

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Wood Products**

with type designation(s)
LIGNOSTONE HII/2/30 Laminated Compressed Wood

Issued to

Röchling Engineering Plastics SE & Co. KG
Haren (Ems) Niedersachsen, Germany

is found to comply with
DNV GL rules for classification – Ships
DNV GL class programme DNVGL-CP-0099 – Type approval – Hardwood for tank supports

Application :

For use as supporting material between cargo tanks for liquified gas and support in hull structure, for minimum temperature of cargo - 196°C.

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

Issued at **Hamburg** on **2017-02-03**

This Certificate is valid until **2021-12-31**.

DNV GL local station: **Leer**

for **DNV GL**

Approval Engineer: **Joachim Rehbein**

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Thorsten Lohmann
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.



Product description

LIGNOSTONE HII/2/30 Laminated Compressed Wood

Application/Limitation

For use as supporting material between cargo tanks for liquified gas and support in hull structure, for minimum temperature of cargo -196°C.

For regular, not submerged material:

- Compressive strength perpendicular ($\perp$) to veneers: 270 MPa
- Compressive strength parallel ($\parallel$) to veneers: 170 MPa
- Recommended safety factor = 4 for long term loading

Further regarding properties, application and limitations: As per Röchling's data sheets and instructions.

Drawings showing arrangement of the compressed wood together with calculation of the compressive stresses shall be submitted for approval for each ship application.

The compressed wood shall be delivered with a works certificate according to EN 10204/3.1 or equivalent.

Type Approval documentation

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

Marking of product

Product package shall be marked with *manufacturer's name*; **Röchling Engineering Plastics KG, Germany** or manufacturer's symbol, and *type designation*; **LIGNOSTONE HII/2/30 Laminated Compressed Wood**.

Periodical assessments

The scope of the Retention/Renewal Survey 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.

Surveys to be performed bi-yearly within the validity of this certificate (Certificate Retention Survey) and at renewal after five (5) years (Certificate Renewal Survey).

The main elements of the survey are:

- 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 Type Approval Certificate.

END OF CERTIFICATE