TYPE APPROVAL CERTIFICATE

Certificate no.:
TAK000013V
Revision No:
2

This is to certify:

that the Sandwich Core Materials

with type designation(s)
BALTEK® SB - Series,
BALTEK® SBC - Series

issued to
Baltek, Inc.
Colfax, NC, USA

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

Application:

Manufacturing of sandwich-structured composite.
BALTEK® SB(C).100 is approved for use in areas exposed to slamming and slamming fatigue.

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

Issued at **Hamburg** on **2024-03-05**

This Certificate is valid until **2028-07-09**.
DNV local unit: **Houston, Approval CMC**

Approval Engineer: **Joachim Rehbein**

for **DNV**

Digitally Signed By:
Stefan Röhr
Location: DNV Hamburg, Germany

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

BALTEK® SB and SBC- series: End Grain Balsa Wood Sheets with and without Forest Stewardship Council (FSC) Certification

Approved variants

- BALTEK® SB(C).50 [1,2]
- BALTEK® SB(C).80 [1,2]
- BALTEK® SB(C).100 [1,2]
- BALTEK® SB(C).150 [1]

Notes:
(C) stands for FSC Certification
1: Production site Ecuador
2: Production site Papua New Guinea (PNG)

Material Properties

Property	Nominal Density (1)	Nominal Density (2)	Compr. Strength (3)	Compr. Modulus (3)	Compr. Strength (4)	Compr. Modulus (4)	Shear Strength (5)	Shear Modulus (5)
Test standard	ASTM C271		ASTM C365				ASTM C273	
Unit	kg/m³		MPa					
Variant								
SB(C).50	109 (84)	113 (87)	5.50 (3.20)	1616 (900)	0.55 (0.40)	46 (34)	1.79 (1.36)	136 (100)
SB(C).80	132 (113)	136 (117)	7.70 (5.90)	2187 (1500)	0.65 (0.55)	56 (47)	2.19 (1.86)	166 (140)
SB(C).100[6]	148 (136)	153 (140)	9.20 (8.10)	2526 (2000)	0.75 (0.70)	63 (58)	2.46 (2.25)	187 (170)
SB(C).150	272 (248)	281 (256)	20.80 (18.5)	5000 (4400)	1.50 (1.30)	120 (110)	4.60 (4.20)	350 (320)

Notes:
(1) Moisture content of 8.5% relative humidity.
(2) Moisture content of 12% relative humidity.
(3) Parallel to the grain.
(4) Perpendicular to the grain.
(5) Shear behavior measured on 1" thick specimens.
(6) SBC.100 has been tested for slamming and slamming fatigue.

Values without brackets: msv (= Manufacturer's specified value) based on average at nominal sheet density
Values within brackets: msmv (= Manufacturer's specified minimum value) based on average at minimum sheet density.

Shear strength is thickness dependent: For other thicknesses the appropriate factor should be applied (see table below):

Core thickness [mm]	Shear strength factor [-]
12.7	1.21
19.0	1.09
25.4	1.00
38.1	0.90
50.8	0.84

Application/Limitation

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

BALTEK® SB(C).100 is approved for use in areas exposed to slamming.

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

Type Approval documentation

Modification TAK000013V rev. 2:
Application for type approval TAA 901 of 2023-12-13;
Slamming test report TR0506_r2 issued by Gateway Materials Test Center of 2023-06-08;
Slamming fatigue test report 23011002-10-A-1 issued by Grasse Zur of 2023-12-07;
AP 24-05_Summary Sandwich used for slamming qualification DNV TAK000013V.

Renewal TAK000013V rev. 1:
Application for type approval TAA 901 of 2022-10-13;
Type approval assessment report TA 401 (Quevedo, Ecuador), issued 2023-03-21;
Workshop Inspection Report WIR-A1244390-001, Rev.1 (Quevedo, Ecuador) of 2023-03-23;
Type approval assessment report TA 401 (ENB Province, Papua New Guinea) issued 2023-02-12;
Technical data sheet GM-TDS-097 of 2023-03;
Test report AP 23-7 issued by 3A Composites, Airex AG of 2023-04-04;
Material specification GL-PS-026 Rev. 7 of 2020-06-05.

- Technical Data Sheet;
- Technical Service Report No. AP 17-09 issued by 3A Composites, dated on 2017-10-13;
- Test Report No. TR0055r3 issued by Gateway Materials Test Center, dated on 2017-09-05;
- Workshop Inspection Report, issued by Germanischer Lloyd, dated on 2011-01-28.

Marking of product

The product or package shall be marked. The marking shall at least include the following information:
— manufacturer's name and address or trademark
— production plant
— product name (grade)
— storage instruction
— production date/batch number
— quality guarantee period if any
The marking shall be carried out in such a way that it is visible, legible, and indelible. The marking of product shall enable traceability to the type approval certificate.

Assessed production site(s)

1. 3A Composites Core Materials Ecuador
   Plantabal S.A
   Luis Alberto Potolo Valencia
   Quevedo, Ecuador
2. 3A Composites PNG Balsa Ltd
   P.O. Box 1929
   Kokopo 611
   ENB Province, Papua New Guinea

Periodical assessment

Provided an approval of manufacturer certificate (see DNV-CP-0426 Manufacturer of Core Materials) which is still valid for at least one year is available, an exemption from the obligation concerning retention and renewal surveys listed in the class programme DNV-CP-0338 Type Approval scheme will typically apply.

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

END OF CERTIFICATE