

Badotherm thermowell model TW2x3 is a bar stock, solid machined type thermowell suitable for a Lap Joint Flange process connection. The construction is available with straight, stepped, or tapered stem. The standard material is AISI 316(L) and optionally various exotic materials are available. Thermowells are designed to protect the temperature bulb from corrosive effect, extreme pressure, or other process conditions. It also allows replacing the temperature instrument without disturbing the process.



STANDARD EXECUTION

TYPE	THERMOWELL	FLANGE	BORE SIZE	LENGTH
bar stock	AISI 316(L)	AISI316(L)	6.5 mm	customer specific

PROCESS CONNECTION

Lap Joint Flange

PROCESS CONNECTIONS

ASME B16.5

size	rating	facing
1.5"	cl. 150 - cl. 2500	RF
2"	cl. 150 - cl. 2500	RF
3"	cl. 150 - cl. 2500	RF
4"	cl. 150 - cl. 2500	RF

EN 1092-1

size	rating	facing type
DN40	PN10-100	B1
DN50	PN10-100	B1
DN80	PN10-100	B1
DN100	PN10-100	B1

INSTRUMENT CONNECTIONS, CONSTRUCTION, AND BORE SIZE

size (F1)	thread	
1/2"	NPT	female
1/2"	BSP	female
M20x1.5	METRIC	female

construction	bore size (d)
straight (TW213)	6.5
stepped (TW223)	7
tapered (TW233)	8

All dimensions in mm

WETTED PARTS, FLANGE MATERIALS, AND FACING OPTIONS

stem material	flange material
AISI 316(L)	AISI 316(L)
AISI 321	A 105
Inconel 625	
Inconel 825	
Duplex	
Hastelloy C-276	
Monel 400	

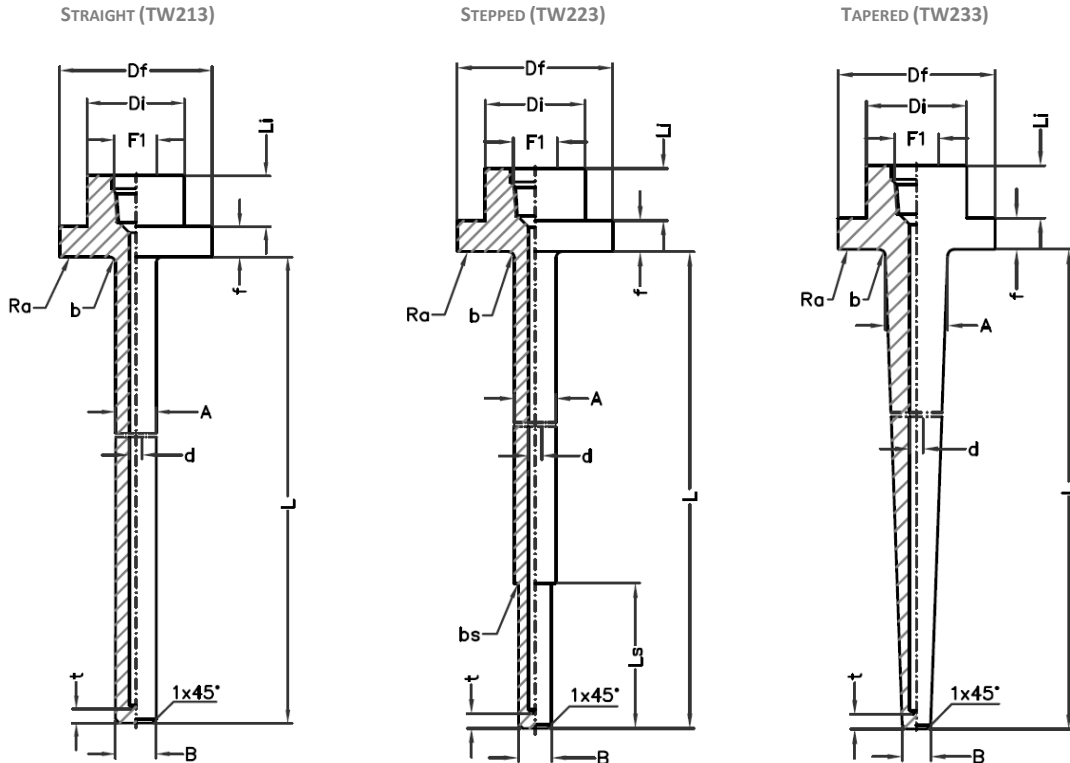
facing (ASME B16.5)	
RF	Ra 3.2-6.3 µm
RJF	Ra <1.6 µm
LMF	Ra 3.2-6.3 µm
SMF	Ra <3.2 µm
FF	Ra 3.2-6.3 µm
LTF	Ra <3.2 µm
STF	Ra <3.2 µm
LGF	Ra <3.2 µm
SGF	Ra <3.2 µm
LFF	Ra 3.2-6.3 µm
SFF	Ra <3.2 µm

facing type (EN 1092-1)	
B1	Ra 3.2-12.5 µm
A	Ra 3.2-12.5 µm
B2	Ra 0.8-3.2 µm
C	Ra 0.8-3.2 µm
D	Ra 0.8-3.2 µm
E	Ra 3.2-12.5 µm
F	Ra 3.2-12.5 µm
G	Ra 0.8-3.2 µm
H	Ra 0.8-3.2 µm

OPTIONS

- wake frequency calculation per ASME PTC 19.3 TW-2010
- coatings: PTFE/ ECTFE for anti-stick purpose only
- pressure test
- stainless steel plug & chain
- tantaline treatment
- thermowells > 610 mm

DRAWING AND DIMENSIONS STANDARD EXECUTIONS



ASME B16.5 - RF FACING

size	rating	A	B	min / max	b	bs <sup>1</sup>	Di	Df	d	f	L	Li	Lr	Ls <sup>1</sup>	t
1,5"	cl. 150	21	16	12.6 / 40	3	3	48	73	6.5	15	various	25	120	various	5
1,5"	cl. 300	21	16	12.6 / 40	3	3	48	73	6.5	15	various	25	120	various	5
1,5"	cl. 400-600	21	16	12.6 / 40	3	3	48	73	6.5	15	various	25	120	various	5
1,5"	cl. 900-1500	21	16	12.6 / 40	3	3	48	73	6.5	15	various	25	120	various	5
1,5"	cl. 2500	21	16	12.6 / 40	3	3	48	73	6.5	15	various	25	120	various	5
2"	cl. 150	21	16	12.6 / 40	3	3	61	92	6.5	20	various	25	120	various	5
2"	cl. 300	21	16	12.6 / 40	3	3	61	92	6.5	20	various	25	120	various	5
2"	cl. 400-600	21	16	12.6 / 40	3	3	61	92	6.5	20	various	25	120	various	5
2"	cl. 900-1500	21	16	12.6 / 40	3	3	61	92	6.5	20	various	25	120	various	5
2"	cl. 2500	21	16	12.6 / 40	3	3	61	92	6.5	20	various	25	120	various	5
3"	cl. 150	21	16	12.6 / 40	3	3	89	127	6.5	20	various	25	120	various	5
3"	cl. 300	21	16	12.6 / 40	3	3	89	127	6.5	20	various	25	120	various	5
3"	cl. 400-600	21	16	12.6 / 40	3	3	89	127	6.5	20	various	25	120	various	5
3"	cl. 900	21	16	12.6 / 40	3	3	89	127	6.5	20	various	25	120	various	5
3"	cl. 1500	21	16	12.6 / 40	3	3	89	127	6.5	20	various	25	120	various	5
3"	cl. 2500	21	16	12.6 / 40	3	3	89	127	6.5	20	various	25	120	various	5
4"	cl. 150	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5
4"	cl. 300	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5
4"	cl. 400	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5
4"	cl. 600	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5
4"	cl. 900	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5
4"	cl. 1500	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5
4"	cl. 2500	21	16	12.6 / 40	3	3	115	157	6.5	20	various	25	120	various	5

All dimensions in mm

Dimensions based on standard execution d=6.5

For restrictions see table dimensional limits

<sup>1</sup> only applicable for stepped executions

EN 1092-1 - TYPE B1

size	rating	A	B	min / max	b	bs <sup>1</sup>	Di	Df	d	f	L	Li	Lr	Ls <sup>1</sup>	t
DN40	PN10-40	21	16	12.6 / 40	3	3	47	88	6.5	15	various	25	120	various	5
DN40	PN63-100	21	16	12.6 / 40	3	3	47	88	6.5	15	various	25	120	various	5
DN50	PN10-16	21	16	12.6 / 40	3	3	59	102	6.5	20	various	25	120	various	5
DN50	PN25-40	21	16	12.6 / 40	3	3	59	102	6.5	20	various	25	120	various	5
DN50	PN63	21	16	12.6 / 40	3	3	59	102	6.5	20	various	25	120	various	5
DN50	PN100	21	16	12.6 / 40	3	3	59	102	6.5	20	various	25	120	various	5
DN80	PN10-16	21	16	12.6 / 40	3	3	88	138	6.5	20	various	25	120	various	5
DN80	PN25-40	21	16	12.6 / 40	3	3	88	138	6.5	20	various	25	120	various	5
DN80	PN63	21	16	12.6 / 40	3	3	88	138	6.5	20	various	25	120	various	5
DN80	PN100	21	16	12.6 / 40	3	3	88	138	6.5	20	various	25	120	various	5
DN100	PN10-16	21	16	12.6 / 40	3	3	114	158	6.5	20	various	25	120	various	5
DN100	PN25-40	21	16	12.6 / 40	3	3	114	162	6.5	20	various	25	120	various	5
DN100	PN63	21	16	12.6 / 40	3	3	114	162	6.5	20	various	25	120	various	5
DN100	PN100	21	16	12.6 / 40	3	3	114	162	6.5	20	various	25	120	various	5

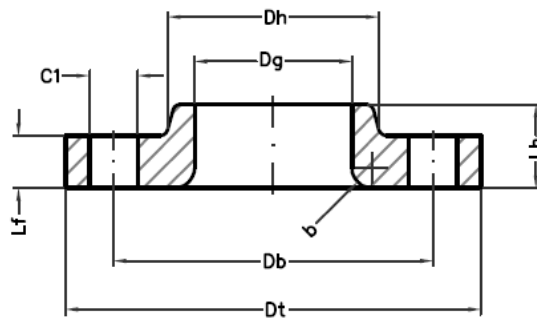
All dimensions in mm

Dimensions based on standard execution d=6.5

For restrictions see table dimensional limits

<sup>1</sup> only applicable for stepped executions

DRAWING AND DIMENSIONS STANDARD EXECUTIONS



ASME B16.5 – LAPPED FLANGE

size	rating	b	Db	Dg	Dh	Dt	Lf	Lh	C1 / pcs
1,5"	cl. 150	6	99	50	65	125	16	22	16 / 4x
1,5"	cl. 300	6	114	50	70	155	19	30	22 / 4x
1,5"	cl. 400-600	6	114	50	70	155	22	32	22 / 4x
1,5"	cl. 900-1500	6	124	50	70	180	32	44	29 / 4x
1,5"	cl. 2500	6	146	50	79	205	45	60	32 / 4x
2"	cl. 150	8	121	63	78	150	18	25	19 / 4x
2"	cl. 300	8	127	63	84	165	21	33	19 / 8x
2"	cl. 400-600	8	127	63	84	165	25	37	19 / 8x
2"	cl. 900-1500	8	165	63	105	215	38	57	25 / 8x
2"	cl. 2500	8	171	63	95	235	51	70	29 / 8x
3"	cl. 150	10	152	91	108	190	22	30	19 / 4x
3"	cl. 300	10	168	91	117	210	27	43	22 / 8x
3"	cl. 400-600	10	168	91	117	210	32	46	22 / 8x
3"	cl. 900	10	191	91	127	240	38	54	25 / 8x
3"	cl. 1500	10	203	91	133	265	48	73	32 / 8x
3"	cl. 2500	10	229	91	133	305	67	92	35 / 8x
4"	cl. 150	11	191	117	135	230	22	33	19 / 8x
4"	cl. 300	11	200	117	146	255	30	48	22 / 8x
4"	cl. 400	11	200	117	146	255	35	54	25 / 8x
4"	cl. 600	11	216	117	152	275	38	54	25 / 8x
4"	cl. 900	11	235	117	159	290	45	70	32 / 8x
4"	cl. 1500	11	241	117	162	310	54	90	35 / 8x
4"	cl. 2500	11	273	117	165	355	76	108	42 / 8x

All dimensions in mm

## EN 1092-1 – LAPPED FLANGE

size	rating	Db	Dg	Dh	Dt	Lf	Lh	C1 / pcs
<b>DN40</b>	PN10-40	110	50	80	150	18	34	18 / 4x
<b>DN40</b>	PN63-100	125	50	80	170	26	34	22 / 4x
<b>DN50</b>	PN10-16	125	62	95	165	20	36	18 / 4x
<b>DN50</b>	PN25-40	125	62	95	165	20	36	18 / 4x
<b>DN50</b>	PN63	135	62	95	180	26	36	22 / 4x
<b>DN50</b>	PN100	145	62	95	195	28	36	26 / 4x
<b>DN80</b>	PN10-16	160	91	130	200	24	44	18 / 8x
<b>DN80</b>	PN25-40	160	91	130	200	24	44	18 / 8x
<b>DN80</b>	PN63	170	91	130	215	28	44	22 / 8x
<b>DN80</b>	PN100	180	91	130	230	32	44	26 / 8x
<b>DN100</b>	PN10-16	180	116	158	220	20	52	18 / 8x
<b>DN100</b>	PN25-40	190	116	158	235	24	52	22 / 8x
<b>DN100</b>	PN63	200	116	158	250	30	52	26 / 8x
<b>DN100</b>	PN100	210	116	158	265	36	52	30 / 8x

All dimensions in mm

EN has a 90° angle instead of a radius; hence missing dimension b

## DIMENSIONAL LIMITS FOR STRAIGHT, TAPERED, AND STEPPED THERMOWELLS

## STRAIGHT AND TAPERED

description	symbol	minimum	maximum
unsupported length	L	63.5	610
bore diameter	d	6.1	21
tip diameter	B	12.6	46.5
taper ratio	B/A	0.6	1
bore ratio	d/B	0.2	0.7
aspect ratio	L/B	2	
minimum wall thickness	(B-d)/2	3	

All dimensions in mm

For tapered executions L > 240 mm; there will be a tapered section (max length of 240 mm) and a straight section (L – 240 mm)

<sup>1</sup> Step diameter ratio, for B=12.7

<sup>2</sup> Step diameter ratio, for B=22.23

## STEPPED

description	symbol	minimum	maximum
unsupported length	L	127	610
bore diameter	D	6.1	6.7
tip diameter	B	12.7 and 22.2	
step diameter <sup>1</sup>	B/A	0.5	0.8
step diameter <sup>2</sup>	B/A	0.6	0.9
length ratio	Ls/L	0	0.6
minimum wall thickness	(B-d)/2	3	



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