DNV·GL

Certificate No:
TAP00001G6

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Globe Valve

with type designation(s)
BOA-W, BOA-Control, BOA-Compact, BOA-Compact EKB, BOA-SuperCompact, BOA-H, BOA-R, BOA-S

Issued to
KSB SE & Co. KGaA
Frankenthal, Germany

is found to comply with
DNV GL class programme DNVGL-CP-0186 – Type approval – Valves
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.

Type:	Temperature range:	Max. working press.:	Sizes:
BOA-W	**-10 °C up to 120 °C**	**16 bar**	**DN15 - DN200**
BOA-Control	**-10 °C up to 120 °C**	**16 bar**	**DN15 - DN200**
BOA-Compact	**-10 °C up to 120 °C**	**16 bar**	**DN15 - DN200**
BOA-Compact EKB	**-10 °C up to 80 °C**	**10 bar**	**DN15 - DN200**
BOA-SuperCompact	**-10 °C up to 120 °C**	**16 bar**	**DN20 - DN200**
BOA-H	**-10 °C up to 350 °C. Refer to certificate.**	**Up to 25 bar. Refer to certificate.**	**DN15 - DN350**
BOA-R	**-10 °C up to 350 °C. Refer to certificate.**	**Up to 16 bar. Refer to certificate.**	**DN15 - DN350**
BOA-S	**-10 °C up to 350 °C. Refer to certificate.**	**Up to 25 bar. Refer to certificate.**	**DN15 - DN400**

Issued at **Hamburg** on **2018-08-13**
This Certificate is valid until **2023-08-12**.
DNV GL local station: **Augsburg**

Approval Engineer: **Andrii Pishchanskyi**

for **DNV GL**

Olaf Drews
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

The overview of type approved products is as follows:

Type	Description	Data sheet
BOA-W	Globe valve with soft seal	7111.1
BOA-Compact	Globe valve with soft seal	7112.1
BOA-SuperCompact	Globe valve with soft seal	7113.1
BOA-H	Bellow-type globe valve with metallic seal	7150.1
BOA-R	Non-return valve with metallic seal	7117.1
BOA-S	Strainer with drain plug	7125.1
BOA-Compact EKB	Globe valve with soft seal and with internal and external electrostatic plastic coating	7112.11
BOA-Control	Globe valve with soft seal, suitable for flow rate measuring using ultrasonic sensor	7128.1

BOA-W, BOA-Compact, BOA-SuperCompact, BOA-Compact EKB and BOA-Control

Globe valves consist of a single-piece, pressure-retaining body without a separate bonnet. The functional unit consists of valve disc, stem, and handwheel. The passage of stem in the body is sealed by a profile seal. The part list of the main components is as follows:

Assembly unit	Material	Remark
Body	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
Stem	Stainless steel, min. 13% chrome (Cr)[1]	
Valve disc	Grey cast iron with EPDM cover	
Profile seal	Elastomer EPDM	

Footnote
[1] The specified stainless steel grades are not approved for application in sea water systems.

BOA-H

Bellow-type globe valves consist of the pressure-retaining parts, i.e. body and body bonnet. The functional unit consists of valve disc, stem and handwheel. Back-up gland packing is tightened by means of two stuffing box screws at stuffing box ring. The part list of the main components is as follows:

Description	Material	Remark
Body	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
	EN-GJS-400-18-LT (5.3103)	Nodular cast iron of ferritic type
Body bonnet	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
	EN-GJS-400-18-LT (5.3103)	Nodular cast iron of ferritic type
Valve disc	X20Cr13 (1.4021)[1]	Stainless steel
	C22 (1.0402)	Non alloy steel
	X 15 CrNiMn 18 8 (1.4370)[1]	Stainless steel
Joint ring	CrNi steel with graphite cover	Stainless steel
Stem	Stainless steel, min. 13% chrome (Cr)[1]	
Welding ring	Stainless steel, min. 13% chrome (Cr)[1]	
Bellows	X6CrNiTi18-10 (1.4541)[1]	Stainless steel
Gland packing	Pure graphite	

Footnote
[1] The specified stainless steel grades are not approved for application in sea water systems.

BOA-R

The non-return valve is a spring-loaded check valve which closes automatically if fluid flow is reversed. The valve consists of the pressure-retaining parts, i.e. body and body cover. The functional unit consists of check disc and spring. Check disc is guided in and by body cover. The position of check disc is determined both by the flow conditions and by spring. The part list of the main components is as follows:

Description	Material	Remark
Body	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
	EN-GJS-400-18-LT (5.3103)	Nodular cast iron of ferritic type
Body cover	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
	EN-GJS-400-18-LT (5.3103)	Nodular cast iron of ferritic type
Check disc	X20Cr13 (1.4021)[1]	Stainless steel
	C22 (1.0402)	Non alloy steel
	X 15 CrNiMn 18 8 (1.4370)[1]	Stainless steel
Joint ring	CrNi steel with graphite cover	Stainless steel
Seat ring	Stainless steel[1]	

Footnote
[1] The specified stainless steel grades are not approved for application in sea water systems.

BOA-S
The strainer consists of the pressure-retaining parts, i.e. body, body cover and screen. Actuating elements are not supplied. Body and body cover are joined by studs and nuts, and the joint is sealed to atmosphere by joint ring. Screen is clamped in the body neck and catches dirt particles depending on the mesh size. The part list of the main components is as follows:

Description	Material	Remark
Body	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
	EN-GJS-400-18-LT (5.3103)	Nodular cast iron of ferritic type
Body cover	EN-GJL-250 (5.1301)	Cast iron with lamellar graphite
	EN-GJS-400-18-LT (5.3103)	Nodular cast iron of ferritic type
Joint ring	CrNi steel with graphite cover	Stainless steel
Screen	X6CrNiTi18-10 (1.4541[1]	Stainless steel
	X 5 CrNi 18 10 (1.4301)[1]	Stainless steel

Footnote
[1] The specified stainless steel grades are not approved for application in sea water systems.

Application/Limitation

The valves are type approved for installation in classes I, II and III piping systems. The valve application for a specific combination of medium, pressure and temperature shall be as per DNVGL-RU-SHIP Pt.4 Ch.6 Sec.1 Table 1.

All valve bodies shall be subjected by the manufacturer to a hydrostatic test at a pressure equal to 1.5 times the nominal pressure. The test pressure need not be more than 70 bar in excess of the nominal pressure. For valves fitted on ship's side and bottom the test pressure shall not be less than 5 bar.

In addition, product certificate issued by DNVGL is required for:

- Valves with DN≥100 and PN≥16 bar;
- Ship side valves with DN≥100.

For other valves a product certificate issued by the manufacturer is acceptable.

Material
Each valve shall be delivered with material certificate as per DNVLG-RU-SHIP Pt.4 Ch.6 Sec.2 Table 3.

Valves with pressure-retaining parts of cast iron with lamellar graphite:
1. Shall not to be used for piping subject to pressure shock, excessive strains and vibration;
2. Shall not be used for class I and II piping with the following exceptions of hydraulic piping systems where failure would not render the system inoperative or introduce a fire risk;
3. May be used for class III piping, with the following exceptions:
    a. Valves fitted on ship's sides and bottom, and on sea chests;
    b. Valves fitted on collision bulkhead;
    c. Valves under static head fitted on the external wall of fuel tanks, lubricating oil tanks and tanks for other flammable oils;
    d. Valves for fluids with temperatures more than 120°C.

Valves with pressure-retaining parts of nodular cast iron of ferritic type:
1. May be used in class II and III piping;
2. May be located on the ship's side and bottom, and on the collision bulkhead;
3. The use in class I piping shall be subject for approval in each case;
4. The use for media having a temperature < 0 °C shall be subject for approval in each case.

BOA-H
Operating properties are as follows:

Characteristic	**Material**	
	EN-GJL-250 (5.1301)	**EN-GJS-400-18-LT (5.3103)**
Nominal pressure	PN16	PN16, PN25
Nominal size	DN15 - DN300	DN15 - DN300
Max. allowable working pressure [bar]	16	25
Min. allowable working temperature [°C]	-10	-10
Max. allowable working temperature [°C]	300	350

Maximum allowable working pressure [bar] for static load depends working temperature as follows:

PN	**Material**	**Working temperature [°C]**							
		-10 up to +120	**≤150**	**≤180**	**≤200**	**≤230**	**≤250**	**≤300**	**≤350**
16	EN-GJL-250 (5.1301)	16	14.4	13.4	12.8	11.8	11.2	9.6	N/A
16	EN-GJS-400-18-LT (5.3103)	16	15.5	N/A	14.7	N/A	13.9	12.8	11.2
25	EN-GJS-400-18-LT (5.3103)	25	24.3	N/A	23	N/A	21.8	20	17.5

BOA-R
Operating properties are as follows:

Characteristic	**Material**	
	EN-GJL-250 (5.1301)	**EN-GJS-400-18-LT (5.3103)**
Nominal pressure	PN6, PN16	PN16
Nominal size	DN15 - DN300	DN15 - DN350
Max. allowable working pressure [bar]	16	16
Min. allowable working temperature [°C]	-10	-10
Max. allowable working temperature [°C]	300	350

Maximum allowable working pressure [bar] for static load depends working temperature as follows:

PN	Material	Working temperature [°C]							
		-10 up to +120	≤150	≤180	≤200	≤230	≤250	≤300	≤350
6	EN-GJL-250 (5.1301)	6	5.4	5	4.8	4.4	4.2	3.6	N/A
16	EN-GJL-250 (5.1301)	16	14.4	13.4	12.8	11.8	11.2	9.6	N/A
16	EN-GJS-400-18-LT (5.3103)	16	15.5	N/A	14.7	N/A	13.9	12.8	11.2

BOA-S

Operating properties are as follows:

Characteristic	Material	
	EN-GJL-250 (5.1301)	EN-GJS-400-18-LT (5.3103)
Nominal pressure	PN6, PN16	PN 16, PN25
Nominal size	DN15 - DN400	DN15 - DN300
Max. allowable working pressure [bar]	16	25
Min. allowable working temperature [°C]	-10	-10
Max. allowable working temperature [°C]	300	350

Maximum allowable working pressure [bar] for static load depends working temperature as follows:

PN	Material	Working temperature [°C]							
		-10 up to +120	≤150	≤180	≤200	≤230	≤250	≤300	≤350
6	EN-GJL-250 (5.1301)	6	5.4	5	4.8	4.4	4.2	3.6	N/A
16	EN-GJL-250 (5.1301)	16	14.4	13.4	12.8	11.8	11.2	9.6	N/A
16	EN-GJS-400-18-LT (5.3103)	16	15.5	N/A	14.7	N/A	13.9	12.8	11.2
25	EN-GJS-400-18-LT (5.3103)	25	24.3	N/A	23	N/A	21.8	20	17.5

Type Approval documentation

Tests carried out

Marking of product

Each valve shall bear legible and durable marking on the body or on a plate fixed securely to the body. Scope of marking shall be at least as follows:

Item	Example
Nominal size	DN…
Nominal pressure class	PN…
Manufacturer	KSB
Type series / Model	BOA-…
Year of construction	2018
Material	…
Flow direction arrow	→
Traceability of the material	…
CE marking	CE
Marking of 3.1 acceptance test (shell and leak test) on BOA-H, BOA-R and BOA-S	

Periodical assessment

A condition for retention of the TA certificate in its validity period is that periodical assessments are successfully carried out. The objective of the periodical assessment is to verify that the conditions for the TA have not been altered.
Main scope of the assessment:

- Verification of the production and quality control system;
- Review of quality control documentation of recent deliveries;
- Review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application;
- Verification of the product marking.

Refer to DNVGL Class Programme CP-0338 for the scope of the periodical assessment.