DNV·GL

Certificate No:
TAK00000M3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sandwich Core Materials

with type designation(s)
Divinycell® HM; HM80, HM100, HM130

Issued to
DIAB AB
LAHOLM, Sweden

is found to comply with
DNV GL class programme DNVGL-CP-0084 – Type approval – Sandwich core materials
DNV GL rules for classification – High speed and light craft
DNV GL standard DNVGL-ST-0342 – Craft
Det Norske Veritas' Standards for Certification No. 2.20, Lifeboats and Rescue Boats, 2007

Application :

For use in marine vessels according to stated Rules/Standard. The core material 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 GL.

This Certificate is valid until **2019-06-30**.

Issued at **Høvik** on **2016-12-19**

for **DNV GL**

DNV GL local station: **Gothenburg**

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

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Product description

Divinycell® HM: HM80, HM100 and HM130.

Core material for sandwich construction. A resilient, closed cell, foam sheet consisting of a polymeric alloy of a cross-linked aromatic polyurea and a linear vinyl polymer with dimensional stability at temperatures up to 100°C.

The manufacturer has given the following values;

Properties	**Test Method**	**HM80**	**HM100**	**HM130**		
Tensile strength	ASTM D1623	2,2	2,5	3,5	min.	MPa
Tensile modulus	ASTM D1623	80	105	135	min.	MPa
Compressive strength, 23ºC	ASTM D1621	1,4	2,0	3,0	nom.	MPa
Compressive strength, 23ºC	ASTM D1621	1,15	1,65	2,4	min.	MPa
Compressive modulus, 23ºC	ASTM D1621-B-73	100	135	170	nom.	MPa
Compressive modulus, 23ºC	ASTM D1621-B-73	80	115	145	min.	MPa
Shear strength	ASTM C273	1,15	1,6	2,2	nom.	MPa
Shear strength	ASTM C273	0,96	1,4	1,9	min.	MPa
Shear modulus	ASTM C273	27	35	50	nom.	MPa
Shear modulus	ASTM C273	22	28	40	min.	MPa
Shear elongation	ASTM C273	41	41	41	nom.	%
Density	ISO 845	80	100	130	nom.	kg/m^3
Density	ISO 845	92	115	149	max.	kg/m^3
Density	ISO 845	70	90	117	min.	kg/m^3
Slamming grade testing, shear strength	ASTM C393	[1]	>1,4 (min) >1,6 (nom)	[2]		

[1] Not approved for use in areas exposed to slamming and slamming fatigue.
[2] Not tested to slamming and slamming fatigue requirements, however, please refer to DNV's Rules for Classification of High Speed, Light Craft and Naval Surface Craft (2013), Pt.3 Ch.4, Sec.5, A105.

Remarks:
The adhesive system used in the slamming tests is POLYLITE® 506-647 (a polyester resin)
Standards used for Type Testing are others than required in the Standards/Rules.

Application/Limitation

The core materials are approved for use in areas exposed to slamming and slamming fatigue.

Type Approval documentation
Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**, according to:
- DNV's Standard for Certification No. 1.9, Type Approval Programme no. 1-501.10, including the tests in accordance with DNV's Slamming and Slamming Fatigue Grade Requirements.

Marking of product

Product shall be marked with *manufacturer's name*: **DIAB AB, Laholm, Sweden** and *type designation*.

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

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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