



Silica Fume

Product Data Sheet

Product description:

Silica Fume is a very fine pozzolanic material composed of amorphous silica produced during the production of silicon-metal or ferro-silicon alloys. It can be used in a variety of cementitious products such as concrete, grout, shotcrete and mortar. Densified silica fume has a bulk density of about 650-750 kg/m³ whereas for undensified silica fume it is about 150-300/m³.

Elkon Silica Fume reacts chemically within a cementitious matrix to increase the amount of calcium silicate hydrate (CSH gel) that is formed (pozzolanic reaction). The CSH gel is the bonding agent that holds the matrix of the cementitious mixture together in the hardened state. The additional CSH gel due to silica fume increases strength and decreases permeability.

Benefits:

- **Enhanced durability & concrete service life**
- **Enhanced overall concrete performance**
- **Increased concrete strength**
- **Increased concrete cohesiveness**

Properties & advantages:

Physical/chemical

- ✓ Decreased matrix permeability
- ✓ Reduced ion chloride penetration
- ✓ Increased resistance to sulfate attack
- ✓ Increased resistance to alkali-silica reactivity
- ✓ Increased pumpability & workability
- ✓ Reduced concrete bleeding

Mechanical

- ✓ Increased compressive strength
- ✓ Increased modulus of elasticity
- ✓ Increased flexural strength
- ✓ Increased abrasion resistance
- ✓ Improved freeze-thaw resistance
- ✓ Increased impact resistance

Applications:

- Any steel-reinforced concrete structures exposed to severe environment conditions, de-icing salts or that require high performance and long-term durability. Also, as below :

- ✓ Parking structures
- ✓ Bridge decks
- ✓ Road infrastructures
- ✓ High-rise buildings
- ✓ Cable & oil well grouting

- ✓ Marine and port structures
- ✓ Water, sewage and drainage structures
- ✓ Tunnels (Precast, shotcrete)
- ✓ Mines (shotcrete)

Standards & guidelines:

- **CSA A3001-08** : Cementing Materials and Blended Supplementary Cementing Materials
- **ASTM C1240-10a** : Standard specification for silica fume used in cementitious mixtures
- **ACI 234R**: Guide for use of silica fume in concrete

Dosage & mixing:

- **Recommended dosage for use in concrete and wet shotcrete applications: 5% to 15% in addition by weight of cement**
- For concrete and wet shotcrete, silica fume is batched at the concrete production plant in a manner similar to that for cement or other cementitious materials such as fly ash. Refer to the ACI 234R guideline or to the Silica Fume Association User's Manual for specific batching and mixing instructions.

Handling & storage:

- Silica fume is stored and handled similar to cement or fly ash. In bulk, it may be stored in a silo. Refer to the Silica Fume Association User's Manual for information on the appropriate set up for pumping and handling silica fume into silos. Packaged silica fume must be stored in a dry area indoor.

Packaging:

- **Densified silica fume**: bulk, bulk bags and 11.34Kg (25 lbs.) water soluble paper bags
- **Undensified silica fume**: bulk bags, 20kg and 50 lbs. bags

Additional information & documents:

- Elkon Products Material Safety Data Sheet (MSDS)
- Certificate of Analysis (typical)
- Silica Fume Association User's manual