BUILDING TRUST

PRODUCT DATA SHEET

Sika® CarboDur® S

CARBON FIBER LAMINATE FOR STRUCTURAL STRENGTHENING

PRODUCT DESCRIPTION

Sika® CarboDur® S is a pultruded carbon fiber reinforced polymer (CFRP) laminate designed for strengthening concrete, timber and masonry structures. Sika® CarboDur® S is bonded onto the structure as external reinforcement using Sikadur 30 epoxy resin as the adhesive.

USES

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

Load increases
- Increased live loads in warehouses
- Increased traffic volumes on bridges
- Installation of heavy machinery in industrial buildings
- Vibrating structures
- Changes of building utilization

Damage to structural parts
- Aging of construction materials
- Steel reinforcement corrosion
- Vehicle impact
- Fire

Serviceability improvements
- Decrease in deformation
- Stress reduction in steel reinforcement
- Crack width reduction

Change in structural system
- Removal of walls or columns
- Removal of slab sections for openings

Design or construction defects
- Insufficient reinforcements
- Insufficient structural depth

CHARACTERISTICS / ADVANTAGES

- Very high strength
- Lightweight
- Non-corrosive
- Unlimited lengths
- Minimal preparation of laminates
- Very easy to install, especially overhead
- High modulus of elasticity
- Outstanding fatigue resistance
- Alkali resistant
- Simple laminate intersections or crossings

PRODUCT INFORMATION

Packaging	Available in any length up to 250 m (820 ft.). Type S 512 width 50 mm (approx. 2”). Type S 812 width 80 mm (approx. 3”). Type S 1012 width 100 mm (approx. 4”).
Appearance / Color	Black
Shelf Life	Unlimited
Storage Conditions	No exposure to direct sunlight.
Density	0.058 lb./in^3 (1.60 g/cm^3)

Dimensions

Type Sika® CarboDur® S	Width	Thickness	Cross section area	Tensile Strength
512	1.97 in. (50 mm)	47.2 in. (1.2 mm)	0.093 sq. in. (60 mm^2)	37.8 x 10^3 lbs. (168 kN)
812	3.15 in. (80 mm)	47.2 in. (1.2 mm)	0.149 sq. in. (96 mm^2)	60.4 x 10^3 lbs. (269 kN)
1012	3.94 in. (100 mm)	47.2 in. (1.2 mm)	0.186 sq. in. (120 mm^2)	75.5 x 10^3 lbs. (336 kN)

Fiber Volume Content	> 68 %

TECHNICAL INFORMATION

Tensile Strength	Mean Value	4.49 x 10^5 psi (3,100 MPa)
	Design Value	4.06 x 10^5 psi (2,800 MPa)
Tensile Modulus	Mean Value	23.9 x 10^6 psi (165,000 MPa)
	Design Value	23.2 x 10^6 psi (160,000 MPa)
Tensile % Elongation	Elongation at Break: 1.69 %	
Thermal Resistance	> 300 °F (> 150 °C)	
Glass Transition Temperature	>100 °C	(EN 61006)

APPLICATION INFORMATION

Coverage	Coverage of Sikadur® 30 epoxy resin with CarboDur: Type S 512: approx. 50 LF/gallon. Type S 812: approx. 32 LF/gallon. Type S 1012: approx. 22 LF/gallon.

APPLICATION INSTRUCTIONS

SUBSTRATE PREPARATION

Surface must be clean and sound. It may be dry or damp, but free of standing water and frost. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles, disintegrated materials and other bond inhibiting materials from the surface. Existing uneven surfaces must be filled with an appropriate repair mortar (e.g. mixed Sikadur 30 epoxy with the addition of 1 part oven-dried sand). The adhesive strength of the concrete must be verified after surface preparation by random pull-off testing (ACI 503R) at the discretion of the engineer. Minimum tensile strength, 200 psi (1.4 MPa) with concrete substrate failure.

Surface Levelness/Irregularities: Maximum allowable deviation in 6 ft. shall be limited to 1/4” (6 mm) but no greater than 1/8” (3 mm) per foot. Any sharp edges (i.e. fins, form-marks, etc.) must be ground smooth and flush.

Preparation Work: Concrete - Blast clean, shotblast or use other approved mechanical means to provide an open roughened texture.

CarboDur - Wipe clean with appropriate cleaner (e.g. MEK).

Cutting the CarboDur Laminate:
Preferred: CarboDur laminates should be cut with tools using a “shearing” force (e.g. guillotine or heavy duty shears). Care must be taken to support both sides of the CarboDur laminate to avoid splintering.
Alternate: A hack saw or other abrasive cutting method may be used. However, extra care must be taken to support the CarboDur laminate on both sides to avoid splintering. In addition, extra care must be taken to avoid exposure to carbon dust.

Mixing
Consult Sikadur 30 technical data sheet for information on epoxy resin.

APPLICATION METHOD / TOOLS

Apply the neat mixed Sikadur 30 epoxy onto the concrete with a trowel or spatula to a nominal thickness of 1/16” (1.5 mm). Apply the mixed Sikadur 30 epoxy onto the CarboDur laminate with a “roofshaped” spatula to a nominal thickness of 1/16” (1.5 mm). Within the open time of the epoxy, depending on the temperature, place the CarboDur laminate onto the concrete surface. Using a hard rubber roller, press the laminate into the epoxy resin until the adhesive is forced out on both sides. Remove excess adhesive. Glue line should not exceed 1/8 inch (3 mm). The external reinforcement must not be disturbed for a minimum of 24 hours. The epoxy will reach its design strength after 7 days.

LIMITATIONS

Design calculations must be made and certified by an independent licensed professional engineer. Design guidelines are available from Sika Corporation.

BASIS OF PRODUCT DATA

Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

OTHER RESTRICTIONS

See Legal Disclaimer.

ENVIRONMENTAL, HEALTH AND SAFETY

For further information and advice regarding transportation, handling, storage and disposal of chemical products, user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data. User must read the current actual Safety Data Sheets before using any products. In case of an emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.

LEGAL DISCLAIMER

- **KEEP CONTAINER TIGHTLY CLOSED**
- **KEEP OUT OF REACH OF CHILDREN**
- **NOT FOR INTERNAL CONSUMPTION**
- **FOR INDUSTRIAL USE ONLY**
- **FOR PROFESSIONAL USE ONLY**

Prior to each use of any product of Sika Corporation, its subsidiaries or affiliates (“SIKA”), the user must always read and follow the warnings and instructions on the product’s most current product label, Product Data Sheet and Safety Data Sheet which are available at usa.sika.com or by calling SIKA’s Technical Service Department at 1-800-933-7452. Nothing contained in any SIKA literature or materials relieves the user of the obligation to read and follow the warnings and instructions for each SIKA product as set forth in the current product label, Product Data Sheet and Safety Data Sheet prior to use of the SIKA product.

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within the product’s shelf life. User determines suitability of product for intended use and assumes all risks. User’s and/or buyer’s sole remedy shall be limited to the purchase price or replacement of this product exclusive of any labor costs. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

Sale of SIKA products are subject to the Terms and Conditions of Sale which are available at https://usa.sika.com/en/group/SikaCorp/termsandconditions.html or by calling 1-800-933-7452.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: +1-800-933-7452
Fax: +1-201-933-6225
usa.sika.com

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Fracc. Industrial Balvanera
Corregidora, Queretaro
C.P. 76920
Phone: 52 442 2385800
Fax: 52 442 2250537