LAFARGE

Oil Well Cements

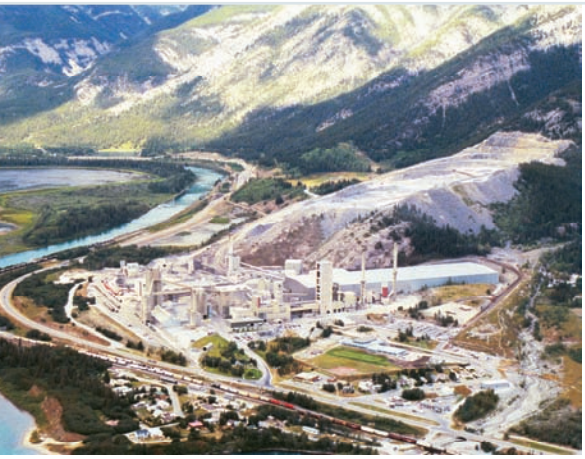
Quality and Consistency for over 50 years

Dual Certified by API:
ISO-9001-2000 and API-10A

LAFARGE

The Joppa Plant is located on the Ohio River in southern Illinois. The plant serves the Gulf Coast, offshore and Louisiana oil field markets.

Lafarge was a pioneer in the development of oil well cement with the introduction of Trinity Inferno Cement in the 1940s. Today, the company continues to lead the industry in the production of oil well cement, locally and internationally. Lafarge's plants and distribution centers cover a wide geography where oil and gas exploration and production are present. Areas served in North America include the Texas-Louisiana Gulf Coast, Mississippi, Alabama, the Midwest, Alaska, western and eastern Canada.



The Exshaw Plant is located west of Calgary, Alberta in the picturesque Canadian Rockies. The plant serves the western Canadian and Alaskan oil fields.

The Brookfield Plant is located north of Halifax, Nova Scotia and supplies well cements for the Hibernia Basin and Sable Island oil fields.

HT-HP "thickening time" testing is part of the Joppa Plant quality control process. Temperatures reach as high as 600° F.

Lafarge Oil Well Cements

Application

Oil well cement is used in the production and exploration of oil and gas onshore as well as deep water offshore wells to depths of up to 7000 feet (~ 2100 meters). A typical well can be thousands of meters deep, less than a meter wide, and is constructed by using a metal casing surrounded by a special cement slurry mix that fills the annulus between the outer face of the tubing and the wall formation of the hole. Lafarge North America's oil well cement provides a base ingredient in the slurry mix that is pumped into the interior metal section of the well and forced back toward the surface from the base of the borehole filling the annulus. Oil well cement slurries are designed for a multitude of purposes from the establishment of the well's safety and structural integrity during drilling to the isolation of the zone of interest and the production of oil and gas upon completion.

Given the complexity of the application and its extreme conditions of temperature and pressure, oil well cement must be carefully designed to meet demanding requirements such as predictable thickening time (set time), high sulfate resistance, high durability, fluid loss control, consistency, low viscosity, low free fluid, and strength. Unlike surface construction, oil well completion is much less tolerant to errors. For instance, premature thickening can have disastrous consequences due to loss of circulation in the well, whereas too long thickening times can cause financial losses due to excessive Wait-On-Cement (WOC) between drilling periods.

Large ball mills are used to grind the oil well clinker.

LAFARGE LEADS IN CEMENTITIOUS MATERIALS

- CEMENT
- FLY ASH (C & F)
- SLAG CEMENT
- SPECIALTY CEMENTS

The Exshaw Plant cement silos ensure an adequate supply of cement is maintained for western Canada and Alaska.

Strategic Call Centers

Industry Leadership

The Joppa Plant silos are capable of storing 90,000 tons of cement with 35,000 tons dedicated to oil well products.

Product

The types of cement are categorized according to the American Petroleum Institute (API) Specification 10A standards, which has identified 8 classes of cement according to the depth of the well, the temperature and pressure. Cement is also classified in grades: Ordinary (O), Moderate Sulfate Resistant (MSR), and High Sulfate Resistant (HSR). Sulfate resistance is based upon the C3A (Tricalcium Aluminate) content, which has a bearing on the durability of the cement under sulfate attacks. When oil well cement is produced, the clinker is analyzed microscopically to ensure that the crystals and clinker mineralogy have the required characteristics. Oil well cement must also be designed and tested to perform with specific admixtures that are added to the slurry mix in order to achieve the desired thickening time and rheology. The three most commonly used oil well cement types are Class A, Class G and Class H, with Class A being used in milder, less demanding well conditions, while Classes G and H are specified for deeper, hotter and higher pressure well conditions. Lafarge North America produces oil well cement meeting and exceeding API specifications, and leads the industry in quality, and consistent performance.

VALUE-ADDED BENEFITS FROM LAFARGE

- ISO 9001-2000 CERTIFIED
- API Q1 LICENSED
- OPTIMIZED LOGISTICS
- 24/7 SHIPPING
- TECHNICAL PRODUCT SUPPORT
- GLOBAL PRESENCE
- FULL PRODUCT TESTING
- PRODUCT CONSISTENCY
- RESEARCH LEADER

PRODUCT SUPPORT TESTING

- CHEMISTRY (XRF and XRD)
- MICROSCOPIC EVALUATION
- THICKENING TIMES
  - Neat evaluation
  - Retarder evaluation
- FLUID LOSS EVALUATION
- FREE FLUID
- RHEOLOGY
- PARTICLE SIZE EVALUATION
- COMPRESSIVE STRENGTHS
  - API
  - UCA
- COMPLETE API SPEC10A

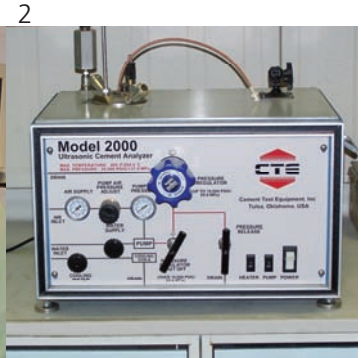
Convenient 24/7 Loading

24/7 product availability at most Lafarge terminals meets customer requirements for delivery.

Product Research

1

2



Lafarge uses the most modern tools for product research and support.
1) Clinker quality controlled by microscopy.
2) UCA testing capability.

The following table summarizes the key features and benefits of the company's products:

Cement Classes	Features	Benefits
Class A		
	• Ordinary grade (No C3A specification) • Used at 46% H_2O (water/cement ratio) • Comparable to ASTM Type I Portland	• Used in shallower applications when no particular high performance characteristics are required
Class G		
	• Used at 44% H_2O • Comparable to ASTM Type II or V Portland Cement	• Thickening Times controllable with additives to prevent loss of circulation up to 250° F (~120° C)
Class H		
	• Used at 38% H_2O • Coarser grinding • Fluid loss control	• Thickening Times controllable with additives to prevent loss of circulation up to 450° F (~230° C) • Low Viscosity to prevent loss of circulation • Low Fluid Loss to minimize cracks and gas migration • Low Permeability for zonal isolation and low gas migration
Class G & H (common to both G&H)	• C3S concentration of 48 to 65% dependent on Grade • C3A concentration of 0 to 8% dependent on Grade	• Excellent Retarder Response for higher economic benefit in mix design • Low Free Fluids for cement integrity and durability • High Sulfate Resistance for high durability under harsh conditions • Non-Settling for uniformity in the column • Consistent Quality for slurry design portability

Technical and Sales Support

Lafarge North America oil well cement is available in western Canada and Alaska, the Atlantic Region of eastern Canada, the Midwest and Gulf Coast states of the United States.

Trained and experienced oil well cement sales and technical representatives are strategically located and committed to provide prompt, dependable technical service over the entire life cycle of the product.

Lafarge North America oil well cement plants are ISO-9001 certified.

Company Profile

Lafarge in North America is part of the Lafarge Group. The world leader in building materials, active on five continents, the Lafarge Group holds top-ranking positions in cement, aggregates, concrete and gypsum.

By focusing on the development and improvement of building materials, Lafarge puts the customer at the core of its strategy and offers the construction industry and the general public innovative solutions that will bring more safety, comfort and beauty to our everyday lives.

Please contact your Lafarge Office for specific product information, availability and ordering.

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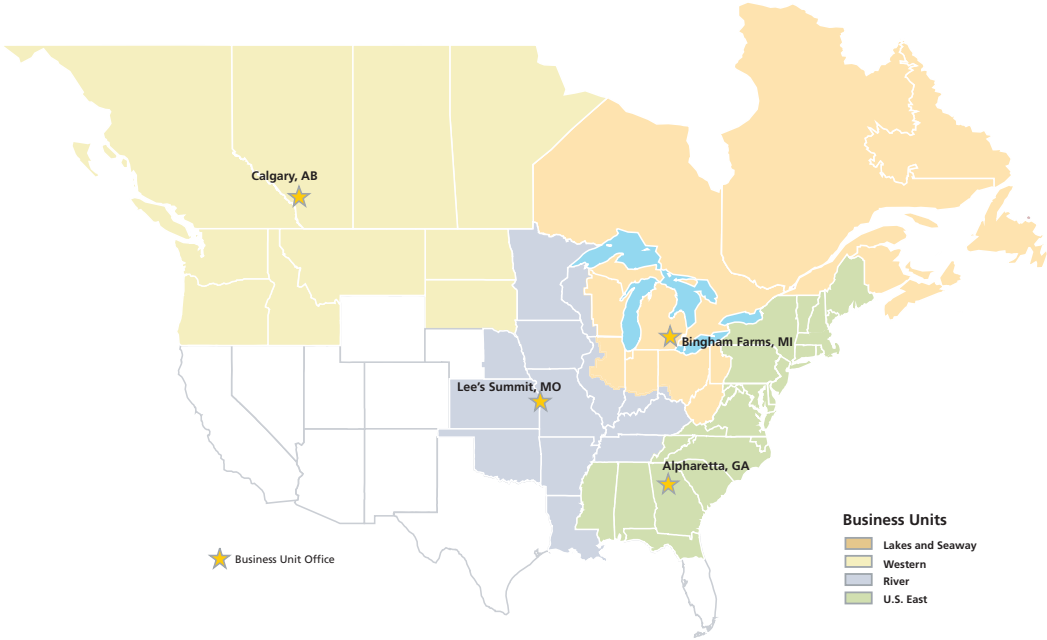
Bingham Farms, Michigan
Phone: 248-594-1991

U.S. East Business Unit
Alpharetta, Georgia
Phone: 678-746-2000

River Business Unit
Lee's Summit, Missouri
Phone: 816-251-2100

Western Business Unit
Calgary, Alberta
Phone: 403-271-9110

Lafarge North America Cement Operating Areas



Limited Warranty

Lafarge warrants that Lafarge oil well cements meet applicable API requirements. Lafarge makes no other warranty, whether of merchantability or fitness for a particular purpose with respect to these products. Having no control over their use, Lafarge will not guarantee finished work in which these products are used.

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LAFARGE NORTH AMERICA

CEMENT

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