

GREENUMBRELLA®

FiberLite

Concrete
Fiber

STAGE II

TRANSPARENT & STRONGER
FROM TOP TO BOTTOM





ARCHITECTURAL APPLICATIONS

4x Macro fiber count permeates any new concrete matrix to attack and contain common causes of cracking. Improve durability with fatigue resistance and increased flexural strength and impact resistance: Fibrillated, accordion action designed to envelop aggregate and concrete components, solidifying the connection between ingredients.

Demanding Applications:

Warehouse/Distribution Centers, Industrial Manufacturing, Fire Stations, Parking Garages, Hospitals, Agricultural

Conventional Concrete Applications:

Retail Spaces, Automotive & Showrooms, Restaurants, Business Offices, Museums, Municipal Facilities, Schools, Residential

Ready Mix Applications:

Pre-Cast, Tilt-Up, Ornamental Concrete, Shotcrete, Mortar, Concrete Masonry Units, Pavers, Roof Tiles, Retaining Wall Units, Stucco, Plaster, Cast Stone

Residential:

Driveways, Sidewalks, Pool Construction With Shotcrete, Basements, Colored Concrete, Foundations, Drainage, Etc.

Commercial:

Exterior And Interior Floors, Slabs And Parking Areas, And Roadways

Warehouse / Industrial:

Light To Heavy-duty Loaded Floors And Roadways

Highways / Roadways / Bridges:

Conventional Concrete Paving, SCC, White-toppings, Barrier Rails, Curb And Gutter Work, Pervious Concrete, Sound Attenuation Barriers, Etc.

Ports and Airports:

Runways, Taxiways, Aprons, Seawalls, Dock Areas, Parking, And Loading Ramps.

Waterways:

Dams, Lock Structures, Channel Linings, Ditches, Storm-Water Structures, Etc.

Mining and Tunneling:

Precast Segments And Shotcrete, Including Tunnel Linings, Shafts, Slope Stabilization, Sewer Work, Etc.

Agriculture:

Farm And Animal Storage Structures, Walls, Silos, Paving, Etc.

Precast Concrete and Products:

Architectural Panels, Tilt-up Construction, Walls, Fencing, Septic Tanks, Burial Vaults, Grease Trap Structures, Bank Vaults, And Sculptures

Other Applications:

Includes Any Other FRC Related Applications Not Specifically Described Above.

ISOTROPIC / ACRYLIC / DESIGNED FOR POLISHED CONCRETE

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TRANSPARENT IN THE MIX

Green Umbrella® FiberLite™ is a low dose, insoluble, transparent in the mix, uniquely designed, secondary reinforcement concrete fiber. Providing isotropic, fiber reinforcement that displaces evenly, without clumping or unsightly protrusion from concrete commonly seen in other fibers. The even dispersion and transparency in the mix make it the best choice for exposed architectural concrete with integral or dyed floors and all exposed concrete finishes, vertical or horizontal. FiberLite provides the added protection from sudden temperature fluctuation and wind changes that cause unsightly plastic cracking—providing an engineered dose that outworks conventional dosing with the lowest .66 pound dosage per c/y and the highest 794,000,000+ fibers per pound count – versus standard market fibers. Transparent in placement and finishing providing no burden to the pumping or finishing crews. Secondary reinforcement with equal strength to Welded Wire Fabric. FiberLite reinforces without the need for WWF mats, layout, installation, overlapping, tying/placing, and potential vapor barrier damage due to puncture. FiberLite's unique formulation forms an ionic bond within the new matrix, attacking plastic shrinkage cracking and reducing it over 94%! Three-dimensional, next-generation reinforcement from top to bottom.

CUTSHEET



CUT TO THE CHASE
GREENUMBRELLA®

TRANSPARENT
IN THE MIX

GREEN UMBRELLA[®] fi·ber dic·ti·o·na·ry



Figure 1: Monofilament and Fibrillated Micro Fibers.

mi·cro fi·ber, noun

Typical fibers designated as “Micro” can be made using polypropylene, cellulose, nylon or acrylic in a monofilament or fibrillated configuration (see Figure 1). Green Umbrella FiberLite is a modified acrylic microfiber. Unlike conventional non-acrylic microfibers, acrylic fibers create an ionic bond within the concrete matrix.

Microfibers feature a very high aspect ratio with diameters less than 0.002 in. (50 μm) and lengths ranging from 0.24 – 0.87 in. (6mm – 22mm); Dosage ratios range from 0.50 lbs./yd³ to 5 lbs./yd³ (0.23 kg/m³ – 2.27 kg/m³) depending on specified performance requirements. They are specifically designed to control/reduce plastic shrinkage cracks that occur within the first 24 hours after the concrete is poured and can replace WWF at the correct dosage and with proper testing.

Green Umbrella FiberLite is a monofilament fiber that creates an ionic bond within the concrete matrix outperforming conventional fibrillated micro fibers’ mechanical bond. The nearly 800 million fibers per cubic yard of concrete provide unparalleled dispersion and preventative reinforcement before concrete thinks about dry shrinkage cracking.

ma·cro fi·ber, noun

Conventional “Macro” designated fibers (see Figure 2) are typically monofilament or fibrillated (yarn, tape, or bundles) with diameters ranging .015 in. – .06 in. (0.4 mm – 1.5 mm), lengths ranging 1.5 in. – 3.0 in. (38mm – 75mm) and made with polyolefin or steel. Typical synthetic macro fiber dosage rate is 3 bs./yd³ – 10 bs./yd³ (1.8 kg/m³ – 7.0 kg/m³) while steel macro fibers have a dosage ratio extending up to 25 lbs./yd³ – 100 lbs./yd³ (15 kg/m³–60 kg/m³). The primary benefit of “Macro” type fibers is post crack control and/or to meet temperature/shrinkage reinforcement similar to welded wire mats when properly positioned. Macro fibers can substitute for the crack control steel mesh provided to slab on ground, precast and composite deck applications.



Figure 2: Monofilament fibrillated (Yarn, Tape and Bundle) Macro Fibers.

mo·no·fil·a·men·t and fi·bri·lla·ted fi·ber·s, adjective

As the name suggests, monofilament fibers are single strand fibers, similar in shape to fishing lines. Fibrillated fibers are irregular, webbed in shape; Expanding and encapsulating in a net-like fashion, similar to a fishing net.

ten·si·le s·tre·n·gth, noun

Tensile strength is the maximum tensile stress sustained by the fiber before failure in a tension test. It is usually expressed in pounds per square inch (psi) or megapascals (MPa). The greater the molecular alignment within a fiber, the higher the tensile strength. Not all materials, even if belonging to the same polymeric base, have equal tensile strengths. Polymer pellets have a considerably lower tensile strength than their filament versions. FiberLite is a highly engineered continuous filament fiber.

Tensile Strength	>650MPa	Specific Gravity	1.17
Modulus of Elasticity	10.5 GPa	Absorption	Very Low
Alkali, Acid & Salt resistance	Excellent	Decomposition Temperature	330° C (626° F)

e·las·tic mo·du·lus, noun

The elastic modulus measures a material’s stiffness under tension: The constant relating stress (force) and strain (deformation) within the elastic range of a material is the material’s ability to stretch without losing its ability to return to its original physical property and dimension. The higher the modulus of elasticity, the stiffer the material; therefore, very high modulus material tends to fail/crack drastically. FiberLite has a modulus of elasticity higher than most other synthetic macro fibers (10.5 GPa vs. a range of 4–5 GPa) on the market. Cement paste usually has an elastic modulus between 10–15 GPa.

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THE MOST ADVANCED MICRO SYNTHETIC FIBER

FIBERLITE—DIFFERENT FROM ANY OTHER AVAILABLE MICROFIBER

ADVANCE TECHNOLOGY—MONOFILAMENT MODIFIED ACRYLIC

CREATES A CHEMICAL BOND BETWEEN THE FIBER AND THE CONCRETE MATRIX

HIGH TENSILE STRENGTH (>650 MPA) —TRANSFERS LOADS EFFICIENTLY

THE MATERIAL IS FLEXIBLE—ALLOWING HIGH LOADING RATES

TRANSPARENT—CREATING NO SURFACE DEFECTS OR PROTRUSION

PROVEN—REPLACEMENT OF WELDED WIRE FABRIC

INSOLUBLE—DISPERSES EVENLY THROUGHOUT, FROM TOP TO BOTTOM

PSCR: PLASTIC SHRINKAGE CRACK REDUCTION

With the addition of FiberLite, PSCR can be reduced by 90%, exceeding the ICBO AC32, Annex A acceptance criteria, which require that the synthetic fibers reduce the plastic shrinkage cracking of concrete by at least 40%. Some synthetic fibers and other fibers provide 60%+ plastic shrinkage cracking reduction - FiberLite yields >90% PSCR!

IMPROVING PERFORMANCE & AESTHETIC: FROM THE INSIDE OUT

TRANSPARENT IN THE MIX

Unlike fibers that clump, protrude, and are unsightly, FiberLite is transparent. It is highly recommended for all decorative and exposed architectural applications, especially *@Profile&Polish* - it can be dyed and abrasively polished with no adverse effects.

FINEST FIBER FLATWORK FINISH

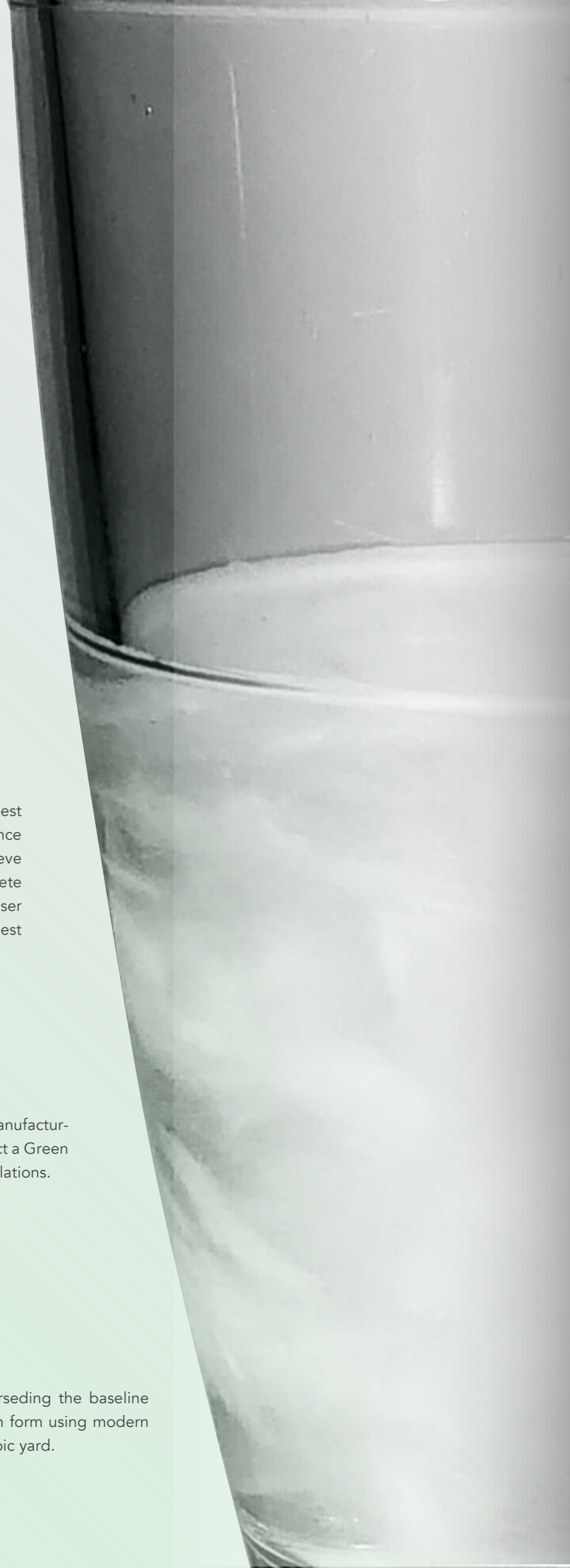
Unlike other microfibers, FiberLite is a very soft fiber promoting best placement practice, excellent finishing, and day of placement insurance against sudden weather changes. Follow proper finishing protocol to achieve a fiber-free surface appearance. The most effective way to screed the concrete is with a hand-held screeded (GOOD), vibratory screed (BETTER), or laser screed (BEST). Follow ACI guidelines when placing and finishing for best results. A broom or coarse finish may reveal fibers at the surface.

THE FIBER DESIGNED FOR SLABS

FiberLite has been utilized for slabs on grade for residential, commercial, manufacturing, distribution, institutional, infrastructure, and other applications. Contact a Green Umbrella Consultant for documentation or other assistance in design calculations.

SUPERIOR PLASTIC SHRINKAGE CRACK REDUCTION

FiberLite provides >90% of Plastic Shrinkage Crack Reduction, far superseding the baseline requirement of 40% for typical fibers. Attacking the problem before it can form using modern technology and unparalleled dispersion of nearly 800 million fibers per cubic yard.



FAQ - UNDERSTANDING WELDED WIRED FABRIC

WHY IS WELDED WIRE FABRIC CONVENTIONALLY USED?

Welded Wire Fabric is considered a Secondary, non-structural reinforcement traditionally viewed as an internal lifeline, binding concrete together AFTER it cracks. WWF, commonly a wire mat, does NOT keep cracks from forming. Synthetic Microfibers have been proven to discourage early plastic shrinkage cracks from developing. In the event micro-crack forms, the correct fiber can positively impact post-crack behavior. WWF does NOT influence post crack concrete behavior on the scale of a Microfiber.

SHOULD CONVENTIONAL MONOFILAMENT FIBER REPLACE ROLLED WELDED WIRE FABRIC (WWF) IN CONCRETE?

No. However, FiberLite can. Though some fiber manufacturers recommend a single strand, monofilament fiber replaces the rolled wire mesh as a secondary reinforcement. Research has shown that while monofilament fibers do reduce plastic shrinkage during the early life of the concrete, they have limited benefit once the concrete cracks. The advanced technology used in GREEN UMBRELLA FiberLite led to passing all criteria for the ICC ES AC 32 testing to replace WWF. A unique Microfiber that is suitable for WWF replacement - FiberLite.

CAN FIBERLITE, A MONOFILAMENT MICROFIBER, REPLACE WWF IN CONCRETE?

Yes. If the wire mesh is non-structural in nature. FiberLite is a unique monofilament, modified acrylic fiber with a low minimum dosage of 0.66 lb/yd³ (0.29 kg per cubic meter) that can adequately replace the wire mesh as the secondary reinforcement as long as they meet the ICC requirements of a min of 50 psi. FiberLite at the low dosage of 2/3 lb. per yard can also replace wire mesh with a 60 psi and pass impact testing. FiberLite provides advantages over WWF, utilizing microfibers that are uniformly dispersed throughout the concrete matrix to minimize the potential for cracks; WWF cannot spread beyond the plane it is installed upon. As a micro synthetic fiber dispersed evenly from top to bottom, a fiber is nearby to retain composite uniformity wherever a crack attempts formation. Cracks in concrete reinforced with WWF will reach the steel mesh and produce an extended effect. When a single layer of WWF runs through the concrete, cracks can propagate and widen both above and below the reinforcement layer, weakening the concrete. The fiber count per unit volume of FiberLite, by contrast, provides uniform 3D configuration reinforcing bonds throughout the concrete, from sub-grade through to the surface.

WHAT FIBERLITE CAN NOT DO!

CAN FIBERLITE EXTEND JOINT SPACING?

No! Use of FiberLite does not supersede ACI guidelines for proper joint spacing for slab on ground applications unless previously tested and approved by the customer. However, extended joint spacing or even joint-free concrete is possible using Green Umbrella Stretched Canvas or Canvas Control. For further information, please contact Green Umbrella. Additional information on these unique systems may be found by visiting our website.

WHY DOES GREEN UMBRELLA OFFER DIFFERENT TYPES OF FIBER REINFORCEMENT?

Research and development have garnered several grades of fiber reinforcement for various applications and performance level values. Each grade of fiber offers outstanding performance value when matched with the appropriate application.

DOES THE USE OF FIBER ELIMINATE THE NEED FOR GOOD CONCRETE PRACTICES?

No! The use of any synthetic or non-synthetic fiber does not replace the need for best concrete practices. As with any concrete, it is important to follow proper industry-recommended standards and practices in all facets of @EarlyAge concrete: mixing, placing, jointing, and curing the concrete to achieve and maintain consistency, quality, and success on every concrete placement.



“GIVING YOU THE DIRECTION YOU NEED.”

CUT YOUR LABOR CUT YOUR DOWNTIME CUT YOUR ENVIRONMENTAL IMPACT

*“Green Umbrella’s product branding is the direct PRODUCT message “Cut to the Chase”. Each product and installation has driven a goal: **Cut your Labor. Cut your Downtime. Cut your Environmental Impact.** Green Umbrella quickly isolates these key benefits to explain the profitability, sustainability, and quality of our industry-unique products.”*

