

SAFETY DATA SHEET: PORTLAND CEMENT

Section 1 – Product Identification

1.1 Product Identifier

Product name: Portland cement
Chemical name: Calcium Compounds (CAS #65997-15-1)
Other product names: Cement, Hydraulic Cement, Type I, II, III, V, Oil Well Cement
Trade names: Buzzi Unicem USA Cement
Lonestar® Portland Cement

1.2 Intended Uses of the Product

Portland cement is a gray powder used as a binding ingredient in concrete and mortar mixes which are used in construction.

1.3 Responsible Party/Company

Lone Star Industries, Inc.
2430 S. 437 Road
Pryor, OK 74361
(918) 825-1937

1.4 Emergency Contact Information

(800) 424-9300 Chemtrec

Section 2 – Hazards Identification

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.

OSHA/HCS Status

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

2.1 Classification of the Substance or Mixture

GHS-US Classification: Skin corrosion/irritation – Category 1
Serious eye damage/eye irritation – Category 1
Skin sensitization – Category 1
Carcinogenicity/inhalation – Category 1
STOT-SE – Respiratory irritation – Category 3

2.2 Label Elements

Hazard pictograms (GHS-US):



Signal Word (GHS-US):

Danger

Hazard Statements (GHS-US):

H314: Causes severe skin burns and eye damage.
H317: May cause an allergic skin reaction.
H335: May cause respiratory irritation.
H302+371: Ingestion may cause damage to the mouth, throat, and/or internal organs.
H350: May cause cancer.

SAFETY DATA SHEET: PORTLAND CEMENT

Precautionary Statements (GHS-US):

P102: Keep out of reach of children.
 P202: Do not handle until all safety precautions have been read and understood.
 P260: Do not breathe dusts.
 P262: Do not get in eyes, on skin, or on clothing.
 P264: Wash hands thoroughly after using this product.
 P270: Do not eat, drink, or smoke while using this product.

P304+310+312+340: If inhaled: remove person to fresh air and keep comfortable for breathing. Immediately call a poison control center or a physician.
 P305+351+388: If in eyes: Rinse cautiously with water for 20 minutes. Remove contact lenses if present and easy to do. Continue rinsing. Get medical attention.
 P302+361+353: If on skin: Take off immediately all contaminated clothing and rinse skin with water. Wash contaminated clothing before reuse.
 P332+313: If skin irritation occurs, get medical attention.
 P301+330+331+312: If swallowed: Rinse mouth. Do not induce vomiting. Contact a poison center or physician.

P403+233: Store in a well-ventilated area with container tightly closed.
 P401: If stored in bulk, keep area secure.
 P401: Material stockpiled in bulk or in silage may present an engulfment hazard. Personnel should not enter bulk storage areas unless they have been trained in the hazards of entering and working in such areas.

2.3 Other hazards

Exposure 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.

2.4 Unknown Acute Toxicity

No data available.

Section 3 – Composition/Information on Ingredients
3.1 Substance

Not applicable.

3.2 Mixture

Portland cement is a mixture of materials consisting of calcium silicates and calcium aluminates, calcium carbonate, crystalline silica and other additives.

Ingredient/component	CAS No.	Concentration percent wt.
Portland cement (containing)	65997-15-1	95-100
-Tri Calcium Silicate, 3CaO.SiO ₂	12168-85-3	45-65
-Di Calcium Silicate, 2CaO.SiO ₂	10034-77-2	15-25
-Tri Calcium Aluminate, 3CaO.Al ₂ O ₃	12042-78-3	0-8.5
-Calcium Aluminoferrite, a solid solution	12068-35-8	8-25

SAFETY DATA SHEET: PORTLAND CEMENT

Calcium sulfate (gypsum) CaSO ₄	13397-24-5	2-6
Calcium carbonate (limestone) CaCO ₃	1317-65-3	0-15
Crystalline silica (quartz)	14808-60-7	0-1
Anhydrite CaSO ₄		0-1.5
Calcite, CaCO ₃ (Limestone)		0-5

Composition comments

Portland cement may also contain small amounts of calcium oxide (a.k.a. quicklime) (CaO), magnesium oxide (MgO), sodium sulfate (Na₂SO₄), and potassium sulfate (K₂SO₄). 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. Cements subject to ASTM C150 standards may contain up to 1.50% insoluble residue. More than 0.1% of these residues may be free crystalline silica, a substance listed as a carcinogen by NTP, OSHA, ACGIH and/or IARC.

Portland cement is not listed as a carcinogen by NTP, OSHA, ACGIH or IARC. However it may contain trace amounts (<0.1%) of substances listed as a carcinogen by NTP, OSHA, ACGIH and/or IARC: chromium VI compounds (hexavalent chromium), nickel or lead.

SECTION 4 – First Aid Measures

4.1 Description of First Aid Measures

Eye contact:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Get medical attention immediately. Call a poison center or physician. Chemical burns must be treated promptly by a physician.
Skin contact:	Take off immediately all contaminated clothing and rinse skin with plenty of water. Wash contaminated clothing before reuse. If skin irritation occurs, get medical attention.
Inhalation:	If breathing is difficult, remove person to fresh air and keep comfortable for breathing. Immediately call a poison control center or a physician.
Ingestion:	Do not induce vomiting. If subject is conscious, rinse the mouth with water to remove any material and drink plenty of water to dilute any swallowed material. Do not give drink or attempt to force water to an unconscious person. Contact a poison center or physician.

4.2 Most Important Symptoms and Effects, Acute and Delayed

Eye contact:	Causes serious eye irritation and may scratch eye surface due to particle abrasion. May cause chemical burns resulting in corneal damage.
Skin contact:	Causes severe skin burns. Symptoms may include redness, pain, blisters. Do not allow product to harden around any body part or allow continuous, prolonged contact with skin. May cause sensitization by skin contact.
Inhalation:	May irritate nose and throat if dust is inhaled. Prolonged or repeated inhalation of respirable dust may lead to respiratory tract or lung damage.
Ingestion:	May cause irritation and burns of mouth, throat, stomach and digestive tract if swallowed. May cause nausea or vomiting.

SAFETY DATA SHEET: PORTLAND CEMENT

4.3 Recommendations for Immediate Medical Care or Special Treatment

Seek immediate medical attention for inhalation of large quantities of dust or exposure of wet material over large areas of skin. Seek immediate medical attention if material comes into contact with eyes and cannot be immediately removed.

SECTION 5 – Fire-Fighting Measures

5.1 Extinguishing Media

Suitable extinguishing media: Use media appropriate for surrounding fire.
Unsuitable extinguishing media: Do not use water jet or water-based fire extinguishers.

5.2 Special Hazards Arising from the Substance or Mixture

Fire hazard: Product does not burn however its packaging may.

5.3 Advice for Fire Fighters

Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Keep upwind of fire. Wear full firefighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).

Hazardous decomposition products: Decomposition products may include the following materials: carbon dioxide, carbon monoxide, sulfur oxides and metal oxide/oxides.

SECTION 6 – Accidental Release Measures

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

General measures: Avoid creating dust. Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Avoid contact with skin and eyes.

6.2 Environmental Precautions

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.

6.3 Methods and Material for Containment and Cleaning Up

For containment: Barricade material to prevent additional spillage.
Cleanup methods: Scoop or vacuum up spilled material while avoiding dust creation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Scoop up wet material and place in approved container. Allow wet material to harden before disposal.

6.4 Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7 – Handling and Storage

7.1 Precautions for Safe Handling

Precautions: Use appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Avoid the use of contact lenses when working with or handling this product. Do not breathe dust. Do not ingest. Do not eat, drink, smoke, or chew gum or tobacco while using this product. Use only with adequate ventilation. Ensure the use of good housekeeping procedures to prevent the

SAFETY DATA SHEET: PORTLAND CEMENT

Hygiene measures: accumulation of dust. Wear appropriate respiratory protection when ventilation is inadequate. Do not eat, drink, smoke, or chew gum or tobacco in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for Safe Storage

Storage conditions: Keep out of the reach of children. Avoid any dust buildup by frequent cleaning and suitable construction of the storage area. Do not store in an area equipped with emergency water sprinklers. Clean up spilled material promptly. Keep in the original container or an approved alternative made from a compatible material and keep the container tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Conditions to avoid: Water/moisture exposure will cause material to generate heat. Keep away from fluoride compounds, strong acids and oxidizers. Portland cement dissolves in hydrofluoric acid, producing corrosive silicon tetrafluoride gas.

7.3 Specific End Uses

Portland cement is a gray powder used as a binding ingredient in concrete and mortar mixes which are used in construction.

SECTION 8 – Exposure Controls/Personal Protection

8.1 Control Parameters

Exposure limits for individual components:

Component	OSHA PEL (mg/m ³)	ACGIH TLV (mg/m ³)	NIOSH REL(mg/m ³)
Portland cement	15 (T); 5 (I)	1 (I)	10 (T); 5 (I)
Calcium carbonate (limestone)	15 (T); 5 (I)	10 (I)	10 (T); 5 (I)
Calcium sulfate (gypsum)	15 (T); 5 (I)	10 (I)	10 (T); 5 (I)
Crystalline silica (as quartz)	0.05 (I)	0.025 (I)	0.05 (I)
Calcium oxide (quicklime)	5	2	2
Magnesium oxide (as magnesia)	15	10 (I)	Not established
Sodium sulfate	15 (T); 5 (I)	10 (I)	10 (T); 5 (I)
Potassium sulfate	15 (T); 5 (I)	10 (I)	10 (T); 5 (I)
Nuisance dust (PNOC)	15 (T); 5 (R)	10 (T); 3 (R)	Not established

T = total dust, R = respirable fraction, I = inhalable aerosol.

8.2 Exposure Controls

Engineering controls: Use product outdoors and in well-ventilated areas; otherwise employ natural or mechanical ventilation or other engineering controls to maintain exposure within applicable exposure limits.

Personal protective equipment: Protective clothing, gloves, eye protection, insufficient ventilation wear respiratory protection.

Skin and body: Wear long sleeved shirts and trousers while using this product. Wear water-proof boots. If working in dusty conditions, impervious over garments are recommended.

Hands: Protective gloves with wrist/arm cuffs should be worn to avoid direct contact with skin.

SAFETY DATA SHEET: PORTLAND CEMENT

Face and eyes:	Safety glasses with side shields or protective goggles should be worn while using this product. For extremely dusty conditions, non-vented goggles or goggles with indirect venting are recommended. Avoid contact lens wear when using this product.
Respiratory:	The use of a NIOSH approved dust respirator or filtering facepiece is recommended in poorly ventilated areas or when permissible exposure limits may be exceeded. Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).
Personal hygiene:	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. If clothing becomes saturated with Portland cement, garments should be removed and replaced with clean, dry clothing.
Environmental controls:	Emissions from ventilation or work process equipment should be monitored to verify compliance with the requirements of environmental protection legislation. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
Other information:	Do not eat, drink, or smoke while using this product; avoid hand-to-mouth contact.

SECTION 9 – Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical state:	Solid
Appearance:	Powder
Color:	Grey or white
Odor:	Odorless
Odor threshold:	No data available
pH:	12 - 13 (Highly alkaline when wet)
Relative evaporation rate (n-butyl acetate=1):	No data available
Melting point:	>1,000° C
Freezing point:	No data available
Boiling point:	>1,000° C
Flash point:	Not combustible
Auto-ignition temperature:	Not applicable
Decomposition temperature:	Not determined
Flammability limits in air:	Not flammable
Vapor pressure:	Not applicable
Relative vapor density at 20 °C:	Not applicable
Relative density:	3.15 (Water = 1)
Solubility:	Slight. (Water: 0.1 - 1 %)
Log Pow:	No data available
Log Kow:	No data available
Viscosity, kinematic:	No data available
Viscosity, dynamic:	No data available
Explosive properties:	No data available
Oxidizing properties:	No data available

SAFETY DATA SHEET: PORTLAND CEMENT

Explosive limits: No data available

9.2 Other Information No other information available.

SECTION 10 – Stability and Reactivity

10.1 Reactivity This product reacts slowly with water to form hardened hydrated compounds, releasing heat and producing a strong alkali solution.

10.2 Chemical Stability Product is stable under proper storage conditions. Keep dry while in storage.

10.3 Possibility of Hazardous Reactions No dangerous reactions are known under conditions of normal use. Do not mix with other chemical products.

10.4 Conditions to Avoid This product is 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.

10.5 Incompatible Materials 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.

10.6 Hazardous Decomposition Products None known

SECTION 11 – Toxicological Information**11.1 Information on toxicological effects**

Portland cement is a mixture of materials consisting of calcium silicates and calcium aluminates, calcium carbonate, crystalline silica, and other additives. May also contain small amounts of calcium oxide (a.k.a. quicklime) (CaO), magnesium oxide (MgO), sodium sulfate (Na₂SO₄), and potassium sulfate (K₂SO₄).

Acute toxicity: Not classified.
LD50/LC50 data: Not classified.
Skin corrosion/irritation: Causes irritation or chemical burns if exposed to moisture on skin.
Critical eye damage/irritation: Causes serious eye injury due to chemical burns or mechanical irritation.
Respiratory or skin sensitization: Not reported/no data available.
Germ cell mutagenicity: Not reported/no data available.
Teratogenicity: Not reported/no data available.
Carcinogenicity: Material contains trace amounts of crystalline silica, which may cause lung cancer through repeated or prolonged exposure to dust.
Specific target organ toxicity (Single exposure): May cause respiratory irritation.

SAFETY DATA SHEET: PORTLAND CEMENT

Specific target organ toxicity (Repeated exposure): May cause damage to lungs through repeated or prolonged exposure.

Reproductive toxicity: Not reported/no data available.

Aspiration respiratory hazard: Not reported/no data available.

Symptoms: Eye contact: Redness and itching. Extended contact may lead to corneal abrasion/ulceration.

Symptoms: Skin contact: Redness and itching. Extended contact may lead to chemical burns.

Symptoms: Inhalation: Coughing, sneezing, mucous discharge and dyspnea. Extended contact may lead to chemical burns.

Symptoms: Ingestion: Irritation and chemical burns of mouth and throat.

Other toxicological information: No additional data available.

Component	Toxicity	Carc: IARC	Carc: NTP	Carc: OSHA
Portland cement	No data	Not listed	Not listed	Not listed
Calcium oxide	Oral LD50 Rat 500 mg/kg	Not listed	Not listed	Not listed
Magnesium oxide (Inhalable fraction)	Oral LD50 Rat 810 mg/kg	Not listed	Not listed	Not listed
Calcium sulfate	Oral LD50 Rat >2000 mg/kg	Not listed	Not listed	Not listed
Crystalline silica (as quartz)	Oral LD50 Rat >22,500 mg/kg LC50 Carp >10,000 mg/L (72 hr.)	Group 1	Known	Not listed
Nuisance dust (PNOC)		Not listed	Not listed	Not listed

SECTION 12 – Ecological Information

12.1 General ecotoxicity Not classified.

12.2 Persistence and Biodegradability No data available.

12.3 Bioaccumulation potential No data available.

12.4 Mobility in soil to groundwater No data available.

12.5 Other adverse effects Avoid release to the environment. Prevent material from entering sewers, drains, ditches or waterways.

SECTION 13 – Disposal Considerations

13.1 Waste treatment methods

Waste disposal recommendations: The generation of waste should be avoided or minimized wherever possible. 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.

Additional information: Avoid creating or breathing dust during disposal. Avoid contact with skin and eyes.

SAFETY DATA SHEET: PORTLAND CEMENT

Ecology – waste materials: Avoid release to the environment. Prevent material from entering sewers, drains, ditches or waterways

SECTION 14 – Transport Information

UN number: Not regulated.
Proper UN shipping name: Not applicable.
Transport hazard class: Not applicable.
Packing group number: Not applicable.
Environmental hazard/IMDG code: Not available.
Special guidance or precautions: Transport product in sealed containers. Avoid creating dust. Avoid release to the environment. Ensure that persons transporting the product know what to do in the event of an accidental release or spillage.

SECTION 15 – Regulatory Information

U.S. Federal regulations: This product contains one or more chemical components or ingredients that may require identification and/or reporting under SARA Section 302, SARA Section 311/312/313, CERCLA and/or TSCA. An examination of the components of this product should be conducted by a qualified environmental professional to determine if such identification or reporting is required by federal law.

- Components: Portland cement, Silica (Crystalline), Iron oxide.

State regulations: This product contains one or more chemical components or ingredients that are included or listed on the hazardous substances lists for one or more of the following states: California, Maine, Massachusetts, Minnesota, New Jersey, Pennsylvania and Rhode Island. An examination of the components of this product should be conducted by a qualified environmental or safety and health professional to determine the specific requirements for those states.

- Components: Portland cement, Limestone (calcium carbonate), Gypsum (calcium sulfate), Silica (Crystalline), Iron oxide.

California Proposition 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 16 – Other Information

History

Last Revised: 20 August 2021

Previous versions: 1 June 2018
1 June 2015

Additional information

SAFETY DATA SHEET: PORTLAND CEMENT

Working safely with this product 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 the cement product is “setting”) pose a far greater hazard than dry Portland cement.

Wet Portland cement can cause caustic burns to unprotected skin, sometimes referred to as cement burns. Employees cannot rely on pain or discomfort to alert them to cement burns because cement burns may not cause immediate pain or discomfort. By the time an employee becomes aware of a cement burn, much damage has already been done. The safest method to use Portland cement is to avoid contact with exposed skin completely. Any employee experiencing a cement burn is advised to see a health care professional immediately.

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 cement product.

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