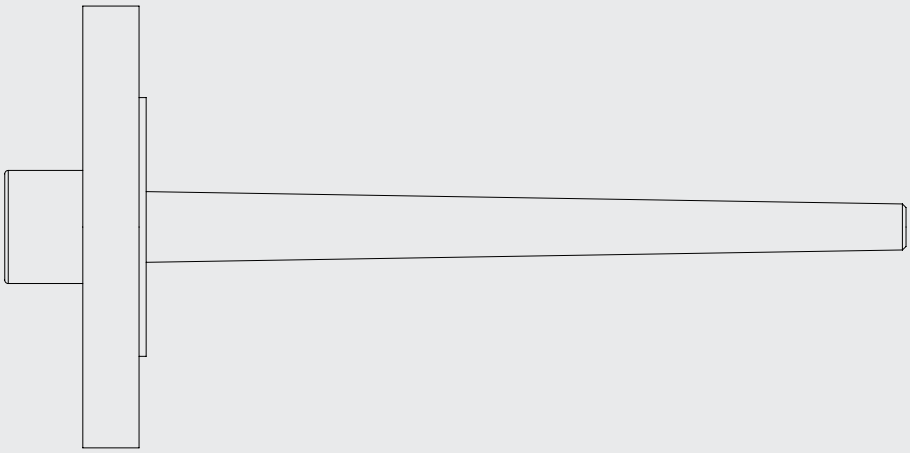
# Drilled bar stock Thermowell

BORED – FLANGED – TAPERED

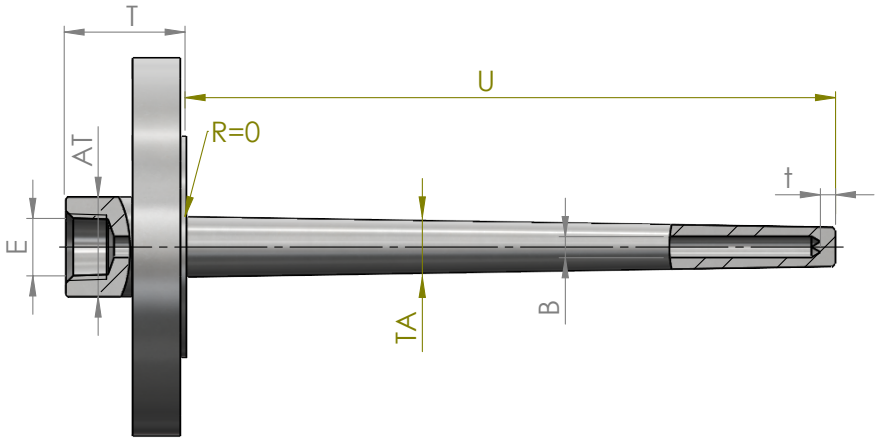
## BFT - BFTR
### CONFIGURATIONS



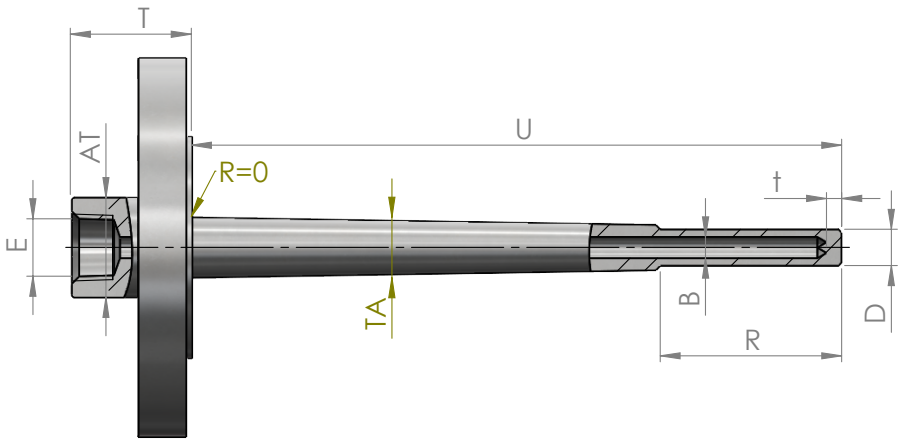
RODAX
new temperature solutions

Product series BFT

**BFT**




**BFTR**




## Features

Our thermowells are machined and drilled with a stem from solid bar stock or are machined from a single forging. High accuracy machines are used to ensure concentricity of the bore with respect to the outside diameter and a consistent wall thickness over the full length of the thermowell.
Our bar stock thermowells have been designed for various fluids and pressure applications. Metric and fractional thread connections are available.
All thermowells with a length under the flange of maximum 600 mm will be completely tapered from root till tip. For thermowells with longer length tapering will only be present on the last 300 mm of the thermowell.

## Technical specification

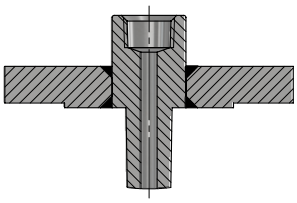
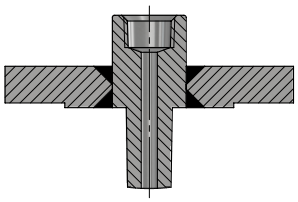
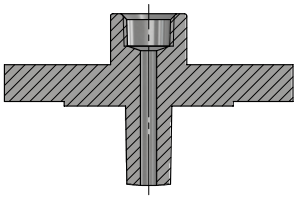
- Tolerances: all dimensions +/- 1 mm except B: +/- 0.15 mm
- Standard finish thermowell stem: 1.6<Ra<3.2 µm
- Material: wide range of materials available as per EN, ASTM and other international standards.
- Reduced tip: OD ½" (12,7mm) or 7/8" (22,2mm) for ASME PTC 19.3 compliant thermowells. Other reduced tips on request. The reduced tip is not tapered.
- Flanges according to following standards: ANSI B16.5, EN 1092-1, DIN 2527
  Sealing face roughness according to flange standard. All other international flange standards on request.
- Welding process: EN-ISO 15613 & 15614 or ASME Sec. IX on request.
- Material: We ensure that all used materials comply to the latest requirements of the international material specifications (ASTM, AISI, ASME, EN and others on request) and try to use as complete material as possible. E.g: SS316/316L 1,4401/1,4404 + NACE
- PED: As thermowells are a component of pressure equipment they do not comply with the definition for pressure equipment in article 2 (1) and therefore does not have to be marked CE. Rodax Thermowells are designed and manufactured in compliance with Article 4 paragraph 3. This means that Rodax thermowells meet all the relevant essential safety requirements mentioned in Annex I (2014/68/EU) related to the manufacturing process used.

## Options

Thermowell calculation to ASME PTC19.3 latest edition is recommended in critical applications, but these calculations put restrictions on the maximum and minimum dimensions of thermowells.

## Flange welding

For Rodax recommendations see RODAX FLANGE WELDING ADDENDUM.

| SW | FPW | FNW |
|---|---|---|
| Seal weld  | Full penetration weld  | Forged, no welds  |
| Weld approved for same temperature and pressure rating as flange. | Used for heavy duty applications. | Used in extreme process applications. |

## Material grade of flange and stem

| M2101 | M2103 | M2108 | M2118 | M0601 | M0703 | M0803 |
|---|---|---|---|---|---|---|
| SS304L | SS321 | SS316/316L | SS310S | Inconel 600 | Incoloy 800HT | Hastelloy C22 |
| 1.4307 | 1.4541 | 1.4401/1.4404 | 1.4845 | 2.4816 | 1.4959 | 2.4605 |

## Flange details according to ASME B16.5

Note: a 900 class flange is identical to a 1500 class flange under 2'' nominal size.

| **Pressure rating** (class) | F1 | F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|---|---|
| | 150 | 300 | 600 | 900 | 1500 | 2500 |

| **Nominal size** | 05 | 06 | 07 | 09 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|
| | ½" | ¾" | 1" | 1 ½" | 2" | 2 ½" | 3" | 3 ½" | 4" |

| **Flange facing** | RF | Raised face |
|---|---|---|
| | FF | Flat face |
| | RTJ | Ring type joint |

| **Surface finish (Ra)** | SF | Smooth finish 3,2-6,3 µm (125-250 µ inch) |
|---|---|---|
| | ST | Stock finish 3,2-12,5 µm (125-500 µ inch) |
| | **Other on request** | |

## Flange details according to EN 1092-1

| **Pressure rating** (PN) | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
|---|---|---|---|---|---|---|---|---|---|
| | PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | PN 63 | PN 100 | PN 160 | PN 250 |

| **Nominal size** (DN) | D04 | D05 | D06 | D07 | D08 | D09 | D10 | D11 | D12 | D13 | D14 | D15 | D16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DN10 | DN15 | DN20 | DN25 | DN32 | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 |

| | | **Flange facing** | **Surface finish** (Ra) |
|---|---|---|---|
| **Flange facing & Surface finish** (Ra) | A | Flat face | 3,2-12,5 µm max |
| | B1 | Raised face PN10 to PN40 | 3,2-12,5 µm max |
| | B2 | Raised face PN63 to PN100 | 0,8-3,2 µm max |
| | C | Tongue | 0,8-3,2 µm max |
| | D | Groove | 0,8-3,2 µm max |
| | E | Project | 3,2-12,5 µm max |
| | F | Recess | 3,2-12,5 µm max |

## Instrument connection thread & height

| E205 | E405 | E206 | E406 | Instrument connection height T (mm) minimum |
|---|---|---|---|---|
| ½" G | ½" NPT | ¾" G | ¾" NPT | 50 mm |

| **Insertion length** | U | Length in mm |
|---|---|---|

## Stem

| | | | | |
|---|---|---|---|---|
| **Tapering stem** | **TA1** | **TA2** | **TA3** | **TAC** |
| | 22 to 19 | 28 to 22 | 16 to 12 | On request |
| | **AT** | **AT** | **AT** | **AT** |
| | 32 | 35 | 30 | Minimum 30 |
| **Reduced stem (for BFTR)** | **D** | **D** | **D** | **DAC** |
| | 12,7/22,2 | 12,7/22,2 | 12,7/22,2 | On request |
| **Bore B** | 6,5/7,0 | 6,5/7,0 | 6,5/7,0 | 6,5/7,0 |
| | Others on request to suit temperature sensor | | | |
| **Tip thickness t** | 6 | 6 | 6 | 6 |
| **Radius thermowell stem (stem to flange and reduced diameter stem)** | r=0 | r=0 | r=0 | r=0 |
| | Others on request, not recommended for seal weld thermowells | | | |

| | | | |
|---|---|---|---|
| **Tip shape** | **Standard** | FL | Broken corners (1 mm 45°) |
| | **Domed tip** | DT | Radius = half of OD stem tip |

| | | |
|---|---|---|
| **Surface finish stem** | **Standard** | Standard finish thermowell: 1.6<Ra<3.2 µm |
| | **Others on request** | Specify roughness |

| | | |
|---|---|---|
| **Radius thermowell** | **Fillet radius root thermowell (between stem and flange)** | Standard r=0, other radius on request but not recommended for seal weld |
| | **Fillet radius reduced diameter stem** | Standard r=0, other radius on request |

## Certificates

| Code | Certificates |
|---|---|
| **Q04100** | Inspection (material) certificate EN10204-3.1 |
| **Q04350** | External hydraulic pressure test |
| **Q04340** | Internal hydraulic pressure test |
| **Q04340** | Positive material identification (XRF) |
| **Q02040** | EN10204-2.2 test report |
| **M01200** | Thermowell stress calculations |

# Rodax flange welding addendum

These recommendations are based on experience to keep flange distortion to a minimum while maintaining optimal thermowell strength.

| Class/Size | ½" | 1" | 1 ¼" | 1 ½" | 2" |
|---|---|---|---|---|---|
| 150 | SW | SW | SW | SW | FP |
| 300 | SW | SW | SW | FP | FP |
| 600 | SW | SW | FP | FP | FP |
| 900 | SW | FP | FP | FP | FP |
| 1500 | SW | FP | FP | FP | FP |
| 2500 | FP | FP | FP | FP | FP |

All flanges above 2'' are welded FP (full penetration).

| PN/DN | 10 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | SW | SW | SW | SW | SW | FP | FP | FP | FP | FP |
| 10 | SW | SW | SW | SW | FP | FP | FP | FP | FP | FP |
| 16 | SW | SW | SW | SW | FP | FP | FP | FP | FP | FP |
| 25 | SW | SW | SW | SW | FP | FP | FP | FP | FP | FP |
| 40 | SW | SW | SW | SW | FP | FP | FP | FP | FP | FP |
| 63 | SW | SW | FP | FP | FP | FP | FP | FP | FP | FP |
| 100 | SW | SW | FP | FP | FP | FP | FP | FP | FP | FP |

## HOW TO ORDER (example)

| Code | Description | Example | Your code |
|---|---|---|---|
| **Type** | Thermowell type | BFTR | |
| **Flange welding** | Seal welding thermowell to stem | SW | |
| **Material grade flange** | Material grade of flange SS316L | M2108 | |
| **Material grade stem** | Material grade of stem SS316L | M2108 | |
| **Pressure rating** | Pressure ration flange class 300 | F2 | |
| **Nominal size** | Nominal flange size 1'' | 07 | |
| **Flange facing** | Raised face flange | RF | |
| **Surface finish** | Smooth finish surface flange | SF | |
| **Instrument connection thread** | Instrument connection thread ½'' NPT | E405 | |
| **Instrument connection height T** | Instrument connection height 55mm | T55 | |
| **Insertion length U** | Insertion length 300mm | U300 | |
| **Tapering stem** | TAI = 22➔19 | TA1 | |
| **Stem top diameter AT** | Standard diameter AT=32 | AT32 | |
| **Reduced stem diameter D** | Standard diameter D 12,7 or 22,2 | D127 | |
| **Bore B** | Bore diameter 6,5 mm | B065 | |
| **Tip thickness** | Standard tip thickness t = 6mm | T060 | |
| **Tip shape** | Standard tip shape | FL | |
| **Certificates** | Inspection (material) certificate EN10204-3,1 | Q04100 | |

0rdering code example:
BFTR SW M2108 M2108 F2 07 RF SF E405 T55 U300 TA1 AT32 D127 B065 T060 FL Q04100

**For all options: please contact Rodax**

**Santvoortbeeklaan 33, 2100 Antwerp - Belgium**
**T +32 (0)3 360 90 00**
**E quotationdesk@rodax-europe.com**

**www.rodax-europe.com**

RODAX
new temperature solutions



**BFT GB 202004**