



Structural Systems

QUANTOM[®] Carbon Plate



QUANTOM[®] Carbon Plates are pultruded carbon fiber reinforced polymer (CFRP) laminates designed for strengthening concrete, timber and masonry structures.

Carbon Plates are bonded onto the structure as external reinforcement using appropriate Quantum epoxy resin for normal and elevated application temperatures (for details on the adhesive see the relevant Product Data Sheet).

Uses

Load increase:

- Increasing the capacity of floor slabs and beams
- Increasing the capacity of bridges to accommodate increase axle loads
- Installation of heavier machinery
- Stabilising vibrating structures
- Changes of building use

Damage to structural elements:

- Deterioration of original construction materials
- Steel reinforcement corrosion
- Vehicle impact
- Fire
- Earthquakes

Service improvements:

- Reduced deflection
- Stress reduction in steel reinforcement
- Crack width reduction
- Reduced fatigue

Change in structural system:

- Removal of walls or columns
- Removal of slab sections for openings

Design or construction defects:

- Insufficient / inadequate reinforcement
- Insufficient / inadequate structural depth

Change of specification:

- Earthquakes
- Changed design philosophy

Characteristics /Advantages

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|---|---|
| ■ Non corrosive | ■ Simple plate intersections or crossings |
| ■ Very high strength | ■ Very easy to install, especially overhead |
| ■ Excellent durability | ■ Outstanding fatigue resistance |
| ■ Lightweight | ■ Minimal preparation of plate, applicable in several plies |
| ■ Unlimited lengths, no joints required | ■ Combinations of high strength and modulus of elasticity available |
| ■ Low overall thickness, can be coated | ■ Clean edges without exposed fibers thanks to the pultrusion process |
| ■ Easy transportation (rolls) | ■ Approvals from many countries worldwide |

PRODUCTS TECHNICAL INFORMATION

Plate Types

Type	Width	Thickness	cross sectional area	Strength
Quantom [®] Carbon Plate M514	50mm	1.4 mm	70 mm ²	224 kN
Quantom [®] Carbon Plate M614	60mm	1.4 mm	84 mm ²	269 kN
Quantom [®] Carbon Plate M914	90mm	1.4 mm	126 mm ²	403 kN
Quantom [®] Carbon Plate M1014	100mm	1.4 mm	140 mm ²	448 kN
Quantom [®] Carbon Plate M1214	120mm	1.4 mm	168 mm ²	540 kN

Plate Properties

(numbers are in N/mm ² or MPa)			(numbers are in N/mm ² or MPa)		
E-Modulus [*]	mean value	210'000	Tensile Strength [*]	mean value	3200
	Min. Value	>200'000		Min. Value	>2900
	5% Fractile-Value	210'000		5% Fractile-Value	3000
	95%Fractile-Value	230'000		95%Fractile-Value	3900
Strain at break [*]		>1.35%			

* Mechanical values obtained from longitudinal direction of fibers.

Substrate Preparation

Substrates must be sound, dry, clean and free from laitance, ice, standing water, grease, oils, old surface treatments or coatings and any loosely adhering particles.

Concrete must be cleaned and prepared to achieve a laitance and contaminant free, open textured surface.

Repairs and levelling: If carbonised or weak concrete cover has to be removed or levelling of uneven surfaces is needed, the following systems may be applied:

Notes on Application/ Limitations

- A suitably qualified Engineer must be responsible for the design of the strengthening works.
- This application is structural and great care must be taken in selecting suitably experienced and trained specialist labour.
- Only apply plates within the Epoxy resin open time.
- Site quality control shall be supported / monitored by an independent testing authority.
- Care must be taken when cutting plates. Use suitable protective clothing, gloves, eye protection and respirator.
- The Quantom[®]Carbon Plate system must be protected from permanent exposure to direct sunlight, to water and/or moisture and from direct contact to wet concrete.

Coating:

The exposed plate-surface can be painted with a coating material for UV and water and/or moisture protection.

-Maximum permissible service temperature is approx. +50°C.