BUILDING TRUST
CONSTRUIRE LA CONFIANCE

PRODUCT DATA SHEET

SikaWrap® Hex-230 C

Carbon fibre fabric for structural strengthening system

PRODUCT 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

SikaWrap® Hex-230 C may only be used by experienced professionals.

Loading increases
- 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
- Column wrapping.
- Masonry walls.

Damage to structure 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.

CHARACTERISTICS / ADVANTAGES

- Lightweight fabric ideal for confined spaces.
- Dry lay-up process.
- 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.

APPROVALS / CERTIFICATES

- 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).

PRODUCT INFORMATION

Fibre Type	**Colours** Black **Primary fibre direction** 0° Unidirectional
Packaging	610 mm x 45.7 m (24 in x 150 ft)/roll
Shelf Life	Unlimited
Storage Conditions	Store dry between 5 and 32 °C (41 and 89 °F).
Mass per Unit Length	228 g/m² (6.7 oz/y²)
Dry Fibre Thickness	0.13 mm (0.005 in)
Dry Fibre Density	1.8 g/cm³ (0.065 lb/in³)

TECHNICAL INFORMATION

Laminate Tensile Strength

Cured Laminate Properties with Sikadur®-330 Epoxy
Properties after standard cure between 21 and 24 °C (70 and 75 °F)/5 days
(ASTM D3039)

Average value[1]	Design value[2]
933 MPa (1.35 x 10⁵ psi)	801 MPa (1.16 x 10⁵ psi)

[1]Average value of test series
[2]Average value minus 3 standard deviations
Note: 24 sample coupons per test series; all other values based on 6 coupon test series.

Tensile strength per unit width
(ASTM D7565)

Average value[1]	Design value[2]
-	3.3 kN/cm/ply 1.9 kips/in/ply

[1]Average value of test series
[2]Average value minus 3 standard deviations

Laminate Modulus of Elasticity in Tension

Cured Laminate Properties with Sikadur®-330 Epoxy
Properties after standard cure between 21 and 24 °C (70 and 75 °F)/5 days
(ASTM D3039)

Average Value[1]	Design Value[2]
-	74 700 MPa (10.83 x 10⁶ psi)

[1] Average value of test series
[2]Average value minus 3 standard deviations
Note: 24 sample coupons per test series; all other values based on 6 coupon test series.

Laminate Elongation at Break in Tension

Cured Laminate Properties with Sikadur®-330 Epoxy
Properties after standard cure between 21 and 24 °C (70 and 75 °F)/5 days
(ASTM D3039)

Average value[1]	Design value[2]
1.25 %	1.01 %

[1]Average value of test series
[2]Average value minus 3 standard deviations
Note: 24 sample coupons per test series; all other values based on 6 coupon test series.

Laminate Nominal Thickness	Average value[1]	Design value[2]
	-	0.38 mm (0.015 in)

[1]Average value of test series
[2] Average value minus 3 standard deviations

Tensile Stiffness	Average value[1]	Design value[2]	(D7565)
		285 kN/cm/ply 163 kips/in/ply	

[1] Average value of test series
[2] Average value minus 3 standard deviations
Note: 24 sample coupons per test series; all other values based on 6 coupon test series.

Consumption		
	First coat	0.7 - 1.2 kg/m² (0.14 - 0.24 lb/ft²)
	Inter-layer coat	0.5 kg/m² (0.10 lb/ft²)
	Sealer coat	0.5 kg/m² (0.10 lb/ft²)

BASIS OF PRODUCT DATA

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. Properties tested at 23 °C (73 °F) and 50 % R.H. unless stated otherwise.

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.

ENVIRONMENT, HEALTH & SAFETY

This product is a manufactured article that does not require Safety Data Sheets to be marketed, transported or applied at the jobsite, according to the Hazardous Product Act - Section 2. Based on our current knowledge, this product is not classified as dangerous and does not contain any hazardous materials. Always wear personal protective equipment (including safety goggles and gloves) to manipulate and install Sika® products.

HAZARDOUS PRODUCT ACT - SECTION 2

APPLICATION INSTRUCTIONS

SUBSTRATE 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 mil). 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 METHOD / TOOLS

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 overlayment

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 a 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.

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

LEGAL NOTES

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 in accordance with Sika's recommendations. 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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