

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.

Properties

Typical Dry Fiber:

Grade	FRC 300
Fiber Area Weight (g/m²)	300
Fabric Design Thickness (mm)	0.166
Fiber Tensile Strength for Design (MPa)	4900
Fiber Tensile E- Modulus for Design (GPa)	230
Ultimate Elongation (%)	2.1

Note:

Those above values are typical and indicative only. The achievable laminate properties (composite) obtained from tensile test are depend on the impregnating resin used and the type of tensile testing procedure.

Nitowrap FRC300 (AS COMPOSITE, prepared follow ASTM C3039)

Grade	FRC 300
Elastic Modulus (MPa)	>45000
Tensile Strength (Mpa) Gross Laminate Area	> 600
Elongation at Break (%)	> 1.5

Nitowrap Primer (S)

Viscosity (cps @ 25 ⁰ C)	< 2,000
Adhesive Strength	>1.5 N/mm ²
Application Temp.	5 ⁰ C to 35 ⁰ C
Pot Life	+/- 40 min. (at 30 ⁰ C)

NITOWRAP FRC300

Nitowrap Encapsulation Resin (S)

Application Temp.	5°C to 35°C
Pot Life	+/- 40 minutes (at 30°C)
Compressive Strength	>60 MPa

Technical Support

Fosroc offers a technical support package to specifiers, end users and contractors, as well as 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 or Nitomortar GP.

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 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/m². Allow to cure for at least 12 hrs prior to application of 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 300	500-600 g/m ²
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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 2nd layer of Nitowrap Encapsulation Resin at the rate of:

FRC 300	300-400 g/m ²
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In case of 2 ply applications allow at least 24 hrs curing prior to 2nd 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

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

Coverage

Nitowrap Primer	0.3 kg/m ²
Nitoplate Encapsulation Resin	0.6 kg/m ²

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.

NITOWRAP FRC300

Shelf life

Nitowrap FRC has a semi-permanent shelf life (min. 10 years) 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 Safety Data Sheet



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