

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Carbon Fibre Products**

with type designation(s)
Carbon UD (0°): 100-1600 g/m²

Issued to

Ahlstrom-Munksjö Glassfibre Oy Mikkeli Plant
MIKKELI, Finland

is found to comply with

DNV GL class programme DNVGL-CP-0434 – Type approval – Uni- and multi-axial multi-ply fabrics made of carbon fibres

DNV GL rules for classification – High speed and light craft

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.

Issued at **Høvik** on **2019-01-08**

This Certificate is valid until **2024-01-07**.

DNV GL local station: **Helsinki**

for **DNV GL**

Approval Engineer: **Gisle Hersvik**

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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

Carbon Fibre products of unidirectional orientations.

Carbon UD (0°): 100-1600 g/m²

- Fibre material: Torayca® T700SC-12K-F0E

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

Property	Test Method	Carbon UD 300		
Tensile Strength	BS EN ISO 527-4	1430	MPa	mean
Tensile Modulus	BS EN ISO 527-4	108	GPa	mean
Compressive Strength	BS EN ISO 14126	831	MPa	mean
Compressive Modulus	BS EN ISO 14126	95	GPa	mean
Flexural Strength	BS EN ISO 14125	962	MPa	mean
Flexural Modulus	BS EN ISO 14125	93	GPa	mean
Fibre content	BS EN ISO 14127	51.8	%	mean
Resin/Hardener	DION® 9500-501 (epoxy vinyl ester resin) (Polynt), NORPOL Peroxide 24 and Inhibitor 9854 (Polynt)			
Curing Procedure for Type Testing	16 hrs at ambient room temperature + 48 hrs at 45°C			

Legends:

mean = Mean of Type Test results

Application/Limitation

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

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**.

Marking of product

Product shall be marked with *manufacturer's name*; **AHLSTROM-MUNKSJÖ GLASSFIBRE OY, Mikkeli Plant, Finland** 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 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: **262.1-029926-1**
Certificate No: **TAK00001F2**

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 DNV GL Type Approval Certificate.

END OF CERTIFICATE