



## CFRP solutions for CIVIL ENGINEERING

### A/Description:

TORAY CFRP solution is a pultruded carbon fibre reinforced laminate or rod, designed for concrete, timber and masonry structures strengthening. TORAY CFRP reinforcement is bonded onto the structure as external reinforcement, using epoxy resin as adhesive.



### B/Main benefits:

- ▶ Lightweight
- ▶ Durability
- ▶ Efficient maintenance
- ▶ Easy application
- ▶ Lower life cycle cost

Profiles are available in different forms: plate (laminates) or cylindrical shape(Rods).



### C/Products:

#### ▶ Plates

#### ▶ S Type plates:

Based on High Strength carbon fiber (T700), S plates feature a minimum lot average of 160 Gpa modulus. Product references:

	FLT S1.030	FLT S1,525	FLT S2,025	FLT S512	FLT S514	FLT S613	FLT S614	FLT S626	FLT S1512
Width (mm)	10	15	20	50	50	60	60	60	150
Thickness (mm)	3	2,5	2,5	1,2	1,4	1,3	1,4	2,6	1,2
	FLT S812	FLT 814	FLT S912	FLT S914	FLT S1012	FLT S1014	FLT S1213	FLT S1214	FLT S1514
Width (mm)	80	80	90	90	100	100	120	120	150
Thickness (mm)	1,2	1,4	1,2	1,4	1,2	1,4	1,3	1,4	1,4

## Toray Carbon Fibers Europe

### ► M Type plates:

Based on Intermediate modulus carbon fibre (T800S), M plates feature a minimum average of 200 Gpa modulus.

Product references:

	FLT M514	FLT M614	FLT M814	FLT M914	FLT M1014	FLT M1214
Width (mm)	50	60	80	90	100	120
Thickness (mm)	1,4	1,4	1,4	1,4	1,4	1,4

### ► Rods

Based on High strength carbon fibre (T700). Surface quality is highly compatible with epoxy adhesive paste.

Product references:

	rod S6	rod S8	rod S10	rod S12	rod S20
Diameter (mm)	6	8	10	12	20

## D/Mechanical Performances:

### ► Plates mechanical performances:

	FLT S type	FLT M type
E-Modulus * (average value) GPa	≥160	≥200
Tensile strength * (average value) MPa	≥2800	≥2900
Strain at break* (average value) %	≥1,65	≥1,35
Width tolerance mm	-1,5/+1,5	-1,5/+1,5
Thickness tolerance mm	-0,03/+0,1	-0,03/+0,1
Glass transition temperature* (average value) °C	≥100	≥100

\* Average value observed on produced batch, tested according to EN 2561 from longitudinal direction of fiber. For high modulus FLT products, please contact TCFE.

Nota: Values correspond to average value, not to individual values.

► **Rods mechanical performances:**

	S6 type	S8 type	S10 type	S12 type	S20 type
E-Modulus * (average value) GPa	150	150	140	140	130
Tensile strength (average value) MPa	≥2800	≥2200	≥1900	≥1900	≥1700
Strain at break* (average value) %	≥1.6	≥1,35	≥1,3	≥1,3	≥1,1
Diam mm	6	8	10	12	19.85
Diam tolerance mm	+/-0.15	+/-0.15	+0.6/-0.15	+0.6/-0.15	+0.6/-0.15
Glass transition temperature* ( average value) °C	≥100	≥100	≥100	≥100	≥100
Transverse shear strength MPa	200	200	200	200	200

\* Average value observed on produced batch, tested according to EN 2561 from longitudinal direction of fiber.  
 For high modulus FLT products, please contact TCFE.  
 Nota: Values correspond to average value, not to individual values.

**D/Dry rods /anchoring system:**

► Dry rods: dry rods are used as anchoring systems.  
 Based on High Strength carbon fibre (T700S), they help properly anchoring fabrics by bridging strength to deepness.  
 2 types are available (T700S based):

	26*12K	15*12K
Number of T700S 12K yarn	26	15
Dry rod yield g/m	21 g/m	12 g/m



**E/Availability:**

More than 33 references are on stock, ready off the shelf.  
 Specific or additional production can be implemented within the frame of a major project.  
 Please contact us.

**F/Packaging:**

Rods: 12-meter bars, customized length upon request.

Plates: Coreless bobbins (internal diameter of 910 mm) conditioned on a 1200 mm \* 1200 mm wood pallets.  
 Ref FLT S1.030, S1.525, S1.030, S626 (internal diameter of 1600 mm) conditioned on a 2000 mm \*2000 mm pallet.

Labelling: Sticker applied on each bobbin.  
 Customized labelling on plates is possible, according to Customers' requirements.

## Toray Carbon Fibers Europe

### G/ Product quality:

- ▶ Our production facility is both ISO 9001 certified (composite activity) & ISO 9100 certified (fiber production).
- ▶ Certificate of conformity is supplied with each delivery one per production batch):
- ▶ Test results available according to various EU norms.
- ▶ In house laboratory, to ensure constant and reliable product quality.



### H/ Winding and twisting:

Toray carbon profiles can be wound or bent without damage, with no tension, up to the following limits:

Winding/bending diameter = 110 times the diameter for rods and 110 times the thickness for laminates.

If during winding or bending some tension /load is applied on the profile, bigger winding/bending diameter should be considered.

Toray carbon rods can be twisted without damage, with no tension, up to the following limits:

Length of one twist turn = 200 times the rods diameter.

If during winding or bending some tension /load is applied on the profile, bigger winding/bending diameter should be considered.

### I/ Storage / Handling precautions:

The usual precautions necessary when handling carbon fibre profile should be observed.

A Material Safety Data Sheet is available upon request.

### J/ Contacts:

#### Customers Service:

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