DNV·GL

Certificate No:
TAK00000R1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Aramid-Glass Hybrid Fibre Products

with type designation(s)
Bi-axial Aramid-Glass Hybrid Fabric: (+45°/-45°) (290-1180 g/m²) with and without chopped strand mats (100-500 g/m²)

Issued to
Telateks Tekstil Urunleri Sanayi Ve Ticaret A.S.
(METYX Composites)
Tuzla Istanbul, Turkey

is found to comply with
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 :

For use in marine vessels according to stated Rules/Standards.

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

Issued at **Høvik** on **2017-02-26**
This Certificate is valid until **2022-02-25**.
DNV GL local station: **Istanbul**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

Martin Strande
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.

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Job Id: **262.1-011606-6**
Certificate No: **TAK00000R1**

Product description

METYX® Aramid-Glass Fibre Reinforcements:
Bi-axial: (AGX) (+45°/-45°) (290-1180 g/m²) with and without (M) (100-500 g/m²)

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

Property - Orientation	**Test Method**	**AGX 630**	**AGLTM 380/225**		
Tensile Strength – 45°	ISO 527	271	-	msmv	MPa
Tensile Modulus – 45°	ISO 527	21 260	-	msv	MPa
Tensile Elongation – 45°	ISO 527	2.6	-	msmv	%
Tensile Strength – 0°	ISO 527	-	352	msmv	MPa
Tensile Modulus – 0°	ISO 527	-	15 641	msv	MPa
Tensile Elongation – 0°	ISO 527	-	2.1	msmv	%
Fibre content (glass+aramid)	ISO 1172	[1)]	65.9	mean	%
Flexural Strength – 45°	ISO 14125	495	-	msmv	MPa
Flexural Modulus – 45°	ISO 14125	18 191	-	msv	MPa
Flexural Elongation – 45°	ISO 14125	3.6	-	msmv	%
Flexural Strength – 0°	ISO 14125	-	406	msmv	MPa
Flexural Modulus – 0°	ISO 14125	-	19 258	msv	MPa
Flexural Elongation – 0°	ISO 14125	-	-	msmv	%
Fibre content (glass+aramid)	ISO 1172	[1)]	65.9	mean	%
Interlaminar Shear Strength	ISO 4585	26.5	24.9	msmv	MPa
Compressive Strength – 45°	ASTM D695	58	-	msmv	MPa
Compressive Modulus – 45°	ASTM D695	4987	-	msv	MPa
Compressive Elongation – 45°	ASTM D695	2.4	-	msmv	%
Compressive Strength – 0°	ASTM D695	-	142	msmv	MPa
Compressive Modulus – 0°	ASTM D695	-	-	msv	MPa
Compressive Elongation – 0°	ASTM D695	-	-	msmv	%
Fibre content (glass+aramid)	ISO 1172	[1)]	65.9	mean	%
Resin		LEDA 922 Vinylester (for AGX) Scott Bader Crystic VE 676-03 (for AGLTM)			
Curing Procedure for Type Testing		24 hrs at room temperature, post-cured 3 hrs at 80°C			

Legends:
msmv = Manufacturer's Specified Minimum Value, verified to be below mean - 2 x standard deviation of Type Test results
msv = Manufacturer's Specified Value, verified to be within ± 10% of mean of Type Test results.
mean = Mean of Type Test results

[1)] Laminates produced to have a fibre content of 50% by weight.

AGX : +45/-45 Bi-axial Aramid-Glass Hybrid

AGLT: 0/90 Bi-axial Aramid-Glass Hybrid
M : Chopped Strand Mat

Application/Limitation

The moisture content in the;
- Glass/Aramid Fibre (combined) is max. 1.4%.
- Glass Fibre is max. 0.05%.
- Aramid Fibre is max. 4.4%.

Type Approval documentation

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

Marking of product

Product shall be marked with *manufacturer's name*: **Telateks Tekstil Urunleri Sanayi Ve Ticaret A.S. (METYX Composites), Tuzla / Istanbul, 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 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 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