



TITLE:
**SURVEY SOCIETY RATINGS FOR MG-5135A,
 MGX-5135A, MG-5135RV AND MGX-5135RV**

DRAFTED BY:
TLH

STANDARD NUMBER:
S928BE

CHECKED BY:
DV

WORKFLOW:
ECNWF-50198

APPROVED BY:
ALC

REVISION:
A

SUBJECT:
MARINE TRANSMISSION

DATE:
12/6/2012

PAGE:
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I. LR APPROVED RATINGS:

MODEL NO.	ASSEMBLY NO.	REV.	APPROVAL EXPIRATION DATE
MG-5135A	PX11380	H	6/25/2013
MGX-5135A	PX11740	P	
MG-5135RV	PX11945	N	
MGX-5135RV	PX11880	T	
MGX-5135RV	PX11880A	F	
MGX-5135RV	PX12520	B	


POWER RATINGS – kW				
All ratings are for Maximum Continuous Ratings				
RATIO	1200 rpm	1600 rpm	1800 rpm	2100 rpm
2.52:1	308	410	445	497
2.00:1				
1.79:1				
1.53:1				
1.25:1				
1.16:1				

POWER RATINGS – kW				
All ratings are for Medium Ratings				
RATIO	1200 rpm	1600 rpm	1800 rpm	2100 rpm
2.52:1	335	447	485	542
2.00:1				
1.79:1				
1.53:1				
1.25:1				
1.16:1				

POWER RATINGS – kW			
All ratings are for Intermediate Duty Ratings			
RATIO	1900 rpm	2100 rpm	2300 rpm
2.52:1	540	560	600
2.00:1			
1.79:1			
1.53:1			
1.25:1			
1.16:1			

POWER RATINGS – kW			
All ratings are for Light Duty Ratings			
RATIO	2100 rpm	2300 rpm	2500 rpm
2.52:1	663	716	768
2.00:1	704	746	788
1.79:1			
1.53:1			
1.25:1			
1.16:1			

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POWER RATINGS – kW			
All ratings are for Pleasure Craft Duty Ratings			
RATIO	2100 rpm	2300 rpm	2500 rpm
2.52:1	734	820	890
2.00:1	817	895	973
1.79:1			
1.53:1			
1.25:1			
1.16:1			

- NOTES:
1. REFER TO PAGES 3-9 FOR LR APPROVED RATINGS
 2. REFER TO THE TWIN DISC MARINE TRANSMISSION CAPACITY TABLES FOR TWIN DISC APPLICATION LIMITATIONS.
 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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 Issue number **2**
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Marine Design Appraisal Document

Lloyd's Register EMEA
 Engineering Systems
 71, Fenchurch Street
 London
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Date
10 January 2012

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MACHINERY GENERAL DESIGN APPROVAL Reduction Gearing

This Design Appraisal Document Supersedes and replaces ENG 134442 Issue 1 and dated 25 June 2008
Valid Until 25 June 2013

1. The documents listed in the appendix have been examined for compliance with Lloyd's Register's Rules and Regulations for the Classification of Ships (2007) Part 5, Chapter 5 and Special Service Craft Volume 7, Part 11, Chapter 1 and have been assigned an appraisal status as indicated subject to the following conditions:

2. Machinery

Manufacturer & Type Designation	Twin Disc MG-5135-A, MGX-5135-A MG-5135-RV, & MGX-5135-RV
Machinery Ice Class Notation	None
Input Coupling Type	Flexible Coupling

3. System Details

Shafts	Diameter, mm		Material	Min UTS, N/mm ²
	OD	ID		
Input	60.10	0	50CrMo4	800
Secondary	60.10	0	50CrMo4	800
Output	82.55	0	42CrMo4	800

4. Gear Elements

Grade (ISO 1328), Q	5
Surface Treatment of Gears	Carburized & Ground
Tooth Surface Roughness (CLA) flank, μ m	0.50
Tooth Surface Roughness (CLA) root, μ m	2.50

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(gear elements continued)

Ratio	Element	No. of Teeth	Surface Treatment	Material	Min UTS (Core), N/mm ²
Transfer	Pinion	45	Carburised	8620H	750
	Wheel	45	Carburised	8620H	750
1.16	Pinion	38	Carburised	8620H	750
	Wheel	44	Carburised	8620H	750
1.25	Pinion	36	Carburised	8620H	750
	Wheel	45	Carburised	8620H	750
1.53	Pinion	32	Carburised	8620H	750
	Wheel	49	Carburised	8620H	750
1.79	Pinion	29	Carburised	8620H	750
	Wheel	52	Carburised	8620H	750
2.00	Pinion	27	Carburised	8620H	750
	Wheel	54	Carburised	8620H	750
2.52	Pinion	23	Carburised	8620H	750
	Wheel	58	Carburised	8620H	750

5. Ratings

Duty	Continuous	Medium	Intermediate
Gear Ratios	1:1, 1.16:1, 1.25:1, 1.53:1, 1.79:1, 2.00:1, 2.52:1		
Rating	308 kW @ 1200 rpm 410 kW @ 1600 rpm 445 kW @ 1800 rpm	355 kW @ 1200 rpm 447 kW @ 1600 rpm 485 kW @ 1800 rpm	540 kW @ 1900 rpm 560 kW @ 2100 rpm 600 kW @ 2300 rpm
Duty	Light	Pleasure Craft	
Gear Ratios	1:1, 1.16:1, 1.25:1, 1.53:1, 1.79:1, 2.00:1		
Rating	704 kW @ 2100 rpm 746 kW @ 2300 rpm 788 kW @ 2500 rpm	817 kW @ 2100 rpm 895 kW @ 2300 rpm 973 kW @ 2500 rpm	

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(Ratings continued)

Duty	Light	Pleasure Craft
Gear Ratio	2.52:1	
Rating	663 kW @ 2100 rpm 716 kW @ 2300 rpm 768 kW @ 2500 rpm	734 kW @ 2100 rpm 820 kW @ 2300 rpm 890 kW @ 2500 rpm

6. Conditions of Approval

- 6.1 The approval is conditional upon the gear set being manufactured and tested in accordance with the requirements of Part 5, Chapter 5, Sections 4 and 5 of the Rules for Ships or Part 11, Chapter 1 of the Rules for Special Service Craft.
- 6.2 The approval is conditional upon the vibration aspects of the complete dynamic installation being found to be acceptable in accordance with the requirements of Part 5, Chapter 8 of the Rules for Ships or Volume 7, Part 13, Chapter 1 of the Rules for Special Service Craft.
- 6.3 The approval is based upon the application of tip relief and end relief.
- 6.4 The intermediate gear is to be pushed up until the gear face is flush with the shaft shoulder.
- 6.5 The output gear is to be pushed up to the shaft shoulder.
- 6.6 The coupling flanges are not covered by this approval.
- 6.7 Hydraulic piping systems are to be in accordance with the requirements of Part 5, Chapters 12 and 14 of the Rules for Ships or Volume 7, Part 15 Chapter 1 of the Special Service Craft Rules as applicable, to the satisfaction of the attending surveyors.
- 6.8 Approval of the piping system is subject to it being manufactured, installed & tested in accordance with the remaining requirements of the Rules to the attending Surveyor's satisfaction.
- 6.9 The gearbox is to operate satisfactorily under the conditions of heel and trim as detailed in Part 5, Chapter 1, Section 3.6. of the Rules for Ships and Volume 7, Part 9, Chapter 1, Section 4.2 of the Rules for Special Service Craft.
- 6.10 The flash point of the lubricating oil used is to be not less than 60°C.
- 6.11 When installed on LR classed vessels a standby lubricating oil pump arrangement should be provided in accordance with Part 5, Chapter 14, Section 8.2.3 of the Rules for Ships and Volume 7, Part 11, Chapter 1, Section 5.2 of the Rules for Special Service Craft.
- 6.12 If capable of developing a pressure exceeding the system design pressure, oil pumps are to be fitted with relief valves in closed circuit or otherwise protected from low or no flow conditions.
- 6.13 In accordance with Volume 7, Part 11, Chapter 1, Section 5.3.1 of the Special Service Craft Rules lubricating oil filters are to be provided and are to be capable of being cleaned without stopping the gear set or reducing the supply of filtered oil to the gearing.
- 6.14 Independently driven lubricating oil pumps are to be capable of being stopped from outside the gearbox compartment as per Part 5, Chapter 14, Section 4.2 of the Rules for Ships or Volume 7, Part 15, Chapter 3, Section 4.5

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of the Special Service Craft Rules and are to be fitted with isolating valves as per Part 5, Chapter 14 Sections 4.4 2 of the Rules for Ships or Volume 7, Part 15, Chapter 3, Section 4.7 of the Special Service Craft Rules.

6.15 Clutches for single engine propulsion plants are to be provided with a suitable means for emergency operation in the event of loss of operating fluid systems. Their suitability for short term high power operation is to be demonstrated, Volume 7, Part 11, Chapter 2, Section 1.3 of the Special Service Craft Rules refers.

6.16 It is noted that at the maximum continuous rating certain bearings within the gearbox will have a basic rating (L_{10}) life of less than 30 000 hours. This is the usual life LR would expect based on service intervals. Acceptance of the gear design is therefore based on bearing monitoring and replacement being carried out in accordance with the gear manufacturer's recommendations, derived from satisfactory service experience for the particular application, and the owner is to be advised accordingly.

7. General Comments

7.1 None.

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Appendix

1. The documents listed below have been examined

Drawing Number	Rev:	Title:	Appraisal Status:	Date:
PX-11380 (8 Sheets)	H	Assembly Drawing (MG-5135-A)	SI	20/09/2004
PX-11740 (6 Sheets)	P	Assembly Drawing (MGX-5135-A)	SI	20/09/2004
P-11735	-	Hydraulic Diagram	SI	20/09/2004
P-12182	-	Hydraulic Diagram	SI	20/09/2004
P-12182A	-	MGX Hydraulic Diagram	SI	25/06/2008
1016217	-	Vulkardan Coupling(14" Flywheel)	SI	20/09/2004
1016215	-	Vulkardan Coupling(11.5" Flywheel)	SI	20/09/2004
P-11356	A	Hub, Splined Input	A	20/09/2004
PX-11946	B	Shaft Assembly, Primary	SI	25/06/2008
P-11946	E	Shaft ,Primary	A	25/06/2008
P-11716	C	Primary Gear Transfer	AI	25/06/2008
P-11716-A	-	Primary Gear, Transfer	A	25/06/2008
PX-11724	B	Shaft Assembly, Secondary	SI	25/06/2008
P-11720	H	Shaft, Secondary	A	25/06/2008
P-11717	D	Secondary Gear Transfer	A	25/06/2008
P-11717-A	-	Secondary Gear Transfer	A	25/06/2008
PX-11335	-	Shaft Assembly, Primary	SI	20/09/2004
P-11335	E	Shaft , Primary	A	20/09/2004
P-11336	-	Primary Gear Transfer	A	20/09/2004
PX-11355	A	Shaft Assembly, Secondary	SI	20/09/2004
P-11355	A	Shaft, Secondary	A	20/09/2004
P-11342	C	Secondary Gear Transfer	A	20/09/2004
PX-11365	E	Pinion Primary & Bushing Assy	SI	20/09/2004
P-11365	E	Pinion Primary, 1.25:1 Ratio	A	25/06/2008
PX-11416	E	Pinion Secondary & Bushing Assy	SI	20/09/2004
P-11416	E	Pinion Secondary 1.25: Ratio	A	25/06/2008
P-11417	D6	Output Gear, 1.25: Ratio	A	20/09/2004
PX-11418	E	Pinion Primary & Bushing Assy	SI	20/09/2004
P-11418	E	Pinion Primary, 1.53:1 Ratio	A	25/06/2008
PX-11419	E	Pinion Secondary & Bushing Assy	SI	20/09/2004
P-11419	E	Pinion Secondary, 1.53:1 Ratio	A	25/06/2008
P-11420	E	Output Gear, 1.53:1 Ratio	A	25/06/2008
PX-11421	D	Pinion Primary & Bushing Assy	SI	20/09/2004

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P-11421	D	Pinion Primary, 1.79:1 Ratio	A	25/06/2008
PX-11422	E	Pinion Secondary & Bushing Assy	SI	25/06/2008
P-11422	D	Pinion Secondary, 1.79:1 Ratio	A	25/06/2008
P-11423	E	Output Gear, 1.79:1 Ratio	A	20/09/2004
PX-11426	D	Pinion Primary & Bushing Assy	SI	20/09/2004
P-11426	E	Pinion Primary, 2.00:1 Ratio	A	25/06/2008
PX-11427	E	Pinion Secondary & Bushing Assy	SI	20/09/2004
P-11427	F	Pinion Secondary, 2.00:1 Ratio	A	25/06/2008
P-11428	F	Output Gear, 2.00:1 Ratio	A	20/09/2004
PX-11431	C	Pinion Primary & Hub Assy	SI	25/06/2008
P-11429	D	Pinion Primary, 2.52:1 Ratio	A	25/06/2008
PX-11429	F	Pinion Primary & Bushing Assy	SI	25/06/2008
P-11433	H	Output Gear, 2.52:1 Ratio	A	25/06/2008
P-11432	F	Pinion Secondary, 2.52:1 Ratio	A	25/06/2008
PX-11432	F	Pinion Secondary & Bushing Assy	SI	25/06/2008
P-11353	B	Shaft, Output	A	20/09/2004
PX-11471	A	Flange Companion Assy	SI	20/09/2004
P-11359	G	Flange, Output	A	20/09/2004
P-12101	-	Flange Companion	SI	20/09/2004
M2008H	-	Hex. Head Cap Screw	SI	20/09/2004
M2026X	-	Hex. Nut	SI	20/09/2004
1002496	-	Tap'd Roller Bearing, Pri./Sec. Eng Side	SI	20/09/2004
M2026W-M2026AR	B	Locknut	SI	25/06/2008
M2008A	D	Hex. Head Cap Screw	SI	25/06/2008
PM-11445	A	Tap'd Roller Bearing, Pri. Prop.Side	SI	20/09/2004
PM-11446	-	Tap'd Roller Bearing, Sec. Prop.Side	SI	20/09/2004
1003788	-	Roller Bearing, Output Shaft,Eng.Side	SI	20/09/2004
PM-11448	A	Tap'd Roller Bearing, Output Shaft. Prop.Side	SI	20/09/2004
PX-11945 (5 Sheets)	N	Assembly Drawing MG-5135 RV	SI	25/06/2008
P11735	-	Hydraulic Diagram	SI	25/06/2008
PX-11944	A	Shaft Assembly Primary	SI	25/06/2008
P-11944	C	Shaft Primary	A	25/06/2008
P-11336	A	Primary Gear Transfer	A	25/06/2008
PX-11355-A	-	Shaft Assembly Secondary	SI	25/06/2008

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P-11355-A	B	Shaft Secondary	A	25/06/2008
P-11342	A	Secondary Gear Transfer	A	25/06/2008
PX-11880 (4 Sheets)	T	Assembly Drawing MGX-5135 RV	SI	25/06/2008
PX-11880-A (3 Sheets)	F	MGX-5135-RV Assembly Drawing	SI	25/06/2008
P-12182	-	Hydraulic Diagram	SI	25/06/2008
PX-12520 (5Sheets)	B	Assembly Drawing MGX-5135-RV	SI	25/06/2008
P-12182-A	-	Hydraulic Diagram	SI	25/06/2008
PX-12521	A	Shaft Assembly Primary	SI	25/06/2008
P-12521	A	Shaft Primary	A	25/06/2008
P-11716	C	Primary Gear Transfer	A	25/06/2008
PX-12389	A	Shaft Assembly Secondary	SI	25/06/2008
P-12389	B	Shaft Secondary	A	25/06/2008
P-11717	D	Secondary Gear Transfer	A	25/06/2008
PX-12382	A	Pinion Primary & Bushing Assembly i=1.16	SI	25/06/2008
P-12382	B	Pinion Primary i=1.16	A	25/06/2008
PX-12383	B	Pinion Secondary & Bushing Assembly i=1.16	SI	25/06/2008
P-12383	B	Pinion Secondary i=1.16	A	25/06/2008
P-12384	C	Output Gear i=1.16	A	25/06/2008
PM-11261-B	-	Heat Exchanger	SI	25/06/2008
PM-11261-A	A	Heat Exchanger	SI	25/06/2008
P-11949	A	Input Flange	SI	25/06/2008

Appraisal Status Key


- A Approved - provided the arrangements are to the surveyor's satisfaction
- SI Retained as supporting documentation for information only

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

Lloyd's Register EMEA
 is a member of the Lloyd's Register Group

Form 6438MARREF (2010.11)

REVISION	WORKFLOW	DATE	REVISION	WORKFLOW	DATE
1	A	12/6/2012	6		
2	ECNWF-50198	12/6/2012	7		
3	-	1/31/2012	8		
4	STDWF-5009		9		
5			10		

	TITLE: SURVEY SOCIETY RATINGS FOR MG-5135A, MGX-5135A, MG-5135RV AND MGX-5135RV	DRAFTED BY: TLH	STANDARD NUMBER: S928BE
		CHECKED BY: DV	WORKFLOW: ECNWF-50198
		APPROVED BY: ALC	REVISION: A
	SUBJECT: MARINE TRANSMISSION	DATE: 12/6/2012	PAGE: 10 OF 12
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IV. RMRS APPROVED RATING:

MODEL NO.	ASSEMBLY NO.	REV.	APPROVAL EXPIRATION DATE
MGX-5135A	PX12380	E	02/03/2015

RATIO	POWER RATING – kW						
	Maximum Continuous Ratings						
	1600 rpm	1800 rpm	1900 rpm	2100 rpm	2300 rpm	2500 rpm	2800 rpm
1.79:1	410	445	462	497	532	567	619

- NOTES:
- REFER TO PAGES 11-12 FOR RMRS SERVICE RESTRICTIONS
 - REFER TO THE TWIN DISC MARINE TRANSMISSION CAPACITY TABLES FOR TWIN DISC APPLICATION LIMITATIONS.
 - 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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12/6/2012

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РОССИЙСКИЙ МОРСКОЙ РЕГИСТР СУДОХОДСТВА
 RUSSIAN MARITIME REGISTER OF SHIPPING

6.8.3



**СВИДЕТЕЛЬСТВО О ТИПОВОМ ОДОБРЕНИИ
 TYPE APPROVAL CERTIFICATE**

Изготовитель
 Manufacturer **TWIN DISC INTERNATIONAL S.A.**

Адрес
 Address **54, Chaussee de Namur, Nivelles, B-1400 BELGIUM**

Изделие*
 Product*
**Передачи главных механизмов (реверсивно-редукторные) типов MGX-5135-A, MGX-5135-SC
 Main machinery reverse-reduction gear (transmission) types MGX-5135-A, MGX-5135-SC**

Код номенклатуры
 Code of nomenclature **09060000**

На основании освидетельствования и проведенных испытаний удостоверяется, что выше-упомянутое(ые) изделие(я) удовлетворяет(ют) требованиям Российского морского регистра судоходства.
 This is to certify that on the basis of the survey and tests carried out the above mentioned item(s) complies(ly) with the requirements of Russian Maritime Register of Shipping.

**Часть IX "Механизмы" Правил классификации и постройки морских судов РС, изд. 2008.
 Part IX "Machinery" of RS Rules for the Classification and Construction of Sea-Going Ships, edition 2008.**

Настоящее Свидетельство о типовом одобрении действительно до **03.02.2015**
 This Type Approval Certificate is valid until

Настоящее Свидетельство о типовом одобрении теряет силу в случаях, установленных в Правилах технического наблюдения за постройкой судов и изготовлением материалов и изделий для судов.
 This Type Approval Certificate becomes invalid in cases stipulated in Rules for the Technical Supervision during Construction of Ships and Manufacture of Shipboard Materials and Products.

Дата выдачи
 Date of issue **03.02.2010** № **10.00001.253**

Российский морской регистр судоходства
 Russian Maritime Register of Shipping
 (подпись)
 signature



Бакума В.В. / V. Bakuma
 (фамилия, инициалы)
 name

*Дополнительную информацию см. на обороте.
 Additional information see overleaf.

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MGX-5135A, MG-5135RV AND MGX-5135RV**

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TLH

STANDARD NUMBER:
S928BE

CHECKED BY:
DV

WORKFLOW:
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APPROVED BY:
ALC

REVISION:
A

SUBJECT:
MARINE TRANSMISSION

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12/6/2012

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Технические данные
Technical data

*Передача главных механизмов (реверсивно-редукторная) типа MGX-5135-A со следующими характеристиками:
Main machinery reverse-reduction gear type MGX-5135-A with the following ratings:*

*Передачное отношение / Ratio : 1.79 : 1
Мощность (постоянное нагружение) при частоте вращения на входном валу 1800 об/мин /
Continuous duty rated power at 1800 rpm : 445 kW
Ограничения скорости на входном валу (об/мин) / Input speed limits (rpm) : 450 min / 2800 max*

*Передача главных механизмов (реверсивно-редукторная) типа MGX-5135-SC со следующими характеристиками:
Main machinery reverse-reduction gear type MGX-5135-SC with the following ratings:*

*Передачное отношение / Ratio : 2.04 : 1
Мощность (постоянное нагружение) при частоте вращения на входном валу 1800 об/мин /
Continuous duty rated power at 1800 rpm : 445 kW
Ограничения скорости на входном валу (об/мин) / Input speed limits (rpm) : 450 min / 2800 max*

Техническая документация и дата ее одобрения Российским морским регистром судоходства
Technical documentation and the date of its approval by Russian Maritime Register of Shipping

*Техническая документация одобрена Главным Управлением РС письмом No.009-6.9.4.2-35733 от 14.12.2009.
Technical documentation has been approved by RS Head Office with letter No.009-6.9.4.2-35733 dated 14.12.2009.*

Образец изделия испытан под техническим наблюдением Российского морского регистра судоходства.
Product's specimen has been tested under the technical supervision of Russian Maritime Register of Shipping.

Акт № 10.00014.253 от 03.02.2010
Report No. of

Область применения и ограничения
Application and limitations

*Для установок судов морского и смешанного (река-море) плавания.
Для судов ограниченного района плавания (R1, R2, R3).
Примечание: Для судов со знаками ледового усиления в символе класса максимально-допустимый момент должен быть уменьшен с учетом требования п.4.2.3.2 части IX Правил классификации и постройки морских судов, изд. 2008.*

*For installations of Sea-Going and Sea-River navigation ships.
For the ships of restricted areas of navigation (R1, R2, R3).
Note: The maximal torque is to be reduced in accordance with the requirement of item 4.2.3.2 Part IX of RS Rules for the Classification and Construction of Sea-Going Ships, edition 2008 for the ships with ice-mark in Class notation.*

Вид документа, выдаваемого на изделие
Type of document issued for product

*Изделие должно поставляться с копией настоящего Свидетельства о типовом одобрении и Свидетельством РС формы 6.5.30 / 6.5.31.
The product should be delivered with a copy of this Type Approval Certificate and with RS unit Certificate form 6.5.30/6.5.31.*

01/2010

10.0001.253

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