

PRODUCT NAME

Gem-Wrap™ CF

Carbon Fabric



MANUFACTURER

Gemite® Products Inc.

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FEATURES

- High modulus of elasticity
- Very high tensile strength
- Excellent fatigue resistance
- Used in tension, bending and shear
- Flexible, can be “wrapped” around structural elements
- Lightweight
- Non-corrosive
- Nontoxic
- Resistant to alkalinity of concrete substrates
- Easy to use

PRODUCT DESCRIPTION

Basic Use

Gemite Gem-Wrap CF, high strength carbon fabrics, are used in the following applications:

Load increase

- Industrial and commercial buildings
- Bridge structures
- Reinforcement of panelized reinforced concrete buildings
- Reinforcement of structures exposed to vibrations
- Reinforcement of structures due to changes in utilization of structures

Repair of deteriorated structural components due to

- Reduction in strength of construction components and materials
- Vehicular impact
- Reduction in strength due to corrosion of reinforcing steel
- Repair to structural fire damage

Performance improvement - serviceability, maintenance

- Deflection reduction
- Stress reduction in reinforcing steel
- Crack width and crack opening reduction

Design or construction defects

- Inadequate structural design
- Insufficient reinforcement

Composition and Materials

Gem-Wrap CF are high strength carbon fiber fabrics, used in combination with epoxy resin for reinforcement of concrete, masonry and timbre structures. Gem-Wrap CF fabrics are bonded to structures using Gem-Cote W ST Primer and Gem-Cote W ST Resin.

Limitations

Structural calculations and designs must be carried out by an independent and certified professional engineer. The design guide lines are available form Gemite Products Inc.

Health and Safety

Gem-Wrap CF fabrics are nontoxic and non-reactive. We recommend the use of rubber gloves when handling Gem-Wrap CF fabrics. Keep product out of reach of children. FOR INDUSTRIAL USE ONLY.

Color

Black.

Packaging

Gem-Wrap CF is supplied in rolls 100 m (328') long x 0.5 m (19 5/8 in) wide.

Gem-Cote W Primer & Resin are supplied as kits (Comp. A - Resin + Comp. B - Hardener.

Storage

Gem-Wrap CF fabrics, stored in pallets in a dry, cool area, have unlimited shelf-life. Do not expose the fabrics to direct sun light in the storage area. Gem-Cote W ST Primer and Gem-Cote W ST Resin have 12 months shelf life when stored at temperature 5-25°C (41-77°F).

TECHNICAL DATA

Gemite Products Inc. Supplies various types of Gem-Wrap CF fabric, depending on structural requirements.

Fabric Weight (ASTM D5261)		
CF-150	155 g/m ²	0.507 ounce/ft ²
CF-200	210 g/m ²	0.687 ounce/ft ²
CF-300	300 g/m ²	0.983 ounce/ft ²
CF-HM300	300 g/m ²	0.983 ounce/ft ²
Thickness (based on total area of carbon fibers)		
CF - 150	0.086 mm	4 mils
CF-200	0.111 mm	5 mils
CF-300	0.166 mm	7 mils
CF-HM300	0.166 mm	7 mils

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1032000 Concrete Reinforcement
1032400 Carbon Fibre Composites

Carbon Fibre Tensile Strength (ASTM D4632)

CF-150	4.9 kPa	0.71 x 10 ⁶ psi
CF-200	4.9 kPa	0.71 x 10 ⁶ psi
CF-300	4.9 kPa	0.71 x 10 ⁶ psi
CF-HM300	4.6 kPa	0.67 x 10 ⁶ psi

Carbon Fibre E-Modulus (ASTM D4632)

CF - 150	230 GPa	33.35*10 ⁶ psi
CF-200	230 GPa	33.35*10 ⁶ psi
CF-300	230 GPa	33.35*10 ⁶ psi
CF-HM300	340 GPa	49.30*10 ⁶ psi

Carbon Fibre Ultimate Strain (ASTM D4632)

CF - 150	1.5%
CF-200	1.5 %
CF-300	1.5 %
CF-HM300	0.8 %

Gem-Cote W ST Primer*

Mix Ratio by weight (A : B)	2:1	
Pot Life (min)	40 minutes	
Application Temperature	15-25°C	59-77 °F
Viscosity @ 20°C (68°F)	1,300 cP	

Gem-Cote W ST Resin*

Mix Ratio by weight (A : B)	2:1	
Pot Life (min)	40 minutes	
Application Temperature	15-25°C	59-77°F
Viscosity @ 20°C (68°F)	5,000 cP	

*Gem-Cote W ST Primer & Resin are available in “summer” 25-35°C (77-95°F) or “winter” 5-15°C (41-59°F) formulations.

INSTALLATION

Concrete Repair

The structure may require a repair prior to the application of *Gem-Wrap CF*. Use *Fibre-Prime* anti-corrosion coating for steel reinforcement, and as bonding agent for *Fibre-Patch OV* repair mortar (consult respective Data Sheets).

Surface Preparation

Remove all deteriorated concrete & clean the surface thoroughly using sandblast (or method approved by Gemite Tech-Service), to remove all oil, grease, scale, dirt and other foreign matter. The surface must be clean, sound and dry.

The tensile strength of concrete must be checked by a random pull-off test (ACI 503R) at the engineers discretion. Minimum tensile strength must be 1.4 MPa (200 psi) with failure in the substrate concrete.

Uneven surfaces must be filled with and epoxy mortar made of 1:1 volume parts of *Gem-Cote W ST Resin* and oven-dry silica sand. Max. allowable deviation is 6 mm (1/4 in) in 3 m (6 ft), and not greater than 3 mm (1/8”) over 1 m (3’). Remove any sharp edges by grinding to assure that maximum surface roughness “peak and valley” is less than 0.5 mm (20 mils). When using *Gem-Cote W ST* epoxy mortar for leveling - apply CF fabric next day, even if still a little tacky. If the repair resin is left longer and hardens, the surface must be sanded and dust removed. All corners have to be rounded to a radius of at least 12 mm (1/2”). The concrete surface must be ground to expose aggregates and dust completely removed.

Cutting Fabrics

Cut the fabric with sharp scissors or knife. Never fold the fabric.

Application

The substrate must be dry - max. moisture content 4%. Mix *Gem-Cote W ST Primer* using a slow electrical drill (max. 600 rpm) and a paddle. The ambient temperature must be above 5°C (41°F) and RH below 85%. Roll on the primer at the coverage of approx. 0.25 kg/m² (0.05 lb/ft²) and let cure overnight, but 12 hours minimum.

Mix *Gem-Cote W ST Resin* same as the primer and use a lamb skin roller to apply at the rate 0.6-0.8 kg/m² (0.12- 0.16 lb/ft²). Place *Gem-Wrap CF* into the resin in the designed direction. Work the fabric into the resin with a plastic roller until the resin is squeezed out between the rowing of the fabric. Apply an additional *Gem-Cote W ST Resin* coat at the rate of 0.5 kg/m² (0.16 lbs/ft²) to applied fabric. If the application requires an additional fabric layer, apply more resin at the same rate. This must be done within one hour at 20°C, (68°F), after the application of the previous layer. If this is not possible, wait for at least 12 hours before the next layer is applied.

Apply a 2nd second layer same way as the 1st one. Overlap the fabric at least 100 mm (4”) over already applied fabric (in the fibre direction). Ambient temperature during application must be min. 5°C (41°F) and at least 3°C (5°F) above dew point.

Prevent exposure of the carbon fabric to constant UV light. The entire *Gem-Wrap CF* reinforcing system must be protected by *Primer # 300* and *Tuff-Flex CA*.

AVAILABILITY AND COST

Gem-Wrap CF fabric is available worldwide. Contact Gemite Products Inc. for Representative/Distributor contact nearest you and pricing information.

WARRANTY

A limited, twelve (12) months, Material Replacement Warranty is available. Contact Gemite Technical Service for details.

Short Specification

The reinforcement will be *Gem-Wrap CF* carbon fibre fabric (weight as specified), manufactured by Gemite Products Inc. [USA 888-443-6483], [Canada 905-672-2020]. It will be applied according to manufacturer's recommendations. Contact Gemite, or a local Representative for specification assistance and application instructions.