

TYPE APPROVAL CERTIFICATE

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

with type designation(s)
PKH

Issued to

MHA ZENTGRAF GmbH & Co. KG
Merzig Saarland, Germany

is found to comply with

DNV GL rules for classification – Ships

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.

Valves may be used for lubrication oil, hydraulic oil, fresh and sea water, chemicals, steam, sanitary and compressed air.

Temperature range: See certificate

Max. working press.: 420 bar (at ambient temperature)

Sizes: DN 6 to DN 50

This Certificate is valid until **2022-01-01**.

Issued at **Hamburg** on **2017-01-02**

DNV GL local station: **Essen**

for **DNV GL**

Approval Engineer: **Guido Friederich**

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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:
Certificate No: **TAP00000RM**

Product description

Ball valve for mounting within manifolds, e.g. within hydraulic systems.

Application/Limitation

PKH valves may be used for lubrication oil, hydraulic oil, fresh and sea water, chemicals, steam, sanitary and compressed air.

Nominal valve size: DN 6 to DN 50

Design pressure: DN 6, DN 10: 500 bar
DN 13, 16, 20, 25, 32, 40 and 50: 420 bar

Temperature range: Depending on type of materials and design pressure

Materials for PKH valves including maximum temperature range for body, adaptors, stem and ball:

Material description	Material no.	Temperature range, °C
Free cutting steel 11SMn30	1.0715	-20°C to +120°C
Carbon steel S355J2+N	1.0577	according to AD-2000-code, data sheet W10
Fine grained steel with $Re \geq 355 \text{ N/mm}^2$	All steels in according to AD-2000-code, data sheet W10	
Stainless steel		
X6CrNiMoTi17-12-2	1.4571	-273°C to +250°C
X2CrNiMoN22-5-3	1.4462	-40°C to +250°C
X5CrNiMo17-12-2	1.4401	-200°C to +250°C
X2CrNiMo17-13-2	1.4404	-200°C to +250°C

Seal material for PKH valves including temperature range:

Ball seats	Stem and adapter sealing materials	Temperature range
Polyacetal, POM	-	-40°C to +100 °C
Polytetrafluorethylene, PTFE	-	-200°C to +220°C
Polyvinylidenefluorid, PVDF	-	-40°C to +150°C
Polyetheretherketone, PEEK	-	-40°C to +250°C
Cast iron, GG25	-	-40°C to +250°C
-	Acrylonitrile-butadiene-rubber, NBR	-30°C to +100°C
-	Fluor-rubber, FPM	-20°C to +200°C
-	Fluor-rubber FPM special compound	- 46°C to +225°C
-	Athylen-Propylene-Dien-rubber, EPDM	-50°C to +130°C
-	Polytetrafluorethylene, PTFE	-200°C to +220°C
-	Perfluorelastomer, FFKM	-20°C to +275°C
-	Tetrafluorethylene/Propylene, FEPM	-25°C to +250°C

Pressure reduction factors for elevated temperatures :

Temperature (°C)	Carbon steel unalloyed	Low alloyed steels	Stainless steels
20	1	1	1
50	1	1	0,95

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100	1	1	0,85
150	0,89	0,93	0,77
200	0,81	0,87	0,71
250	0,72	0,81	0,67

Limitation

The PKH valves may not be used for the following service and operation conditions:
Flowing media specified as toxic or dangerous fluids, sour gas
Flammable and liquefied gases including LNG/LPG, e.g. as subject to the IGC Code and IGF Code

Remark for PKH valve fabrication: The PKH Bolt in the valve body has to be secured against loosening due to vibration caused by ship's engine room operation.

Type Approval documentation

Tests carried out

According recognized standard: DIN EN 12266-1
Industrial valves – Testing of metallic valves
Pressure tests, test procedures and acceptance criteria –
Mandatory requirements

Test		Purpose
Title	Test reference	
Shell strength	P10	To confirm the pressure containing capability of the shell against internal pressure
Shell tightness	P11	To confirm the leak tightness of the shell including the operating mechanism sealing against internal pressure
Seat tightness	P12	To confirm the capability of the seat(s) to comply with the specified leakage rate - at the time of manufacture - In the direction(s) for which the valve is designed

Minimum test duration

Nominal size	Minimum test duration	Type test -liquid or gas
up to DN 50	15 s	10 min

Marking of product

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

- 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.



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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