Construction

SikaWrap®-230 C

Woven unidirectional carbon fibre fabric, designed for structural strengthening applications as part of the strengthening system.

Product Description

SikaWrap®-230 C is a unidirectional woven carbon fibre fabric with mid-range strengths, designed for installation using the dry application process.

Uses

Structural strengthening of reinforced concrete, masonry, steel, brickwork and timber elements or structures, to increase flexural, shear and axial loading capacity for:

- Improved seismic performance of masonry walls
- Replacing missing steel reinforcement
- Increasing the strength and ductility of columns
- Increasing the loading capacity of structural elements
- Enabling changes in use / alterations and refurbishment
- Correcting structural design and / or construction defects
- Increasing resistance to seismic movement
- Improving service life and durability
- Structural upgrading to comply with current standards

Characteristics / Advantages

- Manufactured with weft fibres to keep the fabric stable (heat-set)
- Multifunctional fabric for use in many different strengthening applications
- Flexible and accommodating of different surface planes and geometry (beams, columns, chimneys, piles, walls, soffits, silos etc.)
- Available in different widths for optimum utilisation
- Low density for minimal additional weight
- Extremely cost effective in comparison to traditional strengthening techniques

Tests

Approval / Standards

France: CSTB - Avis Technique 3/10-669, SIKA CARBODUR SIKA WRAP

USA: ACI 440.2R-08, Guide for the Design and construction of Externally Bonded FRP Systems for strengthening concrete structures, July 2008

UK: Concrete Society Technical Report No. 55, Design guidance for strengthening concrete structures using fibre composite material, 2000

Italy: CNR-DT 200/2004 - Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Existing Structures

Product Data

Form

Fibre Type

Mid-range strength of selected carbon fibres.

Fabric Construction

Fibre orientation: 0° (unidirectional).
Warp: black carbon fibres (99% of total areal weight).
Weft: white thermoplastic heat-set fibres (1% of total areal weight).

Packaging

	Fabric length / roll	Fabric width
1 roll in cardboard box	100 m	500 mm

Storage

Storage Conditions / Shelf Life

24 months from date of production if stored properly in undamaged, original sealed packaging, in dry conditions at temperatures between +5°C and +35°C.
Protect from direct sunlight.

Technical Data

Areal Weight

230 g/m^2 $\pm$ 10 g/m^2

Fabric Design Thickness

0.128 mm (based on fibre content).

Fibre Density

1.8 g/cm^3

Mechanical / Physical Properties

Dry Fibre Properties

Values in the longitudinal direction of the fibres (according to EN 2561)

Tensile Modulus	Minimum Value	234'000 N/mm^2
Tensile Strength	Minimum Value	4'300 N/mm^2
Elongation at break		1.8 %

Laminate Properties (related to effective laminate thickness) Select one type of laminate property

Values in the longitudinal direction of the fibres (according to ISO 527)
Single layer, 10 samples per test series

Impregnating resin		Sikadur®-330	Sikadur®-300
Laminate thickness (nominal)		1 mm	1 mm
Design cross section per 1000 mm width		1000 mm^2	1000 mm^2
Tensile Modulus	Average	28.2 kN/mm^2	29.0 kN/mm^2
	Characteristic	26.0 kN/mm^2	26.3 kN/mm^2
Tensile Strength	Average	415 N/mm^2	440 N/mm^2
	Characteristic	365 N/mm^2	363 N/mm^2

Laminate Properties (related to fibre thickness) Select one type of laminate property

Values in the longitudinal direction of the fibres (according to ISO 527)
Single layer, 10 samples per test series

Impregnating resin		Sikadur®-330	Sikadur®-300
Laminate thickness (nominal)		0.131 mm	0.131 mm
Design cross section per 1000 mm width		131 mm^2	131 mm^2
Tensile Modulus	Average	216 kN/mm^2	222 kN/mm^2
	Characteristic	199 kN/mm^2	201 kN/mm^2
Tensile Strength	Average	3176 N/mm^2	3367 N/mm^2
	Characteristic	2793 N/mm^2	2778 N/mm^2

Design Values

Actual design strain has to be determined according to relevant design standard.
Values given relate to impregnating resin Sikadur®-330 and Sikadur®-300

Tensile resistance	Average	415 kN/m
	Characteristic	365 kN/m
Tensile force at 0.4% elongation	Average	113 kN/m
	Characteristic	104 kN/m
Tensile force at 0.6% elongation	Average	169 kN/m
	Characteristic	156 kN/m

System Information

System Structure

The system build-up and configuration as described must be fully complied with and may not be changed.

Concrete substrate adhesive primer - Sikadur®-330.

Impregnating / laminating resin - Sikadur®-330.

Structural strengthening fabric - SikaWrap®-230 C.

For detailed information on Sikadur®-330, together with the resin and fabric application details, please refer to the Sikadur®-330 Product Data Sheet and the Method Statement of SikaWrap® manual dry application.

Application Details

Consumption

First layer including priming layer:	0.7 – 1.2 kg/m^2
Following layers:	0.5 kg/m^2

Please also refer to the Method Statement of SikaWrap® manual dry application for further information.

Substrate Quality

Minimal substrate tensile strength: 1.0 N/mm^2 or as specified in the strengthening design.

Please also refer to the Method Statement of SikaWrap® manual dry application for further information.

Substrate Preparation

Please also refer to the Method Statement of SikaWrap® manual dry application for further information.

Application Instructions

Application Method / Tools

The fabric can be cut with special scissors or a Stanley knife (razor knife / box-cutter knife). Never fold the fabric!

SikaWrap® 230C is applied using the dry application process.

Please refer to the Method Statement of SikaWrap® manual dry application for the impregnating / laminating procedure.

Notes on Application / Limitations

This product should only be used by trained and experienced professionals.

SikaWrap®-230 C fabric is coated to ensure maximum bond and durability with the Sikadur® adhesives / impregnating / laminating resins. To maintain and ensure full system compatibility, do not interchange different system components.

SikaWrap®-230 C can be over coated with a cementitious overlay or other coatings for aesthetic and / or protective purposes. The over coating system selection is dependent on the exposure and the project specific requirements. For additional UV light protection in exposed areas use Sikagard®-550 W Elastic, Sikagard® ElastoColor-675 W or Sikagard®-680 S.

Please refer to the Method Statement of SikaWrap® manual dry application for further information, guidelines and limitations.

Health and Safety Information

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

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 written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. 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.

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