

Features

- Instrument connection:
thread M14x1.5, M18x1.5, M20x1.5, G1/2" or others
- Total lengths L:
200 mm, 260 mm, 410 mm
or acc. to customer's specification
- Flange according to standard:
EN 1092-1, DIN 2527, ASME B16.5 or others
- Maximal process pressure and temperature
depends on thermowell dimension and material¹⁾
- Drilled hole diameters:
Ø3.5 mm, Ø7 mm, Ø9 mm
- Thermowell materials:
1.4401 (AISI316), 1.4404 (AISI316L)
1.4541 (AISI321), 1.4571 (AISI316Ti)
1.5415 (16Mo3), 1.7335 (15HM)
1.7380 (10H2M)

Options

- Certificate 3.1 acc. to EN 10204
- PMI test
- Designation with individual serial number
- Other materials, threads and dimensions
- Protective coatings: PFA, silicon carbide or others

Description

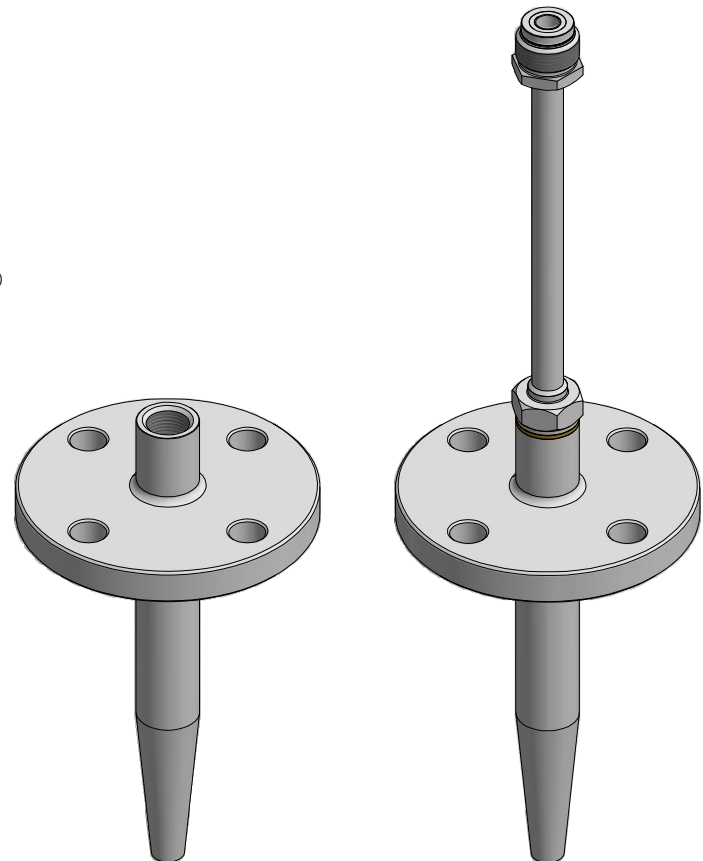
Thermowells are used to separate sensor from process environment. They are designed to work with high process loads such as high pressure and flow rates. Flange process connection allows to install thermowells into process.

Drilled thermowells with welded flange type DF are mainly used in energy and petrochemical industries.

Protective coatings

Additional protective coatings are commonly used in applications where resistance to abrasion, corrosion or erosion is critical.

This solution is also an alternative to expensive materials - it allows to lower production costs compared to thermowells made entirely of desired material. Coat can be applied for example to standard stainless steel AISI316L (1.4404).



**Drilled thermowell
Type DF
DIN 43772
(form 4F)**

**Drilled thermowell
Type DF
with neck extension
Type EDO**

Rating depends on the parameters below:

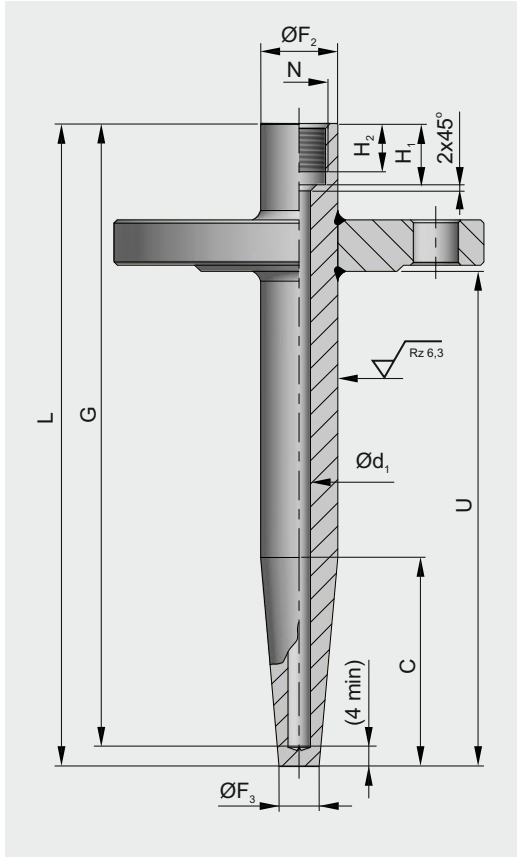
- Process medium
- Process pressure and temperature
- Flow rate
- Design of thermowell (dimensions, material)

Termoaparatura Wrocław offers following protective coating materials:

- Teflon® PTFE/PFA
- Stellite®
- Hard chrome
- Silicon carbide SiC
- Aluminum oxide

Wake frequency calculations in accordance with ASME PTC 19.3 are recommended in critical applications. TERMOAPARATURA offer this as an engineering service.

Solid machined drilled thermowells dimensions acc. to DIN 43772 – form 4F



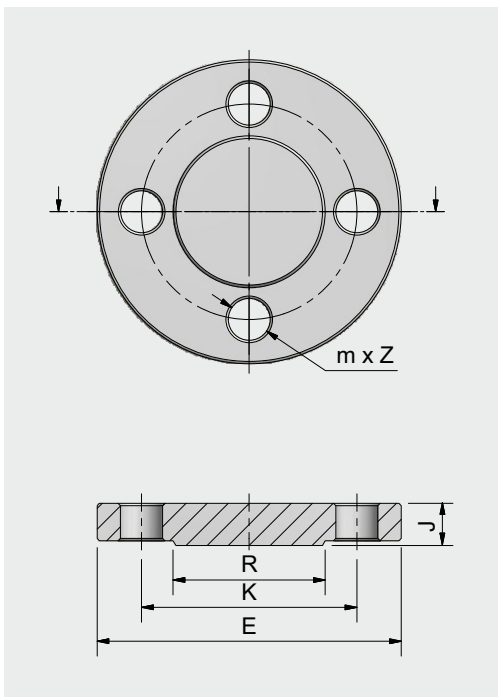
Standard diameters and threads type

d_1	F_2	N	F_3	H_1	H_2
3,5	18h7	M14x1,5	9	16	13
7	24h7	M18x1,5	12,5	19	15
	26h7	G1/2" (M20x1,5) (1/2"NPT)			
9	32h11	G3/4" (M27x2) (3/4"NPT)	17	22	17
11			19		
13			20		
14					

Standard lengths

L_0^{-2}	G_0^{+1}	C_0^{-2}	U_0^{-2}
200	195	65	130
260	255	125	190
410	405	275	340

Flange (process connection) acc. to EN 1092-1



Connection flanges can be made in accordance with standards EN 1092-1, DIN 2527, ASME B16.5. Other types available upon request.

DN20 PN16 – PN40 05 B

Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
Ø105 mm	Ø75 mm	Ø58 mm	18 mm	4 x Ø14 mm

DN25 PN16 – PN40 05 B

Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
Ø115 mm	Ø85 mm	Ø68 mm	18 mm	4 x Ø14 mm

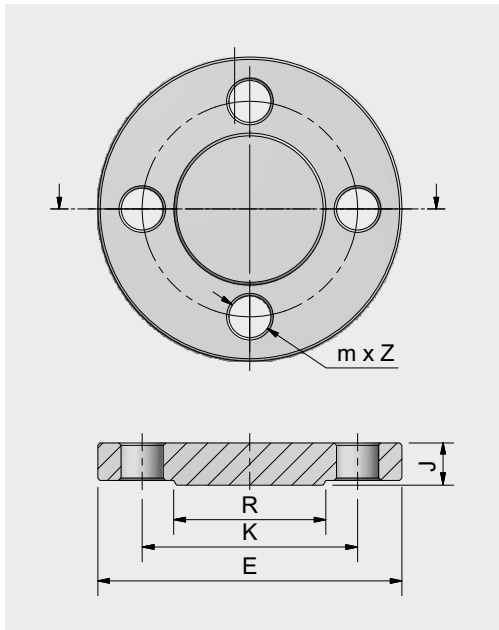
DN50 PN25 – PN40 05 B

Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
Ø165 mm	Ø125 mm	Ø102 mm	20 mm	4 x Ø18 mm

DN80 PN25 – PN40 05 B

Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
Ø200 mm	Ø160 mm	Ø138 mm	24 mm	4 x Ø18 mm

Flange (process connection) acc. to ANSI B16.5



	1" RF				
	Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
150 Lbs	Ø110 mm	Ø79,4 mm	Ø51 mm	14,7 mm	4 x Ø16 mm
300 Lbs	Ø125 mm	Ø88,9 mm	Ø51 mm	17,9 mm	4 x Ø19 mm

	1 1/2" RF				
	Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
150 Lbs	Ø125 mm	Ø98,4 mm	Ø73 mm	17,9 mm	4 x Ø16 mm
300 Lbs	Ø155 mm	Ø114,3 mm	Ø73 mm	21,1 mm	4 x Ø22 mm
600 Lbs	Ø155 mm	Ø114,3 mm	Ø73 mm	29,3 mm	4 x Ø22 mm

	2" RF				
	Diameter E	Diameter K	Diameter R	Height J	Dimension m x Z
150 Lbs	Ø150 mm	Ø120,7 mm	Ø92 mm	19,5 mm	4 x Ø19 mm
300 Lbs	Ø165 mm	Ø127 mm	Ø92 mm	22,7 mm	8 x Ø19 mm
600 Lbs	Ø165 mm	Ø127 mm	Ø92 mm	32,4 mm	8 x Ø19 mm

Materials

DIN material number designation	DIN	PN
1.5415	16Mo3	16Mo3
1.7335	13CrMo4-5	15HM
1.7380	10CrMo9-10	10H2M
1.4571	X6CrNiMoTi17-12-2	H17N13M2T

Material	Maximal temperature	Material properties	Applications
1.5415	530°C	High resistance in water vapor environment. Perfect for applications that requires high pressure resistance. Very well weldable material.	Industrial boilers and furnaces, pressure tanks, heat exchangers, chemical industry.
1.7335	560°C	Good welded properties, does not require special preliminary heat treatment. Increased resistance to hydrogen and water vapor environment. Resistant up to 560°C.	Power and chemical industry, tank and boiler construction.
1.7380	590°C	Good welded properties. Increased resistance to hydrogen and water vapor environment. Resistant up to 590°C.	Power and chemical industry, boiler construction and pressure vessels.
1.4571	800°C	High resistance to intercrystalline corrosion after welding. Good resistance to heavy oils, steam and exhaust gases. High resistance to oxidation. Can be used continuously up to approximately 800°C. Can be use as an alternative to steel 1.4404.	Nuclear power and reactor construction, chemical apparatus engineering, annealing furnaces, heat exchangers, petrochemical and crude oil industry, food processing industry.

Load charts for selected dimensions and material types of drilled thermowells acc. to DIN 43772

Parameters and material types for load charts selected as an example.

Form	curve	C	$\varnothing F_2$	$\varnothing d_1$	Material
4F	a	65	18	3,5	1.4571
					1.5415
	b	125	24	7	1.7335
					1.7380
	c	125	26	11	1.4571
	d				

NOTES: Designation from a to d are only use for load charts purpose

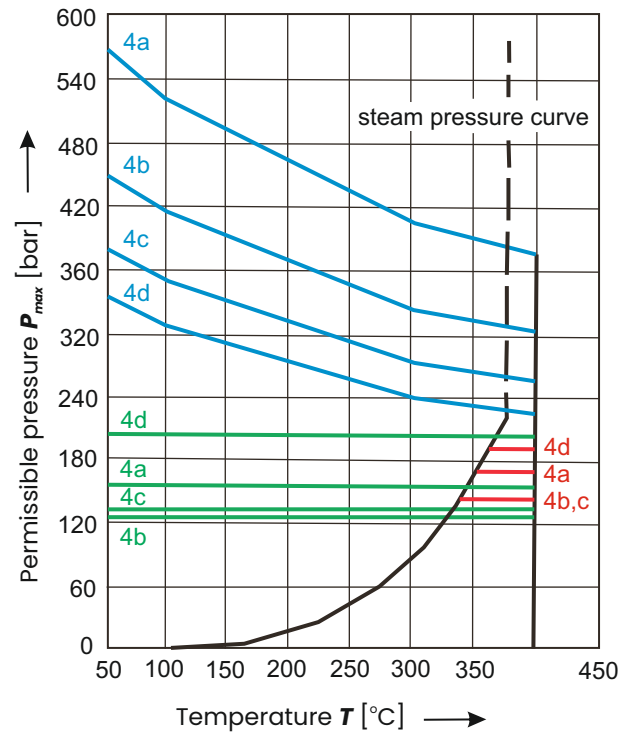


Chart 1:
Permissible loads for drilled thermowell type D form 4 for material: **1.4571**

- Values for water flow 5 m/s
- Values for air flow 60 m/s
- Values for steam flow 60 m/s

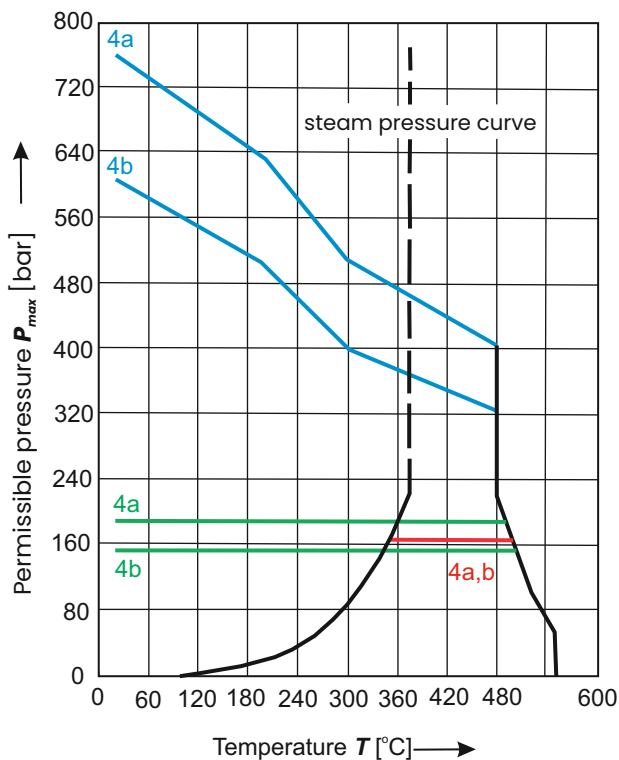


Chart 2:
Permissible loads for drilled thermowell type D form 4 for material: **1.5415**

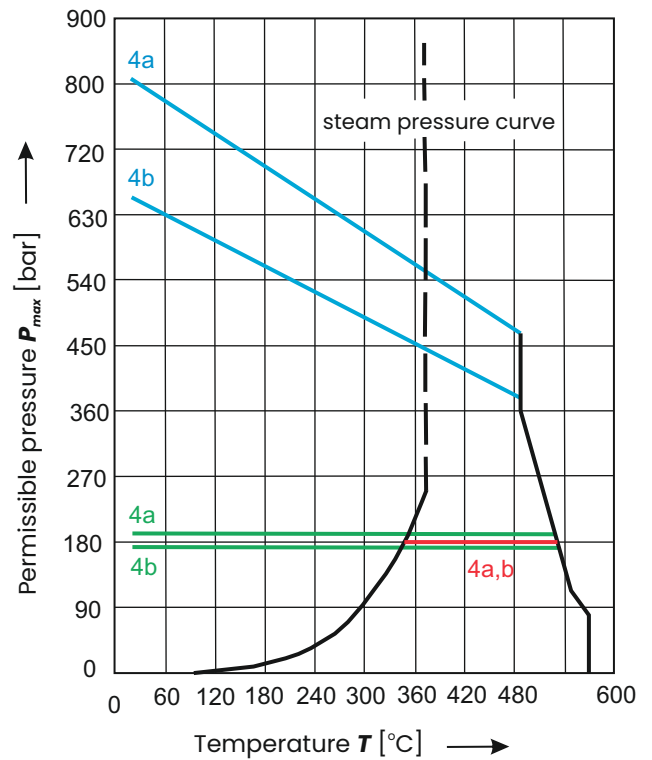


Chart 3:
Permissible loads for drilled thermowell type D form 4 for material: **1.7335 i 1.7380**

Ordering code

DF - 1 - 2 - 3 - 4 - 5 - 6 - 7

1	<input type="text"/>	Design	
		18	drilled thermowell, Ø18h7
		24	drilled thermowell, Ø24h7
		26	drilled thermowell, Ø26h7
2	<input type="text"/>	Length L	
		200	200 mm
		260	260 mm
		410	410 mm
3	<input type="text"/>	Length C	
		65	65 mm
		125	125 mm
		275	275 mm
4	<input type="text"/>	Length U	
		130	130 mm
		190	190 mm
		340	340 mm
5	<input type="text"/>	Instrument connection N	
		M12x1.5	metric thread M12x1.5
		M14x1.5	metric thread M14x1.5
		M18x1.5	metric thread M18x1.5
		M20x1.5	metric thread M20x1.5
		G1/2"	inch thread G1/2"
1/2"NPT	tapered inch thread 1/2"NPT		
6	<input type="text"/>	Thermowell material	
		1.5415	steel 1.5415 (16Mo3)
		1.7335	steel 1.7335 (13CrMo4-5, 15HM)
		1.7380	steel 1.7380 (10CrMo9-10, 10H2M)
		1.4571	stainless steel 1.4571 (X6CrNiMoTi17-12-2)
7	<input type="text"/>	Process connection	
		DN20PN16	flange DN20PN16 in accordance to EN 1092-1
		DN25PN16	flange DN20PN16 in accordance to EN 1092-1
		DN50PN25	flange DN50PN25 in accordance to EN 1092-1
		xxx	other, please specify