

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Rudder Bearing Bushing Material, Synthetic**with type designation(s)
HP Super

Issued to

**Becker Marine Systems GmbH
Hamburg, Germany**

is found to comply with

DNV GL rules for classification – Ships**DNV GL class programme DNVGL-CP-0081 – Type approval – Synthetic bearing bushing materials****Application :****Rudder Carrier Bearing****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Hamburg** on **2018-01-29**This Certificate is valid until **2021-12-31**.DNV GL local station: **Hamburg**for **DNV GL**Approval Engineer: **Joachim Rehbein**

**Thorsten Lohmann
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.



Product description

HP Super: Thermoplastic Elastomer Compound

Application/Limitation

Fields of Application	- Rudder carrier – axial and radial bearing
Lubricants	- Dry
Operational Limits	- Maximum permissible surface pressure: 10.0 MPa - Maximum working temperature: 50°C
Installation	According manufacturers instructions
Dimensions	According to the drawings approved by DNV GL

Installation shall be carried out only in accordance with the Rules and instructions of rudder bearing supplier.

The maximum surface pressure of 10 N/mm² will be subject to evaluation with respect to service experience in connection with renewal of the certificate.

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

Any change of production site will render the approval invalid.

Type Approval documentation

Tests carried out

Tests carried out at production site and witnessed by surveyor dated 2015-04-16

Marking of product

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

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 assessments will be carried out bi-yearly(Certificate Retention) and at renewal after 5 years (Certificate Renewal).

When possible, this assessments may be harmonised with normal surveys for product certification and / or other surveys and audits carried out.

END OF CERTIFICATE