

## **FORTA-FERRO<sup>®</sup>**

A second generation macro synthetic fiber, FORTA-FERRO<sup>®</sup> allows for a higher replacement level of conventional reinforcing steel. A unique twisted-bundle heavy-duty configuration allows for excellent mixing and surface finish at high 3.0 to 30.0 pound/cubic yard dosages.

## **ULTRA-NET<sup>®</sup>**

An easy-to-finish, color-blended (tan) fiber, made of polypropylene in a unique twisted bundle, extra heavy duty network form. ULTRA-NET<sup>®</sup> has ultra-bonding power and long lengths-up to 2 ½" (60 mm). Dosage of 1.6 lbs. /per cubic yard (1.0 kg. /per cubic meter).

## **SUPER-NET<sup>®</sup>**

An easy-to-finish, color-blended (gray) fiber, made of polypropylene in a network form. SUPER-NET<sup>®</sup> has super networking power and long lengths up to 1 ½" (38 mm). Dosage of 1.5 lbs. /per cubic yard (0.9 kg. /per cubic meter).

## **ECONO-NET<sup>®</sup>**

A white polypropylene fiber in a medium-duty network form. ECONO-NET<sup>®</sup> has good bonding power with lengths up to 1 ½" (38mm). Dosage of 1.5 lbs. /per cubic yard (0.9 kg. /per cubic meter).

## **MIGHTY-MONO<sup>®</sup>**

A premium polypropylene monofilament fiber. Lengths of ½" (13mm) to ¾" (19mm). Dosage of 1.0 lbs. /per cubic yard (0.6 kg. /per cubic meter).

## **ECONO-MONO<sup>®</sup>**

A polypropylene monofilament fiber in a length of ¾" (19mm). Dosage of 1.0 lbs. /per cubic yard (0.6 kg. /per cubic meter).

## **NYLO-MONO<sup>®</sup>**

A fully-stretched nylon monofilament for a nylon fiber finish in a length of ¾" (19mm). Dosage of 1.0 lbs. /per cubic yard (0.6 kg. /per cubic meter).

## **CAST-MASTER<sup>®</sup>**

A premium precast fiber, made of polypropylene in a twisted bundle, extra heavy-duty network form. Long lengths up to 2 ½" (60 mm). Dosage of 1.6 lbs. /per cubic yard (1.0 kg. /per cubic meter).

## **ECONO-CAST<sup>®</sup>**

An economical precast fiber made of polypropylene in a heavy-duty network form. Long lengths up to 2 ½" (60 mm). Dosage of 1.5 lbs. /cubic yard (0.9 kg. /per cubic meter).

## **STUCCO-BOND<sup>®</sup>**

A superior stucco fiber made of polypropylene in monofilament form. Length of ½" (13 mm). Dosage of 1.0 lbs. /per cubic yard (0.6 kg. /per cubic meter).



## **FORTA Corporation**

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# FORTA<sup>®</sup>

Reinforcing the Future - *Worldwide*

## Fiber Selection

## 4-C's Formula





## The Past

One of the earliest uses of fiber in building materials was in ancient Egypt, when crude straw “fibers” were added to clay and mud building blocks and bricks. Though somewhat primitive in design, these fibers added a certain amount of cohesiveness and toughness which the Egyptian builders found to be very valuable. Early plasterers achieved similar benefits by adding horse hair to plaster as a method of reinforcement. Though the design and uniform distribution of these early fibers were questionable, the basic theory of adding three-dimensional fibers to increase the toughness and durability of various building materials proved to be a sound one.

## The Future

Thousands of years later, FORTA Corporation was founded to introduce a fiber product that offered tremendous improvements over the original Egyptian straw-fiber theory. By combining space-age synthetic materials with unique designs and shapes, FORTA® offered the construction market a valuable fiber reinforcement product that controlled cracking and added long-term durability to a wide variety of concrete applications. FORTA® has expanded their product line to include an entire family of fibers – tailored to specific applications and demands of the international concrete community. Since FORTA®'s beginning in 1978, their fibers have played an important role in the design and construction of many different types of projects – from airports to tennis courts – from swimming pools to public schools.

# FORTA®'s 4-C's Formula

## Configuration

Monofilament,  
Fibrillated Networks, or Macro

The most important criteria is the fiber configuration. Common sense would suggest that something deformed or irregular in shape will anchor much better than something straight and smooth. A thin, smooth finishing nail doesn't hold like a heavy lag bolt. For the same reason, fibrillated network and macro fibers anchor better in concrete than smooth monofilament fibers. The fiber's ability to anchor also determines its ability to contribute to short-term and long-term concrete durability. If the fiber's objective on a project is simply to control plastic shrinkage cracking during the very early concrete stages, a monofilament configuration will be sufficient. For additional anchorage benefits, choose a fibrillated network or macro configuration to maximize the long-term durability results.

## Chemistry

Polypropylene, Co-polymer  
or  
Nylon

The chemical make-up of the fiber is important if the fiber is expected to hold up in the aggressive alkali environment of Portland cement concrete. For monofilament fibers, the buyer can choose nylon, which possess high strength and good resistance to alkali, or polypropylene, which combines strength with an excellent (inert) resistance to alkali and chemical attack. In addition, polypropylene is non-absorptive, which makes it an excellent choice for freeze-thaw environments and better anchoring power. For fibrillated or macro fibers, only polypropylene is suitable to the fibrillation or network manufacturing process.

## Contents

1.0, 1.5, 1.6, or more  
lbs. per cu. yd.

Though it sounds obvious, using a sufficient quantity of fiber is an often overlooked factor. Even the best fiber in the world will fall short on performance if enough is not used to get the job done. After extensive FORTA® research, it became apparent that there is an **optimum** dosage level for a particular fiber type to achieve **optimum** results. For polypropylene or nylon monofilament fibers to reduce early shrinkage cracking, 1.0 lb. per cubic yard (0.6 kg. per cubic meter) is sufficient. For fibrillated polypropylene fibers to act as a true temperature reinforcement, 1.5 to 1.6 lbs. per cubic yard (0.9 to 1.0 kg per cubic meters) is the standard. Even higher dosages of synthetic macro fibers can offer additional long-term benefits and performance – contact FORTA® technical services for assistance.

## Correct Length

1/2", 3/4", 1-1/2",  
2-1/4", or 2-1/2"

Length is very similar to configuration with regards to fiber's ability to anchor. If you try to break a short string held between your fingers, your fingers most likely slip off, while adding length to the string allows for better grip. Likewise, if a short fiber pulls out of the concrete before it breaks, the high tensile strength of the fiber has been wasted. Fiber length recommendations vary based on the configuration that is chosen. The optimum length for the monofilament fibers is typically in the ¾" (19 mm) range. For standard fibrillated fibers, lengths range from ¾" (19 mm) up to 1-½" (38 mm). Even longer lengths, up to 2-½" (60 mm), may be specified for macro fibers if the fiber bundles are pre-twisted during manufacturing.