Statement of Approval

ANNEX
Approval No.: WP 1410006 HHH

Date: 2014-03-06

Reference Documents
Technical specifications deposited at Germanischer Lloyd Head Office

Assessed Documentation
- Technical Data Sheets
- Test Report for fatigue testing No. C 2012-XX issued by KTH Stockholm and dated on 2012-12-03.

Fields of Application
Construction of FRP sandwich laminates of components, at the condition that the resins comply with the applicable requirements of the Germanischer Lloyd and are compatible to the core material.

Approved Variants
SAERfoam® O PU (35/yy) 25/35

O: ±45° glass fibre reinforcement bridges in 2 directions
PU (35/yy): Polyurethane foam core with a density of 35 kg/m³ and a thickness between 15 and 30 mm.
25/35: 2.5 glass bridges/cm² and Saertex ID-code related to the mass of dry bridges

Confirmed Values
For the material the following average values (minimum values within brackets) have been verified by testing:

<table>
<thead>
<tr>
<th>Variant</th>
<th>Compr. Strength (1)</th>
<th>Compr. Modulus (1)</th>
<th>Tensile Strength (2)</th>
<th>Shear Strength (3)</th>
<th>Shear Modulus (3)</th>
<th>Shear Strength (4)</th>
<th>Shear Modulus (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAERfoam O</td>
<td>4.77</td>
<td>185.2</td>
<td>2.2</td>
<td>2.3</td>
<td>168.1</td>
<td>2.2</td>
<td>171.3</td>
</tr>
<tr>
<td>PU (35/20) 25/35</td>
<td>(4.33)</td>
<td>(156,6)</td>
<td>(2.0)</td>
<td>(2.1)</td>
<td>(154,9)</td>
<td>(2.0)</td>
<td>(166,5)</td>
</tr>
<tr>
<td>SAERfoam O</td>
<td>2.85</td>
<td>139.46</td>
<td>1.4</td>
<td>1.4</td>
<td>126.4</td>
<td>1.2</td>
<td>118.5</td>
</tr>
<tr>
<td>PU (35/30) 25/35</td>
<td>(2.55)</td>
<td>(133,4)</td>
<td>(1.3)</td>
<td>(1.2)</td>
<td>(120,3)</td>
<td>(0.9)</td>
<td>(109,3)</td>
</tr>
</tbody>
</table>

(1) Compressive properties according to ISO 844 in MPa, tested perpendicular to the plane at 23°C.
(2) Tensile strength according to ASTM C 297 in MPa.
(3) Shear properties according to ISO 1922 in MPa, tested parallel to the plane in 0° direction.
(4) Shear properties according to ISO 1922 in MPa, tested parallel to the plane in 90° direction.

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

Remarks
None

End of Annex

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The material described below complies with the applicable requirements as given in the Rules and Regulations of Germanischer Lloyd. On this basis the material is

approved as    Sandwich Core Material

for the construction of components provided that the recommendations for use as specified by the producer are observed.

Type    SAERfoam® O

Description    Lightweight Structural Core Material

Producer    SAERTEX France SAS
            2 parc lot ZA Arandon,
            38510 Arandon
            France

Normative Reference    Rules for Classification and Construction,
                        II - Material and Welding Technology
                        Part 2 Non-Metallic Materials

This document consists of this page and a one-page annex which is integral part of the approval.

This Statement of Approval is valid until 2018-03-05.

Hamburg,  2014-03-06

Germanischer Lloyd

Guido Michalek
Joachim Renbein

The latest edition of the General Terms and Conditions of Germanischer Lloyd is applicable i.e. Chap. 1 - Ship Technology, Part 6 - Classification and Surveys. JAN/01/12, Registered Office Hamburg, HRB 71142.