TYPE APPROVAL CERTIFICATE

This is to certify:
That the Sandwich Core Materials

with type designation(s)
PVC-Series

Issued to
Gurit Composite Materials AG
Zürich, Switzerland

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 2017-12-19
This Certificate is valid until 2020-12-31. for DNV GL
DNV GL local station: Venice

Approval Engineer: Guido Michalek

Thorstén Lohmann
Head of Section
Product description

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

Approved variants

- Gurit® PVC 40
- Gurit® PVC 48
- Gurit® PVC 60
- Gurit® PVC 80
- Gurit® PVC 100
- Gurit® PVC 130
- Gurit® PVC 200
- Gurit® PVC 250

Material Properties

<table>
<thead>
<tr>
<th>Variant</th>
<th>Nominal Density (1)</th>
<th>Density Range (1)</th>
<th>Compr. Strength (2)</th>
<th>Compr. Modulus (2)</th>
<th>Shear Strength (3)</th>
<th>Shear Modulus (3)</th>
<th>Tensile Strength (4)</th>
<th>Tensile Modulus (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC 40</td>
<td>40</td>
<td>35 - 47</td>
<td>0.52 (0.39)</td>
<td>37 (24)</td>
<td>0.47 (0.35)</td>
<td>15 (12)</td>
<td>0.71 (0.29)</td>
<td>68 (9)</td>
</tr>
<tr>
<td>PVC 48</td>
<td>48</td>
<td>43 - 55</td>
<td>0.62 (0.49)</td>
<td>44 (30)</td>
<td>0.52 (0.44)</td>
<td>16 (13)</td>
<td>0.98 (0.55)</td>
<td>71 (13)</td>
</tr>
<tr>
<td>PVC 60</td>
<td>60</td>
<td>54 - 69</td>
<td>0.98 (0.82)</td>
<td>67 (46)</td>
<td>0.79 (0.69)</td>
<td>21 (17)</td>
<td>1.82 (1.43)</td>
<td>100 (46)</td>
</tr>
<tr>
<td>PVC 80</td>
<td>80</td>
<td>72 - 92</td>
<td>1.60 (1.42)</td>
<td>97 (76)</td>
<td>1.20 (1.07)</td>
<td>30 (26)</td>
<td>2.74 (2.28)</td>
<td>146 (94)</td>
</tr>
<tr>
<td>PVC 100</td>
<td>100</td>
<td>90 - 115</td>
<td>2.05 (1.65)</td>
<td>121 (99)</td>
<td>1.48 (1.29)</td>
<td>36 (31)</td>
<td>3.18 (2.79)</td>
<td>162 (101)</td>
</tr>
<tr>
<td>PVC 130</td>
<td>130</td>
<td>120 - 150</td>
<td>3.22 (2.83)</td>
<td>183 (154)</td>
<td>2.44 (2.17)</td>
<td>55 (50)</td>
<td>4.35 (3.47)</td>
<td>227 (133)</td>
</tr>
<tr>
<td>PVC 200</td>
<td>200</td>
<td>180 - 250</td>
<td>5.07 (4.54)</td>
<td>300 (243)</td>
<td>3.44 (2.67)</td>
<td>77 (62)</td>
<td>6.26 (4.69)</td>
<td>358 (195)</td>
</tr>
<tr>
<td>PVC 250</td>
<td>250</td>
<td>225 - 288</td>
<td>6.88 (5.83)</td>
<td>384 (330)</td>
<td>4.37 (3.47)</td>
<td>98 (79)</td>
<td>7.19 (5.53)</td>
<td>439 (321)</td>
</tr>
</tbody>
</table>

(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.

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

Heat resistance temperature: +47°C

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
- 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.

This certificate supersedes the Type Approval WP 1510006 HH.

END OF CERTIFICATE