



Certificate no.:
TAK00002D1

TYPE APPROVAL CERTIFICATE

This is to certify:
that the Epoxy Systems

with type designation(s)
Reaster EP-2011

issued to
ZheJiang TianHe Resin Co., Ltd.
Linhai, China

is found to comply with
DNV class programme DNV-CP-0089 – Type approval – Epoxy resin systems

Application:
Manufacture of fibre reinforced composites.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Hamburg** on **2024-07-16**

This Certificate is valid until **2029-07-15**.

for **DNV**

DNV local unit: **Ningbo CMC**

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 300,000 USD.



Form code: TA 251

Revision: 2023-09

www.dnv.com

Page 1 of 2

Product description

Reaster-EP-2011: A two-component epoxy resin

- Intended for medium and high temperature extrusion resin composites.

Components: EP-2011A (Resin) and EP-2011B (Hardener)

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

Properties	Test Methods	Tested values	Units	
Tensile strength	ISO 527-2	81.5	MPa	mean
Tensile Modulus	ISO 527-2	2970	MPa	mean
Flexural strength	ISO 178	131	MPa	mean
Flexural Modulus	ISO 178	3290	MPa	mean
Heat Deflection Temperature (HDT)	ISO 75-2 (Method A)	115	°C	mean
Glass Transition Temperature (Tg)	ISO 6721 (Method B)	126	°C	mean
Water absorption, Distilled water	ISO 62 (Method 1)	71.6	mg	mean

Curing procedure used: 100°C for 1h + 140°C for 1h + 180°C for 1h.

Application/Limitation

For use in fibre reinforced laminates, incl. wind power girder plate extrusion composites.

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/package shall be marked with *manufacturer's name*: **ZheJiang TianHe Resin Co., Ltd., China**, *type designation* and *date of production/batch number*.

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