



PRODUCT DATA SHEET

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COMPOSITE REINFORCING

SikaWrap® Hex-230 C

CARBON FIBRE FABRIC FOR STRUCTURAL STRENGTHENING SYSTEM

Description	SikaWrap® Hex-230 C is a unidirectional carbon fibre fabric. When used in conjunction with Sikadur®-330 epoxy laminating resin, the system can provide a dry lay-up applied composite strengthening system.
Where to Use	Strengthening of reinforced concrete structures, masonry and timber, structural elements on structures such as bridges, parking structures, marine structures, chimneys, silos, tunnels and tanks, pipelines, etc. Loading increases <ul style="list-style-type: none"> ▪ Increasing the live loads in warehouses. ▪ Increased traffic volumes on bridges. ▪ Installation of heavy machinery in industrial buildings. ▪ Vibrating structures. ▪ Change in building use. Seismic strengthening <ul style="list-style-type: none"> ▪ Column wrapping. ▪ Masonry walls. Damage to structure parts <ul style="list-style-type: none"> ▪ Aging of construction materials. ▪ Vehicle impact. ▪ Fire. Change in structural system <ul style="list-style-type: none"> ▪ Removal of walls or columns. ▪ Removal of slab sections for openings. Design or construction defects <ul style="list-style-type: none"> ▪ Insufficient reinforcements. ▪ Insufficient structural depth.
Advantages	<ul style="list-style-type: none"> ▪ Lightweight fabric ideal for confined spaces. ▪ Lay-Up dry. ▪ Use for shear, confinement or flexural strengthening. ▪ Flexible, can be wrapped around complex shapes. ▪ High strength. ▪ Lightweight. ▪ Non-corrosive and alkali resistant. ▪ Low aesthetic impact. ▪ Approved by ICBO ER-5558. ▪ Approved by ICC ESR-3288. (certain conditions apply, please consult Sika Canada). ▪ Product recognized by the British Columbia Ministry of Transportation (BC MoT).

Technical Data	
Packaging	SikaWrap® Hex-230 C 610 mm x 45.7 m (24 in x 150 ft)/roll 305 mm x 45.7 m (12 in x 150 ft)/roll (on special order only) Black
Colours	
Yield of epoxy	
First coat	0.7 - 1.2 kg/m ² (0.14 - 0.24 lb/ft ²)
Inter-layer coat	0.5 kg/m ² (0.10 lb/ft ²)
Sealer coat	0.5 kg/m ² (0.10 lb/ft ²)
Shelf Life	Unlimited, store dry between 5 and 32 °C (41 and 89 °F).
Fibre Properties	
Primary fibre direction	0° Unidirectional
Tensile strength	3.45 GPa (5 x 10 ⁵ psi)
Tensile E-modulus	230 GPa (33.4 x 10 ⁶ psi)
Elongation	1.5 %
Density	1.8 g/cm ³ (0.065 lb/in ³)
Area weight	228 g/m ² (6.7 oz/y ²)
Nominal Fiber Thickness	0.13 mm (0.005 in)

Cured Laminate Properties with Sikadur®-330 Epoxy

Properties after standard cure between 21 and 24 °C (70 and 75 °F)/5 days

	Average value ¹		Design value ²		ASTM Test
	MPa	(psi)	MPa	(psi)	Method
Tensile strength*	933	(1,35 x 10 ⁵)	801	(1,16 x 10 ⁵)	D3039
Tensile modulus*			74 700	(10,83 x 10 ⁶)	D3039
Tensile elongation %*	1,25		1,01		D3039
Nominal laminate thickness			0.38 mm (0.015 in)		
Tensile strength per unit width			3.3 kN/cm/ply	1.9 kips/in/ply	D7565
Stiffness (E*A), per unit width			285 kN/cm/ply	163 kips/in/ply	D7565

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

¹ Average value of test series² Average value minus 3 standard deviations

Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods.

HOW TO USE**Surface Preparation**

Prepare the concrete surface by sandblasting or grinding (CSP 3 - 4 as per ICRI). Remove any dust or loose particles by means of an industrial vacuum cleaner. The surface must be clean, free from grease and oil and should be dry with the maximum substrate moisture content of < 4 % by weight.

The surface to be bonded must be level, with no irregularities or protrusion > 0.5 mm (20 mils). Larger deviations must be levelled with Sikadur®-30, extended with (mix. ratio 1:1 parts by volume) oven-dried silica sand for thicknesses over 3 mm (1/8 in).

The concrete adhesive strength must be verified following surface preparation by random pull-off testing (ACI 503R) at the engineer's discretion. Minimum tensile strength, 1.5 MPa (218 psi) with concrete substrate failure. All corners of the structure must be rounded to a radius of 12 mm (1/2 in).

Mixing

Consult Sikadur®-330 Product Data Sheet for information on epoxy resin.

Application

Cut the fabric to the desired length.

Then apply the mixed Sikadur®-330 epoxy resin directly onto the prepared substrate at a quantity of 0.7 - 1.2 kg/m² (0.14 - 0.24 lb/ft²), depending on the surface profile, using a trowel or brush.

Carefully place the fabric onto the resin coating in the required direction with gloved hands and smooth out. Work out any irregularities or air pockets with a plastic laminating roller. Let the resin squeeze out between the rovings of the fabric.

Protection and overlayerment

If more than one layer of fabric is required, apply additional Sikadur®-330 [0.5 kg/m² (0.10 lb/ft²)] within 60 minutes at 20 °C (68 °F) after the application of the previous layer. If the waiting time exceeds 60 minutes at 20 °C (68 °F), wait 12 hours before continuing the lay-up process. Then repeat as above.

Apply a sealer coat of Sikadur®-330 [0.5 kg/m² (0.10 lb/ft²)] onto the exposed surface.

At low temperatures and/or high relative humidity it may be longer than 12 hours for the surface may become slightly tacky (amine blush). Before laying up another layer of fabric or a coating, the tackiness must be removed. This can be accomplished by washing the surface with a wet sponge or rinsing with water. (consult the Sikadur®-330 Product Data Sheet). To avoid this phenomenon, use the **SikaWrap® Peel Ply** (please see below).

To prevent exposure of the strengthening fabric to direct sunlight, top coat with Sikagard®-550 W Elastic, Sikagard® Color A50 Lo-VOC or other acceptable product. To adhere cementitious top coat systems to the cured epoxy, apply an additional layer of epoxy (15 - 20 mils) and blind (broadcast) the surface with silica sand to promote adhesion before coating.

SikaWrap® Peel Ply

If the product needs to be overcoated either with a coating (Sikagard®, etc.) or with an extra layer of fabric passing the overlay delay, apply the SikaWrap® Peel Ply **immediately after the fabric installation**, in order to protect and provide a textured surface (consult SikaWrap® Peel Ply Product Data Sheet for more informations).

Clean Up

Ventilate area. Confine spill. Collect with absorbent material. Dispose of in accordance with current, applicable local, state and federal regulations. Uncured material can be removed with approved solvent. Cured material can only be removed mechanically.

Limitations

- Overlapping of the fabric in the direction of the fibres must be 100 mm (4 in) minimum.
- When placing fabric sheets side by side, overlapping is not necessary.
- Minimum substrate and ambient temperature 4 °C (39 °F).
- Ambient temperature must be 3 °C (6 °F) above the Dew Point.
- Maximum service temperature is 50 °C (122 °F).
- Do not thin with solvents.
- Material is a vapour barrier after cure.
- Minimum age of concrete must be between 21 and 28 days depending on curing and drying conditions.
- Mix left over Sikadur®-330 and discarded in metal pails with the volume not to exceed 1 kg (750 mL) [2.2 lb (25 fl oz)].
- Prevent exposure of the strengthening system to direct sunlight.
- Protect the freshly applied resin from rain for a minimum of 12 hours.
- Design calculations must be made and certified by independent licensed professional engineer.

**Health and Safety
Information**

For information and advice on the safe handling, storage and disposal of chemical products, users should refer to the most recent SAFETY DATA SHEET containing physical, ecological, toxicological and other safety-related data.

KEEP OUT OF REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY

The Information, and in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions, within their shelflife. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any recommendations, or from any other advice offered. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request or may be downloaded from our website at: www.sika.ca

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