UHPC Additive – Ultra-High Performance Concrete Enhancer

Optimized admixture to achieve 120 MPa (standard cure) and 150 MPa (steam cure) UHPC

Product Description

The UHPC Additive is a high-performance admixture designed to produce ultra-high-performance concrete (UHPC) with superior compressive strength and durability. By combining with local cement (P·O 42.5/52.5) and graded quartz sand (20–40 mesh and 40–70 mesh), the additive enables production of UHPC with compressive strength of 120 MPa (standard curing) and 150 MPa (steam curing). The additive improves particle packing density, enhances cohesion, reduces porosity and significantly increases mechanical and durability performance.

Key Features & Benefits

• Achieves 120 MPa (standard curing) and 150 MPa (steam curing) compressive strength.

• Optimized particle packing for dense microstructure and low permeability.

• Enhanced cohesion, rheology, and fiber dispersion.

• Improved durability: freeze–thaw >700 cycles, chloride diffusion ≤0.40 × 10^-12 m²/s.

• Compatible with local cements and graded quartz sands.

Recommended Mix Design

• UHPC Additive: 150–200 kg
• Cement (42.5/52.5): 400 kg
• Quartz Sand: 400–450 kg (50% 20–40 mesh + 50% 40–70 mesh)
• Water-binder ratio: 0.18–0.20
• Optional HRWR (polycarboxylate): 2–3% of binder
• Steel/PE fibers: 2 vol.% typical

Performance Parameters

Property	Result	Test Method
Compressive strength (28d, standard cure)	≥ 120 MPa	CECS 10107-2020 / ASTM C1856
Compressive strength (28d, steam cure)	≥ 150 MPa	CECS 10107-2020
Flexural strength (28d)	≥ 20 MPa	ASTM C1609
Splitting tensile strength	≥ 12 MPa	ASTM C496
Elastic modulus	≥ 45 GPa	ASTM C469
Chloride diffusion coefficient	≤ 0.40 × 10^-12 m²/s	NT Build 492
Carbonation depth (28d, 20% CO2)	≤ 1 mm	RILEM CPC-18
Drying shrinkage (28d)	≤ 300 × 10^-6	ASTM C157
Autogenous shrinkage (7d)	≤ 200 × 10^-6	ASTM C1698
Freeze–thaw resistance	≥ 700 cycles, no damage	ASTM C666
Fire resistance	≥ 60% residual strength at 600 °C	ISO 834

Scope of Application

• Bridges, deck overlays, joints, and anchorage zones.

• Marine and offshore structures including wind turbine foundations.

• Nuclear and defense protective structures.

• Architectural façades and cladding panels.

• Precast UHPC components for tunnels, subways, and modular buildings.

Mixing & Curing Guidelines

• Mixing: Use a high-shear pan or planetary mixer. Dry blend solids before adding water and admixtures.

• Standard curing: 20 °C, RH ≥ 95%, 28 days → 120 MPa compressive strength.

• Steam curing: Ramp to 90 °C in 2h, hold 8–12h, cool down → 150 MPa compressive strength.

Packaging & Storage

• Supplied in 25 kg composite bags.
• Shelf life: 6 months in dry, ventilated storage.
• Avoid direct contact with moisture; reseal opened bags immediately.

Disclaimer

The information provided in this Technical Data Sheet is based on laboratory tests and field experience and is offered in good faith. Sino-sina Building Materials Co., Ltd. makes no warranty of results obtained under different conditions beyond its control. Users should conduct trial mixes and confirm the suitability of the product for their specific applications.