SYNTHETIC FIBERS
FREQUENTLY ASKED QUESTIONS

What types of fiber are available?

PRODUCT	TYPE	TYPICAL DOSAGE	APPLICATION
MasterFiber M100	Micro fiber - Monofilament	1/2 lbs./cy	Control plastic shrinkage cracking - 90% reduction
MasterFiber F70	Micro fiber - Fibrillated	1.5 lbs./cy	Replace 10 gauge mesh in slab-on-ground secondary reinforcement applications.
MasterFiber MAC 360FF	Macro fiber	3.0 lbs./cy	Replace mesh and rebar in slab-on-ground applications.
MasterFiber MAC 360FF	Macro fiber	4.0 lbs./cy	Replace mesh in composite metal deck applications.
MasterFiber MAC MATRIX	Macro fiber	3.0 lbs./cy	Replace rebar in residential basement wall applications.

How long have fibers been used in concrete?

The concept of using fibers as reinforcement is not new; it was used in ancient Egypt to strengthen mortar and bricks. Since the 1960's, the most common material used in concrete fibers is polypropylene. Today, there are two primary classes of synthetic fiber, "Microsynthetic" and "Macrosynthetic".

What does the American Concrete Institute (ACI) say about fibers?

ACI 360 "Guide to Design of Slabs-on-Ground" permits the use of structural synthetic fibers to replace welded wire mesh and small rebar in slab-on-ground applications.

How do fibers provide performance comparable to steel mesh?

In most slab on ground applications, the mesh does not act as primary reinforcement, but is used to provide secondary reinforcement or crack width control. While mesh must be in the top third of the slab to function correctly, synthetic fibers provide 3-dimensional reinforcement without any special handling. Mesh that "ends up" at the bottom of the slab or directly on the subbase is ineffective as secondary reinforcement.

Are synthetic fibers approved for composite metal deck applications?

Macro synthetic fibers can also be used to replace wire mesh in elevated metal deck applications. The Steel Deck Institute guidelines govern this application and require a minimum dosage of 4 lbs./cy.

Can fibers be used in radiant heat flooring?

Since the heating tubes are typically connected to the wire mesh in a conventional radiant heat flooring slab, wire mesh is rarely in the correct location for crack control. Substituting macro fiber for mesh provides optimum crack control without affecting the heating tube location. Tubes can be connected to the insulation with special staples or special insulation panels with a tube holding grid.

How do fibers reduce costs during construction?

- Save on labor. Installing steel mesh or tying rebar is very labor intensive. Fiber reinforced concrete eliminates this cost.
- Save on materials. With the escalating price of steel, structural synthetic fibers are less expensive than the mesh or rebar that they replace.
- Save on logistics. Replacing mesh with structural synthetic fibers eliminates the need order and stockpile mesh at the site. Your reinforcement arrives in the concrete
- Save on pumping. Mesh on chairs or rebar mats force contractors to use concrete pumps and make the use of laser screeds difficult. Often, by replacing the steel rebar and mesh with fibers, the contractor can tailgate the concrete instead of pumping it.
- Safety. Instead of wrestling with mesh on an elevated deck, the reinforcing can be pumped from the ground in the concrete. Cuts and punctures associated with tying rebar can also be eliminated.

What are the advantages of fibers in concrete after construction?

- Better crack control. Fibers are distributed throughout the mix at the concrete batch plant and provide three-dimensional reinforcement without any special precautions. As per ACI 360, wire mesh must be placed in the top third of the slab to function properly. Wire mesh that is placed in the lower half of the slab or lies directly on the stone subgrade provides no crack control benefit.
- Eliminate risk of corrosion. Many slabs are damaged when the interior steel reinforcement corrodes, expands, and spalls the concrete. Structural synthetic fibers are composed of polypropylene plastic and will not corrode or degrade. All corrosion concerns are eliminated when using fibers to replace wire mesh.
- Fiber reinforcement increases the impact resistance of the slab. The result is less spalling and chipping.

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