Certificate No:
TAM0000196

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Torsional Vibration Dampers

with type designation(s)
Sleeve spring damper for the MaK engine M453C

Issued to
Caterpillar Motoren GmbH & Co. KG
Kiel, Schleswig-Holstein, Germany

is found to comply with
DNV rules for classification – Ships
DNV rules for classification – High speed and light craft

Application :

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

Issued at **Hamburg** on **2022-01-03**
This Certificate is valid until **2027-01-02**.
DNV local station: **Essen**

Approval Engineer: **Stanislav Avanesov**

for **DNV**

Olaf Drews
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

Torsional vibration damper with sleeve springs for the MaK engine M453C.

Technical data:

Outer diameter: 850mm,
Width: 200mm,
Spring pitch diameter: 530mm,
Number of spring packs: 24,
Moment of inertia inner part: 7,74kgm²,
Moment of inertia outer part: 62,7kgm²,
Torsional stiffness: 3,6MNm/rad,
Damping: 9598,6 Nms/rad,
Permissible spring deflection: 3,2mm,
Permissible power loss: 14,4kW,
Permissible alternating torque: 43,2kNm

Places of production

Hasse & Wrede GmbH,

Georg-Knorr-Strasse 4
12681 Berlin, Germany

Application/Limitation

The type approval is valid for the about mentioned damper as single design for the MaK engine M453C.

Type Approval documentation

Marking of product

Manufacturer’s name or trademark. Type number designation.

Periodical assessment

For retention of the Type Approval, a DNV surveyor shall perform a survey after 2 and 3,5 years and before the expiry date of this certificate to verify that the conditions of the type approval are complied with.

The objective of the Periodical Assessment is to verify that the conditions for the Type Approval are not altered since the Type Approval Certificate was issued. The main scope of the Periodical Assessment will normally include:

- Verification of the Type Approval applicant’s production and quality system w.r.t. ensuring continued consistent production of the Type Approved products at the Type Approval applicant’s own premises and at other companies that are given the responsibility for manufacturing of the products.
- Review of the Type Approval documentation and that this is still used as basis for the production
- Review of possible changes to the design, the material and the performance of the product
- Verification of the product marking.

END OF CERTIFICATE