DNV·GL

Certificate No:
TAM00000TW

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hydraulic Rudder Actuator for Steering Gear

with type designation(s)
SR742, SR743

Issued to
Rolls-Royce Marine AS
BRATTVÅG, Norway

is found to comply with
DNV GL rules for classification – Ships
DNV GL rules for classification – High speed and light craft

Application :

Can be used for all steering gears which according to current rules may be provided with single rudder actuator, including compliance with Appendix A.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2018-01-01**
This Certificate is valid until **2022-12-31**.
DNV GL local station: **Ålesund**

Approval Engineer: **Svein-Olav Hannevik**

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.

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Job Id: **262.1-016162-2**
Certificate No: **TAM00000TW**

Product description
Type of actuator: Hydraulic rotary vane

Application/Limitation
Approval cover hydraulic actuator, hydraulic system and fitting to rudderstock.

	SR742 2x(35°, 45° or 70°)			SR743 2x(35° or 43°)		Unit
Number of vanes	2			3		-
Max design pressure	156			156		bar
Max safety valve set	156			156		bar
Max working pressure	125			125		bar
Test pressure	234			234		bar
Max design torque	541			812.5		kNm
Max working torque	433			650		kNm
Max rule rudder torque	541			812.5		kNm
Max rudder stock Ø	395			395		mm
Min rudder stock Ø [1]	273			313		mm
Max rudder angle	35	45	70	35	43	deg
Upper/lower housing [2]						
Min. tensile strength	490			490		N/mm^2
Min. yield strength	300			300		N/mm^2
Min. elongation	12			12		%
Rotor						
Min. tensile strength	420			420		N/mm^2
Min. yield strength	325			325		N/mm^2
Min. elongation	12			12		%
Max radial force	1400			1400		kN
Max axial force	480			480		kN
Standard pull-up distance [3]						
Rudder stock diameter = 340 mm	30.5			30.5		mm
Rudder stock diameter = 360 mm	29.6			29.6		mm
Rudder stock diameter = 395 mm	27.0			27.0		mm

1. Based on rudder stock material with yeld strength of 235 N/mm2. Note that rudder stock – steering gear friction coupling may be limiting.
2. For non-duplicated rudder actuators for oil, chemical and liquefied gas carriers of 10 000 gross tonnage and upwards, but less than 100 000 tdw (Pt.4 Ch.10 Appendix A), Magnetic particle testing (MT) is required for all machined surfaces of the housing.
3. For standard rudder stock diameters, connection to rudderstock is included in the type approval. Pull-up distance is specified from the point where the initial clearance is closed. For other rudder stock diameters, connection to rudder stock is subject to case-by-case approval.

Type Approval documentation

Marking of product
The product is to be marked with the menufacturer's name or trademark and type number identification

Periodical assessment
For retention of the Type Approval, a DNV GL 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.

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.

Other conditions
A steering test is to be carried out under normal working conditions to demonstrate compliance with requirements in Pt.4 Ch.10 Sec.1 [9].

For approval of the complete steering gear the following shall be submitted case-by-case:

- Technical data sheet
- Pump capacity and relief valve capacity
- Hydraulic diagram with list of alarms and set points
- Arrangement drawing of steering gear
- Mounting and operation instructions to follow each delivery

- Operation instructions for all operation modes including local control (Yard supply)
- Foundation and mounting arrangement, including bolting and chocking calculations (Yard supply)
- Arrangement of steering gear compartment (Yard supply)

END OF CERTIFICATE