

# FORTA-FERRO

## Advanced Concrete Reinforcing Fiber

### Frequently Asked Questions

#### Why use secondary reinforcement?

Secondary non-structural reinforcement such as wire mesh does not keep cracks from occurring, but has traditionally been used to hold the concrete together AFTER it cracks. Synthetic fibers have proven the ability to discourage early plastic shrinkage cracks from occurring in the first place, and the correct heavy-duty fiber can also affect post-crack behavior. The FORTA® Engineering Department is available to assist project owners and specifiers in determining the correct fiber type to act as an alternate to conventional reinforcement.

#### Can fibrillated fibers replace wire mesh in concrete?

YES. If the wire mesh is non-structural in nature, then a fibrillated (net-shaped) polypropylene fiber at a minimum dosage of 1.5 lbs. per cubic yard (0.9 kg per cubic meter) can adequately replace the wire mesh as the secondary reinforcement. FORTA® recommends a 1 1/2" (38 mm) or longer length fiber to optimize performance.

#### Should monofilament fibers replace wire mesh in concrete?

NO. Some fiber manufacturers recommend a single strand, monofilament fiber at a dosage rate of 1.0 lbs. per cubic yard (0.6 kg per cubic meter) as sufficient to replace the wire mesh as secondary reinforcement. FORTA® research has shown that while monofilament fibers do reduce plastic shrinkage during the early life of the concrete, they have limited benefit once the concrete cracks. As a result, FORTA® does not recommend this fiber level as a wire mesh alternative.

#### Do FORTA® reinforcing fibers reduce cracking in concrete?

YES. The use of FORTA's synthetic fibers at the manufacturer's recommended dosage rate per cubic yard can reduce plastic shrinkage cracking in concrete. FORTA's experience has been that almost any material that is in the general form of a fiber will help reduce plastic shrinkage within the early life of the concrete. However, additional FORTA® research has shown that if we expect the fiber to offer hardened or post-crack benefits, it is important to deform the fiber into a fibrillated or net-shaped form to enhance the anchorage ability within the concrete.

#### Does the use of FORTA® affect the compressive strength?

The use of low or high-volume synthetic fibers is not intended as a method to increase the raw strength of the concrete. The use of fibers does not appreciably increase or decrease compressive strength. However, high dosages or macro/structural synthetic fibers have been shown to dramatically change how concrete cracks and fails, encouraging a very ductile mode of failure.

#### Does the use of FORTA® affect the impact resistance?

YES. Impact resistance tests were performed using FORTA® ULTRA-NET (2 1/4" lengths) at a dosage rate of 1.6 lbs per cubic yard (1.0 kgs per cubic meter) to the first visual crack and then to ultimate failure using the drop hammer test method recommended by ACI Committee 544. The FORTA® reinforced specimens offered a dramatic +35% improvement at ultimate failure over the control specimen, reinforcing this fiber's ability to improve post crack behavior.

#### Does the use of FORTA® require mix design changes?

YES AND NO. When our fibers are used at standard dosage and application rates, no mix design changes are necessary. However, when fiber volume rates are dramatically increased, some alterations in the mix design may be required. Please contact our Technical Department for assistance regarding mix design and fiber dosage rates.

#### Does the use of FORTA® eliminate the need for good concrete practices?

NO. The use of any of the FORTA® synthetic fibers does not replace the need for good concrete practices. As with any concrete, it is important to follow proper industry-recommended practices in regard to mixing, placing, jointing and curing the concrete to improve the opportunity to achieve a successful project.