



# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAK00000R1**  
Revision No:  
**1**

## 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/m<sup>2</sup>) with and without chopped strand mats (100-500 g/m<sup>2</sup>)**

Issued to

**Telateks Tekstil Urunleri Sanayi Ve Ticaret A.S.  
(METYX Composites)  
Tuzla, Istanbul, Türkiye**

is found to comply with

**DNV rules for classification – High speed and light craft  
DNV standard DNV-ST-0342 – Craft**

## 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.**

Issued at **Høvik** on **2022-12-21**

This Certificate is valid until **2027-12-20**.

DNV local unit: **Istanbul**

for **DNV**

Approval Engineer: **Gisle Hersvik**

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**Gustav Heiberg  
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



## Product description

### METYX® Aramid-Glass Fibre Reinforcements:

Bi-axial: (AGX) (+45°/-45°) (290-1180 g/m<sup>2</sup>) with and without (M) (100-500 g/m<sup>2</sup>)

#### Legends:

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

AGLT: 0/90 Bi-axial Aramid-Glass Hybrid

M: Chopped Strand Mat

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.

## Application/Limitation

The approval covers the weight ranges stated above.

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

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**.

The approval testing is based on the class programmes for both aramid and glass fibre reinforcements.

### 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 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