



constructive solutions

# Nitowrap FRC

## High strength carbon fibre sheet wrap system for structural reinforcement

### Uses

Nitowrap FRC is a structural reinforcement system for use on reinforced concrete, brickwork, steel & timber.

It can be used to strengthen columns and beams of load bearing structures specifically where improvement to shear strength and deformation properties is required. Typical applications include:

- Piers
- Columns
- Road & rail bridges
- Car parks
- Culverts
- Chimneys
- Historic structures

### Advantages

- Very high strength to weight ratio
- Improves flexural strength capacity
- High chemical resistance
- Increases load carrying capacity of structure
- Low build system – minimal effect on structural dimensions
- Fast & easy installation – quick return to service
- No heavy equipment or temporary support during curing required - as compared to steel plate bonding
- Simple detailing – cut to length on site
- Corrosion resistant – no maintenance costs

### Description

Nitowrap FRC is a high strength, high modulus, uni-directional, carbon fibre sheet which, when used in conjunction with a specially developed epoxy primer and resin adhesive, improves structural performance by strengthening and improving shear strength and deformation properties.

Nitowrap FRC is very easy to handle and apply on-site with minimal equipment required, allowing quick & easy reinforcement of structural members without major disruption.

### Specification

Where indicated on the contract drawings, the carbon fibre sheet, consisting of uni-directional carbon fibres, providing tensile strength >390 kgf/cm and tensile modulus of  $>2.35 \times 10^6$  kgf/cm<sup>2</sup>, shall be Nitowrap FRC supplied by Fosroc. (insert values appropriate to grade of wrap selected).

### Properties

#### Nitowrap FRC

Grade	FRC	FRC	FRC
	200	300	300HM
<b>Weight (g/m<sup>2</sup>)</b>	200	300	300
<b>Design Thickness (mm)</b>	0.111	0.167	0.165
<b>Tensile Strength for Design (kgf/cm<sup>2</sup>)</b>	35,500	35,500	30,000
<b>Tensile Modulus for Design (kgf/cm<sup>2</sup>)</b>	$2.35 \times 10^6$	$2.35 \times 10^6$	$3.8 \times 10^6$
<b>Elongation at Break (%)</b>	1.5	1.5	0.8

#### Nitowrap Primer (S)

<b>Viscosity</b> (cps @ 20°C)	2,000
<b>Adhesion Strength</b> JIS K 5400	2.4 N/mm <sup>2</sup>
<b>Application Temp.</b>	+25°C to +35°C
<b>Pot Life</b>	40 minutes (+30°C)

#### Nitowrap Encapsulation Resin (S)

<b>Viscosity</b> (cps @ 20°C)	7,000
<b>Application Temp.</b>	+25°C to +35°C
<b>Pot Life</b>	40 minutes (+30°C)
<b>Adhesion Strength</b> JIS K 5400	2.4 N/mm <sup>2</sup>
<b>Compressive Strength</b> ASTM D1002	100 N/mm <sup>2</sup>
<b>Compressive Modulus</b> ASTM D 695	2,050 N/mm <sup>2</sup>
<b>Tensile Strength</b> ASTM D 638	50 N/mm <sup>2</sup>
<b>Flexural Strength</b> ASTM D 790	75 N/mm <sup>2</sup>

### Technical Support

Fosroc offers a technical support package to specifiers, end users and contractors, as well as unrivalled on site technical assistance all over the world.

### Instructions for Use

#### **Surface Preparation**

Concrete surfaces must be dry, flat, sound and free from debris and loose material. Surfaces must be fully cured and free from contamination. Blowholes or imperfections should be filled with Nitomortar FC.

Tolerance for flatness is 10mm maximum over a 2m length, with no steps or formwork marks more than 0.5mm.

Surface preparation is preferably by sand/grit blasting to remove the surface laitance and expose the fine aggregate.

Corners of concrete surfaces to receive Nitowrap FRC should be ground to a min. radius of 10 mm.

#### **Application**

Ensure sufficient material, manpower & equipment to carry out application within the pot-life of the resin.

#### **Priming**

Add Comp. B to Comp. A of the Nitowrap Primer and mix for 3 minutes using Fosroc No. 2 mixing paddle fitted to a low speed (<500 rpm) electric drill. Apply the Nitowrap Primer to the prepared, cleaned concrete surface, using a brush or roller, at the rate of 0.3 kg/m<sup>2</sup>. Allow to cure for at least 12 hrs prior to application of Nitowrap FRC.

# Nitowrap FRC

## Application of Nitowrap FRC

Mix the Nitowrap Encapsulation Resin (*same procedure as Primer*) and apply to the substrate with a roller at the rate of:

FRC 200	400-500 g/m <sup>2</sup>
<b>FRC 300/300HM</b>	500-600 g/m <sup>2</sup>

Immediately place the pre-cut Nitowrap FRC onto the prepared substrate and push the wrap firmly into the epoxy using a hard rubber roller and remove the release paper backing. To ensure proper impregnation of the resin roll, using an impregnation roller, in a direction parallel to the fibres of the wrap.

After minimum 30 minutes, maximum 3 hours, roller apply a 2<sup>nd</sup> layer of Nitowrap Encapsulation Resin at the rate of:

FRC 200	100-200 g/m <sup>2</sup>
<b>FRC 300/300HM</b>	200-300 g/m <sup>2</sup>

In case of 2 ply applications allow at least 24 hrs curing prior to 2<sup>nd</sup> layer application.

**Top and bottom overlaps are to be minimum 100mm. Side overlaps are not required.**

## Limitations

- Nitowrap FRC should not be exposed to direct sunlight – Fosroc has a range of UV resistant coatings suitable for overcoating Nitowrap/Nitoplate products

## Estimating

### Supply

<b>Nitowrap FRC</b>	100 m rolls
<b>Nitowrap Primer</b>	15 kg set (A+B)
<b>Nitowrap Encapsulation Resin</b>	15 kg set (A+B)

### Coverage

<b>Nitowrap Primer</b>	0.3 kg/m <sup>2</sup>
<b>Nitoplate Encapsulation Resin</b>	
FRC 200	600 g/m <sup>2</sup>
<b>FRC 300/300HM</b>	800 g/m <sup>2</sup>

*The above figures are dependent on substrate roughness and do not allow for wastage*

## Storage

Nitowrap FRC, Nitowrap Primer & Encapsulation Resin should be stored in covered warehouse conditions and out of direct sunlight.

## Shelf life

Nitowrap FRC has a semi-permanent shelf life when properly stored.

Nitowrap Primer & Nitowrap Encapsulation Resin have a shelf life of 12 months when stored in normal warehouse conditions.

## Precautions

Nitowrap FRC is non-reactive. Protect against airborne carbon dust generated by the cutting procedure. Ensure adequate ventilation.

Nitowrap Primer & Nitowrap Encapsulation Resin should not come in contact with skin or eyes or be swallowed. Wear suitable protective clothing, gloves and eye protection.

In case of contact with skin, rinse with clean water, then clean with soap and water. Do not use solvent. In case of contact with eyes, rinse immediately with clean water and seek medical advice. If swallowed, seek immediate medical attention – do not induce vomiting.

For further information refer to the Material Safety Data Sheet.



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