



**Marine & Offshore
Division**

Certificate number: 04050/F0 BV

File number: ACM 119/1501/001

Product code: 0720H

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

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

TRELLEBORG SEALING SOLUTIONS ROTHERHAM

Rotherham - UNITED KINGDOM

for the type of product

BEARING MATERIALS

ORKOT "TLM MARINE" BEARING.

Requirements:

BUREAU VERITAS Rules for the Classification of Steel Ships.

This certificate is issued to attest that BUREAU VERITAS 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: 06 Aug 2019

For BUREAU VERITAS,

At BV LONDON, on 06 Aug 2014,

Jon Watson



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. 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 Division 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 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.

The electronic version is available at: <http://www.veristarnb.com/veristarnb/jsp/viewPublicPdfTypepec.jsp?id=yegrjppgcw>

BV Mod. Ad.E 530 May 2009

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

ORKOT "TLM MARINE" BEARING

Non Abestos composite material, made of impregnated special fabrics with thermosetting resins.

Dimension range stern tube bearing:

Outer diameter: 95 - 1 200 mm
 Inner diameter: 50.5 - 950 mm
 Length: 100 - 1 300 mm

Dimension range rudder bearing:

Lower bearing Up to 1678 mm

Physical and Mechanical Properties:

Tensile strength: 60 N/mm² - (60 MPa)
 Compressive strength (Normal): 300 N/mm² - (300 MPa)
 Compressive strength (Parallel): 92 N/mm² - (92 MPa)
 Hardness Rockwell: 100 (M scale)
 Density: 1.30
 Swell in water: < 0.1
 Maximum operating temperature: 130°C

2. DOCUMENTS AND DRAWINGS:

Description, Production specification and Quality control as per manufacturer's booklets.

3. TEST REPORTS:

Report by BMT Ministry of Defence (PE), ME112 Foxhill, Bath U.K. Nov. 1989.
 ORKOT composites test reports N° 0101, 0102 and 0103 (19.12.2000).
 Friction and wear testing Orkot TLM Marine (September 2010)

4. APPLICATION / LIMITATION:

Application:

- Dry or Water / Grease Lubricated Rudder Stock, Pintle Bushes, Rudder Carrier Bushes & discs.
- Dry or Water Lubricated Stabiliser Fin Bearings.
- Water Lubricated Stern Tube Bearings.

Limitation of use:

- Maximum pressure (static condition) for stabilisers: 15 N/mm², (15 MPa).
- Maximum pressure for rudder bearing of 25 N/mm², (25 MPa).
- Bearing wall thickness: according to load and shaft diameter, as per Manufacturer's recommendations.
- Length / breadth ratio for stern tube bearings of not less than 2:1.
- Length / breadth ratio for rudder bearing of not more than 1:2.

On board installation & Maintenance requirements:

- As per the manufacturer's instructions.
- Drawings showing the actual dimension of the bearings are to be submitted for each particular application. (supplied by installer).
- Complete justifications must be sent to the Society about the distribution of loads on the shafts-line bearings or the rudder pintles.

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 - The Bearing Materials ORKOT "TLM MARINE" are to be supplied by **TRELLEBORG SEALING SOLUTIONS ROTHERHAM**, in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320.

5.3 - **TRELLEBORG SEALING SOLUTIONS ROTHERHAM** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products:

TRELLEBORG SEALING SOLUTIONS ROTHERHAM
BRADMARSH BUSINESS PARK
Rotherham
UNITED KINGDOM

6. MARKING OF PRODUCT:

- Weight and dimension
- Manufacturing Data and lot number
- Nominal Shaft Diameter
- Date of fitting

7. OTHERS:

7.1 - It is understood that the herewith mentioned manufacturer will give the shipyards and related subcontractors all the relevant information for the proper fitting and uses of the product covered in this Type Approval Certificate. This information has to include the conditions stated in the Certificate.

It is also understood that Bureau Veritas remains rightfully entitled to perform any check or test on the product at any time.

7.2 - This Certificate supersedes the Type Approval Certificate N° 04050/E0 BV issued on 22 July 2009 by the Society.

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