



Certificate No:
TAM0000194

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Thruster Components

with type designation(s)
706T2, 706T3, 709T2, 709T3

Issued to

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

is found to comply with

DNV rules for classification – Ships

Application :

Planetary gears for thruster steering

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Hamburg** on **2021-12-10**

This Certificate is valid until **2026-12-09**.

DNV local station: **Venice**

for **DNV**

Approval Engineer: **Olaf Richter**

.....
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.



Form code: TA 251

Revision: 2021-03

www.dnv.com

Page 1 of 5

Product description

Multi stage reduction planetary gearboxes with external pinion for use in hydraulic or electric steering system for azimuth thrusters.

Approval does not cover slewing ring.

Application/Limitation

Code	Type	Installation dwg	Pinion			Ratio	Design*) torque [Nm]	Working**) torque [Nm]	High cycle***) torque [Nm]
			m _n [mm]	z	b [mm]				
2T706T2033A02	706T2F	56062650	10	15	85	33,1	17000	8000	3000
2T706T2033A03	706T2F	56062660	9	15	101	33,1	11000	5000	1800
2T706T2033A04	706T2F	56062301	9	15	101	33,1	11000	5000	1800
2T706T2033A05	706T2F	56062312_A	10	15	85	33	17000	8000	3000
2T706T2033A06	706T2F	56062411	9	15	101	33,1	8000	5000	1250
2T706T2033A07	706T2F	56062800	9	15	101	33,1	8000	5000	1500
2T706T2033A11	706T2F	56063150	- *	-	-	33,1	9300	7800	2300
2T706T3072A01	706T3RF	56071690_B	9	15	101	72,9	8000	5000	1250
2T706T3084A01	706T3RF	56071680_B	9	15	101	84,7	11000	5000	1800
2T706T3131A07	706T3F	56071780	12	13	115	130,7	15000	9700	3000
2T709T3101A02	709T3F	56171111_A	12	17	110	100,7	26250	18000	6300
2T709T2046A02	709T2F	56161680_C	16	12	125	46,7	26250	14500	6000

*Pinion not part of type approval

Type	Installation dwg	Pinion			Ratio	Design*) torque [Nm]	Working**) torque [Nm]	High cycle***) torque [Nm]
		m _n [mm]	z	b [mm]				
706T2F	56062760	10	15	85	13,0	9650	7750	2325
					15,3	10300	8250	2475
					18,1	10750	8630	2590
					22,7	10750	8630	2590
					26,4	10750	8630	2590
					28,4	10750	8630	2590
					33,1	10750	8630	2590
					38,1	9000	7200	2160
					46,5	9000	7200	2160
					56,3	9250	7400	2220
					72,5	8250	6600	1980

Type	Installation dwg	Pinion			Ratio	Design*) torque [Nm]	Working**) torque [Nm]	High cycle***) torque [Nm]
		m _n [mm]	z	b [mm]				
706T2F	56062750	9	15	101	13,0	9460	7565	2270
					15,3	9460	7565	2270
					18,1	9460	7565	2270
					22,7	9460	7565	2270
					26,4	9460	7565	2270
					28,4	9460	7565	2270
					33,1	9460	7565	2270
					38,1	9000	7200	2160
					46,5	9000	7200	2160
					56,3	9250	7400	2220
					72,5	8250	6600	1980
706T2F	56062710	9	15	101	13,0	9460	7565	2270
					15,3	9460	7565	2270
					18,1	9460	7565	2270
					22,7	9460	7565	2270
					26,4	9460	7565	2270
					28,4	9460	7565	2270
					33,1	9460	7565	2270
					38,1	9000	7200	2160
					46,5	9000	7200	2160
					56,3	9250	7400	2220
					72,5	8250	6600	1980
706T2F	56062770	8	15	67	13,0	8400	6700	2010
					15,3	8400	6700	2010
					18,1	8400	6700	2010
					22,7	8400	6700	2010
					26,4	8400	6700	2010
					28,4	8400	6700	2010
					33,1	8400	6700	2010
					38,1	8400	6700	2010
					46,5	8400	6700	2010
					56,3	8400	6700	2010
					72,5	8250	6600	1980
706T3RF	56071850	10	15	85	33,2	9680	7750	2325
					39,2	10300	8250	2475
					46,3	10750	8600	2580
					58,1	10750	8600	2580
					67,5	10750	8600	2580
					72,9	10750	8600	2580
					84,7	10750	8600	2580
					98,5	9000	7200	2160
					119,2	9000	7200	2160
					144,1	9250	7400	2220
706T3RF	56071840	9	15	101	33,2	9680	7750	2325
					39,2	10300	8250	2475
					46,3	10750	8600	2580
					58,1	10750	8600	2580
					67,5	10750	8600	2580
					72,9	10750	8600	2580
					84,7	10750	8600	2580
					98,5	9000	7200	2160
					119,2	9000	7200	2160
					144,1	9250	7400	2220

Type	Installation dwg	Pinion			Ratio	Design*) torque [Nm]	Working**) torque [Nm]	High cycle***) torque [Nm]
		m _n [mm]	z	b [mm]				
706T3RF	56071790	9	15	101	33,2	9460	7565	2270
					39,2	9460	7565	2270
					46,3	9460	7565	2270
					58,1	9460	7565	2270
					67,5	9460	7565	2270
					72,9	9460	7565	2270
					84,7	9460	7565	2270
					98,5	9000	7200	2160
					119,2	9000	7200	2160
					144,1	9250	7400	2220
706T3RF	56071860	8	15	67	33,2	8400	6700	2010
					39,2	8400	6700	2010
					46,3	8400	6700	2010
					58,1	8400	6700	2010
					67,5	8400	6700	2010
					72,9	8400	6700	2010
					84,7	8400	6700	2010
					98,5	8400	6700	2010
					119,2	8400	6700	2010
					144,1	8400	6700	2010

*) 1.000 load cycles corresponding to torque limitation

**) 100.000 load cycles corresponding to maximum torque during steering gear test

***) 5x10⁷ load cycles corresponding to course keeping/auto-pilot operation

Type Approval documentation

Tests carried out

None.

Other conditions

The following documents must follow the application for approval for each thruster installation:

- Installation drawing
- Datasheet for gear calculation for steering pinion & slewing gear, including actual data for both pinion and slewing ring.

Marking of product

Manufacturers name or trademark and type number identification.

Periodical assessment

For retention of the Type Approval, a DNV 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



Job Id: **262.1-008342-3**
Certificate No: **TAM0000194**

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