

GFRC UltraFace System

SPRAY-TECH inc.

Introduction

Spray-Tech inc. is a full service supplier of raw materials and technical solutions to the GFRC industry. Their technical team is always on the lookout for innovative technical solutions which will solve some of the problems GFRC producers face on their day-to-day operations. The **GFRC UltraFace System** was researched and designed by Spray-Tech inc. to solve some of the production problems related to face-mix design, production and finish.

Challenges with the GFRC Face Mix

Designing and producing a perfect face mix can be real challenge. That cannot be improvised by anyone and it requires good technical skills. The most common problems related to face mix are as follows:

- Onsite cracking and crazing due to excessive face mix.
- Difficulty in controlling production time for large GFRC panels which can lead to excessive drying of the face mix.
- Issues of inadequate training of the personnel applying the mix.
- Difficulty with color control, homogeneous thickness and overall uniformity of the face mix.
- Excessive face mix build-up due to the shape of the mold or to the amount of small details required by the job.

The Technical Solution

The *UltraFace* fiber is an engineered AR glass fiber designed for use in concrete and mortars where uniform dispersion of the reinforcement is needed. Also known as Cem-FIL[®] Anti-Crak[™] HD, the *UltraFace* fiber is available either as a direct roving, for chopping directly into the mix; or as a pre-chopped strand, either in bulk packaging or in mono dose bags.

The combination of the mix design, proper mixing sequence and Cem-FIL[®] Anti-Crak[™] HD creates the unique concept of the **GFRC UltraFace System**.

Cem-FIL[®] Anti-Crak[™] HD fibers are produced with a “water-dispersible” size on the fibers, allowing full dispersion into individual filaments when mixed in an aqueous mortar. A small dose of fiber provides a very large number of distributed reinforcing filaments, minimizing the distance between filaments, and resisting the formation of cracks.

Once distributed in the mix, the fibers are almost invisible. They will not protrude through the surface of the product, and require no further finishing.

Anti-Crak[™] HD chopped in 1/8 inch (3mm) is the fiber presentation that contains the greatest number of mono-filament per pound. Indeed one pound of this product contains 788 million filaments creating a strong barrier against cracking, crazing and preventing slump lines.

Cracking and Crazing



Corner Spawling



Slump Lines



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Recommended Dosage

1% by weight of the mix for flat GFRC products.
2% by weight of the mix for extra-detailed and deep GFRC products.

The Anti-Crak™ HD 1/8 inch fibers are added last in the mixing sequence. Fibers are poured directly into the mixer and are mixed for an additional 3 to 5 minutes.

Benefits of the UltraFace System

- Reduces micro-cracking and overall crazing of the panels.
- Reduces effect of freeze thaw such as peeling and scaling.
- Reduces slump lines in the final product.
- Increases vertical climbing ability during production.
- Increases uniformity of the GFRC face mix after the sand blasting and/or acid washing processes.
- Improves the patterning of face mix during the spray process.
- Reduces corner spawling during handling and shipping of the final GFRC products.
- Tightens up surface finish and improves surface finish.
- Reduces mix rebound during spray-up process.
- Reduces risk associated with difficult mold or details and the accumulation of face mix in specific areas.

The fiber does not float or show at the surface of the mix. It is not visible to the naked eye. When used in conjunction with Forton Polymer, the system helps you achieve superior face mix properties.

Example of Surface Finishes Obtained at Spray-Tech inc.



Smooth Finish – No surface defects



Limited defects at Corners



Better Color Control



No Air Holes or Slump Lines

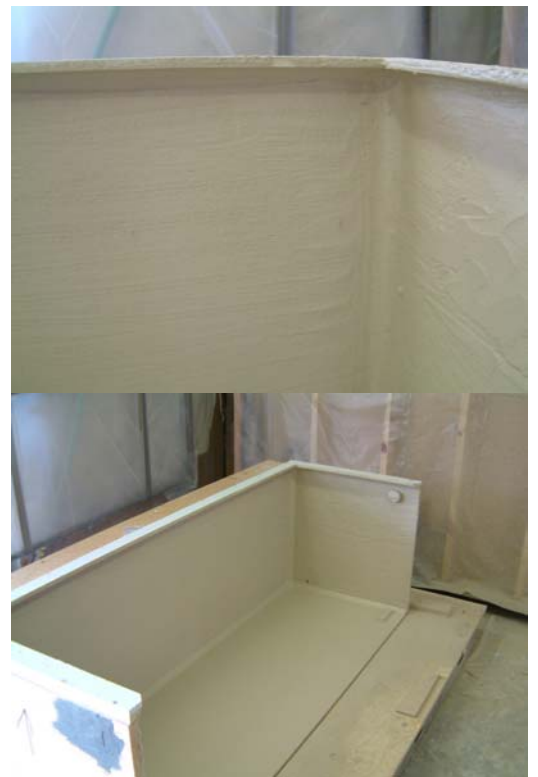
UltraFace Added in the Mixer



UltraFace Sprayed in the Mold



UltraFace Prevents Slump Lines



Typical Properties of Cem-FIL® AR Glass

Density:	2.68t/m ³
Tensile Strength	
Virgin Filament:	3,500 MPa
Strand:	1,700 MPa
Elastic Modulus:	72 GPa
Elongation at Break:	4.5%
Moisture Content:	< 0.3%
Effect of Temperature:	Non-Combustible. Softening Point 860°C

Identification (ISO)

Example:	ARC14 320 HD
AR:	Alkali Resistant
C:	Continuous filament
14:	Filament diameter in microns
320:	Strand Tex (g/km)
HD:	Product code

Technical considerations (nominal values)

Filament diameter (µm)	Moisture Content (%)	(L.O.I.) (%)
14	ISO 3344 : 1977	ISO 1887 : 1980
	< 0.3	1.0

Characteristics and Performance

- » Density similar to concrete / Elastic Modulus greater than concrete / Tensile Strength greater than steel.
- » Anti-Crak™ HD fibers provide micro-reinforcement, and therefore improved mechanical performance, unlike synthetic fibers which give micro-defects due to their low modulus and strength.
- » Fiber to matrix bond is optimum: mineral to mineral.
- » Very high dispersibility: 788 million reinforcing monofilaments per lb of fibers. Non-corroding reinforcement, resistant to acid and alkalis.

Elastic Modulus:

Unlike synthetic fibers, Anti-Crak™ HD fibers have an Elastic Modulus greater than that of hardened concrete, and can therefore effectively reinforce both fresh and hardened concrete and mortars.

Material	Modulus of Elasticity GPa
Cem-FIL® AR Fibers	72
Polypropylene	3.5
High Mod. Polypropylene	7
PVA	29
Polyester	17
Concrete	35

Properties

- Alkali Resistant Glass reinforcement, regulated by International Standards
- Rapid dispersion into mono-filaments
- 788 million filaments per lb (in 1/8 inch)
- Effective at very low dosage
- Safe and easy to handle
- Control and prevention of cracking
- Improves homogeneity
- Proven technology around the world
- Overall improvement of durability and physical properties of concrete and mortars



Tensile Strength:

Material	Tensile Strength MPa
Cem-FIL [®] AR Fibers	1,700
Polypropylene	350
High Mod. Polypropylene	550
PVA	910
Polyester	1,000
Steel	1100


Specific Gravity:

The Specific Gravity of Cem-FIL[®] AR glass fibers is similar to that of concrete, therefore the fibers will neither float nor sink in the mix when under vibration.


Material	Specific Gravity
Cem-FIL [®] AR Fibers	2.68
Polypropylene	0.91
High Mod. Polypropylene	0.91
PVA	1.30
Polyester	1.34
Concrete	2.40

Packaging Information

Anti-Crak[™] HD chopped strands are packed in cartons within an inner polythene bag which contains loose fibers. An individual label identifies each carton. Cem-FIL[®] Anti-Crak[™] HD chopped strands are white but a blue color is used for identification on labels.

	Product Length (in.)	Individual Packaging		Carton Weight (lb)
		Packaging Color code	Packaging Type	
Anti-Crak [™] HD	1/8, 1/4, 1/2	Blue	Carton	40

Each pallet contains 48 cartons on 3 levels of 16 cartons each. The completed pallet is enclosed in polythene and identified with two labels.

	Packaging style	Total number of cartons	Pallets			
			Length (in)	Width (in)	Height (in)	Approx. net weight (lb)
Anti-Crak [™] HD	Bulk Carton	48	45	45	43	1,920

Edited by :

SPRAY-TECH inc.

Spray-Tech inc.
5850 Fletcher Avenue
Lincoln, NE 68507
United States of America
Tel: 1 402 466 1645
Fax: 1 402 466 1752
Stspraytec@aol.com
www.spraytechne.com

Storage

Cem-FIL[®] fibers should be stored dry in their original packaging, the best conditions being at a temperature of 60 to 95°F, and at a relative humidity of 35 to 65%. If the product is stored at low temperature (below 60°F) it is advisable to condition the product in the workshop for 24 hours before use to prevent condensation.

Quality

Cem-FIL[®] chopped strands are manufactured under a Quality Management System approved to ISO 9001. Additionally, the consistency and performance of Cem-FIL[®] is subject to independent assessment and approval in Germany. (Zulassung n° Z-31.2-127)