

Nitowrap CW

(Formerly Known as Nitowrap FRC)

High performance, high strength carbon fibre system for structural reinforcement of concrete

Uses

Nitowrap CW is a system of high-quality carbon fibre fabric used with epoxy laminating resins. It is used for strengthening load carrying capacity of different structures, commonly to improve strength in flexure and shear. As a lightweight fabric it can be shaped to fit angles and contours.

Typical applications include, but are not limited to, dynamic and dead load increases, seismic strengthening and repairing structurally damaged concrete. Nitowrap CW may be used on civil structures and buildings.

Advantages

- Improves flexural strength capacity
- High tensile strength and elastic modulus
- Non-intrusive
- Corrosion resistance with high life expectancy
- Rapid installation provides cost savings, rapid return to service and minimal disruption to surrounding works
- Lightweight system reduces requirement for heavy supporting equipment and adds negligible additional load
- Typically low-build reducing effects on structural dimensions and clearance
- No pre-fabrication required, can be shaped to existing contours
- May be applied by dry or wet wrap technique
- Comes in varying fabric strengths and thicknesses

Description

Nitowrap CW is a 0° unidirectional carbon fibre sheet with high strength and high elastic modulus. It is used with specially developed resins 'Nitowrap Primer' and 'Nitowrap Encapsulation Resin' and externally applied to concrete or masonry. When correctly designed and applied, the Nitowrap system may improve structural load carrying capacity, flexural strength, shear strength and provide resistance to deformation.



Nitowrap CW is available in Standard e-modulus CWS 230GPa, High e-modulus CWH 340 GPa and Very High e-modulus CWHM 640 GPa.

Nitowrap CW comes with a ribbed roller to assist in correct application.

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Fosroc also provides the following materials for structural strengthening:

- Nitowrap AW:** Aramid fabric materials
- Nitowrap GW:** Glass fabric materials
- Nitoplate CP:** Carbon fibre pultruded plates
- Nitorod CR:** Carbon fibre pultruded rods

Fosroc provides ancillary primers, adhesives and repair materials.

Technical Support

Fosroc offers a technical support service to specifiers, end users and contractors as well as unrivalled onsite technical assistance in locations all over the world.

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Properties

Table 1: Nitowrap CW

Product dimensions and physical properties

Product Grade	Nitowrap CWS						Nitowrap CWH	Nitowrap CWHM	
	200	230	300	450	530	610		300	400
Product Code	200	230	300	450	530	610	300	300	400
Fibre Density g/cm ³	1.8						1.82	2.12	
Fibre Area Weight (g/m ²)	200	230	300	450	530	610	300	300	400
Standard Roll Width mm	500						500	500	
Standard Roll Length m	100	100	100	50	50	50	100	100	50
Approximate consumption of Encapsulation Resin g/m ² /layer*	450	450	500	550	600	700	500	500	550
Design Thickness (mm)**	0.111	0.131	0.166	0.255	0.293	0.337	0.167	0.145	0.190
Ultimate Elongation	2.1%						1.4%	0.4%	
Fibre Strength (MPa)	>4,900						>4,600	>1,900	
Fibre E-modulus (GPa)	>230						>340	>640	
Tensile Strength (kgf/cm:width)	390	450	590	875	1050	1725	544	280	360
Tensile Strength -Design Value (kgf/cm ²)	35,500						32,630	19,370	
Tensile E-modulus – Design Value (kgf/cm ²)	2.35x10 ⁶						3.467x10 ⁶	6.526x10 ⁶	

* does not include primer or final encapsulation layer.

** Design Thickness based on net-fibre area for single ply. Resin is excluded.

Application Instructions

Fosroc recommends that application of any structural strengthening system should be undertaken by trained and experienced contractors.

Nitowrap products must be applied in strict accordance with the product method statement, a copy of which may be obtained from your nearest Fosroc technical office.

Surface Preparation

Concrete surfaces must be dry, smooth and free from debris or loose material. Surfaces must be fully cured and free from coatings, impregnations or contamination.

Thorough preparation of the substrate is vital. Light grit blasting is recommended to remove all deleterious substances and provide a suitable mechanical key. The surface should be vacuumed after mechanical preparation.

All defects, including cracks, loose concrete blowholes and surface imperfections should be made good with Nitomortar repair materials as advised by Fosroc.

When applying fabric to corners, they should be mechanically ground to a smooth radius of >10mm. For Nitowrap CWHM fabrics this should be >20mm.

Instruction for Use – Dry Wrap Technique

Systems may also be applied using the 'wet wrap' technique. Consult Fosroc's technical department for further information if this is required.

Substrates should be primed using Nitowrap Primer to ensure substrate consolidation and correct consumption of Nitowrap Encapsulation Resin.

Any identified defects and pinholes visible subsequent to priming should be rapidly sealed with an appropriate Nitomortar product or an additional coat of Nitowrap Primer.

Apply Nitowrap Encapsulation Resin at minimum consumption as stated according to the grade of product in the table 1. Use a wet film thickness gauge to ensure minimum thickness is achieved. Apply Nitowrap CW immediately after the application of Nitowrap Encapsulation Resin.

Nitowrap CW product must be cut and handled in a clean environment using clean gloves at all times. Do not use any part of the fabric that is visibly distressed, has been folded or contaminated. Measure and cut the Nitowrap CW in accordance with the designed drawings, ensuring that all overlaps are correctly accounted for.

Nitowrap CW

Carefully place the Nitowrap CW onto the substrate, ensuring full tight contact with the substrate with no air pockets. Use a ribbed laminating roller to remove ridges and air pockets and to draw sufficient Nitowrap Encapsulation resin to the surface.

Observe minimum/maximum overcoating times before commencing follow on works. If a subsequent layer of Nitowrap CW is to be applied over the top of the applied system, re-priming is not necessary.

Finishing

After completing the application of the carbon fibre sheet a final layer of encapsulation resin shall be applied at a consumption of 200 to 250g/m².

As Nitowrap CW is inert and corrosion resistant the product may be left uncoated. If exposed UV Fosroc recommends that the system is coated with Dekguard S or a similar protective system.

Other considerations may require the system to be covered over, by coatings or renders. These are permissible but should be selected in consultation with Fosroc's technical office.

Cleaning

Nitowrap Primer and Nitowrap Encapsulation Resin should be removed from tools and equipment using Fosroc Solvent 102 immediately after use. Hardened material may be removed mechanically.

Estimating

Supply

Nitowrap CW Rolls	See table 1
Nitowrap Primer	15 kg pack
Nitowrap Encapsulation Resin	15 kg pack

Coverage

* Dependent upon substrate. Two coats of primer may be required.

Make allowance for wastage.

Limitations

Design calculations must be approved by a licensed professional engineer in accordance with the prevailing

design standards of the country where the material will be installed.

Fosroc recommends that application of any structural strengthening system should be undertaken by trained and experienced contractors.

Do not fold Nitowrap CW.

Nitowrap Encapsulation Resin is not UV stable. Protect from exposure to direct UV sources.

Storage

Nitowrap CW should be stored in covered warehouse conditions, and kept clean and dry.

Shelf Life

Nitowrap CW has an unlimited shelf life when kept in appropriate storage conditions.

Nitowrap Primer has a shelf life of 12 months when stored in appropriate conditions.

Nitowrap Encapsulation Resin has a shelf life of 12 months when stored in appropriate conditions.

Precautions

Health and Safety

For further information refer to the appropriate Product Safety Data Sheet.

Fire

Nitowrap CW is non-flammable.

Nitowrap Primer*	0.25 – 0.3 kg/m ²
Nitowrap Encapsulation Resin	See table 1
Final layer of Nitowrap Encapsulation Resin	0.2 - 0.25 kg/m ²

In service, observe Glass Transition Point.



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Important note:

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