

# TECHNICAL DATA SHEET

Rhino Carbon Fiber™ 400 GSM Unidirectional | Revision Date 3/10/2022

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## 01: PRODUCT IDENTIFICATION

8383 Riley Street,  
Zeeland, MI  
USA 49464

Product Name: Rhino Carbon Fiber™ 400 GSM Unidirectional

## 02: DESCRIPTION

Rhino Carbon Fiber™ 400 GSM Unidirectional is a high-strength, unidirectional carbon fiber fabric equipped with weft fibers that keep the fabric stable. The material is field laminated using RCF™ Saturant-Adhesive Epoxy to form a carbon fiber reinforced polymer (CFRP) system used to strengthen structural concrete elements.

## 03: WHERE TO USE:

- Increase load capacity of structural elements (Beams, Slabs, Columns, Walls, Etc.)
- Restore structural integrity of damaged or deteriorated structural elements
- Repair for damaged or missing reinforcing steel/post tensioning
- Improved blast resistance of concrete, masonry, or stone in mining operations
- Additional Reinforcement to repair/withstand seismic events

## 04: ADVANTAGES

- Used for shear, confinement or flexural strengthening
- Flexible, can be wrapped around complex geometries
- High-Strength
- Lightweight
- Non-corrosive
- Alkali Resistant
- Low aesthetic impact
- Economical

## 05: TYPICAL DATA

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Storage Conditions	Store dry at 40° - 95°F (4° - 35°C)
Shelf Life	2 years from date of production
Color	Black
Primary Fiber Direction	Unidirectional
Areal Weight	400g/m2 (0.124 lbs/ft2)

FIBER PROPERTIES			
	English	Metric	
Tensile Strength	710 ksi	4,900 MPa	
Tensile Modulus	36.3 Msi	250 GPa	
Elongation	1%	1%	
Density	.065 lbs/in <sup>3</sup>	1.79 g/cm <sup>3</sup>	
Nominal Thickness	.013 in	0.33 mm	

COMPOSITE PROPERTIES					
	Tested Value <sup>1</sup>		Design Value <sup>2</sup>		STM Testing Method <sup>4</sup>
	English	Metric	English	Metric	
Tensile Strength	149.9 ksi	1033.5 ksi	128.8 MPa	887.8 MPa	D3039
Tensile Modulus	10.62 Msi	73.2 Msi	8.80 GPa	60.6 GPa	D3039
Tensile Elongation, %	1.42	1.42	1.18	1.18	D3039
Load Per Unit Width <sup>3</sup>	4047 lbf/in	0.71 kN/mm	3477 lbf/in	0.61 kN/mm	D3039
Chord Stiffness per Unit <sup>3</sup>	287 lbf/in	50.2 N/mm			D3039
Nominal Thickness	0.027 in	0.68 mm			

<sup>1</sup>Load and Chord Stiffness per Unit are computed based on CFRP laminate specimen width

<sup>2</sup>20 sample coupons per test series

<sup>3</sup>Average value of test series

<sup>4</sup>Average value minus 3 standard deviations per ACI440



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## 06: HOW TO USE: SURFACE PREP

Surface must be clean, sound, and dry. Remove a light layer of concrete from the surface to allow the epoxy to penetrate the substrate. Typical methods include shot blasting or grinding to achieve this open textured surface. Consult the epoxy adhesive data sheets for additional information on surface preparation.

Existing uneven surfaces must be filled with an appropriate repair mortar/hydraulic cement. The adhesive strength of the concrete must be verified after surface preparation by random pull-off testing (ASTM D-4541) at the discretion of the engineer. Minimum tensile strength, 200 psi (1.4 MPa) with concrete substrate failure.

Round all corners to 1/2" radius in certain "contact critical" applications and at the engineers discretion, a thorough cleaning of the substrate using low pressure sand or water blasting may be sufficient.

## 07: APPLICATION

Apply a prime coat of epoxy to the substrate, work the carbon fiber into the epoxy, then add final layer of epoxy to ensure the material is properly saturated. The fabric may also be pre saturated using accepted industry techniques. In either case, installation of this system should be performed only by a trained contractor. In fiber direction, overlapping of the fabric must be at least 6 in or as per the project specifications. Overlapping sections of additional layers should be distributed in location free of other laps.

## 08: TOOLING & FINISHING

Fabric can be cut to appropriate lengths by using sharp heavy duty shears. Dull or worn cutting implements can damage, weaken or fray the fabric and their use should be avoided.

## 09: LIMITATIONS

- Design calculations must be made and certified by an independent licensed professional engineer.
- System is a vapor barrier. Concrete should not be fully encapsulated in areas of freeze/thaw.



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