

Hex-3R™ Composite Strengthening Systems
Hex-3R Wrap 116™

The Hex-3R™ Composite Strengthening Systems provide construction industry professionals with a viable alternative to traditional repair 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 116 is an 18 oz/yd² +/- 45 degree E-glass fabric with a half oz/ft² glass mat backing. This fabric is primarily used to provide high levels of shear strength enhancement with minimal installation labor. 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

E-glass Fiber Properties

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

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Hex-3R Wrap 116™

Hex-3R Epoxy 300™ and Hex-3R Wrap 116™ Laminate Properties

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

Property	Average Value ¹		Design Value ²		ASTM Test
	US Units	SI Units	US Units	SI Units	Method
	psi	MPa	psi	MPa	
Tensile Strength*	37,200	256	29,100	201	D3039
Tensile Modulus*	2,304,800	15,880	2,046,200	14,130	D3039
Tensile % Elongation *	1.97	1.97	1.52	1.52	D3039
140F - Tensile Strength	25,400	175	20,000	138	D3039
140F - Tensile Modulus	1,579,300	10,881	1,292,500	8,906	D3039
140F - % Elongation	1.84	1.84	1.66	1.66	D3039
Compressive Strength	39,000	269	28,800	199	D695
Compressive Modulus	3,079,000	21,214	2,669,500	18,393	D695
90 deg Tensile Strength	0	0	0	0	D3039
90 deg Tensile Modulus	0	0	0	0	D3039
90 deg %Tensile Elongation	0	0	0	0	D3039
Shear Strength+/-45 In Plane	23,800	164	16,300	113	D3518
Shear Modulus +/-45 In Plane	1,203,000	8,289	1,184,100	8,159	D3518
Ply Thickness (inch/mm)	0.037	0.94			

Hex-3R Epoxy 306XR™ and Hex-3R Wrap 116™ Laminate Properties

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

Property	Average Value ¹		Design Value ²		ASTM Test
	US Units	SI Units	US Units	SI Units	Method
	psi	Mpa	psi	Mpa	
Tensile Strength*	35,600	245	27,200	188	D3039
Tensile Modulus*	2,106,400	14,513	1,784,500	12,296	D3039
Tensile % Elongation *	1.99	1.99	1.6	1.6	D3039
140F - Tensile Strength	29,400	203	24,300	167	D3039
140F - Tensile Modulus	1,803,500	12,426	1530500	10,545	D3039
140F - % Elongation	1.91	1.91	1.43	1.43	D3039
Compressive Strength	32,400	223	27,300	189	D695
Compressive Modulus	2,791,100	19,231	2,381,600	16,410	D695
90 deg Tensile Strength	0	0	0	0	D3039
90 deg Tensile Modulus	0	0	0	0	D3039
90 deg %Tensile Elongation	0	0	0	0	D3039
Shear Strength+/-45 In Plane	24,200	167	17,000	118	D3518
Shear Modulus +/-45 In Plane	1,167,400	8,043	1,026,700	7,074	D3518
Ply Thickness (inch/mm)	0.04	0.94			

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

¹ Average value of test series – based on year 2000 testing program

² Average value minus 3 standard deviations calculated from the year 2000 testing program

