

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Glass Fibre Products

with type designation(s)

Chopped Strand Mats;

TGFM-300P, TGFM-450P, TGFM-600P, TGFM-300E, TGFM-450E and TGFM-600E

Issued to

Taiwan Glass Ind. Corp., Taoyuan Factory
Taoyuan, Taiwan

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 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 **2017-12-22**

This Certificate is valid until **2022-12-21**.

DNV GL local station: **Kaohsiung**

for **DNV GL**

Approval Engineer: **Gisle Hersvik**

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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.



Product description

Powder- and emulsion bonded glass fibre chopped strand mats, including the following variants;
— **TGFM-300P, TGFM-450P and TGFM-600P**
— **TGFM-300E, TGFM-450E and TGFM-600E**

Legend:

P = Powder bonded

E = Emulsion bonded

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

Property	Test Method	TGFM-450P			
		A	B		
Tensile Strength	ISO 527	108	98	msmv	MPa
Tensile Modulus	ISO 527	9 860	8 680	msv	MPa
Tensile Elongation	ISO 527	1,5	1,4	msmv	%
Flexural Strength - Longitudinal	ISO 14125	152	211	msmv	MPa
Flexural Modulus - Longitudinal	ISO 14125	8 340	8 700	msv	MPa
Flexural Deflection - Longitudinal	ISO 14125	2,2	2,9	msmv	%
Flexural Strength - Transverse	ISO 14125	196	156	msmv	MPa
Flexural Modulus - Transverse	ISO 14125	8 860	8 010	msv	MPa
Flexural Deflection - Transverse	ISO 14125	2,6	2,0	msmv	%
Glass content	ISO 1172	30,5	32,3	mean	%
Resin	2157BQT (Yong Shun Chemical Co., Ltd.)				
Curing Procedure used for Type Testing	-				

Remarks:

Specimens from two batches (A and B) were tested and the results from each batch are tabulated above.

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 $\pm 10\%$ of mean of Type Test results.

mean = Mean of Type Test results

Application/Limitation

The Type Approval is valid for the following nominal weight variants; 300, 450 and 600 g/m².

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

Marking of product

Job Id: **262.1-008791-3**
Certificate No: **TAK000012N**

Product shall be marked with *manufacturer's name*: **Taiwan Glass Ind. Corp., Taiwan** 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