DNV·GL

Certificate No:
TAM0000113

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Tunnel Thruster

with type designation(s)
BU50F, BU60F, BU90F, BU100F, BU120F, BU140F

Issued to
Jastram GmbH & Co. KG
Hamburg, Germany

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

Application :

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

Issued at **Hamburg** on **2018-12-07**
This Certificate is valid until **2023-12-06**.
DNV GL local station: **Hamburg**

Approval Engineer: **Olaf Richter**

for **DNV GL**

Burkhard Lilienthal
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.

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Product description

Gearbox for tunnel thruster unit with fixed pitch propeller, for electric or Diesel engine drive, for auxiliary use with or without dynamic positioning

Application/Limitation

Type		BU50F	BU60F	BU90F	BU100F	BU120F	BU140F
Input rot. speed max	[rpm]	1500	1800	1800	1200	1200	1200
Gear ratio		2.21	3.07	4.33	3.73	3.78	4.42
Electric drive, no dynamic positioning, K_test=1.2							
Maximum input torque	[Nm]	2005	3024	3714	7162	7958	12335
Maximum power	[kW]	315	570	700	900	1000	1550
Electric drive, no dynamic positioning, K_test=1.0							
Maximum input torque	[Nm]	2228	3554	4085	7958	9231	14722
Maximum power	[kW]	350	670	770	1000	1160	1850
Electric drive, dynamic positioning, K_test=1.2							
Maximum input torque	[Nm]	-	2334	3183	5730	6923	9549
Maximum power	[kW]	-	440	600	720	870	1200
Electric drive, dynamic positioning, K_test=1.0							
Maximum input torque	[Nm]	-	2812	3714	6844	7958	11539
Maximum power	[kW]	-	530	700	860	1000	1450
Diesel engine drive, no dynamic positioning, K_test=1.2							
Maximum input torque	[Nm]	2005	2546	-	-	-	-
Maximum power	[kW]	315	480	-	-	-	-
Diesel engine drive, no dynamic positioning, K_test=1.0							
Maximum input torque	[Nm]	2228	2971	-	-	-	-
Maximum power	[kW]	350	560	-	-	-	-

K_test represents different ways of contact pattern check, see DNVGL CG-0036 Sec.1 [9.9] for details.
K_test=1.2 for check during spin test at very low load.
K_test=1.0 for check during test run at full torque.

The approval is valid for the following maximum application factors:
K_A=1.1, K_AP=1.3 for electric drive with frequency converter for torque limitation and smooth start
K_A=1.3, K_AP=1.5 for Diesel engine drive, to be confirmed by torsional vibration calculation

Type Approval documentation

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.

Other conditions

At the input shaft keyway, the bottom radius must be at least 0.4 mm for BU60F to BU120F.

This approval does not cover:

- Lubrication / hydraulic diagram incl. instrumentation (measuring devices, sensors and alarms)
- Propeller blades
- Elastic coupling and its connection to the input shaft
- Welding workshop qualification for BU140F gear wheel hub
- Thruster tunnel
- Torsional vibration assessment

END OF CERTIFICATE