

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Reduction Gear for Diesel Propulsion

with type designation(s)
ZF 665

Issued to

ZF Padova s.r.l.
SELVAZZANO DENTRO PD, Italy

is found to comply with

Det Norske Veritas' Rules for Classification of Ships/High Speed and Light Craft

Application :

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

Input torque	See page 2
Input speed	See page 2
Reduction ratio	See page 2

This Certificate is valid until **2019-09-14**.

Issued at **Høvik** on **2015-09-15**

DNV GL local station: **Venice**

Approval Engineer: **Terje Sollie**

for **DNV GL**

Oddvar Deinboll
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

Standard marine reduction gear ZF 665 with cylindrical gears, built-in hydraulic clutch and reversing stage (1:1).

Application/Limitation

The following maximum ratings are approved according to DNV Rules for Ships and High Speed Light Craft:

Ratio	Ship – Light Duty			Ship – Medium Duty			Ship – Continuous Duty		
	kW	rpm _{IN}	Torque _{IN}	kW	rpm _{IN}	Torque _{IN}	kW	rpm _{IN}	Torque _{IN}
1,111	926	2600	3401	746	2400	2968	696	2400	2770
1,182	926	2600	3401	746	2400	2968	696	2400	2770
1,262	926	2600	3401	746	2400	2968	696	2400	2770
1,400	926	2600	3401	746	2400	2968	696	2400	2770
1,500	926	2600	3401	746	2400	2968	696	2400	2770
1,743	926	2600	3401	746	2400	2968	696	2400	2770
1,833	926	2600	3401	746	2400	2968	696	2400	2770
2,000	926	2600	3401	746	2400	2968	696	2400	2770
2,233	890	2600	3269	696	2400	2770	646	2400	2571
2,593	740	2600	2718	640	2400	2547	625	2400	2487
3,042	595	2600	2185	520	2400	2069	495	2400	1970

The following maximum ratings are approved for Class Notations Naval, Patrol, Yacht and Crew:

Ratio	Pleasure Duty			Light Duty		
	kW	rpm _{IN}	Torque _{IN}	kW	rpm _{IN}	Torque _{IN}
1,111	926	2600	3401	926	2600	3401
1,182	926	2600	3401	926	2600	3401
1,262	926	2600	3401	926	2600	3401
1,400	926	2600	3401	926	2600	3401
1,500	926	2600	3401	926	2600	3401
1,743	926	2600	3401	926	2600	3401
1,833	926	2600	3401	926	2600	3401
2,000	926	2600	3401	926	2600	3401
2,233	926	2600	3401	918	2600	3372
2,593	878	2600	3225	805	2600	2957
3,042	686	2600	2520	629	2600	2310

Ratio	Medium Duty			Continuous Duty		
	kW	rpm _{IN}	Torque _{IN}	kW	rpm _{IN}	Torque _{IN}
1,111	746	2400	2968	696	2400	2770
1,182	746	2400	2968	696	2400	2770
1,262	746	2400	2968	696	2400	2770
1,400	746	2400	2968	696	2400	2770
1,500	746	2400	2968	696	2400	2770
1,743	746	2400	2968	696	2400	2770
1,833	746	2400	2968	696	2400	2770
2,000	746	2400	2968	696	2400	2770
2,233	696	2400	2770	646	2400	2571
2,593	696	2400	2770	646	2400	2571
3,042	572	2400	2276	537	2400	2137

The different duties above are according to ZF specification.

Maximum application factor $K_A = 1,2$.



Job Id: **262.1-012627-3**
Certificate No: **TAM000001Y**

Minimum lubrication oil FZG load stage = 12.

Type Approval documentation

Other conditions

The following is not included in this Type Approval Certificate and has to be submitted for approval case-by-case (often yard supply):

- Connection to propeller shaft
- Fastening arrangement

Marking of product

Manufacturer's name or trademark, type designation and serial number.

Periodical assessment

For retention of the Type Approval, a DNV surveyor shall perform a survey every second year and before the expiry of this certificate to verify that the conditions for 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.



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END OF CERTIFICATE