

Badotherm thermowell model TW2x2 is a bar stock type thermowell with a flanged 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
flanged

PROCESS CONNECTIONS

ASME B16.5

| size | rating | facing |
|-------|--------------------|--------|
| 1" | cl. 150 - cl. 2500 | RF |
| 1.25" | cl. 150 - cl. 2500 | RF |
| 1.5" | cl. 150 - cl. 2500 | RF |
| 2" | cl. 150 - cl. 2500 | RF |
| 2.5" | cl. 150 - cl. 2500 | RF |
| 3" | cl. 150 - cl. 2500 | RF |
| 4" | cl. 150 - cl. 2500 | RF |

EN 1092-1

| size | rating | facing type |
|-------|----------|-------------|
| DN25 | PN10-100 | B1 |
| 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 (TW212) | 6.2 | 10.0 |
| stepped (TW222) | 6.5 | 10.5 |
| tapered (TW232) | 7.0 | 11.0 |
| | 8.0 | 12.0 |
| | 8.5 | 12.5 |
| | 9.0 | |

All dimensions in mm

WETTED PART AND FLANGE MATERIALS, AND FACING OPTIONS

| wetted part material | flange material |
|-------------------------|-----------------|
| see tables on next page | |

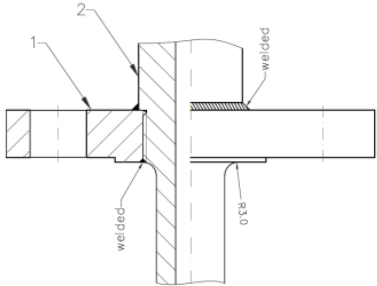
| facing (ASME B16.5) | |
|---------------------|---------------|
| RF | Ra 3.2-6.3 µm |
| RJF | Ra <1.6 µm |
| LMF | Ra 3.2-6.3 µm |
| SMF | Ra <3.2 µm |
| FF | Ra 3.2-6.3 µm |
| LTF | Ra <3.2 µm |
| STF | Ra <3.2 µm |
| LGF | Ra <3.2 µm |
| SGF | Ra <3.2 µm |
| LFF | Ra 3.2-6.3 µm |
| SFF | Ra <3.2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

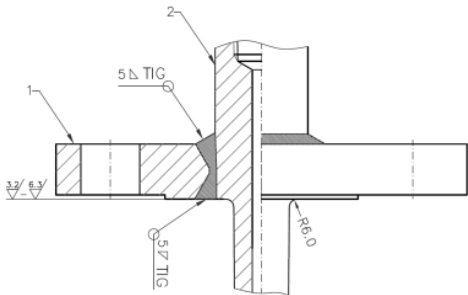
| facing type (EN 1092-1) | |
|-------------------------|----------------|
| B1 | Ra 3.2-12.5 µm |
| A | Ra 3.2-12.5 µm |
| B2 | Ra 0.8-3.2 µm |
| C | Ra 0.8-3.2 µm |
| D | Ra 0.8-3.2 µm |
| E | Ra 3.2-12.5 µm |
| F | Ra 3.2-12.5 µm |
| G | Ra 0.8-3.2 µm |
| H | Ra 0.8-3.2 µm |

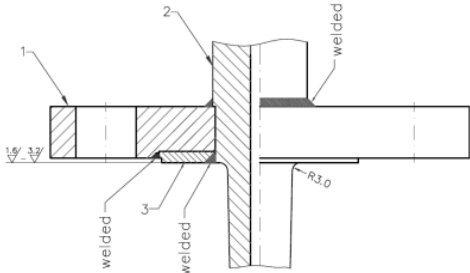
OPTIONS

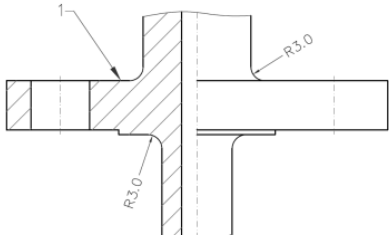
- certified weld including PQR & WPS for full penetration weld
- coatings: PTFE/ ECTFE for anti-stick purpose only, PFA
- dye penetrant test, outside pressure test
- heat treatment per customer requirements
- stainless steel plug & chain
- tantaline treatment
- thermowells > 610 mm
- wake frequency calculation per ASME PTC 19.3 TW-2010

EXECUTIONS AND MATERIALS

| STANDARD EXECUTION | 1 | 2 | Design |
|---|-----------------|-----------------|-----------------|
|  | AISI316(L) | AISI316(L) | 2 parts, welded |
| | AISI 321 | AISI 321 | |
| | Duplex 2205 | Duplex 2205 | |
| | Hastelloy C-276 | Hastelloy C-276 | |
| | Inconel 600 | Inconel 600 | |
| | Inconel 825 | Inconel 825 | |
| | Monel 400 | Monel 400 | |

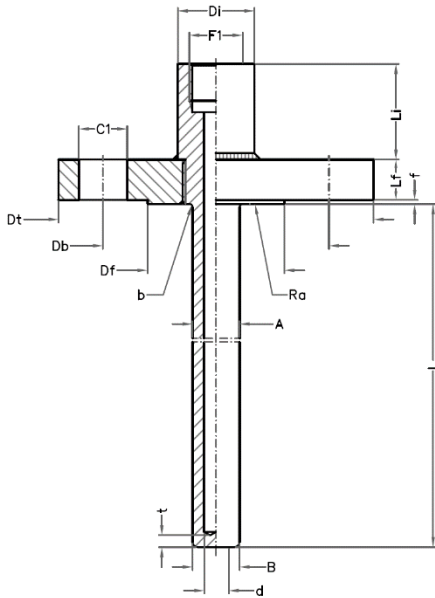
| FULL PENETRATION WELD EXECUTION | 1 | 2 | DESIGN |
|--|-----------------|-----------------|--------------------------------|
|  | AISI316(L) | AISI316(L) | 2 parts, full penetration weld |
| | AISI 321 | AISI 321 | |
| | Duplex 2205 | Duplex 2205 | |
| | Hastelloy C-276 | Hastelloy C-276 | |
| | Inconel 600 | Inconel 600 | |
| | Inconel 825 | Inconel 825 | |
| | Monel 400 | Monel 400 | |

| EXOTIC EXECUTION | 1 | 2 | 3 | Design |
|---|------------|-----------------|-----------------|--------------------------------------|
|  | AISI316(L) | Monel 400 | Monel 400 | 3 parts, welded, wetted parts exotic |
| | AISI316(L) | AISI 321 | AISI 321 | |
| | AISI316(L) | Duplex 2205 | Duplex 2205 | |
| | AISI316(L) | Hastelloy C-276 | Hastelloy C-276 | |
| | AISI316(L) | Inconel 600 | Inconel 600 | |
| | AISI316(L) | Inconel 625 | Inconel 625 | |
| | AISI316(L) | Inconel 825 | Inconel 825 | |
| | AISI316(L) | Titanium Gr. 2 | Titanium Gr. 2 | |
| | AISI316(L) | Titanium Gr. 2 | Titanium Gr. 2 | |

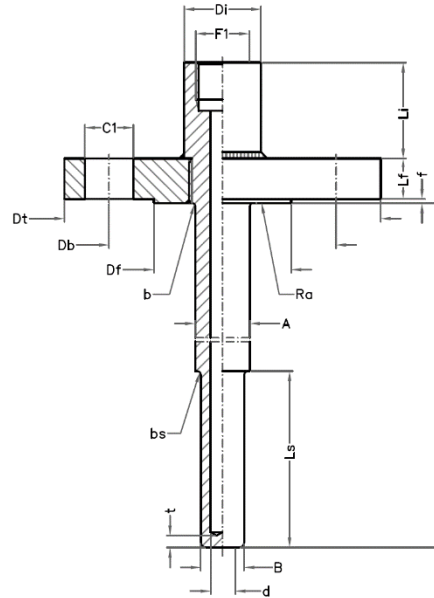
| SOLID MACHINED EXECUTION | 1 | Design |
|---|-----------------|----------------|
|  | AISI316(L) | solid machined |
| | Monel 400 | |
| | Hastelloy C-276 | |
| | Duplex 2205 | |
| | AISI 321 | |
| | Inconel 600 | |
| | Inconel 825 | |
| Titanium Gr. 2 | | |

DRAWING AND DIMENSIONS STANDARD EXECUTIONS

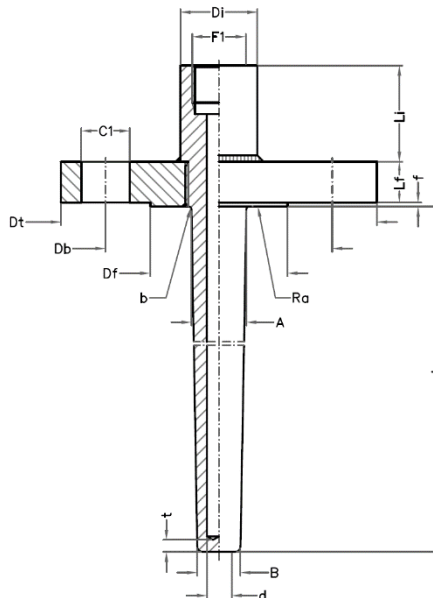
STRAIGHT (TW212)



STEPPED (TW222)



TAPERED (TW232)



ASME B16.5 - RF FACING

| size | rating | A | B | min / max | b | bs ¹ | Db | Di | Df | Dt | d | f | L | Lf | Li | Ls ¹ | C1/pcs |
|-------|--------------|----|----|-----------|---|-----------------|-----|----|-----|-----|-----|---|---------|----|----|-----------------|---------|
| 1" | cl. 150 | 21 | 16 | 12.6 / 26 | 3 | 3 | 79 | 35 | 51 | 110 | 6.5 | 2 | various | 13 | 50 | various | 16 / 4x |
| 1" | cl. 300 | 21 | 16 | 12.6 / 26 | 3 | 3 | 89 | 35 | 51 | 125 | 6.5 | 2 | various | 16 | 50 | various | 19 / 4x |
| 1" | cl. 400-600 | 21 | 16 | 12.6 / 26 | 3 | 3 | 89 | 35 | 51 | 125 | 6.5 | 7 | various | 18 | 50 | various | 19 / 4x |
| 1" | cl. 1500 | 21 | 16 | 12.6 / 26 | 3 | 3 | 102 | 35 | 51 | 150 | 6.5 | 7 | various | 29 | 50 | various | 25 / 4x |
| 1" | cl. 2500 | 21 | 16 | 12.6 / 26 | 3 | 3 | 108 | 35 | 51 | 160 | 6.5 | 7 | various | 35 | 50 | various | 25 / 4x |
| 1.25" | cl. 150 | 21 | 16 | 12.6 / 38 | 3 | 3 | 89 | 35 | 64 | 115 | 6.5 | 2 | various | 16 | 50 | various | 16 / 4x |
| 1.25" | cl. 300 | 21 | 16 | 12.6 / 38 | 3 | 3 | 98 | 35 | 64 | 135 | 6.5 | 2 | various | 18 | 50 | various | 19 / 4x |
| 1.25" | cl. 400-600 | 21 | 16 | 12.6 / 38 | 3 | 3 | 98 | 35 | 64 | 135 | 6.5 | 7 | various | 21 | 50 | various | 19 / 4x |
| 1.25" | cl. 900-1500 | 21 | 16 | 12.6 / 38 | 3 | 3 | 111 | 35 | 64 | 160 | 6.5 | 7 | various | 29 | 50 | various | 25 / 4x |
| 1.25" | cl. 2500 | 21 | 16 | 12.6 / 38 | 3 | 3 | 130 | 35 | 64 | 185 | 6.5 | 7 | various | 38 | 50 | various | 29 / 4x |
| 1.5" | cl. 150 | 21 | 16 | 12.6 / 40 | 3 | 3 | 99 | 35 | 73 | 125 | 6.5 | 2 | various | 16 | 50 | various | 16 / 4x |
| 1.5" | cl. 300 | 21 | 16 | 12.6 / 40 | 3 | 3 | 114 | 35 | 73 | 155 | 6.5 | 2 | various | 19 | 50 | various | 22 / 4x |
| 1.5" | cl. 400-600 | 21 | 16 | 12.6 / 40 | 3 | 3 | 114 | 35 | 73 | 155 | 6.5 | 7 | various | 22 | 50 | various | 22 / 4x |
| 1.5" | cl. 900-1500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 124 | 35 | 73 | 180 | 6.5 | 7 | various | 32 | 50 | various | 29 / 4x |
| 1.5" | cl. 2500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 146 | 35 | 73 | 205 | 6.5 | 7 | various | 45 | 50 | various | 32 / 4x |
| 2" | cl. 150 | 21 | 16 | 12.6 / 40 | 3 | 3 | 121 | 35 | 92 | 150 | 6.5 | 2 | various | 18 | 50 | various | 19 / 4x |
| 2" | cl. 300 | 21 | 16 | 12.6 / 40 | 3 | 3 | 127 | 35 | 92 | 165 | 6.5 | 2 | various | 21 | 50 | various | 19 / 8x |
| 2" | cl. 400-600 | 21 | 16 | 12.6 / 40 | 3 | 3 | 127 | 35 | 92 | 165 | 6.5 | 7 | various | 25 | 50 | various | 19 / 8x |
| 2" | cl. 900-1500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 165 | 35 | 92 | 215 | 6.5 | 7 | various | 38 | 50 | various | 25 / 8x |
| 2" | cl. 2500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 171 | 35 | 92 | 235 | 6.5 | 7 | various | 51 | 50 | various | 29 / 8x |
| 2.5" | cl. 150 | 21 | 16 | 12.6 / 40 | 3 | 3 | 140 | 35 | 105 | 180 | 6.5 | 2 | various | 21 | 50 | various | 19 / 4x |
| 2.5" | cl. 300 | 21 | 16 | 12.6 / 40 | 3 | 3 | 149 | 35 | 105 | 190 | 6.5 | 2 | various | 24 | 50 | various | 22 / 8x |
| 2.5" | cl. 400-600 | 21 | 16 | 12.6 / 40 | 3 | 3 | 149 | 35 | 105 | 190 | 6.5 | 7 | various | 29 | 50 | various | 22 / 8x |
| 2.5" | cl. 900-1500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 191 | 35 | 105 | 245 | 6.5 | 7 | various | 41 | 50 | various | 29 / 8x |
| 2.5" | cl. 2500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 197 | 35 | 105 | 265 | 6.5 | 7 | various | 57 | 50 | various | 31 / 8x |
| 3" | cl. 150 | 21 | 16 | 12.6 / 40 | 3 | 3 | 152 | 35 | 127 | 190 | 6.5 | 2 | various | 22 | 50 | various | 19 / 4x |
| 3" | cl. 300 | 21 | 16 | 12.6 / 40 | 3 | 3 | 168 | 35 | 127 | 210 | 6.5 | 2 | various | 27 | 50 | various | 22 / 8x |
| 3" | cl. 400-600 | 21 | 16 | 12.6 / 40 | 3 | 3 | 168 | 35 | 127 | 210 | 6.5 | 7 | various | 32 | 50 | various | 22 / 8x |
| 3" | cl. 900 | 21 | 16 | 12.6 / 40 | 3 | 3 | 191 | 35 | 127 | 240 | 6.5 | 7 | various | 38 | 50 | various | 25 / 8x |
| 3" | cl. 1500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 203 | 35 | 127 | 265 | 6.5 | 7 | various | 48 | 50 | various | 32 / 8x |
| 3" | cl. 2500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 229 | 35 | 127 | 305 | 6.5 | 7 | various | 67 | 50 | various | 35 / 8x |
| 4" | cl. 150 | 21 | 16 | 12.6 / 40 | 3 | 3 | 191 | 35 | 157 | 230 | 6.5 | 2 | various | 22 | 50 | various | 19 / 8x |
| 4" | cl. 300 | 21 | 16 | 12.6 / 40 | 3 | 3 | 200 | 35 | 157 | 255 | 6.5 | 2 | various | 30 | 50 | various | 22 / 8x |
| 4" | cl. 400 | 21 | 16 | 12.6 / 40 | 3 | 3 | 200 | 35 | 157 | 255 | 6.5 | 7 | various | 35 | 50 | various | 25 / 8x |
| 4" | cl. 600 | 21 | 16 | 12.6 / 40 | 3 | 3 | 216 | 35 | 157 | 275 | 6.5 | 7 | various | 38 | 50 | various | 25 / 8x |
| 4" | cl. 900 | 21 | 16 | 12.6 / 40 | 3 | 3 | 235 | 35 | 157 | 290 | 6.5 | 7 | various | 45 | 50 | various | 32 / 8x |
| 4" | cl. 1500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 241 | 35 | 157 | 310 | 6.5 | 7 | various | 54 | 50 | various | 35 / 8x |
| 4" | cl. 2500 | 21 | 16 | 12.6 / 40 | 3 | 3 | 273 | 35 | 157 | 355 | 6.5 | 7 | various | 76 | 50 | various | 41 / 8x |

All dimensions in mm

Dimensions based on standard execution d=6.5

For restrictions see table dimensional limits

¹ only applicable for stepped executions

EN 1092-1 - TYPE B1

| size | rating | A | B | min / max | b | bs ¹ | Db | Di | Df | Dt | d | f | L | Lf | Li | Ls ¹ | C1/pcs |
|-------|----------|----|----|-----------|---|-----------------|-----|----|-----|-----|-----|---|---------|----|----|-----------------|---------|
| DN25 | PN10-40 | 21 | 16 | 12.6 / 35 | 3 | 3 | 85 | 35 | 68 | 115 | 6.5 | 2 | various | 16 | 50 | various | 14 / 4x |
| DN25 | PN63-100 | 21 | 16 | 12.6 / 35 | 3 | 3 | 100 | 35 | 68 | 140 | 6.5 | 2 | various | 22 | 50 | various | 18 / 4x |
| DN40 | PN10-40 | 21 | 16 | 12.6 / 40 | 3 | 3 | 110 | 35 | 88 | 150 | 6.5 | 3 | various | 15 | 50 | various | 18 / 4x |
| DN40 | PN63-100 | 21 | 16 | 12.6 / 40 | 3 | 3 | 125 | 35 | 88 | 170 | 6.5 | 3 | various | 23 | 50 | various | 22 / 4x |
| DN50 | PN10-16 | 21 | 16 | 12.6 / 40 | 3 | 3 | 125 | 35 | 102 | 165 | 6.5 | 3 | various | 15 | 50 | various | 18 / 4x |
| DN50 | PN25-40 | 21 | 16 | 12.6 / 40 | 3 | 3 | 125 | 35 | 102 | 165 | 6.5 | 3 | various | 17 | 50 | various | 18 / 4x |
| DN50 | PN63 | 21 | 16 | 12.6 / 40 | 3 | 3 | 135 | 35 | 102 | 180 | 6.5 | 3 | various | 23 | 50 | various | 22 / 4x |
| DN50 | PN100 | 21 | 16 | 12.6 / 40 | 3 | 3 | 145 | 35 | 102 | 195 | 6.5 | 3 | various | 25 | 50 | various | 26 / 4x |
| DN80 | PN10-16 | 21 | 16 | 12.6 / 40 | 3 | 3 | 160 | 35 | 138 | 200 | 6.5 | 3 | various | 17 | 50 | various | 18 / 8x |
| DN80 | PN25-40 | 21 | 16 | 12.6 / 40 | 3 | 3 | 160 | 35 | 138 | 200 | 6.5 | 3 | various | 21 | 50 | various | 18 / 8x |
| DN80 | PN63 | 21 | 16 | 12.6 / 40 | 3 | 3 | 170 | 35 | 138 | 215 | 6.5 | 3 | various | 25 | 50 | various | 22 / 8x |
| DN80 | PN100 | 21 | 16 | 12.6 / 40 | 3 | 3 | 180 | 35 | 138 | 230 | 6.5 | 3 | various | 29 | 50 | various | 26 / 8x |
| DN100 | PN10-16 | 21 | 16 | 12.6 / 40 | 3 | 3 | 180 | 35 | 158 | 220 | 6.5 | 3 | various | 17 | 50 | various | 18 / 8x |
| DN100 | PN25-40 | 21 | 16 | 12.6 / 40 | 3 | 3 | 190 | 35 | 162 | 235 | 6.5 | 3 | various | 21 | 50 | various | 22 / 8x |
| DN100 | PN63 | 21 | 16 | 12.6 / 40 | 3 | 3 | 200 | 35 | 162 | 250 | 6.5 | 3 | various | 27 | 50 | various | 26 / 8x |
| DN100 | PN100 | 21 | 16 | 12.6 / 40 | 3 | 3 | 210 | 35 | 162 | 265 | 6.5 | 3 | various | 33 | 50 | various | 30 / 8x |

All dimensions in mm

Dimensions based on standard execution d=6.5

For restrictions see table dimensional limits

¹ only applicable for stepped executions

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)

¹ Step diameter ratio, for B=12.7

² 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 ¹ | B/A | 0.5 | 0.8 |
| step diameter ² | B/A | 0.6 | 0.9 |
| length ratio | Ls/L | 0 | 0.6 |
| minimum wall thickness | (B-d)/2 | 3 | |



Holland – United Kingdom – Romania – India – Thailand – Dubai

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