

## PRODUCT DATA SHEET

# Sika® CarboDur® S NSM

### PULTRUDED CARBON FIBRE PLATES FOR STRUCTURAL STRENGTHENING AS PART OF THE SIKA® CARBODUR® SYSTEM

#### DESCRIPTION

Sika® CarboDur® plates are pultruded carbon fibre reinforced polymer (CFRP) laminates, designed for strengthening concrete, timber and masonry. Sika® CarboDur® plates are bonded into slots as near surface mounted reinforcement using Sika Anchor-Fix®-3+, Sikadur®-330 or Sikadur®-30 epoxy resin based adhesives for normal application temperatures, or Sikadur®-30 LP epoxy resin based adhesive for elevated temperatures during application. Sikadur®-300 epoxy resin based adhesive is used for horizontal applications.

Please refer to the relevant Product Data Sheet for more detailed information about each of these adhesives.

#### USES

Sika® CarboDur® S NSM may only be used by experienced professionals.

Sika® CarboDur® systems are used to improve, increase or repair the performance and resistance of structures for:

Increased Load Carrying Capacity:

- Increasing the load capacity of floor slabs, beams and bridge sections
- For the installation of heavier machinery
- To stabilise vibrating structures
- For changes in building use

Damage to structural elements due to:

- Deterioration of the original construction materials
- Steel reinforcement corrosion
- Accidents (Vehicle impact, earthquakes, fire)

Improvement of serviceability and durability:

- Reduced deflection and crack width
- Stress reduction in the steel reinforcement
- Improved fatigue resistance

Change of the structural system:

- Removal of walls and / or columns
- Removal of floor and wall sections to create access / openings

Resistance to possible events:

- Increased resistance to earthquakes, impact or explosion etc.

To repair design or construction defects such as:

- Insufficient / inadequate reinforcement
- Insufficient / inadequate structural depth

#### CHARACTERISTICS / ADVANTAGES

- Non-corroding
- Very high strength
- Excellent durability and fatigue resistance
- Unlimited lengths, no joints required
- Easy transportation (rolls)
- Lightweight, very easy to install
- Minimum preparation of plate
- Smooth edges without exposed fibres as result of production by pultrusion
- Extensive Testing and Approvals available from many countries worldwide

#### APPROVALS / CERTIFICATES

- Slovakia: TSUS, Building Testing and research institutes,
- Slovakia: Technical Approval TO-09/0080, 2009: Systémy dodatočného zosilňovania konštrukcií Sika® CarboDur® a SikaWrap®.
- Poland: Technical Approval ITB AT-15-5604/2011: Zestaw wyrobów Sika® CarboDur® do wzmacniania i napraw konstrukcji betonowych
- 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
- UK: Concrete Society Technical Report No. 55, Design guidance for strengthening concrete structures using

- fibre composite material, 2012.
- Italy: CNR-DT 200/2004 - Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Existing Structures

## PRODUCT INFORMATION

<b>Packaging</b>	Supplied in rolls of 250 m in nonreturnable cardboard boxes.			
<b>Appearance / Colour</b>	Carbon fibre reinforced polymer with an epoxy matrix, black.			
<b>Shelf life</b>	Unlimited, provided the storage conditions are met.			
<b>Storage conditions</b>	Store in original, unopened, sealed and undamaged packaging in dry conditions at temperatures of max. +50 °C. Protect from direct sunlight. Transportation: only in the original packaging, or otherwise adequately protected against any mechanical damage			
<b>Density</b>	1.60 g/cm <sup>3</sup>			
<b>Dimensions</b>	<b>Type Sika® CarboDur® S NSM</b>	<b>Width</b>	<b>Thickness</b>	<b>Cross section area</b>
	1.030	10 mm	3.0 mm	30 mm <sup>2</sup>
	1.525	15 mm	2.5 mm	37.5 mm <sup>2</sup>
	2.025	20 mm	2.5 mm	50 mm <sup>2</sup>
<b>Fibre volume content</b>	> 68 %			

## TECHNICAL INFORMATION

<b>Laminate tensile strength</b>	Mean value	3 100 N/mm <sup>2</sup>	(EN 2561)
	5 % Fractile-value	2 900 N/mm <sup>2</sup>	
	Values in the longitudinal direction of the fibres		
<b>Laminate modulus of elasticity in tension</b>	Mean value	170 000 N/mm <sup>2</sup>	(EN 2561)
	5 % Fractile-value	165 000 N/mm <sup>2</sup>	
	Values in the longitudinal direction of the fibres		
<b>Laminate elongation at break in tension</b>	Mean value	1.80 %	(EN 2561)
	Values in the longitudinal direction of the fibres		
<b>Glass transition temperature</b>	> 100 °C		(EN 61006)

## SYSTEMS

<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>Resin Adhesive – Sika AnchorFix®-3030, Sikadur®-330, Sikadur®-30, Sikadur®-30 LP</p> <p>Structural strengthening Carbon plates – Sika® CarboDur® S NSM</p> <p>For detailed information on the different resins, together with the application details, please refer to the latest Product Data Sheets and the “Method Statement Sika® CarboDur® Near Surface Mounted Reinforcement” Ref: 850 41 07.</p>
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## APPLICATION INFORMATION

<b>Consumption</b>	All CarboDur® plates	≤ 0.12 kg/m*
	*Note: Consumption is for standard application only. Loss and wastage can lead to a higher adhesive consumption.	

## APPLICATION INSTRUCTIONS

### SUBSTRATE QUALITY

Recommended minimum concrete pull-off strength after surface preparation: 1.0 N/mm<sup>2</sup>

Please refer to the "Method Statement for Sika® CarboDur® Near Surface Mounted Reinforcement" Ref: 850 41 07 for more detailed information.

### SUBSTRATE PREPARATION

Slits must be dry and free from dust and loose particles. Please also refer to the "Method Statement Sika® CarboDur® Near Surface Mounted Reinforcement" Ref: 850 41 07 for more detailed information.

### APPLICATION METHOD / TOOLS

Please refer to the relevant Product Data Sheet

- Sikadur®-30
- Sikadur®-30 LP
- Sikadur®-330
- Sikadur®-300
- Sika® AnchorFix®-3030

Please refer the "Method Statement Sika® CarboDur® Near Surface Mounted Reinforcement" Ref: 850 41 07.

## IMPORTANT CONSIDERATIONS

Please refer to the relevant Sika® epoxy adhesive Product Data Sheet:

- Sikadur®-30
- Sikadur®-30 LP
- Sikadur®-330
- Sikadur®-300
- Sika® AnchorFix®-3030

**A suitably qualified Structural Engineer must be responsible for the design of the strengthening works. Additionally as this application is structural, great care must also be taken in selecting suitably experienced and trained specialist contractors.**

Maximum permissible continuous service temperature is approx. +50 °C.

Please also refer to the "Method Statement Sika® CarboDur® Near Surface Mounted Reinforcement" Ref: 850 41 07.

Contact Sika technical service for detailed advice.

## 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 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.

## ECOLOGY, HEALTH AND SAFETY

### REGULATION (EC) NO 1907/2006 - REACH

This product is an article as defined in article 3 of regulation (EC) No 1907/2006 (REACH). It contains no substances which are intended to be released from the article under normal or reasonably foreseeable conditions of use. A safety data sheet following article 31 of the same regulation is not needed to bring the product to the market, to transport or to use it. For safe use follow the instructions given in the product data sheet. Based on our current knowledge, this product does not contain SVHC (substances of very high concern) as listed in Annex XIV of the REACH regulation or on the candidate list published by the European Chemicals Agency in concentrations above 0,1 % (w/w).

## 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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