**Description**

The DEP7 is an SG iron direct acting bellows sealed excess pressure valve. The standard version has an EPDM diaphragm limited to 125 °C and is suitable for steam and water applications. Also available for oil applications is a Nitrile rubber diaphragm (suffix 'N' i.e. DEP7B1N which is limited to 90 °C).

**Note:** To protect the actuator diaphragm on steam applications a WS4 water seal pot must be installed in the upstream pressure signal line to the actuator. Refer to TI-S12-03 for further details.

**Standards**

The products listed below comply with the requirements of the Pressure Equipment Directive (PED) and carry the mark when so required.

**Certification**

This product is available with a manufacturers' Typical Test Report. **Note:** All certification/inspection requirements must be stated at the time of order placement.

**Available types:**

DN15 to DN50 screwed connections and DN15 to DN100 flanged connections. The DEP7 is also available in a choice of 6 pressure ranges (suffix 1 - 6):

### Upstream pressure ranges:

<table>
<thead>
<tr>
<th>Range</th>
<th>Valve type</th>
<th>Actuator type</th>
<th>Spring colour</th>
<th>Pressure range (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DN15 - DN40</td>
</tr>
<tr>
<td>1</td>
<td>DEP7B1</td>
<td>11 or 11N</td>
<td>Yellow</td>
<td>0.1 - 0.5</td>
</tr>
<tr>
<td>2</td>
<td>DEP7B2</td>
<td>12 or 12N</td>
<td>Yellow</td>
<td>0.2 - 0.8</td>
</tr>
<tr>
<td>3</td>
<td>DEP7B3</td>
<td>13 or 13N</td>
<td>Blue</td>
<td>0.5 - 1.7</td>
</tr>
<tr>
<td>4</td>
<td>DEP7B4</td>
<td>14 or 14N</td>
<td>Blue</td>
<td>1.4 - 3.4</td>
</tr>
<tr>
<td>5</td>
<td>DEP7B5</td>
<td>15 or 15N</td>
<td>Blue</td>
<td>3.2 - 7.5</td>
</tr>
<tr>
<td>6</td>
<td>DEP7B6</td>
<td>15 or 15N</td>
<td>Red</td>
<td>7.0 - 16.0</td>
</tr>
</tbody>
</table>

**Sizes and pipe connections**

½", ¾", 1", 1¼", 1½" and 2"

Screwed: BSP (BS 21 parallel), NPT also available DN15, DN20, DN25, DN32, DN40, DN50, DN65, DN80 and DN100

Standard flanges: EN 1092 PN16 or PN25

Flanges available on request: ASME 150 and JIS
The product must not be used in this region.

**A-D-E** Flanged EN 1092 PN25

**A-C-G** Flanged EN 1092 PN16

**A-B-F** Flanged ASME 150

**Note:** In the case of liquid service, this product is to be used only on intermittent duty. Applications such as continuous pump recirculation may cause valve and pipework damage due to cavitation which is not covered under the terms of our warranty.

<table>
<thead>
<tr>
<th>Body design conditions</th>
<th>PN25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum design pressure</td>
<td>25 bar g @ 100 °C</td>
</tr>
<tr>
<td>Maximum design temperature</td>
<td>300 °C @ 17.5 bar g</td>
</tr>
<tr>
<td>Minimum design temperature</td>
<td>0 °C</td>
</tr>
<tr>
<td>Maximum operating temperature</td>
<td>125 °C EPDM diaphragm</td>
</tr>
<tr>
<td>Minimum operating temperature (ambient)</td>
<td>90 °C Nitrile diaphragm</td>
</tr>
</tbody>
</table>

**Note:** For lower operating temperatures consult Spirax Sarco

<table>
<thead>
<tr>
<th>Maximum differential pressure</th>
<th>25 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed for a maximum cold hydraulic test pressure of:</td>
<td>38 bar g</td>
</tr>
<tr>
<td><strong>Note:</strong> With internals fitted, test pressure must not exceed:</td>
<td>25 bar g</td>
</tr>
</tbody>
</table>

### $K_{vs}$ values

<table>
<thead>
<tr>
<th>Size DN</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>32</th>
<th>40</th>
<th>50</th>
<th>65</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>$K_{vs}$</td>
<td>3.4</td>
<td>6.5</td>
<td>11.4</td>
<td>16.4</td>
<td>24</td>
<td>40</td>
<td>58</td>
<td>92</td>
<td>145</td>
</tr>
</tbody>
</table>

**Note:** The $K_{vs}$ values shown above are full capacities and should be used for safety valve sizing purposes where they are required.
### Materials

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Material</th>
<th>Material Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>SG iron, DN15 to DN50</td>
<td>DIN 1693 GGG 40.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SG iron, DN65 to DN100</td>
<td>ENG JS 400-18-LT</td>
</tr>
<tr>
<td>2</td>
<td>Bonnet</td>
<td>SG iron</td>
<td>DIN 1693 GGG 40.3</td>
</tr>
<tr>
<td>3</td>
<td>Valve seat</td>
<td>Stainless steel</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>4</td>
<td>Valve seat gasket</td>
<td>Stainless steel, DN15</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reinforced exfoliated graphite, DN20 and DN25</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reinforced exfoliated graphite, DN32 to DN50</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>5</td>
<td>Valve head</td>
<td>Stainless steel</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>6</td>
<td>Valve head screw</td>
<td>Stainless steel, DN15</td>
<td>BS 6105 A2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless steel, DN20 and DN25</td>
<td>BS 6105 A2</td>
</tr>
<tr>
<td>7</td>
<td>Valve head seal</td>
<td>Arlon 1555</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>8</td>
<td>Bush</td>
<td>Stainless steel, DN25</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless steel, DN25 to DN100</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>9</td>
<td>Bush (part of item 10)</td>
<td>Stainless steel</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>10</td>
<td>Balancing bellows assembly</td>
<td>AISI 316L</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>11</td>
<td>Balancing bellows gasket</td>
<td>Reinforced exfoliated graphite, DN25 to DN100</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>12</td>
<td>Bonnet gasket</td>
<td>Reinforced exfoliated graphite</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>13</td>
<td>Bonnet nuts</td>
<td>Steel</td>
<td>DIN 267 Pt13 Gr. 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DN15 to DN40, M10</td>
<td>DIN 267 Pt13 Gr. 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DN50 and DN65, M12</td>
<td>DIN 267 Pt13 Gr. 8.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DN80 and DN100, M16</td>
<td>DIN 267 Pt13 Gr. 8.8</td>
</tr>
<tr>
<td>15</td>
<td>Pillars</td>
<td>Zinc plated steel</td>
<td>BS 970 230 M07</td>
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</tbody>
</table>

Materials are continued on the next page
<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Material</th>
<th>Material Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Pillars nuts</td>
<td>Zinc plated steel</td>
<td>BS 3693 Gr. 8</td>
</tr>
<tr>
<td>17</td>
<td>Spring adjuster</td>
<td>Zinc plated cast iron</td>
<td>DIN 1691 GG25</td>
</tr>
<tr>
<td>18</td>
<td>Spring(s)</td>
<td>Chrome vanadium</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Bush (part of item 20)</td>
<td>PTFE/steel composite</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Sealing bellows assembly</td>
<td>Stainless steel</td>
<td>AISI 316L</td>
</tr>
<tr>
<td>21</td>
<td>Sealing bellows gasket</td>
<td>DN15 and DN20 Stainless steel 'S' type</td>
<td>Reinforced exfoliated graphite</td>
</tr>
<tr>
<td>22</td>
<td>Clamp nut</td>
<td>DN25 to DN100 Zinc plated steel</td>
<td>BS 970 230 M07</td>
</tr>
<tr>
<td>25</td>
<td>Lock-nut</td>
<td>Zinc plated steel</td>
<td>BS 970 230 M07</td>
</tr>
<tr>
<td>26</td>
<td>Spring plate</td>
<td>Zinc plated steel</td>
<td>BS 1449 Pt 1 HR14</td>
</tr>
<tr>
<td>27</td>
<td>Needle bearing</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Setting nut</td>
<td>Zinc plated steel</td>
<td>BS 970 230 M07</td>
</tr>
<tr>
<td>29</td>
<td>Bearing locator</td>
<td>Zinc plated steel</td>
<td>BS 970 230 M07</td>
</tr>
<tr>
<td>30</td>
<td>Adjuster sleeve</td>
<td>Zinc plated steel</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Mounting plate (not shown)</td>
<td>Zinc plated steel</td>
<td>BS 1449 Pt 1 HR14</td>
</tr>
<tr>
<td>32</td>
<td>Housing</td>
<td>Types 11(N) to 14(N) Steel</td>
<td>DIN 1514 St W24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type 15(N) Steel</td>
<td>BS EN 10025 S355 J2G3</td>
</tr>
<tr>
<td>33</td>
<td>Housing screws</td>
<td>Types 11(N) to 12(N) Zinc plated steel</td>
<td>BS 3692 Gr. 5.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Types 13(N), 14(N) and 15(N) Zinc plated steel</td>
<td>BS 3692 Gr. 8.8</td>
</tr>
<tr>
<td>34</td>
<td>Housing nuts</td>
<td>Types 11(N) to 12(N) Zinc plated steel</td>
<td>BS 3692 Gr. 5.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Types 13(N), 14(N) and 15(N) Zinc plated steel</td>
<td>BS 3692 Gr. 8</td>
</tr>
<tr>
<td>35</td>
<td>Spindle guide</td>
<td>Stainless steel</td>
<td>BS 970 431 S29</td>
</tr>
<tr>
<td>36</td>
<td>Diaphragm</td>
<td>EPDM fabric reinforced or suffix 'N' Nitrile fabric reinforced</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Hexagon headed bolt</td>
<td>Stainless steel</td>
<td>BS 6105 A2</td>
</tr>
<tr>
<td>38</td>
<td>Sealing washer</td>
<td>Fibre</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Diaphragm clamp</td>
<td>Stainless steel</td>
<td>ASTM A351 CF8M</td>
</tr>
<tr>
<td>40</td>
<td>Piston</td>
<td>Zinc plated carbon steel</td>
<td>BS 1449 Pt 1 HR14</td>
</tr>
<tr>
<td>41</td>
<td>Spindle</td>
<td>Zinc plated carbon steel</td>
<td>BS 970 230 M07</td>
</tr>
<tr>
<td>42</td>
<td>Mounting nuts</td>
<td>Zinc plated steel</td>
<td>BS 3692 Gr. 8</td>
</tr>
<tr>
<td>43</td>
<td>Coupling</td>
<td>Zinc plated steel</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Thread insert</td>
<td>DN15 and DN20 Stainless steel</td>
<td>DTD 734</td>
</tr>
<tr>
<td>45</td>
<td>Self-locking nut</td>
<td>DN25 to DN100 Zinc plated steel</td>
<td>BS 1449 CR4</td>
</tr>
<tr>
<td>46</td>
<td>Washer</td>
<td>Type 12(N) only Zinc plated steel</td>
<td>BS 1449 CR4</td>
</tr>
<tr>
<td>47</td>
<td>Circlip</td>
<td>Zinc plated steel</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Spindle seal 'O' ring</td>
<td>EPDM or suffix 'N' Nitrile</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Bearing bush</td>
<td>PTFE/steel composite</td>
<td></td>
</tr>
</tbody>
</table>
### DN25 to DN50

(Parts 42 and 46 are not shown)

### DN15 to DN20

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Housing seal 'O' ring</td>
<td>EPDM or suffix 'N' Nitrile</td>
</tr>
<tr>
<td>51</td>
<td>Vent plug</td>
<td>Plastic</td>
</tr>
<tr>
<td>52</td>
<td>Coupling clamp</td>
<td>Zinc plated steel</td>
</tr>
<tr>
<td>53</td>
<td>Spring</td>
<td>Spring steel</td>
</tr>
<tr>
<td>54</td>
<td>Clamp screw</td>
<td>Zinc plated steel</td>
</tr>
</tbody>
</table>
Sizing and selection for steam applications

The sizing chart below can be used to determine the $K_v$ value of the valve for steam applications by plotting:

- Upstream pressure.
- Maximum valve pressure drop.
- Maximum steam load.

Where the $K_v$ value is known, the chart can be used to determine pressure drop across the valve for any given flowrate.

$K_v$ sizing example:
Maximum flowrate 1500 kg/h
Upstream pressure 9 bar g (10 abs)
Maximum pressure drop 0.5 bar

Draw a horizontal line A - B at 10 abs.
At intersection with 0.5 pressure drop draw a vertical line C - D.
Draw a vertical line E - F at 1500 kg/h.
At intersection G, read the required $K_v = 28$.
Valve size required DN50 having the next highest $K_v$ of 40.

Note: The sizing chart is empirical and should not be used for critical applications.
Sizing and selection for water applications

The sizing chart below can be used to determine the $K_v$ value of the valve for water applications by plotting:

- Maximum flowrate.
- Maximum valve pressure drop.

Where the $K_v$ value is known, the chart can be used to determine pressure drop across the valve for any given flowrate.

$K_v$ sizing example:
Maximum flowrate 10 m$^3$/h.
Maximum allowable pressure drop 0.3 bar.

Draw a horizontal line A - B at 10 m$^3$/h.
Draw a vertical line C - D at 0.3 bar pressure drop.
At intersection E, read the required $K_v = 19$.
Valve size required DN40 having the next highest $K_v$ of 24.

Note: The sizing chart is empirical and should not be used for critical applications.
Spare parts for the DN15 and DN20 (¼" and ¾") valves
The spare parts available for sizes DN15 and DN20 valves are detailed below. No other parts for these sizes are supplied as spares.

Available spares

<table>
<thead>
<tr>
<th>Available spares</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling</td>
<td>A</td>
</tr>
<tr>
<td>Diaphragm set</td>
<td>B, C</td>
</tr>
<tr>
<td>Needle bearing</td>
<td>D</td>
</tr>
<tr>
<td>Sealing bellows set</td>
<td>E, F, G, H</td>
</tr>
<tr>
<td>Control spring(s)</td>
<td>I</td>
</tr>
<tr>
<td>Seat/head set</td>
<td>J, K, L, G, H</td>
</tr>
<tr>
<td>Gasket set</td>
<td>F, G, K</td>
</tr>
<tr>
<td>Actuator spindle guide assembly</td>
<td>P, R, S, T, V</td>
</tr>
</tbody>
</table>

How to order spares
Always order spares by using the description given in the column headed 'Available spares' and state the size and type of valve.

Example: 1 - Gasket set for a Spirax Sarco DN15 DEP7B1 express pressure valve.

How to fit spares
Full fitting instructions are given in the Installation and Maintenance Instructions supplied with the spare(s).
Spare parts for the DN25 to DN100 (1" to 2") valves

The spare parts available for sizes DN25 and DN100 valves are detailed below. No other parts for these sizes are supplied as spares.

### Available spares

<table>
<thead>
<tr>
<th>Available Spares</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coupling</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>Diaphragm set</strong></td>
<td>B, C</td>
</tr>
<tr>
<td><strong>Needle bearing</strong></td>
<td>D</td>
</tr>
<tr>
<td><strong>Sealing bellows set</strong></td>
<td>E, F</td>
</tr>
<tr>
<td><strong>Control spring(s)</strong></td>
<td>I</td>
</tr>
<tr>
<td><strong>Seat/head set DN25 to DN50</strong></td>
<td>J, K, L, W, H, G</td>
</tr>
<tr>
<td><strong>Head set DN65 to DN100</strong></td>
<td>L, H, W, G, M</td>
</tr>
<tr>
<td><strong>Balancing bellows set DN25 to DN50</strong></td>
<td>N, M, G, H, F</td>
</tr>
<tr>
<td><strong>Balancing bellows set DN65 to DN100</strong></td>
<td>N, M, G, H</td>
</tr>
<tr>
<td><strong>Gasket set DN25 to DN50</strong></td>
<td>F, G, K, M</td>
</tr>
<tr>
<td><strong>Gasket set DN65 to DN100</strong></td>
<td>F, G, M</td>
</tr>
<tr>
<td><strong>Actuator spindle guide assembly</strong></td>
<td>P, R, S, T, V</td>
</tr>
</tbody>
</table>

### How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of valve.

**Example:** 1 - Gasket set for a DN25 DEP7B1 excess pressure valve.

### How to fit spares

Full fitting instructions are given in the Installation and Maintenance Instructions supplied with the spare(s).
### Dimensions (approximate) in millimetres

<table>
<thead>
<tr>
<th>Size</th>
<th>Flanged</th>
<th>Screwed</th>
<th>Upstream pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EN 1092</td>
<td>BSP/NPT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASME 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A1</td>
<td>A2</td>
<td>1</td>
</tr>
<tr>
<td>DN15</td>
<td>130</td>
<td>88</td>
<td>553</td>
</tr>
<tr>
<td>DN20</td>
<td>150</td>
<td>102</td>
<td>553</td>
</tr>
<tr>
<td>DN25</td>
<td>160</td>
<td>134</td>
<td>562</td>
</tr>
<tr>
<td>DN32</td>
<td>180</td>
<td>144</td>
<td>632</td>
</tr>
<tr>
<td>DN40</td>
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<td>DN50</td>
<td>230</td>
<td>180</td>
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<td>290</td>
<td>-</td>
<td>635</td>
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<tr>
<td>DN80</td>
<td>310</td>
<td>-</td>
<td>637</td>
</tr>
<tr>
<td>DN100</td>
<td>350</td>
<td>-</td>
<td>744</td>
</tr>
</tbody>
</table>

**DEP**

with flanged connections and Type 13/13N or 14/14N actuator

with screwed connections and Type 13/13N or 14/14N actuator
Safety information, installation and maintenance

For full details see IM-S12-10 supplied with the product.

Installation note:

Caution: To protect the actuator diaphragm on steam applications a WS4 series water seal pot must be installed in the upstream pressure signal line to the actuator, refer to TI-S12-03 for details.

The valve should be mounted vertically downwards in a horizontal pipeline with the direction of flow as indicated by the arrow on the valve body. For applications with upstream temperatures below 125 °C the valve can alternatively be mounted vertically upwards.

How to order

Example: 1 off Spirax Sarco DN40 DEP7B3 direct acting pressure reducing valve having flanged PN25 connections.

Note: Add suffix 'N' if the Nitrile rubber diaphragm is required. i.e. DEP7B3N.