

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Carbon Fibre Products

with type designation(s)
TC 808 T (T700SC-F0E)

Issued to

PRO-SYSTEMS S.p.A.
Mozzate CO, Italy

is found to comply with

DNV GL rules for classification – High speed and light craft

Det Norske Veritas' Type Approval Programme 1-501.19, 2009, Carbon Fibre Reinforcements

DNV GL standard DNVGL-ST-0342 – Craft

Det Norske Veritas' Standards for Certification No. 2.20, Lifeboats and Rescue Boats, 2007

Application :

Manufacturing of FRP laminates.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2024-02-05**.

Issued at **Høvik** on **2019-02-06**

DNV GL local station: **Milan**

for **DNV GL**

Approval Engineer: **Gisle Hersvik**

Rikard Törnqvist
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

Woven carbon fibre fabric **TC 808 T**;

Weave structure: TWILL 8/4
Mass per unit area: 800 g/m² ±4%
Fabric thickness: 1400 µm ±15%
Fibre material: 12K CARBON TORAYCA® T700SC-F0E

The following indicative properties have been verified by Type Testing of laminates:

Property	Test Method	TC 808 T (hand)	TC 808 T (infusion)		
Tensile Strength – 0° / 90°	ASTM D3039	626 / 385	779 / 578	MPa	mean
Tensile Modulus – 0° / 90°	ASTM D3039	38,5 / 36,2	59,0 / 58,0	GPa	mean
Compressive Strength – 0° / 90°	-	-	-	MPa	mean
Compressive Modulus – 0° / 90°	-	-	-	GPa	mean
Flexural Strength – 0° / 90°	ASTM D790	327 / 316	328 / 338	MPa	mean
Flexural Modulus – 0° / 90°	ASTM D790	25,4 / 25,8	41,3 / 45,5	GPa	mean
Fibre content (by volume)	-	52	69,7	%	mean
Resin	Atlac 580 ACT, Butanox M50 2%				
Curing Procedure for Type Testing	3 hrs at 80°C				

Legend:

mean = Mean of Type Test results

Application/Limitations

The fabric complies with the applicable requirements of DNV GL and is compatible to the laminating resin.

Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Please note that the type testing and approval has been carried out with basis in DNV Type Approval Programme No. 1-501.19 as the DNVGL-CP-0434 is not specifically made for woven carbon fibre fabrics.

Marking of product

Product/package shall be marked with *manufacturer's name, type designation, dimensions, batch no. and storage instructions*.

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.



Job Id: **262.1-029176-1**
Certificate No: **TAK00001EM**

Periodical Assessment to be performed after 2 and 3.5 years (Certificate Retention) and at renewal after 5 years (Certificate Renewal).

The main elements of the Periodical Assessment are to:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV GL Type Approval Certificate.

END OF CERTIFICATE