



Certificate No:
TAK0000283

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Vinyl Ester Resins

with type designation(s)
TH-110

Issued to

Nantong Tianhe Resin Co., Ltd.
Nantong, China

is found to comply with

DNV class programme DNV-CP-0083 – Type approval – Polyester resin, vinylester resin, gelcoat and topcoat
DNV rules for classification – High speed and light craft
DNV standard DNV-ST-0342 – Craft

Application :

Grade 1 resin 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.

Issued at **Hamburg** on **2023-06-06**

This Certificate is valid until **2028-06-05**.

DNV local unit: **Nantong**

for **DNV**

Approval Engineer: **Gisle Hersvik**

Thorsten Lohmann
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2022-12

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Product description

TH-110: Epoxy-modified (Bisphenol-A Type) Vinyl Ester Resin

The following indicative properties have been verified by Type Testing:

Property	Test Method	TH-110		
Fracture Elongation	ISO 527-2	4.69	%	mean
Tensile Strength	ISO 527-2	81.1	MPa	mean
Water Absorption	ISO 62	57.9	mg	mean
HDT	ISO 75-2	96	°C	mean
Barcol Hardness	ASTM D2583	37	-	msv
Density	ISO 1183-1	1.13	g/cm ³	msv
Curing Procedure used for Type Testing	24 hrs at 23°C and post curing 24 hrs at 60°C			

mean = mean of Type Test results

msv = Manufacturer's Specified Value, verified to be within ±10% of mean of Type Test results

Application/Limitation

Manufacture of FRP components.

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 according to **Type Approval documentation**.

Marking of product

Product shall be marked with *manufacturer's name*: **Nantong Tianhe Resin 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 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 / Certificate Renewal) shall be performed according to DNV-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.dnv.com>

END OF CERTIFICATE