

PRODUCT DESCRIPTION

AFZIR's L-Shaped UD Carbon Laminate or Plate (LUCL™) is a high strength, pre-manufactured carbon/epoxy laminate. These laminates are used as externally bonded reinforcement providing additional strength in shear and stiffness to concrete, masonry, and wood structural elements. The laminates are bonded to the structural element using two part, 100% solids, high strength structural adhesive system. The resulting repair is lightweight, non-corrosive and is much easier to install than steel.



L-Shaped Carbon FRP Laminate - LUCL™

PRODUCT FEATURES

- CFRP L-shaped laminate with a 90° bend.
- High tensile strength.
- Shear enhancement.
- Light weight.
- Low overall thickness, can be over coated.
- Non-corrosive reinforcement system
- Compatible with different resins such as: Epoxy Resin, Polyester, Phenolic, Polyurethane and Vinylester.
- Easy installation
- Minimal aesthetic impact.

- Increasing the live load capacity of parking garages

Seismic Strengthening

- 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
- Reinforces slabs for new openings
- Design or Construction Defects
- Insufficient amount of shear reinforcement
- Insufficient size and/or layout of reinforcement

TECHNICAL DATA- LUCL™	
Color	Black
Fiber Type	Carbon
Matrix Type	Epoxy Vinylester Resin
Density	1.55 g/cm ³
Fiber Volume Fraction	70%
Primary Fiber Direction	0° (unidirectional)
Tensile Strength	2400 MPa
Tensile Modulus	131 GPa
Elongation	1.87%
Laminate Width	50 mm
Laminate Thickness	2 mm
Shelf Life	10 years
Storage Conditions	Store dry at 4°C – 40°C

Physical Properties - LUCL™				
Name	Leg length Short (mm)	Leg length Long (mm)	Width (mm)	Thickness (mm)
LUCL™400	400 mm	400 mm	50 mm	2 mm
LUCL™500	200 mm	500 mm	50 mm	2 mm
LUCL™700	300 mm	700 mm	50 mm	2 mm
LUCL™1000	500 mm	1000 mm	50 mm	2 mm
LUCL™1500	800 mm	1500 mm	50 mm	2 mm

HOW TO USE

SURFACE PREPARATION

- Surfaces to receive FRP Plate laminates LUCL™ 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.
- Large voids should be patched using an approved repair mortar. Uneven areas should be leveled with an appropriate leveling mortar or putty.
- Sandblast, pressure wash, shotblast or use other approved mechanical means to achieve an open-pore texture with a concrete surface profile of CSP 3 or better (ICRI).
- The adhesive strength to 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 1.3 MPa must be achieved. The minimum compressive strength of the concrete must be greater than 17 MPa.

CUTTING

Laminates can be cut to appropriate length using a reciprocal saw with a fine tooth blade or a grinder.

MIXING

ERA™420 epoxy is recommended for bonding the plates. Epoxy adhesive must be mixed according to the manufacturer's specifications to achieve a homogeneous mixture.

PRODUCT USES

Structural Strengthening

- Increasing the live loads capacity of floor systems
- Increasing shear strengths of reinforced and pre-stressed beams

APPLICATION:

- Before applying the structural adhesive to the laminate, the sanded side of the laminate is wiped with acetone or other solvent until any excess residue (e.g., carbon dust) is removed. Observe proper fire and health precautions when using solvents.
- Apply thin prime coat of the epoxy adhesive to the surface approximately 1.5 mm thick and 15 mm wider than the plate to be used. Structural adhesive is applied to both the carbon and substrate surfaces.
- Apply 1.5 mm thick coat of the epoxy adhesive to the cleaned laminated surface. Plate laminates should be applied with approved epoxy adhesive.
- Press the laminates against the working surface using a hard rubber roller to achieve a void free bond line with thickness between 1.5 to 2.5 mm. Excess adhesive is then removed from the sides of the laminate before it cures.
- The laminate may be coated with a protective or decorative coating.
- Test plates may be simultaneously installed adjacent to the area being strengthened and should be prepared using the same method described above. Bond pull-off tests are performed to validate proper installation. The bond strength of the plate to concrete may be verified by random pull-off testing at the discretion of the engineer. Minimum tensile strength of 1.3 MPa must be achieved

LIMITATIONS

- Design calculations must be made and certified by a professional company.
- Concrete deterioration 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

Individual pieces

HANDLING

Approved personal protection equipment should be worn at all times. Particle mask is recommended for possible airborne particles. Gloves are recommended when handling mortar 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.

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. Store laminates packaging until ready to use. Keep laminates dry and free from dust and oil.

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 six months 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.