

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Sandwich Core Materials**with type designation(s)
StruCell™ P-Series

Issued to

Changzhou Tiansheng Composite Materials Co., Ltd.
Changzhou, China

is found to comply with

DNV GL class programme DNVGL-CP-0084 – Type approval – Sandwich core materials**Application :****Core material for sandwich construction.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2019-03-26**This Certificate is valid until **2024-03-25**.for **DNV GL**DNV GL local station: **Nanjing**Approval Engineer: **Gisle Hersvik**

Rikard Törnqvist
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.



Job Id: **262.1-007338-3**
Certificate No: **TAK00001DV**

Product description

A closed-cell, crosslinked, rigid PVC (Polyvinyl Chloride) foam core material for sandwich constructions;
StruCell™ P60 and StruCell™ P80

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

StruCell™					
Properties	Test Method	P60	P80	Unit	
Density (Nominal)	ISO 845	60	80	kg/m ³	msv
Density	ISO 845	54	72	kg/m ³	msmv
Tensile strength	ASTM C297	1,8	2,5	MPa	msv
Tensile strength	ASTM C297	1,5	2,2	MPa	msmv
Tensile modulus	ASTM C297	75	95	MPa	msv
Tensile modulus	ASTM C297	57	85	MPa	msmv
Compressive strength	ISO 844	0,93	1,4	MPa	msv
Compressive strength	ISO 844	0,7	1,15	MPa	msmv
Compressive modulus	ISO 844	70	90	MPa	msv
Compressive modulus	ISO 844	60	80	MPa	msmv
Shear strength	ISO 1922	0,76	1,15	MPa	msv
Shear strength	ISO 1922	0,63	0,95	MPa	msmv
Shear modulus	ISO 1922	20	27	MPa	msv
Shear modulus	ISO 1922	16	23	MPa	msmv
Shear elongation, at break	ISO 1922	20	30	%	msv
Shear elongation, at break	ISO 1922	10	15	%	msmv
Heat resistance, % retention of shear strength, +60°C ¹⁾	ASTM C393	>80	>80	%	
Water resistance, % retention of shear strength	ASTM C393	>80	>80	%	

¹⁾ Heat resistance temperature: +60°C

Legends:

msmv = Manufacturer's Specified Minimum Value

msv = Manufacturer's Specified Value (average values at average densities)

Application/Limitation

Core material for sandwich construction.

Area of application will be evaluated during approval of classified objects.

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

Tests carried out

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

Marking of product

Product shall be marked with *manufacturer's name*; **Changzhou Tiansheng Composite Materials Co., Ltd., China** and *type designation*.

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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 2 and 3.5 years (Certificate Retention) and at renewal after 5 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