DNV·GL

Certificate No:
TAK00001BN

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Glass Fibre Products

with type designation(s)
EMC (powder type) mats, EMCL (emulsion type) mats

Issued to
Taishan Fiberglass Inc.
TAIAN, SHANDONG, China

is found to comply with
DNV GL class programme DNVGL-CP-0467 – Type approval – Uni- and multi-axial multi-ply fabrics made of glass fibres
Det Norske Veritas' Type Approval Programme 1-501.8, 2009, Glass Fibre Reinforcements
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 in accordance with 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 **2018-09-10**
This Certificate is valid until **2023-09-09**.
DNV GL local station: **Qingdao**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

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.

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Job Id: **262.1-007040-4**
Certificate No: **TAK00001BN**

Product description

EMC; Powder type glass fibre mats; EMC225, EMC250, EMC300 and EMC450.
EMCL; Emulsion type glass fibre mats; EMCL225, EMCL250, EMCL300 and EMCL450.

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

Property – Orientation	**Test Method**	**EMC300**	**EMCL450**		
Tensile Strength – 0º	ISO 527	79,3	114,6	msmv	MPa
Tensile Modulus – 0º	ISO 527	6,7	7,6	msv	GPa
Tensile Elongation – 0º	ISO 527	1,1	1,5	msmv	%
Flexural Strength – 0º	ISO 14125	180,0	196,0	msmv	MPa
Flexural Modulus – 0º	ISO 14125	7,6	8,3	msv	GPa
Flexural Deflection – 0º	ISO 14125	2,6	2,4	msmv	%
Tensile Strength – 90º	ISO 527	100,2	120,4	msmv	MPa
Tensile Modulus – 90º	ISO 527	7,2	8,1	msv	GPa
Tensile Elongation – 90º	ISO 527	1,3	1,5	msmv	%
Flexural Strength – 90º	ISO 14125	158	148	msmv	MPa
Flexural Modulus – 90º	ISO 14125	7,6	7,5	msv	GPa
Flexural Deflection – 90º	ISO 14125	2,4	2,7	msmv	%
Glass Fibre content	ISO 1172	29,8	33,8	mean	%
Resin		TM-189 (Unsaturated polyester resin)			
Curing Procedure for Type Testing		24 hrs at room temperature, 3 hrs at 60°C, 3 hrs at 110°C			

Note:
Curing procedure is different from what is given in DNV Type Approval Programme No. 1-501.8.

Legend:
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

Application/Limitation

The Type Approval is valid for the nominal weight variants; 200 to 450 g/m^2 for both EMC and EMCL.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**, ref. Test Report No. 20090827 from Testing Center of Shanghai FRP Research Institute Co., Ltd. (TCSHFRP) & FRP Industry Test Point of Shanghai Testing Center, China of 2009-12-25.

Note that the DNV GL Class Programme DNVGL-CP-0467 – Type approval – Uni- and multi-axial multi-ply fabrics made of glass fibres, is not dedicated for CSM products, hence the DNV TAP No. 1-501.8 may be used as reference for this kind of products until a specific DNVGL-CP is established for CSM products.

Marking of product

Product shall be marked with *manufacturer's name*: **Taishan Fiberglass Inc., Shandong, 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 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 the DNV GL Type Approval Certificate.

END OF CERTIFICATE