BORAL FLY ASH

ASTM C 618

PRODUCT DESCRIPTION

Boral Fly Ash is a pozzolan for concrete that improves plastic and hardened properties. Concrete containing Boral Fly Ash shows increased ultimate strengths and decreased permeability.

Basic Applications

Boral Fly Ash can be used as a pozzolan in all concrete to improve the strength, stability and long-term durability of concrete.

Suggested Specifications

Boral Fly Ash as marketed by Boral Material Technologies Inc. conforming to requirements of ASTM C 618, Class (F) or (C) shall be used in all concrete unless prior approval of the engineer. Use according to manufacturer's recommendations.

CSI-Formatted Product Guide Specifications are available from Boral representatives or www.boralmti.com.

Composition and Materials

Boral Fly Ash is a pozzolanic material possessing chemical compounds similar to those found in portland cement. A pozzolan is a siliceous or siliceous and aluminous material which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide to form compounds possessing cementitious properties. When portland cement reacts with water (a process known as hydration) the reaction forms calcium silicate hydrate (CSH). CSH is the glue or binder which cements the aggregate particles together into a solid matrix. A by-product of the hydration reaction is calcium hydroxide. Calcium hydroxide, a water soluble compound, adds little to strength gain and may be susceptible to attack by aggressive chemicals such as sulfate or acid. Boral fly ash chemically reacts with the calcium hydroxide forming additional CSH. The pozzolanic reaction increases strength because of the additional CSH produced and will also improve durability because of the elimination of the calcium hydroxide.

Boral Fly Ash is produced to meet the specification requirements of ASTM C 618 to ensure performance in concrete applications. ASTM C 618 designates the Class of fly ash as well as the physical and chemical requirements for use in concrete applications.

- **Class F Fly Ash** is a pozzolan with physical and chemical properties that improve concrete's resistance to sulfate attack. Class F fly ash also mitigates the deleterious effects of alkali-silica reactivity. Class F fly ash also decreases the permeability, increasing the long-term durability of concrete. Class F fly ash is produced from the combustion of pulverized bituminous or Texas lignite coal.
- **Class C Fly Ash** in addition to being a pozzolan is also cementitious. Class C fly ash because of its pozzolanic properties also increases strength and durability in concrete applications. Because Class C fly ash is self-cementitious it can also be used in a variety of geotechnical applications to stabilize soils and aggregates.

Limitations

Differences of materials used in producing concrete vary from region to region. Therefore, trial mixes should be conducted to determine the optimal replacement and performance criteria for the class of fly ash used. Class C Fly Ash should not be used in a sulfate environment unless the material is tested for approval by ASTM C 1012.

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Boral Fly Ash

RECOMMENDED INSTALLATION

Applicable Standards

- ASTM C 618
- AASHTO M 295
- **Boral Fly Ash** meets or exceeds all applicable standards required by ASTM, AASHTO and the individual state transportation agencies within the states that the material is sold. Individual physical and chemical properties are analyzed and certified by independent laboratories. These results are available by contacting the Boral sales office in your area.

Recommended Installation

Boral Fly Ash is added to the concrete mixture along with portland cement, fine and coarse aggregates, water and chemical admixtures in accordance with ASTM C 94. Proper proportions of each constituent should be determined by trial batches prior to use in the field.

Recommended Proportioning

Boral Fly Ash should be added according to one of the following:

- Minimum of 15% of the total cementitious content.
- Amount required for meeting durability requirements for alkali-silica reactivity resistance, sulfate resistance, and impermeability as described in ACI 201.
- Mass concrete applications shall contain a minimum of 30% of the total cementitious as fly ash.

Compatibility

Boral Fly Ash is compatible with all types of cements, or other supplementary cementitious materials.

Precautions

Normal safety precautions are advised when handling this material. Dampen with a water mist to control airborne dust and use appropriate personal protective equipment to avoid inhalation and exposure to eyes, skin and mucus membranes. Excessive exposure to materials may cause irritation of the eyes, skin and mucus membranes and chronic exposure could lead to fibrotic disease of the lungs. This product contains silica, which has been identified as a carcinogen. If contact is made, areas affected should be thoroughly flushed with water. Medical attention is advised in case of ingestion, inhalation or eye contact. A Material Safety Data Sheet is available by contacting Boral or going to www.boralmti.com.

Boral Fly Ash

AVAILABILITY AND COST

Boral Fly Ash is available to concrete producers throughout the United States. Price information is available through Boral sales offices.

PACKAGING INFORMATION

Boral Fly Ash is available in bulk. Samples are available in buckets or drums.

WARRANTY DISCLAIMER

Boral Material Technologies Inc. disclaims warranty of merchantability and warranty of fitness for a particular purpose.

In addition, because Boral Material Technologies Inc. cannot control the final use of its products, there are no warranties expressed or implied regarding a product's use or performance in any given circumstance. Persons receiving this information should make their own tests to determine suitability for their particular use.

Boral Fly Ash is guaranteed to meet the requirements of the specifications prescribed herein, when used and batched in accordance to manufacturer recommendations. As, the overall performance of a concrete mixture is related to a complex matrix of materials and since many factors can affect the performance of concrete, Boral Material Technologies Inc. reserves the right to determine the actual cause of a concrete problem.

TECHNICAL SERVICE

- Technical service is available by contacting Boral Engineering Support Services or a Boral sales office.
- Technical services can be provided via telephone, e-mail, fax, in your office or at the jobsite.
- Boral representatives are available as a technical resource for Boral Product information, as well as other concrete related areas such as: concrete mix design, placement and curing techniques.

Regional Sales Offices

Florida
1-800-329-6337

Georgia
1-800-241-4943

North Carolina
1-800-822-8896

California
1-800-864-4521

Colorado
1-800-255-0663

Arizona
1-800-528-6630

*Texas.
1-800-292-5354

*Engineer Support Services location

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