



Nitoplate CPS

(Formerly Known as Nitowrap CFP)

High Strength Pultruded Composite Laminate Structural Strengthening System for Concrete Structures

Uses

Nitoplate CPS is a system of high-quality carbon fibres, pre-laminated into dense, unidirectional plates. They are adhered using Nitowrap 40 thixotropic adhesive, making them ideal for overhead applications on beams and slabs.

Typical applications include, but are not limited to, dynamic and dead load increases, seismic strengthening and repairing structurally damaged concrete. Nitoplate CPS 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
- Pultrusion process increases density making strengthening of narrow sections possible
- Thixotropic resin adhesive makes overhead working easier.
- Typically low build reducing effects on structural dimensions and clearance
- No pre-fabrication required, can cut to size on site
- Comes in varying strengths and thicknesses



Description

Nitoplate CPS is a 0° unidirectional carbon fibre sheet with high tensile strength and high tensile modulus. It is used with specially developed resin Nitowrap 40 and externally applied to concrete or masonry. When correctly designed and applied, the Nitoplate CPS system may improve structural load carrying capacity, flexural strength, and provides resistance to deformation.

Nitoplate CPS is available in Standard tensile modulus (CPS), Medium Tensile Modulus (CPM)

Fosroc also provides the following materials for structural strengthening:

Nitowrap CWS: Carbon fabric materials

Nitowrap AWS: Aramid fabric materials

Nitowrap GWS: Glass fabric materials

Nitorod CRS: Carbon fibre pultruded rods

Aramid plates and rods are also available upon request.

Fosroc provides ancillary primers, adhesives and repair materials

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Table 1 : Nitoplate CPS - Product dimensions and physical properties

Properties of Nitoplate CPS Series

Nitoplate CPS series (Thickness/width)(mm/ mm)	512	514	524	530	1012	1014	1024	1030
Resin	Epoxy							
Fiber Content, %	>70%							
Fiber Direction	0°							
Density, g/cc	1.8							
Width, mm	50				100			
Thickness, mm	1.2	1.4	2.4	3.0	1.2	1.4	2.4	3.0
Cross Section, mm ²	60	70	120	150	120	140	240	300
Fibre Tensile Strength, MPa	≥4900							
Fiber Modulus, GPa	≥250							
Laminate Tensile Strength in MPa (ASTM D-3039)	≥3100							
Laminate Modulus, GPa (ASTM D-3039)	≥165							
Elongation	≥1.8							

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.

Application Instructions

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

Nitoplate 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.

Approvals/Standards

*FIB, Technical Report, Bulletin 14: Externally bonded FRP reinforcement for RC structures, July 2001.

*ACI 440.2R : Guide for the Design and Construction of Externally Bonded Fiber-Reinforced Polymer (FRP) Systems for Strengthening Concrete Structures (all versions).

Surface Preparation

Concrete surfaces must be dry, smooth and free from debris or loose materials. 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.

Surface irregularities shall be made good to achieve flatness in accordance with the designer's specification. As a general guide this shall be approximately $\pm 1\text{mm}$ in 1m.

Cut the Nitoplate CPS strips to the required length using a sharp disc cutter or guillotine. Inspect the plate for damage including splits and splinters. Discard any damaged sections of plate.

Clean the matt surface of the Nitoplate CPS with a clean cloth lightly dampened with Nitoflor Sol. Allow any solvent residue to dissipate before applying adhesive.

Application

After surface preparation is completed, apply Nitowrap 40 adhesive at a consumption rate in accordance with Table 2.

Mix the base and hardener components of Nitowrap 40. Mix well using a low speed powered mixer (300-500 RPM) for a minimum of 5 minutes. Ensure there are no visual streaks in the mixture.

Using a trowel, apply a minimum of 1mm thickness of Nitowrap 40 adhesive to the substrate.



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It must be applied to the cleaned surface of the Nitoplate CPS strip creating a domed profile with the apex of the dome at a minimum of 3mm thick, tapering to 0.1mm at the edges. Total minimum thickness should be no less than 2mm for the plate and total 3mm for substrate and plate.

Apply the plate to the substrate while both resins are still wet. Use a wooden or rubber seam-roller to push the plate into the resin ensuring no voids and that resin is extruded from the sides of the plate. Remove any excess adhesive with a trowel before it sets.

Wait a minimum of 24 hours before applying any subsequent coatings.

As Nitoplate CP is inert and corrosion resistant, the product may be left uncoated if exposed to UV light.

Finishing

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.

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

Cleaning

Nitowrap 40 Adhesive should be removed from tools and equipment using Fosroc Solvent 102 immediately after use. Hardened material may be removed mechanically.

Estimating

Packaging

Nitoplate CPS series is available in 50 & 100m roll based on the profile	
Nitowrap 40	3.7 litres pack

Table 2: Theoretical Coverage of Nitowrap 40 adhesive

Coverage of Epoxy Adhesive

Nitowrap 40	CPS50	CPS100
Theoretical coverage* in RM @ 2mm thickness per litre	10	5

*Adhesive Requirement is theoretical and does not allow for concrete profile or 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.

Storage

Nitoplate CPS should be stored in covered warehouse conditions, and kept clean and dry.

Shelf Life

Nitoplate CPS has an unlimited shelf life when kept in appropriate storage conditions.

Precautions

Health and safety

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

Fire

Nitoplate CPS is non-flammable.

In service, observe the Glass Transition Point.

Additional information

Fosroc have produced several educational training videos which provide more detail about the mechanisms which cause corrosion within reinforced concrete structures and the solutions which are available to arrest or retard these destructive mechanisms. Further information is available from the publication 'Concrete Repair And Protection - The Systematic Approach'.

For further information about products, training videos or publications, contact the local Fosroc office.

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