Temperature Measurement Devices

Bimetal Thermometers and Thermowells

- Accurate to ± 1 % of full scale in accordance with ASME B40.200
- Easy-to-read dial sizes with single and dual scales
- Dampened movement for protection against vibration
- Stainless steel construction
Dampened-Movement Bimetal Thermometers

Swagelok® thermometers are actuated by a bimetal helix coil. Silicone-free gel dampens vibration effects, and cases are hermetically sealed in accordance with ASME B40.200 to prevent fogging and moisture damage to internal components.

Features
- Acrylic, glass, polycarbonate, and safety-glass lenses to meet application requirements
- All-welded 304 stainless steel construction standard; 316 stainless steel process connection and stem available
- Adjustable-angle, center-back, and lower-back mount process connections
- External adjustment for field calibration
- 50% over- and under-range protection against damage to internal components up to 500°F (260°C)
- Anti-parallax dial for easy reading

Technical Data

Dial
- Temperature measurement ranges:
  - –100 to 150°F through 200 to 1000°F
  - –70 to 70°C through 100 to 540°C.

Case
- Stem angle adjusts more than 180°; case rotates 360°.
- Maximum ambient operating temperature 200°F (93°C)

Materials of Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem</td>
<td>304 SS</td>
</tr>
<tr>
<td>Case, bezel, staff rod, bellows, bracket, screws</td>
<td>304 SS</td>
</tr>
<tr>
<td>Adjustment screw</td>
<td>303 SS</td>
</tr>
<tr>
<td>O-ring</td>
<td>Silicone</td>
</tr>
<tr>
<td>Dial, pointer</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Bimetal element</td>
<td>Varies with temperature range</td>
</tr>
<tr>
<td>Dampening media</td>
<td>Silicone-free inert gel</td>
</tr>
<tr>
<td>Lens gasket</td>
<td>Neoprene (dial ranges 500°F [260°C] and under); Silicone (dial ranges over 500°F [260°C])</td>
</tr>
<tr>
<td>Lens</td>
<td>Acrylic, glass, polycarbonate, or safety glass</td>
</tr>
</tbody>
</table>

Wetted components listed in italics.

Testing

Every Swagelok dampened-movement bimetal thermometer is factory calibrated to meet ASME B40.200.
Dampened-Movement Bimetal Thermometers

Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.

<table>
<thead>
<tr>
<th>Dial Size (in. (mm))</th>
<th>Dimensions, in. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Adjustable-Angle Mount</td>
<td></td>
</tr>
<tr>
<td>3 (76.2)</td>
<td>2.5 (63.5), 4 (102), 6 (152), 9 (229), or 12 (305)</td>
</tr>
<tr>
<td>5 (127)</td>
<td>2.5 (63.5), 4 (102), 6 (152), 9 (229), or 12 (305)</td>
</tr>
</tbody>
</table>

| Center-Back Mount |
| 3 (76.2) | 2.5 (63.5), 4 (102), 6 (152), 9 (229), or 12 (305) | 3.25 (82.6) | 3.00 (76.2) | — |
| 5 (127) | 2.5 (63.5), 4 (102), 6 (152), 9 (229), or 12 (305) | 5.25 (133) | 5.00 (127) | — |

| Lower-Back Mount |
| 3 (76.2) | 2.5 (63.5), 4 (102), 6 (152), 9 (229), or 12 (305) | 3.25 (82.6) | 3.00 (76.2) | 1.94 (49.3) |
| 5 (127) | 2.5 (63.5), 4 (102), 6 (152), 9 (229), or 12 (305) | 5.25 (133) | 5.00 (127) | 2.94 (74.7) |

Ordering Information
Build a dampened-movement bimetal thermometer ordering number by combining the designators in the sequence shown below.

1. Dial Size, Mounting
   - T48A = 3 in. (76.2 mm), adjustable angle
   - T48C = 3 in. (76.2 mm), center back
   - T48L = 3 in. (76.2 mm), lower back
   - T80A = 5 in. (127 mm), adjustable angle
   - T80C = 5 in. (127 mm), center back
   - T80L = 5 in. (127 mm), lower back

2. Stem Length
   - 025 = 2.5 in. (63.5 mm)
   - 040 = 4 in. (102 mm)
   - 060 = 6 in. (152 mm)
   - 090 = 9 in. (229 mm)
   - 120 = 12 in. (305 mm)

3. Scale
   - CS = Celsius
   - DS = Dual Fahrenheit (primary) and Celsius (secondary)
   - FS = Fahrenheit

4. Dial Range
   See below.

5. Lens Material
   - A = Acrylic
   - G = Glass (standard)
   - P = Polycarbonate
   - S = Laminated safety glass

6. Process Connection
   - 8 = 1/2 in. male NPT
   - 9 = Male G1/2B

7. Options
   - ND = No dampening
   - NT = NIST-traceable calibration certificate
   - SF = Silicone liquid fill (not available with standard dampening, with glass lens options, or for dial ranges over 500°F [260°C])
   - SS = 316 stainless steel process connection and stem
   - UN = NPT union lock nut

Dial Ranges

<table>
<thead>
<tr>
<th>Fahrenheit (°F)</th>
<th>Celsius (°C)</th>
<th>Designator</th>
</tr>
</thead>
<tbody>
<tr>
<td>–100 to 150</td>
<td>–70 to 70</td>
<td>01</td>
</tr>
<tr>
<td>–40 to 160</td>
<td>–40 to 70</td>
<td>19</td>
</tr>
<tr>
<td>0 to 200</td>
<td>–15 to 90</td>
<td>05</td>
</tr>
<tr>
<td>0 to 250</td>
<td>–20 to 120</td>
<td>06</td>
</tr>
<tr>
<td>50 to 300</td>
<td>10 to 150</td>
<td>08</td>
</tr>
<tr>
<td>50 to 550</td>
<td>10 to 290</td>
<td>16</td>
</tr>
<tr>
<td>150 to 750</td>
<td>65 to 400</td>
<td>11</td>
</tr>
<tr>
<td>200 to 1000</td>
<td>100 to 540</td>
<td>12</td>
</tr>
</tbody>
</table>

1. Dial range not available with silicone liquid fill.
2. Not recommended for continuous use over 800°F (426°C).
THERMOMETERS / THERMOWELLS

Thermowells are recommended to protect Swagelok dampened-movement bimetal thermometers from damage that could result from contact with pressurized, corrosive, flowing, viscous, or abrasive process fluids. They also enable removal of thermometers for replacement or service without affecting the process or system.

Features

- 304 stainless steel construction standard; 316 stainless steel available
- Accommodate 2.5 through 12 in. (63.5 through 305 mm) thermometer stem lengths in reduced-, straight-, and tapered-shank configurations
- Available with lag extensions for use in insulated piping applications

Technical Data

**Instrument Connection**

1/2 in. female NPSM straight pipe thread for mechanical joints standard; female G1/2B connection available

**Process Connection**

- ASME B16.5 raised-face flange
- 3-A–compliant sanitary Kwik-Clamp
- Threaded (NPT)
- Weld socket

Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change. The U dimension is the depth the thermowell is inserted into the fluid system and is specified in the ordering number. See Ordering Information, page 1018.

**Threaded (TWT) Process Connection**

<table>
<thead>
<tr>
<th>A Stem Length</th>
<th>B No Lag</th>
<th>1/2 in. Size</th>
<th>3/4 in. Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With Lag</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>2.5 (63.5)</td>
<td>-</td>
<td>0.50 (12.7)</td>
<td>-</td>
</tr>
<tr>
<td>4 (102)</td>
<td>-</td>
<td>0.62 (15.7)</td>
<td>0.62 (15.7)</td>
</tr>
<tr>
<td>6 (152)</td>
<td>1.75 (44.4)</td>
<td>3.75 (95.2)</td>
<td>0.62 (15.7)</td>
</tr>
<tr>
<td>9 (229)</td>
<td>4.75 (121)</td>
<td>4.75 (121)</td>
<td>1/18 in. hex</td>
</tr>
</tbody>
</table>

**Kwik-Clamp (TWS) Process Connection**

<table>
<thead>
<tr>
<th>A Stem Length</th>
<th>B No Lag</th>
<th>1/2 in. Size</th>
<th>3/4 in. Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With Lag</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>4 (102)</td>
<td>-</td>
<td>0.50 (12.7)</td>
<td>-</td>
</tr>
<tr>
<td>6 (152)</td>
<td>1.75 (44.4)</td>
<td>3.75 (95.2)</td>
<td>0.75 (12.7)</td>
</tr>
<tr>
<td>9 (229)</td>
<td>4.75 (121)</td>
<td>4.75 (121)</td>
<td>1/18 in. hex</td>
</tr>
</tbody>
</table>

R denotes reduced shank; S denotes straight shank; T denotes tapered shank.
Thermowells

Dimensions
Dimensions, in inches (millimeters), are for reference only and are subject to change.
The U dimension is the depth the thermowell is inserted into the fluid system and is specified in the ordering number.
See Ordering Information, page 1018.

Raised-Face Flange (TWF) Process Connection

Flange Dimensions

No Lag and Reduced Shank Shown

<table>
<thead>
<tr>
<th>A Stem Length</th>
<th>B No Lag</th>
<th>With Lag</th>
<th>C R</th>
<th>S</th>
<th>T</th>
<th>D R</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (102)</td>
<td>2.25</td>
<td>4.25 (108)</td>
<td>0.88</td>
<td>0.75</td>
<td>0.88</td>
<td>0.50</td>
<td>0.75</td>
<td>0.62</td>
</tr>
<tr>
<td>6 (152)</td>
<td>5.25 (133)</td>
<td>2.25</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9 (229) 12 (305)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

ASME Class 150

<table>
<thead>
<tr>
<th>Nominal Flange Size in.</th>
<th>Dimensions in. (mm)</th>
<th>Mounting Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>4.25 (108)</td>
<td>3.12 (79.2)</td>
</tr>
<tr>
<td>1/2</td>
<td>5.00 (127)</td>
<td>3.88 (98.6)</td>
</tr>
<tr>
<td>2</td>
<td>6.00 (152)</td>
<td>4.75 (121)</td>
</tr>
</tbody>
</table>

ASME Class 300

<table>
<thead>
<tr>
<th>Nominal Flange Size in.</th>
<th>Dimensions in. (mm)</th>
<th>Mounting Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>4.88 (124)</td>
<td>3.50 (88.9)</td>
</tr>
<tr>
<td>1/2</td>
<td>6.12 (155)</td>
<td>4.50 (114)</td>
</tr>
<tr>
<td>2</td>
<td>6.50 (160)</td>
<td>5.00 (127)</td>
</tr>
</tbody>
</table>

R denotes reduced shank; S denotes straight shank; T denotes tapered shank.

Weld Socket (TWW) Process Connection

No Lag and Tapered Shank Shown

<table>
<thead>
<tr>
<th>A Stem Length</th>
<th>B No Lag</th>
<th>With Lag</th>
<th>C R</th>
<th>S</th>
<th>T</th>
<th>D R</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (102)</td>
<td>1.75</td>
<td>3.75 (95.2)</td>
<td>0.62</td>
<td>0.75</td>
<td>0.88</td>
<td>0.50</td>
<td>0.75</td>
<td>0.62</td>
</tr>
<tr>
<td>6 (152)</td>
<td>4.75 (121)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>9 (229) 12 (305)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal Flange Size in.</th>
<th>Dimensions in. (mm)</th>
<th>Mounting Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>4.05 (103)</td>
<td>3.10 (79)</td>
</tr>
<tr>
<td>1/2</td>
<td>4.88 (124)</td>
<td>3.88 (98.6)</td>
</tr>
<tr>
<td>2</td>
<td>5.75 (146)</td>
<td>4.75 (121)</td>
</tr>
</tbody>
</table>

⚠️ Qualified personnel should perform welding.

R denotes reduced shank; S denotes straight shank; T denotes tapered shank.
Thermowells

Ordering Information

Build a thermowell ordering number by combining the designators in the sequence shown below.

```
TWF - 110 - R - 1 - L - 2.00 - CS
```

1. **Process Connection**
   - **TWF** = ASME B16.5 raised-face flange
   - **TWS** = Sanitary clamp
   - **TWT** = Threaded
   - **TWW** = Weld socket

2. **Process Connection Size**
   - **TWF Process Connection**
     - 110 = 1 in. ASME class 150
     - 115 = 1 1/2 in. ASME class 150
     - 120 = 2 in. ASME class 150
     - 310 = 1 in. ASME class 300
     - 315 = 1 1/2 in. ASME class 300
     - 320 = 2 in. ASME class 300
   - **TWS Process Connection**
     - C15 = 1 1/2 in. Kwik-Clamp
     - C20 = 2 in. Kwik-Clamp
   - **TWT Process Connection**
     - 008 = 1/2 in. male NPT
     - 012 = 3/4 in. male NPT
   - **TWW Process Connection**
     - P12 = 3/4 in. pipe
     - P16 = 1 in. pipe

3. **Shank**
   - **R** = Reduced
   - **S** = Straight
   - **T** = Tapered
   - ① Tapered shanks are not available for thermowells with U dimensions of 4.00 in. (102 mm) or less.

4. **Bore Diameter**
   - 1 = 0.260 in. (6.6 mm)

5. **Lag Extension**
   - **L** = Lag extension ①
   - **N** = No lag extension
   - ① Not available for thermometer stems less than 6 in. (152 mm) long. Lag is 2 in. (50.8 mm) for 6 in. (152 mm) thermometer stems and 3 in. (76.2 mm) for thermometer stems longer than 6 in. (152 mm).

6. **U Dimension**
   - **Connections with Lag Extensions**
     - **TWF Process Connection**
       - 2.00 = 2.00 in. (50.8 mm) (6 in. stem)
       - 4.00 = 4.00 in. (102 mm) (9 in. stem)
       - 7.00 = 7.00 in. (178 mm) (12 in. stem)
     - **TWS and TWW Process Connections**
       - 2.50 = 2.50 in. (63.5 mm) (6 in. stem)
       - 4.50 = 4.50 in. (114 mm) (9 in. stem)
       - 7.50 = 7.50 in. (190 mm) (12 in. stem)
   - **TWT Process Connection**
     - 2.50 = 2.50 in. (63.5 mm) (6 in. stem)
     - 4.50 = 4.50 in. (114 mm) (9 in. stem)
     - 7.50 = 7.50 in. (190 mm) (12 in. stem)
   - **Connections with No Lag Extensions**
     - **TWF Process Connection**
       - 2.00 = 2.00 in. (50.8 mm) (4 in. stem)
       - 4.00 = 4.00 in. (102 mm) (6 in. stem)
       - 7.00 = 7.00 in. (178 mm) (9 in. stem)
       - 10.0 = 10.0 in. (254 mm) (12 in. stem)
     - **TWS and TWW Process Connections**
       - 2.50 = 2.50 in. (63.5 mm) (4 in. stem)
       - 4.50 = 4.50 in. (114 mm) (6 in. stem)
       - 7.50 = 7.50 in. (190 mm) (9 in. stem)
       - 10.5 = 10.5 in. (267 mm) (12 in. stem)
     - **TWT Process Connection**
       - 1.00 = 1.00 in. (25.4 mm) (2.5 in. stem, 1/2 in. connection)
       - 1.63 = 1.63 in. (41.4 mm) (2.5 in. stem, 3/4 in. connection)
       - 2.50 = 2.50 in. (63.5 mm) (4 in. stem)
       - 4.50 = 4.50 in. (114 mm) (6 in. stem)
       - 7.50 = 7.50 in. (190 mm) (9 in. stem)
       - 10.5 = 10.5 in. (267 mm) (12 in. stem)

7. **Options**
   - **CS** = Protective stainless steel cap and chain
   - **G1** = Female G1/2B instrument connection
   - **SS** = 316 stainless steel material
About this document

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Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Warranty Information

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