

Bimetal thermometer

Process version per EN 13190

Model TG54

WIKA data sheet TM 54.02



for further approvals
see page 11

Applications

- General process instrumentation in the chemical and petrochemical industries, oil and gas industries, power generation and water/wastewater industries
- Temperature measurement in harsh and aggressive environments
- Suitable for applications with high vibrations

Special features

- Nominal sizes 63, 80, 100, 160 mm
- Robust, hermetically sealed case
- External reset for reference temperature adjustment
- Dished dial (anti-parallax) for ease of reading
- Adjustable stem and dial version enables optimal process connection



Fig. left: Back mount (axial)

Fig. right: Back mount, adjustable stem and dial

Description

The model TG54 bimetal thermometer has been developed and is manufactured in accordance with the EN 13190 standard. The thermometer meets the high requirements of the process industries.

Especially in the chemical and petrochemical, oil and gas, power engineering and shipbuilding industries, the temperature measuring instrument manufactured from stainless steel is used successfully. The robust, hermetically sealed case with IP65 ingress protection enables use with harsh external conditions and high vibration.

With a count of four different nominal sizes, an optimal matching to the available space and mounting conditions is possible.

At an easily accessible point on the back of the case, the zero point can be easily corrected.

The model TG54 satisfies the high requirements for resistance against aggressive media. As an option, the case, the stem and the process connection can be made from 316L.

Specifications

| Bimetal thermometer, model TG54 | | | |
|---|---|--|--|
| Measuring element | Bimetal coil | | |
| Nominal size in mm | <ul style="list-style-type: none"> ■ 63 ■ 80 ■ 100 ■ 160 | | |
| Connection location | <ul style="list-style-type: none"> ■ Back mount (axial) ■ Lower mount (radial) ■ Back mount, adjustable stem and dial | | |
| Unit (scale range) | <ul style="list-style-type: none"> ■ °C ■ °F Option: <ul style="list-style-type: none"> ■ °C/°F (dual scale) ■ °F/°C (dual scale) | | |
| Process connection | <ul style="list-style-type: none"> ■ Plain, without thread ■ G ½ B ■ ½ NPT ■ G ½ B female ■ ½ NPT female ■ M20 x 1.5 ■ M24 x 1.5 female others on request | | |
| Accuracy class | Class 1 per EN 13190 | | |
| Working range Continuous load (1 year) Short time (max. 24 h) | Measuring range (EN 13190) Scale range (EN 13190) | | |
| Stem diameter | <ul style="list-style-type: none"> ■ 6 mm ■ 8 mm | | |
| Insertion length L₁ | 63 ... 1,000 mm Minimum/maximum length is dependent on the measuring range and diameter (see tables from page 5 and 6) | | |
| Window | Instrument glass Option: <ul style="list-style-type: none"> ■ Laminated safety glass ■ Polycarbonate (shatterproof) | | |
| Damping | Without Option: With silicone oil case filling, up to max. 250 °C (at the probe) | | |
| Versions (option) | <ul style="list-style-type: none"> ■ Oil and grease free version ■ Silicon oil free version | | |
| Materials Case, ring Stem, process connection (wetted) Elbow behind the case Dial Pointer | Stainless steel 304 (option: stainless steel 316L) Stainless steel 304 (option: stainless steel 316L) Stainless steel 304 (only with lower mount) Aluminium, white, black lettering Aluminium, black, adjustable pointer | | |
| Ingress protection IEC/EN 60529 | IP65 Option: <ul style="list-style-type: none"> ■ IP66 ■ IP67 ■ IP68 (standard: Continuous immersion up to 5 m) | | |
| Permissible ambient temperature at case Instrument glass Laminated and polycarbonate window | unfilled -40 ... +100 °C ¹⁾ -40 ... +70 °C ¹⁾ | filled -40 ... +70 °C -40 ... +70 °C | Option -50 ... +70 °C -50 ... +70 °C |
| Permissible operating pressure at the stem | max. 25 bar, static | | |
| Temperature limits for storage and transport Without liquid damping With liquid damping | -50 ... +70 °C -40 ... +70 °C | | |

1) For ambient temperatures < 0 °C the measuring system and the window may fog up and possibly ice over.

Bimetal thermometer, model TG54

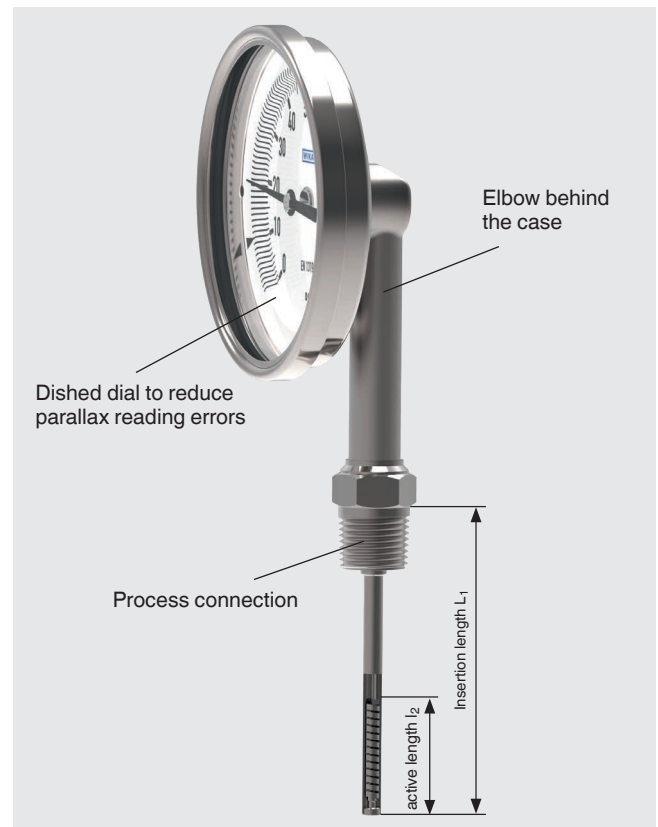
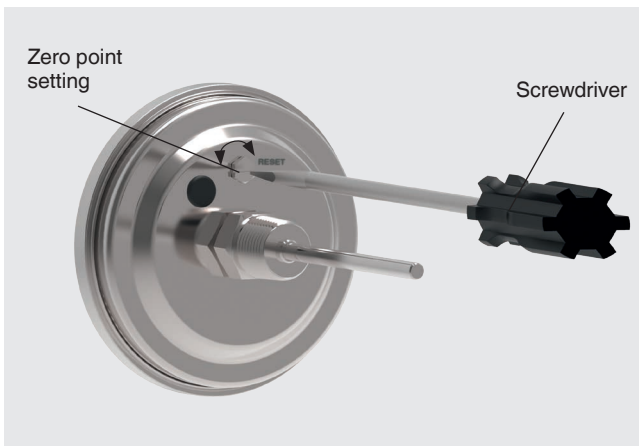
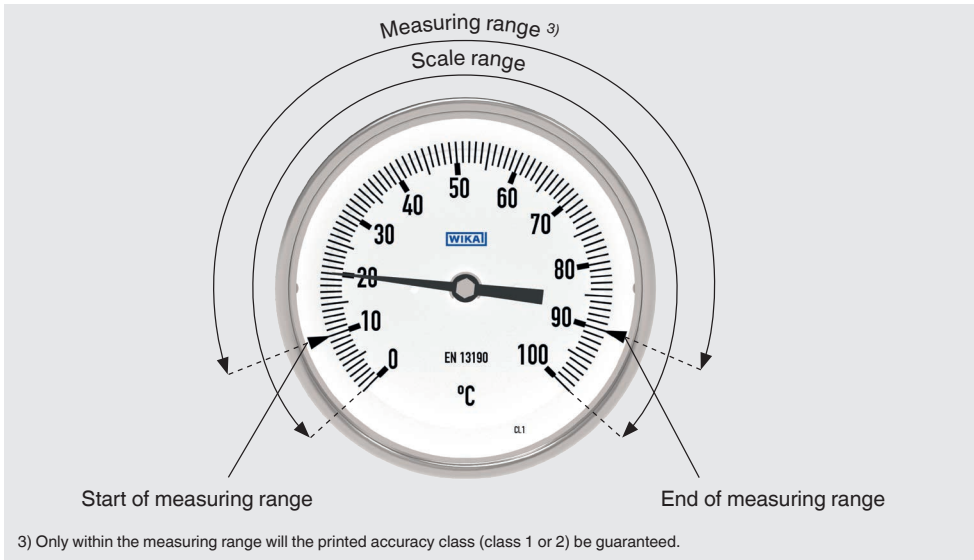
Overtemperature stability ²⁾

Scale range -70 ... +120 °C
Scale range 120 ... 280 °C
Scale range 280 ... 400 °C
Scale range 400 ... 600 °C

100 % overload safety of scale range
50 % overload safety of scale range
max. 430 °C of scale range
max. full scale value

2) Overtemperature stability only in non-Ex area

Detailed views



Scale and measuring ranges ¹⁾ (EN13190)

Scale graduation per WIKA standard

| Scale range in °C | Measuring range ¹⁾ in °C | Scale spacing in °C | Standard |
|-------------------|-------------------------------------|---------------------|----------|
| -70 ... +70 | -50 ... +50 | 2 | |
| -70 ... +30 | -60 ... +20 | 1 | ● |
| -60 ... +50 | -50 ... +40 | 1 | |
| -50 ... +50 | -40 ... +40 | 1 | |
| -50 ... +100 | -30 ... +80 | 2 | |
| -50 ... +200 | -20 ... +170 | 5 | |
| -50 ... +300 | 0 ... 250 | 5 | |
| -50 ... +400 | 0 ... 350 | 5 | |
| -50 ... +500 | 0 ... 450 | 10 | |
| -40 ... +40 | -30 ... +30 | 1 | ● |
| -40 ... +60 | -30 ... +50 | 1 | ● |
| -40 ... +80 | -20 ... +60 | 2 | |
| -40 ... +160 | -20 ... +140 | 2 | |
| -30 ... +30 | -20 ... +20 | 1 | ● |
| -30 ... +50 | -20 ... +40 | 1 | ● |
| -30 ... +70 | -20 ... +60 | 1 | ● |
| -20 ... +40 | -10 ... +30 | 1 | ● |
| -20 ... +60 | -10 ... +50 | 1 | |
| -20 ... +80 | -10 ... +70 | 1 | |
| -20 ... +100 | 0 ... 80 | 2 | |
| -20 ... +120 | 0 ... 100 | 2 | ● |
| -20 ... +140 | 0 ... 120 | 2 | |
| -10 ... +50 | 0 ... 40 | 1 | |
| 0 ... 60 | 10 ... 50 | 1 | ● |
| 0 ... 80 | 10 ... 70 | 1 | ● |
| 0 ... 100 | 10 ... 90 | 1 | ● |
| 0 ... 120 | 10 ... 110 | 2 | ● |
| 0 ... 160 | 20 ... 140 | 2 | ● |
| 0 ... 200 | 20 ... 180 | 2 | ● |
| 0 ... 250 | 30 ... 220 | 5 | ● |
| 0 ... 300 | 30 ... 270 | 5 | ● |
| 0 ... 400 | 50 ... 350 | 5 | |
| 0 ... 500 | 50 ... 450 | 5 | |
| 0 ... 600 | 100 ... 500 | 5 | |

| Scale range in °F | Measuring range ¹⁾ in °F | Scale spacing in °F | Standard |
|-------------------|-------------------------------------|---------------------|----------|
| -100 ... +150 | -70 ... +120 | 5 | ● |
| -80 ... +120 | -40 ... +100 | 2 | |
| -80 ... +240 | -50 ... +210 | 5 | |
| -40 ... +120 | -20 ... +100 | 2 | |
| 0 ... 140 | 20 ... 120 | 2 | ● |
| 0 ... 200 | 20 ... 180 | 2 | |
| 0 ... 250 | 30 ... 220 | 5 | ● |
| 30 ... 300 | 60 ... 270 | 2 | ● |
| 30 ... 400 | 80 ... 350 | 5 | |
| 50 ... 400 | 100 ... 350 | 5 | ● |
| 100 ... 800 | 200 ... 700 | 10 | |
| 150 ... 750 | 200 ... 700 | 5 | ● |
| 200 ... 1,000 | 300 ... 900 | 10 | |

¹⁾ The measuring range is indicated on the dial by two triangular marks. Only within this range is the stated error limit valid per EN 13190.

Minimum insertion lengths in mm

Scale range in °C

| Minimum insertion length in mm | | | | | | |
|--------------------------------|---------------------|--------|-------------|--------|--------------------------|--------|
| Scale range in °C | Connection location | | | | | |
| | Back mount | | Lower mount | | Adjustable stem and dial | |
| | Ø 6 mm | Ø 8 mm | Ø 6 mm | Ø 8 mm | Ø 6 mm | Ø 8 mm |
| -70 ... +70 | 80 | 63 | 80 | 80 | 80 | 80 |
| -70 ... +30 | 90 | 80 | 100 | 90 | 100 | 90 |
| -60 ... +50 | 90 | 80 | 100 | 90 | 100 | 90 |
| -50 ... +50 | 90 | 80 | 90 | 80 | 90 | 80 |
| -50 ... +100 | 80 | 63 | 90 | 80 | 90 | 80 |
| -50 ... +200 | 80 | 80 | 90 | 80 | 90 | 80 |
| -50 ... +300 | 125 | 125 | 125 | 125 | 125 | 125 |
| -50 ... +400 | 125 | 125 | 125 | 125 | 125 | 125 |
| -50 ... +500 | 125 | 125 | 125 | 125 | 125 | 125 |
| -40 ... +40 | 100 | 90 | 125 | 100 | 125 | 100 |
| -40 ... +60 | 90 | 80 | 90 | 80 | 90 | 80 |
| -40 ... +80 | 90 | 80 | 90 | 80 | 90 | 80 |
| -40 ... +160 | 80 | 63 | 80 | 63 | 80 | 63 |
| -30 ... +30 | 125 | 100 | 125 | 125 | 125 | 125 |
| -30 ... +50 | 90 | 80 | 100 | 90 | 100 | 90 |
| -30 ... +70 | 90 | 80 | 100 | 90 | 100 | 90 |
| -20 ... +40 | 125 | 90 | 125 | 100 | 125 | 100 |
| -20 ... +60 | 90 | 80 | 100 | 90 | 100 | 90 |
| -20 ... +80 | 80 | 80 | 90 | 80 | 90 | 80 |
| -20 ... +100 | 80 | 63 | 80 | 80 | 80 | 80 |
| -20 ... +120 | 80 | 63 | 80 | 80 | 80 | 80 |
| -20 ... +140 | 80 | 63 | 80 | 80 | 80 | 80 |
| -10 ... +50 | 125 | 90 | 125 | 100 | 125 | 100 |
| 0 ... 60 | 125 | 90 | 125 | 100 | 125 | 100 |
| 0 ... 80 | 90 | 80 | 100 | 90 | 100 | 90 |
| 0 ... 100 | 80 | 63 | 100 | 80 | 100 | 80 |
| 0 ... 120 | 80 | 63 | 80 | 80 | 80 | 80 |
| 0 ... 160 | 63 | 63 | 80 | 63 | 80 | 63 |
| 0 ... 200 | 63 | 63 | 63 | 63 | 63 | 63 |
| 0 ... 250 | 80 | 80 | 90 | 80 | 90 | 80 |
| 0 ... 300 | 125 | 125 | 125 | 125 | 125 | 125 |
| 0 ... 400 | 125 | 125 | 125 | 125 | 125 | 125 |
| 0 ... 500 | 125 | 125 | 125 | 125 | 125 | 125 |
| 0 ... 600 | 125 | 125 | 125 | 125 | 125 | 125 |

Notes:

- Optionally with 2nd scale °C/°F or °F/°C
- The minimum insertion lengths of 100 and 125 mm are valid for ≤ 15 pieces per order.
For larger lot sizes (> 15 pieces), as a variation to the standard minimum insertion lengths, other lengths can be requested.

Scale range in °F

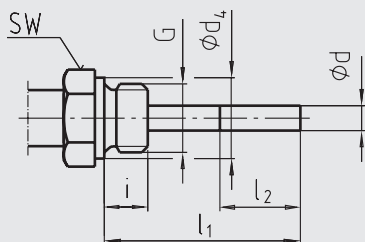
| Minimum insertion length in mm | | | | | | |
|--------------------------------|---------------------|--------|-------------|--------|--------------------------|--------|
| Scale range in °F | Connection location | | | | | |
| | Back mount | | Lower mount | | Adjustable stem and dial | |
| | Ø 6 mm | Ø 8 mm | Ø 6 mm | Ø 8 mm | Ø 6 mm | Ø 8 mm |
| -100 ... +150 | 90 | 80 | 90 | 90 | 90 | 90 |
| -80 ... +120 | 90 | 80 | 100 | 90 | 100 | 90 |
| -80 ... +240 | 90 | 80 | 90 | 80 | 90 | 80 |
| -40 ... +120 | 100 | 90 | 125 | 100 | 125 | 100 |
| 0 ... 140 | 90 | 80 | 100 | 90 | 100 | 90 |
| 0 ... 200 | 125 | 125 | 125 | 125 | 125 | 125 |
| 0 ... 250 | 80 | 63 | 80 | 80 | 80 | 80 |
| 30 ... 300 | 80 | 63 | 80 | 80 | 80 | 80 |
| 30 ... 400 | 63 | 63 | 63 | 63 | 63 | 63 |
| 50 ... 400 | 63 | 63 | 63 | 63 | 63 | 63 |
| 100 ... 800 | 125 | 125 | 125 | 125 | 125 | 125 |
| 150 ... 750 | 125 | 125 | 125 | 125 | 125 | 125 |
| 200 ... 1,000 | 125 | 125 | 125 | 125 | 125 | 125 |

Notes:

- Optionally with 2nd scale °C/°F or °F/°C
- The minimum insertion lengths of 100 and 125 mm are valid for ≤ 15 pieces per order.
For larger lot sizes (> 15 pieces), as a variation to the standard minimum insertion lengths, other lengths can be requested.

Connection designs

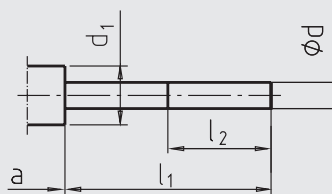
Standard design (male thread connection)



Standard insertion length $l_1 = 100, 160, 200, 250$ mm
 Recommendation: For applications with vibration on the process side

| Nominal size | Process connection | | Dimensions in mm | | |
|------------------|--------------------|----|------------------|-------|-----------------|
| NS | G | i | SW | d_4 | $\varnothing d$ |
| 63, 80, 100, 160 | G 1/2 B | 14 | 27 | 26 | 6 or 8 |
| | 1/2 NPT | 19 | 22 | - | 6 or 8 |

Design 1, plain stem (without thread)

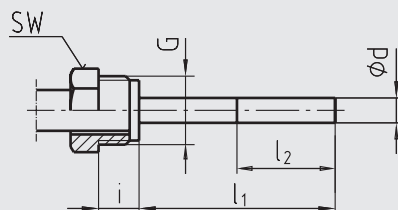


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Standard insertion length $l_1 = 100, 140, 160, 200, 240, 290$ mm
 Basis for design 4, compression fitting

| Nominal size | Dimensions in mm | | | |
|------------------|------------------|-----------------|-------------|--------------------------------|
| NS | d_1 | $\varnothing d$ | a for axial | a for adjustable stem and dial |
| 63, 80, 100, 160 | 18 | 8 | 28 | 30 |

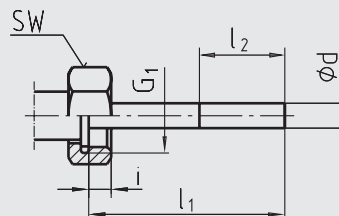
Design 2, male nut



Standard insertion length $l_1 = 140, 180, 230$ mm
 Non-sealed process connection, thus use with thermowell.

| Nominal size | Process connection | | Dimensions in mm | | |
|------------------|--------------------|----|------------------|-----------------|--|
| NS | G | i | SW | $\varnothing d$ | |
| 63, 80, 100, 160 | G 1/2 B | 20 | 27 | 6 or 8 | |
| | M18 x 1.5 | 17 | 22 | 6 or 8 | |

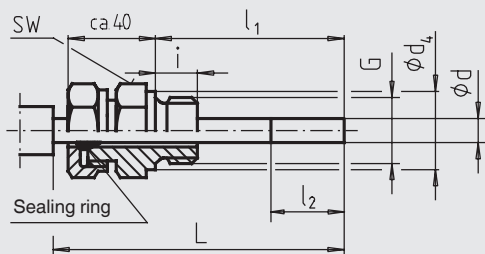
Design 3, union nut



Standard insertion length $l_1 = 126, 186, 226, 276$ mm

| Nominal size | Process connection | | Dimensions in mm | | |
|------------------|--------------------|------|------------------|-----------------|--|
| NS | G | i | SW | $\varnothing d$ | |
| 63, 80, 100, 160 | G 1/2 B | 8.5 | 27 | 6 or 8 | |
| | M24 x 1.5 | 13.5 | 32 | 6 or 8 | |

Design 4, compression fitting (sliding on stem)



Insertion length $l_1 =$ variable
 Length $L = l_1 + 40$ mm

| Nominal size | Process connection | | Dimensions in mm | | |
|------------------|--------------------|----|------------------|-------|-----------------|
| NS | G | i | SW | d_4 | $\varnothing d$ |
| 63, 80, 100, 160 | G 1/2 B | 14 | 27 | 26 | 6 or 8 |
| | 1/2 NPT | 19 | 22 | - | 6 or 8 |

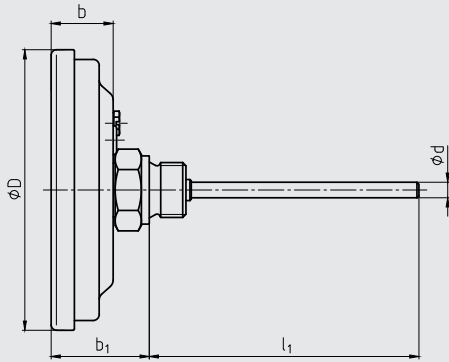
Legend:

- G Male thread
- G₁ Female thread
- i Thread length (incl. collar)
- a Distance to the case/articulated joint
- Ø d₄ Diameter of the sealing collar
- SW Spanner width
- Ø d Stem diameter
- l₂ Active length

Dimensions in mm

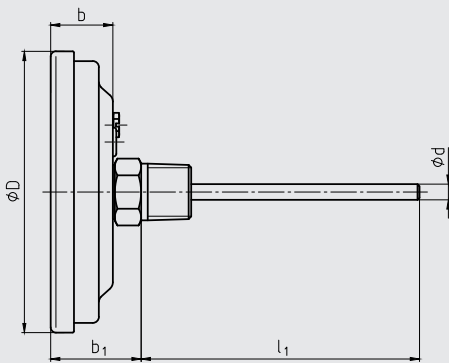
Back mount (axial)

G thread



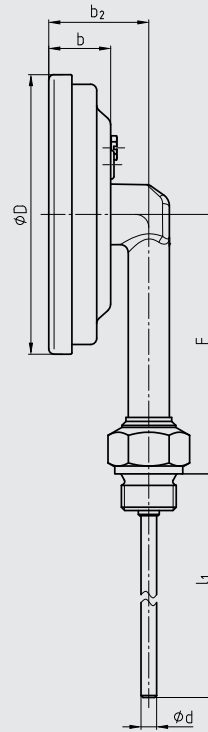
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NPT thread

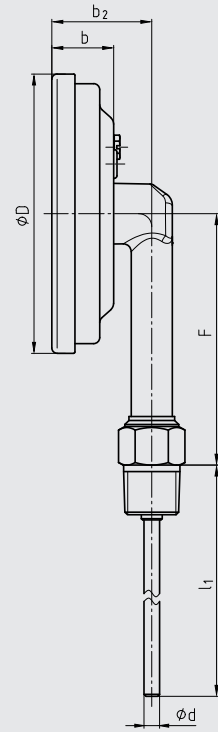


Lower mount (radial)

G thread



NPT thread

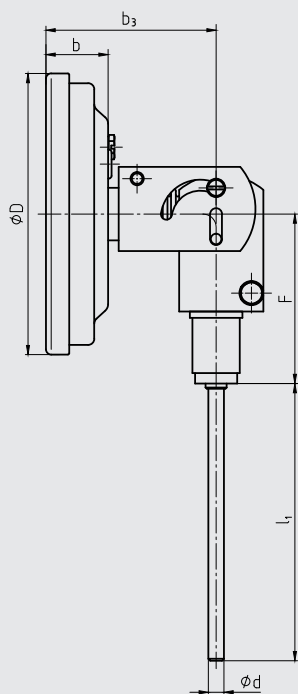


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| Nominal size | Dimensions in mm | | | | | | | | |
|--------------|------------------|--------|-----|----|------------------------------|------------|----------------|----------|------------|
| | NS | Ø D | Ø d | b | b ₁ ¹⁾ | | b ₂ | F | |
| | | | | | G thread | NPT thread | | G thread | NPT thread |
| 63 | 70 | 6 or 8 | 24 | 45 | 38 | 39 | 81 | 77 | |
| 80 | 83 | 6 or 8 | 23 | 44 | 37 | 38 | 88 | 84 | |
| 100 | 107 | 6 or 8 | 24 | 45 | 38 | 39 | 100 | 95 | |
| 160 | 167 | 6 or 8 | 24 | 45 | 38 | 39 | 130 | 125 | |

1) With scale ranges ≥ 0 ... 300 °C the dimensions increase by 40 mm

Back mount, adjustable stem and dial



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| Nominal size | Dimensions in mm | | | | |
|--------------|------------------|--------|----|----------------|----|
| | Ø D | Ø d | b | b ₃ | F |
| 63 | 70 | 6 or 8 | 24 | 65 | 67 |
| 80 | 83 | 6 or 8 | 23 | 64 | 67 |
| 100 | 107 | 6 or 8 | 24 | 65 | 67 |
| 160 | 167 | 6 or 8 | 24 | 65 | 67 |

Thermowell

In principle, the operation of a mechanical thermometer is possible without a thermowell with low process-side loading (low pressure, low viscosity and low flow velocities).

However, in order to enable exchanging the thermometer during operation (e.g. instrument replacement or calibration) and to ensure a better protection of the measuring instrument and also the plant and the environment, it is advisable to use a thermowell from the extensive WIKA thermowell portfolio.

For further information on the wake frequency calculation, see Technical information IN 00.15.

Common thermowells for mechanical thermometers

Thermowell with flange (solid-machined), model TW10

Data sheets: TW 95.10, TW 95.11, TW 95.12



Threaded thermowell (solid-machined), model TW15

Data sheet: TW 95.15



Weld-in thermowell (solid-machined), model TW25

Data sheet: TW 95.25



Threaded thermowell (fabricated), design per DIN 43772 form 5, 8, model TW45

Data sheet: TW 95.45



Threaded thermowell (solid-machined), design per DIN 43772 form 6, 7, 9, model TW50

Data sheet: TW 95.50









Thermowell, weld-in or with flange (solid-machined), design per DIN 43772 form 4, 4F, model TW55

Data sheet: TW 95.55



Special thermowells on request

Approvals

| Logo | Description | Country |
|---|--|----------------|
|  | EU declaration of conformity (option) ATEX directive Hazardous areas Ignition protection type "c" with instrument category 2G and 2D (marking, see instrument) | European Union |
|  | GOST (option) Metrology, measurement technology | Russia |
|  | KazInMetr (option) Metrology, measurement technology | Kazakhstan |
| - | MTSCHS (option) Permission for commissioning | Kazakhstan |
|  | BelGIM (option) Metrology, measurement technology | Belarus |
|  | Uzstandard (option) Metrology, measurement technology | Uzbekistan |
| - | CRN (option) Safety (e.g. electr. safety, overpressure, ...) | Canada |
|  | DNV GL (option) Type approval for the shipbuilding industry - Nominal size: 63, 80, 100 mm - Damping: with liquid damping - Maximum insertion length: 500 mm Location classification: Humidity DNVGL-CG-0339, section 3, class B Salt mist DNVGL-CG-0339, section 3, class D Vibration DNVGL-CG-0339, section 3, class B Using a thermowell is absolutely necessary. | International |

Certificates (option)

- 2.2 test report
- 3.1 inspection certificate with 3 test points (optionally with 5 test points)

Approvals and certificates, see website

Ordering information

Model / Nominal size / Connection location / Connection design / Unit / Scale range / Process connection / Stem diameter / Insertion length l_1 / Approvals / Certificates / Options

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