DNV·GL

Certificate No:
TAK000003X

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Glass Fibre Products

with type designation(s)
Knitted Fabrics; E-BX (600-1300 g/m²) and E-LT (400-1900 g/m²) with or without Chopped Strand Mats (CSM)

Issued to
Zhejiang Hengshi Fiberglass Fabrics Co., Ltd.
TONGXIANG, ZHEJIANG, China

is found to comply with
Det Norske Veritas' Rules for Classification of High Speed, Light Craft and Naval Surface Craft
Det Norske Veritas' Type Approval Programme 1-501.9, 2012, Polyester- and Vinylester Resins, Gelcoats and Topcoats
Det Norske Veritas Standards' for Certification No. 2.21, Craft, 2010
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.

This Certificate is valid until **2019-10-22**.

Issued at **Høvik** on **2015-10-23**

for **DNV GL**

DNV GL local station: **Shanghai**

Approval Engineer: **Gisle Hersvik**

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: **262.1-003277-5**
Certificate No: **TAK000003X**

Product description

Bi-axial Knitted Fabrics; E-BX (600-1300 g/m^2) and E-LT (400-1900 g/m^2) with or without Chopped Strand Mats (CSM)

Legends:
E: E-Glass
BX: ±45°
LT: 0°/90°
24, 36: Weight per unit area of woven roving, ounce/yd^2
15: Weight per unit area of chopped roving layer, ounce/ft^2

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

Property	**Test Method**	**E-LTMC3615**	**E-BXMC2415**		
Tensile Strength – Longitudinal	ISO 527	240	120	mean	MPa
Tensile Modulus – Longitudinal	ISO 527	12.7	10.4	msv	GPa
Tensile Elongation – Longitudinal	ISO 527	2.15	2.26	mean	%
Tensile Strength – Transverse	ISO 527	246	118	mean	MPa
Tensile Modulus – Transverse	ISO 527	13.5	11.0	msv	GPa
Tensile Elongation – Transverse	ISO 527	1.92	2.12	mean	%
Glass content	ISO 1172	47.1	50.8	mean	%
Resin	TM-107 from Changzhou Huari New Material Co.				
Curing Procedure used for Type Testing	24 hrs at room temperature, 8 hrs at 80°C				

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

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*; **Zhejiang Hengshi Fiberglass Fabrics Co., Ltd., Tongxiang, China** 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 two (2) years (Certificate Retention) and at renewal after four (4) 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 the DNV GL Type Approval Certificate.

END OF CERTIFICATE