

RENEWWRAP®

ESR CF335



STRUCTURAL STRENGTHENING



OIL/GAS/INDUSTRIAL

Unidirectional Carbon Fiber Reinforcing Fabric ICC-ES ESR-3663

RenewWrap ESR CF335 is a dry, unidirectional reinforcing fabric made with high strength, standard modulus carbon fibers. RenewWrap ESR CF335 fabrics, along with either RenewWrap ESR or RenewWrap LPL Saturant, are used to strengthen or retrofit existing concrete and masonry structures. ICC - ESR - 3663 certification requires RenewWrap ESR Saturant.

TYPICAL USES

Recommended for:

- ◆ Strengthen for load increases
- ◆ Address changes in structural system, like slab openings
- ◆ Retrofit for seismic, wind, or blast
- ◆ Restore strength to damaged members like fire or vehicle impact
- ◆ Restore strength to deteriorated members subject to corrosion
- ◆ Strengthen for design/construction errors

RELEVANT INFORMATION

- ◆ Design calculations shall be made and sealed by a licensed, independent engineer knowledgeable with the design of FRP strengthening systems.
- ◆ Avoid completely encapsulating/covering concrete or masonry members subject to freeze/thaw or moisture vapor transmission.

STORAGE AND SHELF LIFE

Store in a cool, dry place at 50-90 °F (10-32 °C) on a roll suspended in a box away from flame or other hazards. Shelf life is 10 years in unopened packaging.

PACKAGING

Available in 150 ft. (45.7 m) long rolls suspended in boxes. Yield equals 300 ft²/roll (27.8 m²).

PRODUCT DESIGNATION

RenewWrap ESR CF335 products are available with and without EZ-Slit slitting zones. All products have a total reinforcement width of 24", with the roll width increasing slightly to accommodate the slitting zones. Other roll widths and EZ-Slit configurations are available.

PRODUCT DESIGNATION	NO. OF FABRIC ZONES	ZONE WIDTH
CF335 — 1 x 24	1	24in. (610mm)
CF335 — 2 x 12	2	12in. (305mm)
CF335 — 3 x 8	3	8in. (203mm)
CF335 — 4 x 6	4	6in. (152mm)

BENEFITS

- ◆ Lightweight, flexible, high-strength fabric can be wrapped around and externally bonded to structural elements
- ◆ Easy to impregnate using wet or dry lay-up methods
- ◆ EZ-Slit™ system enabling accurate, rapid, and clean slitting



CAUTION

RenewWrap carbon fabrics are non-reactive. Wear appropriate PPE and use caution when handling since fine carbon dust may be present on surface of fabric. Use caution when cutting or working with carbon fiber around electrical equipment since carbon fibers are electrically conductive. SDS are available and should be consulted for additional information.

ENGINEERING SUPPORT

GeoTree Solutions provides no-cost, pre-bid, engineering support. Contact your sales representative for more information

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Typical Dry Fiber Properties¹

PROPERTY	VALUE
Fiber Type	Carbon
Color	Black
Fabric Construction	Unidirectional
Fiber Tensile Strength	700 ksi (4830 MPa)
Fiber Tensile Modulus	33,400 ksi (230 GPa)
Fiber Rupture Strain	2.0%
Fabric Areal Weight	9.8 oz./yd ² (335 gsm)
Fiber Thickness	0.0065 in (0.16mm)

Flame Spread and Smoke Density: The RenewWrap ESR system yields a Class 1 and Class A flame-spread and smoke-density, per ASTM E84 in accordance with Section 802.2 of the UBC and Section 803.1 of the IBC, respectively. The thickness is limited to a maximum of four layers for CF335.

Notes:

1. Fiber properties are typical values of the fibers used in the manufacture of the reinforcing fabrics. They are reported here to provide the designer with a general understanding of the grade of fibers used in the reinforcing fabrics.

Physical properties

PROPERTY	VALUE	TEST METHOD
Nominal Thickness ²	0.023 inch (0.58mm)	

Mechanical properties

PROPERTY	VALUE	METHOD
Tensile Strength	112 ksi (770 MPa)	ASTM D3039 / ASTM D7565
Tensile Modulus of Elasticity ³	9.55 Msi (65.8 GPa)	ASTM D3039 / ASTM D7565
Elongation at Break	1.12%	ASTM D3039 / ASTM D7565
Tensile Strength/Unit Width	2.58 kip/in./ply (0.45 kN/mm/ply)	ASTM D3039 / ASTM D7565
Tensile Modulus/Unit Width ⁴	220 kip/in./ply (38.7 kN/mm/ply)	ASTM D3039 / ASTM D7565

Notes:

2.The laminate reported thickness is based on measurements made on panels prepared in the laboratory. Based on experience the typical thickness of a single ply (fibers + saturant), impregnated with either RenewWrap ESR or LPL Saturant is approximately 0.05-0.08 inch depending on how the fabric is impregnated in the field. Actual thicknesses measured in the field may vary slightly. As with any FRP strengthening system, the strength/unit width and modulus/unit width should be used for design and for field QC purposes.

3.Modulus of elasticity and unit stiffness are reported as average values in accordance with ACI 440.2R and shall be used for design. They shall not be used for accepting/rejecting results of field QC test results.

4.AC 125 instructs to test using ASTM D3039. (ASTM D7565 uses Max Force/Width, whereas ASTM D3039 uses Max Force/Area). ASTM D3039 and ASTM D7565 are essentially the same, except D7565 provides the calculation to report the unit strength and unit stiffness values. We test per ASTM D3039 and then calculate properties per ASTM D7565. Strain values are unitless and based on ASTM D3039.

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Before using any GeoTree product, the user must review the most recent version of the product's technical data sheet, safety data sheet and other applicable documents, available at www.geotreesolutions.com or by calling +1.855.655.6750.



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