



Certificate No. 02-004661/026417

TYPE APPROVAL CERTIFICATE

This is to certify that this product complies with the Rules for the classification of ships, Part 1 - General requirements, Chapter 3 - Type approval of products.

TYPE AND DESCRIPTION OF PRODUCT:

Marine Reduction Gearboxes for Diesel Propulsion type ZF 286 Family

MANUFACTURER:

ZF Padova S.r.l.
Via Penghe 48
35030 Caselle di Selvazzano (PD)
Italia

THE PRODUCT MEETS FOLLOWING RULES/REGULATIONS:

Rules for the Classification of Ships, Part 9-Machines

FURTHER DETAILS OF THE PRODUCT AND CONDITIONS FOR CERTIFICATION ARE GIVEN OVERLEAF.

APPROVAL IS VALID UNTIL: **2028-11-29**

Place and date: **Split, 2024-11-29**

Seal

Marinko Popović, dipl.ing.

NOTE: This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Croatian Register of Shipping of any modification or changes to the product in order to obtain a valid certificate.

DETAILED PRODUCT DESCRIPTION:

Marine reverse reduction gearboxes, models ZF286 (parallel offset), ZF 286 IV (V-angle) and ZF 286 A (down-angle gearbox), with built-in hydraulic actuated clutches with mechanical or electrical control.

APPLICATION / LIMITATIONS:

The approval status is based on application factor 1,30.

Continuous Duty*, multiple propulsion				
Model	Max. input power [kW] at 2400 rpm	Max. input speed [rpm]	Power Factor [kW/rpm]	Ratios
ZF 286	251	3300	0.1047	1.237:1, 1.400:1, 1.500:1, 1.966:1, 2.269:1
	230	3300	0.0959	0.923:1, 1.000:1, 2.481
	210	3300	0.0875	2.917:1
ZF 286 A	251	3300	0.1047	1.200:1, 1.333:1, 1.484:1, 1.750:1, 1.962:1
	217	3300	0.0906	2.208:1, 2.391:1, 2.500:1

*Reference is made to Manufacturer marine service classification definitions

Medium Duty*, multiple propulsion				
Model	Max. input power [kW] at 2800 rpm	Max. input speed [rpm]	Power Factor [kW/rpm]	Ratios
ZF 286	323	3300	0.1152	1.237:1, 1.400:1, 1.500:1, 1.966:1, 2.269:1
	295	3300	0.1053	0.923:1, 1.000:1, 2.481:1
	269	3300	0.0959	2.917:1
ZF 286 A	323	3300	0.1152	1.200:1, 1.333:1, 1.484:1, 1.750:1, 1.962:1
	304	3300	0.1086	2.208:1
	281	3300	0.1005	2,391:1, 2.500:1
ZF 286 IV	288	3300	0.1152	1.266:1, 1.535:1, 2.011:1
	272	3300	0.1086	2.322:1
	263	3300	0.1053	2.539:1

*Reference is made to Manufacturer marine service classification definitions

Light Duty*, multiple propulsion				
Model	Max. input power [kW] at 2800 rpm	Max. input speed [rpm]	Power Factor [kW/rpm]	Ratios
ZF 286	433	3300	0.1545	1.237:1, 1.400:1, 1.500:1, 1.966:1, 2.269:1
	417	3300	0.1491	0.923:1, 1.000:1
	384	3300	0.1372	2.481:1
	334	3300	0.1193	2.917:1
ZF 286 A	432	3300	0.1545	1.200:1, 1.333:1, 1.484:1, 1.750:1, 1.962:1
	397	3300	0.1417	2.208:1
	376	3300	0.1343	2,391:1
	355	3300	0.1268	2.500:1
ZF 286 IV	433	3300	0.2072	1.266:1, 1.535:1, 2.011:1
	397	3300	0.1900	2.322:1
	384	3300	0.1840	2.539:1

*Reference is made to Manufacturer marine service classification definitions

Pleasure Duty*, multiple propulsion				
Model	Max. input power [kW] at 3300 rpm	Max. input speed [rpm]	Power Factor [kW/rpm]	Ratios
ZF 286	566	3300	0.1715	1.237:1, 1.400:1, 1.500:1, 1.966:1,
	542	3300	0.1641	0.923:1, 1.000:1, 2.269:1, 2.269:1
	497	3300	0.1506	2.481:1
	428	3300	0.1297	2.917:1
ZF 286 A	566	3300	0.1715	1.200:1, 1.333:1, 1.484:1, 1.750:1, 1.962:1
	497	3300	0.1506	2.208:1
	485	3300	0.1471	2.391:1
	454	3300	0.1377	2.500:1
ZF 286 IV	566	3300	0.2300	1.266:1, 1.535:1, 2.011:1
	535	3300	0.2172	2.322:1
	492	3300	0.1999	2.539:1

*Reference is made to Manufacturer marine service classification definitions .

TYPE APPROVAL DOCUMENTATION:

Drawings and calculations approved by CRS with letters: 2975/026417 (2024-11-29)

MARKING OF PRODUCT:

- manufacturer's mark
- serial No.
- location and year of manufacturing
- CRS mark

CONDITIONS FOR CERTIFICATION:

Measuring devices, sensors and alarms shall be subject to CRS approval in each particular case and will depend on service applied and the degree of automation of the propulsion plant.

The manufacturer shall deliver bearings with sufficient capacity for the intended application consistent with the definition of service classification. Periodical replacements shall be carried out following the manufacturer's maintenance program.