

## SikaWrap®-230 C

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

### Product Description

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



### Uses

Structural strengthening of reinforced concrete, masonry, brickwork and timber elements or structures, to increase flexural and shear 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

Slovakia: TSUS, Building Testing and research institutes, Technical Approval TO-09/0080, 2009: Systémy dodatočného zosilňovania konštrukcií Sika® CarboDur® a SikaWrap® (Slovak).

Poland: Technical Approval ITB AT-15-5604/2011: Zestaw wyrobów Sika CarboDur do wzmacniania i napraw konstrukcji betonowych (Polish).

Poland: Technical Approval IBDiM Nr AT/2008-03-0336/1 „Płaskowniki. pręty, kształtki i maty kompozytowe do wzmacniania betonu o nazwie handlowej: Zestaw materiałów Sika CarboDur® do wzmacniania konstrukcji obiektów mostowych (Polish).

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, 2012 (UK).



## Product Data

### Form

**Fibre Type** Selected mid-range strength 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	300 / 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 and heat.

## Technical Data

**Areal Weight** 235 g/m<sup>2</sup> ± 10 g/m<sup>2</sup> (Carbon fibres only)

**Fabric Design Thickness** 0.129 mm (based on fibre content).

**Fibre Density** 1.82 g/cm<sup>3</sup>

## Mechanical / Physical Properties

Dry Fibre Properties	Values in the longitudinal direction of the fibres		(according to ISO 10618)
		Minimum Value	
Tensile Modulus			230'000 N/mm <sup>2</sup>
Tensile Strength			4'000 N/mm <sup>2</sup>
Elongation at break			1.7 %

Laminate Properties (related to fibre thickness)	Values in the longitudinal direction of the fibres		(according to EN 2561*)
Single layer, minimum 27 samples per test series			
Laminate thickness (nominal)			0.129 mm
Design cross section per 1000 mm width			129 mm <sup>2</sup>
Tensile Modulus	Average		225 kN/mm <sup>2</sup>
	Characteristic		220 kN/mm <sup>2</sup>
Tensile Strength	Average		3500 N/mm <sup>2</sup>
	Characteristic		3200 N/mm <sup>2</sup>

\* modification sample with 50 mm

<b>Design Values</b>	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	452 kN/m
		Characteristic	413 kN/m
	Tensile force at 0.4% elongation	Average	116 kN/m
		Characteristic	114 kN/m
	Tensile force at 0.6% elongation	Average	174 kN/m
		Characteristic	170 kN/m

## System Information

<b>System Structure</b>	<p>The system build-up and configuration as described must be fully complied with and may not be changed.</p> <p>Concrete substrate adhesive primer - Sikadur®-330.          Impregnating / laminating resin - Sikadur®-330.          Structural strengthening fabric - <b>SikaWrap®-230 C</b>.</p> <p>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 (Ref. 850 41 02).</p>
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## Application Details

<b>Consumption</b>	<p>Dry application with Sikadur®-330</p> <p>First layer including priming: 0.8 – 1.2 kg/m<sup>2</sup></p> <p>Following layers: 0.7 kg/m<sup>2</sup></p> <p>Wet application with Sikadur®-300</p> <p>First layer including priming: 0.8 – 1.2 kg/m<sup>2</sup></p> <p>Following layers: 0.7 kg/m<sup>2</sup></p> <p>Please also refer to the Method Statement of SikaWrap® manual dry application (Ref. 850 41 02), SikaWrap® manual wet application (Ref. 850 41 03) or SikaWrap® machine wet application (Ref. 850 41 04) for further information.</p>
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<b>Substrate Quality</b>	<p>Minimal substrate tensile strength: 1.0 N/mm<sup>2</sup> or as specified in the strengthening design.</p> <p>Please also refer to the Method Statement of SikaWrap® manual dry application (Ref. 850 41 02), SikaWrap® manual wet application (Ref. 850 41 03) or SikaWrap® machine wet application (Ref. 850 41 04) for further information.</p>
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<b>Substrate Preparation</b>	<p>Concrete must be cleaned and prepared to achieve a laitance and contaminant free, open textured surface.</p> <p>Please also refer to the Method Statement of SikaWrap® manual dry application (Ref. 850 41 02), SikaWrap® manual wet application (Ref. 850 41 03) or SikaWrap® machine wet application (Ref. 850 41 04) for further information.</p>
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## Application Instructions

<b>Application Method / Tools</b>	<p>The fabric can be cut with special scissors or a Stanley knife (razor knife / box-cutter knife). Never fold the fabric!</p> <p><b>SikaWrap® 230C</b> is applied using the dry application process.</p> <p>Please refer to the Method Statement of SikaWrap® manual dry application (Ref. 850 41 02), SikaWrap® manual wet application (Ref. 850 41 03) or SikaWrap® machine wet application (Ref. 850 41 04) for the impregnating / laminating procedure.</p>
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**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 (Ref. 850 41 02), SikaWrap® manual wet application (Ref. 850 41 03) or SikaWrap® machine wet application (Ref. 850 41 04) for further information, guidelines and limitations.

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<b>Value Base</b>	All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.
<b>Local Restrictions</b>	Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.
<b>Health and Safety Information</b>	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.
<b>Legal Notes</b>	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.

All products are manufactured under a management system certified to conform to the requirements of the quality, environmental and occupational health & safety standards ISO 9001, ISO 14001 and OHSAS 18001



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