



Material Safety Data Sheet (MSDS) Portland Cement

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Portland Cement (Types I, II, III, IV, V)
Chemical Family:	Calcium Compounds. Calcium silicate compounds and other calcium compounds containing iron and aluminum make up the majority of this product.
Chemical Name and Synonyms:	Portland Cement; also known as hydraulic cement.
Formula:	This product consists of finely ground Portland cement clinker mixed with a small amount of calcium sulfate (Gypsum).
Supplier/Manufacturer:	Drake Cement LLC 5745 N. Scottsdale Rd., Ste. B-135 Scottsdale, AZ 85250 (480) 219-6670
Emergency Contact Information:	David G. Chavez (Corporate Health and Safety Director): (480) 219-6670 (o); (602) 319-7572 (c) Derek Taylor (QA/QC Manager): (928) 636-6004 (o); (480) 797-9041 (c)

24 Hour Emergency Number: CHEMTREC 1-800-424-9300

SECTION 2: COMPOSITION, INFORMATION, AND INGREDIENTS

This product consists of finely ground portland cement clinker mixed with a small amount of gypsum (calcium sulfate dihydrate). The portland cement clinker is made by heating to a high temperature a mixture of substances such as limestone, sand, clay and shale. Portland cement is essentially hydraulic calcium silicates contained in a crystalline mass, not separable into individual components.

Major Compounds:	Tricalcium silicate	-3CaO-SiO ₂
	Dicalcium silicate	-2CaO-SiO ₂
	Tricalcium aluminate	-3CaOAl ₂ O ₃
	Tetracalcium aluminoferrite	-4CaO-Al ₂ O ₃ -Fe ₂ O ₃
	Calcium sulfate dehydrate (Gypsum)	

Portland Cement: (CAS# 65997-15-1) – approximately 94 % by weight
ACGIH TLV-TWA (1995-1996) = 10 mg total dust/m³
OSHA PEL (8-hour TWA) = 50 million particles/ft³

Gypsum: (CAS# 7778-18-9) – approximately 6 % by weight

ACGIH TLV-TWA (1995-1996) = 10 mg total dust/m³

OSHA PEL (8-hour TWA) = 10 mg total dust/m³

OSHA PEL (8-hour TWA) = 5 mg respirable dust/m³

Respirable Quartz: (CAS# 14808-60-7) – less than 0.75 % by weight

ACGIH TLV-TWA (1995-1996) = 0.10 mg respirable quartz dust/m³

OSHA PEL (8-hour TWA) = (10 mg of respirable dust/m³) / (percent silica + 2)

NIOSH REL (8-hour TWA) = 0.05 mg respirable quartz dust/m³

Other Ingredients:

Diethylene-glycol (CAS# 111-46-6) less than 0.1 % by weight.

Amine Phenolate (CAS# 23184-71-6 / 64601-03-2) less than 0.1 % by weight.

Trace Constituents:

Portland cement is made from materials mined from the earth and is processed using heat provided by fossil fuels. Trace amounts of naturally occurring, potentially harmful chemicals might be detected during chemical analysis. For example, portland cement may contain up to 0.75% insoluble residue, some of which may be free crystalline silica. Other trace constituents may include calcium oxide (also known as lime or quick lime), magnesium oxide, potassium sulfate, sodium sulfate, chromium compounds, and nickel compounds.

SECTION 3: HAZARD IDENTIFICATION

Emergency Overview: Portland cement is a light gray powder that poses little immediate hazard. 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.

Potential Health Effects:

Eye Contact: 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 portland cement may cause effects ranging from moderate eye irritation to chemical burns and blindness.

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 or avoiding skin contact, particularly contact with wet cement. Persons exposed to wet cement 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. 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 their first contact with the product. Other persons may first experience this effect after years of contact with hydraulic cement products.

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. (Also see "Carcinogenic potential" below)

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.

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:

Portland cement is not listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a potential trace level contaminate in Portland cement, is now classified by IARC as known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

Medical conditions which may be aggravated be, inhalation or dermal exposure:

- Pre-existing upper respiratory and lung diseases.
- Unusual (hyper) sensitivity to hexavalent chromium (chromium+6) salts.

SECTION 4: FIRST AID MEASURES

Eyes: Immediately flush eyes thoroughly with water. Continue flushing eyes 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 intended for use on skin. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposures to dry cement.

Inhalation of

Airborne Dust: Remove to fresh air. Seek medical help if coughing and 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 immediately.

SECTION 5: FIRE AND EXPLOSION DATA

Flash Point: None

Lower Explosive Limit: None

Upper Explosive Limit: None

Auto Ignition Temperature: Not Combustible

Flammable Limits: Not Applicable

Extinguishing Media: Not Combustible

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.)

Unusual Fire/Explosion Hazards: None

Hazardous Combustion Products: None

SECTION 6: 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 8.

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 7: HANDLING AND 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 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Skin Protection: Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened portland cement. 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 eliminate 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 by wet cement or concrete fluids 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 and 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.)

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

Eye protection: Where potentially subject to splashes or puffs of cement, wear safety glasses with side shields or goggles. In extremely dusty environments and 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 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical Properties:

Appearance:	Gray or White powder
Odor:	No distinct odor
Physical state:	Solid (powder)
pH (in water)(ASTM D 1293-95):	12 to 13
Solubility in water:	Slightly soluble (0.1 to 1.0%)
Vapor pressure:	Not applicable
Vapor density:	Not applicable
Boiling point:	Not applicable (i.e. > 1000oC)
Melting point:	Not applicable
Specific gravity (H2O = 1.0):	3.15
Evaporation rate:	Not applicable

Chemical Properties:

Tricalcium Silicate (3CaO-SiO₂)	< 70%
Dicalcium Silicate (2CaO-SiO₂)	< 40%
Tricalcium Aluminate (3CaOAl₂O₃)	< 15%
Tetracalcium Aluminoferrite (4CaO-Al₂O₃-Fe₂O₃),	< 18%
Calcium Sulfate (CaSO₄)	< 10%
Gypsum (CaSO₄-H₂O)	< 10%
Gypsum Anhydrite (CaSO₄-½ H₂O)	< 10%

SECTION 10: STABILITY AND REACTIVITY

Stability:	Stable.
Conditions to avoid:	Unintentional contact with water.
Incompatibility:	Wet portland cement is alkaline. As such it is incompatible with acids, ammonium salts and phosphorous.
Hazardous decomposition:	Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide.
Hazardous polymerization:	Will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

For a description of available, more detailed toxicological information, contact the supplier or manufacturer.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: No recognized unusual toxicity to plants or animals.

For relative physical and chemical properties see sections 9 and 10.

SECTION 13: DISPOSAL CONSIDERATIONS

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 14: TRANSPORT INFORMATION

Portland cement is not hazardous under U.S. Department of Transportation (DOT) regulations.

SECTION 15: REGULATORY INFORMATION

Status under USDOL-OSHA Hazard Communications 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 and 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:

This product contains up to 0.05 percent of chemicals (trace elements) 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.

SECTION 16: OTHER INFORMATION

Prepared by
Drake Cement LLC
Approved by
Drake Cement LLC
Approval Date
January 2011

Other important information

Portland cement should only be used by knowledgeable persons. 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 far more severe hazard than does portland cement itself. While the information provided in this 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

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