

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Glass Fibre Products**

with type designation(s)
CSM (emulsion type) (100-600 g/m²),
CSM (powder type) (100-600 g/m²)

Issued to

Wanda New Material (Thailand) Co., Ltd
Chonburi, Thailand

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 **2019-08-29**

This Certificate is valid until **2024-08-28**.

DNV GL local station: **Bangkok**

for **DNV GL**

Approval Engineer: **Gisle Hersvik**

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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.



Product description

Powder- and emulsion bonded glass fibre chopped strand mats, including the following variants;
— **CSM300-xxxx(P)**, **CSM450-xxxx(P)** and **CSM600-xxxx(P)**
— **CSM300-xxxx(E)**, **CSM450-xxxx(E)** and **CSM600-xxxx(E)**

Legend:

P = Powder bonded

E = Emulsion bonded

xxxx = width (e.g. 1040, 1250)

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

Property	Test Method	CSM450-1040			
		Powder	Emulsion		
Tensile Strength	ISO 527	223	312	mean	MPa
Tensile Modulus	ISO 527	7 885	12 703	msv	MPa
Tensile Elongation	ISO 527	2,0	1,5	mean	%
Flexural Strength	ISO 14125	216	228	mean	MPa
Flexural Modulus	ISO 14125	9 111	9 326	msv	MPa
Glass content	ISO 1172	30	30	mean	%
Resin	S3B01 Polyester resin (Nan Ya Plastics Corporation)				
Curing Procedure used for Type Testing	24 hrs at room temperature				

Legend:

msv = Manufacturer's Specified Value, verified to be within $\pm 10\%$ of mean of Type Test results.

mean = Mean of Type Test results (values are mean of tests in two directions)

Application/Limitation

The Type Approval is valid for the following standard weights per unit area: 300, 450 and 600 g/m² and general approval for the weight range 100 - 600 g/m².

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 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

Product shall be marked with *manufacturer's name*: **Wanda New Material (Thailand) Co., Ltd.**, *type designation/product code*, *batch no.*, *weights* and *width of roll*.

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.

Job Id: **262.1-031073-1**
Certificate No: **TAK00001SH**

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