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MATERIAL SAFETY DATA SHEET

Effective Date: 5-08
 Replaces: 12-1-97

I – PRODUCT AND COMPANY IDENTIFICATION		
CHEMICAL NAME Not Applicable	CHEMICAL FORMULA Mixture	MOLECULAR WEIGHT Not Applicable
TRADE NAME Cement-Treated Base		
SYNONYMS CTB		DOT IDENTIFICATION NO. None

II – COMPOSITION/INFORMATION ON INGREDIENTS				
COMPONENT(S) CHEMICAL NAME	CAS REGISTRY NO	% by weight (approx)	MSHA/OSHA PEL	ACGIH TLV-TWA
Aggregate (limestone, granite, traprock)*	Mixture	70-90	NA	NA
Hydraulic (Portland) Cement	65997-15-1	5-8	(T) 15 mg/m ³ / (R) 5 mg/m ³	10 mg/m ³ †
Flash (Fly Ash)	68131-74-8	0-2	N/A	NA
Water	7732-18-5	5-10	N/A	N/A
Crystalline Silica	14808-60-7	>1	(R) 10 mg/m ³ / (%SiO ₂ +2) §	0.025 mg/m ³

* Particulates (Not Otherwise Regulated). (T): Total. (R): Respirable. §: Crystalline silica is normally measured as respirable dust. The OSHA standard also presents a formula for calculation of the PEL based on total dust: 30 mg/m³ / (% SiO₂ +2). †: Applicable if no asbestos and < 1% crystalline silica.

III – HAZARDS IDENTIFICATION
<p>Cement-treated base (CTB) is a general term that applies to a mixture of native soils and/or manufactured aggregates with measured amounts of portland cement and water that is compacted and cured to form a strong, durable, frost-resistant paving material. It is odorless and not flammable. Respirable dust particles containing silicon dioxide may be generated when using cement-treated base. Inhalation of excessive particulate matter may cause respiratory problems. Crystalline silica, a component of this product, has been designated as a Group I carcinogen by IARC. The NTP has listed respirable crystalline silica as a known human carcinogen and the ACGIH has listed respirable crystalline silica as a suspected human carcinogen (A-2 designation). OSHA does not list crystalline silica as a carcinogen. Portland Cement is not listed as carcinogen on the NTP, IARC or OSHA list of carcinogens, however Portland Cement may contain trace amounts of hexavalent chromium [Cr(VI)] and certain chromium compounds which are listed in the NTP and IARC lists of carcinogens. The total amounts of chromium and chromium compounds in Portland Cement are typically less than 0.003% and hexavalent chromium less than 0.001%.</p> <p>After product has cured further handling or processing may generate dust. Cement is hygroscopic (absorbs and retains water) and wet cement is caustic (pH approximately 12).</p> <p>Health Effects: The information below represents an overview of health effects caused by overexposure to one or more components in cement-treated base. The individual effects are described in Section XI.</p> <p>Primary routes(s) of exposure: ■ Inhalation ■ Skin ■ Ingestion</p>

SKIN: Contact with wet cement has caused abrasion of the skin, and contact dermatitis (cement dermatitis), the symptoms of which may include erythema (reddening), irritation, and rash. Drying and cracking of the skin and nails may also occur. More severe effects can occur, including chemical (caustic) burns and skin ulcers. Precautions must be observed because acute effects may occur with little or no warning. Exposure to concrete dust may irritate skin.

Hydraulic cement may contain trace amounts (0.1%) of chromium, including hexavalent chromates. Chromates have been associated with contact dermatitis and skin ulcerations. Some individuals may become allergically sensitized to chromates, and subsequent contact with chromium compounds may result in an allergic reaction in these persons.

EYES: Contact with wet cement has caused chemical (caustic) burns and irritation of the eyes. Exposure to cement dust may irritate eyes.

INGESTION: Ingestion is considered unlikely, but could cause chemical (caustic) burns on contacted tissues.

INHALATION: Exposure to dust may irritate the respiratory system.

Silicosis:

Use of cement-treated base for construction purposes is not believed to cause additional acute toxic effects. Repeated overexposures to respirable crystalline silica (quartz, cristobalite, tridymite) for periods as short as 6 months has caused acute silicosis.

Symptoms of acute silicosis include (but are not limited to): shortness of breath, cough, fever, weight loss, and chest pain. Acute silicosis is a rapidly progressive, incurable lung disease and is typically fatal.

Chronic exposure to respirable quartz-containing dust in excess of appropriate exposure limits has caused silicosis, a progressive pneumoconiosis (lung disease). Restrictive and/or obstructive lung function changes may result from chronic exposure.

Lung Cancer:

Crystalline silica is classified by the International Agency For Research on Cancer (IARC) as a carcinogenic to humans (Group 1). Prolonged and repeated breathing of silica may cause lung cancer.

Tuberculosis:

Silicosis increases the risk of tuberculosis.

Autoimmune and Chronic Kidney Disease:

Some studies show excess number of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in worker exposed to respirable crystalline silica.

Non-Malignant Respiratory Diseases (other than Silicosis):

Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to crystalline silica.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Inhaling respirable dust and/or crystalline silica may aggravate existing respiratory system disease(s) and/or dysfunctions.

Exposure to dust may aggravate existing skin and/or eye conditions. Smoking and obstructive / restrictive lung diseases may also exacerbate the effects of excessive exposure to this product.

IV – FIRST AID MEASURES

Skin:	Wash affected areas thoroughly with soap and water. For minor irritation, apply a lanolin-containing cream to skin after washing. Seek medical attention if irritation persists or later develops. Burns should be treated as caustic burns.
Eyes:	Flush eyes immediately with plenty of water for at least 15 minutes, lifting the lower and upper lids occasionally. Beyond flushing, do not attempt to remove material from the eye(s). Seek medical attention immediately.
Ingestion:	If conscious, drink large amount of water. Induce vomiting; however, never attempt to make an unconscious person drink or vomit. Seek medical attention immediately

Inhalation: Remove to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or later develops.

V – FIRE FIGHTING MEASURES

FLASHPOINT

Not Flammable

FLAMMABLE LIMITS IN AIR

Not Flammable

EXTINGUISHING AGENT

None required

UNUSUAL FIRE AND EXPLOSION HAZARD

Contact with powerful oxidizing agents may cause fire and/or explosions (see Section X of this MSDS).

VI – ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Persons involved in cleaning should first follow the precautions defined in Section VII of the MSDS. Wet product should be removed from roads or other surfaces where it may interfere with traffic. Wet product should not be allowed to spill into sewers or drainage systems where it can harden and clog flow.

None of the components in this product are subject to the reporting requirements of Title III of SARA, 1986, and 40 CFR 372.

Material can be retained until it hardens, when it can be disposed of as common waste. However, disposal must be in compliance with all applicable federal, state, and local laws and regulations. Caution should be exercised to minimize the generation of dust during handling of hardened product.

VII – HANDLING AND STORAGE

Follow protective controls set forth in Section VIII of this MSDS when handling this product. Every attempt should be made to avoid skin and eye contact with CTB. Respirable dust may be generated when hardened product is subjected to mechanical forces, such as in demolition work and surface treatment (sanding, grooving, chiseling, etc.).

Avoid contact with skin and eyes.

Do not store near food or beverages or smoking materials.

Do not stand on piles of materials; it may be unstable.

VIII – EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Ventilation: Ordinarily not required when working with wet product. Activities that generate dust from hardened product require the use of local exhaust or general ventilation adequate to maintain exposures below appropriate exposure limits.

Ample water should always be readily available for skin and (emergency) eye washing. Clothing should be washed between uses. Respirable dust levels should be monitored regularly for activities which generate dust from hardened product. Dust levels in excess of appropriate exposure limits should be reduced by all feasible engineering controls, including (but not limited to) wet suppression, ventilation, process enclosures and enclosed employee work stations.

EYE/FACE PROTECTION

Safety glasses with side shields should be worn as minimum protection. Goggles or face shield should be worn whenever possible. Dust goggles should be worn when excessively (visible) dusty conditions are present or are anticipated due to working with hardened product.

SKIN PROTECTION

Waterproof gloves, rubber boots and clothing sufficient to protect the skin from contact with fresh cement should be worn. Clothing saturated from contact with wet cement should be removed promptly to prevent continued contact with skin.

RESPIRATORY PROTECTION

Respirator Recommendations:

For respirable quartz levels that exceed or are likely to exceed appropriate exposure limits, a NIOSH-approved 100 series particulate filter respirator must be worn. If respirable quartz levels exceed or are likely to exceed an 8 hour-TWA of 0.5 mg/m³, a NIOSH-approved air purifying, full-face respirator with a 100 series particulate filter must be worn. Respirator use must comply with applicable MSHA or OSHA standards, which include provisions for a user training program, respirator repair and cleaning, respirator fit testing, and other requirements. For additional information contact NIOSH at 1-800-356-4674.

Emergency or planned entry into unknown concentrations or IDLH conditions: Any self-contained breathing apparatus that has a full-face piece and is operated in a pressure-demand or other positive-pressure mode or any supplied-air respirator that has a full-face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus.

Escape from unknown or IDLH conditions: Any air-purifying, full-face piece respirator with a high-efficiency particulate filter or any appropriate escape-type, self-contained breathing apparatus.

GENERAL HYGIENE CONSIDERATIONS

Skin should be kept free of wet cement. Wash hands thoroughly before eating, smoking, and using toilet facilities. After working with cement, workers should shower with soap and water. Clean clothing should be worn after showering.

IX – PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR

Gray, plastic, flowable, granular mixture. Size from pebbles to boulders. Odorless.

SPECIFIC GRAVITY.

2.3 – 3.0

BOILING POINT

Not applicable

VAPOR DENSITY IN AIR (AIR = 1)

Not applicable

VAPOR PRESSURE

17.5 mmHg @ 20°C

% VOLATILE, BY VOLUME

<10%

EVAPORATION RATE

Similar to Water

SOLUBILITY IN WATER

Not Applicable

X – STABILITY AND REACTIVITY

STABILITY

Stable

CONDITIONS TO AVOID

Contact with incompatible materials (see below).

INCOMPATIBILITY (Materials to avoid)

Contact with powerful oxidizing agents such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride may cause fire and/or explosions. Silica dissolves in hydrofluoric acid producing a corrosive gas-silicon tetrafluoride. Wet Portland cement is caustic (pH approximately 12) and could react with strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS POLYMERIZATION

Not known to polymerize.

XI – TOXICOLOGICAL INFORMATION

This product is a mixture of components. The composition percentages are listed in Section II. Toxicological information for each component is listed below:

Chronic exposure to wet cement has caused chronic dermatitis, the symptoms of which may include erythema (reddening), skin irritation, and eczematous rashes. Drying, thickening, and cracking of the skin and nails may also occur. Irritated or broken skin is more likely to develop further complications such as ulcers and infection, and may increase the chance of absorbing toxic materials into the body through the skin.

Individuals who become allergically sensitized to hexavalent chromates may experience an allergic reaction upon subsequent contact with those compounds (delayed Type IV hypersensitivity reaction).

The chronic toxicity effects described above have been associated with exposure to wet cement. Once the product has set and hardened, these effects are extremely unlikely to occur; hardened cement base poses no known health hazard. If hardened product is subjected to mechanical force (such as in demolition work) which generate dust particles, exposure to respirable quartz dust is possible. Chronic exposure to respirable dust in excess of appropriate exposure limits has caused pneumoconiosis (lung disease). Chronic exposure to respirable quartz-containing dust in excess of appropriate exposure limits has caused silicosis, a progressive pneumoconiosis. Chronic tobacco smoking may further increase the risk of developing chronic lung problems.

Limestone, Granite, Traprock:

Exposure Route: Eyes, skin, inhalation, ingestion.

Target Organs: Eyes, skin, respiratory system.

Acute Effect: Direct eye and skin contact with dust may cause irritation by mechanical abrasion. Dusts may irritate the nose, throat, and respiratory tract by mechanical abrasion or corrosive action. Coughing, sneezing, chest pain, shortness of breath, inflammation of mucous membrane, and flu-like fever may occur following exposures in excess of appropriate exposure limits. Small amounts (a tablespoonful) swallowed during normal handling operations are not likely to cause injury. Ingestion of large amounts may cause gastrointestinal irritation and blockage.

Chronic Effect: Repeated exposure to respirable dust in excess of appropriate exposure limits has caused silicosis, a progressive pneumoconiosis (lung disease) and lung cancer. Restrictive and/or obstructive lung function changes may result from chronic exposure. Chronic tobacco smoking may further increase the risk of developing chronic lung problems.

Portland Cement:

Exposure Routes: inhalation, ingestion, skin and/or eye contact

Target Organs: Eyes, skin, respiratory system.

Acute Effect: Exposure to dry portland cement may cause drying of the skin and mild irritation, or more significant effects from the aggravation of other conditions. Wet portland cement is caustic (pH > 12) and dermal exposure may cause more severe skin effects, including thickening, cracking or fissuring of the skin. Eye exposures to portland cement may cause immediate or delayed irritation or inflammation of the cornea. Eye contact with larger amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns and blindness. Inhalation of dry portland cement may cause irritation to the moist mucous membranes of the nose, throat and upper respiratory system, or may cause or aggravate certain lung diseases or conditions.

Chronic Effect: Prolonged exposure can cause severe skin damage in the form of chemical (caustic) burns. Portland cement is not listed as carcinogenic on the NTP, IARC or OSHA list of carcinogens, however Portland cement may contain trace amounts of hexavalent chromium [Cr(VI)] and certain chromium compounds which are listed on the NTP and IARC lists of carcinogens. The total amounts of chromium and chromium compounds in Portland cement are typically less than 0.003% and hexavalent chromium is less than 0.001%.

Some individuals who are exposed to portland cement may exhibit an allergic response, which can result in symptoms ranging from mild rashes to severe skin ulcers. Cement dermatitis may be irritant contact dermatitis induced by the alkaline, abrasive, and hygroscopic (water-absorbing) properties of portland cement, or it may be allergic contact dermatitis elicited by an immunological reaction to Cr(VI), or it may be a combination of the two.

Fly Ash:

Fly ash is a mixture of components. The toxicology for this compound is encompassed above under limestone due its similar chemical composition.

Crystalline Silica: In some batches, crystalline silica may represent up to 100% of silicon dioxide.

Respirable (R) crystalline silica (quartz):

ACGIH TLV= 0.025 mg/m³

MSHA and OSHA PEL:

Crystalline quartz (R): PEL-TWA 10 mg/m³ (%SiO₂ + 2).

Other Particulates: TLV = 10 mg/m³ (inhalable/total particulate, not otherwise classified), TLV = 3 mg/m³ (respirable particulate, not otherwise classified), OSHA PEL = 15 mg/m³ (total particulate, not otherwise regulated), OSHA PEL = 5 mg/m³ (respirable particulate, not otherwise regulated)

ACGIH, MSHA, and OSHA have determined that adverse effects are not likely to occur in the workplace provided exposure levels do not exceed the appropriate exposure limits. Lower exposure limits may be appropriate for some individuals including persons with pre-existing medical conditions such as those described below.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Inhaling respirable dust and/or crystalline silica may aggravate existing respiratory system disease(s) and/or dysfunctions.

Exposure to dust may aggravate existing skin and/or eye conditions.

Occupational exposure to free silica is known to produce silicosis, a chronic, disabling lung disease characterized by the formation of silica-containing nodules of scar tissue in the lungs. Simple silicosis, in which the nodules are less than 1 cm in diameter is generally asymptomatic but can be slowly progressive, even in the absence of continued exposure.

Silicosis leads to conditions such as lung fibrosis and reduced pulmonary function. The form and severity in which silicosis manifests itself depends in part on the type and extent of exposure to silica dusts: chronic, accelerated and acute forms are all recognized. In later stages the critical condition may become disabling and potentially fatal. Restrictive and/or obstructive lung function changes may result from chronic exposure. A risk associated with silicosis is development of pulmonary tuberculosis (silico-tuberculosis). Respiratory insufficiencies due to massive fibrosis and reduced pulmonary function, possibly with accompanying heart failure, are other potential causes of death due to silicosis.

Symptoms of Silicosis: Not all individuals with silicosis will exhibit symptoms (signs) of the disease. However, silicosis can be progressive, and symptoms may potentially appear years after exposures have ceased. Symptoms of silicosis may include (but are not limited to): Shortness of breath; difficulty breathing with or without exertion; coughing; diminished work capacity; diminished chest expansion; reduction of lung volume; heart enlargement and/or failure.

Respirable dust containing newly broken particles has been shown to be more hazardous to animals in laboratory tests than respirable dust containing older silica particles of similar size. Respirable silica particles which had aged for sixty days or more showed less lung injury in animals than equal exposures of respirable dust containing newly broken pieces of silica.

There are reports in the literature indicating that crystalline silica exposure may be associated with adverse health effects involving the kidney, scleroderma (thickening of the skin caused by swelling and thickening of fibrous tissue) and other autoimmune and immunity-related disorders. Several studies of persons with silicosis or silica exposure also indicate or suggest increased risk of developing lung cancer, a risk that may increase with the duration of exposure. Many of these studies of silicosis do not account for lung cancer confounders, especially smoking. In October 1996, an IARC Working group re-assessing crystalline silica, a component of this product, designated crystalline silica as a human carcinogen (Group 1 carcinogen). The NTP indicates that crystalline silica is reasonably anticipated to be a human carcinogen (Group 2). These classifications are based on sufficient evidence of carcinogenicity in certain experimental animals and epidemiological studies of workers exposed to crystalline silica. Crystalline silica in October 1996 was listed on the Safe Drinking Water and Toxic Enforcement ACT of 1986 (California Proposition 65) as a chemical known to the state to cause cancer or reproductive toxicity.

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XII – ECOLOGICAL INFORMATION

No data available

XIII – DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

None of the components in this product are subject to the reporting requirements of Title III of SARA, 1986, and 40 CFR 372.

Material can be retained until it hardens, when it can be disposed of as common waste. However, disposal must be in compliance with all applicable federal, state, and local laws and regulations. Caution should be exercised to minimize the generation of dust during handling of hardened product.

XIV – TRANSPORT INFORMATION**DOT HAZARD CLASSIFICATION**

None

PLACARD REQUIRED

None

LABEL REQUIRED

Label as required by the OSHA Hazard Communication standard [29 CFR 1910.1200(f) and 30 CFR Part 42], and applicable state and local regulations.

XV – REGULATORY INFORMATION

Crystalline silica, a component of this product, is on the NTP and IARC carcinogen lists, but not on the OSHA carcinogen list. In October 1996, an IARC Working group re-assessing crystalline silica, a component of this product, designated crystalline silica as a human carcinogen (Group 1 carcinogen). The NTP indicates that crystalline silica is reasonably anticipated to be a human carcinogen (Group 2).

Portland cement is not listed as carcinogenic on the NTP, IARC or OSHA list of carcinogens, however Portland cement may contain trace amounts of hexavalent chromium [Cr(VI)] and certain chromium compounds which are listed in the NTP and IARC lists of carcinogens.

Crystalline silica and hexavalent chromium are listed on the Safe Drinking Water and Toxic Enforcement ACT of 1986 (California Proposition 65) as chemicals known to the State to cause cancer or reproductive toxicity.

XVI – OTHER INFORMATION

ACGIH: American Conference of Governmental Industrial Hygienists

CFR: US Code of Federal Regulations

DOT: US Department of Transportation

IARC: International Agency for Research on Cancer

IDLH: Immediately Dangerous to Life and Health

NIOSH: National Institute for Occupational Safety and Health, US Department of Health and Human Services

NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration, US Department of Labor
PEL: Permissible Exposure Limit
SARA Title III: Title III of the Superfund Amendments and Reauthorization Act, 1986
TLV: Threshold Limit Value
TWA: Time-weighted Average

FOR FURTHER INFORMATION

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DATE OF PREPARATION 5/08

NOTICE: Martin Marietta Materials believes that the information contained on this Material Safety Data Sheet is accurate. The suggested precautions and recommendations are based on recognized good work practices and experience as of the date of publication. They are not necessarily all-inclusive or fully adequate in every circumstance as not all use circumstances can be anticipated. Also, the suggestions should not be confused with nor followed in violation of applicable laws, regulation, rules or insurance requirement. However, product must not be used in a manner which could result in harm.

NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE IS MADE

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