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Technical product information

QuantumUHPC

Product overview

QuantumUHPC, with or without fibre, is a superior-grade concrete material known for its combination of high strength, high durability, excellent crack control, and perfect flowability. It is formulated using cementitious materials, sand/aggregates and advanced admixtures to achieve unparalleled performance in various construction applications.

Applications

QuantumUHPC is appropriate for a broad spectrum of structural applications, especially where superior mechanical behaviour and improved durability are needed. This product is particularly suitable for installations in congested areas due to its high flowability and self-consolidating consistency. Some applications are (but not limited to):

- High-rise buildings
- Bridge decks and overlays
- Marine structures
- Precast elements
- Industrial flooring
- Architectural facades
- Infrastructure rehabilitation

Compositions and materials

QuantumUHPC is composed of high-quality raw materials, including cementitious materials, sand/aggregates, and admixtures, all pre-mixed for convenience. On the construction site, only water needs to be added. **QuantumUHPC** can be delivered with or without fibres.

Packing

25kg paper bag, 1000kg BigBag, bulk on request.

Certifications and standards

- AFGC: Ultra-High Performance Fibre-Reinforced Concrete
- ASTM C1856/C1856M - Standard Practice for Fabricating and Testing Specimens of Ultra-High Performance Concrete

The technical data of our products are given to the best of our knowledge, but are not binding. Due to the wide range of material and environmental influences, we recommend a suitability test before use; it may be necessary to adjust the quantity used.

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Benefits and environmental sustainability

- High mechanical performance
- Excellent workability for ease of placement and finishing
- Superior resistance to abrasion, chemical attack, and freeze-thaw cycles
- High durability against aggressive environmental conditions
- Perfect crack control
- Improve the structural resistance to earthquakes and seismic events
- Extended service life which causes around 20% reduction in CO_2 emission
- Reduce material usage by decreasing structural dimensions which causes from 20% to 40% in material savings

Physical properties

Depending on the client's requirement, **QuantumUHPC** can produce up to 230 MPA compressive strength.

Colour		White or Gray
Rheology		Self-compacting
Density (kg/m^3)		2397
Flowability (mm)	t_{30}	220
	t_{60}	235
	t_{120}	245
	t_{total}	250
Compressive strength (MPa)	1 Day	36.51
	7 Day	121.38
	28 Day	169.59
Flexural strength (MPa)	1 Day	9.27
	7 Day	21.77
	28 Day	28.29
Modulus of Elasticity (GPa)	28 Day	45
Long-term shrinkage (µm)		<600
Chloride Ion Penetrability		Negligible

Mixing and installation

- The formwork needs to be waterproof to prevent any leakage of the self-consolidating material during placement. Additionally, it should be lined or coated to avoid water absorption from the fresh material and to prevent bonding with the forms.
- In the case of UHPC overlaying, surfaces intended for contact with **QuantumUHPC** must be structurally sound, feature a roughened or exposed aggregate finish, and be pre wetted to a saturated surface-dry condition before placement. Any dirt, oil, grease, dust, or other materials that may hinder bonding must be thoroughly removed to ensure maximum bond strength.

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- **QuantumUHPC** is typically batched using high-shear mixers. Only water should be added to our dry pre-mixed powder. Depending on your mixer type, we will provide individual instructions for your mixing procedure.
- **QuantumUHPC** is self-consolidating, eliminating the need for vibration during placement. It's essential to avoid vibration to prevent material segregation. Right after placement, it's recommended to promptly cover top forms over the material to permit proper curing.
- Curing of the material should continue until a minimum compressive strength is attained. It's crucial not to remove the forms until the curing process is fully complete.

Safety precautions

- Wear appropriate personal protective equipment (PPE) such as gloves, goggles, and masks during handling.
- Avoid inhalation of dust particles.
- Wash hands thoroughly after handling UHPC.

Storage

Store **QuantumUHPC** in a dry environment away from moisture and contamination. The materials should be covered properly to prevent cement hydration. We do recommend 3 month storage time max. Any materials that have been subjected to moisture should be disposed of. Protect from direct sunlight and extreme temperatures.

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