

**SAFETY DATA SHEET**

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**1. SUBSTANCE AND SOURCE IDENTIFICATION**

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**Product Identifier**

**SRM Number:** 1881b  
**SRM Name:** Portland Cement (Blended with Fly Ash)  
**Other Means of Identification:** Not applicable.

**Recommended Use of This Material and Restrictions of Use**

This Standard Reference Material (SRM) is intended primarily for use in evaluating chemical methods of analysis and in the calibration of instrumental methods for analysis of cements and materials of similar matrix. A unit of SRM 1881b consists of four sealed vials, each containing approximately 5 g of portland cement ground to pass a 75 µm (No. 200) sieve.

**Company Information**

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**2. HAZARDS IDENTIFICATION**

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**Classification**

<b>Physical Hazard:</b>	Not classified.	
<b>Health Hazard:</b>	Skin Corrosion/ Irritation	Category 1
	Eye Damage/Irritation	Category 1
	Skin Sensitization	Category 1
	Carcinogen	Category 1A
	STOT, Single Exposure	Category 3
	STOT, Repeated Exposure	Category 1

**Label Elements****Symbol****Signal Word**

Danger

**Hazard Statement(s)**

H314	Causes severe skin burns and eye damage.
H317	May cause allergic skin reaction.
H350	May cause cancer (lung).
H335	May cause respiratory irritation.
H372	Causes damage to lungs through prolonged or repeated exposure (inhalation).

**Precautionary Statement(s)**

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated room.
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves and clothing and eye and face protection.
P301+P330+P331	If swallowed: Rinse mouth. Do Not induce vomiting.
P302+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P333+P313	If skin irritation or rash occurs, get medical attention.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P310	Immediately call a doctor.
P308+P313	If exposed or concerned: Get medical attention.
P363	Wash contaminated clothing before reuse.
P403+P233	Store in well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

**Hazards Not Otherwise Classified:** None.

**Ingredients(s) with Unknown Acute Toxicity:** None.

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### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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**Substance:** Portland Cement

**Other Designations:** Hydraulic cement; cement (portland); silicate, portland cement; portland cement silicate.

Components are listed in compliance with OSHA's 29 CFR 1910.1200. Cement may also contain trace amounts of oxides and other chemicals due to the starting minerals and manufacturing process, including chromium compounds. Concentration ranges for portland cement components are listed below and may differ from the constituents listed in the NIST Certificate of Analysis. Concentrations shown as ranges to protect vendor confidentiality or process variation.

<b>Hazardous Component(s)</b>	<b>CAS Number</b>	<b>EC Number (EINECS)</b>	<b>Nominal Mass Concentration<sup>(a)</sup> (%)</b>
Portland cement	65997-15-1	266-043-4	100
Calcium oxide	1305-78-8	215-138-9	A to B
Quartz	14808-60-7	238-878-4	C to D
Hexavalent chromium	18540-29-9	606-053-1	E to F
Gypsum	13397-24-5	603-783-2	G to H
Limestone	1317-65-3	215-279-6	I to J
Magnesium oxide	1309-48-4	215-171-9	K to L

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## 4. FIRST AID MEASURES

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### Description of First Aid Measures

**Inhalation:** If adverse effects occur, remove to well-ventilated (uncontaminated) area. If breathing is difficult, qualified personnel may administer oxygen. If not breathing, qualified personnel should give artificial respiration. Seek immediate medical attention.

**Skin Contact:** Rinse affected skin with water for at least 15 minutes, and then wash thoroughly with soap or mild detergent and water. If skin irritation persists, seek medical aid and bring the container or label.

**Eye Contact:** Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

**Ingestion:** If a large amount is swallowed, seek medical attention.

**Most Important Symptoms/Effects, Acute and Delayed:** Prolonged exposure to wet or dry cement on moist areas of the body can cause burns to skin or respiratory tract and eye damage. Prolonged exposure respirable silica particles can cause lung damage (silicosis) and cancer.

**Indication of any immediate medical attention and special treatment needed, if necessary:** If any of the above symptoms are present, seek immediate medical attention.

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## 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

### Extinguishing Media

Suitable: Use extinguishing agents appropriate to surrounding fire.

Unsuitable: Do not use water jet or water-based extinguishers.

**Specific Hazards Arising from the Chemical:** Not applicable.

**Special Protective Equipment and Precautions for Fire-Fighters:** Move container from fire area if it can be done without personal risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**NFPA Ratings** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 3                      Fire = 0                      Reactivity = 0

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## 6. ACCIDENTAL RELEASE MEASURES

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**Personal Precautions, Protective Equipment and Emergency Procedures:** Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

**Methods and Materials for Containment and Clean up:** Avoid generating dust. Collect in appropriate container for disposal.

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## 7. HANDLING AND STORAGE

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**Safe Handling Precautions:** Use suitable personal protection equipment (PPE). See Section 8, "Exposure Controls and Personal Protection".

**Storage and Incompatible Materials:** Store in a well-ventilated area. Samples should be used immediately after opening the aluminized bag and vial.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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Exposure Limits			
Components	OSHA (PEL)	ACGIH (TLV)	NIOSH (REL)
Portland cement	TWA: 15 mg/m <sup>3</sup> (total dust) TWA: 5 mg/m <sup>3</sup> (respirable fraction) TWA: 50 mppcf (<1 % crystalline silica)	TWA: 1 mg/m <sup>3</sup> (respirable fraction, particulate matter containing no asbestos and <1 % crystalline silica)	TWA: 10 mg/m <sup>3</sup> (total dust) TWA: 5 mg/m <sup>3</sup> (respirable dust) IDLH: 5000 mg/m <sup>3</sup>
Calcium oxide	TWA: 5 mg/m <sup>3</sup>	TWA: 2 mg/m <sup>3</sup>	TWA: 2 mg/m <sup>3</sup>

Exposure Limits			
Components	OSHA (PEL)	ACGIH (TLV)	NIOSH (REL)
Silica, crystalline quartz	TWA: 30/(SiO <sub>2</sub> + 2) mg/m <sup>3</sup> (total dust) TWA: 10/(SiO <sub>2</sub> + 2) mg/m <sup>3</sup> (respirable fraction) TWA: 250/(SiO <sub>2</sub> + 5) mppcf (respirable fraction)	TWA: 0.025 mg/m <sup>3</sup> (respirable fraction)	TWA: 0.05 mg/m <sup>3</sup> (respirable dust) IDLH: 50 mg/m <sup>3</sup> (respirable dust)
Hexavalent chromium	TWA: 5 µg/m <sup>3</sup> <sup>(a)</sup>	No occupational exposure limits.	TWA: 0.0002 mg/m <sup>3</sup> <sup>(b)</sup>
Calcium sulfate (gypsum)	TWA: 15 mg/m <sup>3</sup> (total dust) TWA: 5 mg/m <sup>3</sup> (respirable fraction)	TWA: 10 mg/m <sup>3</sup> (inhalable fraction)	TWA: 10 mg/m <sup>3</sup> (total dust) TWA: 5 mg/m <sup>3</sup> (respirable dust)
Calcium carbonate (limestone)	TWA: 15 mg/m <sup>3</sup> (total dust) TWA: 5 mg/m <sup>3</sup> (respirable fraction)	No occupational exposure limits established.	TWA: 10 mg/m <sup>3</sup> (total dust) TWA: 5 mg/m <sup>3</sup> (respirable dust)
Magnesium oxide	TWA: 15 mg/m <sup>3</sup> (total particulates)	TWA: 10 mg/m <sup>3</sup> (inhalable fraction)	No occupational exposure limits.

<sup>(a)</sup> See 29 CFR 1910.1026; 2.5 µg/m<sup>3</sup> action level.

<sup>(b)</sup> As Cr, related to Chromium (VI) compounds.

**Engineering Controls:** Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**Personal Protection Measures:** In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate PPE to minimize exposure to this material.

**Respiratory Protection:** If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

**Eye Protection:** Splash resistant safety goggles and emergency eyewash are recommended.

**Skin and Body Protection:** Chemical resistant clothing and gloves are recommended.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties	Portland Cement
<b>Molar Mass (g/mol)</b>	not applicable
<b>Molecular Formula</b>	not applicable
<b>Appearance (physical state, color, etc.)</b>	white to gray powder
<b>Odor</b>	odorless
<b>Odor threshold</b>	not available
<b>pH</b>	>11.5 [Conc. (% w/w): 1 %]
<b>Evaporation rate</b>	not applicable
<b>Melting point/freezing point</b>	not available
<b>Relative Density</b>	2.3 to 3.1
<b>Density</b>	not applicable
<b>Vapor Pressure</b>	not applicable
<b>Vapor Density (air = 1)</b>	not applicable
<b>Viscosity</b>	not applicable
<b>Solubilities</b>	slightly soluble in water (0.1 % to 1 %)
<b>Partition coefficient (n-octanol/water)</b>	not applicable
<b>Particle Size</b>	≤75 µm
<b>Thermal Stability Properties</b>	
<b>Autoignition Temperature</b>	not applicable
<b>Thermal Decomposition</b>	not applicable
<b>Initial boiling point and boiling range</b>	> 1000 °C (>1832 °F)
<b>Explosive Limits, LEL (Volume %)</b>	not applicable
<b>Explosive Limits, UEL (Volume %)</b>	not applicable
<b>Flash Point</b>	not applicable
<b>Flammability (solid, gas)</b>	not applicable

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## 10. STABILITY AND REACTIVITY

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**Reactivity:** Stable at normal temperatures and pressure.

**Stability:**  Stable  Unstable

**Possible Hazardous Reactions:** Not applicable.

**Conditions to Avoid:** Avoid generating dust.

**Incompatible Materials:** 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. 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:** Miscellaneous decomposition products including carbon dioxide, carbon monoxide, sulfur oxides and metal oxide/oxides.

**Hazardous Polymerization:**  Will Occur  Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Exposure:**  Inhalation  Skin  Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Eye damage, skin irritation, and skin sensitization. May damage mucous membranes. May aggravate respiratory disorders.

### Potential Health Effects (Acute, Chronic, and Delayed)

**Inhalation:** Irritation, cough phlegm. Prolonged or repeated exposure to mixed cement dusts may cause cough, expectoration, dyspnea, wheezing, pharyngitis, chronic bronchitis, emphysema, cement pneumoconiosis, and silicosis.

**Skin Contact:** Irritation (possibly severe) and dermatitis. Direct contact with wet cement, combined with prolonged contact time and pressure may cause ulcerations and possibly burns. Sensitivity to constituents of cement may induce allergic skin reactions (chromium compounds).

**Eye Contact:** Irritation, visual disturbances, eye damage. In addition, wet cement may cause a burning sensation, corneal edema indicated by seeing halos around lights, and injury to the conjunctiva.

**Ingestion:** Irritation (long-term) and possible gastroduodenal ulcers.

### Numerical Measures of Toxicity

**Acute Toxicity:** Not classified.

Portland cement: No data available.

Gypsum (related to calcium sulfate): Rat, Oral LD50: >3000 mg/kg.

Calcium oxide, hexavalent chromium, limestone, magnesium oxide: No data available.

**Skin Corrosion/Irritation:** Category 1

Exposure may cause irritation (rash, scaling, and cracking) and dermatitis. May cause serious burns in the presence of moisture.

**Serious Eye Damage/Irritation:** Category 1, Serious eye damage.

Exposure to portland cement dust may cause severe eye damage and burns in the presence of moisture.

**Respiratory Sensitization:** No data available.

**Skin Sensitization:** Category 1.

Portland cement may contain trace amounts of hexavalent chromium which may cause allergic skin reactions.

**Germ Cell Mutagenicity:** No data available.

**Carcinogenicity:** Category 1A.

**Listed as a Carcinogen/Potential Carcinogen**  Yes  No

Portland cement, limestone, gypsum, calcium oxide, and magnesium oxide are not listed by OSHA, IARC, or NTP as a carcinogen or potential carcinogen.

Hexavalent chromium is listed as Group 1, *carcinogenic to humans* by IARC, *known human carcinogen* (related to chromium (VI) compounds) by NTP, and is listed by OSHA as a designated carcinogen.

Silica, crystalline quartz, is listed as Group 1, *carcinogenic to humans* by IARC, *known human carcinogen* (respirable size) by NTP, and is not listed by OSHA as a designated carcinogen.

Tumorigenic data: Rat, Inhalation, TCLo: 50 mg/m<sup>3</sup> (6 h)

Mutagenic data: Human, 120 mg/L (24 h)

**Reproductive Toxicity:** No data available.

**Specific Target Organ Toxicity, Single Exposure:** Category 3, Respiratory tract irritation.

May cause respiratory irritation.

**Specific Target Organ Toxicity, Repeated Exposure:** Category 1, Lungs.

Repeated and prolonged exposure to portland cement and respirable quartz may cause chronic bronchitis, emphysema, cement pneumoconiosis, and silicosis.

**Aspiration Hazard:** Not applicable.

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## 12. ECOLOGICAL INFORMATION

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### Ecotoxicity Data

Calcium oxide

Nile tilapia (*Oreochromis niloticus*) juvenile, NOEC (46 d): 100 mg/L fresh water

Gypsum (related to Calcium sulfate)

Bluegill (*Lepomis macrochirus*) LC50 (96 h): 2980 mg/L [static]

Fathead minnow (*Pimephales promelas*) LC50 (96 h): >1970 mg/L [static]

Hexavalent chromium

Fathead minnow (*Pimephales promelas*) LC50 (96 h): 36.2 mg/L

Portland cement, limestone, magnesium oxide: No data available.

**Persistence and Degradability:** No data available.

**Bioaccumulative Potential:** No data available.

**Mobility in Soil:** No data available.

**Other Adverse effects:** No data available.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose in accordance with all applicable federal, state, and local regulations.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** Not regulated by DOT and IATA.

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## 15. REGULATORY INFORMATION

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### U.S. Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Hexavalent chromium: 0.1 % de minimis concentration (except for chromite ore mined in the Transvaal Region of South Africa and the untreated ore component of the chromite ore processing residue (COPR), chemical category N090)(related to chromium compounds).

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21)

ACUTE HEALTH:	Yes
CHRONIC HEALTH:	Yes
FIRE:	No
REACTIVE:	No
PRESSURE:	No

### State Regulations

California Proposition 65: Warning! This product contains chemicals (quartz and chromium (VI) ion) known to the state of California to cause cancer. The product contains a chemical (chromium (VI) ion) known to the state of California to cause reproductive and developmental effects.

**U.S. TSCA Inventory:** Portland cement, calcium oxide, silica, crystalline quartz, hexavalent chromium, gypsum, limestone, and magnesium oxide are listed.

**TSCA 12(b), Export Notification:** Hexavalent chromium: Section 6, 0.1 % de minimus concentration (only those that can be used to treat water cooling systems)(related to Chromium (VI) compounds).

**Canadian Regulations:** WHMIS Information is not provided for this material.

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## 16. OTHER INFORMATION

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**Issue Date:** 07 October 2015

**Sources:** Lehigh Hanson, SDS, *Portland Cement*, 01 June 2015.  
ChemADVISOR, Inc., SDS *Portland Cement*, 20 March 2015.  
ChemADVISOR, Inc., SDS *Limestone*, 20 March 2015.  
ChemADVISOR, Inc., SDS *Gypsum*, 20 March 2015.  
ChemADVISOR, Inc., SDS *Quartz*, 20 March 2015.  
ChemADVISOR, Inc., SDS *Hexavalent Chromium*, 20 March 2015.  
ChemADVISOR, Inc., SDS *Magnesium Oxide*, 20 March 2015.  
ChemADVISOR, Inc., SDS *Calcium Oxide*, 20 March 2015.

### Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration	STOT	Specific Target Organ Toxicity
LD50	Median Lethal Dose or Lethal Dose, 50 %	STEL	Short Term Exposure Limit
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	WHMIS	Workplace Hazardous Materials Information System

**Disclaimer:** Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail [srmmsds@nist.gov](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.