



TYPE APPROVAL CERTIFICATE

Certificate No:
TAS0000329
Revision No:
2

This is to certify:

That the Rudder Bearing Bushing Material, Synthetic

with type designation(s)
Tufcot T100 Marine

Issued to

Tufcot Engineering Ltd.
Sheffield, United Kingdom

is found to comply with

DNV class programme DNV-CP-0081 – Type approval – Synthetic bearing bushing materials
DNV rules for classification – Ships

Application :

Maximum surface pressure 5.5 MPa for the synthetic rudder bearing bushing material against steel/metal, non-lubricated, water or oil lubricated. The Type Approval is valid only when the installation/application of the product is according to the DNV Rules and the Manufacturer's recommendations.

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

Issued at **Høvik** on **2022-10-06**

for **DNV**

This Certificate is valid until **2026-06-24**.

DNV local station: **UK & Ireland CMC & VMC**

Approval Engineer: **Gisle Hersvik**

Gustav Heiberg
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Tufcot T100 Marine: Polyester resin based bushing material, incl. Molybdenum Disulphide powder and PTFE powder.

Application/Limitation

Fields of Application: - Rudder Neck Bearings
- Rudder Pintle Bearings
- Rudder Carrier
- Rudder Thrust

Lubricants: - Water, oil
- Dry-running

Surface Pressure: - 5.5 MPa, maximum

Max. service temperature: - 70°C, maximum

Installation: - Press fit
- Freeze fit
- Bonding

Dimensions: - As per DNV Rules and Manufacturer's recommendations.
- Min – max diameters (OD): 20 – 2000 mm
- Min – max thicknesses (WT): 8 – 130 mm
- Recommended/optimum wall thickness, ref. 'Tufcot T100 Marine Engineering Manual'.

The Type Approval is valid only when the installation/application of the product is according to the specified DNV Rules and the Manufacturer's recommendations, ref. 'Tufcot T100 Marine Engineering Manual'.

In accordance with DNV Rules for Ships, Pt.3 Ch.14, the bushing shall be effectively secured to the bearing.

Bushing should be effectively secured in accordance with Manufacturer's recommendation. Physical stopper should be arranged to prevent the bushing from shifting in vertical direction.

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

Type Approval documentation

1. Tufcot TR0036A, DNV 200 Hour Dry & Water Lubricated Coefficient of Friction Results.
2. Application for Type Approval of 2021-11-19.
3. Assessment Report from DNV Manchester of 2021-03-24. (with comments and records).
4. R-Tech Materials Laboratory Test Report C20043-2 of 2021-02-17.
5. Tufcot TR0035, DNV 48 Hour Water Lubricated Coefficient of Friction Results.
6. Tufcot TR0036, DNV 200 Hour Dry & Water Lubricated Coefficient of Friction Results.
7. PC Correction Factor (sheet).
8. Wear rate DNV 48 Hour Test Tufcot T100 Marine.
9. Tufcot T100 Marine Engineering Manual.
10. TUFcot's "How to guide on performing low speed, high speed or oscillatory bearing tests".
11. Safety Data Sheet – T100 Marine.
12. Additional Fitting Information as recommended by Classification Society.
13. Tufcot Engineering Ltd. - Initial approval of bushing material (A0770712), Approval documentation summary ref DNVGL-CP-0081 Section 1, 3.
14. ISO 9001-certificate (QMS International, certificate 14130979).
15. Application for Type Approval of 2019-11-26.

Tests carried out

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

Marking of product

Product shall be marked with *manufacturer's name* and *type designation*.



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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 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 assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

END OF CERTIFICATE