DNV·GL

Certificate No:
**TAP00000RS**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Check Valve**

with type designation(s)
**RVZ-SAE210, RVZ-SAE420**

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.**

**RVZ valves may be used for hydraulic oil, lubrication oil, fresh and sea water, steam, sanitary and compresed air.**

| Type: | Temperature range: | Max. working press.: | Sizes: |
|---|---|---|---|
| **RVZ-SAE210** | **-20° to 100°C** | **210 bar (at ambient temperature)** | **DN 15 to DN 50** |
| **RVZ-SAE420** | **-20°C to 100°C** | **420 bar (at ambient temperature)** | **DN 15 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**

**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.


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Job Id:
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## Product description

Check valve to be installed in pipes for various fluid flow applications.

## Application/Limitation

| | |
|---|---|
| Available type sizes: | RVZ-SAE ; DN 15, DN 20, DN 25, DN 32, DN 40, DN 50 |
| Design Temperature : | depending on material selection,<br>see table with material/ temperature ranges |
| Design Pressure : | RVZ-SAE210: 210 bar / RVZ-SAE420: 420 bar |
| Flange connections : | RVZ-SAE210: ISO 6162-1<br>RVZ-SAE420: ISO 6162-2 |

RVZ valves may be used for hydraulic oil, lubrication oil, fresh and sea water, steam, sanitary and compresed air.

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

| Material description | Material no. | Temperature range, °C |
|---|---|---|
| Free cutting steel<br>11SMn30 | 1.0715 | -20°C to +120°C |
| Carbon steel<br>S355J2+N<br><br>Fine grained steel with<br>Re≥355N/mm² | 1.0577<br><br>All steels in according to AD-2000-code, data sheet W10 | <br><br>according to AD-2000-code, data sheet W10 |
| Stainless steel<br><br>X6CrNiMoTi17-12-2<br>X2CrNiMoN22-5-3<br>X5CrNiMo17-12-2<br>X2CrNiMo17-13-2 | <br><br>1.4571<br>1.4462<br>1.4401<br>1.4404 | <br><br>-273°C to +250°C<br>-40°C to +250°C<br>-200°C to +250°C<br>-200°C to +250°C |

Seal material for RVZ valves including temperature range:

| Ball seats | Stem and adater 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<br>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 |

| | | | |
|---|---|---|---|
| 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 RVZ-SAE valves may not be used for the following service and operation conditions:
RVZ-SAE valves are not suitable for operation with fluids specified as toxic or dangerous fluids
Cryogenic fluids including LNG/LPG, e.g. as subject to the IGC Code and IGF Code

## 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 | | |
|---|---|---|
| Title | Test reference | Purpose |
| 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<br>- at the time of manufacture<br>- In the direction(s) for which the valve is designed |

Minimum test duration

| Nominal size | Minimum test duration<br>Production and acceptance test - liquid or gas | Type test -liquid or gas |
|---|---|---|
| up to DN 50 | 15 s | 10 min |

## Marking of product

For traceability to this type approval each valve shall be marked on its type plate with the following minimum information:
- Manufacturer's name and/or trade mark
- Valve type and size
- Design pressure
- Design 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**