

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Carbon Fibre Products**

with type designation(s)

**Woven Fabrics, Uni-axial: SPN U XXX (200-700 g/m<sup>2</sup>)**

Issued to

**SPINTEKS TEKSTIL INSAAT SANAYI VE TICARET A.S.****Denizli, Turkey**

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 :****Manufacture 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 **2019-10-08**for **DNV GL**This Certificate is valid until **2024-10-07**.DNV GL local station: **Istanbul**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.



Job Id: **262.1-031437-1**  
Certificate No: **TAK00001SW**  
Revision No: **1**

## Product description

**SPN U XXX:** Woven carbon fibre fabrics of uni-axial orientations in the range 200-700 g/m<sup>2</sup>. 'XXX' is the areal weight in g/m<sup>2</sup>.

- Weave structure: Unidirectional
- Fibre material: 3K, 6K, 12K, 24K

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

Property	Test Method	SPN U 300		
Tensile Strength	EN ISO 527-4	1408	MPa	mean
Tensile Modulus	EN ISO 527-4	124	GPa	mean
Compressive Strength	ISO 14126	561	MPa	mean
Compressive Modulus	ISO 14126	40	GPa	mean
Flexural Strength	ISO 14125	944	MPa	mean
Flexural Modulus	ISO 14125	90	GPa	mean
Fibre content	EN 2564	54	%	mean
Resin/Hardener	HEXION's EPIKOTE™ Resin MGS™ RIMR 135/EPIKURE™ Curing Agent MGS™ RIMH 134-RIMH 137			
Curing Procedure for Type Testing	24 hours at ambient temperature and 3 hours at 80°C			

*Legends:*

mean = Mean of Type Test results

## Application/Limitation

Manufacture of FRP components for applications including marine vessels. The products' suitability in rotor blades within wind energy (ref. DNVGL-ST-0376) to be evaluated on a case-by-case basis.

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

Assessment Report from DNV GL Istanbul of 2019-06-19.  
Metyx Composites Technical Report No. KK-TR-SPINTEKS-19-01/ 08.08.2019.  
TDS for Carbon Fibre materials used (DowAksa/Mitsubishi Chemical Corporation).  
TDS for HEXION's EPIKOTE™ Resin MGS™ RIMR 135/EPIKURE™ Curing Agent MGS™ RIMH 134-RIMH 137.  
"SPINTEKS WOVEN FABRIC TYPE LIST (UNIAXIAL FABRICS)".  
Application for Type Approval of 2019-02-20.

## 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.

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## Marking of product

Product shall be marked with *manufacturer's name*; **SPINTEKS TEKSTIL INSAAT SANAYI VE TICARET A.S., Turkey** 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 Retention/Renewal Survey 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 and Certificate Renewal) shall be performed according to DNVGL-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.dnvgl.com>

END OF CERTIFICATE