Certificate No:
TAK000023J

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sandwich Adhesives

with type designation(s)
ETERSET 2968PT-689

Issued to
Eternal Materials Co., Ltd.
Kaohsiung, **Taiwan**

is found to comply with
DNV class programme DNV-CP-0085 – Type approval – Sandwich adhesives
DNV rules for classification – High speed and light craft
DNV GL standard DNVGL-ST-0342 – Craft

Application :

Grade 1 sandwich adhesive for use in marine vessels according to stated Rules/Standards. Area of application will be evaluated during approval of classified objects.

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

Issued at **Høvik** on **2021-12-22**
This Certificate is valid until **2026-12-21**.
DNV local station: **Kaohsiung**

Approval Engineer: **Gisle Hersvik**

for **DNV**

Gustav Heiberg
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.

Product description

ETERSET 2968PT-689; Pre-promoted, elastomer modified vinyl ester resin-based adhesive for sandwich construction.

The following values have been given by the manufacturer based on type testing:

Properties	Test Method	ETERSET 2968PT-689		
Tensile strength, +23°C	ASTM C297	9.4 / 5.0	MPa	mean / msmv
Tensile strength, +45°C	ASTM C297	7.2 / 4.0	MPa	mean / msmv
Tensile strength, -10°C	ISO 527-1/4	42.2 / 30.0	MPa	mean / msmv
Tensile strength, 0°C	ISO 527-1/4	32.9 / 24.0	MPa	mean / msmv
Tensile strength, +23°C	ISO 527-1/4	18.9 / 12.0	MPa	mean / msmv
Tensile strength, +45°C	ISO 527-1/4	>4.2 / 3.0	MPa	mean / msmv
Fracture elongation, -10°C [1)]	ISO 527	1.7 / 1.1	%	mean / msmv
Fracture elongation, 0°C	ISO 527	1.9 / 1.2	%	mean / msmv
Fracture elongation, +23°C	ISO 527	75.2 / 30.0	%	mean / msmv
Fracture elongation, +45°C	ISO 527	>10.0 / >3.0	%	mean / msmv
Shear strength, +23 °C	ISO 1922	3.73 / 1.0	MPa	mean / msmv
Water resistance: Retained strength after 4 weeks in sea water	ASTM C297	7.26 / 4.0	MPa	mean / msmv

mean: mean of type test results.
msmv: manufacturer's specified minimum value, verified to be less than mean – 2 standard deviations.

[1)] Fracture elongation (msmv = 1.1%) at -10°C is below the requirement of min. 2.0% for a Grade 1 sandwich adhesive. Ref. DNV-RU Ship Pt.2 Ch.3.

Application/Limitation

Designing with this sandwich adhesive shall be done with reference to the below deviations from DNV Rules and DNV-CP-0085.

The tensile/fracture elongation at -10°C is below DNV Rules requirement of 2.0% for Grade 1, and the use in hull structures/critical applications will therefore be evaluated during approval of classified objects.

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*; **Eternal Materials Co., Ltd., Taiwan** and *type designation;* ***ETERSET 2968PT-689***, *Lot no.*, *Gross weight / Net weight* and *Manufacturing date*.

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 and 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