

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Globe Valve**with type designation(s)
240 series, 250 series

Issued to

**SAMSON AG Mess- und Regeltechnik
Frankfurt am Main, Germany**

is found to comply with

DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers**DNV GL rules for classification – Ships Pt.6 Ch.2 Sec.5 Gas fuelled ship installations – Gas fuelled****DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems****DNV GL class programme DNVGL-CP-0186 – Type approval – Valves****Application :****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**

Type:	Temperature range:	Max. working press.:	Sizes:
240 series	See cert.	See cert.	See cert.
250 series	See cert.	See cert.	See cert.

Issued at **Hamburg** on **2017-10-20**for **DNV GL**This Certificate is valid until **2022-10-19**.DNV GL local station: **Augsburg**Approval Engineer: **Guido Friederich**-----
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.



Job Id: **262.1-005159-7**
 Certificate No: **TAP0000014**
 Revision No: **1**

Product description

The 240 and 250 valve type series are designed either as globe valves, angle valves or three-way valve. The type approval does not include actuator and/or other equipment for remote control of the valves.

Sizes Series 240 (3241, 3244, 3246 and 3248)

Valve type series		240 type series			
Valve design types		3241	3244	3246	3248
Nominal size	DN ANSI	DN 15 – DN 300 NPS ½" – NPS 12"	DN 15 – DN 150 NPS ½" – NPS 6"	DN 15 – DN 250 NPS ½" – NPS 10"	DN 25 – DN 150 NPS 1" – NPS 6"
Pressure rating	PN ANSI Class	PN 16 – PN 40 150 - 300	PN 16 – PN 40 150 - 300	PN 16 – PN 100 150 - 600	PN 16 – PN 100 150 - 600

Sizes Series 250 (3251, 3253, 3254, 3256)

Valve type series		250 type series			
Valve design types		3251	3253	3254	3256
Nominal size	DN ANSI	DN 15 – DN 500 NPS ½" – NPS 20"	DN 15 – DN 500 NPS ½" – NPS 20"	DN 50 – DN 300 NPS 2" – NPS 12"	DN 15 – DN 400 NPS 1" – NPS 16"
Pressure rating	PN ANSI Class	PN 16 – PN 320 150 - 2500	PN 16 – PN 400 150 - 1500	PN 10 – PN 320 300 - 1500	PN 16 – PN 400 150 - 2500

Design standards for valves acc. pressure / temperature ratings: EN 12516 / ASME B16.34.
 Flange standards: ASME or EN Standards.

Materials

Materials for valve body – castings

EN Material	EN standard	EN Mat. No.	ANSI material	UNS No.
GP240GH	DIN EN 10213	1.0619	A216 WCC	J02503
GX2CrNi19-11	DIN EN 10213	1.4309	A351 CF3	J92500
GX5CrNi19-10	DIN EN 10213	1.4308	A351 CF8	J92600
GX2CrNiMo19-11-2	DIN EN 10213	1.4409	A351 CF3M	J92800
GX5CrNiMo19-11-2	DIN EN 10213	1.4408	A351 CF8M	J92900

Materials for valve bonnet – forgings

EN Material	EN standard	EN Mat. No.	ANSI Material	UNS No.
P250GH	DIN EN 10222-2	1.0460	A105	K03504
X2CrNi19-11	DIN EN 10272	1.4306	A182 F304L	S30403
X5CrNi18-10	DIN EN 10222-5	1.4301	A182 F304	S30400
X5CrNiMo17-12-2/ X2CrNiMo17-12-2	DIN EN 10222-5	1.4401/ 1.4404	A182 F316/ A182 F316L	S31600/ S31603
X5CrNiMo17-12-2/ X2CrNiMo17-12-2	DIN EN 10222-5	1.4401/ 1.4404	A182 F316/ A182 F316L	S31600/ S31603

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Materials for valve bonnet – Bar stock

EN Material	EN Standard	EN Mat. No.	ANSI Material	UNS No.
P250GH	DIN EN 10273	1.0460	A105	K03504
X2CrNi19-11	DIN EN 10272	1.4306	A479 304L	S30403
X5CrNi18-10	DIN EN 10272	1.4301	A479 304	S30400
X5CrNiMo17-12-2/ X2CrNiMo17-12-2	DIN EN 10272	1.4401/ 1.4404	A479 316/ A479 316L	S31600/ S31603
X5CrNiMo17-12-2/ X2CrNiMo17-12-2	DIN EN 10272	1.4401/ 1.4404	A479 316/ A479 316L	S31600/ S31603

Materials for fabrication of pressure retaining valve items such as valve body and bonnet shall be supplied by DNV GL Approved Material Manufacturers.

All material properties shall comply with requirements specified in DNV GL Rules Materials & Welding Pt.2 Ch. 1 to Ch. 4.

Materials for valve bodies and bonnet to be installed in cryogenic systems, e.g. LNG, as well as in ship's gas fuel systems shall comply with DNV GL Rules Pt.5 Ch.7 – Liquefied gas tankers, Section 6 – Materials of construction, quality control and marking.

For cryogenic application material certificates shall provide material properties for the relevant minimum design temperature, in particular charpy impact test results according to DNV GL Rules Pt. 5 Ch. 7, Table 4.

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Application/Limitation

Stainless steel globe valves approved for the use in ships piping, machinery piping, fuel systems and cargo handling piping systems. Operating media include flammable gases, nitrogen and cryogenic liquefied gases including LNG.

Minimum design temperature: -196 °C
Maximum design temperature: +450 °C

Design pressures see tabular overview on page 2

For maximum allowable working pressure at ambient and elevated temperatures see ASME B16.34 or EN 12516-1 as appropriate.

Sea water application

In seawater applications, used material shall be properly protected. Surface preparation and coating shall be approved by society. Austenitic stainless steels shall not be considered as seawater resistant material.

Limitation

Valves may not be used for media specified as toxic and/or dangerous fluids

Type Approval documentation

- Manufacturer's datasheets and instruction manuals.
- Design drawings of valves
- Parts lists with material specifications
- Inspection and Test Plan (ITP)
- Cryogenic test reports, dated 2017-03-22 and 2017-03-28
- Type Approval Assessment Report, dated 2017-04-05

Tests carried out

Test standards:	DNV GL Pt. 5 Ch. 7 Liquefied gas tankers DNV GL Pt. 6 Ch.2 Section 5 Gas fuelled ship installations DNV GL Rules Pt.4 Ch.6 – Piping systems DNV GL Class Programme CP 0186 - Valves
Valve test	Purpose
Pressure test	Minimum test pressure = 1,5 times the design pressure Test standard: DNV GL Pt.4 Ch. 6; DNV GL CP 0186
Seat tightness	To confirm the capability of the seat with the specified leakage rate Seat tightness test at ambient temperature, test fluid: Nitrogen Test standard EN 12266-1
Seat tightness	Seat tightness test at cryogenic temperature, test temperature -196°C, test fluid Helium. Test standard EN 12266-1
Functional test	Functional test at cryogenic temperature, test temperature -196°C, test fluid Helium, (20 cycles OPEN/CLOSE) Test standard EN 12266-2

Production testing

- I. Application for Liquefied gas tankers
1. Certification of valves [DN \geq 100 or Working temperature $<$ -55°C]
For all valves having a nominal Diameter DN \geq 100 or a working temperature below -55°C a product certificate has to be issued by DNV GL based on the following scope of tests and according to:
DNV GL Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 5, Item 13.2

<u>Type of test</u>	<u>Test pressure</u>
Shell strength	1,5 times the design pressure
Tightness test of pressure bearing housing	1,1 times the design pressure
Seat tightness test	1,1 times the design pressure
Functional test	Design / work pressure

Pt. 5 Ch. 7, Section 1, Table 7 – Certification of components

<u>DN \geq 100 or Working temperature $<$ -55°C</u>	<u>Type of certificate / Issued by</u>
	VL Certificate / DNV GL

2. Additional cryogenic testing – 10 % of the batch
In addition, cryogenic testing consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve intended to be used at a working temperature below -55°C shall be carried out.
3. Material certification of valves working temperature $<$ -55°C
DNV GL Rules Part 5, Chapter 7 – Liquefied gas tankers

Pt. 5 Ch. 7, Section 1, Table 8 – Certification of material quality and testing Material certificates of valve bodies

<u>Valve nominal diameter</u>	<u>Type of Certificate / Issued by</u>
DN $>$ 100	VL Certificate / DNV GL
DN \leq 100	W Works Certificate / Manufacturer

4. Certification of valves [Working temperature \geq -55°C]
For all valves intended for use at a working temperature \geq -55°C a works certificate has to be issued based on the tests listed above and according to
DNV GL Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 1

<u>Valve nominal size</u>	<u>Type of certificate / Issued by</u>
DN $<$ 100 mm	W Works Certificate / Manufacturer

Material certificates (valve bodies)
W Works Certificate, issued by
Manufacturer

Important Note:

For valves intended to be installed in ship's gas fuel systems certification requirements according to DNV GL Rules Pt. 6 Ch.2 Section 5 – "Gas fuelled ship installations " are to be observed. These are different to applicable requirements provided in DNV GL Rules Pt. 5 Ch. 7 – Liquefied gas tankers.

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Production testing - continuation

II. Application in Gas as fuel systems

For each valve intended to be installed in ship's gas fuel supply systems a product certificate is to be issued based on the following scope of tests and according to DNV GL Rules Part 6, Chapter 2, Section 5 – Gas fuelled ship installations – Gas fuelled

Type of test	Test pressure
Shell strength	1,5 times the design pressure
Tightness test of pressure bearing housing	1,1 times the design pressure
Seat tightness test	1,1 times the design pressure
Functional test	Design / work pressure

Valves in LNG / Gas fuel system – Table 3 Certification required

<u>Valve design conditions - Test and certification</u>	<u>Type of certificate / Issued by</u>
Design temperature < 0°C / DNV GL Pt.5 Ch.7 irrespective of size	VL Certificate / DNV GL
Design pressure > 10 bar/ DNV GL Pt.5 Ch.7 irrespective of size	VL Certificate / DNV GL
Design pressure ≤ 10 bar Design temperature ≥ 0°C	Works certificate / Manufacturer

Material certificates

DNV GL Pt. 6 Ch.2 Section 5 – Gas fuelled ship installations
Table 4 Certification of material quality and testing

Design temperature < 0°C ≥ 0°C	<u>Type of certificate / Issued by</u> VL Certificate / DNV GL W Works Certificate / Manufacturer
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III. Application in machinery piping systems

For valves intended to be installed in piping system listed in DNVGL Rules Pt.4,Ch.6 – Section 1 shall be certified according to DNV GL Rules Pt.4 Ch.6 – Piping systems, Section 9

<u>Valve nominal size / Pressure rating</u> DN > 100 mm / PN > 16 bar DN ≤ 100 mm / PN ≤ 16 bar	<u>Type of certificate / Issued by</u> VL Certificate / DNV GL W Works Certificate / Manufacturer
Ship side valves DN > 100 mm regardless of pressure rating	VL Certificate / DNV GL

Material certificates (valve bodies)

In accordance with DNV GL Rules Pt.4 Ch.6 – Piping systems, Section 2 – Table 3

Note:

Valves having a nominal diameter DN >100 and to be fabricated with a design temperature > 400°C shall provide VL material certificates for valve body and bolts.

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Marking of product

Each valve shall be clearly marked for identification. The identification marking may be performed on the body or on a plate of non-corrosive material. When a metallic plate is used, the plate shall be permanently fixed to the body.

Identification marking on the body shall be located to non-stressed areas and shall be clearly legible. The identification marking shall as a minimum include the following:

- Manufacturers name or trade mark
- Valve type designation
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow on one way flow valves

Periodical assessment

A condition for retention of the Type Approval 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 type approval have not been altered. The main scope of the periodical assessment will normally include:

- Verification of the TA applicant's production and quality system w.r.t ensuring continued consistent production of the type approved products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products.
- Review of the TA documentation and that this is still used as a basis for the production
- Review of possible changes to the design, the material and the performance of the product
- Verification of the product marking

END OF CERTIFICATE