

SIGMA®

HIGH PERFORMANCE SILICA FUME GEL



RAMKA
CONSTRUCTION
CHEMICALS

SIGMA® is a silica-fume super gel combining silica fume, superplasticizer and polypropylene fibres to improve hardened-concrete quality and fresh-concrete rheology. It can be added at the batching plant or project site. The silica-fume pozzolan fills pores, reduces permeability and protects against aggressive-ion ingress. SIGMA is suitable for durable, watertight concrete and for high-performance concrete (HPC).

Applications

- Durable, low-permeability concrete
- Unreinforced concrete
- Concrete requiring extended transport
- Concrete exposed to sulfate and chloride ions
- Hydraulic and marine structures

Approvals / Standards

- Silica fume refs: ASTM C1240 / INSO 13278.
- ASTM C494

Advantages / Benefits

- Increased durability against aggressive chemicals
- Reduced water-to-cement ratio
- Easier pumping and reduced concrete-pump wear
- Increased tensile, compressive and flexural strength
- Reduced shrinkage and thermal-stress cracking
- Lower cement content at equal strength

Guideline for Use

At the batching plant, add SIGMA after the cement and mix until uniform and homogeneous.

For job-site addition, first assess concrete slump and flowability visually. If initial flowability is excessive, adding the gel can cause bleeding. Pour the gel onto the concrete, then mix at high speed for 4 minutes.

Dosage

5 to 10% by mass of cement, with a suggested average of 7%. For HPC, 15 to 20% by mass of cement is permitted. Determine the exact dosage through site trials according to the concrete, project and performance requirements; RAMKA Technical Services can assist.

Compatibility

SIGMA is compatible with all known Portland cements manufactured under ASTM specifications. Always conduct trials before combining products in specific mixes and contact our Technical Service Department for information about specific combinations.

Effects

SIGMA 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.

Storage

Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect from direct sunlight. For specific storage condition contact RAMKA Technical Services Department.

Basis of Data

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

Health and Safety

SIGMA does not fall into the hazard classifications of current regulations. However, it should not be swallowed or allowed to come into contact with skin and eyes. Suitable protective gloves and goggles should be worn. Splashes on the skin should be removed with water. In case of contact with eyes rinse immediately with plenty of water and seek medical advice.

Product Information

State	Thick gel
Packaging	22KG Pail
Chloride Content	Chloride ion-free
Corrosion Behavior	-
Appearance / Color	Grey
Shelf Life	12 months from date of production if stored properly in undamaged unopened, original packaging.
Air content increase	<2% (increase, not total air content)
Alkali content	<5 g Na ₂ O equivalent/L
Storage Condition	Store in dry conditions at temperatures between +10°C and +30°C. Protect from direct sunlight and frost.
PH-Value	3-7
Recommended Dosage	5-10% by mass of cement; recommended average 7%. For HPC: 15-20% by mass of cement
Chemical base	Silica fume and naphthalene sulfonate formaldehyde
Density	1.45 ± 0.05 g/cm ³ at 20°C

Refer to the Safety Data Sheet (MSDS).

Additional Information

For additional information on SIGMA admixture, consult our Technical Services Department.

References (continued)

ASTM C1202; BS 1881-122; BS EN 12390-8; INSO 2930.



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Important Notes: The information, and, in particular, the recommendations relating to the application and end-use of RAMKA products, are given in good faith based on RAMKA's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with RAMKA's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. RAMKA reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.