DNV·GL

Certificate No:
TAK00001CX

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Support Materials for Gas Carriers

with type designation(s)
DURASIN

Issued to
Daemmstoff Industrie Korea Ltd.
Busan, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships

Application :

Chocking material for LNG cargo tank support.

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

Issued at **Høvik** on **2018-10-12**
This Certificate is valid until **2023-10-11**.
DNV GL local station: **Gimhae Station**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

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.

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Product description

DURASIN, Two-component epoxy-based pourable compound for foundation chocking.

The following properties have been obtained by type testing:

Properties	Test Method	Test Temperature	Value	Unit
Compressive strength	ISO 604: 2002	ambient	145.35	MPa
		-65°C	243.79	MPa
		-165°C	390.59	MPa
Shear strength	ASTM D732-17	ambient	65.66	MPa
		-65°C	85.90	MPa
		-165°C	78.97	MPa

Place of manufacture

Daemmstoff Industrie Korea Ltd., 162, Dasan-ro, Saha-gu, Busan, Korea

Application/Limitation

The approval is valid for foundation chocking of liquiefied gas tank supports, i.e. between the cargo tanks and the surrounding hull structure. Please refer to DNVGL-CG-0133, *Liquefied gas carriers with independent prismatic tanks of type A and B*, Sec. 3 [4.1] and DNVGL-RU-SHIP, Pt.5 Ch.7 Sec.1 [5.3] Table 8.

Operating temperatures; Min. -165°C

This approval is solely connected to the strength properties of the chocking compound. The approval does not include any evaluation of toxicity, contamination, pollution, or fire technical properties.

The Type Approval Certificate is invalid if the formulation of product is changed to a degree deemed significant by DNV GL.

Other conditions;
The actual use of the material as tank supports is subject to approval in each particular case.

Manufacturer's instructions to surface preparation, casting and curing of the compound are to be followed.

A Barcol hardness test to be performed with a result of at least 40 to confirm compound is fully cured.

Type Approval documentation

Tests carried out

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

Marking of product

Product/package shall be marked with *manufacturer's name*; **Daemmstoff Industrie Korea Ltd., Korea**, or *trademark* and *type number identification*.

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 DNV GL Type Approval Certificate.

END OF CERTIFICATE