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FREYSSINET
SUSTAINABLE TECHNOLOGY

Ultra High Performance Concrete /
Ultra High Performance Fibre Reinforced Concrete

REPAIR | STRENGTHEN | PROTECT



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Foreva Solutions THE FREYSSINET BRAND FOR EXCELLENCE IN REPAIR



Our Offer for UHPC / UHPFRC

Ultra-High-Performance Fibre Reinforced Concrete (UHPFRC also called simply UHPC) is a cementitious material with outstanding performance characteristics including exceptional strength, durability, and resistance to wear and tear. It is typically made by combining a high-strength cementitious binder, such as Portland cement, with a fine aggregate, such as silica fume, and a high concentration of fibres, usually metal, minerals, or polymer fibers. In addition, it has a very low water content (water / cement ratio <math><0.25</math>) thanks to the optimized use of latest generation superplasticizers. This specific mix delivers a concrete with a ductile behavior in tension reducing the need for passive steel reinforcements.

The fibres which are a key component of UHPC, provide the ductility to the material. They generally have a diameter of 0.1 to 0.3 mm, and a length of 10 to 20 mm. Metal fibers are used for structural applications that require high tensile strengths, while polymer and mineral fibres are used for architectural applications.

From Investigation to Implementation

Our team of experienced structural engineers and technical experts will support you throughout your project's development. We'll assist you in every step of the project cycle, from design and logistics to material management, construction, concrete laying, and quality assurance.

Specialised Teams

Our teams are trained in the various techniques for applying UHPC. This includes the on-site manufacture of concrete dosed with more than 150 kg/m³ of metal fibers and its application by pumping or even spraying are highly technical operations carried out by our dedicated and trained teams.

Advantages

- ✓ Exceptional Strength
- ✓ Post-Crack Tensile Strength
- ✓ High Durability
- ✓ Flexibility of Implementation
- ✓ Resistance to Penetration
- ✓ Resistance External Aggression

Areas of Application



The benefits of ultra-high-performance fibre-reinforced concrete as a repair material are widely recognised; it is ideal for lightweight, thin, watertight and durable reinforcement applications. Its advantages make it the perfect choice for repairs with a design lifetime of 50 to 100 years".

- ✓ Light Weight Precast
- ✓ Ultra-Thin Precast Wall
- ✓ Precast Building Façade
- ✓ Structural Steel Encasement
- ✓ Column Strengthening / Jacketing
- ✓ Bridge Construction
- ✓ Strengthening of Pier
- ✓ Deck Overlay
- ✓ Expansion Joint Repair
- ✓ Culvert Relining



Characteristics

Strength

- ✓ Characteristic strengths at 28 days greater than 130 MPa in compression and 6 MPa in tension, which is significantly higher than conventional concrete,
- ✓ According to standard NF P18-470, structural UHPFRCs, called UHPFRC-S have a strength characteristic that can range from 150 MPa to 250 MPa and are reinforced with metal fibres to obtain a ductile behaviour in traction,
- ✓ UHPC enable the use of a smaller reinforcement diameter,
- ✓ Possible to dispense with the traditional secondary reinforcement.

Outstanding Performance

- ✓ Exceptional durability (which allow to use them in very aggressive environments),
- ✓ High ductility, which results in a capacity of deformability under load without brittle fracture,
- ✓ High resistance to microcracking,
- ✓ Very low shrinkage and creep,
- ✓ High resistance to abrasion and impact including hydraulic abrasion,
- ✓ Low permeability resists attack by aggressive agents (gasses and liquids) and drastically reduces the penetration of chlorides into the structure.

Cost Effectiveness

- ✓ Reduce the need for maintenance and related costs as the material does not corrode.
 - Applied in a shorter time, and the repair will outlast traditional solutions.

Flexibility

- ✓ Non-structural UHPFRCs, called UHPFRC-Z, can be used in various non-structural or architectural applications (facade cladding panel, street furniture, miscellaneous equipment, etc.),
- ✓ Variable application including cast in place, prefabricated, or wet sprayed,
 - Particularly aesthetic appearance with a very fine skin texture