

ECMAS EXF 54

Hybrid Synthetic Structural Fiber

Description

ECMAS X FIBER 54 (EXF 54) is a synthetic structural fiber designed to improve the durability and mechanical properties of concrete. EXF 54 is a hybrid fiber, meaning it consists of a non-fibrillated monofilament containing a special mix of Polyolephinic polymers and a fibrillated Polypropylene fiber capable of reducing and in some cases totally eliminating plastic shrinkage. EXF 54 increases concrete's flex fatigue, ductility, fatigue resistance and durability.

Unlike metal fibers, EXF 54 is non-corrosive, non-magnetic, and 100% acid and alkali proof.

Concrete made with EXF 54 offers much greater durability and mechanical performance than concrete made with an equal amount (by volume) of metal fibers, either smooth or hooked. EXF 54 may be used in place of electro-welded mesh in all flooring applications.

Properties

Use of EXF 54 guarantees uniform performance thanks to the excellent dispersion of fibers in the mix. It maintains the same mix workability. In flooring, it solves all the corrosion-related problems typically associated with metal fibers, significantly improving durability. It help reducing floor thickness and eliminates the need for electro-welded mesh and metal fibers.

EXF 54 effectively control temperature/ plastic shrinkage cracks in concrete and improves concrete's residual tensile strength, and therefore its final strength and resistance to the stress caused by dynamic and static overloads.

Lastly, it simplifies work on the construction site, preventing errors and saving time.

Typical applications

EXF 54 fibers may be used in any kind of concrete and for any of the exposure classes they are designed for (in accordance with EN206). Its chemical inertia allows EXF 54 to be used beneficially in making concrete for use in highly aggressive environments such as the marine environment or the chemicals industry, where concrete with metal fibers cannot be used because of corrosion.



EXF 54 synthetic structural fiber is particularly recommended in concrete for the following uses:

- Industrial floors and outdoor pavements: Parking areas, material storage areas, flooring subject to heavy weights and/or high dynamic loads, jointless flooring, service stations and workshops, refrigerating cells, storage areas, wharves, airport runways. A special calculation software for this type of slab on ground pavement, ECMAS team can provide software aided X Floor Designs.
- Residential & Commercial construction: Foundation slabs, floor slabs, Composite Steel Deck slabs.
- Prefabrication: Panels, prefabricated elements for tunnels, drinking water reservoirs, cable ducts (conventional, fiber optic, etc.), railway ties, prefabricated rail plates, roofing elements, jersey barriers.

Use Recommendations

Fibers should be added directly to the mixer in the prefabrication or concrete mixing plant, or in the mixer truck.

Add fibers to the conveyor belt with inert matter, cement, sand and the first portion of gravel. Do not add fibers first. Dry Mix for at least 5 minutes at maximum speed before adding water.

Note

Do not use EXF 54 fiber in place of primary reinforcement for applications other than industrial flooring.

Technical Properties

Material	Mix of fibers of a Polyolephin (Polyethylene Co-Polymer) and a fibrillated Polypropylene fiber
Specific weight	0.91 kg/dm ³
Length	54 mm
Equivalent diameter	0.48 mm
Length/diameter ratio	113
Tensile strength	620 - 758 MPa
Chemical Resistance	Total Resistance to acids, bases and salts
Conformity	ASTM C-1116

Certifications & Compliances

- Standard EN 14889-2 for structural applications in concrete and mortars.
- ASTM C1116 / C1116M-10a, Standard Specification for Fiber-Reinforced Concrete, "Type III Synthetic Fiber- Reinforced Concrete"
- ASTM D7508 / D7508M-10(2015), Standard Specification for Polyolefin Chopped Strands for Use in Concrete

Fire Reaction

Like all synthetic fibers, EXF 54 deteriorates upon reaching its melting point in the event of fire. This is only apparently a disadvantage as compared to metal fibers, for instance; during a fire, when they reach their melting temperature the fibers decompose without releasing toxic gases, transforming the volume they previously occupied in the cement mix into a series of interconnected “channels”. These channels act as “escape routes” for the heat and steam that is generated when the water in the gaps suddenly comes to a boil. This property prevents EXF 54 fiber reinforced concrete from exploding violently the way concrete reinforced with steel fibers or unreinforced concrete will do, as they lack the porosity automatically generated by EXF 54 fibers.

Doses

Minimum 1.5 Kg/m³ of concrete (to be assessed on the basis of the application parameters). Discuss ECMAS team for recommendation of doses.

Packaging

16 bags weighing 1 kg each on 192 kg pallets or 8 bags weighing 2 kg each on 192 kg pallets

These Synthetic Structural Fibers are manufactured by FORTA FERRO CORPORATION, USA and marketed as EXF 54 Fibers by ECMAS Construction Chemicals Pvt. Ltd. in India.



Slab-on-Ground



Composite Steel Deck

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