

SAFETY DATA SHEET: PORTLAND CEMENT
SECTION I - IDENTIFICATION

Product Name:	Portland Cement
Chemical Name:	Calcium Compounds (CAS #65997-15-1)
Other Common Names:	Cement, Hydraulic Cement, Type I, II, III, Oil Well Cement
Trade Names:	Buzzi Unicem USA Cement Incor® Portland Cement Lonestar® Portland Cement
Manufacturer Name and Address:	Lone Star Industries, Inc. 2430 S. 437 Road Pryor, OK 74361
Information Telephone Numbers:	(918) 825-1937
Emergency Contact Information:	(800) 424-9300 Chemtrec
Product Information/Uses:	Portland cement is a gray powder used as a binding ingredient in concrete and mortar mixes which are used in construction.

SECTION II – HAZARDS IDENTIFICATION
Emergency Overview

Danger! Overexposure to Portland cement mixed with water can cause skin or eye damage in the form of chemical (caustic) burns, including third-degree burns. The same type of injury can occur if wet or moist skin has prolonged exposure to dry Portland cement. Portland cement and water mixture has a pH > 12.

Portland cement is not classifiable as a human carcinogen.

OSHA/HCS Status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

GHS LABEL Elements

Hazard Pictograms:



Signal word: **Danger**

Classification of the substance or mixture:

SKIN CORROSION/IRRITATION: Category 1
 SERIOUS EYE DAMAGE/EYE IRRITATION: Category 1
 SKIN SENSITIZATION: Category 1
 CARCINOGENICITY/INHALATION: Category 1
 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
 [Respiratory tract irritation]: Category 3

SAFETY DATA SHEET: PORTLAND CEMENT

Hazard Statements: OVEREXPOSURE TO PORTLAND CEMENT MIXED WITH WATER CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.
MAY CAUSE AN ALLERGIC SKIN REACTION.
SWALLOWING MAY CAUSE DAMAGE TO MOUTH, THROAT OR INTERNAL ORGANS.
INHALATION MAY CAUSE RESPIRATORY IRRITATION.
LONG TERM INHALATION MAY DAMAGE LUNGS OR CAUSE CANCER.

Relevant Routes of Exposure: *eye contact, skin contact, inhalation and ingestion.*

Effects resulting from Eye Contact:

Exposure to dust may cause immediate or delayed irritation or inflammation. 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. Such exposures require immediate first aid (see Section 4, below) and medical attention to prevent significant damage to the eye.

Effects resulting from Skin Contact

Contact with cement can cause drying of the skin, severe irritation or chemical burns (third-degree), and dermatitis. A single short-term exposure to the dry powder is not likely to cause serious harm.

Overexposure to wet cement can cause severe skin damage in the form of chemical burns, including third-degree burns. The same type of injury can occur if wet or moist skin is exposed to dry Portland cement. Cement dust in wet or moist clothing can transmit the caustic effects to the skin, causing chemical burns. Portland cement causes skin burns with little warning; discomfort or pain cannot be relied upon to alert a person to a serious injury. You may not feel pain or the severity of the burn until hours after the exposure.

Portland cement can cause dermatitis by irritation and allergy. Irritant dermatitis is caused by fine particles of cement that abrade the skin mechanically and cause irritation resulting in dermatitis. Portland cement may contain trace amounts of hexavalent chromium. Hexavalent chromium is associated with allergic skin reactions which may appear as contact dermatitis and skin ulcerations. Persons already sensitized may react to their first exposure of cement. Other individuals may develop allergic dermatitis after repeated exposure to cement. The symptoms of allergic reactions may include reddening of the skin, rash, and irritation. Symptoms of chronic exposure to wet cement may include reddening, irritation, and eczematous rashes. Drying, thickening, and cracking of the skin and nails may also occur.

Effects resulting from Inhalation:

Dusts may irritate the nose, throat, and respiratory tract. Coughing, sneezing, and shortness of breath may occur following exposures in excess of appropriate exposure limits. Prolonged and repeated inhalation of respirable crystalline silica-containing dust in excess of appropriate exposure limits has caused silicosis, fibrosis or scar tissue formation in the lungs.

Effects resulting from Ingestion:

Although small quantities of dust are not known to be harmful, ingestion of large quantities may cause severe irritation and chemical burns of the mouth, throat, stomach and digestive tract. Do not swallow Portland cement.

SAFETY DATA SHEET: PORTLAND CEMENT

Carcinogenicity:

Portland cement is not listed as a carcinogen by NTP, OSHA, ACGIH or IARC. However it may contain trace amounts of substances listed as a carcinogen by NTP, OSHA, ACGIH and/or IARC: crystalline silica, chromium VI compounds (hexavalent chromium), nickel or lead.

SECTION III – COMPOSITION/INGREDIENTS INFORMATION

CHEMICAL FAMILY: Calcium Salts

COMPONENTS	CAS #	CONCENTRATION
Portland Cement (containing)	(CAS # 65997-15-1)	95% - 100%
- Tri Calcium Silicate, 3CaO.SiO ₂	(CAS #12168-85-3)	45% - 65%
- Di Calcium Silicate, 2CaO.SiO ₂	(CAS #10034-77-2)	10% - 20%
- Tri Calcium Aluminate, 3CaO.Al ₂ O ₃	(CAS #12042-78-3)	0 – 8.5%
- Calcium Aluminoferrite, a solid solution	(CAS #12068-35-8)	8.0% - 20%
Gypsum CaSO ₄ -2H ₂ O	(CAS #13397-24-5)	2.0 – 8.0%
Crystalline Silica	(CAS #14808-60-7)	Approx. 0.2%

Composition comments

Small amounts of calcium oxide (a.k.a. quicklime) (CaO), magnesium oxide (MgO), sodium sulfate (Na₂SO₄), and potassium sulfate (K₂SO₄) may be present. Since Portland cement is manufactured from materials mined from the earth (limestone, shale, sand, gypsum), and process heat is provided by burning fuels derived from the earth, trace but detectable amounts of naturally occurring metals, and possibly harmful elements may be found during chemical analysis. Mercury and lead were not found to be present at or above detection levels. Under ASTM Standards, Portland cement may contain up to 0.75% insoluble residue. More than 0.1% of these residues may be free crystalline silica.

SECTION IV – FIRST AID MEASURES

Eyes

Quickly and gently blot or brush Portland cement off the face. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain immediate medical attention.

Skin

Heavy exposure to Portland cement dust, wet concrete or associated water requires prompt attention. Quickly remove contaminated clothing, shoes, and leather goods (e.g. watchband, belts). Quickly and gently blot or brush away excess Portland cement. Immediately wash thoroughly with lukewarm, gently flowing water and not-abrasive soap. Seek medical attention for rashes, burns, irritation, dermatitis and prolonged unprotected exposures to wet cement, cement mixtures or liquids from wet cement. Burns should be treated as caustic burns. Portland cement causes skin burns with little warning; discomfort or pain cannot be relied upon to alert a person to a serious injury. You may not feel pain of the severity of the burn until hours after the exposure.

Inhalation of Airborne Dust

Remove source of contamination or move victim to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen. DO NOT allow victim to move about unnecessarily. Seek medical help if coughing and other symptoms persist. Inhalation of large amounts of Portland cement requires immediate medical attention.

Ingestion

SAFETY DATA SHEET: PORTLAND CEMENT

NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. **DO NOT INDUCE VOMITING.** Have victim drink 60 to 240 mL (2 to 8 oz.) water. Immediately obtain medical attention.

SECTION V – FIRE FIGHTING MEASURES

Extinguishing media:	Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media:	Do not use water jet or water- based fire extinguishers.
Specific hazards arising from the chemical:	No specific fire or explosion hazard.
Hazardous thermal decomposition products:	Decomposition products may include the following materials: carbon dioxide, carbon monoxide, sulfur oxides and metal oxide/oxides
Special protective actions for fighters:	Move containers from fire area if this can be done without risk. Use water fire-spray to keep fire-exposed containers cool.
Special protective equipment for fighters:	Fire-fighters should wear appropriate protective equipment and self- for fire-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

SECTION VI – ACCIDENTAL RELEASE MEASURES

Take personal precautions and keep unnecessary and unprotected personnel from coming into contact with spilled material. Do not touch or walk through spilled material. Do not breathe dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment when in contact with the material.

For cleaning-up spills, avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has entered the environment, including waterways, soil or air. Materials can enter waterways through drainage systems. 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 cement down drains. Dispose of waste material by using licensed disposal contractor.

SECTION VII – HANDLING AND STORAGE

Handling:

Use personal protective equipment (See Section VIII) when handling Portland cement. Persons using Portland cement should be familiar with its properties and hazards. A key to using the product safely requires the user to recognize that Portland cement reacts chemically with water to produce calcium hydroxide that can cause severe chemical burns.

Avoid actions that generate dust and cause dust to become airborne. Avoid prolonged exposure to dust.

Skin and eye contact with cement should be avoided. Do not get Portland cement inside boots, shoes or gloves. Do not allow wet clothing saturated with cement to remain against the skin. Promptly remove clothing and shoes that are dusty or wet with cement fluids and launder/clean before reuse. Wash thoroughly after exposure to dust or wet cement mixtures.

SAFETY DATA SHEET: PORTLAND CEMENT

Do not enter a confined space that stores or contains Portland cement unless appropriate procedures and protection are available. Portland cement can build up or adhere to walls of a confined space and release or fall suddenly. Likewise, do not walk on top of Portland cement stored in vessels, bins, and silos (engulfment hazard).

Storage:

Keep Portland cement dry until used.

Further Information:

Drying Portland cement is hygroscopic (it absorbs water). Portland cement needs water to harden. It will draw water away from any material it contacts, including skin.

Respirable crystalline silica-containing dust may be generated by Portland cement when hardened product is subjected to mechanical forces, such as sanding, crushing, grinding and cutting.

SECTION VIII – EXPOSURE CONTROL/PERSONAL PROTECTION

I. Exposure Guidelines

Substance Name		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
		mg/m³	mg/m³
Portland Cement	Total dust	15	-
	Respirable	5	1
Calcium Sulfate (Gypsum)	Total dust	15	-
	Respirable	5	10
Magnesium Oxide (inhalable fraction)		15	10
Calcium Oxide		5	2
Silica (quartz)	Total dust	30/(% silica+2)	-
	Respirable	10/(% silica+2)	0.025
Nuisance dust	Total dust	15	10
	Respirable	5	3

II. Engineering Controls:

Avoid creating dust and actions that cause dust to become airborne. Use general or local exhaust ventilation as required to maintain exposures below appropriate exposure limits. Use product in well-ventilated areas. If ventilation is not adequate, see the respiratory protection recommended in this section.

III. Personal Protection Equipment:

Eye/face protection

To prevent eye contact wear safety glasses with side shields, safety goggles or face shield when handling dust or wet cement. Dust goggles should be worn in extremely dusty conditions. Wearing contact lenses when working with cement is not recommended.

Hand protection

Use impervious, waterproof, abrasion- and alkali-resistant gloves. Do not rely on barrier creams in place of impervious gloves. Do not get Portland cement inside gloves.

Skin and body protection

SAFETY DATA SHEET: PORTLAND CEMENT

Use impervious, waterproof, abrasion- and alkali-resistant boots and protective long-sleeved and long-legged clothing to protect the skin from contact with wet Portland cement. Where required to reduce foot and ankle exposure, wear impervious boots that are high enough to prevent Portland cement from getting inside them. Do not get Portland cement inside boots, shoes or gloves. Remove clothing and protective equipment that becomes saturated with cement and immediately wash exposed areas.

Respiratory protection

Ordinarily, a respirator should not be required when handling wet cement. Use NIOSH-approved respirators, when an exposure limit could be exceeded, in poorly ventilated areas, or when dust causes discomfort or irritation. 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.

IV. General hygiene considerations

Danger: Clean water should always be readily available for skin and (emergency) eye washing. Periodically wash areas contacted by Portland cement with a pH neutral soap and clean, uncontaminated water. Wash again at the end of the work shift. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with Portland cement. It should be removed and replaced with clean, dry clothing. Begin each day by wearing clean clothing and conclude the day with a bath or shower.

SECTION IX – PHYSICAL AND CHEMICAL PROPERTIES

Physical State/Appearance.....	Solid/Powder
Color.....	Gray or white
Odor.....	Odorless
Specific gravity.....	3.15
Flammability.....	Not flammable
Flash point [method].....	Not combustible
Auto ignition temperature.....	Not applicable
Flammable limits (approx. volume % in air).....	Not applicable
Boiling point.....	> 1000°C (1832°F)
Melting point.....	> 1000°C (1832°F)
Decomposition temperature.....	Not determined
pH.....	12 – 13
Solubility (H ₂ O).....	Slightly soluble (0.1 – 1.0%)
Vapor pressure.....	Not Applicable
Vapor density.....	Not Applicable

SECTION X – STABILITY AND REACTIVITY

Reactivity

Reacts slowly with water forming hardened hydrated compounds, releasing heat and producing a strong alkaline solution.

Stability

Stable. Keep dry until used.

Incompatible Materials or Conditions

SAFETY DATA SHEET: PORTLAND CEMENT

Reactive or incompatible with the following materials: oxidizing materials, acids, aluminum and ammonium salt. Portland cement is highly alkaline and will react with acids to produce a violent, heat-generating reaction. Toxic gases or vapors may be given off depending on the acid involved. Reacts with acids, aluminum metals and ammonium salts. Aluminum powder and other alkali and alkaline earth elements will react in wet mortar or concrete, liberating hydrogen gas. Limestone ignites on contact with fluorine and is incompatible with acids, alum, ammonium salts, and magnesium. Silica reacts violently with powerful oxidizing agents such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride yielding possible fire and/or explosions. Silicates dissolve readily in hydrofluoric acid producing a corrosive gas — silicon tetrafluoride.

Hazardous Decomposition

None known under normal conditions of storage and use.

Hazardous Polymerization

Will not polymerize.

Conditions to avoid

Contact with Incompatible Materials

SECTION XI – TOXICOLOGICAL INFORMATION

Other than hazards identified in Section 2, no other known toxicological information available.

SECTION XII – ECOLOGICAL INFORMATION

Eco-toxicity

Portland cement hardens with water or moisture and is not expected to present unusual eco-toxicity risks to plants or animals. No recognized unusual toxicity to plants or animals.

Relevant physical and chemical properties: (See Sections 9 and 10.)

SECTION XIII – DISPOSAL CONSIDERATIONS

Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Untreated waste should not be released to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe manner. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff, and contact with soil, waterways, drains and sewers.

SECTION XIV – TRANSPORTATION INFORMATION

	<u>DOT Classification</u>	<u>IMDG</u>	<u>IATA</u>
UN number	Not regulated.	Not regulated.	Not regulated.
Hazard class(es)	—	—	—
Packing group	—	—	—
Environmental hazards	None.	None.	None.
Additional information	—	—	—

SAFETY DATA SHEET: PORTLAND CEMENT**SECTION XV - REGULATORY INFORMATION****U.S. Federal regulations:****Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200**

Cement may contain hazardous chemicals identified under this regulation, and should be incorporated as appropriate.

Toxic Substances Control Act (TSCA)

Cement may contain certain substances identified under the TSCA inventory list, and should be incorporated as appropriate.

Status under the Federal Hazardous Substances Act (FHSA)

Cement is a "hazardous substance" subject to statutes promulgated under the FHSA.

Hazard Category under Superfund Amendments and Reauthorization Act of 1988 (SARA)**(Title III, Sections 311 and 312)**

Cement qualifies as a "hazardous substance" with delayed health effects. See Section 3 for Composition/information on ingredients.

Hazard categories: Immediate hazard – Yes
Delayed hazard – No
Fire hazard – No
Pressure hazard – No
Reactivity hazard – No

Section 302 extremely hazardous substance(s): None

SARA (313) Toxic Release Inventory (40 CFR 372.65): This product does not contain any constituents listed under SARA (Title III) Section 313 in amounts requiring supplier notification under 40 CFR Part 372 Subpart C

CERCLA

This product is not listed as a CERCLA substance.

Other Regulations

Massachusetts: The following components are listed: cement, portland, chemicals, limestone
New York: None of the components are listed.
New Jersey: The following components are listed: cement, portland, chemicals, gypsum, limestone
Pennsylvania: The following components are listed: cement, portland, chemicals, gypsum, limestone
California: Prop. 65

WARNING: This product contains crystalline silica and chemicals (trace metals) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires the above warning in the absence of definitive testing to prove the defined risks do not exist.

SECTION XVI – OTHER INFORMATION**Revision date**

June 1, 2015

Date of previous MSDS

August 1, 2004

Other important information

SAFETY DATA SHEET: PORTLAND CEMENT

A key to using the product safely requires the user to recognize that cement chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while the cement product is “setting”) pose a far greater hazard than dry cement.

While the information provided in this 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 the 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 information furnished in this safety data sheet does not address hazards that may be posed by other materials not commonly mixed with Portland cement. Users should review other relevant safety data sheets before working with this Portland cement product.

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Abbreviations

ACGIH — American Conference of Governmental Industrial Hygienists CAS — Chemical Abstract Service
CERCLA — Comprehensive Emergency Response and Comprehensive Liability Act CFR — Code of Federal Regulations
DOT — Department of Transportation GHS — Globally Harmonized System HEPA — High Efficiency Particulate Air
IATA — International Air Transport Association
IARC — International Agency for Research on Cancer IMDG — International Maritime Dangerous Goods
NIOSH — National Institute of Occupational Safety and Health NOEC — No Observed Effect Concentration
NTP — National Toxicology Program
OSHA — Occupational Safety and Health Administration PEL — Permissible Exposure Limit
REL — Recommended Exposure Limit RQ — Reportable Quantity
SARA — Superfund Amendments and Reauthorization Act SDS — Safety Data Sheet
TLV — Threshold Limit Value
TPQ — Threshold Planning Quantity TSCA — Toxic Substances Control Act TWA — Time-Weighted Average
UN — United Nations