

# Flanged thermowell built-up design

## Design description

Badotherm thermowell model TW112 is a built-up, fabricated type thermowell with a flanged process connection. The construction is available with straight stem. The standard material is AISI 316(L). Thermowells are designed to protect the temperature bulb from corrosive effect or other process conditions. It also allows replacing the temperature instrument without disturbing the process.

## Wetted part materials

Material common name	UNS	Wst.
AISI 316(L)	S31603	1.4404

## Flange standard, size, rating and facings

ASME B16.5			
Size	Rating	Facing	Roughness
1" to 2"	cl. 150 - cl. 600	RF, LMF, FF, SGF	Ra 3.2-6.3 $\mu\text{m}$
		RJF, SFF	Ra <1.6 $\mu\text{m}$
		SMF, LTF, STF, LGF, LFF	Ra <3.2 $\mu\text{m}$

EN 1092-1			
Size	Rating	Type	Roughness
DN25 to DN50	PN10-40	A, B1, E, F	Ra 3.2-12.5 $\mu\text{m}$
		B2, C, D, G, H	Ra <0.8-3.2 $\mu\text{m}$

## Pressure & Temperature limits

Pressure limit	40 bar
Temperature limit	500°C

## Dimension limits

### Standard DIN 43772 length dimensions

Insert length U
225
315
465

### Standard diameter dimensions

Tube OD (A)	Bore size (d)
8	6.2
12	7
14	9
	11



## Material Certification

Material traceability and related certification are applicable for all process wetted parts. Material certification possibilities depend on the type of seal, the assembly construction and the materials used. Material certification is in accordance with EN10204 3.1.

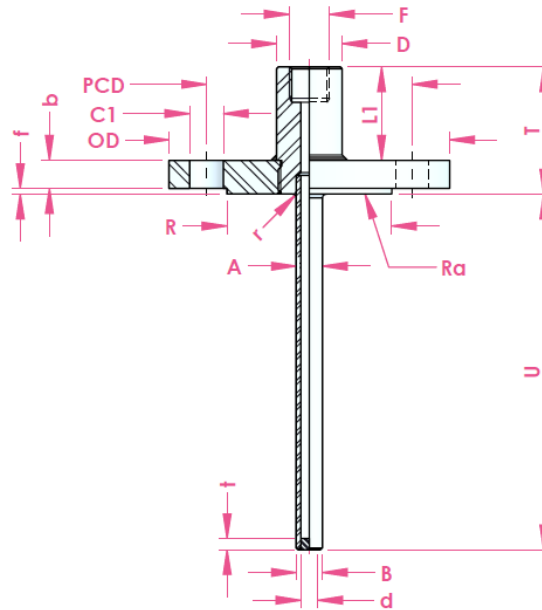
## Flange Marking & Traceability

All flanges are marked by the forging shop with heat number, material designation, size, and rating. Badotherm adds a Badotherm reference number, heat number of the stem and the manufacturers name to the flange for traceability purposes.

## Flanges and origin

The flanged parts are made from forged materials according to the applicable standards. The standard sourcing of flanges is of international origin. Optionally regional preference can be requested, for example materials from EU origin.

### Dimensions table:



#### ASME B16.5 RF flange dimensions

	rating	OD	b	PCD	C1 / pcs	R	f	L1	T	D	t
1"	cl. 150	110.0	14.7	79.4	15.9 / 4x	50.8	2.0	50	66.7	35	5.5
	cl. 300	125.0	17.9	88.9	19.1 / 4x		7.0		69.9		
	cl. 400-600		81.5								
1.25"	cl. 150	115.0	17.9	88.9	15.9 / 4x	63.5	2.0		71.5		
	cl. 300	135.0	19.5	98.4	19.1 / 4x		7.0		71.5		
1.5"	cl. 400-600		27.7			98.4	19.1 / 4x		73.0		
	cl. 150	125.0	17.9	98.4	15.9 / 4x	7.0	69.9				
	cl. 300	155.0	21.1	114.3	22.3 / 4x	2.0	73.1				
cl. 400-600	29.3		86.3								
2"	cl. 150	150.0	19.5	120.7	19.1 / 4x	92.1	2.0		71.5		
	cl. 300	165.0	22.7	127.0	19.1 / 8x		7.0	74.7			
	cl. 400-600		32.4			89.4					

All dimensions in mm, weight in kg

#### DIN 1092-1 B1 flange dimensions

	rating	OD	b	PCD	C / pcs	R	f	L1	T	D	t
DN25	PN10-40	115.0	18.0	85.0	14.0 / 4x	68.0	2.0	50.0	70.0	35.0	5.5
DN40	PN10-40	150.0	18.0	88.0	18.0 / 4x	88.0	3.0		71.0		
DN50	PN10-40	165.0	20.0	125.0	18.0 / 4x	102.0	3.0		73.0		

All dimensions in mm, weight in kg

## ASME Thermowell selection

Selection		Suffix	Description
Thermowell type	BDTW112		Straight stem - Flanged bar stock thermowell
Flange standard	A		ASME B16.5 sizing
Size	02		1"
	04		1.5"
	05		2"
Class	A1		cl. 150
	A2		cl. 300
	A4		cl. 600
Facing type	RF RJF LMF SMF FF LTF STF LGF SGF LFF SFF		Raised Face ◀ Ring Joint Face Large Male Face Small Male Face Flat Face Large Tongue Face Small Tongue Face Large Groove Face Small Groove Face Large Female Face Small Female Face
Instrument connection	N12F M20F G12F		½" NPT female M20 female G ½" female
Insertion length	U...		U length followed by U length in mm
Bore diameter	B62 B70 B90 B11		6.2mm 7.0mm 9.0mm 11.0mm Bore diameter may be selected in all dimensions. Please check if the ratio's for wall thickness and bore ratio are in line with the tables for dimensional limits.
Root diameter	D08 D12 D14		8mm in combination with b=6.2mm 12mm in combination with b=7mm 14mm in combination with b=9 or 11mm
Material selection of wetted parts	S316		AISI 316(L) S31600/S31603

## EN Thermowell selection

Selection		Suffix	Description
Thermowell type	BDTW212		Straight stem - Flanged bar stock thermowell
Flange standard	E		EN 1092-1
Size	23		DN25
	26		DN40
	27		DN50
Class	D4		PN10-40
Facing type	A B1 B2 C D E F		Flat face Raised face standard finish ◀ Raised face smooth finish Tongue Groove Spigot Recess
Instrument connection	N12F M20F G12F		½" NPT female M20 female G1/2 female
Insertion length	U... U#...mm		U length followed by U length in mm U1 length for stepped executions only
Bore diameter	B62 B70 B90 B11		6.2mm 7.0mm 9.0mm 11.0mm Bore diameter may be selected in all dimensions. Please check if the ratio's for wall thickness and bore ratio are in line with the tables for dimensional limits.
Root diameter	D08 D12 D14		8mm in combination with b=6.2mm 12mm in combination with b=7mm 14mm in combination with b=9 or 11mm
Material selection of wetted parts	S316		AISI 316(L) S31600/S31603

## option selection

Options		
Accessory	PCH	Plug and chain mounted to the thermowell
Coating and treatments	K1	Cleaned from oil and grease
	CPTS	PTFE Coating of $\pm 30\mu\text{m}$ thickness
	CPTT	PTFE Coating of $\pm 80\mu\text{m}$ thickness
	CPFS	PFA Coating $\pm 35\mu\text{m}$ thickness
	CPFS	PFA Coating $\pm 90\mu\text{m}$ thickness
	CHAL	ECTFE Coating $\pm 600\mu\text{m}$ thickness
Certificates and testing <sup>6</sup>	CFEP	FEP Coating $\pm 35\mu\text{m}$ thickness
	N75	2.1 NACE ISO 15156 (MR 01 75)
	LTPA	2.1 Static pressure leak test certificate acc ASME B16.5 (1.5 x MWP) <sup>5</sup>
	LTCE	2.1 Static pressure leak test certificate acc PED 2014/68/EU (1.43 x MWP) <sup>5</sup>
	PT1	2.1 Penetrant test certificate level 1 acc ISO 9712
	PT2	2.2 Penetrant test certificate level 2 acc ISO 9712
Special options	PMI	2.2 Positive Material Identification
	WPS	2.2 Welding documents (WPS/PQR)
	IC32	3.2 Material certificate on materials
Special options	RD	Rush Delivery
	EU	European Origen materials

<sup>5</sup>:MWP is limited by flange rating, MWP pressure instrument, and MWP seal construction. Lowest value is used in order to prevent permanent damage.

<sup>6</sup>: Test report and 3.1 certificate on wetted parts is standard part of supply.

## Order related options

Options on complete order		
Certificates and testing	PMI	2.2 Positive Material Identification
	3PI	Third party inspection of goods
Packing	SW	Seaworthy packing

**Authorised Distributor:**



46, Jalan SS 22/21, Damansara Jaya,  
47400 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia.

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DTW 9112 - 30 March 2022

**Change log**

Date	Change

Holland – Romania – India – Thailand – Dubai – USA

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