

SYNTHETIC FIBERS

Expert Solutions Using Fiber Reinforced Concrete

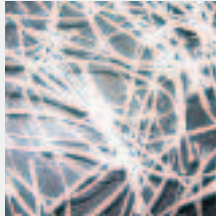
SYNTHETIC FIBERS

EUCO FIBER REINFORCED CONCRETE SOLUTIONS

The use of synthetic micro- and macro-fibers in concrete can often greatly improve the overall durability and long-term performance of concrete structures. The Euclid Chemical Company provides fibers for concrete under the Fiberstrand and TUF-STRAND SF™ product lines.

Synthetic micro-fibers provide superior resistance to the formation of plastic shrinkage cracks versus welded wire fabric. However, they are unable to provide any resistance to further crack width openings caused by drying shrinkage, structural load or other forms of stress.

Synthetic macro-fibers can provide resistance to plastic shrinkage. These products will also provide concrete enhanced toughness and the ability to deliver structural capacity when properly designed. Synthetic macro-fibers can be used as a true alternative to welded wire fabric, steel fibers and light gauge steel rebar for pre-cast, slabs-on-grade and shotcrete applications.



All Euclid Chemical Company micro- and macro-synthetic fibers meet or exceed the requirements of ASTM C 1116 which defines Type III Synthetic Fiber Reinforced Concrete or Shotcrete with documentary evidence confirming their long-term resistance to deterioration when in contact with the moisture and alkalis present in cement paste or the substances present in air entraining and chemical admixtures.



"The use of fibers in my pre-cast operation produced a superior looking product, saved time and money and increased my productivity nearly 40%"

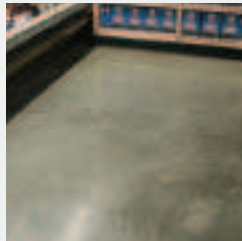
- US pre-cast concrete producer



FIBERSTRAND FIBERS



FIBERSTRAND Fibers



Fiberstrand synthetic micro-fibers are specifically designed to help control plastic shrinkage cracking as a replacement for secondary reinforcing of concrete only.

Fiberstrand F / fibrillated polypropylene
Fiberstrand 100 / monofil polypropylene
Fiberstrand 150 / monofil polypropylene
Fiberstrand 150 ML / multi-cut polypropylene
Fiberstrand 200 / monofil polyester

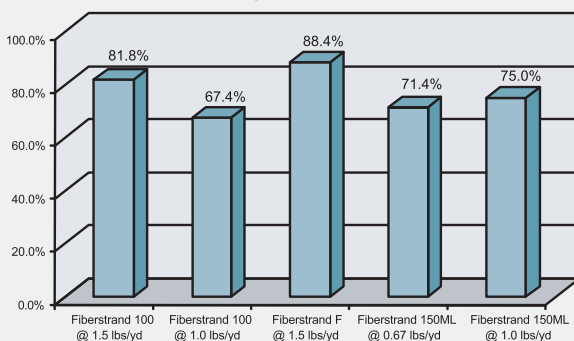


Applications

- Industrial and warehouse floors
- White-toppings and overlays
- Pre-cast products



Plastic Shrinkage Reduction versus plain concrete



PST&ESI
Evaluation Report
#9505 B



TUF-STRAND SF™



TUF-STRAND SF

TUF-STRAND SF is a patented synthetic structural macro-fiber engineered for use in slab-on-grade, pre-cast and shotcrete applications as a true replacement for

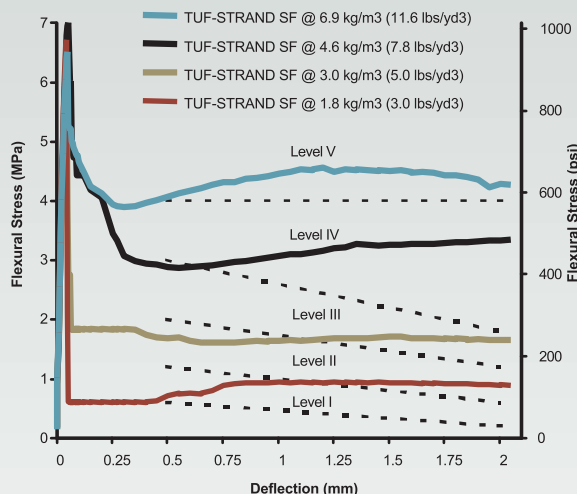
welded wire fabric, conventional light gauge steel reinforcing and steel fibers. The self-fibrillating polypropylene/polyethylene blend will provide concrete and shotcrete with enhanced flexural toughness, impact and fatigue resistance and superior plastic shrinkage control.



Applications

- Industrial and warehouse floors
- Thin-wall pre-cast products
- White-toppings and overlays
- Shotcrete

ASTM C 1018-97 $f'_c=33 \text{ MPa (4800 psi)}$ $f'_d(\text{design})=4 \text{ MPa (500psi)}$



Fiber Dosage kg/m ³ (lbs/yd ³)	1.8 (3.0)	3.0 (5.0)	4.6 (7.8)	6.9 (11.6)
Toughness Factor, R _{es} (%)	20	37	53	75

Quick Reference Guide for Slab-on-Grade Design with TUF-STRAND SF™, lbs/yd³ (kg/m³)

Slab Thickness	6x6 10/10	6x6 6/6	4x4 6/6	4x4 4/4	#3 @ 12"	#3 @ 16"	#4 @ 12"	#4 @ 16"
4"	3.0 (1.8)	3.0 (1.8)	3.9 (2.3)	5.2 (3.1)	4.9 (2.9)	3.6 (2.1)	8.6 (5.1)	6.5 (3.9)
6"	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.5 (2.1)	3.2 (1.9)	3.0 (1.8)	5.8 (3.4)	4.3 (2.6)
8"	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	4.3 (2.6)	3.2 (1.9)
10"	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.5 (2.1)	3.0 (1.8)
12"	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)

For specified 60 ksi welded wire fabric and light steel as shown, 4000 psi concrete and for designed location of steel in top half of slab only.

Minimum recommended dosage set to 3.0 lbs/yd³ (1.8kg/m³) - equivalent to 0.1% steel reinforcing ratio.

TUF-STRAND SF dosage is calculated by determining equivalent post-crack load carrying capacity to specified steel as determined from PCA Design Method for non-structural reinforcement.

Note: Values shown are valid for Euclid TUF-STRAND SF only and are derived from standardized testing. For additional information, structural slab considerations, or dosages not provided by this table, please consult your local Euclid Chemical Company sales representative.



Referenced testing for fiber reinforced concrete:

ASTM C 1116
Standard Specification

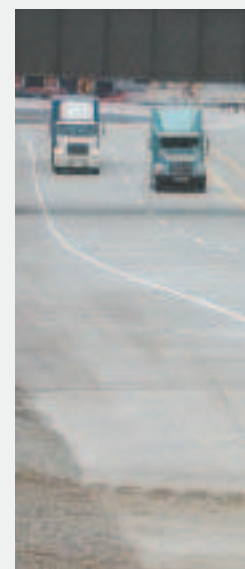
ASTM C 78 & C 1018
Flexural Strength and Toughness

ASTM C 1399
Average Residual Strength

ASTM C 1550
Round Determinate Panel Test

Plus

- Plastic and Drying Shrinkage
- Creep and Fatigue
- Impact and Abrasion





EUCO FIBER PRODUCTS

Product Name	Type of Fiber	Available Lengths	
Fiberstrand F	Fibrillated Polypropylene Fiber	3/4", 1.5", 2" (19, 38, 50 mm)	Secondary reinforcing fibers (plastic shrinkage only); typical dosage rates range from 0.5 to 1.5 lbs/yd ³ (0.3-0.9 kg/m ³)
Fiberstrand 100	Monofil Polypropylene Fiber	1/2", 3/4" (12, 19 mm)	
Fiberstrand 150	Monofil Polypropylene Fiber	3/4" (19 mm)	
Fiberstrand 150ML	Multi-cut Polypropylene Fiber	varies 1/4" - 3/4" (6-19 mm)	For information on packaging sizes, please call 1-800-321-7628 or contact your local Euclid Chemical representative
Fiberstrand 200	Monofil Polyester Fiber	3/4" (19 mm)	
TUF-STRAND SF	Polypropylene / Polyethylene Fiber	2" (50 mm)	For actual WWM and steel fiber replacement; typical dosage rates range from 3.0 to 20 lbs/yd ³ (1.8-11.5 kg/m ³)

For additional technical information, including MSDS and technical data sheets, please contact your local Euclid Sales Representative or consult our website at www.euclidchemical.com

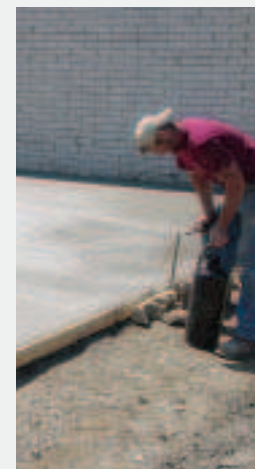
RELATED EUCO PRODUCTS

The following products are also available to assist in your fiber reinforced concrete solution project.

PLASTOL 341 - Mid-to-high range polycarboxylate water reducer for slump retention with reduced set retardation. Can be used in conventional high slump concrete or self-consolidating concrete applications.

EUCON SRA - Shrinkage reducing admixture provides less shrinkage in concrete by reducing surface tension in pore water.

DIAMOND HARD - High performance liquid densifier and sealer to increase abrasion and marking resistance, and water repellency.



FIBERSTRAND FIBERS TUF-STRAND SF

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An RPM Company

The Euclid Chemical Company, founded in 1910, is today a worldwide supplier of quality products and services for the concrete and masonry industry. Marketed under the EUCO name, we offer a full line of admixtures, repair and maintenance products based on the latest technologies. We provide complete specification assistance and laboratory support as well as on-site service for guidance on proper product usage. EUCO materials are warehoused in over 200 locations in the USA and are available world-wide through international affiliates.

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