DNV·GL

Certificate No:
TAK000001X

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Elastomer Core Materials

with type designation(s)
Elastocore® 9010/100

Issued to
Intelligent Engineering Ltd.
Gerrards Cross BU, United Kingdom

is found to comply with
Det Norske Veritas' Type Approval Programme 1-501.20, 2009, Elastomer Core Materials for Use in Sandwich Plate System (SPS) or Similar

Application :

Elastomer filler system for use as core material in Sandwich Plate System (SPS).

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

This Certificate is valid until **2017-08-05**.

Issued at **Høvik** on **2015-08-06**

for **DNV GL**

DNV GL local station: **London**

Approval Engineer: **Gisle Hersvik**

Martin Strande
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.

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The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Job Id: **262.1-006999-3**
Certificate No: **TAK000001X**

Product description

Elastocore® 9010/100; A two component polyurethane, PUR, system for Sandwich Plate System (SPS) applications.

Polyol component: Elastocore® 9010/100
Isocyanate component: IsoPMDI 92140

The following properties have been verified by Type Testing:

Property	*Test standard*	*Result*
Density	ISO 845	1 150 kg/m^3
Tensile Strength	ISO 527 ASTM D412	6.2 MPa at +80°C
Tensile Modulus		1 164 MPa at -20°C 248 MPa at +80°C
Elongation at break		15.1 % at –20°C
Compressive Strength	ISO 604 ASTM D575	7.9 MPa at +80°C
Compressive Modulus		1 166 MPa at -20°C 336 MPa at +80°C
Shear Modulus (G)	DIN EN ISO 6721-2 (torsion pendulum test)	G ≥ 312-2.4T [MPa] (T: °C) (-20°C to +80°C) 135 MPa at +80°C
Bonding Strength	ASTM D429-81 (shear bond strength)	2.7 MPa (shot blasted) 4 MPa (grit blasted)

Manufactured by

BASF Polyurethanes GmbH, Landwehrweg, 49448 Lemförde, Germany.

DNV GL local office: Essen.

BASF Company Ltd., 27 Sinyeoncheon-ro, Nam-Ku, Ulsan, Korea.

DNV GL local office: Ulsan.

Responsibility

The Company (stated on the front page of this Certificate) takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

Elastomer filler system for use as core material in Sandwich Plate System (SPS).

Surface preparation of metal and application of the elastomer material to be in accordance with Manufacturer's Recommendations.

Type Approval documentation
Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Marking of product

Product shall be marked with *manufacturer's name, place of production* and *type designation*.

The polyol component is to be marked: **Elastocore® 9010/100**.

The isocyanate component is to be marked: **IsoPMDI 92140**.

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical Assessment to be performed after two (2) years (Certificate Retention) and at renewal after four (4) years (Certificate Renewal).

The main elements of the Periodical Assessment are to:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer’s product marking and the DNV GL Type Approval Certificate.

END OF CERTIFICATE