

## Hex-3R™ Composite Strengthening Systems

### Hex-3R Wrap 100™

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The Hex-3R Composite Strengthening Systems provide construction industry professionals with a viable alternative to traditional methods through the application of composite materials science. This carefully designed portfolio of high strength, high modulus, externally applied reinforcing elements represent a cost-effective and efficient alternative to strengthen or stiffen a structure without resorting to remove and replace methods or invasive internal rebuilding techniques.

Hex-3R Wrap 100 is a 27 oz/yd<sup>2</sup> E-glass unidirectional fabric. Material is field laminated using Hex-3R epoxy to form a glass fiber reinforced polymer used to strengthen structural elements.

#### Where to Use

- Loading increases
- Seismic strengthening
- Temporary strengthening
- Change in structural system
- Design or construction defects

#### Advantages

- Used for shear, confinement or flexural strengthening
- Flexible, can be wrapped around complex shapes
- Lightweight
- Non-corrosive
- Acid resistant
- Low aesthetic impact
- Economical
- This fabric is registered with ICBO

#### Packaging

- Rolls: 50 in. x 150 linear feet

#### E-glass Fiber Properties

Tensile strength	330,000 psi
Tensile modulus	10.5 msi
Density	2.54 g/cc
Elongation	4.0 %

## Hex-3R™ Composite Strengthening Systems

### Hex-3R Wrap 100™

#### Hex-3R Epoxy 300™ and Hex-3R Wrap 100 Laminate Properties

Properties after standard cure followed by standard post cure (70-75°F – 5 days, 48 hours at 140°F)

Property	Average Value <sup>1</sup>		Design Value <sup>2</sup>		ASTM Test Method
	US Units	SI Units	US Units	SI Units	
	psi	MPa	psi	MPa	
Tensile Strength*	88,800	612	77,100	531	D3039
Tensile Modulus*	3,790,800	26,119	3,426,300	23,607	D3039
Tensile % Elongation *	2.45	2.45	2.12	2.12	D3039
140F - Tensile Strength	79,900	551	75,700	521	D3039
140F - Tensile Modulus	3,728,600	25,690	3,221,600	22,197	D3039
140F - % Elongation	2.28	2.28	2.07	2.07	D3039
Compressive Strength	86,600	597	74,600	515	D695
Compressive Modulus	4,312,700	29,715	3,393,800	23,384	D695
90 deg Tensile Strength	4,400	30	4,400	30	D3039
90 deg Tensile Modulus	965,000	6,649	892,700	6,151	D3039
90 deg %Tensile Elongation	0.46	0.46	0.28	0.28	D3039
Shear Strength+/-45 In Plane	5,800	40	4,600	31	D3518
Shear Modulus +/-45 In Plane	335,900	2,314	291,500	2,008	D3518
Poisson's Ratio	.256	.256			
Ply Thickness (inches/mm)	0.04	1.016			

#### Hex-3R Epoxy 306XR™ and Hex-3R Wrap 100 Laminate Properties

Properties after standard cure followed by standard post cure (70-75°F – 5 days, 48 hours at 140°F)

Property	Average Value <sup>1</sup>		Design Value <sup>2</sup>		ASTM Test Method
	US Units	SI Units	US Units	SI Units	
	psi	MPa	psi	MPa	
Tensile Strength*	83,400	575	70,200	484	D3039
Tensile Modulus*	3,672,000	25,300	2,909,100	20,044	D3039
Tensile % Elongation *	2.31	2.31	1.89	1.89	D3039
140F - Tensile Strength	69,300	477	62,400	431	D3039
140F - Tensile Modulus	3,306,400	22,781	2,970,700	20,468	D3039
140F - % Elongation	2.19	2.19	1.92	1.92	D3039
Compressive Strength	75,000	517	64,800	447	D695
Compressive Modulus	4,248,200	29,270	3,202,400	22,064	D695
90 deg Tensile Strength	500	34	5,450	22	D3039
90 deg Tensile Modulus	819,800	5,648	710,300	4,894	D3039
90 deg %Tensile Elongation	0.66	0.66	0.45	0.45	D3039
Shear Strength+/-45 In Plane	6,100	42	5,500	37.5	D3518
Shear Modulus +/-45 In Plane	337,200	2,323	297,600	2,050	D3518
Ply Thickness (inches/mm)	0.04	1.016			

\* 24 sample coupons per test series; all other values based on 6 coupon test series

<sup>1</sup> Average value of test series – based on year 2000 testing program

<sup>2</sup> Average value minus 3 standard deviations calculated from the year 2000 testing program

