DNV·GL

Certificate No:
TAK00001JS

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sandwich Core Materials

with type designation(s)
AIRCELL HR-Series

Issued to
Materiales Estructurales Ligeros S.L.
Camí del Mig, 5
Pol. Ind. Els Garrofers
08340 Vilassar de Mar, Barelona, Spain

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

Application :

Manufacturing of sandwich-structured composite.

Issued at **Hamburg** on **2019-03-15**
This Certificate is valid until **2020-12-31**.
DNV GL local station: **Hamburg Materials & Welding**

Approval Engineer: **Christian Wildhagen**

for **DNV GL**

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.

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Job Id: **262.1-031130-1**
Certificate No: **TAK00001JS**

Product description

A cross-linked, closed-cell PVC (Polyvinyl Chloride)-foam core material for sandwich construction.

Approved variants

- AIRCELL HR40
- AIRCELL HR45
- AIRCELL HR60
- AIRCELL HR80
- AIRCELL HR100
- AIRCELL HR130
- AIRCELL HR200
- AIRCELL HR250

Material Properties

Variant	Nominal Density (1)	Density Range (1)	Compr. Strength (2)	Compr. Modulus (2)	Shear Strength (3)	Shear Modulus (3)	Tensile Strength (4)	Tensile Modulus (4)	HRT (5)
HR40	40	35 - 47	0.52 (0.39)	37 (24)	0.47 (0.35)	15 (12)	0.71 (0.29)	68 (9)	--
HR45	48	43 - 55	0.62 (0.49)	44 (30)	0.52 (0.44)	16 (13)	0.98 (0.55)	71 (13)	--
HR60	60	54 - 69	0.98 (0.82)	67 (46)	0.79 (0.69)	21 (17)	1.82 (1.43)	100 (46)	--
HR80	80	72 - 92	1.60 (1.42)	97 (76)	1.20 (1.07)	30 (26)	2.74 (2.28)	146 (94)	--
HR100	100	90 - 115	2.05 (1.65)	121 (99)	1.48 (1.29)	36 (31)	3.18 (2.79)	162 (101)	--
HR130	130	120 - 150	3.22 (2.83)	183 (154)	2.44 (2.17)	55 (50)	4.35 (3.47)	227 (133)	--
HR200	200	180 - 250	5.07 (4.54)	300 (243)	3.44 (2.67)	77 (62)	6.26 (4.69)	358 (195)	--
HR250	250	225 - 288	6.88 (5.83)	384 (330)	4.37 (3.47)	98 (79)	7.19 (5.53)	439 (321)	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 in MPa.
(4) Tensile properties according to ASTM D 1623 in MPa.
(5) Heat resistance temperature (HRT) in °C where the shear strength is > 80% of the shear strength at RT.

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

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

- Technical Data Sheet
- Test Report No.11226, issued by DNV GL accepted testing laboratory (Approval No. GL-LZ 2312 HH) of Gurit Americas, dated 2017-11-24.
- Workshop Inspection Report issued by DNV GL Venice, dated 2017-10-24.
- Quality documentation

Assessed production site

Maricell S.r.l.
Via Villanova 15

32013 Longarone
Italy

Periodical assessment

A production site with a valid Approval of Manufacturer (AoM) certificate for material in question is exempted from the obligation concerning retention and renewal assessments.
For manufacturer without a valid AoM a periodical assessment after 2.5 years and at renewal after 5 years is required.

Remarks

ASTM D 1621-73 procedure B and ISO 844:2014 procedure B work on the same technical principle and provide comparable test results.

ASTM C 273 and ISO 1922 work on the same technical principle and provide comparable test results.

END OF CERTIFICATE