

## Secondary Armor of Retraction

# MULTIFIBRAS<sup>®</sup> Monofilament fiber PP Concrete

### PRODUCT

The monofilament polypropylene fibers are produced 100% pure, provided in filaments for secondary reinforcement of concrete and mortar. The three - dimensional reinforcement, provided by the polypropylene fibers, intercept the fissures that occur in the plastic or hydraulic retraction of the concrete in its initial stage of micro and macro fissures inherent in concrete without the fibers. The added polypropylene fibers provide better impact resistance to abrasion and reduce permeability. **Monofilament fiber PP concrete** meets the standards ASTM C-1116 section 4.1.3.

### BENEFITS

- Better link in concrete and mortar due to the woven mesh;
- Uniform distribution in the concrete matrix and mortar;
- Any method can be used in the finish;
- Does not have outcrops on the surface;
- Minimizes breaks or chipping;
- Does not suffer corrosion from alkalis;
- Anti-magnetic;
- Better resistance to impact and abrasion;
- Reduction of permeability;
- Reduce micro and macro fissures.

### SEGMENTS OF USE

Industrial floors, slabs, decks, pre-cast walls, highway pavements, sports arenas, façades, artifacts of cement, tilt-up panels, dam structures, in tunnels, with mechanical application either humid or dry, hydroelectric and nuclear power plants, port and maritime infrastructure, etc. Other applications include façade mortar, pool restorations.

### APPLICATIONS

**Monofilament fiber PP concrete** typically has 12 mm of length and are added to an average of 0.60 kg to 1.0 kg for each m<sup>3</sup> of concrete. The amount can be higher, as a function of desired results, obeying the maximum amount of 8.0 kg. When mixed in the concrete, the fibers disperse separating themselves in 300 million filaments per kg. The ability of the fibers in absorbing water is 0.01% by weight.

### HOW TO USE

Monofilament fiber PP concrete is presented in packages of 600 g or multiples and can be added manually or mechanically, being measured in the concrete plant or in the concrete truck. The fibers should be added in proportion to the requirements of the project, being dispersed manually and mixed in the truck for a minimum of 5 minutes.

### LIMITATIONS OF APPLICATION

When used in elevated slabs, the polypropylene fibers, by themselves, cannot guarantee the absence of fissures. In these instances, the steel screen should be incorporated together with the fibers.

### CHARACTERISTICS AND PERFORMANCE

**PERMEABILITY:** Tests conducted by **ATEC (American Testing and Engineering Corp) Associates Inc.** in Indianapolis, IN, USA confirm that 600 g/m<sup>3</sup> of glass fibers reduce the permeability of concrete by approximately 44%, when compared with concrete without reinforcement. The ability of the fiber PP concrete in absorbing water is 0.01 % by weight.

**IMPACT RESISTANCE:** Tests concluded that a cylindrical concrete disk that is subjected to an impact load of 4.5 kg falling from a height of 5 meters resulted in various fissures and breaks. The tests established that the addition of 600 g/m<sup>3</sup> of polypropylene fibers increased the number of blows required for the first fissure to occur by 58% and the number of blows required for total fracture increased by 100% when compared to concrete without reinforcement. The difference between the first fissure up to the point of breaking proves that the union of the fibers with the matrix of concrete has occurred.

### PHYSICAL PROPERTIES

Diameter of Filament	18 microns
Number of Filaments per kg	300 million
Density (g/cm <sup>3</sup> )	0.94
Length of fibers	6, 12 and 19 mm
Resistance to traction	80 Mpa
Elongation	5 Gpa
Resistance to UV	High
Resistance to alkalis	Excellent
Electrical conductivity	Low
Thermal conductivity	Low
Air incorporation into concrete	No effect

### STORAGE

**Monofilament fiber PP concrete** Should be stored in a dry and ventilated location at a temperature below 77°F (25°C).

### EXPIRATION

Indefinite in unopened package.

### NOTE

The data confirm that 600 grams of polypropylene fiber per m<sup>3</sup> of concrete reduce plastic shrinkage cracking by 83% compared to concrete without reinforcement..