

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Hydraulic Actuator for Valve (Not Hydraulic Motor)**

with type designation(s)

HQ10, HQ25, HQ50, HQ100, HQ200, HQ400, HQ800 and HQ1600

Issued to

KSB Seil Co., Ltd.**Busan 11, Republic of Korea**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Dsgn. press./Torque 160 bar / 219 - 55251 Nm (see cert.)**Issued at **Høvik** on **2017-10-26**This Certificate is valid until **2022-06-30**.DNV GL local station: **Gimhae Station**for **DNV GL**Approval Engineer: **Mehdi Rowshan**

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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.
Rack and pinion type HQ10- HQ200.
Scotch yoke type HQ400-HQ1600.

Materials:

Item	Material	Grade acc. JIS
Housing and Cylinder	nodular cast iron	FCD 450 or ASTM A536
	nodular cast iron	FCD 350-22L
Rack and pinion	stainless steel	SUS 304 (see limitations) SCM 440
O-rings and sealings	NBR, Viton	
Sealings	Urethane, NBR for low temp.	

Application/Limitation

Temperature range: -45°C to 100 °C for material FCD 350-22L
-20°C to 100 °C for materials FCD 450 or ASTM A536

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. At maximum allowable working pressure of 160 bar, the corresponding maximum torque is:

Type	Torque	Type	Torque
HQ10	219 Nm	HQ200	4832 (4310 for Arctic) Nm
HQ25	597 Nm	HQ400	16961 Nm
HQ50	1117 Nm	HQ800	30377 (27793 for Arctic) Nm
HQ100	2282 Nm	HQ1600	55251 Nm

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

Screwed on connections will have to be of approved type, and connections where the packing is made by using packing compound on the threads is not permitted.

Each cylinder body to be hydraulically pressure tested to 240 bar.

Each product is to be accompanied by the following documents:

- 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

		AMHQ-0100 : REV.2			AMHQ-4000 : REV.2
	Assembly	AMHQ-0180 : REV.2			AMHQ-4000-1 : REV.2
		AMHQ-0101 : REV.0		Assembly-F16	AMHQ-4080 : REV.2
				Assembly-F25 (Arctic)	AMHQ-4080-1 : REV.2
		AMHQ-0102 : REV.1			AMHQ-4001 : REV.1
		AMHQ-0200 : REV.2			AMHQ-4001-1 : REV.1

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		AMHQ-0280 : REV.2			AMHQ-4002 : REV.1
		AMHQ-0201 : REV.0			AMHQ-4003 : REV.0 (2014.12.18)
		AMHQ-0202 : REV.1			AMHQ-8000 : REV.2
					AMHQ-8000-1 : REV.2
		AMHQ-0500 : REV.2		Assembly-F35	AMHQ-8080 : REV.3
		AMHQ-0580 : REV.2		Assembly-F30	AMHQ-8080-1 : REV.3
		AMHQ-0501 : REV.1			AMHQ-8001 : REV.0
					AMHQ-8001-1 : REV.0
		AMHQ-0502 : REV.1			AMHQ-8002 : REV.1
					AMHQ-8003 : REV.0
		AMHQ-1000 : REV.2			AMHQ-1600 : REV.2
		AMHQ-1080 : REV.2			AMHQ-1680 : REV.2
		AMHQ-1001 : REV.0			AMHQ-1601 : REV.0
					AMHQ-1602 : REV.1
		AMHQ-1002 : REV.1			AMHQ-1603 : REV.0
		AMHQ-2000 : REV.2			
		AMHQ-2080 : REV.2			
		AMHQ-2001 : REV.0			
		AMHQ-2002 : REV.1			

Tests carried out

Burst Test

Marking of product

For traceability to this type approval, the products are at least to be marked with:

- 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.