



Dial Thermometers

The thermometers in this section have circular dials and are actuated by a bimetal strip element or liquid filled (some thermometers use N₂ gas) bourdon tube, linked to the pointer. The following British and European Standard forms the basis of the design and manufacture of the thermometers and of these guidelines. The standard should also be the source of reference for additional information:

BS EN 13190 : 2001 Dial Thermometers.

Selection

Temperature Range - The nominal range shall be selected such that the operating temperature, including ambient temperature, shall extend over between 2/3 and 3/4 of that range.

Safety Design - Where appropriate, thermometers are supplied with a pocket and should not be installed without them or other suitable pockets.

Materials - Standard pockets are brass with 1/2" BSP process connection and are suitable for pressures up to 25 bar. Other sizes and materials are available. Some pockets are produced as an interference fit on the thermometer stem to ensure a high degree of sensitivity. Customers uncertain of the suitability of the standard pocket should consult their supplier.

Storage and Transport

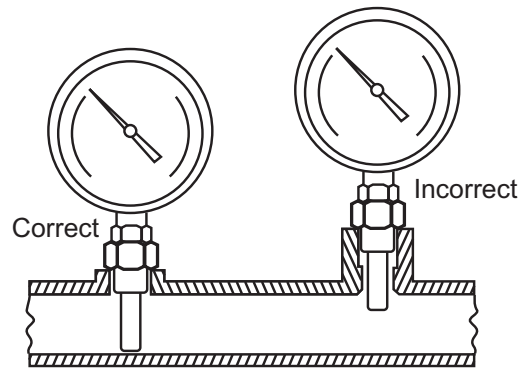
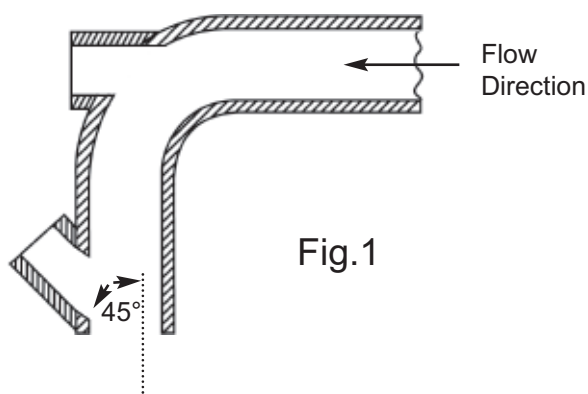
Gauges should be kept in dry, clean conditions within a temperature range of -40 to +60°C and should be protected from impact damage.

Installation

General - Thermometers will only measure the temperature experienced by the sensor probe. It is important, to achieve correct readings, that the probe is fully immersed into the flow of the pipeline or vessel. Customers must ensure the correct nominal range and stem lengths have been selected before a thermometer is installed.

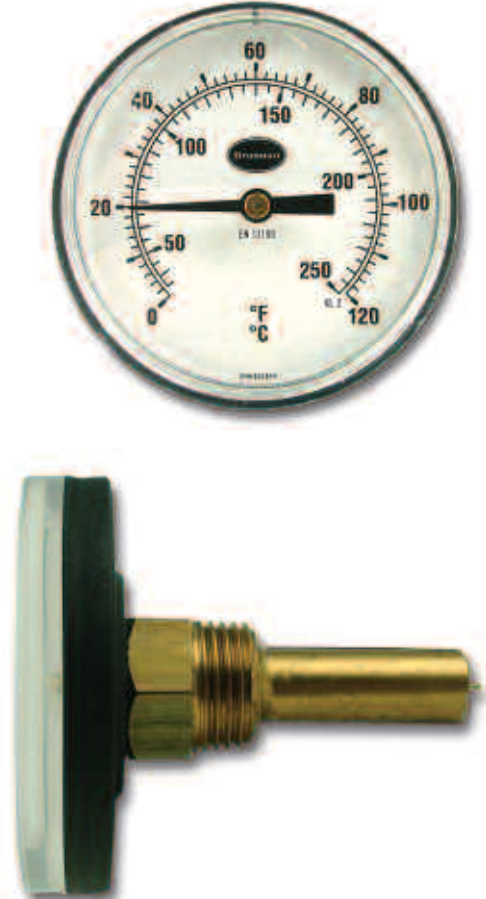
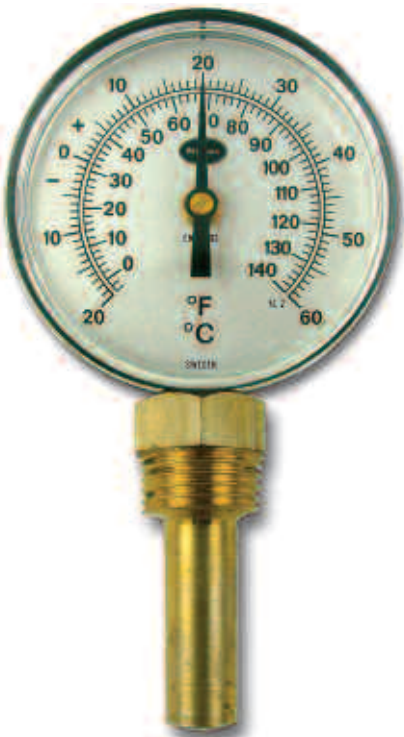
Conditions - In smaller diameter pipelines the bulb or pocket should be located across the whole of the pipe diameter. In larger pipes adequate immersion can be achieved by ensuring that the stem is inserted to the centre of the flow.

When mounting thermometers in pipelines having a diameter of less than 50mm, the female connection, or stud, should be placed in a pipe bend or at an angle of 45° to provide greater immersion. See the illustrations below (Figures 1 and 2).



The pockets (or thermowell), protect the thermometer against mechanical, thermal and chemical damage. Replacement of the instrument is also simplified. Removal from the pocket being possible without disturbing operations. Always check that the pocket material is compatible with the water, gas or other liquid into which it is to be immersed.





Standard Specifications

| | |
|--------------------------|-----------------------|
| Case: | Plastic |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Standard bimetal coil |
| Filling: | Dry |

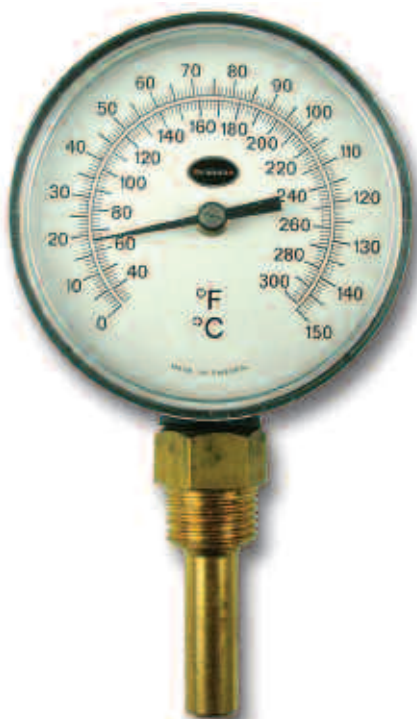
Options

| | |
|--------------------------|---------------------------------------|
| Case: | Plastic or Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Sensor Mechanism: | Stainless Steel |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |

Standard Product Numbers

| Range | Bottom Entry (Radial) | | | Back Entry (Axial) | | |
|---------------|-----------------------|----------|----------|--------------------|----------|----------|
| | Stem Length | | | Stem Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 32/428/0 | 32/448/0 | 32/468/0 | 31/428/0 | 31/448/0 | 31/468/0 |
| 0 to 120°C&F | 32/421/0 | 32/441/0 | 32/461/0 | 31/421/0 | 31/441/0 | 31/461/0 |
| 0 to 160°C&F | 32/424/0 | 32/444/0 | 32/464/0 | 31/424/0 | 31/444/0 | 31/464/0 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.



Standard Specifications

| | |
|--------------------------|-----------------------|
| Case: | Black Steel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Standard bimetal coil |
| Filling: | Dry |

Options

| | |
|--------------------------|---------------------------------------|
| Case: | Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Sensor Mechanism: | Stainless Steel |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

Standard Product Numbers

| Range | Bottom Entry (Radial) | | | Back Entry (Axial) | | |
|---------------|-----------------------|----------|----------|--------------------|----------|----------|
| | Stem Length | | | Stem Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 32/524/0 | 32/544/0 | 32/564/0 | 31/524/0 | 31/544/0 | 31/564/0 |
| 0 to 120°C&F | 32/521/0 | 32/541/0 | 32/561/0 | 31/521/0 | 31/541/0 | 31/561/0 |
| 0 to 160°C&F | 32/525/0 | 32/545/0 | 32/565/0 | 31/525/0 | 31/545/0 | 31/565/0 |

100mm Thermometer : BS EN 13190 Direct Mounting Bimetal Mechanism



Standard Specifications

| | |
|--------------------------|-------------------------------|
| Case: | Black Steel with Chrome Bezel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Standard bimetal coil |
| Filling: | Dry |

Options

| | |
|--------------------------|---------------------------------------|
| Case: | Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Sensor Mechanism: | Stainless Steel |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |

Standard Product Numbers

| Range | Bottom Entry (Radial) | | | Back Entry (Axial) | | |
|---------------|-----------------------|----------|----------|--------------------|----------|----------|
| | Stem Length | | | Stem Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 32/624/0 | 32/644/0 | 32/664/0 | 31/624/0 | 31/644/0 | 31/664/0 |
| 0 to 120°C&F | 32/621/0 | 32/641/0 | 32/661/0 | 31/621/0 | 31/641/0 | 31/661/0 |
| 0 to 160°C&F | 32/628/0 | 32/648/0 | 32/668/0 | 31/625/0 | 31/645/0 | 31/665/0 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

100mm Stainless Steel Thermometer : BS EN 13190 Direct Mounting Bimetal Mechanism



Standard Specifications

| | |
|--------------------------|--|
| Case: | Stainless Steel |
| Class: | 1 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Supplied without pocket unless specified |
| Sensor Mechanism: | Standard bimetal coil |
| Filling: | Dry |

Options

| | |
|--------------------------|--------------------------------|
| Orientation: | Back entry (axial) |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Sensor Mechanism: | Stainless Steel |
| Filling: | Glycerine |
| Logos: | Available |

Standard Product Numbers

| Range | Stem Length | | |
|-------------|-------------------------|----------|----------|
| | 50mm | 100mm | 160mm |
| -30 to 50°C | 32/722/0 | 32/725/0 | 32/726/0 |
| 0 to 120°C | 32/752/0 | 32/755/0 | 32/756/0 |
| 0 to 160°C | 32/762/0 | 32/765/0 | 32/766/0 |
| | Stainless Steel Pockets | | |
| | 39/145/0 | 39/146/0 | 39/163/0 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

100mm Thermometer : BS EN 13190 Direct Mounting Liquid Expansion Mechanism



Standard Specifications

| | |
|--------------------------|------------------|
| Case: | Black Steel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Liquid Expansion |
| Filling: | Dry |

With 50mm lagging extension

Options

| | |
|--------------------|---------------------------------------|
| Case: | Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Logos: | Available |
| Filling: | Glycerine (with Stainless Steel case) |

Standard Product Numbers

| Range | Bottom Entry (Radial) | | | Back Entry (Axial) | | |
|---------------|-----------------------|----------|----------|--------------------|----------|----------|
| | Stem Length | | | Stem Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 97/624/0 | 97/644/0 | 97/664/0 | 96/624/0 | 96/644/0 | 96/664/0 |
| 0 to 120°C&F | 97/626/0 | 97/646/0 | 97/666/0 | 96/626/0 | 96/646/0 | 96/666/0 |
| 0 to 160°C&F | 97/628/0 | 97/648/0 | 97/668/0 | 96/628/0 | 96/648/0 | 96/668/0 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

100mm Thermometer : BS EN 13190

Remote Mounting Liquid Expansion Mechanism



Standard Specifications

| | |
|--------------------------|---|
| Case: | Black Steel with chrome bezel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Liquid Expansion |
| Filling: | Dry |
| Capillary: | 1.5m, 3m or 5m Plastic coated Bronze |

Suitable for surface mounting.
Complete with back flange.

Options

| | |
|--------------------|---------------------------------------|
| Case: | Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |
| Capillary: | Other sizes/materials |

Standard Product Numbers

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

| Range | 1.5m Capillary | | | 3m Capillary | | | 5m Capillary | | |
|---------------|----------------|----------|----------|---------------|----------|----------|---------------|----------|----------|
| | Pocket Length | | | Pocket Length | | | Pocket Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 91/624/0 | 91/624/1 | 91/624/2 | 91/634/0 | 91/634/1 | 91/634/2 | 91/654/0 | 91/654/1 | 91/654/2 |
| 0 to 120°C&F | 91/626/0 | 91/626/1 | 91/626/2 | 91/636/0 | 91/636/1 | 91/636/2 | 91/656/0 | 91/656/1 | 91/656/2 |



100mm Stainless Steel Thermometer : BS EN 13190 Remote Mounting Liquid Expansion Mechanism



Standard Specifications

| | |
|--------------------------|---|
| Case: | Stainless Steel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP Female Stainless Nut |
| Sensor Mechanism: | Liquid Expansion |
| Filling: | Dry |
| Capillary: | 2m, 5m or 10m Stainless Interlocking |

Suitable for surface mounting.
Complete with back flange.

Options

| | |
|--------------------|---------------------------------------|
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |
| Capillary: | Other sizes/materials |

Standard Product Numbers

| Range | Capillary | | |
|-------------|-----------|----------|----------|
| | 2m | 5m | 10m |
| 0 to 120°C | 90/160/6 | 90/170/6 | 90/180/6 |
| 0 to 160°C | 90/161/6 | - | 90/181/6 |
| -20 to 60°C | 90/163/6 | 90/173/6 | - |

For high temperature or demanding applications, see Marine Thermometers, page 32.

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

150mm Thermometer : BS EN 13190 Direct Mounting Bimetal Mechanism



Standard Specifications

- Case:** Black Steel with chrome bezel
- Class:** 2
- Window:** Plastic
- Connection:** 1/2" BSP
- Pocket:** Brass
- Sensor Mechanism:** Standard bimetal coil

Options

- Case:** Stainless Steel
- Class:** 1
- Range:** Customer to specify
- Connection:** Other sizes/materials inc. NPT
- Pocket:** Stainless Steel
- Sensor Mechanism:** Stainless steel
- Filling:** Glycerine (with Stainless Steel case)
- Logos:** Available

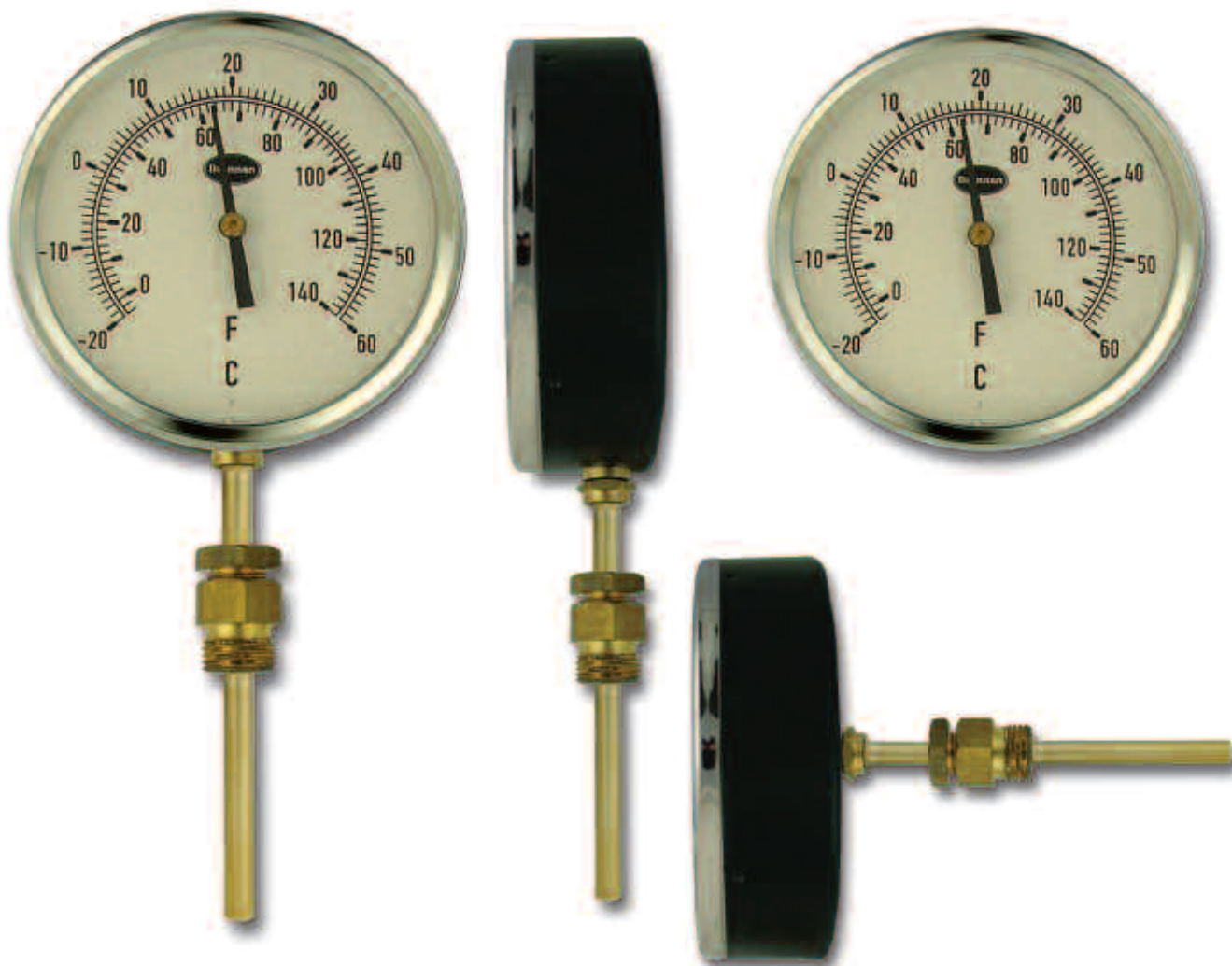
Standard Product Numbers

| Range | Bottom Entry (Radial) | | | Back Entry (Axial) | | |
|---------------|-----------------------|----------|----------|--------------------|----------|----------|
| | Stem Length | | | Stem Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 32/924/0 | 32/944/0 | 32/964/0 | 31/924/0 | 31/944/0 | 31/964/0 |
| 0 to 120°C&F | 32/921/0 | 32/941/0 | 32/961/0 | 31/921/0 | 31/941/0 | 31/961/0 |
| 0 to 160°C&F | 32/925/0 | 32/945/0 | 32/965/0 | 31/925/0 | 31/945/0 | 31/965/0 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.



150mm Thermometer : BS EN 13190 Direct Mounting Liquid Expansion Mechanism



Standard Specifications

| | |
|--------------------------|-------------------------------|
| Case: | Black Steel with chrome bezel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Liquid Expansion |
| Filling: | Dry |

Options

| | |
|--------------------------|---------------------------------------|
| Case: | Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Sensor Mechanism: | Stainless Steel |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |

Standard Product Numbers

| Range | Bottom Entry (Radial) | | | Back Entry (Axial) | | |
|---------------|-----------------------|----------|----------|--------------------|----------|----------|
| | Stem Length | | | Stem Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 97/924/0 | 97/944/0 | 97/964/0 | 96/924/0 | 96/944/0 | 96/964/0 |
| 0 to 120°C&F | 97/926/0 | 97/946/0 | 97/966/0 | 96/926/0 | 96/946/0 | 96/966/0 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

150mm Thermometer : BS EN 13190 Remote Mounting Liquid Expansion Mechanism



Standard Specifications

| | |
|--------------------------|---|
| Case: | Black Steel with chrome bezel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP |
| Pocket: | Brass |
| Sensor Mechanism: | Liquid Expansion |
| Filling: | Dry |
| Capillary: | 1.5m, 3m or 5m Plastic coated Bronze |

Suitable for surface mounting.
Complete with back flange.

Options

| | |
|--------------------------|---------------------------------------|
| Case: | Stainless Steel |
| Class: | 1 |
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Pocket: | Stainless Steel |
| Sensor Mechanism: | Stainless Steel |
| Logos: | Available |
| Filling: | Glycerine (with Stainless Steel case) |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

| Standard Product Numbers | | | | | | | | | |
|--------------------------|----------------|----------|----------|---------------|----------|----------|---------------|----------|----------|
| Range | 1.5m Capillary | | | 3m Capillary | | | 5m Capillary | | |
| | Pocket Length | | | Pocket Length | | | Pocket Length | | |
| | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm | 50mm | 100mm | 150mm |
| -20 to 60°C&F | 91/924/0 | 91/924/1 | 91/924/2 | 91/934/0 | 91/934/1 | 91/934/2 | 91/954/0 | 91/954/1 | 91/954/2 |
| 0 to 120°C&F | 91/926/0 | 91/926/1 | 91/926/2 | 91/936/0 | 91/936/1 | 91/936/2 | 91/956/0 | 91/956/1 | 91/956/2 |



150mm Stainless Steel Thermometer : BS EN 13190 Remote Mounting Liquid Expansion Mechanism



Standard Specifications

| | |
|--------------------------|------------------------------------|
| Case: | Stainless Steel |
| Class: | 2 |
| Window: | Plastic |
| Connection: | 1/2" BSP Female Stainless Nut |
| Sensor Mechanism: | Liquid Expansion |
| Filling: | Dry |
| Capillary: | 2m or 5m Stainless Interlocking |

Suitable for surface mounting.
Complete with back flange.

Options

| | |
|--------------------|---------------------------------------|
| Range: | Customer to specify |
| Connection: | Other sizes/materials inc. NPT |
| Filling: | Glycerine (with Stainless Steel case) |
| Logos: | Available |
| Capillary: | Other sizes/materials |

For high temperature or demanding applications, see page 32, Marine Thermometers.

Standard Product Numbers

| Range | Capillary | |
|------------|-----------|----------|
| | 2m | 5m |
| 0 to 120°C | 90/260/6 | - |
| 0 to 160°C | - | 90/271/6 |

Special products can be supplied to order. Quantities required will affect unit price and initial leadtime may be extended.

41mm Dial Bimetal Thermometer

Standard Specifications

- Case:** Steel
- Window:** Glass
- Sensor Mechanism:** Standard bimetal coil
- Filling:** Dry
- Stem:** 100mm x 4mm Stainless Steel

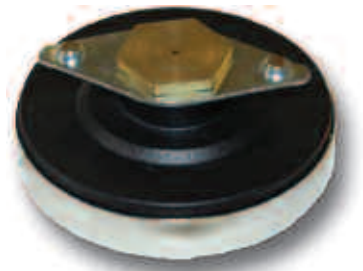


| Standard Product Numbers | |
|--------------------------|------------|
| Range | Product No |
| 0 to 120°C | 31/343/0 |

63mm Magnetic Pipe and Radiator

Standard Specifications

- Case:** Steel
- Window:** Glass
- Sensor Mechanism:** Standard bimetal coil
- Filling:** Dry



| Standard Product Numbers | |
|--------------------------|------------|
| Range | Product No |
| 0 to 120°C&F | 33/409/0 |
| 0 to 200°C&F | 33/410/0 |
| -50 to 50°C&F | 33/411/0 |

63mm Clip on Pipe

Need to add 33/501/0 and 33/503/0

Standard Specifications

- Case:** Plastic painted bezel (except*)
- Window:** Glass
- Connection:** Spring
- Sensor Mechanism:** Standard bimetal coil
- Filling:** Dry

Standard Specifications

- Case:** Metal
- Window:** Glass
- Connection:** Spring
- Sensor Mechanism:** Standard bimetal coil
- Filling:** Dry



| Standard Product Numbers | |
|--------------------------|------------|
| Range | Product No |
| -40 to 40°C&F | 33/403/0 |
| 0 to 120°C&F | 33/401/0 |
| 0 to 200°C&F | 33/402/0 |
| 0 to 120°C&F | 33/404/0* |

| Standard Product Numbers | |
|--------------------------|------------|
| Range | Product No |
| -40 to 40°C&F | 33/503/0 |
| 0 to 120°C&F | 33/501/0 |
| | |
| | |

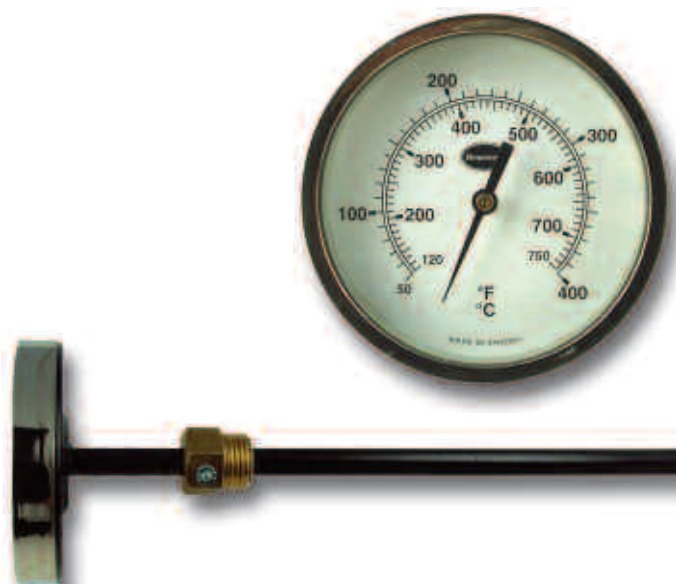
* no bezel



80mm Flue Gas

Standard Specifications

| | |
|--------------------------|------------------------|
| Case: | Steel |
| Window: | Glass |
| Connection: | 1/2" BSP sliding union |
| Sensor Mechanism: | Standard bimetal coil |
| Stem: | 250mm x 10mm |
| Filling: | Dry |



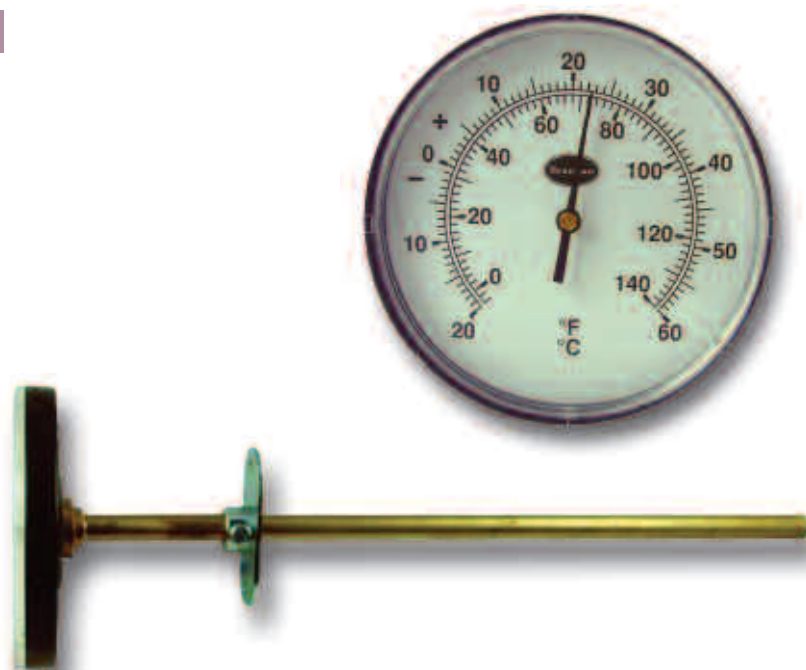
Standard Product Numbers

| Range | Product No |
|---------------|------------|
| 50 to 400°C&F | 33/593/0 |

100mm and 150mm Air Duct

Standard Specifications

| | |
|--------------------------|------------------------|
| Case: | Steel |
| Window: | Plastic |
| Connection: | Sliding flange |
| Sensor Mechanism: | Stainless bimetal coil |
| Stem: | 300mm x 10mm |
| Filling: | Dry |



Standard Product Numbers

| Dial Diameter | Range | Product No |
|---------------|---------------|------------|
| 100mm | -20 to 60°C&F | 33/773/0 |
| 100mm | 0 to 120°C&F | 33/771/0 |
| 150mm | -20 to 60°C&F | 33/973/0 |