TYPE APPROVAL CERTIFICATE

Certificate no.:
TAK00001HZ
Revision No:
2

This is to certify:

that the Carbon Fibre Products

with type designation(s)
Woven (0°/90°): (85-1500 g/m²)

issued to
Sigmatex UK Ltd
Runcorn, Cheshire, **United Kingdom**

is found to comply with
DNV class programme DNV-CP-0434 – Type approval – Uni- and multi-axial multi-ply fabrics made of carbon fibres
DNV rules for classification – High speed and light craft
DNV standard DNV-ST-0342 – Craft

Application:

Manufacturing of FRP laminates.

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

Issued at **Hamburg** on **2024-05-03**

This Certificate is valid until **2029-02-21**.
DNV local unit: **UK & Ireland CMC & VMC**

Approval Engineer: **Gisle Hersvik**

for **DNV**

Digitally Signed By:
Christian Wildhagen
Location: DNV Hamburg, Germany

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 (0°/90°) – (85-1500 g/m²): Woven Carbon Fibre fabrics.

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

Property	Test Method	PC467		
Tensile Strength – 0°	ISO 527–4	749	MPa	mean
Tensile Modulus – 0°	ISO 527–4	51.7	GPa	msv
Compressive Strength – 0°	ISO 604	277	MPa	mean
Compressive Modulus – 0°	ISO 604	44.4	GPa	msv
Flexural Strength – 0°	ISO 14125	-	MPa	mean
Fibre content (by volume)	-	34	%	mean
Resin	Gurit's Ampreg 22 – Epoxy Resin			
Curing Procedure for Type Testing	24 hrs at ambient room temperature, 16 hrs at 55° C			

Legends:
msv = Manufacturer's Specified Value (verified to be within mean ±10% of Type Test results)
mean = Mean of Type Test results

Application/Limitation

Manufacture of FRP components for applications including marine vessels - and rotor blades within wind energy (ref. DNV-ST-0376).

The fabric complies with the applicable requirements of DNV 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

1. Assessment Report from DNV Manchester of 2024-04-09.
2. Assessment Report from DNV Manchester of 2021-07-19.
3. BSI Certificate No. FM 01364 (EN 9100:2018 and ISO 9001:2015).
4. Declaration Letter from Sigmatex of 2021-06-30.
5. Application for Type Approval of 2021-06-30.
6. Assessment Report from DNV GL Manchester of 2019-01-28, EN 9100 Certificate and Letter from Sigmatex of 2018-11-21.
7. Application for Type Approval of 2018-11-21.
8. Initial & Periodical Assessment Report MAN-14-091682, incl. attachment, from DNV GL Manchester of 2014-08-05.
9. Data Submission 29th May, 2013 - Sigmatex Carbon Fibre Fabrics, DNVMCR SBOL-2013-001, TA Application 2013-07-17, incl. test results from UK National Composite Certification & Evaluation Facility (NCCEF) in Manchester University, UK.
10. Data Submission 11th June, 2013 - Sigmatex Carbon Fibre Fabrics, DNVMCR SBOL-2013-001, TA Application 2013-07-17, incl. test results from UK National Composite Certification & Evaluation Facility (NCCEF) in Manchester University, UK.
11. Email from DNV Liverpool of 2009-09-03, incl. Site Audit Visit Report of 2009-08-25.
12. Email from DNV Liverpool of 2009-08-26, incl. Survey Report of 2009-08-20.
13. Email from DNV Long Beach of 2009-03-12, incl. Application for Type Approval dated 2008-07-28 and letter from Sigmatex of 2008-07-28 with product specifications and data sheets.
14. Test Report (W.O. No. T41505) from DELSEN Testing Laboratories Inc. of 2008-11-06.
15. Test Report (W.O. No. T41735) from DELSEN Testing Laboratories Inc. of 2009-01-19.
16. Various correspondences between DNV and Sigmatex April 2008 – July 2009.

Tests carried out

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

Marking of product

Product/Package shall be marked with *manufacturer's name*, *place of production* and *type designation*.

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 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.

Periodical assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com

END OF CERTIFICATE