

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Check Valve**

with type designation(s)

Storm valve straight type 159801 and angle type 159301

Issued to

LK Valves AB**HELSINGBORG, Sweden**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**DNV GL class programme DNVGL-CP-0186 – Type approval – Valves****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Temperature range: -10°C to 60°C****Max. working press.: 4 bar****Sizes: DN50, DN65, DN80, DN100, DN125 and DN150**This Certificate is valid until **2021-11-30**.Issued at **Høvik** on **2016-12-01**DNV GL local station: **Malmö**Approval Engineer: **Sinisa Sedlan**for **DNV GL**

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

Self-closing swing check valves, straight type and angle type with a closing device (hand wheel).

Pressure rating: PN4
End connections: Flanges PN10 acc. to EN 1092-2 or flanges ANSI 150 acc. to ASME B16.5 (applicable for both straight and angle types and all sizes)
Sizes: DN50, DN65, DN80, DN100, DN125 and DN150

Medium: Sea water and fresh water

Materials:

Body	Ductile iron EN GJS 400-15 (GGG40)
Disc	Ductile iron EN GJS 400-15 (GGG40)
Sleeve	Brass CW614N (Ms58)
Sealing	NBR
Stem	Brass CW614N (Ms58)
Shaft	Brass CW614N (Ms58)
Plug	Zinc plated steel

Application/Limitation

Maximum allowable working pressure: 4 bar
Permissible temperatures: -10 °C to +60 °C

The valves can be used in ship side discharge applications.

The valves are not to be considered fire safe.

Material in contact with seawater shall be properly protected. Surface preparation and coating shall be approved by society.

Type Approval documentation

159301 Storm Valve Angle PN10/PN4, Drawing No. 37184 Rev.B
159801 Storm valve, straight type PN10/PN4, Drawing No. 37185 Rev.C
Datasheet Storm valve angle type 159301
Datasheet Storm valve straight type 159801
Pressure tests, procedure and acceptance criteria, Doc. No. 22 (VHB-TS-OTE-0001-C)
Burst Pressure Test of Valve Bodies for LK Valves Storm Valve (procedure), dated 2016-08-31
Burst Pressure Test of Valve Bodies for LK Valves Storm Valve (test report for valve size DN150), dated 2016-11-22

Tests carried out

Burst testing

Production Testing

Each valve body shall be subjected to a hydrostatic pressure test at 1.5 times the allowable pressure at room temperature.

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In addition each valve shall be subject to seat leakage testing at 1.1 times the design pressure in the valve flow direction.

Testing shall follow procedures and acceptance criteria in EN12266-1.

Certification

Valves with sizes DN125 and DN150 shall be delivered with product certificate. Other valves may be delivered with manufacturer's works certificate only.

Material certificates shall be according to DNV GL Pt.4 Ch.6 Sec.2 Table 3.

Marking of product

For traceability to this type approval the valves are to be marked as a minimum with:

- Manufacturer's name or trade mark
- Type designation
- Max. design pressure or pressure class

Periodical assessment

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

When possible, this assessment may be harmonised with normal surveys for product certification and / or other surveys and audits carried out.

The main elements of the certificate retention survey are:

- 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
- Review of Type Approval documentation and assurance that it is still used as basis for production
- Review of possible changes in design, materials and performance
- Assurance of traceability between manufacturer's product type marking and Type Approval Certificate.

Renewal should be applied for in writing before the certificate expires.