

BCW[™]

Bidirectional Carbon Wrap



Building
&
Transportation



Oil, Gas
&
Industrial



Offshore
&
Onshore



Water
&
Wastewater



PRODUCT DESCRIPTION

CTech-LLC[®] Bidirectional Carbon Wrap (BCW[™]) is a high strength carbon fabric with fibers oriented in the 0° and 90° directions. Carbon wrap BCW[™] are used in a growing number of fields, like strengthening and retrofitting of structures, defense industry, automobile industry and many other important industries. The carbon fiber reinforced polymers (CFRP) are usually bonded to elements by adhesive resins and can increase load capacity and shear or bending strength of different elements in structures.

CTech-LLC's BCW[™] is available in several patterns, including:

- Plain weave pattern: In a plain weave, the wrap and fill yarns cross over and under one another.
- Satin Weave: Satin weave produces a more flexible fabric than a plain weave. The fill yarn "floats" over several wrap yarns before interlacing under one.
- Twill Weave: Twill weave is similar to satin weaves in that the fill yarns float over several intersections. The weave is characterized by its diagonal lines, which are created by an offset in the warp threads.

ADVANTAGES

- Lightweight, flexible, high-strength fiber can be used in different surfaces like circular columns and other arched surfaces.
- Chemical and corrosion resistant.
- Compatible with different materials and standard adhesive resins.
- Easy to impregnate using wet or dry lay-up methods.
- Low aesthetic impact

TYPICAL USES

CTech-LLC[®] Bidirectional Plan Carbon Wrap (BCW[™]) may be used to strengthen or retrofit a wide range of concrete, steel and masonry structural elements including columns, beams, slabs, walls, pier caps, piles, etc.

- Strengthen for increasing load capacity.
- Address changes in structural system, like slab openings and walls, beams or columns removal.
- Retrofit for seismic, wind or blast.
- Restore strength of structural elements damaged by fire or vehicle impact.

- Restore strength to deteriorated and corroded members.
- Strengthen for design or construction defects.

DESIGN

Design calculations shall be made and sealed by a licensed, independent engineer knowledgeable with the design of FRP strengthening systems.

INSTALLATION PROCEDURE

Installation of CTech-LLC[®] carbon fabrics should be performed by licensed and specially trained groups of installers. The Installation must be compatible with existing relevant international codes. This section outlines the procedure to install CTech-LLC[®] Bidirectional Carbon Wrap (BCW[™]).

PREPARATION OF SUBSTRATE

- Substrate preparation can highly effect on the quality of the performance of CFRP systems.
- All the surfaces must be cleaned from dirt, grime, dust, curing compounds, oils, grease, waxes and all the other contaminated materials which may cause voids behind the CTech-LLC[®] composites.
- Repair mortar must be used to repair all the eroded or damaged concrete surfaces.
- An industrial vacuum cleaner must be used to remove dust and dirt.
- All the surfaces need grinding, Sandblasting, shot blasting, pressure wash or other common mechanical methods to reach an even Substrate.

- The sharp edges must be smooth and rounded to a minimum radius of 30 mm.
- Note that concrete surfaces must be fully dried or cured so adhesive can properly dry.

MIXING

Epoxy resins (or other resins) are required to make CFRP systems. Epoxy compounds are usually supplied in two different containers. Before pouring the contents of component B into contents of component A, each part should be stirred separately to avoid deposit in container. Then part A and B should be mixed together depending on the required quantity. Process of mixing should take 3-5 minutes with a low speed mixer.

TECHNICAL DATA

	Unit	BCW™3.0h	BCW™2.0h	BCW™1.0h
Elastic modulus*	GPa	230	230	230
Ultimate strength*	MPa	4900	4900	4900
Ultimate strain*	-	0.02	0.02	0.02
Thickness**	mm	0.09	0.11	0.18

* In accordance with the standard ISO 10618

** Based on total unidirectional fiber content

NOTE: BCW™ is available in a variety of thicknesses such as 0.13 & 0.22 mm by customer order

NOTE: Please ask the supplier for product number including type of yarn, textile width, warn type etc.

TREATMENT

Carbon fabrics can be cut with knives, commercial quality heavy-duty scissors, and rulers. These are proper tools for cutting CFRP systems to obtain an ideal length and width. Any of the other cutting instruments can damage the fabrics.

APPLICATION

The substrate must be clean and eroded or damaged concrete surfaces must be repaired by CTech-LLC® epoxy mortar. Cover the substrate with suitable form of ERP™ epoxy primer. Saturate the fabrics by a mechanical saturator. The saturator controls fiber-resin ratio in operation and converts carbon and fibers into prepreg fabrics, so they can be used instantly on the surface of different elements. Installation of all the layers of saturated fabrics must be done according to the design requirements. If required, additional fabrics can be used on top of previous layers. Using a roller can ensure all pockets are removed between fabric and substrate and there is a good bonding between them. This process should be performed by licensed and specially

trained groups of installers.

PROTECTIVE COATINGS

A protective coating must be applied on the surface of FRP system. The coating should be non-vapor-barrier and complies with the FRP system. Plaster final coating, paint final coating and fireproofing coating are three common methods witch can be used to make barrier between damaging environment and structures. Painting should be done between 24 to 72 hours after final application of epoxy. The protective coating can protect surface against corrosion, decaying, cracking, chipping, fading and other typical problems which may happen for the structure.

STORAGE & SHELF LIFE

Carbon fibers should be stored at +5°C to +35°C and should not be exposed to direct sunlight. Keep the carbon fabrics in a dry place.

CAUTION

All components of FRP systems may cause skin irritation and sensitization. Use of chemical resistant gloves is recommended. Avoid breathing vapors and dust. Get medical attention if you are breathing with difficulty. Resins products can cause strong eye irritation. Avoiding eye contact and Using safety goggles is necessary.

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IMPORTANT NOTE:
Before using any CTech-LLC® product, the user must review the most recent version of the product's technical data sheet, material safety data sheet and other applicable documents, available at www.ctech-llc.com.

WARANTY:
CTech-LLC® warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within one month of the 'date of purchase. CTech-LLC® shall not be liable for any consequential or special damages of any kind, resulting from any claim or breach of warranty, breach of contract, negligence or any legal theory. The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before utilizing.