FIB-energy® FPC

FIB-energy® FPC FIBRE WITH VERY HIGH RESISTANCE AND VERY HIGH ELASTICITY MODULUS

Description

Is a fibre with very high tenacity, particularly studied for use in concrete, micro-concretes and renders. The fibre strands will disperse uniformly when preparing the paste with water with perfect distribution of the fibres.
100% polyacrylonitrile product from humid spinning process, has rough contact surface resulting in a strong adhesion with the cement.

Technical characteristics (typical values)

• Diameter	16µm
• Length	8 mm – 24 mm
• Specific weight	1,18 g/cm^3
• Tensile strength	650 N/mm^2
• Elasticity modulus	14.500 N/mm^2 (14,5 GPa)
• Elongation till break	10%
• Dosage	from 0,5 to 1,5 Kg/m^3

Indications of use/advantages

Chemical resistance:
Specific solvents of **FIB-energy® FPC** are: dimethylformamide; dimethylacetamide; dimethylsulphoxide; ethylene carbonate; salts like chlorides and nitrates of aluminium, zinc, and other heavy/transition metals; halogens and rodanates of alkali metals.
FIB-energy® FPC have complete resistance to organic solvents like: alcohols like methanol and homologues, benzol, benzyl alcohol, glycol, glycerol, toluol, xylol, phenol; tetralin; ethers; ethanolamine; ethylenediamine; amylacetate; aniline; dioxane; lactic acid; mineral oils; m-cresol; ketones; esters; aliphatic, olefins, aromatic hydrocarbons; chlorated hydrocarbons e.g. CCl4, CCl3, di-, tri-, tetra-Chloroethylene; carbon sulphide.
Very good resistance of **FIB-energy® FPC** to solutions of organic and inorganic acids and alkali like: formic acid; acetic acid; phosphoric acid; nitrous acid; chloric acid; sulphuric acid; fluoric acid; potassium alkalis; ammonia and sodium carbonate solutions.
At high temperatures and concentrations, some solutions may harm **FIB-energy® FPC** especially >80°C concentrated solutions of nitric acid and sodium carbonate.

General properties:
The properties which distinguish the performance of FIB-energy® FPC are:

- High chemical and mechanical adhesion to the cement matrix, combination of the particular surface shape of the fibre and of the attraction between –CN groups of the polymer chain of the fibre and the –OH groups of the silica hydrates.
- Optimal resistance to physical and chemical agents. Resistant to alkali from the cement, the fibre in 100% polyacrylonitrile is both way resistant to acids, chlorides and other salts; and completely stable to U.V. rays. The physical properties remain the same at temperatures even over 100°C, also permitting its use at high temperatures. It is all the same completely inert to organic substances, it is not fragile, doesn't create dangerous powders, doesn't produce stains or corrosion marks;
- High number of fibres: one kilo of fibres is composed out of 527 million of individual fibres, length 8 mm, and 160 million fibres with length 24 mm. Because of grinding and fine diameter that create a dense three-dimensional network.
- Very high form factor (ratio length-diameter), variable from 250 (for 4mm) to 1500 (for 24 mm) in function of the length of the fibre.

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- High performance/cost ratio because of the low specific density of the fibre and its inherent toughness allow obtaining excellent results with a low dosage.
- The effect of the fibre in concrete and renders is already notable at 0.5kg/m³ dosage.
- High fineness of the fibre, that is ideal for all rendering types, stucco's, also applied with very thin layers.
- Easy dispersion in the mix and therefore possibility of high dosage. The stranded fibre is dispersed in a uniform way in the mix. Next, when the hydro-soluble bond is broken, the individual fibres will be dispersed uniformly as well.
- The reduction or elimination of cracks can be achieved with the use of rational Mix Designs and our additives for concrete allowing low w/c ratios and reduced shrinkage, better homogeneity of the mix etc.
- A clear reduction of the segregation of aggregates and "bleeding". In fact, the three-dimensional fibrous structure contrasts the vertical movements of solid particles and water in the mix, especially during transport and the vibration of the concrete. This increases also the impermeability of the surface.
- An easy finish of the concrete as the fibres for their fineness, hydrophilicity and specific weight remain completely incorporated in the matrix, facilitating the smoothing. Use super-plasticizer to obtain the necessary w/c ratio. Recommended are our additives Tecnos ® or Tecnos ® azur.

An increased thixotropy, reduced number of surface defects, and a better adhesion in case of renders and mortars is an additional benefit.
FIB-energy® FPC fibres create high chemical and mechanical adhesion with the cement matrix, resulting in optimal resistance to chemicals, are unaffected by the cement alkalinity, are resistant to chlorides and to UV rays.
FIBRE-tec® FPC ultra fine fibres increase the thixotropy of the paste and eliminate or reduce plastic shrinkage: 1 Kg of FIB-energy® FPC = 500 million fibres. FIBRE-tec® FPC contributes to the reduction in bleeding, the easier finish of the concrete, to the reduction of rebound, and to the increasing ductility.
FIB-energy® FPC fibres are used in concrete pavements, renders, mortars, sprayed concreted, prefabrication of elements etc.

Packaging

Length 8 mm:
bags of 15 Kg
water soluble bags of 0,8 Kg in box of 20 Kg.

Length 24 mm:
water soluble bags of 0,5 Kg in box of 15 Kg.
water soluble bags of 4 Kg in box of 16 Kg.

Note: Exceptional volumetric stability of concrete can be achieved, with maximum reduction or elimination of shrinkage and rapid finishing using simultaneously with the fibre, our technology **SHRINKO-tec® nano** (reduction of shrinkage) - **Tecnos azur® PF 2000** (super-plasticizer effect of reducing mixing water) as such or together with **CEMEX M-1000** (expansive with steel net) for floors without joints.

Engineers of our Service Department and Project Promotion are available to the conception and pre-qualification of Mix Designs for high performance concrete.

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