



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **K-4676**

This is to certify that the  
**Glass Fibre Products**

with type designation(s)  
**Knitted Fabrics; E-BX (600-1300 g/m<sup>2</sup>) and E-LT (550-1900 g/m<sup>2</sup>) with or without Chopped Strand Mats (CSM)**

Manufactured by  
**Zhenshi Group Hengshi Fiberglass Fabrics Co., Ltd.**  
**TONGXIANG, ZHEJIANG, China**

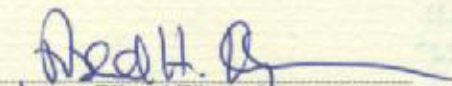
is found to comply with  
Det Norske Veritas' Rules for Classification of High Speed, Light Craft and Naval Surface Craft  
Det Norske Veritas' Standards for Certification No. 2.21, Craft, 2008  
Det Norske Veritas' Standards for Certification No. 2.20, Lifeboats and Rescue Boats, 2007

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

Høvik, 2011-07-04  
for Det Norske Veritas AS



This Certificate is valid until  
-- 2015-06-30

  
for **Rikard Törnqvist**  
**Head of Section**

DNV local office:  
**Shanghai**

  
**Gisle Hersvik**  
**Surveyor**

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.  
If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.





Certificate No.: K-4676  
File No.: 332.50  
Job Id.: 262.1-003949-3

## Product description

Bi-axial Knitted Fabrics; E-BX (800-1300 g/m<sup>2</sup>) and E-LT (550-1900 g/m<sup>2</sup>) 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<sup>2</sup>

15: Weight per unit area of chopped roving layer, ounce/ft<sup>2</sup>

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

1. Previous Type Approval Certificate No. K-3981.
2. Email from DNV Shanghai of 2011-05-13, incl. Survey Report from DNV Shanghai of 2011-05-03 and Test Reports.
3. Letter from DNV Shanghai of 2007-08-15, including Survey Report of 2007-08-15, Application for Type Approval of 2007-07-16, and product information.

## Tests carried out

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

## Marking of product

Product shall be marked with *manufacturer's name*; **Zhenshi Group Hengshi Fiberglass Fabric Co., Ltd., Tongxiang, China** and *type designation*.

## Certificate Retention/Renewal Survey

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.

Survey to be performed after two (2) years (Certificate Retention Survey) and at renewal after four (4) years (Certificate Renewal Survey).





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The main elements of the survey are:

- 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 Type Approval Certificate.

END OF CERTIFICATE