

MATERIAL SAFETY DATA SHEET

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SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: API Oilwell Cement, Class 'G', Moderate Sulphate Resistant

CAS #: 65997-15-1

Product Use: Preparation of well casing.

MSDS Information: This MSDS was produced in September 2008 and replaces any previous versions. This MSDS covers Oilwell Cement, Class 'G', Moderate Sulphate Resistant. Individual constituents will vary within the range shown in Section 2.
composition of

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: Hydraulic well cement, well cement.

Formula: This product consists of finely ground portland cement clinker and gypsum.

Supplier/Manufacturer: Lehigh Inland Cement Limited
12640 Inland Way
Edmonton, Alberta, Canada, T5V 1K2 Telephone 780-420-2500

Emergency Contact Information: Lehigh Inland Cement Limited
12640 Inland Way
Edmonton, Alberta, Canada, T5V 1K2 Telephone 780-420-2541

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Oilwell Cement Exposure Limits:

| | |
|---------------|-------------------------------------|
| ACGIH TLV-TWA | 10 mg total dust/m ³ |
| OSHA PEL-TWA | 15 mg total dust/m ³ |
| OSHA PEL-TWA | 5 mg respirable dust/m ³ |

Oilwell Cement 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 |
| Gypsum | 7778-18-9 | 3-7% | 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 NIOSH REL (8-hour TWA) = 0.05 mg respirable quartz dust/m ³ | (10 mg respirable dust/m ³)/(percent silica+2) |
| Magnesium Oxide | 1309-48-4 | 1-4% | 10 mg total dust/m ³ | 10 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:

Oilwell cement 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, oilwell cement may contain potassium and sodium sulfate compounds, chromium compounds (including up to 0.003% hexavalent chromium) and nickel compounds.

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SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:

Oilwell cement is a light gray powder that poses little immediate hazard. A single short term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet oilwell 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 tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry oilwell cement.

Potential Health Effects:

- **Relevant routes of exposure are:**

Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting From EYE CONTACT:

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

Eye contact by larger amounts of dry powder or splashes of wet oilwell cement 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 wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Exposure to dry oilwell cement may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Dry oilwell cement contacting wet skin or exposure to moist or wet oilwell cement 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 oilwell 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 oilwell cement products.

Effects Resulting From INHALATION:

Oilwell cement 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 oilwell 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.

Effects Resulting From INGESTION:

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

- **Carcinogenic Potential:**

Oilwell cement 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 oilwell cement, 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.

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SECTION 4 - FIRST-AID MEASURES

Eyes:

Immediately flush eyes thoroughly with water. Continue flushing for at least 15 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 wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation Of Airborne Dust:

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside. ("Inhalation" of gross amounts of oilwell cement 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 oilwell cement down drains.

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

SECTION 7 - HANDLING AND STORAGE

Keep oilwell cement dry until used. 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 exposure to dust or wet cement mixtures or fluids.

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SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection:

When engaged in activities where cement dust or wet cement or concrete 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 oilwell cement or fresh cement products.

Skin Protection:

Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened (wet) oilwell cement products. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened oilwell cement products 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 dry oilwell cement or by wet cement or concrete fluids 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 wet concrete, 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: | White to gray powder. |
| Odor: | No distinct odor. |
| Odor Threshold: | Not applicable. |
| Physical State: | Solid (powder). |
| 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: | Oilwell cement reacts with water to produce a caustic solution, pH 12 to pH 13. Wet oilwell cement 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 wet mortar or concrete, liberating hydrogen gas. Oilwell cement dissolves in hydrofluoric acid producing corrosive silicon tetrafluoride gas. Silicates react with powerful oxidizers such as fluorine, chlorine, trifluoride and oxygen difluoride. |

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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:

Oilwell cement and wet oilwell cement mixtures 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:

Oilwell cement 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 oilwell cement is stable, uncontaminated material may be saved for future use.)

Dispose of bags in an approved landfill or incinerator.

SECTION 14 - TRANSPORT INFORMATION

Hazardous materials description/proper shipping name: Oilwell cement 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:

Oilwell 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:

Oilwell 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.

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SECTION 15 - REGULATORY INFORMATION (CONTINUED)

Status under TSCA (as of May 1997):

Some substances in oilwell cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act:

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

Status under California Proposition 65:

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:

Oilwell cement 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: | Robin Cowdrey |
| Approved By: | Dan Thillman |
| Approval Date or Revision Date: | October 1, 2008 |
| Date Of Previous MSDS: | October 1, 2005 |
| MSDS Number: | Not Applicable |

Other Important Information:

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

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of oilwell cement 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 oilwell cement to produce oilwell cement products. Users should review other relevant material safety data sheets before working with this oilwell cement or working on oilwell cement products, for example, oilwell cement concrete.

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