

Carficom PFT type UDS *technical data sheet*

Pultruded unidirectional carbon fibre laminates.



• field of application

Carficom PFT laminates are used for the post-reinforcement of concrete elements, wood, masonry.

Elements made out of reinforced concrete are statically calculated and executed to a set load bearing capacity. These loads can change during the life span of the construction and the original assumptions become insufficient due to:

- Changes in the code of construction concerning the load bearing capacity or loads.
- Openings cut in the floors or beams.
- The fact that the construction is dedicated to another use and the loads are raised.
- Aging of the construction materials used.
- Corrosion of the reinforcement.
- Concrete rot.
- Cutting through of pre- or post-stressing cables.
- Damage through fire in certain areas of the construction.
- Earthquakes which have happened or will happen.

The external application of pultruded carbon fibre laminates can increase the load bearing capacity of the elements (increase of the flexural load). The increased flexural strength reduces bending of the element and crack formation.

• advantages

- Only high quality fibres used in manufacture.
- Large freedom of design.
- Clear advantages over steel plates in certain applications.
- Can be applied to wooden as well as concrete beams, columns, floors and walls.
- Lasting reinforcement under both positive and negative bending moment.
- Light and flexible: no heavy tools required.
- Resistant to corrosion, no additional treatment required.
- No difficult connections and transitions.
- Less risk of buckling (columns).
- Low esthetical impact.

• **description**

Carficom PFT laminates type UDS are pultruded laminates manufactured from unidirectional stretched carbon fibres (UD) in a specially formulated epoxy resin matrix with extra crosslink properties (S).

Two types of pultruded laminates are available with E-moduli higher than 165 kN/mm² (standard) and 200 kN/mm² (by request).

• **application**

1. Preparation of the surface

- To ensure optimum transfer of the loads from the substrate to the Carficom PFT laminate, the surface needs to be roughened through sanding or sandblasting. All damaged areas (cracks, honeycombs and deficiencies in the surface) need to be repaired before application of the Carficom PFT laminate. Cracks need to be structurally repaired through injection with Deltapox INJ.
- Roughness of the substrate needs to be filled and levelled out with suitable materials.
- The adhesion strength of the prepared substrate needs to be verified by adhesion tests performed on random spots. The minimal adhesion strength of the concrete needs to be 1,5 N/mm².
- If the quality of the concrete is insufficient, it is best to apply Multitek Primer.

2. Preparation of the laminate

- Carficom PFT laminates are supplied on rolls. The unrolling needs to be performed carefully, preferably using a special tool. Be careful not to split the end of the laminate. Always wear suitable protective clothing and equipment.
- Carficom PFT laminates can be cut with specialist cutting tools such as heavy duty scissors or a grinder. Both ends of the laminate need to be supported during the cutting.
- One side of the surface needs to be thoroughly cleaned with Multitek Cleaner until all residual carbon has been removed (a white cloth remains white when the laminate is clean).

3. Preparation of the epoxy glue

- Carficom PFT laminates need to be glued to the surface with Multitek Adhesive SDC.
- Mix for both products the A- and B-component in a clean container and mix thoroughly for 3 minutes at low speed (500 rpm) with a paddle mixer until a homogenous grey mixture is obtained. Only mix the quantity of product which can be applied within the pot life of the epoxy resin.

4. Application of the Carficom PFT laminates

- The surface needs to be dry, clean and dust-free before application of Multitek Adhesive SDC.
- Preferably, apply the glue to the Carficom PFT carbon fibre laminate. Apply the layer of glue in a conical shape (e.g. 1 mm on the edges, 5 mm in the middle) to the cleaned side of the laminate.
- Press the Carficom PFT carbon fibre laminate uniformly against the concrete to obtain a uniform layer of adhesive. A rubber roller is used to remove air entrapment and ensure perfect application of the laminate. Apply sufficient pressure to expel all superfluous glue to the side where it is carefully removed before the adhesive is hardened.
- The average thickness of the adhesive layer is $\pm 1,5$ to 2 mm.
- Press the Carficom PFT laminate against the concrete until the adhesive has cured sufficiently.
- Multitek Adhesive SDC can be applied with a hopper. Build the hopper for the Multitek Adhesive with a bridge-shaped spatula on 1 side. The Carficom PFT laminate is then pulled underneath the hopper and through the spatula to apply a uniform layer of adhesive.
- The material should not be disturbed within 24 hours after application. Multitek Adhesive SDC will reach its full mechanical strength after 7 days.

5. Tensile strength for static design

CFRP laminate 165		
Width/Thickness	Design elongation = 0,6%	Design elongation = 0,8%
50/1,2 and 50/1,4	58 kN and 68 kN	77 kN and 90 kN
80/1,2 and 80/1,4	92 kN and 107 kN	123 kN and 144 kN
100/1,2 and 100/1,4	115 kN and 134 kN	154 kN and 180 kN
120/1,2 and 120/1,4	139 kN and 162 kN	185 kN and 216 kN

Remark

- Laminates with different thickness, higher E-modulus, Higher Tgm and fixed lengths are available on request.
- Contact our technical department for further information.

• technical data/properties

Property	CFRP laminate 165 (standard)	CFRP laminate 200 (on request)
Composition	Pultruded laminate manufactured from unidirectional stretched carbon fibres in a specially formulated epoxy resin matrix with chemical crosslink.	
V _f	± 70% fibres	
T _{gm}	76-78°C (100-125°C on request)	
Mechanical properties		
Minimum E-modulus	> 165 GPa	> 200 GPa
Average E-modulus	170 GPa	210 GPa
F _u (min. Tensile Strength)	> 2600 MPa	> 2800 MPa
ε _r (maximum elongation)	1,6%	1,4%

• appearance

Black carbon fibre laminate on 150 m roll.

• consumption

Consumption Multitek Adhesive SDC	
Width/thickness (mm)	Consumption Multitek Adhesive SDC
50/1,2 and 50/1,4	170 g/m
80/1,2 and 80/1,4	275 g/m
100/1,2 and 100/1,4	340 g/m
120/1,2 and 120/1,4	410 g/m

• packaging

Laminates are supplied on 150 m rolls.
Width/thickness.

- 50/1,2.
- 80/1,2.
- 100/1,2.
- 120/1,2.

Available by request

Laminates with width / thickness (mm).

- 10/1,4.
- 50/1,4.
- 80/1,4.
- 100/1,4.
- 120/1,4.

Fixed lengths according to site conditions.

• storage

Carficom PFT laminates needs to be stored in a dry and dust-free environment.

• **accessories**

To be ordered separately

- Deltapox INJ.
 - Multitek Primer.
 - Multitek Adhesive SDC.
 - Multitek Cleaner.
- (See respective Technical Data Sheets).

• **health & safety**

Carficom PFT laminates are manufactured from carbon fibres.
Always wear suitable protective clothing and equipment.
Please refer to the respective Material Safety Data Sheets for additional information.