DNV·GL

Certificate No:
TAM00000SB

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Stern Tube Bearing Material

with type designation(s)
Thordon RiverTough / Composite

Issued to
Thordon Bearings Inc.
Burlington ON, Canada

is found to comply with
DNV GL class programme DNVGL-CP-0081 – Type approval – Synthetic bearing bushing materials
DNV GL rules for classification – Ships
DNV GL rules for classification – High speed and light craft
DNV GL rules for classification – Inland navigation vessels
DNV GL rules for classification – Yachts
DNV GL rules for classification – Naval vessels
DNV GL rules for classification – Offshore units

Application :

The bearing material is approved for use as water lubricated propeller shaft bearing material. The Type Approval is valid only when the installation/application of the product is according to the DNV GL Rules and the Manufacturer's recommendations. Length/breadth ratio of not less than 2:1 for the aft most bearing. Maximum nominal bearing pressure: 6 bar.

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

Issued at **Høvik** on **2017-12-20**
This Certificate is valid until **2022-12-19**.
DNV GL local station: **Montreal**

Approval Engineer: **Helene Munkhaugen**

for **DNV GL**

Martin Strande
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

Thordon RiverTough / Composite; Water lubricated non-metallic sleeve bush, with axial grooves, in stave and sleeve bush (cylindrical) form in single and multiple segments.

Place of manufacture

Thordon Bearings Inc., 3225 Mainway, Burlington, Ontario L7M 1A6, Canada

DNV GL local office: Montreal

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

Fields of Application;	- Propeller shaft bearings
Lubricants;	- Water - Dry, for limited periods (example; periodic discontinous rotation in dry-dock
Surface Pressure;	- 0.6 MPa, maximum
Max. service temperature;	- +60°C (wet)
Installation;	- Press fit - Interference freeze fit - Adhesive bonded with TG-75 (or equivalent adhesive) Axial retention is required for press fit and interference fit installation
Dimensions;	- As per DNV GL Rules and Manufacturer's recommendations. - Min – max diameters (OD): 35 mm - 3000 mm - Min – max thicknesses (WT): 8 – 120 mm - Minimum wall thickness (interference installation): Thordon Engineering Manual Version E2006.1, Figure 15 “Wall thickness guide” -page 18

The bearing material is approved as water lubricated non-metallic propeller shaft bearing (including struts) with a minimum L/D ratio of 2:1 for the bearing next to propeller. For all other positions, L/D ratio as per Manufacturer' recommendations.

The stave type bearing is to be provided with axial retention.

The Type Approval is valid only when the installation/application of the product is according to the specified DNV GL Rules and the Manufacturer's recommendations. Reference is made to TBI’s Engineering/Design Manual.

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

Type Approval documentation

Tests carried out

Marking of product

Product or packaging shall be marked with *manufacturer's name*, *type designation, bearing main dimensions, batch number* and *place of production***.**

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 years and 3.5 years (Certificate Retention) and at renewal after five (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