BUILDING TRUST

PRODUCT DATA SHEET

Sika® CarboShear L

CARBON FIBRE SHEAR LINKS FOR STRUCTURAL STRENGTHENING AS PART OF THE SIKA® CARBODUR® CFRP STRENGTHENING SYSTEM

PRODUCT DESCRIPTION

Sika® CarboShear L carbon fibre shear links are corrosion resistant, designed for strengthening concrete structures in shear and to anchor Sika® CarboDur® plates at their ends. They are part of the Sika® CarboDur® CFRP Strengthening System.
Sika® CarboShear L shear links are bonded as external reinforcement using Sikadur®-30 epoxy resin based adhesive for normal, or Sikadur®-30 LP epoxy resin based adhesive for elevated temperatures during application.
For fixing into the anchorage holes, Sika AnchorFix®-3+ can also be used.
Please refer to the relevant Product Data Sheet for more detailed information about each of these adhesives.

USES

Sika® CarboShear L may only be used by experienced professionals.
Sika® CarboShear L profiles are used to improve, increase or repair the performance and shear resistance of structures for:
Increased Load Carrying Capacity:
- Increasing the load capacity of beams.
- For the installation of heavier machinery.
- 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 etc.)

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
- Changed design philosophy

To repair design or construction defects such as:
- Insufficient / inadequate reinforcement
- Insufficient / inadequate structural depth

CHARACTERISTICS / ADVANTAGES

- Tested anchorage system.
- Non-corroding
- Very high strength and durability
- Shear and bursting enhancement.
- Well defined anchoring.
- Lightweight.
- Low overall thickness, can be over coated.
- Easy transportation.
- Easy installation – no heavy handling and installation equipment.
- Outstanding fatigue resistance.
- Minimal preparation of the shear links is required.
- Minimal aesthetic impact.

APPROVALS / STANDARDS

- 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
- EMPA Test Report 169’219 E/1: Testing of CFRP shear strips on reinforced concrete T-beams T1 and T2, Swiss Federal Laboratories for Materials Testing and Research EMPA, 1998
- EMPA Test Report 169’219 E/2: Testing of CFRP shear strips. Flexural beam T3, Swiss Federal Laboratories for Materials Testing and Research EMPA, 1998
- EMPA Test Report 116/7: Shear strengthening with prefabricated CFRP L-shaped plates, Test beams S1 to S6, Swiss Federal Laboratories for Materials Testing and Research EMPA, 2002

PRODUCT INFORMATION

Packaging	Packs of 20 links, or individual pieces
Appearance / Colour	Carbon fibre reinforced polymer with an epoxy matrix, black.
Shelf Life	Unlimited, provided the storage conditions are met.
Storage Conditions	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
Density	1.55 g/cm^3
Dimensions	Sika® CarboShear L is a CFRP L-shaped plate with a 90° bend.

Type	Leg length short	Leg length long	Width	Nominal thickness
4/20/50	200 mm	500 mm	40 mm	2 mm
4/30/70	300 mm	700 mm	40 mm	2 mm
4/50/100	500 mm	1,000 mm	40 mm	2 mm
4/80/150	800 mm	1,500 mm	40 mm	2 mm

The leg length can be cut to size (by saw, or preferably by diamond cutting disc). The inner radius of the bend zone is 25 mm for all sizes

Fibre Volume Content	> 56 %

TECHNICAL INFORMATION

Laminate Tensile Strength	Mean value	> 1 350 N/mm^2
	*Values in the longitudinal direction of the fibres, considering a nominal thickness of 2 mm	
Laminate Tensile Modulus of Elasticity	Mean value	95 000 N/mm^2
	Values in the longitudinal direction of the fibres, considering a nominal thickness of 2 mm	
Laminate Elongation at Break	Strain mean value	> 1.30 %
	Values in the longitudinal direction of the fibres, considering a nominal thickness of 2 mm	

APPLICATION INFORMATION

Consumption	Refer to the “Technical Information Manual for Sika® CarboShear Externally Bonded Shear Reinforcement” Ref: 850 41 06.

APPLICATION INSTRUCTIONS

SUBSTRATE QUALITY

Recommended minimum concrete pull-off strength after surface preparation
- Mean: 2.0 N/mm^2
- Minimum: 1.5 N/mm^2

The effective concrete pull-off strength after surface preparation has to be checked and confirmed.
When the concrete pull-off strength is below the stated minimum requirements, alternative Sika strengthening solutions are available: Refer to the Product Data Sheet for SikaWrap® fabrics.
Concrete must generally be older than 28 days (dependent on curing conditions and the type of concrete etc.).

SUBSTRATE PREPARATION

Refer to the “Technical Information Manual for Sika® CarboShear Externally Bonded Shear Reinforcement” Ref: 850 41 06.

APPLICATION METHOD / TOOLS

Refer to the relevant Product Data Sheet for:
- Sikadur®-30
- Sikadur®-33

Refer to the “Technical Information Manual for Sika® CarboShear Externally Bonded Shear Reinforcement” Ref: 850 41 06.

LIMITATIONS

Refer to the relevant Sika epoxy adhesive Product Data Sheet for:
- Sikadur®-30
- Sikadur®-33

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.

Sika® CarboShear strengthening systems with Sika® CarboShear L profiles must be protected from permanent exposure to direct sunlight, moisture and/or water. Refer to the relevant Technical Information Manual and Product Data Sheets for the selection of suitable over coating materials in situations where systems will be fully or partially exposed.
Maximum permissible continuous service temperature is approx. +50 °C.
Refer to the “Technical Information Manual for Sika® CarboShear Externally Bonded Shear Reinforcement” Ref: 850 41 06 for further limitations and guidelines.
Contact Sika technical service for detailed advice.

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.

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 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.

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