

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Sandwich Core Materials**with type designation(s)
FLEXYFOAM ET Series

Issued to

Angeloni Group S.r.l.
Quarto d'Altino VE, Italy

is found to comply with

DNV GL class programme DNVGL-CP-0084 – Type approval – Sandwich core materials**Application :****Manufacturing of sandwich-structured composites.**Issued at **Høvik** on **2021-02-26**This Certificate is valid until **2026-02-25**.for **DNV GL**DNV GL local station: **Italy/Malta CMC**Approval Engineer: **Gisle Hersvik**

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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

FLEXYFOAM ET Series: A cross-linked, closed-cell PVC (PolyVinyl Chloride)-foam core material for sandwich construction.

Approved variants:

- FLEXYFOAM ET-55
- FLEXYFOAM ET-75

Material Properties:

Variant	Nominal Density (1)	Density Range (1)	Compr. Strength (2)	Compr. Modulus (2)	Shear Strength (3)	Shear Modulus (3)	Shear Elongation (4)	Tensile Strength (5)	Tensile Modulus (5)	HRT (6)
ET-55	60	54 - 69	1.01 (0.84)	65 (50)	0.86 (0.73)	21 (17)	29	1.98 (1.15)	97 (22)	-
ET-75	80	72 - 92	1.63 (1.44)	96 (74)	1.26 (1.09)	29 (24)	32	2.84 (1.91)	138 (58)	47

(1) Density according to ISO 845 in kg/m³

(2) Compressive properties according to ISO 844:2014, procedure B in MPa.

(3) Shear properties according to ISO 1922 and ASTM C393 in MPa.

(4) Shear elongation at break according to ISO 1922 in %.

(5) Tensile properties according to ASTM D 1623 in MPa.

(6) Heat Resistance Temperature (HRT) in °C where the shear strength is > 80% of the shear strength at RT. HRT = 47°C.

All values are average values and verified by testing. The values within brackets are manufacturer specified minimum values (msmv).

Remarks:

- ASTM D1621-73 procedure B and ISO 844:2014 procedure B work on the same technical principle and provide comparable test results.
- ASTM C273 and ISO 1922 work on the same technical principle and provide comparable test results.

Application/Limitation

The foam complies with the applicable requirements of DNV GL and is compatible to the laminating resin and/or adhesive.

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, place of production* 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.



Job Id: **262.1-035265-1**
Certificate No: **TAK0000201**

Periodical assessments (for Certificate Retention and Certificate Renewal) shall be performed according to DNVGL-CP-0338.

A production site with a valid Approval of Manufacturer (AoM) certificate for material in question is exempted from the obligation concerning periodical assessments.

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.dnvgl.com>

END OF CERTIFICATE