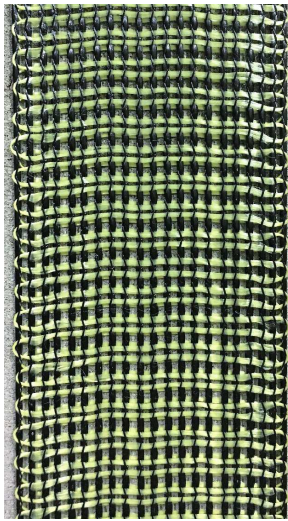


Fortress Carbon-Kevlar Strap

Unidirectional Carbon Fiber Textile or Tow Sheet
for structural reinforcement



Product Description: Fortress Carbon-Kevlar Strap is a pre-impregnated, unidirectional carbon fiber grid strap with a transverse Kevlar weave for use as an externally bonded reinforcement for strengthening concrete, timber and masonry structures. Fortress Carbon-Kevlar Straps are typically field installed using either Fortec #4020 resins to form an inexpensive carbon fiber reinforced polymer (CFRP) system.



Key Features

- ❖ Reinforcement & strengthening
- ❖ Concrete and masonry basement wall support
- ❖ Grid allows visual verification of void removal during application

PRODUCT USE

Target Applications

- ❖ Increased strength of masonry & concrete walls
- ❖ Structural Retrofit & Upgrades
- ❖ Changes in building use requiring larger loads
- ❖ Increased strength of parking decks & floor slabs
- ❖ Crack and moisture control
- ❖ Seismic retrofits
- ❖ Shear strength improvements
- ❖ Flexural strength improvements
- ❖ Addition of heavy or vibrating machinery
- ❖ Service life increases

Repair Applications

- ❖ Collision
- ❖ Corrosion
- ❖ Fire
- ❖ Age
- ❖ Overuse

Structural Benefits

- ❖ Strength increase
- ❖ Crack and moisture control
- ❖ Seismic resistance
- ❖ Arrest structure movement
- ❖ Substrate stress reduction

PRODUCT SPECIFICATIONS

Base Material	Carbon filament tows and Kevlar roving woven into a grid
Shelf Life	Unlimited
Color	Black/gold
Carbon Filament Tensile Strength, ksi (MPa)	600 (4,133)
Carbon Filament Tensile Modulus, ksi (MPa)	34,000 (234,000)
Grid Nominal Thickness, in (mm)	0.020 (0.51)

Laminated CFRP System Mechanical and Physical Properties

	Ultimate Tensile Strength ¹ f'_{tu} ksi (MPa)	Modulus of Elasticity ¹ E_f ksi (GPa)	Ultimate Tensile Strength per Unit Width ² p'_{tu} kips/in (kN/mm)	Tensile Elastic Modulus per Unit Width ² E_t kips/in (kN/mm)	Ultimate Strain at Rupture ϵ^*_{tu} in/in (mm/mm)
Design Values ³	217.3 (1,498)	13,550 (93.4)	1.1 (0.76)	271 (47.6)	0.0160

Laminate results at room temperature using SKRS Room 77°F curing epoxy resin

¹ASTM D3039 ²Thickness of cured laminate = 0.020 in (0.51 mm)

³Design values are statistically based as recommended by American Concrete Institute, ACI 440.2R

Packaging 4-inch (100 mm) widths standard. Standard packaging includes cardboard boxed. Labeled on box.

Kevlar is a registered trademark of E.I. du Pont de Nemours and Company

HOW TO USE

Preparation. Protect the work area from standing water and inclement weather. Surfaces may be damp. Surfaces must be clean and sound. Spalling or other damaged concrete must be removed to solid material. Paint, finishes and laitance must be removed. Grinding, chipping, scarifying, shot blasting, sand blasting, or water jet are all acceptable methods to prepare the substrate. For concrete and masonry applications, patch all uneven surfaces with Fortec #4550 LPL or #1276 Hi-Modulus Fiber Matrix epoxy resins. Broadcast silica sand on patches to avoid amine blush. Use oil-free compressed air to remove any dust debris immediately prior to application of epoxy resins. Keep Fortress Carbon-Kevlar Straps from contamination. Store in a clean and dry area away from direct sunlight. Keep in original packaging until installation and protect from physical damage. Remove dust, dirt, and any other foreign materials. Remove water, grease, wax, oil or any other liquids with an appropriate solvent.

Cutting. Fortress Carbon-Kevlar Straps may be cut to a desired length with sharp scissors or a sharp utility knife. Dull tools tend to fray the ends of the carbon tows and should be avoided.

Epoxy Resin. Fortec #4020 epoxy resin is recommended for all applications for bonding Fortress Carbon-Kevlar Straps.

Applications. For horizontal, vertical and overhead applications use the dry lay-up application method when installing Fortress Carbon-Kevlar Straps.

Dry Lay-Up Application. Apply resin to the substrate at a uniform rate of approximately 20 ft²/gal (approx. 80 mils). Coverage yield will vary with substrate roughness. Remove the Clean Peel™ fabric from both sides of the Fortress Carbon-Kevlar Strap. Using gloved hands and a plastic laminating roller, press the Fortress Carbon-Kevlar Strap into the resin. Continue to press on the strap to force resin to squeeze through the openings to remove voids for a proper bond. Add more resin if needed. Trowel resin evenly over the strap. Ensure resin penetrates the grid mesh and covers the strap completely. Position the plastic Mylar sheet over the Fortress Carbon-Kevlar Strap and trowel or roll the strap, forcing out all air voids until smooth. Again, ensure the resin covers the grid mesh completely. After cure, perform sounding to locate any voids. Inject epoxy resin as needed to fill all voids.

Qualifications. Except for standard Fortress installations by Fortress qualified installers, each structural and life safety application requires the design and certification of a licensed, professional engineer. See the Fortress Warranty for more details.

Cautions An externally applied CFRP system is a vapor barrier. Consult with a licensed, professional engineer to evaluate results of encapsulating porous substrates. Installation should be performed only by a Fortec trained and approved installer. Caution must be used when handling Fortress Carbon-Kevlar Straps. Gloves should be worn to protect against carbon dust skin irritation and exposed fiber ends. Use of an appropriate, properly fitted NIOSH approved respirator is recommended. As with any cutting and adhesive operation, proper eye protection should be used. Always follow OSHA and site safety requirements.

Keep Out Of Reach of Children - Keep Container Tightly Closed – Not For Internal Consumption – For Industrial Use Only

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