Richter Chemical Control Valves

Corrosion-resistant PFA-lined
DIN and ANSI face to face lengths

“Heavy duty bellows for permeating media”
**Fields of application**
Control of corrosive, pure and/or slightly solids-laden media in the chemical, pharmaceutical and other industries. The Richter RSS series is specially suited
- for use in media where stainless steel does not have sufficient corrosion resistance
- as an alternative to valves made of exotic expensive metals (Hastelloy, Monel, tantalum etc.)
- for environmentally critical media (Clean Air Act)
- for metal-reactive media, e.g. $\text{H}_2\text{O}_2$
- for pure media where good cleaning possibilities and anti-adhesive wetted surfaces are important
- for highly permeating media and for “biotechnology/pure media” (see page 6)

**Actuators and accessories**
- pneumatic or with electric motor
- positioners
- limit switches etc.
  All common makes.

**Rubber protective bellows and travel stop**
optional

**Safety packing**
adjustable from the outside is a standard feature. Valve design complies with the German Clean Air Act.

**Fast and simple maintenance** of the wetted internals: removable valve upper section.

High-quality external corrosion protection: Epoxy coating of the valve; screws and stem made of stainless steel.

**PTFE bellows**
protects the stem against corrosion and hermetically seals off the product chamber from the atmosphere. Standard PTFE bellows up to 10 bar (145 psi) operating pressure.

**Options** (see page 5):
- Heavy duty PTFE bellows for highly permeating media, pressures to 16 bar (235 psi) and elevated temperatures.
- Hastelloy bellows for special applications (e.g. extreme permeation).

**Alarm connection**
as an option, especially for critical media.
Type codes, wetted materials

Bellows control valve, remote actuation  RSS/…
Lining:  PFA (perfluorooalkoxy)  … /F
                    FEP (perfluoroethylene propylene)  … /F
Antistatic lining  … /F-L
Bellows:  PTFE, modif. PTFE, Hastelloy
Seat and plug:  reinforced modified PTFE, PTFE, Hastelloy, tantalum etc.

Design
Glandless bellows-type control valve. Lined with fluoroplastic. Safety packing as standard feature. Pneumatic or electric actuation.

Control characteristics
to DIN EN 60534
equal percentage, linear, on-off. Rangeability 1:25.

Pressure / Vacuum / Temperature Range

Heavy-duty PTFE bellows with stainless steel support rings
Standard PTFE bellows
Heavy-duty PTFE bellows with PTFE / carbon support rings
All bellows

Thick-walled thermoplastic PFA lining
(e. g. Teflon®, Dyneon®),
FEP lining and antistatic linings on request.
Lining thickness: 5 - 6 mm (DN 15 + 20: 3.5 - 4 mm).

One-piece valve body
as well as all other pressure-bearing parts made of ductile cast iron EN-JS 1049 (0.7043/GGG-40.3 to DIN)
or ASTM A395 to ASME, alternatively, cast steel 1.0619 (GS-C 25).
No additional sealing points. Absorbs system pressure and pipe forces.
Top entry = easy maintenance of bellows, plug and seat.
Body heating on request.

Replaceable valve plug
made of reinforced, modified PTFE (without fillers).
Screwed play-free onto the bellows and secured with PTFE cord.
The $k_{100}/C_v$ value can be changed by replacing the seat/plug.

Replaceable seat
made of reinforced, modified PTFE (without filler).
Seat area metal-supported.

Dimensions and weights

<table>
<thead>
<tr>
<th>DN (mm)</th>
<th>H1 (mm)</th>
<th>Face to face I (mm)</th>
<th>Weight** (appr. kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>130</td>
<td>130</td>
<td>6</td>
</tr>
<tr>
<td>20</td>
<td>130</td>
<td>130</td>
<td>6</td>
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<tr>
<td>25</td>
<td>185</td>
<td>160</td>
<td>11</td>
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<tr>
<td>40</td>
<td>225</td>
<td>200</td>
<td>17</td>
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<tr>
<td>50</td>
<td>280</td>
<td>230</td>
<td>19</td>
</tr>
<tr>
<td>65</td>
<td>340</td>
<td>290</td>
<td>29</td>
</tr>
<tr>
<td>80</td>
<td>340</td>
<td>310</td>
<td>39</td>
</tr>
<tr>
<td>100</td>
<td>350</td>
<td>350</td>
<td>44</td>
</tr>
</tbody>
</table>

*formerly DIN 3202/F1 resp. 2532/33
**without actuator

<table>
<thead>
<tr>
<th>DN (inch)</th>
<th>H1 (mm)</th>
<th>Face to face I Cl. 150* (mm)</th>
<th>Weight*** (appr. kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>130</td>
<td>130 (not to ANSI)</td>
<td>6</td>
</tr>
<tr>
<td>1&quot;</td>
<td>185</td>
<td>184</td>
<td>11</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>225</td>
<td>222</td>
<td>17</td>
</tr>
<tr>
<td>2&quot;</td>
<td>230</td>
<td>254</td>
<td>19</td>
</tr>
<tr>
<td>3 1/2&quot;</td>
<td>340</td>
<td>298</td>
<td>39</td>
</tr>
<tr>
<td>4&quot;</td>
<td>350</td>
<td>353</td>
<td>44</td>
</tr>
</tbody>
</table>

*Dimensions for Cl. 300 on request (DN 1", 1 1/2", 2")
**DN 1/2": Flanges with tapped bore.
***without actuator

Standardised pneumatic actuators

Valve with column-style actuator
Valve with yoke-style actuator

Type RSS with Fisher, Honeywell, Kämmer, Von Rohr etc.
Type RSS with Samson, Arca, Foxboro etc.
Attention:

– Plug and seat made of other materials partially require higher shut-off forces. Details on request.

### Required shut-off-forces (N) with seat and plug made of modified PTFE*

#### k\textsubscript{100} values (m\textsuperscript{3}/h), Cv values (US gpm)

<table>
<thead>
<tr>
<th>Available DN</th>
<th>Seat Ø (mm)</th>
<th>1.20</th>
<th>1.40</th>
<th>0.80</th>
<th>0.93</th>
<th>0.50</th>
<th>0.58</th>
<th>0.20</th>
<th>0.23</th>
<th>0.12</th>
<th>0.10</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN/ISO (mm)</td>
<td>ANSI 150 (inch)</td>
<td>k\textsubscript{100}/ Cv</td>
<td>96</td>
<td>80</td>
<td>65</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>15+20</td>
<td>1/2 + 3/4</td>
<td>k\textsubscript{100}/ Cv</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>k\textsubscript{100}/ Cv</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>40</td>
<td>1 1/2</td>
<td>k\textsubscript{100}/ Cv</td>
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</tr>
<tr>
<td>50+65</td>
<td>2</td>
<td>k\textsubscript{100}/ Cv</td>
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</tr>
<tr>
<td>80</td>
<td>3</td>
<td>k\textsubscript{100}/ Cv</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>k\textsubscript{100}/ Cv</td>
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</table>

*If a U-plug (see page 5) is used, the k\textsubscript{100} (Cv) values reduce from 155 (180) to 135 (157) m\textsuperscript{3}/h (gpm) and from 100 (117) to 90 (105) m\textsuperscript{3}/h (gpm).

**Notes:**
1. The plugs used for the k\textsubscript{100} values 0.05 to 0.8 (Cv 0.06 to 0.93) are designed with inserts made of Hastelloy C4 to increase stability. The seats are also made of Hastelloy C4 for the k\textsubscript{100} values 0.1 and 0.05 (Cv 0.12 and 0.06). Other materials on request.
2. The next lower k\textsubscript{100}/Cv value can also be achieved with special plugs without changing the seat Ø. This is important if the k\textsubscript{100}/Cv value is subsequently changed as only the plug then has to be replaced.
3. Conversion into Cv (US gpm) = k\textsubscript{100} x 1.165.

#### Mechanical travel stop

- has to be provided if
  - Δp > 10 bar/145 psi and seat-Ø 15-50 mm
  - Δp > 6 bar/ 87 psi and seat-Ø 65 mm

<table>
<thead>
<tr>
<th>Seat Ø</th>
<th>Mechanical travel stop</th>
<th>Mechanical travel stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 65 mm</td>
<td>65</td>
<td>117* 48.9 11</td>
</tr>
<tr>
<td>Ø 80 mm</td>
<td>75</td>
<td>117* 32.6 17.5</td>
</tr>
<tr>
<td>Ø 100 mm</td>
<td>50</td>
<td>75</td>
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</tbody>
</table>

#### Attention:

If Δp < p\textsubscript{j}, then insert p\textsubscript{j} instead of Δp. Please note application limits shown in Pressure-Temperature-Diagram.

* Plug and seat made of other materials partially require higher shut-off forces. Details on request.

- for DN 25 with 15 mm travel. In case of actuators with larger travel the required control curves are achieved by means of positioners.
- valve opening requires higher forces than with standard bellows.

- DN 25 = 900 N, DN 40/50/65 = 2000 N, DN 80/100 = 800 N. Please consider this when sizing the actuators.
Pure, unfilled lining plastics

The linings can dispense with mechanically stabilising fillers up to the full temperature limit:
- Production quality control of the lining is therefore much more reliable.
- The permeation resistance is not reduced.

Pure media from the pharmaceutical and fine chemical industries are not contaminated due to absence fillers.

The Richter control valve series RSS are at the cutting edge of technology. The crucial factors for this are
- the above-average high flow values
- the design and material options
- trouble-shooting special designs (see below and page 6)
- the possibility of being able to select bellows, plug and seat tailored to the application in question.

Options

Heavy duty bellows for DN 25-100 (1”-4”)

This bellows was developed for particularly difficult operating conditions:
- Strong tendency of the medium to permeate: The wall thickness of 2.5 mm (0.1”) ensures a much greater resistance to permeation. Also available in modified PTFE (TFM) for particularly severe permeation.
- Elevated pressures and temperatures: The convolutions of the bellows also retain their function at an operating pressure of 16 bar (235 psi) and at high temperatures:

They are individually supported on the stainless steel support rings (and not on the stem!) and thus remain elastic. On request, support rings also of PTFE/carbon for 10 bar (145 psi) operating pressure.
- Pure media: The large fold spaces facilitate rinsing/sterilisation of the valve interior (see also page 6 “Biotechnology/Pure media”).

Flow values

\[ \text{cv} \leq 0.8 \]

A plug with a Hastelloy C plug insert – also titanium, tantalum etc. on request – is provided for RSS valves with DN 15-25 (1/2”-1”) and seat Ø 5 mm.

Advantage: Dimensional stability and control accuracy, especially at elevated temperatures and differential pressures.

Optional for all RSS bellows versions. For the \( \text{cv} \leq 0.05 \) (CV 0.12 and 0.06) also the seats are made of Hastelloy.

Operating point close to cavitation

Guided U-plug

This special U-plug (U = circumferential guiding) is recommended for operation of the DN 80 and 100 (3” and 4”) versions where cavitation might occur.

The higher loads are safely managed owing to the division of the medium flow and the above-mentioned guiding in the seat.

Available for all RSS bellows versions.
Special designs

"Biotechnology/Pure media" design for applications in the pharmaceutical, fine chemical, electronic chemicals, fermentation sectors etc. CIP and SIP-proven!

With this proven RSS version, ITT Richter offers a solution which is unique in the field of lined control valves in terms of freedom from cavities and cleaning possibilities of the wetted surfaces:

- Homogenous, antiadhesive PFA body lining with seamlessly integrated seat
- Filler-free lining
- One-piece PTFE bellows/plug design
- Bellows with wide fold spaces, easy to clean with DN 15 + 20 (1/2" + 3/4") with standard-bellows
- On request, FDA conformity certificate, depending on the lining material
- as of DN 15 (1/2").

**Design for heavily permeating media (e.g. chlorine)**

The special bushing – material, e.g. Hastelloy C – protects the cover flange in the stem area against corrosive attack from permeating media. The stem – also Hastelloy C for example – remains movable.

Bellows: PTFE heavy-duty bellows with PTFE carbon or Hastelloy support rings, alternatively bellows made of Hastelloy C. The thick-walled body lining offers excellent protection against permeation.

Subject to change without notice.
Printed in Germany
Teflon® = TM Du Pont
Dyneon® = TM Dyneon
ITT= TM ITT Industries
Richter = TM ITT Richter Chemie-Technik