



Certificate no.:  
**TAK00002H3**

# TYPE APPROVAL CERTIFICATE

**This is to certify:**  
**that the Vinyl Ester Resins**

with type designation(s)  
**ARES® M 3021 N**

issued to  
**MARTE S.p.A.**  
**Brugherio MB, MB, Italy**

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 2 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 **2025-04-23**

This Certificate is valid until **2030-04-22**.

DNV local unit: **Italy/Malta CMC**

for **DNV**

Approval Engineer: **Gisle Hersvik**

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 USD 300 000.

## Product description

**ARES® M 3021 N**: an unaccelerated vinylester resin modified, based epoxy bisphenol-A, diluted in styrene, with medium reactivity.

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

| Property                                     | Test Method        | ARES® M 3021 N                                                                                                                                                                                                                             |                   |      |
|----------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|
| Tensile Strength                             | ISO 527-1,2        | 56.8                                                                                                                                                                                                                                       | MPa               | mean |
| Tensile Modulus                              | ISO 527-1,2        | 3670                                                                                                                                                                                                                                       | %                 | msv  |
| Fracture Elongation                          | ISO 527-1,2        | 2.0                                                                                                                                                                                                                                        | %                 | mean |
| Flexural Strength                            | ISO 178            | 101                                                                                                                                                                                                                                        | MPa               | mean |
| Flexural Modulus                             | ISO 178            | 3610                                                                                                                                                                                                                                       | %                 | msv  |
| Water Absorption                             | ISO 62             | 59.9                                                                                                                                                                                                                                       | mg                | mean |
| Glass Transition Temperature, T <sub>g</sub> | ISO 6721-3         | 90.2                                                                                                                                                                                                                                       | °C                | msv  |
| HDT                                          | ISO 75-2, Method A | 69.0                                                                                                                                                                                                                                       | °C                | mean |
| Barcol Hardness                              | ASTM D2583         | 46                                                                                                                                                                                                                                         | -                 | mean |
| Density                                      | ISO 1183-1         | 1.1685                                                                                                                                                                                                                                     | g/cm <sup>3</sup> | mean |
| Curing Procedure used for Type Testing       |                    | <ul style="list-style-type: none"> <li>- 24 hrs at room temperature, 16 hrs at 40°C, 2 hrs at 80°C [tensile and flexural properties]</li> <li>- 24 hrs at room temperature, 16 hrs at 40°C, 2 hrs at 80°C, 2 hrs at 120°C [HDT]</li> </ul> |                   |      |

### Legends:

mean: mean of Type Test results

msv: manufacturer's specified value, verified to be within  $\pm 10\%$  of 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**.

### Marking of product

Product shall be marked with *manufacturer's name and address, type designation, batch number, expiry date and storage instructions*.

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