

MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Portland Cement Clinker
CAS #:	Not Applicable.
Product Use:	Manufacture of portland cement.
MSDS Information:	This MSDS was approved in April 2011 and replaces any previous versions.
Product Code:	Not Applicable.
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 clinker. Portland cement clinker is also known as Clinker.
Formula:	Not Applicable.
Supplier/Manufacturer:	Lehigh Cement, a Division of Lehigh Hanson Materials Limited 7777 Ross Road, Delta, British Columbia, Canada, V4G 1B8 Telephone 604-946-0411
Emergency Contact Information:	Lehigh Cement, a Division of Lehigh Hanson Materials Limited 7777 Ross Road, Delta, British Columbia, Canada, V4G 1B8 Telephone 604-946-0411

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

Portland Cement Clinker Ingredients & Their Exposure Limits:

Ingredient	CAS#	% By Weight	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium Silicates	various	60-80%	10 mg total dust/m ³	15 mg total dust/m ³ 5 mg respirable dust/m ³
Crystalline Silica	14808-60-7	less than 0.1%	0.10 mg respirable quartz/m ³	(10 mg respirable dust/m ³)/(percent silica+2)NIOSH REL (8-hour TWA) = 0.05 mg respirable quartz dust/m ³
Magnesium Oxide	1309-48-4	1-3%	10 mg total dust/m ³	15 mg total dust/m ³
Calcium Oxide	1305-78-8	0.5-1.5%	2 mg total dust/m ³	5 mg total dust/m ³

Trace Elements:

Portland cement clinker is made from materials mined from the earth and is processed using energy provided by fuels. Trace amounts of chemicals, some of which may be potentially harmful, might be detected during chemical analysis. For example, in addition to the ingredients listed above, portland cement clinker may contain potassium and sodium sulfate compounds, chromium compounds (including up to 0.003% hexavalent chromium) and nickel compounds.

SECTION 3 – HAZARDS IDENTIFICATION

Emergency Overview:

Clinker is a dark gray granular solid that poses little immediate hazard. A single short term exposure to dry clinker is not likely to cause serious harm. However, exposure of sufficient duration to wetted clinker can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns, including third degree burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry clinker.

SECTION 3 – HAZARDS IDENTIFICATION (CONTINUED)

Potential Health Effects:

▪ **Relevant routes of exposure are:**

Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting From EYE CONTACT:

Exposure to airborne clinker dust may cause immediate or delayed irritation or inflammation.

Eye contact by larger amounts of clinker dust or splashes of wetted clinker may cause effects ranging from moderate eye irritation to chemical burns and blindness. Such exposures require immediate first aid (see Section 4) 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 wetted clinker. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Exposure to clinker dust may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Dry clinker dust contacting wet skin or exposure to wetted clinker 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 clinker, 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 clinker or portland cement products.

Effects Resulting From INHALATION:

Clinker may contain trace amounts of crystalline silica. Prolonged exposure to respirable free crystalline silica may aggravate other lung conditions. It also may cause delayed lung injury including silicosis, a disabling and potentially fatal lung disease, and/or other diseases. (Also see "Carcinogenic Potential" below.)

Exposure to clinker dust 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 clinker are not known to be harmful, ill effects are possible if larger quantities are consumed. Clinker should not be eaten.

▪ **Carcinogenic Potential:**

Clinker 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 contaminant in clinker, is now classified by IARC as a known human carcinogen (Group 1). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

▪ **Medical Conditions That May Be Aggravated By Inhalation Or Dermal Exposure:**

Pre-existing upper respiratory and lung diseases.

Unusual (hyper) sensitivity to hexavalent chromium (chromium⁺⁶) salts.

MATERIAL SAFETY DATA SHEET

SECTION 4 – FIRST AID MEASURES

Eyes:

Immediately flush eyes thoroughly with water. Continue flushing for at least 30 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 wetted clinker.

Inhalation Of Airborne Dust:

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside. ("Inhalation" of gross amounts of clinker dust 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 FIGHTING MEASURES

Flammability:	Not Flammable.
Flash Point:	Not Applicable.
Lower Explosive Limit:	Not Applicable.
Upper Explosive Limit:	Not Applicable.
Auto ignition Temperature:	Not Applicable.
Sensitivity To Static Discharge:	Not Applicable.
Sensitivity To Impact:	Not Applicable.
Extinguishing Media:	Not Applicable.
Special Fire-Fighting Procedures:	None.
Hazardous Combustion Products:	Not Applicable.
Unusual Fire And Explosion Hazards:	Not Applicable.

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 clinker down drains.

Dispose of waste material according to local, provincial, state and federal regulations.

SECTION 7 – HANDLING AND STORAGE

Keep clinker dry until used. Normal temperatures and pressures do not affect the material.

Promptly remove dusty clothing or clothing which is contaminated with wetted clinker and launder before reuse. Wash thoroughly after exposure to clinker dust or wetted clinker.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection:

When engaged in activities where clinker dust or wetted clinker could contact the eye, 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 clinker.

Skin Protection:

Prevention is essential to avoiding potentially severe skin injury. Avoid contact with wetted clinker. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to wetted clinker might occur, wear impervious clothing and gloves to eliminate skin contact. Where required, wear 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 clinker with a pH-neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wetted clinker, 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 after July 10, 1998) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation.

Ventilation:

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

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Gray solid.
Odor:	No distinct odor.
Odor Threshold:	Not applicable.
Physical State:	Solid (granular).
pH (as a solid):	Not applicable.
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., >1000°C).
Freezing Point:	Not applicable.
Melting Point:	Not applicable.
Specific Gravity (H₂O = 1.0):	3.15
Evaporation Rate:	Not applicable.
Coeff. Water/Oil Dist.:	Not applicable.

SECTION 10 – STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	Unintentional contact with water.
Incompatibility:	Clinker reacts with water to produce a caustic solution, pH 12 to pH 13. Wetted clinker is alkaline. As such it is incompatible with acids, ammonium salts and aluminum metal. Aluminum powder and other alkali and alkaline earth elements will react in wetted clinker, liberating hydrogen gas. Clinker dissolves in hydrofluoric acid producing corrosive silicon tetrafluoride gas. Silicates react with powerful oxidizers such as fluorine, chlorine, trifluoride and oxygen difluoride.

MATERIAL SAFETY DATA SHEET

SECTION 10 – STABILITY AND REACTIVITY (CONTINUED)

- Hazardous Decomposition:** Will not spontaneously occur. Adding water results in hydration and produces (caustic) calcium hydroxide.
- Hazardous Polymerization:** Will not occur.

SECTION 11 – TOXICOLOGICAL INFORMATION

Effects of Acute Exposure:

Clinker and wetted clinker can dry the skin, cause alkali burns and irritate the eyes and upper respiratory tract. Ingestion can cause irritation of the throat.

Effects of Chronic Exposure:

Clinker dust can cause inflammation of the tissue lining the interior of the nose and the cornea (white) of the eye.

SECTION 12 – ECOLOGICAL INFORMATION

- Ecotoxicity:** No recognized unusual toxicity to plants or animals.
- Relevant Physical And Chemical Properties:** See Sections 9 and 10.

SECTION 13 – DISPOSAL CONSIDERATIONS

Dispose of waste material according to local, provincial, state and federal regulations. (Since clinker is stable, uncontaminated material may be saved for future use.)

Dispose of containers in an approved landfill or incinerator.

SECTION 14 – TRANSPORT INFORMATION

- Hazardous materials description/proper shipping name:** Clinker is not hazardous under the TDG Act (Canada) or DOT regulations (USA).
- Hazard Class:** Not applicable.
- Identification Number:** Not applicable.
- Required Label Text:** Not applicable.
- Hazardous substances/reportable quantities (RO):** Not applicable.

SECTION 15 – REGULATORY INFORMATION

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200:

Clinker 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:

Clinker qualifies as a "hazardous substance" with delayed health effects.

Status under SARA (Title III), Section 313:

Not subject to reporting requirements under Section 313.

SECTION 15 – REGULATORY INFORMATION (CONTINUED)

Status under TSCA (as of May 1997):

Some substances in clinker are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act:

Clinker is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under California Proposition 65:

This product contains crystalline silica, a substance known to the State of California to cause cancer. This product contains chemicals (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 the defined risks do not exist.

Status under Canadian Environmental Protection Act:

Not listed.

Status under WHMIS:

Clinker is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations and is therefore subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

SECTION 16 – OTHER INFORMATION

Prepared By:	Lehigh Cement, a Division of Lehigh Hanson Materials Limited, Delta BC
Approved By:	Jasper van de Wetering, Environmental Manager
Approval Date or Revision Date:	May 2014
Date Of Previous MSDS:	April 2011
MSDS Number:	Not Applicable

Other Important Information:

Clinker should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that clinker chemically reacts with water, and that some of the intermediate products of this pose a far more severe hazard than does clinker itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of clinker 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.

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

No representations or warranties with respect to the accuracy or correctness of this information, or of any kind or nature whatsoever are given, made or intended by Lehigh Hanson Materials Limited. No legal responsibility whatsoever is assumed for this information, or for any injuries or damages, however caused which may result from the use of this information. This information is offered solely for informational purposes and is subject to your own independent investigation and verification.