

# Foreva<sup>®</sup> TFC

- High strength bi-directional reinforcement
- Excellent bond strength: in situ saturation
- Corrosion free material
- Light and thin
- Certified system: technical approval from CSTB (France)

## Strengthening solution by in situ saturated composite - Carbon fibre fabric

**Foreva<sup>®</sup> TFC** is the Freyssinet solution for structural strengthening using carbon fibre reinforced polymer. The composite is made of a carbon fibre fabric placed into an epoxy matrix, the fabric being in situ saturated against the surface.

### Advantages

- **Fast loading of the strengthening:** thanks to its high modulus of elasticity, the bonded composite immediately drains a significant fraction of the stresses introduced in the section when loading the strengthened structure.
- **Easy adjustment of the strengthening cross section:** strips can be overlapped, superimposed and crossed without strength reduction factor; particularly suitable for heavily stressed zones.
- **Matches complex profiles** and tolerates planarity defects.
- **No reduction in the clearance:** valuable for installations such as car parks.
- **No added weight.**
- **Short intervention delays:** fast polymerisation of the resin.

- **Wide range of temperatures of use:** from -20°C to 45°C in continuous service; 60°C in peak.
- **Fire, shock and UV resistances:** can be enhanced by an optional protective cover.

### Fields of application

The **Foreva<sup>®</sup> TFC** solution strengthens slabs under flexure, beams under bending and shear, columns and any elements in tension. It also increases the ductility of elements, in particular those subject to accidental dynamic stresses (earthquakes).

**Foreva<sup>®</sup> TFC** is suitable for standard or industrial buildings, bridges and any kind of concrete structures. It can also be used on wood, metal and masonry structures.



## Principle

The **Foreva<sup>®</sup> TFC** solution is based on the in situ fabrication of a carbon fibre composite, by saturation of the fabric with an organic resin which polymerises against the substrate, bonding the composite advantageously on the tensile stressed area of the part to be strengthened. The resulting composite is integrated to the structure and becomes loaded as soon as the strengthened element begins to deflect.

Outstanding resistance to interlamellar shear delamination and delamination at the composite/concrete interface lead to a failure in the height of the concrete cover under ultimate load.

Under permanent deformation of the strengthened element the resisting effort durability is ensured by the composites excellent resistance to creep effects.

## Expertise

Design rules associated to **Foreva<sup>®</sup> TFC** are available at Freyssinet technical department.

## Products

The **Foreva<sup>®</sup> TFC** solution utilizes specific resin and fabric to manufacture the strengthening composite Foreva<sup>®</sup> TFC 75, 150, 200 or 300.

**Foreva<sup>®</sup> TFC** anchors and braids allow the strengthened composite to be anchored to the substrate, where required.

## Specialised teams

The **Foreva<sup>®</sup> TFC** solution is implemented by specialised Freyssinet teams.

If necessary, the structure is first unloaded and cracks are injected.

Once surface integrity has been checked, the surface is prepared by mechanical scouring, and then the composite is stratified, in situ, under controlled conditions of air hygrometry and temperature.



*Application of the carbon fabric*



*Option: overcoat*

Foreva<sup>®</sup> Solutions  
Extending life span  
Of structures

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Sustainable Technology