HEXCEL® **Civil Engineering & Construction Systems**

Hex-3R® Composite Strengthening Systems

Hex-3R Wrap 106G™

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 106G™ is a 9.6 oz/yd^2 0/90 degree E-glass fabric. 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
- This Fabric has been registered with ICBO

Packaging

- Rolls: 50 in. x 150 lin. ft.

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 300™ and Hex-3R Wrap 106G™ Laminate Properties

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

	Average Value[1]		Design Value[2]		ASTM Test
Property	**US Units**	**SI Units**	**US Units**	**SI Units**	**Method**
	psi	MPa	psi	MPa	
Tensile Strength*	40,700	280	32,600	225	D638
Tensile Modulus*	2,714,400	18,702	2,183,400	15,044	D638
Tensile % Elongation *	1.79	1.79	1.25	1.25	D638
140F - Tensile Strength	35,700	246	32,400	224	D638
140F - Tensile Modulus	2,450,000	16,881	2,357,000	16,239	D638
140F - % Elongation	1.59	1.59	1.35	1.35	D638
Compressive Strength	45,600	314	40,200	277	D695
Compressive Modulus	3,386,000	23,330	2,906,000	20,023	D695
90 deg Tensile Strength	40,700	280	50,915	225	D638
90 deg Tensile Modulus	2,714,400	18,702	2,183,400	15,044	D638
90 deg %Tensile Elongation	1.79	1.79	1.25	1.25	D638
Shear Strength-+/-45 In Plane	9,600	66	9,000	62	D3518
Shear Modulus +/-45 In Plane	377,500	2,601	344,800	2,376	D3518
Ply Thickness(inch/mm)	0.014	0.3556			

Hex-3R 306XR™ and Hex-3R Wrap 106G™ Laminate Properties

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

	Average Value[1]		Design Value[2]		ASTM Test
Property	**US Units**	**SI Units**	**US Units**	**SI Units**	**Method**
	psi	MPa	psi	Mpa	
Tensile Strength*	39,800	274	22,700	157	D638
Tensile Modulus*	2,609,500	17,979	2,191,300	15,099	D638
Tensile % Elongation *	1.78	1.78	1.24	1.24	D638
140F - Tensile Strength	27,900	192	24,900	171	D638
140F - Tensile Modulus	1,883,000	12,974	1,697,000	11,693	D638
140F - % Elongation	1.69	1.69	1.36	1.36	D638
Compressive Strength	36,600	252	28,800	198	D695
Compressive Modulus	2,952,000	20,339	2,943,000	20,278	D695
90 deg Tensile Strength	39,800	274	22,700	157	D638
90 deg Tensile Modulus	2,647,700	18,243	2,229,500	15,362	D638
90 deg %Tensile Elongation	1.78	1.78	1.21	1.21	D638
Shear Strength-+/-45 In Plane	9,300	64	8,100	57	D3518
Shear Modulus +/-45 In Plane	334,400	2,304	307,700	2,120	D3518
Ply Thickness	0.014	0.3556			

* 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

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