DNV·GL

Certificate No:
TAK00001TH

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Glass Fibre Products

with type designation(s)
Woven Rovings; EWR270, EWR360, EWR500, EWR580, EWR600 and EWR800

Issued to
Jushi Group Co., Ltd.
Tongxiang, ZHEJIANG, China

is found to comply with
DNV GL rules for classification – High speed and light craft
Det Norske Veritas' Type Approval Programme 1-501.8, 2009, Glass Fibre Reinforcements
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 **2019-10-29**
This Certificate is valid until **2024-10-28**.
DNV GL local station: **Shanghai**

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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Product description

Woven Roving; **EWR270**, **EWR360**, **EWR500**, **EWR580**, **EWR600** and **EWR800**.

Legends:
E: E-Glass
WR: Woven Roving
270, 360, 500, 580, 800: Weight per unit area, g/m^2

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

Properties	**Test Method**	**EWR270**	**EWR360**	**EWR500**		
Tensile Strength – warp	ISO 527-1,4	395.52	436.75	393.43	mean	MPa
Tensile Modulus – warp	ISO 527-1,4	24.62	25.89	22.16	msv	GPa
Tensile Elongation – warp	ISO 527-1,4	2.23	2.39	2.47	mean	%
Tensile Strength – weft	ISO 527-1,4	424.17	372.48	438.29	mean	MPa
Tensile Modulus – weft	ISO 527-1,4	26.22	23.48	23.71	msv	GPa
Tensile Elongation – weft	ISO 527-1,4	2.16	2.38	2.59	mean	%
Fibre content	ISO 1172	65.02 (0) 63.84 (90)	61.40 (0) 61.85 (90)	62.06 (0) 61.86 (90)	mean	%
Resin		TM-107				
Curing Procedure used for Type Testing		24 hrs at room temperature, 4 hrs at 80°C				

Properties	**Test Method**	**EWR580**	**EWR600**	**EWR800**		
Tensile Strength – warp	ISO 527-1,4	457.78	477.94	428.33	mean	MPa
Tensile Modulus – warp	ISO 527-1,4	24.77	26.30	22.84	msv	GPa
Tensile Elongation – warp	ISO 527-1,4	2.54	2.58	2.69	mean	%
Tensile Strength – weft	ISO 527-1,4	351.47	416.87	310.81	mean	MPa
Tensile Modulus – weft	ISO 527-1,4	22.83	24.40	20.13	msv	GPa
Tensile Elongation – weft	ISO 527-1,4	2.40	2.47	2.75	mean	%
Fibre content	ISO 1172	61.18 (0) 60.66 (90)	65.52 (0) 64.85 (90)	62.67 (0) 61.28 (90)	mean	%
Resin		TM-107				
Curing Procedure used for Type Testing		24 hrs at room temperature, 4 hrs at 80°C				

(0): fibre content for warp laminates
(90): fibre content for weft laminates

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

Application/Limitation

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

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

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 these kind of products, hence the DNV TAP No. 1-501.8 may be used as reference for these kind of products until a specific DNVGL-CP may be established.

Marking of product

Product shall be marked with *manufacturer's name*; **Jushi Group Co., Ltd., 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 assessments (for Certificate Retention and Certificate Renewal) shall be performed according to DNVGL-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.dnvgl.com

END OF CERTIFICATE