UCW™

Unidirectional Carbon Wrap

AFZIR
Advanced Solutions
Strengthening Company

PRODUCT DESCRIPTION

UCW™ is a Unidirectional Carbon Fiber Wrap with fiber oriented in the 0° direction. UCW™ 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. This product is equivalent to T300, 12k / 24k.

PRODUCT FEATURES

- High tensile strength
- Light weight
- Good reinforce and protect structural elements
- Allowing for use in hand lay-up process to produce large-area parts
- Superior acid corrosion resistance
- Compatible with different resins such as: Epoxy Resin, Polyester, Phenolic, Polyurethane and Vinylester.

PRODUCT USES

This wrap 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 pre-stressed beams
- Increasing the axial capacity of columns
- Increasing the 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

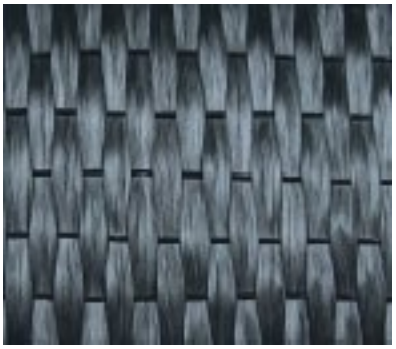
Design or Construction Defects

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

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. Note that tensile strength of composite laminates should be considered approximately 1000 MPa base on test reports. Contact our company to determine applicable design factors.



Unidirectional Carbon Wrap - UCW™

TECHNICAL DATA & FIBER PROPERTIES (DRY)	
Color	Black
Weave Pattern	Unidirectional
Primary Fiber Direction	0°
Density ISO 10119	1.76 – 1.80 gr/cm^3
Tensile Strength* ISO 10618 and CTech-LLC® guidelines	2000 - 3000 MPa
Tensile Modulus ISO 10618	200-240 GPa
Elongation ISO 10618	1.5 - 2 %
Application Methods	Hand lay-up Spray machine Robot processes
Compatible Resins	Epoxy, Polyester, Phenolic, Polyurethane, Vinylester
Storage Conditions	Store dry at 4°C – 40°C

*For Carbon Fiber Tow (Non-Woven)

Wrap Physical Properties - UCW™		
Name	Width (cm)	Thickness (mm)
UCW™300	50	0.09

Note: Net woven fiber wrap tensile strength in composite is approximately 600 MPa based on fiber effective cross sectional area ($A_{effective}$) (according to ASTM D-3039 test methods and CTech-LLC® guidelines)

SURFACE PREPARATION

- Surfaces to receive UCW™ 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, shot blast, grind or other approved mechanical means to achieve an open-pore texture with a concrete surface profile. 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 30mm radius minimum. A minimum overlap [or lap splice] of 100-200mm is required to achieve continuity.
- The adhesive strength of the concrete may be verified after surface preparation by random pull-off testing (ACI 503R or ASTM D7522) at the discretion of the engineer. Minimum tensile strength of 1.0 MPa must be achieved. The minimum compressive strength of the concrete must be greater than 18 MPa.

CUTTING

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

APPLICATION

- Installation of the UCW™ strengthening system should be performed only by a specially trained, approved contractor.
- The strengthening system shall consist of UCW™ carbon fabric and epoxy resins such as: ERS™200 and ERS™400.
- Note the specified number of plies, ply widths, and fiber orientation. Mix resin components using recommended procedures on product datasheet. Apply one coat of epoxy as a primer to the surface using a nap roller. Fill minor concrete or steel defects such as bug holes and other imperfections with epoxy putty or epoxy mixed with fumed silica or talc or calcium carbonate powder (thickened epoxy). Where the resin sags, can also be used one of these three materials. Apply putty or thickened epoxy using a roller or trowel to primed surface. Adjust the gap between saturator rollers. Using the saturator machine or hand lay-up method, pre-saturate the appropriate length of UCW™ with AFZIR 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. If a splice is needed, a minimum100-200 mm overlap is required. On multiple plies with splices, stagger the splice locations. If required, apply topcoat material.

LIMITATIONS

- Design calculations must be achieved by a professional company.
- Concrete deterioration and steel corrosion must be resolved prior to application
- Only apply this product when the ambient temperature is within the temperature range of the approved epoxy adhesive. Minimum application temperature is 4°C

PACKAGING

Fabric rolls: 0.5m - 1.0m Width x 50m - 100m Length

STORAGE

Unless otherwise specified, it should be stored in a dry, cool and rain-proof area. It is recommended that the room temperature and humidity should be always maintained at 4°C～40°C and below 75% respectively.

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 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.

DISCLAIMER OF LIABILITY

AFZIR, 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.
AFZIR 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 committing to production.