



Marine & Offshore

Certificate number: 30227/B0 BV

File number: COMP3/2/1

Product code: 9064H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to
SAERTEX FRANCE
 ARANDON - FRANCE

for the type of product
MISCELLANEOUS CORE MATERIALS FOR F.R.P. SANDWICH
 Structural Foam core material for composites sandwich construction

Requirements:

Bureau Veritas "Hull in Composite Materials and Plywood, Material Approval, Design Principles, Construction and Survey " NR546 as amended

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 26 Feb 2023

For Bureau Veritas Marine & Offshore,

At BV LYON, on 26 Feb 2018,

Yann Krempelwicz



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

Designation: SAERfoam PUXX O YY-30

PU: PU Foam with density of 35 kg/m³

XX: Thickness of the core,

O: core reinforcement with Eglass fibres bridges oriented @ +/-45° around z axis, equilibrated in x and y axis.

YY: Glass fibers bridge density per cm² x 10 (20 for 2.0 bridges/cm²; 25 for 2.5 bridges /cm²).

30: Manufacturer internal reference relative to the mass of the bridges

Applications: Structural Core material for sandwich constructions.

Material description: Polyurethan foam core of 35 kg/m³ reinforced with E-glass fibre oriented @ +/- 45° around Z axis (thickness) in 0° and 90° direction of the product (in plane).

The following manufacturer's specified values are confirmed by type testing:

| | | SAERfoam O | Unit |
|---------------------------------------|-------------|--------------------------------------|--------------------------|
| XX | | 10 to 30 | mm |
| Bridges areal density in x and y axis | | 2 to 2.5 | Bridges /cm ² |
| YY | | 20 to 25 | |
| Properties | Test Method | | |
| Dry Density | ISO845 | 67 | kg/m ³ |
| Density (infused) | ISO845 | 195 | kg/m ³ |
| Compressive strength | ISO844 | 2.75 | MPa |
| Compressive modulus | ISO844 | 78 | MPa |
| Shear strength (1) | ISO1922 | 0° / 90° / 45° 0.58 / 0.62 / 0.58 | MPa |
| Shear strength (2) | ISO1922 | 0° / 90° / 45° 0.88 / .78 / 0.76 | MPa |
| Shear modulus (3) | ISO1922 | 0° / 90° / 45° 163 / 137 / 132 | MPa |
| Tensile strength (4) | ASTMC297 | 1.05 | MPa |
| Tensile modulus | ASTMC297 | 58 | MPa |
| Water absorption (5) | ISO2896 | < 1 | % |

Note 1: First failure values.

Note 2: Failure values.

Note 3: Value given for XX= 25.

Note 4: Flatwise values.

Note 5: After 7 days of complete immersion in salt water at 40°C. expressed in % of volume increase.

Values given in the table have been obtain for SAERfoam O core with skins composed by Eglass qudraxial1200 gr/m² / 1 Eglass CSM 450gr/m² and infused under vaccum with Vinylester ATLAC E-nova MA 6215.

2. DOCUMENTS AND DRAWINGS:

- O (YY/30) reinforcement system
- Technical datasheet SAERFOAM O PU (35/25) 25/30

3. TEST REPORTS:

- Type Testing carried out according to Type Approval documentation, NR 546 as amended. Test reports from COMPOSITEC studies n° 11/104RD, n°11/171P, n°12/103P dated 19/03/2012 and test reports studies n°12/132P1, n°12/132P2 dated 25/06/2012

4. APPLICATION / LIMITATION:

- Use: structural core for hull sandwich construction or other parts of ships according to BUREAU VERITAS Rules. Special consideration shall be taken for area subject to hydro-dynamical impact due to ship movement and highly concentrated local loads (load application surface corresponding to bridge spacing).
- Compatibility with resins: polyester, vinylester, epoxy.

5. PRODUCTION SURVEY REQUIREMENTS :

The *SAERFOAM type PUXX O YY-30* is to be manufactured, examined and tested by SAERTEX in accordance with the type described in this certificate and Bureau Veritas Rules for " Hull in Composite Materials and Plywood, Material Approval, Design Principles, Construction and Survey".

Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end SAERTEX has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

SAERTEX has declared to Bureau Veritas that the type of product described in this certificate may be manufactured at the following production sites:

SAERTEX FRANCE SAS
2 lot PARC d'activités d'arrandon
38150 ARRANDON
FRANCE

6. MARKING OF PRODUCT:

- Product shall be marked with *type designation, density, type of foam, reinforcement type and manufacturer's name;*

SAERTEX FRANCE SAS

7. OTHERS:

Nil.

***** END OF CERTIFICATE *****