

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Check Valve

with type designation(s)
RVB, RVBL

Issued to

HOERBIGER Wien GmbH
Wien, Austria

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems

DNV rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers

DNV rules for classification – Ships Pt.6 Ch.2 Sec.5 Gas fuelled ship installations – Gas fuelled LNG

DNV class programme DNV-CP-0186 – Type approval – Valves

Application :

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

Temperature range: -55° C - 200°C

Max. working press.: PN 10 - PN 400

Sizes: DN 25 - DN 400

Issued at **Hamburg** on **2023-08-31**

This Certificate is valid until **2028-08-30**.

DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

Sven Klinger
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Check-valves type RVB and RVBL applications in reciprocating compressor discharge check valves in medium flammable and non - flammable gases system installations as well as in machinery piping systems.

Housing Type: Wafer Type, Lug Type

Materials:

Valve Part	Material	Standard
Body	1.4301, 1.4435 (316L)	EN10088-3
Seat	1.4301, 1.4435 (316L)	EN10088-3
Plate	1.4532	HN696
Gasket	flat gasket graphite serrated gasket - graphite filled	-

Application

Stainless steel check valves type RVB and RVBL approved for the following operating media: flammable and non - flammable gases to be used in ships piping, machinery piping, fuel systems and cargo handling piping systems.

Limitation

Check valves type RVB and RVBL are not approved for liquid and gaseous hydrogen and are not approved for temperature below -55°C and may not be used for other type of combustible and applications with flowing media specified as toxic and/or dangerous fluids.³

³: See United Nations (UN) Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Tests carried out

Test standards:	DNV Pt. 5, Ch. 7 Liquefied gas tankers DNV Pt. 6, Ch.2 Section 5 Gas fuelled ship installations. DNV Rules Pt.4, Ch.6 – Piping systems; DNV Class Programme CP 0186 – Valves
Valve test	Purpose
Pressure test	Minimum test pressure = 1,5 times the design pressure Test standard: DNV Pt.4, Ch. 6; DNV CP-0186
Seat tightness	To confirm the capability of the seat with the specified leakage rate Seat tightness test at ambient temperature.
Seat tightness	Seat tightness test
Flow and functional test	Flow and functional test

Type Approval documentation

Scope of type approval documentation kept confidential.

Production testing and valve certification

I. Application for flammable and non - flammable gas tankers

1. Certification of valves [DN $\geq$ 100 or Working temperature $< -55^{\circ}\text{C}$]

For all valves having a nominal diameter DN $\geq$ 100 or a working temperature below -55°C a Product Certificate (PC) shall be issued by DNV based on the following scope of tests and according to: DNV 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

DNV Rules Pt. 5 Ch. 7, Section 1, Table 7 – Compliance documents

<u>DN $\geq$ 100 or Working temperature $< -55^{\circ}\text{C}$</u>	<u>Type of certificate / Issued by</u>
	Product Certificate (PC) / DNV

2. Material certification of valves

DNV Rules Part 5, Chapter 7 – Liquefied gas tankers

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

<u>Valve nominal diameter</u>	<u>Type of Certificate / Issued by</u>
DN $>$ 100, design temperature $\geq -55^{\circ}\text{C}$	Material Declaration (MD) / Manufacturer
DN $\leq$ 100	Material Declaration (MD) / Manufacturer

3. Certification of valves [DN $<$ 100 and working temperature $\geq -55^{\circ}\text{C}$]

For all valves having a nominal diameter DN $<$ 100 intended for use at a working temperature $\geq -55^{\circ}\text{C}$ a Product Declaration (PD) shall be issued based on the tests listed above and according to DNV Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 1, Table 7 – Compliance documents

<u>Valve nominal size</u>	<u>Type of certificate / Issued by</u>
DN $<$ 100	Product Declaration (PD) / Manufacturer

Production testing and valve certification - 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 (PC) shall be issued based on the following scope of tests and according to DNV Rules Part 6, Chapter 2, Section 5 – Gas fuelled ship installations

1. 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

2. Valves in flammable and non - flammable gases / Gas fuel system – Table 3 Certification required

Valve design conditions - Test and certification	Type of certificate / Issued by
Design temperature < 0°C / DNV Pt.5 Ch.7 irrespective of size	Product Certificate (PC) / DNV
Design pressure > 10 bar/ DNV Pt.5 Ch.7 irrespective of size	Product Certificate (PC) / DNV
Design pressure ≤ 10 bar Design temperature ≥ 0°C	Product Declaration (PD) / Manufacturer

3. Material certificates

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

Design temperature	Type of certificate / Issued by
< 0°C	Material Certificate (MC) / DNV
≥ 0°C	Material Declaration (MD) / Manufacturer

III. Application in machinery piping systems

Valves intended to be installed in piping systems listed in DNV Rules Pt.4, Ch.6 – Section 1 shall be certified according to DNV Rules Pt.4, Ch.6 – Piping systems, Section 1, Table 3 Compliance documents – piping components

Valve nominal size / Pressure rating	Type of certificate / Issued by
DN > 100 mm / PN > 16 bar	Product Certificate (PC) / DNV
DN ≤ 100 mm / PN ≤ 16 bar	Product Declaration (PD) / Manufacturer

Material certificates (valve bodies)

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

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:

- Manufacturer's name or trademark
- Valve type designation
- Size
- Pressure
- Material Body
- Material Trim
- DNV ID no.
- Date of Prod
- Certificate no., Tag No., Hull no, Shipp no.
- Arrow to indicate direction of flow on one-way flow valves.

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNV CP-0338, Sec.4.

The certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

END OF CERTIFICATE