

SikaWrap® Hex 230C

Carbon fiber fabric for structural strengthening

Construction

Description SikaWrap Hex 230C is a unidirectional carbon fiber fabric. Material is field laminated using Sikadur 300, Sikadur Hex 300/306 or Sikadur 330 epoxy to form a carbon fiber reinforced polymer (CFRP) used to strengthen structural elements.

Where to Use

- Load increases**
 - Increased live loads in warehouses.
 - Increased traffic volumes on bridges.
 - Installation of heavy machinery in industrial buildings.
 - Vibrating structures.
 - Changes of building utilization.
- Seismic strengthening**
 - Column wrapping.
 - Masonry walls.
- Damage to structural parts**
 - Aging of construction materials.
 - Vehicle impact.
 - Fire.
- Change in structural system**
 - Removal of walls or columns.
 - Removal of slab sections for openings.
- Design or construction defects**
 - Insufficient reinforcements.
 - Insufficient structural depth.

Advantages

- Approved by ICBO/ICC ER-5558.
- Lightweight fabric ideal for confined spaces.
- Can be applied in dry or wet lay-up process.
- Used for shear, confinement or flexural strengthening.
- Flexible, can be wrapped around complex shapes.
- High strength.
- Non-corrosive.
- Alkali resistant.
- Low aesthetic impact.

Packaging Rolls: 12 in. x 150 ft. 24 in. x 150 ft.

How to Use

Surface Preparation Surface must be clean and sound. It may be dry or damp, but free of standing water and frost. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles, disintegrated materials, and other bond inhibiting materials from the surface. Consult Sikadur 300, Sikadur Hex 300/306 and Sikadur 330 technical data sheets for additional information on surface preparation.

Existing uneven surfaces must be filled with an appropriate repair mortar. The adhesive strength of the concrete must be verified after surface preparation by random pull-off testing (ACI 503R) at the discretion of the engineer. Minimum tensile strength, 200 psi (1.4 MPa) with concrete substrate failure.

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)
Color	Black
Primary Fiber Direction	0° (unidirectional)
Weight per Square Yard	6.7 oz. (230 g/m ²)

Fiber Properties

Tensile Strength	5 x 10 ⁵ psi (3,450 MPa)
Tensile Modulus	33.4 x 10 ⁶ psi (230,000 MPa)
Elongation	1.5%
Density	0.065 lbs./in. ³ (1.8 g/cc)



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Preparation Work: Concrete - Blast clean, shotblast or use other approved mechanical means to provide an open roughened texture.

In certain applications and at the engineer's discretion, the intimate contact between the substrate and the fabric may be determined to be non-critical. In these cases, a thorough cleaning of the substrate using low pressure sand or water blasting is sufficient.

Mixing Consult Sikadur 300, Sikadur Hex 300/306 or Sikadur 330 technical data sheets for information on epoxy resins.

Application SikaWrap Hex 230C can be applied using wet or dry lay-up methods.
Dry Lay-Up: Apply the mixed Sikadur 330 epoxy resin directly onto the substrate at a rate of 40-50 ft.²/gal. (32-40 mils), depending on the surface profile. Carefully place the fabric into the resin with gloved hands and smooth out any irregularities or air pockets using a plastic laminating roller. Allow the resin to squeeze out between the rovings of the fabric. If more than one layer of fabric is required apply additional Sikadur 330 at a rate of 100ft.²/gal. (16 mils) and repeat as above. Apply a final coat of Sikadur 330 to the exposed surface at a rate of 160ft.²/gal. (10 mils).

Wet Lay-Up: Seal the prepared concrete surface using Sikadur 300, Sikadur Hex 300 or Sikadur Hex 306. Material may be applied by spray, brush or roller. SikaWrap Hex 230C can be impregnated using either the Sikadur 300, Sikadur Hex 300 or Sikadur Hex 306 epoxy. For best results, the impregnation process should be accomplished using an automated saturator. Once saturated, apply fabric to the sealed concrete surface and smooth out any irregularities or air pockets using a plastic laminating roller. If required, apply additional layers of fabric while epoxy on previous layer is still tacky. For overhead or vertical applications, prime concrete with Sikadur 330 to improve tack. Saturate fabric with Sikadur 300, Sikadur Hex 300 or Sikadur Hex 306. Coat the exposed surface of final fabric layer using Sikagard 670W or Sikagard 62.

Installation of SikaWrap Products should be performed only by specially trained approved contractors.

Cutting SikaWrap Fabric can be cut to appropriate length by using a commercial quality heavy duty scissor. Since dull or worn cutting implements can damage, weaken or fray the fiber, their use should be avoided. Consult MSDS for proper handling procedures.

Limitations

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

Caution SikaWrap fabric is non-reactive. However, caution must be used when handling since a fine "carbon dust" may be present on the surface. Gloves must therefore be worn to protect against skin irritation.
 Caution must also be used when cutting SikaWrap fabric to protect against airborne carbon dust generated by the cutting procedure. Use of an appropriate, properly fitted NIOSH approved respirator is recommended.

Cured Laminate Properties with Sikadur 330 Epoxy Properties after standard cure [70° -75° F (21° -24° C) - 5 days]

Property	Average Value ¹		Design Value ²		ASTM Test Method
	US Units psi	SI Units MPa	US Units psi	SI Units MPa	
Tensile Strength*	129,800	894	104,000	715	D-3039
Tensile Modulus*	9,492,300	65,402	8,855,000	61,012	D-3039
Tensile % Elongation*	1.33	1.33	1.09	1.09	D-3039
140° F (60° C) Tensile Strength	118,200	814	102,000	703	D-3039
140° F (60° C) Tensile Modulus	9,789,000	67,450	8,693,000	59,896	D-3039
140° F (60° C) % Elongation	1.16	1.16	1.00	1.00	D-3039
Compressive Strength	113,000	779	97,000	668	D-695
Compressive Modulus	9,724,700	67,003	9,230,000	63,597	D-695
90 deg Tensile Strength	3,965	27	390	23	D-3039
90 deg Tensile Modulus	852,800	5,876	799,000	5,502	D-3039
90 deg % Tensile Elongation	0.46	0.46	0.40	0.40	D-3039
Shear Strength +/-45 in. Plane	9,100	63	8,100	56	D-3518
Shear Modulus +/-45 in. Plane	421,200	2,902	406,000	2,800	D-3518
Ply Thickness	0.015	0.381	---	---	---

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

¹ Average value of test series.

² Average value minus 2 standard deviations

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