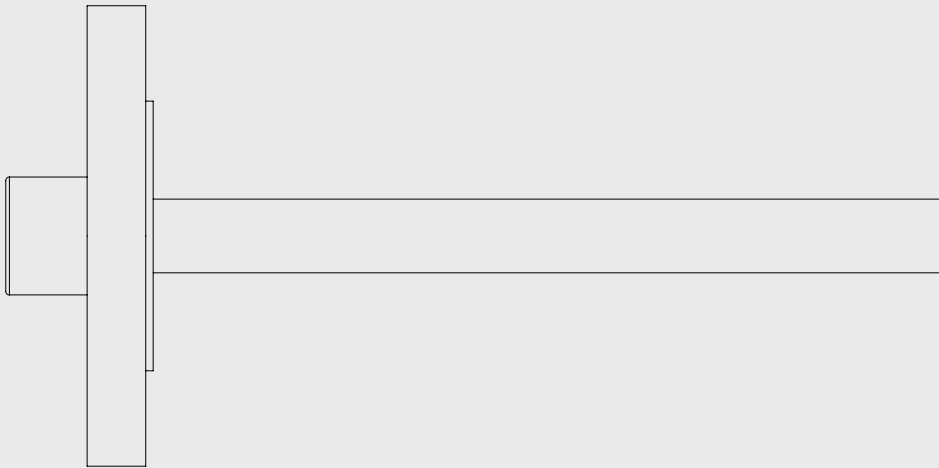


# Drilled bar stock Thermowell

BORED – FLANGED – STRAIGHT

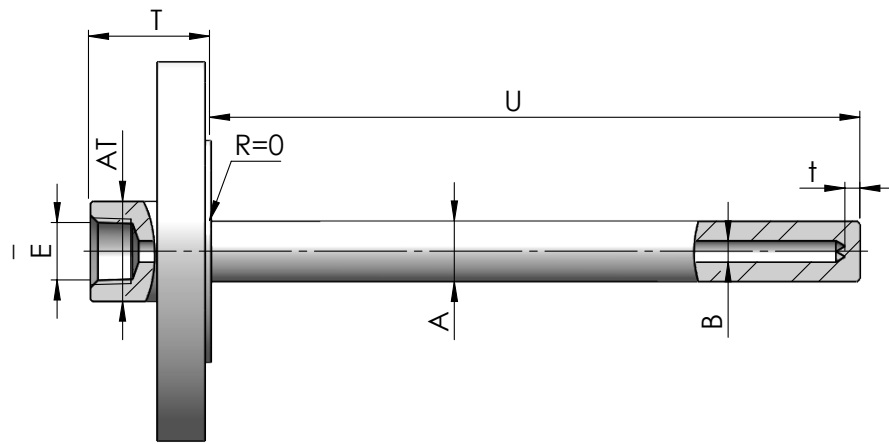
**BFS - BFSR**  
CONFIGURATIONS



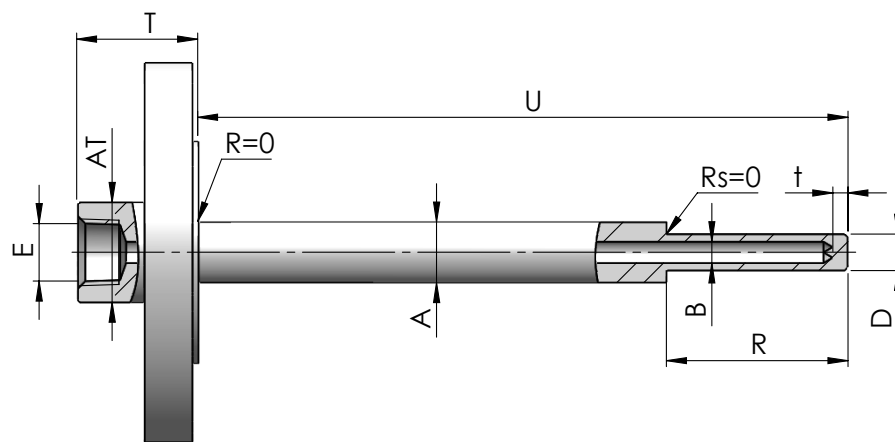
**RODAX**<sup>o</sup>  
new temperature solutions

Product series BFS

## BFS



## BFSR



## 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.

## Technical specification

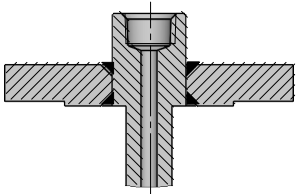
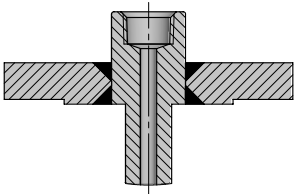
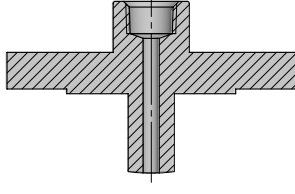
- Tolerances: all dimensions +/- 1 mm except B: +/- 0.15 mm
- Standard finish thermowell stem:  $1.6 < Ra < 3.2 \mu m$
- Material: wide range of materials available as per EN, ASTM and other international standards.
- Reduced tip: OD 1/2" (12,7mm) or 7/8" (22,2mm) for ASME PTC 19.3 compliant thermowells. Other reduced tips on request.
- 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.

<b>Pressure rating (class)</b>	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>	<b>F5</b>	<b>F6</b>			
	150	300	600	900	1500	2500			
<b>Nominal size</b>	<b>05</b>	<b>06</b>	<b>07</b>	<b>09</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
	½"	¾"	1"	1 ½"	2"	2 ½"	3"	3 ½"	4"
<b>Flange facing</b>	<b>RF</b>	Raised face							
	<b>FF</b>	Flat face							
	<b>RTJ</b>	Ring type joint							
<b>Surface finish (Ra)</b>	<b>SF</b>	Smooth finish 3,2-6,3 µm (125-250 µ inch)							
	<b>ST</b>	Stock finish 3,2-12,5 µm (125-500 µ inch)							
	Other on request								

## Flange details according to EN 1092-1

<b>Pressure rating (PN)</b>	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>	<b>F5</b>	<b>F6</b>	<b>F7</b>	<b>F8</b>	<b>F9</b>					
	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250					
<b>Nominal size (DN)</b>	<b>D04</b>	<b>D05</b>	<b>D06</b>	<b>D07</b>	<b>D08</b>	<b>D09</b>	<b>D10</b>	<b>D11</b>	<b>D12</b>	<b>D13</b>	<b>D14</b>	<b>D15</b>	<b>D16</b>	
	DN10	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200	
			<b>Flange facing</b>					<b>Surface finish (Ra)</b>						
<b>Flange facing &amp; Surface finish (Ra)</b>			<b>A</b>	Flat face					3,2-12,5 µm max					
			<b>B1</b>	Raised face PN10 to PN40					3,2-12,5 µm max					
			<b>B2</b>	Raised face PN63 to PN100					0,8-3,2 µm max					
			<b>C</b>	Tongue					0,8-3,2 µm max					
			<b>D</b>	Groove					0,8-3,2 µm max					
			<b>E</b>	Project					3,2-12,5 µm max					
			<b>F</b>	Recess					3,2-12,5 µm max					

## Instrument connection thread & height

<b>E205</b>	<b>E405</b>	<b>E206</b>	<b>E406</b>	<b>Instrument connection height T (mm) minimum</b>
½" G	½" NPT	¾" G	¾" NPT	50 mm
<b>Insertion length</b>		<b>U</b>	Length in mm	

## Stem

<b>Stem</b>	<b>A</b>	<b>AC</b>	
	22	On request	
	<b>AT</b>	<b>AT</b>	
<b>Reduced stem (for BFSR)</b>	32	Minimum 30	
	<b>D</b>	<b>DAC</b>	
<b>Bore B</b>	12,7/22,2	On request	
	6,5/7,0	6,5/7,0	
<b>Tip thickness t</b>	Others on request to suit temperature sensor		
<b>Radius thermowell stem (stem to flange and reduced diameter stem)</b>	6	6	
<b>Radius thermowell stem (stem to flange and reduced diameter stem)</b>	r=0	r=0	
	Others on request, not recommended for seal weld thermowells		
<b>Tip shape</b>	<b>Standard</b>	FL	Broken corners (1 mm 45°)
	<b>Domed tip</b>	DT	Radius = half of OD stem tip
<b>Surface finish stem</b>	<b>Standard</b>	Standard finish thermowell: 1.6<Ra<3.2 µm	
	<b>Others on request</b>	Specify roughness	
<b>Radius thermowell</b>	<b>Fillet radius root thermowell (between stem and flange)</b>	Standard r=0, other radius on request but not recommended for seal weld	
	<b>Fillet radius reduced diameter stem</b>	Standard r=0, other radius on request	

## Certificates

Code	Certificates
<b>Q04100</b>	Inspection (material) certificate EN10204-3.1
<b>Q04350</b>	External hydraulic pressure test
<b>Q04340</b>	Internal hydraulic pressure test
<b>Q05340</b>	Positive material identification (XRF)
<b>Q02040</b>	EN10204-2.2 test report
<b>M01200</b>	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	1/2"	1"	1 1/4"	1 1/2"	2"
<b>150</b>	SW	SW	SW	SW	FP
<b>300</b>	SW	SW	SW	FP	FP
<b>600</b>	SW	SW	FP	FP	FP
<b>900</b>	SW	FP	FP	FP	FP
<b>1500</b>	SW	FP	FP	FP	FP
<b>2500</b>	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
<b>6</b>	SW	SW	SW	SW	SW	FP	FP	FP	FP	FP
<b>10</b>	SW	SW	SW	SW	FP	FP	FP	FP	FP	FP
<b>16</b>	SW	SW	SW	SW	FP	FP	FP	FP	FP	FP
<b>25</b>	SW	SW	SW	SW	FP	FP	FP	FP	FP	FP
<b>40</b>	SW	SW	SW	SW	FP	FP	FP	FP	FP	FP
<b>63</b>	SW	SW	FP	FP	FP	FP	FP	FP	FP	FP
<b>100</b>	SW	SW	FP	FP	FP	FP	FP	FP	FP	FP

## HOW TO ORDER (example)

Code	Description	Example	Your code
<b>Type</b>	Thermowell type	BFSR	
<b>Flange welding</b>	Seal welding thermowell to stem	SW	
<b>Material grade flange</b>	Material grade of flange SS316L	M2108	
<b>Material grade stem</b>	Material grade of stem SS316L	M2108	
<b>Pressure rating</b>	Pressure rating flange class 300	F2	
<b>Nominal size</b>	Nominal flange size 1"	07	
<b>Flange facing</b>	Raised face flange	RF	
<b>Surface finish</b>	Smooth finish surface flange	SF	
<b>Instrument connection thread</b>	Instrument connection thread 1/2" NPT	E405	
<b>Instrument connection height T</b>	Instrument connection height 55mm	T55	
<b>Insertion length U</b>	Insertion length 300mm	U300	
<b>Stem diameter A</b>	Standard diameter A = 22 mm	A22	
<b>Stem top diameter AT</b>	Standard diameter AT=32	AT32	
<b>Reduced stem diameter D</b>	Standard diameter D 12,7 or 22,2	D222	
<b>Bore B</b>	Bore diameter 6,5 mm	B065	
<b>Tip thickness</b>	Standard tip thickness t = 6 mm	T060	
<b>Tip shape</b>	Standard tip shape	FL	
<b>Certificates</b>	Inspection (material) certificate EN10204-3,1	Q04100	

Ordering code example:

BFSR SW M2108 M2108 F2 07 RF SF E405 T55 U300 A22 AT32 D222 B065 T060 FL Q04100

**For all options: please contact Rodax**

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new temperature solutions

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**BFS GB 202004**