

# PRODUCT DATA SHEET

## SikaWrap®-450 C

### STITCHED CARBON FIBER FABRIC FOR STRUCTURAL STRENGTHENING

#### DESCRIPTION

SikaWrap®-450 C is a unidirectional woven carbon fiber fabric, designed for installation using the dry or wet application process.

#### USES

SikaWrap®-450 C may only be used by experienced professionals.

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

#### 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

#### APPROVALS / 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 „Płaskownicy. 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 INFORMATION

<b>Construction</b>	Fiber orientation: 0° (unidirectional). Warp: black carbon fibers (99% of total areal weight). Weft: white thermoplastic heat-set fibers (1% of total areal weight).		
<b>Fibre Type</b>	Mid strength carbon fibers		
<b>Packaging</b>	<u>1 Roll in Cardboard Box</u>	<u>Fabric Length / Roll</u> ≥ 50 m	<u>Fabric Width</u> 500 mm
<b>Shelf Life</b>	24 months from date of production if stored as per recommendation.		
<b>Storage Conditions</b>	Store properly in undamaged original sealed packaging in dry conditions at temperatures between +5°C and +35°C. Protect from direct sunlight.		
<b>Dry Fibre Density</b>	1.82 g/cm <sup>3</sup>		
<b>Dry Fibre Thickness</b>	0.255 mm (based on Fiber content)		
<b>Dry Fibre Tensile Strength</b>	4000 N/mm <sup>2</sup> (Nominal, Longitudanal direction of Fiber)		ISO 10618
<b>Dry Fibre Modulus of Elasticity in Tension</b>	2,30,000 N/mm <sup>2</sup> (Longitudanal direction of fiber)		ISO 10618
<b>Dry Fibre Elongation at Break</b>	1.7% ( Longitudanal direction of Fiber)		ISO 10618

## TECHNICAL INFORMATION

<b>Laminate Nominal Thickness</b>	0.255 mm ( Values in the longitudinal direction of the fibres Single layer, minimum 27 samples per test series)		EN 2561
<b>Laminate Nominal Cross Section</b>	255 N/mm <sup>2</sup> ( as per 1000mm width)		EN 2561
<b>Laminate Tensile Strength</b>	<u>Average</u>	<u>3500 N/mm<sup>2</sup></u>	EN 2561
	<u>Characteristics</u>	<u>3200 N/mm<sup>2</sup></u>	
<b>Laminate Modulus of Elasticity in Tension</b>	<u>Average</u>	<u>225 kN/mm<sup>2</sup></u>	EN 2561
	<u>Characteristic</u>	<u>220 kN/mm<sup>2</sup></u>	
<b>Tensile Resistance</b>	<u>Average</u>	<u>452 kN/m</u>	
	<u>Characteristic</u>	<u>413 kN/m</u>	
Actual design strain has to be determined according to relevant design standard. Values given relate to impregnating resin Sikadur®-330 IN.			

## SYSTEM INFORMATION

<b>System Structure</b>	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®-450 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.
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## APPLICATION INFORMATION

<b>Consumption</b>	Dry application with Sikadur®-330 IN	
	<u>0.8-1.2 kg/m<sup>2</sup></u>	<u>First Layer including priming layer</u>
	<u>0.7 kg/m<sup>2</sup></u>	<u>Following layers</u>

## APPLICATION INSTRUCTIONS

### SUBSTRATE QUALITY

Minimal substrate tensile strength: 1.0 N/mm<sup>2</sup> 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 METHOD / TOOLS

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

SikaWrap® 450 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

### LIMITATIONS

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

SikaWrap® -450 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.

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#### **Product Data Sheet**

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SikaWrap® -450 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

## BASIS OF PRODUCT DATA

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.

## LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the declared data for this product may vary from country to country. Please consult the local Product Data Sheet for the exact product data.

## ECOLOGY, HEALTH AND SAFETY

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) 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.