



TITLE:
**SURVEY SOCIETY RATINGS FOR MGX-5114IV
 PER ASSEMBLY PX12510, MG-5114IV PER
 ASSEMBLY PX11920, MG-5114IV FREE
 STANDING PER ASSEMBLY PX12200**

SUBJECT:
MARINE TRANSMISSION

DRAFTED BY:
DV

CHECKED BY:
DV

APPROVED BY:
ALC

DATE:
7/22/2011

STANDARD NUMBER:
S928AU

WORKFLOW:
STDWF-5004

REVISION:
-

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I. BV APPROVED RATINGS

MODEL NO.	ASSEMBLY NO.	REV.	APPROVAL EXPIRATION DATE
MG-5114IV	PX11920	Q	8/27/2013
MG-5114IV (Free Standing)	PX12200	B	8/27/2013
MGX-5114IV	PX12510	A	8/27/2013

POWER RATINGS – kW (hp) TWIN DISC Continuous Duty (MCR) Main gear single or duplicate machinery according to BV Classification of Steel Ship and Classification/Certification of Yachts						
RATIO	1800 RPM	2100 RPM	2300 RPM	2500 RPM	2800 RPM	3000 RPM
1.05:1	347 (465)	387 (519)	418 (561)	451 (605)	498 (668)	532 (713)
1.23:1						
1.52:1						
1.80:1						
1.98:1	321 (430)	366 (491)	396 (531)	427 (573)	472 (633)	503 (675)
2.57:1						

POWER RATINGS – kW (hp) TWIN DISC Medium Duty Main gear single or duplicate machinery according to BV Classification of Steel Ship and Classification/Certification of Yachts						
RATIO	1800 RPM	2100 RPM	2300 RPM	2500 RPM	2800 RPM	3000 RPM
1.05:1	357 (479)	407 (546)	440 (590)	474 (636)	526 (705)	560 (751)
1.23:1						
1.52:1						
1.80:1						
1.98:1	338 (453)	385 (516)	417 (559)	449 (602)	498 (668)	530 (711)
2.57:1						

POWER RATINGS – kW (hp) TWIN DISC Intermediate Duty Main gear single or duplicate machinery according to BV Classification of Steel Ship and Classification/Certification of Yachts						
RATIO	1800 RPM	2100 RPM	2300 RPM	2500 RPM	2800 RPM	3000 RPM
1.05:1	404 (542)	466 (625)	504 (676)	543 (728)	603 (809)	643 (862)
1.23:1						
1.52:1						
1.80:1						
1.98:1	351 (471)	400 (536)	433 (581)	466 (625)	516 (692)	550 (738)
2.57:1						

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POWER RATINGS – kW (hp) TWIN DISC Light Duty Main gear duplicate machinery according to BV Classification of Steel Ship and main gear single or duplicate machinery according to BC Classification/Certification of Yachts						
RATIO	1800 RPM	2100 RPM	2300 RPM	2500 RPM	2800 RPM	3000 RPM
1.05:1	529 (709)	580 (777)	629 (843)	656 (880)	677 (908)	693 (929)
1.23:1						
1.52:1						
1.80:1						
1.98:1						
2.57:1	510 (684)	560 (751)	607 (814)	632 (848)	653 (876)	668 (896)

POWER RATINGS – kW (hp) TWIN DISC Pleasure Craft Duty Main gear single or duplicate machinery according to BV Classification and Certification of Yachts						
RATIO	1800 RPM	2100 RPM	2300 RPM	2500 RPM	2800 RPM	3000 RPM
1.05:1	539 (723)	621 (833)	673 (900)	701 (940)	724 (971)	742 (995)
1.23:1						
1.52:1						
1.80:1						
1.98:1						
2.57:1	510 (684)	560 (751)	642 (861)	677 (908)	698 (936)	716 (960)

- NOTES:
1. REFER TO PAGES 3-7 FOR BV SERVICE RESTRICTIONS
 2. ALL APPLICATIONS REQUIRING SURVEY SOCIETY APPROVED EQUIPMENT MEETING EITHER TYPE APPROVAL OR CERTIFICATE LEVEL STATUS MUST BE APPROVED BY TWIN DISC APPLICATION ENGINEERING.
 3. ALL APPLICATIONS REQUIRING SURVEY SOCIETY APPROVED EQUIPMENT MEETING EITHER TYPE APPROVAL OR CERTIFICATE LEVEL STATUS MUST BE APPROVED BY TWIN DISC APPLICATION ENGINEERING.

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MARINE DIVISION

Certificate number: 20443/A3 BV
File number: RED 23/36
Product code: 0353I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

TWIN DISC INTERNATIONAL S.A. / NIVELLES
Nivelles - BELGIUM

for the type of product

REDUCTION GEARS FOR DIESEL ENGINES

MGX - 5114-IV & MG - 5114-IV.

Requirements:
BUREAU VERITAS Rules for the Classification of Steel Ships.
BUREAU VERITAS Rules for the Classification and the Certification of Yachts.

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 27 Aug 2013

For BUREAU VERITAS,
At BV ANTWERP, on 13 Jul 2011,
Claude Calmeyn




This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the Internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

MGX - 5114-IV & MG - 5114-IV

Two steps reduction gear with reverse train (double hydraulic clutch).

MGX is with smooth trolling control.

Roller-Bearing for all shafts

Ve type angle 14°

Reduction Gear identification:

RED Number	Model	Reduction Ratio	Number of Teeth
RED 23/36/18 RED 23/36/23	MG-5114-IV MGX-5114-IV	1.05	37/38
		1.23	35/42
		1.52	31/46
		1.80	28/49
		1.98	26/50
		2.57	18/45

Transfer set number of teeth: 54/54

Intermediate set number of teeth: 37/38

Maximum input speed 3000 rpm.

- **Approved ratings for main gear single and duplicate machinery according to BUREAU VERITAS Rules for the Classification of Steel Ships and BUREAU VERITAS Rules for the Classification and the Certification of Yachts and as per TWIN DISC service classification as hereunder enclosed:**

TWIN DISC Continuous Duty (MCR):

For use in continuous operation with little or no variation in engine speed power settings Typical vessels include fishing trawlers, tow & tug boats & ocean going vessels.

1.05:1 ; 1.23:1 ; 1.52:1, 1.80:1, 1.98:1 ratios		2.57:1 ratio
347 kW (465 Hp) at 1800 rpm		321 kW (430 Hp) at 1800 rpm
387 kW (519 Hp) at 2100 rpm		366 kW (491 Hp) at 2100 rpm
418 kW (561 Hp) at 2300 rpm		396 kW (531 Hp) at 2300 rpm
451 kW (605 Hp) at 2500 rpm		427 kW (573 Hp) at 2500 rpm
498 kW (668 Hp) at 2800 rpm		472 kW (633 Hp) at 2800 rpm
532 kW (713 Hp) at 3000 rpm		503 kW (675Hp) at 3000 rpm

TWIN DISC Medium Duty:

Hour usage of up to 4000 hours/year with up to 80% of operating time at full engine power. This duty classification is for usage where some variations in engine speed/power occur as part of normal vessel operation

Typical vessels include mid-water trawlers, crew/supply boats, ferries and some inland water tow boats.

1.05:1 ; 1.23:1 ; 1.52:1, 1.80:1, 1.98:1 ratios		2.57:1 ratio
357 kW (479 Hp) at 1800 rpm		338 kW (453 Hp) at 1800 rpm
407 kW (546 Hp) at 2100 rpm		385 kW (516 Hp) at 2100 rpm
440 kW (590 Hp) at 2300 rpm		417 kW (559 Hp) at 2300 rpm
474 kW (636Hp) at 2500 rpm		449 kW (602 Hp) at 2500 rpm
526 kW (705 Hp) at 2800 rpm		498 kW (668 Hp) at 2800 rpm
560 kW (751Hp) at 3000 rpm		530 kW (711Hp) at 3000 rpm

TWIN DISC Intermediate Duty:

For hours usage up to 2000 hours per year with 50% of operating time at full engine rating.

Typical applications include planning hull vessel such as ferries, fishing boats, some crew boats, and also some displacement hull yachts as well as some bow and stern thruster applications

1.05:1 ; 1.23:1 ; 1.52:1, 1.80:1, 1.98:1 ratios		2.57:1 ratio
404 kW (542 Hp) at 1800 rpm		351 kW (471 Hp) at 1800 rpm
466 kW (625 Hp) at 2100 rpm		400 kW (536 Hp) at 2100 rpm
504 kW (676 Hp) at 2300 rpm		433 kW (581 Hp) at 2300 rpm
543 kW (728Hp) at 2500 rpm		466 kW (625 Hp) at 2500 rpm
603 kW (809 Hp) at 2800 rpm		516 kW (692 Hp) at 2800 rpm
643 kW (862Hp) at 3000 rpm		550 kW (738Hp) at 3000 rpm

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- Approved ratings for main gear duplicate machinery according to BUREAU VERITAS Rules for the Classification of Steel Ships and for main gear single and duplicate machinery according to BUREAU VERITAS Rules for the Classification and the Certification of Yachts and as per TWIN DISC service classification as hereunder enclosed:

TWIN DISC Light Duty:

1.05:1 ; 1.23:1 ; 1.52:1, 1.80:1 , 1.98:1 ratios	2.57:1 ratio
529 kW (709 Hp) at 1800 rpm	510 kW (684 Hp) at 1800 rpm
580 kW (777 Hp) at 2100 rpm	560 kW (751 Hp) at 2100 rpm
629 kW (843 Hp) at 2300 rpm	607 kW (814 Hp) at 2300 rpm
656 kW (880 Hp) at 2500 rpm	632 kW (848 Hp) at 2500 rpm
677 kW (908 Hp) at 2800 rpm	653 kW (876 Hp) at 2800 rpm
693 kW (929 Hp) at 3000 rpm	668 kW (896 Hp) at 3000 rpm

- Approved ratings for main gear single and duplicate machinery according to BUREAU VERITAS Rules for the Classification and the Certification of Yachts and as per TWIN DISC service classification as hereunder enclosed:

TWIN DISC Pleasure Craft Duty:

1.05:1 ; 1.23:1 ; 1.52:1, 1.80:1 , 1.98:1 ratios	2.57:1 ratio
539 kW (723 Hp) at 1800 rpm	510 kW (684 Hp) at 1800 rpm
621 kW (833 Hp) at 2100 rpm	560 kW (751 Hp) at 2100 rpm
673 kW (900 Hp) at 2300 rpm	642 kW (861 Hp) at 2300 rpm
701 kW (940 Hp) at 2500 rpm	677 kW (908 Hp) at 2500 rpm
724 kW (971 Hp) at 2800 rpm	698 kW (936 Hp) at 2800 rpm
742 kW (995 Hp) at 3000 rpm	716 kW (960 Hp) at 3000 rpm

- The above mentioned ratings do not apply for reduction-gears fitted on ships granted with an Ice Notation.

2. DOCUMENTS AND DRAWINGS :

Assembly drawings for	MGX-5114-IV	MG-5114-IV
Ass'y Drawing, Cross Section	PX-12510, Rev. A, 9 sh.	PX-11920, Rev. Q, 7 Sh. PX-12200, Rev b, 6 Sh. (free standing)
Hydraulic Diagram	P-12182-A, Rev-	A-7119-P, Rev-
Shaft Assembly, primary	PX-12442-B, Rev A	PX-11916-B, Rev-
Shaft, Primary	P-12442, Rev A	P-11916, Rev D
Gear Driving Transfer	P-11726, Rev C	P-9714, Rev C
Shaft Assembly, primary	PX-12442C, Rev A	PX-11916-C, Rev-
Shaft, Primary	P-12442, Rev A	P-11916, Rev D
Gear Driving Transfer,	P-11726-A, Rev B	P-9714-A, Rev A
Shaft Assembly, secondary	PX-12463, Rev A	PX-9971, Rev B
Shaft, secondary	P-12463, Rev A	P-9971, Rev B
Gear Driven Transfer	P-11795, Rev-	P-9789, Rev A
Shaft Assembly, secondary	PX-12463-A, Rev A	PX-9971-A, Rev B
Shaft, Secondary	P-12463, Rev A	P-9971 Rev B
Gear Driven Transfer	P-11795-A, Rev -	P-9789-A, Rev -

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Assembly drawing for MG-5114-IV , MGX-5114-IV & MG-5114-IV free standing

Hub Splined Ass'y	P-11919, Rev-
Primary Pinion Assembly, 37 teeth, 1.03:1 ratio	PX-10645, Rev.F
Pinion Primary, 37 teeth, 1.03:1 ratio	P-10645, Rev. C
Involute data	P-10645, Involute data
Secondary Pinion Assy', 37 teeth, 1.03:1 ratio	PX-10646, Rev.C
Secondary Pinion, 37 teeth, 1.03:1 ratio	P-10646, Rev. C
Involute data	P-10646, Involute data
Gear Intermediate, 38 teeth, 1.03:1 ratio	P-10647, Rev B.
Involute data	P-10647 Involute data
Shaft & Pinion, 1.05:1 ratio	P-10305, Rev B.
Gear Output, 1.05:1 ratio	P-11068, Rev. C
Involute Data of Gear Output 1.05:1 ratio	P-11068 Involute data
Shaft & Pinion, 1.23:1 ratio	P-10304A Rev. A
Gear Output, 1.23:1 ratio	P-11069 Rev. C
Involute Data of Gear Output 1.23:1 ratio	P-11069 Involute data
Shaft & Pinion, 1.52:1 ratio	P-11066 Rev.-
Gear Output, 1.52:1 ratio	P-11070 Rev. C
Involute Data of Gear Output 1.52:1 ratio	P-11070 Involute data
Shaft & Pinion, 1.80:1 ratio	P-11067 Rev.-
Gear Output, 1.80:1 ratio	P-11071 Rev. C
Involute Data of Gear Output 1.80:1 ratio	P-11071 Involute data
Shaft Pinion Intermediate, 1.98:1 ratio	P-11064, Rev -
Output Gear, 1.98:1 ratio	P-11072, Rev C
Involute data	P-11072 Involute data
Shaft Pinion Intermediate - 2.57:1 ratio	P-11065, Rev A
Output Gear, 2.57:1 ratio	P-11073, Rev C
Involute data	P-11073 Involute data
Output shaft	P-9928 Rev B
Output Flange	P-11524, Rev A
Companion Flange Ass'y	XB5917, Rev C
Flange Companion	B5917, Rev C
Bolt	M2008G, Rev D
Screw	M2026X, Rev B

Other materials and/or components:

The flexible pipes fitted on the gear box must be type approved.

3. TEST REPORTS :

Nil.

4. APPLICATION / LIMITATION :

These gear boxes may be fitted on ships granted with an automation notation provided that all the requirements stated in our Rules are complied with.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The Gearboxes are to be manufactured, examined and tested by **TWIN DISC INTERNATIONAL S.A. / NIVELLES** in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.

5.2 - Arrangements shall be made for a Society's Surveyor to attend the relevant tests and examinations at manufacturer's works or to perform the relevant audits when an alternative survey scheme (BV Mode I) has been agreed. Relevant Bureau Veritas certificate will be issued after satisfactory completion of the procedure.

5.3 - For information, the following production site has been declared by:

TWIN DISC INTERNATIONAL S.A. / NIVELLES
Chaussée de Namur, 54
B-1400 Nivelles
BELGIUM

5.4 - Inspection at workshops by the Society Surveyors as per BV Rules (see NR 266 - Section G2).

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5.5 - This Certificate applies to the naked gearbox. Each attached equipment must, if required by the Rules, be type approved or individually approved, and individually inspected at workshops according to the applicable Rules.

6. MARKING OF PRODUCT :

- Serial number.
- Rated power and speed.
- Gear ratio and teeth number.
- Date of workshop trial.
- Bureau Veritas' Marks.

7. OTHERS :

7.1 - It is understood that the herewith mentioned manufacturer will give the shipyards and related subcontractors all the relevant information for the proper fitting and uses of the product covered in this Type Approval Certificate. This information has to include the conditions stated in the Certificate.

It is also understood that Bureau Veritas remains rightfully entitled to perform any check or test on the product at any time.

7.2 - This Certificate supersedes the Type Approval Certificate N° 20443/A2 BV issued on 18 Feb. 2010 by the Society.

*** END OF CERTIFICATE ***

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