

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hydraulic Actuator for Valve (Not Hydraulic Motor)

with type designation(s)
RA2, RB2, RC2, RD2

Issued to

Scana Skarpenord AS
RJUKAN, Norway

is found to comply with

Det Norske Veritas' Rules for Classification of Ships

Application :

The actuator may be used on valves that have up to 90° rotation. On the condition of appropriate corrosion protection, the actuators may be used in the following areas: On deck, in tanks, pump room, duct keel, engine rooms.

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

Design. press./Torque 75- 220 bar/ 125- 64 000 Nm (Dep. configuration, see cert.)

This Certificate is valid until **2021-12-31**.

Issued at **Høvik** on **2017-01-25**

DNV GL local station: **Sandefjord**

for **DNV GL**

Approval Engineer: **Ole Osuldsen**

Marianne Spæren Marveng
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

Double acting hydraulic actuators for quarter turn valves.

Type:

- RA2 : Mechanically locked end positions.
- RB2 : Adjustable end positions ($\pm 2^\circ$)
- RC2 : Mechanically locked end positions.
De-clutchable hand wheel for manual operation.
- RD2 : Adjustable end positions ($\pm 2^\circ$)
De-clutchable hand wheel for manual operation.

For each actuator size, there are 9 different cylinder sizes in order to tailor-make the actuators for different working pressures thus torque:

Cylinder Type :	H1	H2	H3	H4	H5	H6	H7	H8	H9
Max. Pressure :	225 bar	185 bar	160 bar	135 bar	110 bar	90 bar	80 bar	70 bar	55 bar

Size 05

Cylinder drawing

DW82040 H1 Cylinder
DW90220 H5 Cylinder
DW90301 H7 Cylinder
DW94863 H8 Cylinder

Size 07

Cylinder drawing

DW82041 H1 Cylinder
DW90302 H5 Cylinder
DW88087 H7 Cylinder
DW94342 H9 Cylinder

Size 10

Cylinder drawing

DW82042 H1 Cylinder
DW90303 H5 Cylinder
DW88077 H7 Cylinder
DW94381 H9 Cylinder

Size 12

Cylinder drawing

DW82043 H1 Cylinder
DW87085 H4 Cylinder
DW90304 H5 Cylinder
DW88132 H7 Cylinder
DW94347 H9 Cylinder

Size 14

Cylinder drawing

DW82044 H1 Cylinder
DW90306 H3 Cylinder
DW90305 H5 Cylinder
DW88133 H7 Cylinder

Cylinder drawing

DW82045 H1 Cylinder
DW88571 H3 Cylinder
DW84926 H4 Cylinder
DW85002 H5 Cylinder
DW84293 H6 Cylinder
DW88367 H7 Cylinder
DW88368 H8 Cylinder

Size 16

Cylinder drawing

DW82046 H1 Cylinder
DW88696 H3 Cylinder
DW84729 H4 Cylinder
DW84751 H5 Cylinder
DW90627 H7 Cylinder
DW93964 H9 Cylinder

Size 25

Size 30

Cylinder drawing

DW82047 H1 Cylinder
DW87690 H3 Cylinder
DW84734 H4 Cylinder
DW84514 H5 Cylinder
DW90651 H7 Cylinder

Cylinder drawing

4F74059 H1 Cylinder
DW89581 H3 Cylinder
DW87243 H4 Cylinder
DW84475 H5 Cylinder
DW90867 H7 Cylinder

Size 35

Cylinder drawing

4F74063 H1 Cylinder
DW86005 H3 Cylinder
DW95245 H4 Cylinder
DW95204 H5 Cylinder

Size 40

Mounting dimensions in accordance with ISO 5211.

Application/Limitation

The maximum output torque from actuators used on butterfly valves must not exceed the limit at which the valve spindle or disc can be damaged if the disc is restrained in any position.

Actuators used on remote controlled ship side valves are to have indicators, which will function satisfactory, even if the actuators accidentally should be submerged in water.

Each actuator to be hydraulically pressure tested to 1,5 times the maximum design pressure. The test pressure need not be higher than 70 bar above maximum working pressure.

- The Cast nodular iron cylinders have temperature limitation ; 0 Deg C to 85 Deg C.
 - Actuators with ferritic type of nodular cast iron pressure containing components may only be used as class II & III piping systems (Ref;DNV GL Rules for Ship Pt 4 Ch 6 Sec 1 (1.5)).

Each product is to be accompanied by the following documents:

- Product certificate prepared by the manufacturer (3.1).
- Work's certificate for the materials used in the pressure exposed parts, indicating mechanical and chemical properties and heat treatment.
- Instruction manual/specification sheet.

Type Approval documentation

Marking of product

- Manufacturers name or trade mark
- Type designation

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey - every second year and before the expiry date of this certificate - to verify that the conditions for the type approval are complied with.