

SikaWrap® -230C/45

Woven Carbon Fiber Fabric for Structural Strengthening

Product Description

SikaWrap®-230 C/45 is a unidirectional woven carbon fiber fabric for the dry application process.



Uses

Strengthening of reinforced concrete structures, brickwork and timber in case of flexural and shear load due to:

- Improved seismic performance of masonry walls
- Substitute missing rebars
- Strength and ductility of columns
- Increasing loading capacity of structural elements
- Changes of building utilisation
- Structural design construction defects
- Seismic movement
- Improved serviceability
- Structural upgrading to comply with current standards

Characteristics / Advantages

- Manufactured with weft fibers to keep the fabric stable (heat-set process)
- Multifunctional use for every kind of strengthening requirement
- Flexibility of surface geometry (Beams, columns, chimneys, piles, walls, silos)
- Fabric available in several widths for optimum utilisation
- Low density for minimal additional weight
- Economical compared to traditional techniques

Tests

Approval / Standards

France: CSTB - Avis Technique 3/07-502, SIKA CARBODUR SIKAWRAP
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 Structures

Construction

Product Data

Form

Fiber Type Mid strength carbon fibers.

Fabric Construction Fiber orientation: 0° (unidirectional).
Warp: black carbon fibers (99% of total areal weight).
Weft: white thermoplastic heat-set fibers (1% of total areal weight).

Packaging

	Fabric length / roll	Fabric width
1 roll in cardboard box	≥100 m	500 mm

Storage

Storage Conditions / Shelf Life 24 months from date of production if stored properly in undamaged original sealed packaging in dry conditions at temperatures between +5°C and +35°C.
Protect from direct sunlight.

Technical Data

Area Weigh 230 g/m² ± 10 g/m²

Fabric Design Thickness 0.131 mm (based on fiber content).

Fiber Density 1.76 g/cm³

Mechanical / Physical Properties

Dry Fiber Properties Tensile strength:
4'300 N/mm² (nominal).
Tensile E-modulus:
234'000 N/mm² (nominal).
Elongation at break:
1.8% (nominal).

Laminate Properties Laminate thickness:
1.0 mm per layer (impregnated with Sikadur®-330).
Ultimate load:
350 kN/m width per layer
Tensile E-modulus:
25.0 kN/mm² (based on typical laminate thickness of 1.0 mm).
Note:
The above values are typical and indicative only.
The achievable laminate properties obtained from tensile test are dependant on the impregnating/laminating resin used and the type of tensile testing procedure.
Apply material reduction factors according to the relevant design standard.

Design	<p>Design strain: Max. 0.6% (this value is dependent on the type of loading and must be adapted according to the relevant local design standards)</p> <p>Tensile strength: (theoretical tensile strength for the design):</p> <ul style="list-style-type: none"> - at elongation 0.4%: 100 kN/m width (= 30 kN / 30 cm) (= 60 kN / 60 cm) - at elongation 0.6%: 150 kN/m width (= 45 kN / 30 cm) (= 90 kN / 60 cm)
System Information	
System Structure	<p>The system configuration as described must be fully complied with and may not be changed.</p> <p>Concrete primer - Sikadur®-330.</p> <p>Impregnating / laminating resin - Sikadur®-330.</p> <p>Structural strengthening fabric - SikaWrap®-230 C/45.</p> <p>For detailed resin properties, fabric application details and general information, refer to Sikadur®-330 Product Data Sheet.</p>
Application Details	
Consumption	<p>Depending on the roughness of the substrate.</p> <ul style="list-style-type: none"> - Impregnating of the first layer incl. primer: ~ 0.7 - 1.2 kg/m² (Sikadur®-330). - Impregnating of the following layers: ~ 0.5 kg/m² (Sikadur®-330).
Substrate Quality	<p>Specific requirements: Minimal substrate tensile strength: 1.0 N/mm² or as specified in the strengthening design.</p>
Substrate Preparation	<p><i>Concrete and masonry:</i> 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.</p> <p>Concrete must be cleaned and prepared to achieve a laitance and contaminant free, open textured surface.</p> <p>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)</p> <ul style="list-style-type: none"> - Protection of corroded rebars: SikaTop® Armatec® 110 EpoCem® - Structural repair materials: Sikadur®-41 epoxy repair mortar, Sikadur®-30 adhesive or cementitious Sika® MonoTop®-412 (horizontal, vertical, overhead) or Sika® MonoTop®-438 (horizontal, top-side) range.
Application Instructions	
Application Method / Tools	<p>The fabric can be cut with special scissors or razor knife. Never fold the fabric! Refer to Sikadur®-330 Product Data Sheet for impregnating / laminating procedure.</p>

**Notes on Application /
Limitations**

This product may only be used by experienced professionals.
Minimum radius required for application around corners: > 10 mm.
Grinding edges or building up with Sikadur® mortars may be necessary.

In fiber direction, overlapping of the fabric must be at least 100 mm depending on SikaWrap® type or as specified in the strengthening design.

For side-by-side application, no overlapping length in the weft direction is required. Overlaps of additional layers must be distributed over the column circumference.

The strengthening application is inherently structural and great care must be taken when choosing suitably experienced contractors.

The SikaWrap®-230 C/45 fabric is coated to ensure maximum bond and durability with the Sikadur® impregnating/laminating resins. To maintain system compatibility do not interchange system parts.

The SikaWrap®-230 C/45 may be / must be coated with a cementitious overlay or coatings for aesthetic and/or protective purposes. Selection will be dependent on exposure requirements. For basic UV protection use Sikagard®-550 W Elastic, Sikagard® ElastoColor-675 W or Sikagard®-680 S.

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.

**Health and Safety
Information**

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

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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