



1.12 XPERT Silica Fume (S.F-D)

Silica Fume Pozzolanic Admixture

PRODUCT DESCRIPTION

XPERT Silica Fume (S.F-D) is a very fine pozzolanic material, composed of amorphous silica produced by electric arc furnaces as a by-product of the production of elemental silicon or ferro silicon alloys.

XPERT Silica Fume (S.F-D) is a dry, densified silica fume (micro silica) pozzolanic admixture for concrete which produces superior performance characteristics. XPERT SILICA FUME (S.F-D) Substantially increases concrete compressive and flexural strengths, durability, and impermeability.

BENEFITS

- Increased compressive and flexural strengths.
- Dramatically improved durability.
- Enhanced resistance to chemical attack.
- Superior freeze-thaw resistance.
- Low permeability.
- Increased abrasion erosion resistance.

USAGE:

XPERT Silica Fume (S.F-D) can be used in a variety of applications such as:

- Concrete
- Grouts
- Mortars
- Fibre cement products
- Refractory
- Oil/gas well cements
- Ceramics, elastomer
- Polymer applications.

RECOMMENDATIONS

XPERT SILICA FUME (S.F-D) is a pozzolan which reacts chemically within the concrete and an ultra-fine material which fills the voids between cement particles creating an extremely dense and impermeable concrete. As a result, XPERT SILICA FUME (S.F-D) will increase the resistance of concrete against sulphate and chloride attack, providing superior protection for substructures and superstructures in harsh environments.

XPERT SILICA FUME (S.F-D) greatly reduces the ingress of water and chemicals, which promote the corrosion of reinforcing steel. These performance characteristics make XPERT SILICA FUME (S.F-D) an ideal material for use in parking decks, bridge decks, marine structures, and any application requiring dense and impermeable concrete. The use of XPERT SILICA FUME (S.F-D) creates extremely high compressive strength concrete. This creates structural economics and design flexibility because of a reduction in member size and/or quantity, increased span lengths, and reduced slab thickness. Consequently, XPERT SILICA FUME (S.F-D) is recommended for demanding or intricate design applications requiring extremely high-performance concrete.



NOTE: For the ultimate in impermeable, durable, high strength performance, use XPERT SP-970 super plasticizer in conjunction with XPERT SILICA FUME (S.F-D) micro silica.

DIRECTIONS FOR USE

XPERT SILICA FUME (S.F-D) is batched at the ready-mixed concrete plant in a similar manner to cement and other cementitious materials. The uniformity of performance is mixing dependent; as a result, ensure the concrete is thoroughly mixed prior to placement with a minimum of 100 revolutions of the drum.

The most important recommendations for optimizing concrete performance and aesthetics are “under finish and over cure!” concrete containing XPERT SILICA FUME (S.F-D) Silica fume. Curing is a poor area in which to try and save money. ACI 308, “Standard Practice for Curing Concrete”, must be followed to ensure the optimum concrete performance.

The greatest difference that you will notice between conventional concrete and XPERT SILICA FUME (S.F-D). Concrete will be in finishing. The difference will become greater with increasing dosages of XPERT SILICA FUME (S.F-D) Admixture. As a result of the increased cohesiveness and density, concrete containing XPERT SILICA FUME (S.F-D) will bleed much less than conventional concrete.

CONSUMPTION RATE

XPERT SILICA FUME (S.F-D) is recommended for use at an addition rate of 5 to 15% by weight of cement depending on the desired performance characteristics. Trial batches using project materials are recommended to confirm conformance to project specific requirements, or when materials, conditions or applications indicate addition rates outside the recommended range.

PHYSICAL PROPERTIES

State	Amorphous - Sub-micron powder
Colour	Gray to medium grey powder
Specific Gravity	2.25
Solubility	Insoluble
Bulk Density - Densified (bulk and bagged products)	41 to 48 lb/ft ³ (655 to 770 kg/m ³)

TECHNICAL SPECIFICATIONS

Chemical Requirements	ASTM	TYPICAL
Silicon Dioxide (SiO ₂) %	85.0 % Minimum	92 % - 95 %
Moisture Content %	3.0 % Maximum	0.45 %



Loss on Ignition (LOI) %	6.0 % Maximum	3.75 %
Physical Requirements	ASTM	TYPICAL
Oversize percent retained on 45-µm (325 sieve)	10.0 % Maximum	1.91 %
Accelerated Pozzolanic Strength Activity Index with Portland cement (7 day)	105.0 % Minimum	139 %
Specific Surface	15 m ² /g Minimum	22.49 m ² /g

POZZOLANIC REACTION IN A CEMENTITIOUS SYSTEM

XPERT Silica Fume (S.F-D) in contact with water goes into solution within an hour. The silica in solution forms an amorphous silica rich, Ca poor, gel on the surface of the silica fume particles and agglomerates. After time the silica rich, Ca poor, coating dissolves and the agglomerates of silica fume reacts with free lime (CaOH₂) to form calcium silicate hydrates (CSH). This reaction is called the pozzolanic reaction

PACKAGING

XPERT Silica Fume (S.F-D) is available in:

- 1000 – KG Bulk Packing
- 40 – KG Packing

STORAGE

XPERT Silica Fume (S.F-D) should be kept dry, out of weather and the elements.

SAFETY AND HANDLING PRECAUTIONS

XPERT Silica Fume (S.F-D) is generally considered a nuisance dust. Use and handling of silica fume does not represent a health risk when normal safety rules are observed. Direct contact may cause irritation of eyes. Prolonged contact may cause skin irritation. Inhalation may cause respiratory irritation resulting in coughing and shortness of breath. This product may be harmful if swallowed. Do not get in eyes and avoid prolonged skin contact. Do not take internally. Wash thoroughly with water after handling. For more detail, see our SDS.

WARRANTY

This product is warranted to be free of defects in material and workmanship, and conform to XPERT Construction Chemicals (“XPERT”) quality control standards. All recommendations, statements and technical data herein are based on tests we believe to be reliable and correct, but accuracy and completeness of said tests are not guaranteed and are not to be construed as a warranty or guaranty of any kind, expressed or implied including but not limited to, an implied warranty of merchantability or an implied warranty of fitness for a particular purpose.



Satisfactory results depend upon many factors beyond XPERT's control. User shall rely on his or her own information and tests to determine suitability of the product for the intended use and user assumes all risk, loss, damage, expense and liability resulting from his or her direct use, indirect use or consequential to their use of the product.

- XPERT shall not be liable to the buyer or any third person for any injury, loss or damage directly or indirectly resulting from use or inability to use the product.
- XPERT's sole responsibility shall be to replace that portion of the product, which proves to be defective.
- Any warranty claim must be made within six (6) months from the date of the claimed breach.
- This limited warranty applies only if the product was properly installed and used according to all instructions.
- This limited warranty applies only if the was properly stored prior to use.