DNV·GL

Certificate No:
TAK00001F8

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Polyester Resins

with type designation(s)
R5E01, R5E02, R4E01, R4E02, R3E01, R3E02, R3F01 and R3F02

Issued to
Nan Ya Plastics Corporation -
Engineering Plastics Plant 3rd Div.
Chiayi, Taiwan

is found to comply with
DNV GL class programme DNVGL-CP-0083 – Type approval – Polyester resin, vinylester resin, gelcoat and topcoat
DNV GL rules for classification – High speed and light craft
DNV GL standard DNVGL-ST-0342 – Craft

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 **2018-12-13**
This Certificate is valid until **2023-12-12**.
DNV GL local station: **Kaohsiung**

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

R5E01, R5E02, R4E01, R4E02, R3E01, R3E02, R3F01 and R3F02; Unsaturated polyester resins.
Note: **R5E02**, **R4E02** and **R3E02** are wax types.

The following properties have been verified by Type Testing of cured resin:

Property	**Test Method**	**R5E01**	**R4E01**		
Fracture Elongation	ISO 527-1,2	3.53	2.85	%	mean
Tensile Strength	ISO 527-1,2	73.0	62.9	MPa	mean
Water Absorption	ISO 62	1.98	0.65	mg	mean
HDT	ISO 75-2	89.7	91.4	ºC	mean
Barcol Hardness	ASTM D2583	39	37	-	mean
Density	ISO 1675	1.110	1.190	g/cm^3	mean
Curing procedure used for Type Testing		Normal curing: 24 hours at 23°C, Post curing: 24 hours at 50°C			

Legend:

mean: mean of Type Test results.

Application/Limitation

R5E02, **R4E02** and **R3E02** are wax types and shall only be used on surface layers. Not for use within laminates as this will affect the adhesion between the layers.

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*; **Nan Ya Plastics Corporation - Engineering Plastics Plant 3rd Div., 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