

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Support Pads for Cargo Tanks**with type designation(s)  
**Norden B328**

Issued to

**Norden Maritim AS**  
**Os, Norway**is found to comply with  
**DNV GL rules for classification – Ships****Application :****Support pads for heated asphalt, bitumen, coal tar, creosote and sulphur tanks.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**This Certificate is valid until **2024-03-03**.Issued at **Høvik** on **2019-03-04**DNV GL local station: **Bergen**for **DNV GL**Approval Engineer: **Gisle Hersvik**

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**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: **262.1-030953-1**  
Certificate No: **TAS00001Y7**

## Product description

**Norden B328** Tank Insulating Material; Synthetic fibre reinforced thermosetting resin material for manufacture of cargo tank support/insulation pads, for

- heated asphalt / bitumen tanks,
- coal tar / creosote tanks,
- sulphur tanks.

## Manufactured by

## 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

Material properties:

Properties	Test method	Value/Unit
Compressive strength, RT	ASTM D695	330 MPa
Compressive strength, 260°C	ASTM D695	180 MPa
Coefficient of friction	Pin-on-disc	0.25 - 0.30

Notes:  
Compressive properties for Norden B328 is not affect by heating to 280°C before testing at RT.  
For other properties, please refer to Norden B328 technical data sheet.

Norden B328:

Maximum operating temperature	300°C
Maximum contact temperature	280°C
Maximum load, static	85 MPa
Maximum load, dynamic	50 MPa
Maximum load, with chocking compound	As per resin/chocking compound manufacturer's recommendations

Insulating properties:

Depending on Norden B328 pad and resin/chocking compound thickness the temperature between:

- the Norden B328 pad and resin/chocking compound	is in the range 66 - 87°C
- the resin/chocking compound and the steel plate	is in the range 43 - 63°C

The Norden B328 pad material has been tested with the following resins/chocking compounds:

CHOCKFAST® ORANGE (PR-610TCF)	Manufacturer: ITW Performance Polymers
EPOCAST 36®	Manufacturer: ITW Performance Polymers

Note:

Documentation of the heat transfer/insulating properties for use of Norden B328 with other resins/chocking compounds shall, when relevant, be requested from Norden Maritim AS.

Any significant changes in design and / or quality of the material will render the approval invalid.

## Type Approval documentation

## Tests carried out

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Type Testing carried out in accordance with **Type Approval documentation**, such as water absorption, compressive properties, coefficient of friction and heat transfer properties.

### **Marking of product**

Product/package shall be marked with *manufacturer's name*; **Norden Maritim AS, Norway** and *type designation*; **Norden B328**.

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