Certificate No:
TAK00001Z6

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sandwich Core Materials

with type designation(s)
Atlas HPE 160 HT

Issued to
NMG EUROPE S.r.l.
Gorizia, GO, **Italy**

is found to comply with
DNV class programme DNV-CP-0084 – Type approval – Sandwich core materials

Application :

Manufacturing of sandwich-structured composites.

Issued at **Hamburg** on **2023-12-13**
This Certificate is valid until **2028-12-12**.
DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Joachim Rehbein**

for **DNV**

Thorsten Lohmann
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

Atlas HPE 160 HT: IPN (interpenetrated polymer network) polyester-based closed cell foam.

Material Properties

Variant	Nominal Density (1)	Density Range (1)	Compr. Strength (2)	Compr. Modulus (2)	Shear Strength (3)	Shear Modulus (3)	Shear Elongation (4)
HPE 160 HT	165	157 - 173	2.80 (2.76)	150.0 (146.3)	1.42 (1.37)	39.79 (37.27)	6.46

(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 in MPa.
(4) Shear elongation at peak in %.

All values are average values and verified by testing. The values within brackets are minimum values.

Application/Limitation

Core material for construction of FRP sandwich laminates.

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

Fatigue tests with the ratio R = 0.1 based on DNV-ST-0376 exhibits an SN curve slope parameter of m > 10.

Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Assessed production site

NMG Europe S.r.l.
Via del San Michele 347/349
34170 Gorizia
Italy

Marking of product

Product 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 type approval certificate.

Periodical assessment

Periodical assessments are required after two years and after 3.5 years (retention survey) and for renewal after 5 years (renewal survey). Refer to DNV-CP-0338, Sec.4.

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

This certificate is only valid if required assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com

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

END OF CERTIFICATE