

SikaWrap®-231 C

Woven unidirectional carbon fibre fabric, designed for structural strengthening applications as part of the Sika® strengthening system.

Product Description

SikaWrap®-231 C is a unidirectional woven carbon fibre fabric with high strength, designed for installation using the dry or wet application process.



Uses

Structural strengthening of reinforced concrete, masonry, brickwork and timber elements or structures, to increase flexural and shear loading capacity for:

- Improved seismic performance of masonry walls
- Replacing missing steel reinforcement
- Increasing the strength and ductility of columns
- Increasing the loading capacity of structural elements
- Enabling changes in use / alterations and refurbishment
- Correcting structural design and / or construction defects
- Increasing resistance to seismic movement
- Improving service life and durability
- Structural upgrading to comply with current standards

Characteristics / Advantages

- Manufactured with weft fibres to keep the fabric stable (heat-set)
- Multifunctional fabric for use in many different strengthening applications
- Flexible and accommodating of different surface planes and geometry (beams, columns, chimneys, piles, walls, soffits, silos etc.)
- Available in different widths for optimum utilisation
- Low density for minimal additional weight
- Extremely cost effective in comparison to traditional strengthening techniques

Tests

Approval / Standards

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 fibre composite material, 2000

Product Data

Form

Fibre Type High strength of selected carbon fibres.

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

Packaging

	Fabric length / roll	Fabric width
1 roll in cardboard box	≥ 50 m	300 / 600 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

Areal Weight 235 g/m² ± 10 g/m²

Fabric Design Thickness 0.129 mm (based on fibre content).

Fibre Density 1.82 g/cm³

Mechanical / Physical Properties

Dry Fibre Properties	Values in the longitudinal direction of the fibres (according to ISO 10618)	
Tensile Modulus	Minimum Value	230'000 N/mm ²
Tensile Strength	Minimum Value	4'900 N/mm ²
Elongation at break		1.7 %

Laminate Properties (related to fibre thickness)	Values in the longitudinal direction of the fibres (according to EN 2561*)	
Single layer, 27 samples per test series		
Laminate thickness (nominal)		0.129 mm
Design cross section per 1000 mm width		129 mm ²
Tensile Modulus	Average	225 kN/mm ²
	Characteristic	210 kN/mm ²
Tensile Strength	Average	4300 N/mm ²
	Characteristic	3850 N/mm ²
* Modification sample with 50mm		

Design Values Actual design strain has to be determined according to relevant design standard.
Values given relate to impregnating resin Sikadur®-330 and Sikadur®-300

Tensile resistance	Average	555 kN/m
	Characteristic	497 kN/m
Tensile force at 0.4% elongation	Average	116 kN/m
	Characteristic	108 kN/m
Tensile force at 0.6% elongation	Average	1774 kN/m
	Characteristic	163 kN/m

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>Concrete substrate adhesive primer - Sikadur[®]-330. Impregnating / laminating resin - Sikadur[®]-330. Structural strengthening fabric - SikaWrap[®]-231 C.</p> <p>For detailed information on Sikadur[®]-330, together with the resin and fabric application details, refer to the Sikadur[®]-330 Product Data Sheet and the Technical Information Manual of SikaWrap[®] dry application (Ref. 850 41 02), SikaWrap[®] wet application (Ref. 850 41 03) or SikaWrap[®] machine wet application (Ref. 850 41 04).</p>
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Application Details

Consumption	<p>Dry application with Sikadur[®]-330 0.8 – 1.2 kg/m²</p> <p>First layer including priming layer: Following layers: 0.7 kg/m²</p> <p>Wet application with Sikadur[®]-300 0.8 – 1.2 kg/m²</p> <p>First layer including priming layer: Following layers: 0.7 kg/m²</p>
Substrate Quality	<p>Minimal substrate tensile strength: 1.0 N/mm² or as specified in the strengthening design.</p>

Substrate Preparation	<p>Concrete must be cleaned and prepared to achieve a laitance and contaminant free, open textured surface.</p>
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Application Instructions

Application Method / Tools	<p>The fabric can be cut with special scissors or a Stanley knife (razor knife / box-cutter knife). Never fold the fabric!</p> <p>SikaWrap[®] 231C is applied using the dry application process.</p>
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Notes on Application / Limitations	<p>This product should only be used by trained and experienced professionals.</p> <p>SikaWrap[®]-231C fabric is coated to ensure maximum bond and durability with the Sikadur[®] adhesives / impregnating / laminating resins. To maintain and ensure full system compatibility, do not interchange different system components.</p> <p>SikaWrap[®]-231 C can be over coated with a cementitious overlay or other coatings for aesthetic and / or protective purposes. The over coating system selection is dependent on the exposure and the project specific requirements. For additional UV light protection in exposed areas use Sikagard[®]-550 W Elastic, Sikagard[®] ElastoColor-675 W or Sikagard[®]-680 S.</p>
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General Note :	<p>Refer to the Technical Information Manual of SikaWrap[®] dry application (Ref. 850 41 02), SikaWrap[®] wet application (Ref. 850 41 03) or SikaWrap[®] machine wet application (Ref. 850 41 04) for further information on the above System Information sections.</p>
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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 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.

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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