

Strengthening Solutions

V-Wrap™ C220B

High Strength Bi-Directional Carbon Fiber Fabric

structural
TECHNOLOGIES

structuraltechnologies.com

+1-410-859-6539

Typical Data for V-Wrap C220B

Storage Conditions:	Store dry at 40°F – 90°F (4°C – 32°C)
Color:	Black
Primary Fiber Direction:	0°/90° (bi-directional)
Weight:	19 oz/yd ² (645 g/m ²)
Shelf life:	10 years

Fiber Properties (Dry)

Tensile Strength:	790,000 psi (5,440 MPa)
Tensile Modulus:	42 x 10 ⁶ psi (289,550 MPa)
Elongation:	1.9 %

Cured Laminate Properties (In each direction)

Tensile Strength:	155,000 psi (1,068 MPa)
Modulus of Elasticity:	14.0 x 10 ⁶ psi (96,527 MPa)
Elongation at Break:	1.1%
Laminate Thickness	0.04 in. (1.02 mm)
Design Thickness:	0.02 in. (0.51 mm)
Strength per Unit Width:	3,100 lbs/in. (0.543 kN/mm)



Description:

V-Wrap C220B is a bi-directional carbon fiber fabric with fiber oriented in the 0° and 90° direction. V-Wrap C220B system is field laminated using environmentally friendly, two-part 100% solids and high strength structural adhesives to form a carbon fiber reinforced polymer (CFRP) system used to reinforce structural elements.

Product Uses:

V-Wrap strengthening systems can be used to resolve strength deficiencies and increase the load carrying capacity of building, bridges, silos, chimneys, and other structures.

Loading Increases:

- Increasing the live loads capacity of floor systems
- Increasing shear and flexural strengths of reinforced and prestressed beams
- Increasing the axial capacity of columns
- Increasing the live load capacity of parking garages

Seismic Strengthening:

- Column confinement for ductility improvement
- Masonry and concrete shear walls strengthening

Damage to Structural Parts:

- Correct strength deficiency due to deterioration and corrosion
- Restore strength of structural elements damaged by fire

Change in Structural System:

- Load redistribution due to removal of walls, beams or columns
- Removal of slab sections for new openings

Design or Construction Defects:

- Insufficient amount of shear or flexural reinforcement
- Insufficient size and/or layout of reinforcement
- Insufficient reinforcing bar or lap splice length
- Low compressive strength in beams, slabs, and columns

Advantages:

- 0% VOC
- Solvent free
- Non-corrosive reinforcement system
- Lightweight flexible fabric can be wrapped around complex shapes
- Used for shear, confinement or flexural strengthening
- High strength and high modulus
- Light weight
- Reduces crack width
- Alkali resistant
- Low aesthetic impact

Packaging:

Fabric: 24 in. & 32 in. widths x 150 ft rolls
0.61 m & 0.81 m widths x 45.7 m rolls

How To Use:

Design:

Design should comply with ACI 440.2R or recognized design/specification entity, and is typically based on CFRP contribution determined by detailed analysis. Design values will vary based on project requirements and applicable environmental and strength reduction factors. Contact STRUCTURAL TECHNOLOGIES to determine applicable design factors.

Surface Preparation:

Surfaces to receive V-Wrap C220B must be clean and sound. It must be dry and free of frost. All dust, laitance, grease, curing compounds, waxes, deteriorated materials, and other bond inhibiting materials must be removed from the surface prior to application. Existing uneven surfaces must be filled with appropriate epoxy putty or repair mortar. Use abrasive blasting, pressure wash, shotblast, grind or other approved mechanical means to achieve an open-pore texture with a concrete surface profile of CSP-3 or better (ICRI). In certain applications and at the engineer's discretion, the bond between the substrate and the fabric may be determined to be non-critical (such as in column confinement applications). All corners must be rounded to 1/2" radius minimum. The adhesive strength of the concrete may be verified after surface preparation by random pull-off testing (ASTM D7522) at the discretion of the engineer. Minimum tensile strength of 200 psi must be achieved.

Cutting V-Wrap C220B:

Fabric can be cut to appropriate length by using a commercial quality heavy-duty scissors.

Application:

Installation of the V-Wrap C220B strengthening system should be performed only by a specially trained, approved contractor. The V-Wrap C220B strengthening system shall consist of V-Wrap C220B carbon fabric and V-Wrap epoxy resins such as: V-Wrap 600, V-Wrap 600PF, V-Wrap 700S, and V-Wrap 770.

Note the specified number of plies, ply widths, and fiber orientation. Mix resin components using recommended procedures on product datasheet. Apply one coat of V-Wrap epoxy as a primer to the surface using a nap roller. Fill minor concrete defects such as bug holes and other imperfections with V-Wrap epoxy putty or V-Wrap epoxy mixed with fumed

silica (thickened epoxy). Apply V-Wrap putty or thickened epoxy using a roller or trowel to primed surface. Adjust the gap between saturator rollers. Using a saturator machine, pre-saturate the appropriate length of V-Wrap C220B with V-Wrap epoxy adhesive as a saturant. Install the saturated FRP sheet. Use a rib roller to remove all air pockets and ensure intimate contact with the surface. On multiple plies with splices, stagger the splice locations. If required, apply topcoat material.

Field Quality Control:

Record batch numbers for fabric and epoxy used each day and note locations of installations. Measure square feet of fabric and volume of epoxy used each day.

Limitations:

- Design calculations must be approved by a licensed professional engineer
- System is a vapor barrier
- Concrete deterioration and steel corrosion must be resolved prior to application
- Minimum application temperature is 40°F

Storage:

Store material in a cool, dark space. Low humidity is recommended.

Handling:

Approved personal protection equipment should be worn at all times. Particle mask is recommended for possible airborne particles. Gloves are recommended when handling fabrics and resins to avoid skin irritation. Safety glasses are recommended to prevent eye irritation. Wear chemical resistant clothing/gloves/goggles. Ventilate area. In absence of adequate ventilation, use properly fitted NIOSH respirator.

Cleanup:

Dispose of material in accordance with local disposal regulations. Uncured material can be removed with approved solvents. Cured materials can only be removed mechanically.

First Aid:

In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water; contact physician immediately. For respiratory problems, remove to fresh air. Wash clothing before reuse.

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