

Fortec[®] 5680-BD Kevlar[®]

Kevlar[®] fiber fabric for crack repair, waterproofing and structural reinforcement

**Fortec Stabilization Systems is a sister company to Fortress Stabilization Systems and the two company names may be used interchangeably throughout this document.*



Product Description: Fortec 5680-BD Kevlar[®] is a unique fabric system comprised of durable 5,680 denier Kevlar[®] yarns woven in the weft, or transverse, direction. The 5680-BD system is designed for crack repair, crack control, and structural strengthening of concrete and masonry structures where durability, impact resistance, and protection from water intrusion is needed. Fortec 5680-BD Kevlar[®] textile used with Fortec Lo-Mod 526 Flexible epoxy resin is the best alliance of strength and bonding that seals out moisture, transfers loads, and allows temperature and stress movements to occur without brittleness.



Key Features

- ❖ 90°, transverse strength
- ❖ Conforms to irregular surfaces
- ❖ Strongest duty Kevlar[®] system available
- ❖ Excellent crack and moisture control

PRODUCT USE

Target Applications

- ❖ Transverse cracks in bridge decks
- ❖ Post-tensioned segmental bridge joints
- ❖ Longitudinal cracks and joints
- ❖ Rigid pavement joint and dowel protection
- ❖ Cast-in-place water storage structures
- ❖ Cyclical loading applications
- ❖ Where crack control with water protection is needed

Repair Applications

- ❖ Collision and impacts
- ❖ Excessive movement
- ❖ Elastomeric joint failures
- ❖ Age
- ❖ Overuse

Benefits

- ❖ Protection from corrosion
- ❖ Increased strength
- ❖ Water and chloride ingress prevention
- ❖ Ride quality
- ❖ Increased service life

PRODUCT SPECIFICATIONS

Typical Data	Base Material	5,680 denier Kevlar [®] yarns woven into a bidirectional weave
	Storage	Product shall be kept from direct sunlight
	Shelf Life	Unlimited
	Color	Yellow
	Filament Tensile Strength, ksi (MPa)	522 (3,600)
	Filament Tensile Modulus, ksi (MPa)	17,985 (124,000)
	Fabric Nominal Width, in (mm)	8 (200)
	Fabric Nominal Thickness, in (mm)	0.040 (1.0)
	Primary Fiber Direction	90°, transverse (weft) weave
	Fabric Weight, oz/yd² (g/m²)	13.3 (450)

Laminated 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 p_{tu} kips/in (kN/mm)	Tensile Elastic Modulus per Unit Width E_{t_f} kips/in (kN/mm)	Ultimate Strain at Rupture ϵ_{tu} in/in (mm/mm)
Average Values	48.1 (333.2)	3,960 (27.3)	2.2 (0.39)	182 (31.9)	0.012 (0.012)
Design ² Values	43.3 (299.6)	3,445 (23.7)	2.0 (0.35)	158 (27.7)	0.012 (0.012)

Laminate results at 24+ hours at 23 ± 1°C (73 ± 3°F) and 35 ± 5% RH curing epoxy resin

¹ASTM D3039 Thickness of cured laminate = 0.046 in (1.17 mm)

²Design values are statistically based as recommended by American Concrete Institute, ACI 440.2R

Packaging: 8-inch (200 mm) width x 200-ft (61 m) length standard. Custom widths and lengths are available.

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 substrate must be removed to solid material. Laitance must be removed. Grinding, chipping, scarifying, shot blasting, sand blasting, or water jet are all acceptable methods. For concrete and masonry applications, patch all uneven surfaces with Fortec #4050 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 Fortec 5680-BD Kevlar® 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. Fortec 5680-BD Kevlar® fabric may be cut to a desired length with sharp scissors or a sharp utility knife. Dull tools tend to fray the ends of the product and should be avoided. Do not cut with circular or reciprocal saws.

Epoxy Resin. Fortec Lo-Mod 526 Flexible epoxy resin is recommended for all applications.

Applications. Horizontal and vertical applications may use either the dry or wet lay-up techniques. The wet lay-up technique using an automated impregnator will provide best results for overhead applications. An automated impregnator will typically provide more uniform application of resin using less resin, and improved results with fewer voids and less waste.

Dry Lay-Up Application. Apply resin to the substrate at a uniform rate of approximately 45 ft²/gal (35 mils). Coverage yield will vary with substrate roughness. Using gloved hands and a plastic laminating roller, press Fortec 5680-BD Kevlar® fabric into the resin pressing out any wrinkles and air voids. Allow the resin to squeeze through the grid to assure a proper bond. For a single grid layer, apply an epoxy resin topcoat at a rate of approximately 160 ft²/gal (10 mils) while the base resin is still within its working limit (depending on temperature) and smooth for a finished appearance. If more than one layer of Tow Sheet textile is used, apply intermediate epoxy resin layers at a rate of approximately 100 ft²/gal (15 mils). A good measure for dry lay-up applications will use approximately twice the weight of resin to textile. After cure, perform sounding to locate any voids. Inject epoxy resin as needed to fill all voids.

Wet Lay-Up Application. Prior to applying the wetted Fortec 5680-BD Kevlar® Fabric, apply Fortec Lo-Mod 526 Flexible epoxy resin at a rate of approximately 160 ft²/gal (10 mils) to a prepared substrate to seal the surface and to provide a tacky surface to apply the textile. Resin will tack at 30 minutes at 70°F. Saturate and infuse the 5680-BD Kevlar® Fabric with Fortec Lo-Mod 526 Flexible epoxy resin. For uniform application, the resin infusing process should be completed using an automated impregnator. Apply the saturated 5680-BD Kevlar® Fabric textile to the sealed substrate and press out any wrinkles and air voids with a plastic laminating roller. Apply additional saturated 5680-BD Kevlar® Fabric textile while the previous layer is still within its resin working limit if multiple layers are desired. Finally, apply a topcoat of epoxy resin at a rate of approximately 160 ft²/gal (10 mils) and smooth for a finished appearance. After cure, perform sounding to locate any voids. Inject epoxy resin as needed to fill all voids.

Surface Coating. Because Kevlar® and all other aramid fibers absorb and are degraded by ultraviolet light, the finished Fortec 5680-BD Kevlar® system must be protected from UV light. Fortec 105 Superstick Hi-Build 100% epoxy is an excellent, corrosive resistant coating designed for this application. Apply Fortec 105 Superstick Hi-Build as directed.

Qualifications. Each structural and life safety application requires the design and certification of a licensed, professional engineer.

Cautions An externally applied Kevlar® and epoxy 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 Fortec 5680-BD Kevlar® Fabrics. As with any cutting and adhesive operation, proper eye protection should be used. Always follow OSHA and site safety requirements.

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Fortec 526 Lo-Mod Epoxy

**Low Modulus Flexible
100% Solids Epoxy**



Product Description: Fortec 526 Lo-Mod Epoxy is 100% solids, two component, moisture insensitive epoxy resin system. It has a unique low modulus of elasticity which allows for variations in stress and temperature. Fortec 526 Lo-Mod Epoxy has been used successfully for years as a waterproofing broadcast providing excellent skid resistant surfaces for bridge decks. Fortec 526 used as a binder resin for skid-resistant broadcast overlays and is designed to provide very rapid cures in thin films, permitting areas to be opened to traffic within three hours at 77°F.



Key Features

- ❖ Rapid cure times
- ❖ Cures as low as 50°F
- ❖ Very high strength in as little as 3 hours
- ❖ Excellent crack and moisture control

PRODUCT USE

Target Applications

- ❖ Bridge deck polymer overlays
- ❖ Kevlar® crack treatments
- ❖ Longitudinal cracks and joints
- ❖ Cyclical loading applications
- ❖ Where crack control with water protection is needed

Repair Applications

- ❖ Excessive movement
- ❖ Elastomeric joint failures
- ❖ Age
- ❖ Overuse

Benefits

- ❖ High skid resistance
- ❖ Water and chloride ingress prevention
- ❖ Increased ride quality
- ❖ Increased service life

PRODUCT SPECIFICATIONS

Typical Data

Base Material	Two-part, 100% solids epoxy
Storage	Product shall be kept from direct sunlight
Shelf Life	Unlimited
Mixing Ratio	1A to 1B by volume
Viscosity	10 to 20 Poises at 75°F (1 to 2 Pa at 24°C)
Pot Life	15 to 20 minutes at 75°F (24°C)

Net Epoxy Properties

Tensile Strength¹, psi (MPa)	2,000 (14) minimum
Tensile Elongation, percent	50 minimum

Epoxy Mortar

	1 Part Mixed Epoxy with 3-1/4 parts loose aggregate by volume
Compressive strength², psi (MPa)	Average values
3 hours at 75°F (24°C)	1,300 (9)
3-1/4 hours at 75°F (24°C)	1,700 (12)
3-1/2 hours at 75°F (24°C)	2,200 (15)
48 hours at 75°F (24°C)	6,800 (47)

¹ASTM D638

Packaging: 3-, 5-, and 55-gallon containers

HOW TO USE

Preparation. All surfaces must be clean and free of dirt, dust, oil, grease, or any contaminant that would adversely affect the bond. Surfaces must be structurally sound. All loose particles or soft, weak sections must be removed. On most concrete surfaces it is recommended that the surface be sandblasted to remove any laitance on top of the concrete, and on road surfaces remove grease, dirt and oil deposited by automobiles. Prior to placing the first course, the contractor shall use the Test Method prescribed in ACI-503-R, Appendix A of the ACI Manual of Concrete Practice to determine the cleaning practice (size of shot, flow of shot, forward speed of shot blast machine, and the number of passes) necessary to provide a tensile bond strength greater than or equal to 250 psi or a failure at the rate of 1/4" or more into the base concrete greater than 50% of the test area.

Mixing. Place in a clean container: 1 part by volume of Component A (resin) with 1 part of Component B (hardener). Mix thoroughly for 2 or 3 minutes with a paddle on a slow speed drill (250 rpm). Mix only the amount that can be used within the working life of the product

Application. The epoxy overlay should be applied to the prepared concrete surface in two separate courses. Apply first coat epoxy binder by using squeegees, rollers, or trowels at the rate of 2 pounds of epoxy per square yard (approximately 40 sq. ft. per gallon). When material levels, immediately broadcast the prescribed dry aggregate at approximately 10 pounds per sq. yard, such that the entire surface is covered in excess. The first course should be cured at least 1 hour until brooming or vacuuming can be performed without tearing or otherwise damaging the surface during this curing period. After the curing period, all loose aggregate should be removed by brooming or vacuuming and next overlay course applied. The second course epoxy binder is to be applied at the rate of 4 pounds per sq. yard (approximately 20 sq. ft. per gallon). The same technique for the second coat shall be used as in the first coat. The surface area is not to be opened to traffic until the compressive strength of 2-inch cubes of the overlay mixture reached at least 1,000 psi.

Aggregate. The size and type of aggregate should be selected bases on the intended use of the application. Hard emery and other aggregates could be recommended where severe abrasion would be encountered. Fine aggregates permit easy cleanup of the surface. Coarse aggregates provide long term skid resistance. For best skid resistance on road surfaces, we recommend that the aggregate be clean, dry with less than 0.2% moisture, angular grain silica or basalt sand and should be free from dirt, clay, asphalt, and other organic materials. The silica sand shall have a minimum MOH hardness of 7. Aggregate gradation percent passing U.S. Standard Sieves is as follows: #4 Sieve, 100%; #8 Sieve, 30-75%; and #16 Sieve, 1% maximum.

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