



Marine & Offshore

Certificate number: 61373/A0 BV

File number: ACM241/015/001

Product code: 6492H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

*This certificate is issued to***NORDEN MARITIM AS**

OS - NORWAY

*for the type of product***SUPPORT MATERIALS FOR HIGHLY HEATED CARGO INDEPENDENT TANKS**

Norden B328

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships

NR622 - Structural Assessment of Independent Tanks and Supports for Asphalt Carriers

*This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.***This certificate will expire on: 01 Oct 2025****For Bureau Veritas Marine & Offshore,**

At BV OSLO, on 01 Oct 2020,

Rune MARSTEIN

Rune Marstein

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

Norden B328

Synthetic fibre reinforced thermosetting resin material used as support/insulation pads for heated asphalt, bitumen, coal tar, creosote and sulphur tanks.

Nominal density	1.80 g/cm ³
Maximum operating temperature	300 °C
Thermal conductivity (K factor)	0.562-0.573
Compressive strength at ambient temperature	330 N/mm ²
Compressive strength at 260 °C	180 N/mm ²
Young's (tensile) modulus (elasticity)	11445 N/mm ²
Shear strength	82.55 N/mm ²
Frictional coefficient	0.25-0.30

2. DOCUMENTS AND DRAWINGS:

As per the Manufacturer's data sheet "NORDEN B328" dated 22/10/2018.

3. TEST REPORTS:

Test report "Norden B328 Tank Insulating Material - Evaluation of Heat Transfer Properties - Support Pad Material at elevated temperature" rev.C dated 20/02/2019 including:

- In-house insulation performance tests,
- Compression tests performed:
 - as per ASTM D 695, at ambient temperature on **Norden B328** maintained at ambient temperature and exposed to 280°C during one hour (certificate N° 8086-1 rev.A dated 08/10/2018, from Quality Lab AS, Norway).
 - as per ISO 604:2002, at 260°C on **Norden B328** (certificate N° 8086-1 rev.B dated 05/11/2018, from Quality Lab AS, Norway - Test performed by Intertek).
- In-house water absorption tests dated 05/09/2017,
- Pin-on-disc test - determination of friction coefficient (report N° K-12/2019 dated 11/02/2019, from Institute of Welding and Machining, Germany),
- Shear strength in-house test (report N° 00000498 rev.A dated 20/08/2020),
- Young's modulus test (report N° T-0835 dated 02/09/2020, as per ASTM D3039, from Kiwa, Norway),
- Determination of thermal conductivity (report N° N020429 dated 03/09/2020, as per ISO 8301, from Noner AS, Norway),

4. APPLICATION / LIMITATION:

- 4.1 - Independent tank supports for Asphalt or other highly heated cargoes. The use for other types of cargo containment system is subject to the agreement of the Society.
- 4.2 - The cargo temperature should not exceed 300 °C.
- 4.3 - Insulation properties of **Norden B328**:
 - At 280°C:
 - Norden B328 pad / Epocast 36® [or Chockfast® Orange] outlet external temperature do not exceed 87°C [or 84°C].
 - Epocast 36® [or Chockfast® Orange] / Steel outlet external temperature do not exceed 63°C [or 49°C].
 - At 240°C: when **Norden B328** pads are not associated with any resin, outlet external temperature do not exceed 100 °C.
- 4.4 - The maximum allowed load for one support is 50 Mpa for dynamic load and 80 Mpa for static load.
- 4.5 - Structure of tanks and supports should be reviewed for each case by the Society.
- 4.6 - The steel surrounding structure is subject to additional design review.
- 4.7 - Installation on board should be performed according manufacturer's instructions.

5. PRODUCTION SURVEY REQUIREMENTS:

- 5.1 - The support/insulation pads "**Norden B328**" are to be supplied by **Norden Maritim AS** in compliance with the type described in this certificate.
- 5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.
- 5.3 - **Norden Maritim AS** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

6. MARKING OF PRODUCT:

The product or packing is to be marked with Manufacturer name, type and designation.

7. OTHERS:

It is **Norden Maritim AS**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

***** END OF CERTIFICATE *****