Not Applicable
ACGIH	American Conference of Governmental Industrial Hygienists	NFPA	National Fire Protection Association
CAS No	Chemical Abstract Service number	NIOSH	National Institute for Occupational Safety and Health
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	NTP	National Toxicology Program
		OSHA	Occupational Safety and Health Administration
CFR	Code for Federal Regulations	PEL	Permissible Exposure Limit
CL	Ceiling Limit	pH	Negative log of hydrogen ion
DOT	U.S. Department of Transportation	PPE	Personal Protective Equipment
EST	Eastern Standard Time	R	Respirable Particulate
HEPA	High-Efficiency Particulate Air	RCRA	Resource Conservation and Recovery Act
HMIS	Hazardous Materials Identification System	SARA	Superfund Amendments and Reauthorization Act
IARC	International Agency for Research on Cancer	T	Total Particulate
		TDG	Transportation of Dangerous Goods
LC_{50}	Lethal Concentration	TLV	Threshold Limit Value
LD_{50}	Lethal Dose	TWA	Time Weighted Average (8 hour)
mg/m^3	Milligrams per cubic meter	WHMIS	Workplace Hazardous Materials Information System
MSHA	Mine Safety and Health Administration		

This MSDS (Sections 1-16) was revised on March 3, 2005.

An electronic version of this MSDS is available at: www.lafarge-na.com under the Products section.

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