

# MATERIAL SAFETY DATA SHEET (MSDS)

## PORTLAND CEMENT

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### Section I – Identity

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Manufacturer's Name and Address: NATIONAL CEMENT COMPANY OF ALABAMA, INC.  
80 National Cement Drive  
P.O. Box 460  
Ragland, Alabama 35131

Telephone Number: 205-472-2191

Emergency Telephone Number: 205-472-2787

Chemical Name and Synonyms: Portland cement. Portland Cement is also known as Hydraulic Cement (CAS #65997-15-1)

Trade Name and Synonyms: Coosa Cement, Type 1,1B, and 3

MSDS Information: This MSDS was produced in February 2004 and replaces any prior versions. (Reviewed and approved September 16, 2009 DG)

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### Section II – Chemical Data

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#### Chemical Family:

Calcium Compounds. Calcium silicate compounds and other calcium compounds containing iron and aluminum make up the majority of the product.

#### Major compounds:

3CaO.SiO <sub>2</sub>	Tricalcium silicate	CAS # 12168-85-3
2CaO.SiO <sub>2</sub>	Dicalcium silicate	CAS # 10034-77-2
3CaO.Al <sub>2</sub> O <sub>3</sub>	Tricalcium aluminate	CAS # 12042-78-3
4CaO. Al <sub>2</sub> O <sub>3</sub> .Fe <sub>2</sub> O <sub>3</sub>	Tetracalcium aluminoferrite	CAS # 12068-35-8
CaSO <sub>4</sub> .2H <sub>2</sub> O	Calcium sulfate dihydrate (gypsum)	CAS # 13397-24-5

Small amounts of CaO, MgO, Na<sub>2</sub>SO<sub>4</sub>, K<sub>2</sub>SO<sub>4</sub> may also be present.

#### Formula:

Portland cement consists of finely ground Portland cement clinker mixed with a small amount of calcium sulfate dihydrate (gypsum). The final product may also contain small amounts of liquid or solid grinding aids. Portland cement clinker is a sintered material produced by heating to high temperature (greater than 1200° Celsius) a mixture of substances such as limestone and shales or clays mined from the earth's crust, with possible additions of waste materials. The substances manufactured are essentially hydraulic calcium silicates contained in a crystalline mass, not separable into the individual components.

### Trace Elements:

Trace amounts of naturally occurring harmful chemicals might be detected during chemical analysis. For example, under ASTM standards, Portland cement may contain up to 0.75% of insoluble residue, some of which may be free crystalline silica. Other trace constituents may include calcium oxide (also known as free lime or quick lime), free magnesium oxide, potassium and sodium sulfate compounds, and chromium and nickel compounds.

### Hazardous Ingredients:

Portland cements are listed by OSHA in 29 CFR 1910.1000, Table Z-1-A, and require material safety data sheets (FR, January 19, 1989), MSHA (30 CFR 55.5. -1, Ref.2, ACGIH TLV's for 1973, Appendix E) and ACGIH (TLV's for 1984-85, Appendix D) list portland cements as nuisance dusts. NTP, IARC, or OSHA does NOT list Portland cements as carcinogens. It may, however, contain trace amounts of substances listed as carcinogens by these organizations.

NTP, IARC, and OSHA do not list the grinding aids used in the manufacturing of Portland cement at this facility as carcinogens.

The main hazardous ingredients of Portland cement are:

Portland cement – approximately 95% by weight

ACGIH TVL-TWA (1995-1996) = 10 mg total dust/m<sup>3</sup>

OSHA PEL (8 hour TWA) = 50 million particles/ft<sup>3</sup>

Gypsum - approximately 5% by weight

ACGIH TVL-TWA (1995-1996) = 10 mg total dust/m<sup>3</sup>

OSHA PEL (8 hour TWA) = 10 mg total dust/m<sup>3</sup>

OSHA PEL (8 hour TWA) = 5 mg respirable dust/m<sup>3</sup>

Quartz (CAS # 14808-60-7) – less than 0.10% by weight or volume

ACGIH TVL-TWA (1995-1996) = 0.10 mg respirable quartz dust/m<sup>3</sup>

OSHA PEL (8 hour TWA) = (10 mg total dust/m<sup>3</sup>) / (%silica +2)

NIOSH REL (8 hour TWA) = 0.05 mg respirable quartz dust/m<sup>3</sup>

Grinding agents - approximately 0.06% by weight

NTP, IARC, and OSHA do not list these grinding agents as carcinogens.

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### Section III – Physical Data

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Boiling point:	Not applicable – Portland cement is a powdered solid
Vapor pressure:	Not applicable – Portland cement is a powdered solid
Vapor density:	Not applicable – Portland cement is a powdered solid
Solubility:	Slight (0.1 – 1.0%)
Specific gravity (H <sub>2</sub> O = 1)	3.15
Evaporation rate:	Not applicable – Portland cement is a powdered solid
Appearance and odor:	Gray or white powder, no odor
Melting point:	Not applicable

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Section IV – Hazards Identification

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Emergency Overview:

Portland cement is a light gray powder that poses little immediate hazard. A single short-term contact with the dry powder is not likely to cause serious harm. However, contact of sufficient duration with wet Portland cement 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 destruction can occur if wet or moist areas of the body come in contact with dry Portland cement.

Potential Health Effects:

**Relevant routes of exposure:**

Eye contact, skin contact, inhalation, and ingestion.

**Effects resulting from eye contact:**

Contact with airborne 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 V) and medical attention to prevent significant damage to the eye.

**Effects resulting from skin contact:**

Exposed persons may not feel discomfort until hours after a hazardous risk exposure has ended and significant injury has occurred. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement.

Contact with 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 contact with moist or wet portland cement may cause more severe effects including thickening, cracking or fissuring of the skin. Prolonged contact can cause severe skin damage in the form of caustic chemical burns.

Some individuals may exhibit an allergic response upon skin contact with 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 Portland cement products.

**Effects resulting from inhalation:**

Contact with 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.

Portland cement may contain trace amounts of free crystalline silica. Prolonged contact with 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. Crystalline silica is now classified by IARC as a known human carcinogen

(Group 1). NTP has characterized respirable silica as “reasonably anticipated to be a carcinogen”.

**Effects resulting from ingestion:**

Although small amounts of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.

**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<sup>+6</sup>) salts.

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Section V – First Aid

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**Eyes:**

Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Consult 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 contact with wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin contact with dry cement.

**Inhalation of airborne dust:**

Remove person to fresh air. Seek medical help if coughing and other symptoms do not subside. Inhalation of large amounts of Portland cement requires immediate medical treatment.

**Ingestion:**

Do not induce vomiting. If conscious, have the victim drink plenty of water and seek medical attention immediately.

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Section VI - Fire and Explosion Data

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Flash point	Portland cement is non-combustible and non-explosive
Flammable and explosive limits:	Not applicable
Auto ignition temperature:	Not applicable
Extinguishing media:	Not combustible
Special firefighting procedures:	Not applicable
Hazardous combustion products:	Not combustible
Unusual fire and explosion hazards:	None

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## Section VII – Stability and Reactivity

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Stability:	Stable. Keep dry until used.
Conditions to avoid:	Unintentional contact with water
Incompatibility:	Wet Portland cement is alkaline. As such it is incompatible with acids, ammonium salts and aluminum metal. Reaction with these substances liberates hydrogen gas.
Hazardous decomposition:	Will not spontaneously occur. Addition of water results in hydration and produces (caustic) calcium hydroxide.
Hazardous polymerization:	Will not occur.

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## Section VIII – Toxicological and Ecological Information

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Ecotoxicity:	No recognized unusual toxicity to plant and animals.
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## Section IX – Handling & Storage/Spill Procedures

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### **Handling and storage:**

Keep Portland cement dry until use. 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 contact with dust or wet cement mixtures or fluids.

### **Spill procedure:**

Collect dry material using a scoop. Avoid cleanup methods that cause dust to become airborne. Avoid breathing the dust. Scrape up wet material and place in appropriate container. Allow the material to dry before disposal. Do not attempt to wash Portland cement down drains. Emergency procedures are not required.

Small amounts of material can be disposed of as common waste or returned to the original container for later use. Large volumes may require special handling. Dispose of waste material according to local, state and federal regulations.

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## Section X – Exposure Controls / Personal Protection

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### **Skin protection:**

Avoid contact with unhardened Portland cement products. If contact occurs, wash affected area with soap and water. Where prolonged exposure to unhardened Portland cement may occur, wear impervious, abrasion, and alkali-resistant gloves and boots, and protective clothing to eliminate skin contact. Where required, wear boots that are impervious to water to avoid foot and ankle contact.

The use of barrier creams is advised. However, barrier creams should not be a substitute for gloves. After working with cement, workers should wash with a pH neutral soap. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean, dry clothing.

**Respiratory protection:**

Avoid actions that can cause the cement dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits. Use NIOSH/MSHA (under 30 CFR 11) approved respirators in poorly ventilated areas. Note: 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 acceptable limits.

**Eye protection:**

Wear safety glasses with side shields or tight fitting goggles. In extremely dusty 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.

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Section XI – Transportation Data

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**Hazardous materials description/proper shipping name**

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

**Hazard class**

Not applicable

**Identification number**

Not applicable

**Required label text**

Not applicable

**Hazardous substances/reportable quantities (RQ)**

Not applicable

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Section XII – Other Regulatory Information

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**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 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 act.

**Status under California Proposition 65**

This product contains chemicals (trace metals), including free crystalline silica, known to the State of California to cause cancer, birth defects, or other reproductive harm. California law requires to give the above warning.

**Status under the Workplace Hazardous Materials Information System (WHMIS)**

Portland cement is considered a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulation (Class E – Corrosive Material) and is therefore subject to the labeling and MSDS requirements of the WHMIS

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Section XIII – Abbreviations and Acronyms

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ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
DOT	Department of Transportation
FR	Federal Register
ft <sup>3</sup>	Cubic foot (cubic feet)
IARC	International Agency for Research on Cancer
m <sup>3</sup>	Cubic meter(s)
MSDS	Materials Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit

RQ	Reportable Quantity
SARA	Superfund Amendment and Reauthorization Act of 1986
TLV	Threshold Limit Volume
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
USDOL	United States Department of Labor

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Section XIV – Other Information

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Portland cement should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that Portland cement reacts chemically with water, and that some of the intermediate products of this reaction (present while the cement is “setting” or “hardening”) pose a far more severe hazard than does Portland cement itself.

While the information provided in this MSDS is believed to provide a useful summary of the hazards of Portland cement as it is commonly used, the MSDS 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.

The data furnished in the MSDS does not address hazards that may be posed by other materials mixed with Portland cement to produce Portland cement products. Users should review other relevant MSDSs before working with Portland cement or its products (i.e. portland cement concrete).

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