

SikaWrap®-230 C

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

Product Description

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



Uses

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 fibers 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.)
- 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 fiber composite material, 2000
Italy: CNR-DT 200/2004 - Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Existing Structure



Product Data

Form

Fiber Type Selected mid –range strength of selected carbon fibers.

Fabric Construction Fiber orientation: 0° (unidirectional).
Warp: black carbon fibers (99% of total areal weight).
Weft: white thermoplastic heat-set fibers (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 235 g/m² ± 10 g/m² (carbon fibres only)

Fabric Design Thickness 0.129 mm (based on fiber content).

Fiber Density 1.82 g/cm³

Mechanical / Physical Properties

Dry Fiber Properties	Values in the longitudinal direction of the fibres		(according to ISO 10618)
	Tensile E-Modulus	Minimum Value	230'000 N/mm ²
Tensile Strength	Minimum Value	4'000 N/mm ² (nominal).	
Elongation at Break		1.7%	

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

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	174kN/m
	Characteristic	170 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

Dry application with Sikadur®-330

First Layer including priming layer : 0.8-1.2 kg/m²

Following layers : 0.7 kg/m²

Please also refer to Method Statement of of SikaWrap® manual dry application.

Substrate Quality

Minimal substrate tensile strength: 1.0 N/mm² or as specified in the strengthening design.

Please also refer to Method Statement of of SikaWrap® manual dry application.

Substrate Preparation

Concrete and masonry:

Substrates must be sound, dry, clean and free from laitance, ice, standing water, grease, oils, old surface treatments or coatings and any loosely adhering particles. Concrete must be cleaned and prepared to achieve a laitance and contaminant free, open textured surface.

Repairs and levelling: If carbonised or weak concrete cover has to be removed or levelling of uneven surfaces is needed, the following systems can be applied: (Details on application and limitation see the relevant Product Data Sheets)

- Protection of corroded rebars: SikaTop® Armatec® 110 EpoCem®
- Structural repair materials: Sikadur®-41 / Sikadur®-31 epoxy repair mortar
- Sikadur®-32 LP adhesive.

Please also refer to Method Statement of of SikaWrap® manual dry application

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® 230 C is applied using the dry application process

Refer to Sikadur®-330 Product Data Sheet for impregnating / laminating procedure.

Please also refer to Method Statement of of SikaWrap® manual dry application

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 main 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®-680 MY or Sikagard® PU UR

Please also refer to Method Statement of of SikaWrap® manual dry application

Value Base

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.

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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