

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Thruster Components**

with type designation(s)
S2300

Issued to

Bonfiglioli Riduttori S.p.A.
Forlì FC, Italy

is found to comply with
DNV GL rules for classification – Ships

Application :

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

Issued at **Hamburg** on **2020-07-07**

This Certificate is valid until **2025-07-06**.

DNV GL local station: **Italy/Malta CMC**

for **DNV GL**

Approval Engineer: **Olaf Richter**

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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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

Pinions for thruster steering.

Pinions will form the output shaft of planetary gearboxes. This approval does not cover the planetary gearboxes.

Application/Limitation

Driven by electric or hydraulic motor.

Pinions will be in contact with gear wheels $z=129$ as per page 2 of attached document "S2000/2300 slewing bearing gear data".

This approval is valid for the following load spectra on the pinion:

	pinion torque [kNm]	load cycles [-]
Application without ice class	50	1000
	20	$2 \cdot 10^7$
Application with ice classes PC5, PC6	55	1000
	26	25000
	20	$2.5 \cdot 10^6$
	10	$1.2 \cdot 10^7$

Type Approval documentation

Tests carried out

None.

Marking of product

Manufacturer's name or trademark. Type number designation.

Periodical assessment

For retention of the Type Approval, a DNV GL surveyor shall perform an assessment after 2 years and after 3.5 years to verify that the conditions of the type approval are complied with. A renewal assessment will be performed at renewal of the certificate.

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

In cases where the Type Approved product is manufactured at other companies, the Periodical Assessment shall verify that the Type Approval applicant has a quality control system for consistent production at their licensees/subcontractors. Furthermore Periodical Assessment shall be carried out randomly at these companies.

When a Type Approved product is manufactured at other companies, the Type Approval applicant takes the sole responsibility for the conformity of the product to the applicable requirements.

END OF CERTIFICATE.