

Sika CarboDur® BC Rods

Pultruded carbon fibre rods for structural strengthening as part of a Sika CarboDur® system

Construction

System Description

Sika CarboDur® BC rods are pultruded carbon fibre reinforced polymer (CFRP) laminates with a circular cross section, designed for strengthening concrete, timber and masonry.

Sika CarboDur® BC rods are bonded into slots as near surface mounted reinforcement using Sikadur®-33, 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.

The Sika CarboDur® BC rods can also be used for anchoring SikaWrap® fabrics where positive attachment to concrete or masonry is required.

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

Uses

Sika CarboDur® BC rods 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



Combination with other strengthening products:

- Doweling applications
 - Anchoring of SikaWrap® fabrics
-

**Characteristics /
Advantages**

- Non corroding
 - Very high strength
 - Invisible once installed, no joints required
 - Excellent durability and fatigue resistance
 - Easy transportation
 - Lightweight, very easy to install
 - Smooth edges without exposed fibres as the result of production by pultrusion
 - Can accept traffic on the strengthened surface (rods not exposed)
 - No surface preparation / levelling of uneven substrates required
 - Improved resistance to fire (compared with externally bonded reinforcement)
 - Testing and Approvals available from many countries worldwide
-

Tests

Approval / Standards

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)

International: Fib, Technical Report, bulletin 14: Externally bonded FRP reinforcement for RC structures, July 2001

UK: Concrete Society Technical Report No. 55, Design guidance for strengthening concrete structures using fibre composite material, 2012 (UK).

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

Product Data**Sika® CarboDur® BC rods****Form****Appearance / Colour** Carbon fibre reinforced polymer with an epoxy matrix, black.**Packaging** Supplied in rolls of 100 m (BC 6) in non-returnable cardboard boxes or cut to 12 m long bars (BC 8, BC 10, BC 12).

Types	Type	Diameter	Cross sectional area
	CarboDur® BC6	6 mm	28 mm ²
CarboDur® BC8	8 mm	50 mm ²	
CarboDur® BC10	10 mm	79 mm ²	
CarboDur® BC12	12 mm	113 mm ²	

Storage**Storage Conditions / Shelf Life** Unlimited, provided there is no exposure to direct sunlight (UV light), in dry conditions and at temperatures of max. 50°C

Transportation: only in the original packaging, or otherwise adequately protected against any mechanical damage

Technical Data**Density** 1.60 g/cm³**Glass Transition Temperature** > 100°C (according to EN 61006)**Fibre Volume Content** > 65%**Mechanical / Physical Properties**

E-Modulus	Values in the longitudinal direction of the fibres (according to EN 2561)	
	Mean Value	148'000 N/mm ²
Tensile Strength	Values in longitudinal direction of fibres (according to EN 2561)	
	Mean Value	3'100 N/mm ²
	5% Fractile-Value	2'900 N/mm ²
Strain at break	Value in longitudinal direction of fibres (according to EN 2561)	
	Minimum value	> 1.70%

System Information

System Structure	<p>The system build-up and configuration as described must be fully complied with and may not be changed.</p> <p>Resin Adhesive – Sikadur®-330, Sikadur®-30, Sikadur®-30 LP</p> <p>Structural strengthening Carbon plates – CarboDur® BC</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>
-------------------------	---

Application Details

Consumption	CarboDur® BC6	≤ 0.12 kg/m
	CarboDur® BC8	≤ 0.18 kg/m
	CarboDur® BC10	≤ 0.24 kg/m
	CarboDur® BC12	≤ 0.32 kg/m
These figures are theoretical and do not allow for any additional material due to surface porosity, wastage, etc.		
Substrate Preparation	Refer to the “Technical Information Manual Sika CarboDur® Near Surface Mounted Reinforcement” Ref: 850 41 07	

Application Conditions / Limitations

Application Conditions / Limitations	Refer to the relevant Sika epoxy adhesive Product Data Sheet: <ul style="list-style-type: none">- Sikadur®-30- Sikadur®-30 LP- Sikadur®-330- Sikadur®-300- Sikadur®-33
---	--

Application Instructions

Application Method / Tools	Refer to the relevant Product Data Sheet <ul style="list-style-type: none">- Sikadur®-30- Sikadur®-30 LP- Sikadur®-330- Sikadur®-300- Sikadur®-33 <p>Refer to the “Technical Information Manual Sika CarboDur® Near Surface Mounted Reinforcement” Ref: 850 41 07</p>
-----------------------------------	---

Notes on Application / Limitations	<p>A suitably qualified Structural Engineer must be responsible for the design of the strengthening works.</p> <p>Additionally as this application is structural, great care must also be taken in selecting suitably experienced and trained specialist contractors.</p> <p>Maximum permissible continuous service temperature is approx. +50°C.</p> <p>Refer to the “Technical Information Manual Sika CarboDur® Near Surface Mounted Reinforcement” Ref: 850 41 07 for further limitations and guidelines</p> <p>Detailed advice can always be obtained from Technical Services Department</p>
---	--

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.

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.

Health and Safety Information

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 this 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.



SIKA LIMITED

Head Office · Watchmead · Welwyn Garden City ·

Hertfordshire · AL7 1BQ · United Kingdom

Phone: +44 1 707 394444 · Fax: +44 1 707 329129 · www.sika.co.uk

