TUF-STRAND SF

Synthetic Macro-Fiber

Description

TUF-STRAND SF "structural fibers" are a patented polypropylene / polyethylene synthetic macro-fiber successfully used to replace steel fibers, welded wire mesh and conventional reinforcing bars in a wide variety of applications. TUF-STRAND SF fibers comply with ASTM C1116, Standard Specification for Fiber Reinforced Concrete and Shotcrete, and are specifically designed to provide equivalent tensile and bending resistance to conventional reinforcement requirements. Concrete reinforced with TUF-STRAND SF will have three-dimensional reinforcing with enhanced flexural toughness, impact and abrasion resistance and will also help mitigate the formation of plastic shrinkage cracking in concrete. Dosage rates will vary depending upon the reinforcing requirements and can range from 3.0 lbs/yd^3 (1.8 kg/m^3) to 20 lbs/yd (12 kg/m^3). TUF-STRAND SF synthetic macro-fibers comply with applicable portions of the International Code Council (ICC) Acceptance Criteria AC32 for synthetic fibers, are UL certified for composite metal deck construction and are recognized within ACI 360 and SDI/ANSI-C1.0 as a reinforcing alternate to WWF.

Primary Applications

- Thin walled pre-cast (septic tanks, vaults, walls, etc.)
- Shotcrete for tunnel linings, pool construction and slope stabilization
- Pavements and white-toppings
- Slab on Grade and elevated construction (distribution centers, warehouses, etc.)

Features/Benefits

- Equivalent strengths to WWM and rebar provided by engineering calculations
- Controls and mitigates plastic shrinkage cracking and reduces segregation and bleed-water
- Provides three-dimensional reinforcement against micro and macro-cracking
- Reduces equipment wear, fiber rebound and increases build-up thickness compared to steel fibers for shotcrete applications
- Increases overall durability, fatigue resistance and flexural toughness
- Reduction of in-place cost versus wire mesh for temperature / shrinkage crack control
- Easily added to concrete mixture at any time prior to placement
- Tested in accordance with ASTM C 1399, C 1550, C 1609 and C 1018
- Applicable for design by ACI 360 R-10
- Certified for use by UL/ULC for D900 Series metal deck assemblies as alternate to WWF (CBXQ.R13773)

Technical Information

Typical Engineering Data

Material	polypropylene/polyethylene blend
Specific Gravity	0.92
Typical dosage rates	3 to 20 lbs/yd^3 (1.8 to 12 kg/m^3)
Available lengths	2" (51 mm)
Aspect Ratio	74
Tensile Strength	87-94 ksi (600 to 650 MPa)
Modulus of Elasticity (EN 14889.2)	1380 ksi (9.5 GPa)
Flash point (ASTM D1929)	625°F (330°C)
Electrical and Thermal Conductivity	low
Water Absorption	negligible
Acid and Alkali Resistance	excellent
Color	white

Packaging

TUF-STRAND SF fibers are packaged in 3.0 lb (1.36 kg), 4.0 lb (1.81 kg) and 5.0 lb (2.27 kg) water soluble bags.

Shelf Life

3 years in original, unopened package.

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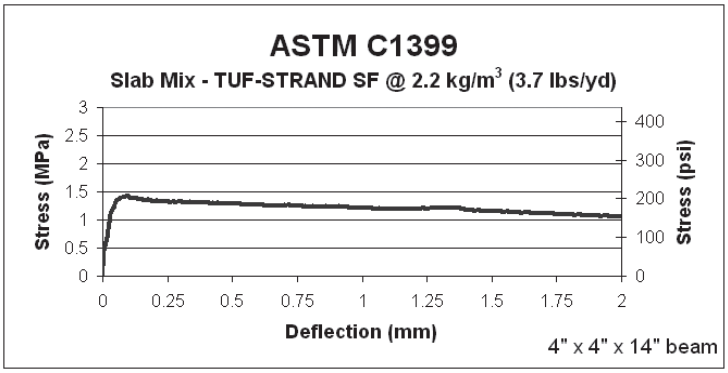
Directions for Use

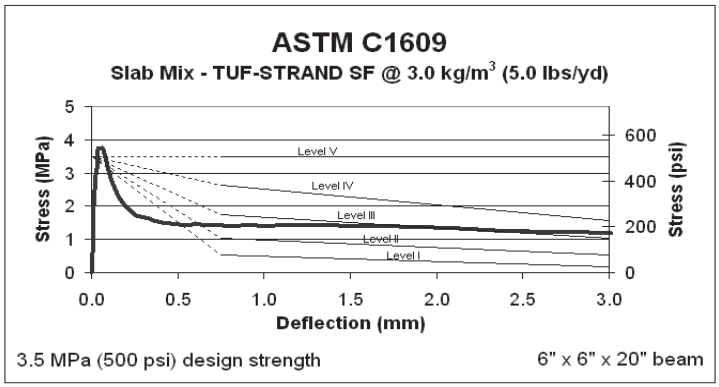
TUF-STRAND SF fibers can be added to the concrete mixture at any time prior to placement of the concrete. It is generally recommended to add any fiber material at the ready-mix concrete plant during batching. Fibers must be mixed with concrete for a minimum of three (3) to five (5) minutes at maximum mixing speed, depending on the mixer type, to ensure complete dispersion and uniformity. When adding 3 to 5 lbs/yd^3 (1.8 to 3 kg/m^3), a slump loss of up to 2" (50 mm) can be expected for a typical ready-mix concrete design. For dosages of 6 to 12 lbs/yd^3 (4 to 7 kg/m^3), a slump loss of 3 to 5 in (75 to 125 mm) can be expected. The use of water reducers and/or superplasticizers, such as Eucon 1037, Eucon MRX or the Plastol series of admixtures may be necessary to maintain desired workability.

Add other admixtures independently from fiber addition. TUF-STRAND SF is compatible with all Euclid Chemical admixtures. When used properly, and placed in a concrete mix of sufficient workability, the fibers will not adversely alter the compressive or flexural strength of concrete or shotcrete.



Average Residual Strength (ARS) at given deflection					
deflection	0.5 mm	0.75 mm	1 mm	1.25 mm	Average
ARS - MPa	1.29	1.24	1.21	1.19	1.23
ARS - psi	187	180	176	172	179

single test analysis - individual results may vary



P 150,0.75	f 150,0.75	P 150,3.0	f 150,3.0	T 150,3.0	JSCE	R_{e3} (%)
10.5 kN	1.4 MPa	9.0 kN	1.2 MPa	35 J	1.41 MPa	34.8
2360 lbs	200 psi	2020 lbs	175 psi	310 in lb	205 psi	

single test analysis - individual results may vary

Clean-up

Loose fiber material may be disposed in proper receptacles for refuse. Finishing equipment with fibers embedded in concrete should be thoroughly cleaned.

Precautions/Limitations

- Use of fibers may cause an apparent loss in measured slump of concrete. This may be offset with the use of a water reducing admixture if necessary.
- Fibers should never be added to a "zero-slump" concrete. Ensure a minimum concrete slump of 3" (80 mm) prior to addition of any fiber material. Fibers may also be added in loose form to aggregate charging devices.
- In all cases, consult the Material Safety Data Sheet before use.

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