MATERIAL SAFETY DATA SHEET

Material: Portland Cement

Section I – Identification

Supplier: **Name:** Holcim (US) Inc. **Address:** 201 Jones Road Waltham, MA 02451 **Telephone:** (781) 647-2307	**Emergency Contact Information: (CHEMTREC)** **Health 1-800-424-9300** **Transportation 1-800-424-9300**
Product Codes: Portland Cement Type I, IA, II, IIA, III, IIIA, IV, IVA, V, VA, White Cement. CSA Type GU, MS, HE, LH, HS. This MSDS covers many products. Individual constituents will vary.	**Formula:** This product consists of finely ground Portland cement clinker mixed with a small amount of calcium sulfate (gypsum).
Chemical Family: Chemical compounds. Calcium silicate components and other calcium compounds containing iron and aluminum make up the majority of this product.	**Chemical Name and Synonyms:** Portland cement. Portland cement is also known as hydraulic cement.

Section II - Components

Hazardous Ingredients

Component (%)	CAS No.	OSHA PEL (8-hour TWA)[1]	ACGIH TLV[2]
Portland cement (100)	65997-15-1	15 mg/m^3 (T); 5 mg/m^3 (R)[3]	None[3]
Tri-calcium silicate (20-70)	12168-85-3	15 mg/m^3 (T); 5 mg/m^3 (R)[3]	None[3]
Di-calcium silicate (10-60)	10034-77-2	15 mg/m^3 (T); 5 mg/m^3 (R)[3]	None[3]
Tetra-calcium- alumino-ferrrite (5-15)	12068-35-8	15 mg/m^3 (T); 5 mg/m^3 (R)[3]	None[3]
Gypsum (Calcium Sulfate)[4] (2-10)	13397-24-5	15 mg/m^3 (T); 5 mg/m^3 (R)	10 mg/m^3 (T)
Tri-calcium Aluminate (1-15)	12042-78-3	15 mg/m^3 (T); 5 mg/m^3 (R)[3]	None[3]
Limestone (Calcium Carbonate)[4] (0 -20)	1317-65-3	15 mg/m^3 (T); 5 mg/m^3 (R)	10 mg/m^3 (T)
Magnesium oxide (0-4)	1309-48-4	15 mg/m^3	10 mg/m^3 (I)
Nuisance Dusts (Particulates not otherwise regulated)	None	15 mg/m^3 (T); 5 mg/m^3 (R)[3]	None[3]
Crystalline Silica (Quartz)[5] (0-1)	14808-60-7	10 mg/m^3 (R) /(percent silica + 2) 30 mg/m^3 (T) /(percent silica + 2)	0.025 mg/m^3 (R)

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Symbology Used:

(I) = Measured as inhalable fraction of the aerosol (see 2010 ACGIH-TLV Booklet for Additional Information)
(R) = Measured as respirable fraction
(T) = Total particulate; OSHA's Particulates Not Otherwise Regulated (PNOR); or ACGIH's Particulates Not Otherwise Classified (PNOC)
(E) = For particulate matter containing no asbestos and <1% crystalline silica.

Trace constituents: Cement is made from materials mined from the earth and processed using energy provided by fuels. Additional materials, such as fly ash, kiln dust and slag may also be introduced into the cement manufacturing process. A chemical analysis of cement may reveal trace amounts of naturally occurring but potentially harmful chemical compounds such as free crystalline silica, organic compounds, potassium and sodium compounds, heavy metals including cadmium, chromium (including hexavalent chromium), nickel and lead. Other trace constituents may include calcium oxide (also known as free lime or quick lime) and organic compounds from grinding aids such as amine acetate salts, glycols and 1,2-ethanediol.

[1] U.S. Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs) are based on Occupational Safety and Health Standards (29 CFR 1910.1000-1052) established at the time this MSDS was last updated.

[2] American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs) were taken from the 2010 publication of the *Guide to Occupational Exposure Values* established at the time this MSDS was last updated. Any component with no defined TLV designation is listed as "none."

[3] OSHA standards (29 CFR 1910.1000 Table Z-1), defined these components as inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name in Table Z-1 are covered by PNOR limit which is the same as the inert or nuisance dust limit of Table Z-3 or ACGIH as PNOC.

[4] This product and various formulations of this generic component are also known by various synonyms and are assigned various CAS numbers. This MSDS does not attempt to list all possible synonyms, chemical formulations or multiple CAS numbers assigned to substances in this category of compounds.

[5] The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) is based on time-weighted average (TWA) concentration for up to a 10-hour workday during a 40-hour workweek. For this chemical NIOSH REL is 0.05 mg/m^3 respirable quartz dust.

Section III - Hazards Identification

Emergency Overview

Portland cement is a light gray, off white or white powder that poses little immediate hazard. It is not combustible or explosive. A single short-term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet portland cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry portland cement. Portland cement contains trace amounts of hexavalent chromium which has an OSHA Permissible Exposure Limit (PEL) (8-hour time weighted average) of 5 $\mu g/m^3$, an OSHA Action Level of 2.5 $\mu g/m^3$, and an ACGIH TLV of 10 $\mu g/m^3$.

Potential Health Effects

- *Relevant Routes of Exposure:* Eye contact, skin contact, inhalation, and ingestion
- *Effects resulting from eye contact:* Exposure to airborne dust may cause immediate or delayed irritation or inflammation. 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. Such exposures require immediate first aid (see section IV) and medical attention to prevent significant damage to the eye.
- *Effects resulting from skin contact:* Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly contact with wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred. Exposure to dry Portland cement may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Irritant dermatitis may be caused by the physical properties of cement including alkalinity and abrasion. Dry portland cement contacting wet skin or exposure to moist or wet portland cement 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 (caustic) chemical burns. Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace amounts of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to the first contact with the product. Other persons may experience this effect after years of contact with portland cement products.
- *Effects resulting from inhalation:* Portland cement may contain trace amounts of free crystalline silica. Prolonged exposure to respirable free crystalline silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease and/or other diseases. Risk of injury or disease depends on duration and degree of exposure. (Also see "Carcinogenic potential" below.) Some studies have shown 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. Silicosis increases the risk of tuberculosis and some studies have shown an increased incidence of chronic kidney disease and end-stage renal disease in workers exposed to respirable crystalline silica. Exposure to Portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.
- *Effects resulting from ingestion:* Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.
- *Carcinogenic potential: NTP, OSHA, or IARC has not listed Portland cement as a carcinogen*. It may, however, contain trace amounts of substances listed as carcinogens by these organizations. Crystalline silica and hexavalent chromium, which may be present in portland cement in small amounts, have been listed by IARC and the NTP as a known human carcinogen (Group I).
- *Medical conditions which may be aggravated by inhalation or dermal exposure*:
  - Pre-existing upper respiratory and lung diseases
  - Unusual (hyper) sensitivity to hexavalent chromium (chromium^{+6}) salts.

Section IV - First Aid

Eyes: Immediately flush eyes 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 a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, wet cement mixtures, wet concrete liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation of Airborne Dust: Remove to fresh air. Seek medical help if coughing or other symptoms do not subside. (Inhalation of gross amounts of portland cement requires immediate medical attention.)

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

Section V - Fire & Explosion Data

Flash point:	*None*	Auto ignition temperature:	*Not Combustible*
Lower Explosive Limit:	*None*	Upper Explosive Limit:	*None*
Extinguishing media:	*Not Combustible*	Unusual fire & explosion hazards	*None*
Hazardous combustion products:	*None*		

Special fire fighting procedures: None. (Although portland cement poses no fire-related hazards, a self-contained breathing apparatus is recommended to limit exposure to combustion products when fighting any fire.)

Section VI - Accidental Release Measures

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section VIII.
Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash portland cement down drains. Dispose of waste material according to local, state, and federal regulations.

Section VII - Handling & Storage

Keep portland cement dry until used. Normal temperatures and pressures do not affect the material. Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

Section VIII - Exposure Control/Personal Protection

Skin Protection: Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened wet portland cement products. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened portland cement products might occur, wear impervious clothing and gloves to prevent skin contact. Where required, wear sturdy boots that are impervious to water to eliminate foot and ankle exposure. Do not rely on barrier creams; barrier creams should not be used in place of gloves. Periodically wash areas contacted by dry portland cement or wet cement or concrete with a pH neutral soap. Wash again at the end of the work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean, dry clothing.

Respiratory protection: Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits. Use NIOSH/MSHA-approved (under 30 CFR 11) or NIOSH-approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after July 10, 1998, must be certified under 42 CFR 84.) Respirators should be used in accordance with the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Ventilation: Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection: In conditions where user may be exposed to splashes or puffs of cement, wear safety glasses with side shields or goggles that meet the ANSI Z87.1 standard. In extremely dusty or unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with portland cement or fresh cement products.

Section IX - Physical & Chemical Properties

Appearance:	*Gray, off white or white powder*	Vapor Pressure:	*Not applicable*
Odor:	*No distinct odor*	Vapor density:	*Not applicable*
Physical state:	*Solid (powder)*	Boiling point:	*Not applicable (i.e., > 1000 °C)*
pH (in water):	*12 to 13*		
Solubility in water:	*Slightly (0.1 to 1.0%)*	Melting point:	*Not applicable (Non combustible*
Evaporation Rate:	*Not applicable*		
		Specific gravity (H_2O = 1.0):	3.15

Section X - Stability & Reactivity

Stability:	*Stable.*
Incompatibility:	*Wet portland cement is alkaline. As such it is incompatible with acids, ammonium salts, and aluminum metal. Cement dissolves in hydrofluoric acid, producing corrosive silicon tetrafluoride gas.*
Conditions to avoid:	*Unintentional contact with water.*
Hazardous decomposition:	*Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide as a result of hydration.*
Hazardous polymerization:	*Will not occur.*

Section XI - Toxicological Information

For a description of available, more detailed toxicological information, contact Holcim (US) Inc. (in Section I).

Section XII - Ecological Information

Ecotoxicity:	*No recognized unusual toxicity to plants or animals*
Relevant physical and chemical properties:	*See Sections IX & X*

Section XIII – Disposal

Dispose of waste material according to local, state, and federal regulations. (Since portland cement is stable, uncontaminated material may be saved for future use.) Dispose of bags in an approved landfill or incinerator.

Section XIV - Transportation Data

Hazardous materials description/proper shipping name:	*Portland cement is not hazardous under U.S. Department of Transportation (DOT) regulations*
Hazard class:	*Not applicable*
Identification class:	*Not applicable*
Required label text:	*Not applicable*
Hazardous substances/reportable quantities (RQ):	*Not applicable*

Section XV - Other Regulatory Information

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200:	*Portland cement is considered a "hazardous chemical" under this regulation, and should be part of any hazard communication program.*
Status under CERCLA/Superfund, 40 CFR 117 and 302:	*Not listed.*
Hazard Category under SARA (Title III), Sections 311 & 312:	*Portland cement qualifies as a "hazardous substance" with delayed health effects.*
Status under SARA (Title III) Section 313:	*Not subject to reporting requirements under section 313.*
Status under TSCA (as of May 1997):	*Some substances in portland cement are on the TSCA inventory list.*
Status under the Federal Hazardous Substances Act:	*Portland cement is a "hazardous substance" subject to statutes promulgated under the subject act.*
Status under California Proposition 65:	*Portland cement contains chemicals (crystalline silica and trace metals) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do not exist.*
Status under Canadian Environmental Protection Act:	*Not listed.*
Workplace Hazardous Material Information System (Canada):	*Portland cement is considered to be a hazardous material under the Hazardous Product Act as defined by the Controlled Products Regulations (Class E - Corrosive Material) and is therefore subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).*

Section XVI - Other Information

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Reviewed by:	James Joyce, Corporate Manager Occupational Health, Safety, and Security
Approved by:	Russell Wiles, Senior Vice President Human Resources

Other important information: Portland cement should only be used by knowledgeable persons. While the information provided in the material safety data sheet is believed to provide a useful summary of the hazards of portland cement as it is commonly used, the sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

A key to using the product safely requires the user to recognize that portland cement chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while a portland cement product is "setting") pose a more severe hazard than does portland cement itself. These hazards include potential injuries to eyes and skin.

The data furnished in this sheet do not address hazards that may be posed by other materials mixed with portland cement to produce portland cement products. Users should review other relevant material safety data sheets before working with this portland cement or with portland cement products, including, for example, portland cement concrete.

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