EUCLID CHEMICAL

TECHNICAL AND SELLING TIPS FOR

FIBER REINFORCEMENT PRODUCTS

PSI™ FIBERSTRAND™ AND TUF-STRAND™

Fiber Reinforced Concrete (FRC) improves durability, reduces plastic shrinkage cracks, saves time on a job site and increases bottom line profit for ready-mix concrete and precast concrete producers. FRC can be used in flatwork construction, elevated decks, residential walls, pavements, precast concrete, shotcrete and other applications.

Fiber reinforcement products from Euclid Chemical can be added to any concrete application to protect against shrinkage cracking and to replace conventional steel reinforcing. The use of fibers in concrete leads to less callbacks and increased service life which reduces maintenance and overall cost.

Synthetic Fiber Products

MICRO-SYNTHETIC FIBERS

Monofilament Polypropylene Fibers

PSI Fiberstrand 100 **@ 1.0 lb/yd^3**
PSI Fiberstrand 150 **@ 1.0 lb/yd^3**
PSI Fiberstrand MM80 **@ 0.5 lb/yd^3**

- unreinforced concrete
- concrete with steel or wire mesh where fiber is in addition to steel

Fibrillated Polypropylene Fibers

Fiberstrand F **@ 1.5 lb/yd^3**

- replacement of 6x6 10/10 wire
- concrete where unspecified fibers are required for basic temperature and shrinkage crack control

Fibers listed above can be used for plastic shrinkage crack control; recommended dosages have been tested to provide adequate protection

MACRO-SYNTHETIC FIBERS

TUF-STRAND SF **@ 3-20 lb/yd^3**

- replacement of steel fibers, heavier gages of wire mesh and light steel rebar in slabs, pavements, walls, precast concrete and elevated decks

TUF-STRAND PX54 **@ 3-15 lb/yd^3**

- precast and shotcrete applications

TUF-STRAND MAXTEN **@ 3-5 lb/yd^3**

- light gage wire mesh replacement
- non-performance specifications

Dosages of macro-synthetic fibers are determined by specification or using tools provided by Euclid Chemical technical support and sales group

WHY USE FIBERS?

- Fibers in concrete provided by Ready-Mix and Precast producers help prevent plastic shrinkage cracks, creating more durable concrete.
- Compared to wire mesh, fibers can provide the same level of reinforcement and will be evenly distributed throughout the concrete.
- FRC allows for faster construction times and lower labor costs, saving time and money.
- With no chairs to support wire mesh or conventional steel, FRC will provide a safer and more efficient work environment.
- FRC will finish smoothly with common tools - any fibers present at the surface will quickly wear away under foot and vehicle traffic.
- Fibers are well recognized by major concrete organizations and have been tested to industry leading standards.
- FRC will provide longer lasting and more durable concrete which reduces future maintenance costs and liability.

QUICK REFERENCE GUIDE FOR SLAB ON GROUND DESIGN WITH TUF-STRAND MACRO-FIBERS, LBS/YD^3

Slab Thickness	all 6" x 6"			4" x 4"		#3 bar (3/8")		#4 bar (1/2")	
	10 ga. (W1.4)	6 ga. (W2.9)	4 ga. (W4.0)	6 ga. (W2.9)	4 ga. (W4.0)	@16"	@12"	@16"	@12"
4	3.0	3.0	4.6	5.1	7.4	3.9	5.6	7.9	10.8
6	3.0	3.0	3.0	3.0	4.6	3.0	3.4	4.9	6.9
8	3.0	3.0	3.0	3.0	3.2	3.0	3.0	3.4	4.9
10	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.7

Tuf-Strand SF or Tuf-Strand MaxTen

Tuf-Strand SF only

All Euclid Chemical synthetic fibers are available in water soluble packaging.

For specific sizes, freight policies or additional technical information, please contact your local Euclid Chemical sales representative.

OTHER TIPS AND USEFUL INFORMATION

FIBER ADDITION AND MIXING

When adding fibers to concrete, make sure that the slump of the concrete is always maintained above 2". Fibers are best added at the end of the batching cycle after all other ingredients have been added.

SLUMP OF FIBER CONCRETE

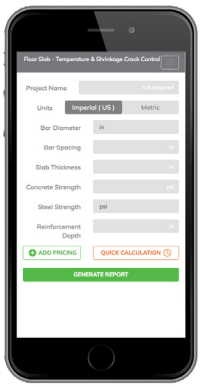
Do not add water to increase slump as this will decrease compressive strength and potentially add air. Always use a water reducing admixture to improve workability.

PLACING / PUMPING FIBER CONCRETE

Pumping fiber concrete is actually just as easy as plain concrete provided that a "pumpable" mix has been provided. When discharging from a truck to a pumper, raise the chute, if possible, and do not allow concrete to build up.

FINISHING FIBER CONCRETE

For "broom'" finish surfaces, only make passes in one direction and do not overlap brush strokes. Do not start finishing too early as fibers can be pulled from concrete.



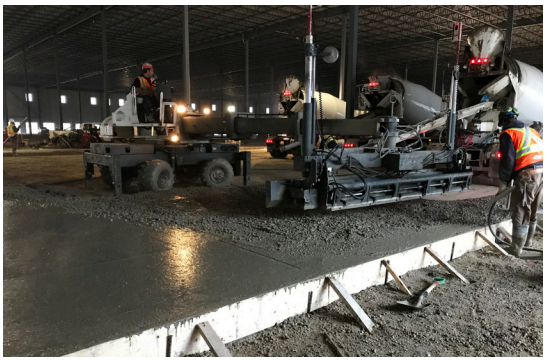
FiberCalc

www.tufstrand.com

Available on the App Store | Get it on Google play

Euclid Chemical's FiberCalc app is a TUF-STRAND SF fiber dosage calculator available for download through app stores and can also be accessed via desktop at www.tufstrand.com.

This design aid and is available to all Euclid Chemical customers to help correctly determine appropriate dosage rates for each individual application. Engineering calculations are included with each recommendation ensuring project compliance.



AVAILABLE TOOLS FOR PROMOTION, MARKETING AND TECHNICAL SUPPORT

www.euclidchemical.com

Technical Data Sheets, SDS and other product information on admixtures, fibers, decorative and construction products are available and include the following information for Fiber Reinforced Concrete:

- Fiber Reinforced Concrete Brochure
- Technical Bulletins
- Project Profiles
- Videos
- Certification Letters
- Market Segment Uses

Additional Marketing and Support

Euclid Chemical's marketing and technical support teams can also provide additional services to assist in FRC projects:

- Laboratory testing services (ASTM C1609, C1550, C1579, etc.)
- Engineering and specification support
- Field testing and validation
- Concrete mix design consultation
- Industry and trade association involvement
- Research and development

ACI 544 provides additional guidance on the use of fibers for concrete, including design, proportioning, placement and testing. Macro-synthetic fibers are also recognized within ACI 360 for reinforcement in slab on ground design.

CLASSIFIED UL

TUF-STRAND SF is UL certified for composite metal deck construction to replace WWM at a minimum dosage of 4.0 lbs/yd^3 (2.4 kg/m^3). This minimum dosage is in accordance with the Steel Deck Institute and International Building Code.