

Thermometers with Capillary Line

Bayonet Ring Case Stainless Steel

Standard (TFCh) or with Case Filling (TFChG)

Accuracy Class 1

Nom. Case Size 80 (3")

Models

TSChg/**T**SChgG
TFChg/**TF**ChgG

Application

These thermometers are designed to meet the requirements of industrial temperature measurement, for fluid or gaseous media. They are suitable also for aggressive media as to find in chemical industries, petrochemistry, process technology, apparatus engineering and food and beverage industry.

Nom. case size (NCS): 80 (3")

Accuracy class (EN 13190): 1

Reference temperature + 23 °C ± 2 °C (+ 73.4 °F ± 3.6)

Temperature ranges (EN 13190): Nominal / measuring ranges as in table below; temperature differences between 80 K to 500 K

Ambient temperature limits: -20 to +60 °C (-4 °F to +140 °F)

Max. allowed static pressure¹⁾ 25 bar (350 psi) at the stem

Protection type (EN 60529 / IEC 529) TSChg, TFChg: IP 55
TSChgG, TFChgG: IP 65

Standard Configuration

Case and ring 304 stainless steel 1.4301, ring crimped-on
TSChg and TFChg without case filling
TSChgG and TFChgG with case filling silicone oil

Window Single strength glass

Connection Bottom connection, optional: center back (**rm**), TSChg/TSChgG optional right-angled to the left (**wl**) or to the right (**wr**), right-angled (**w**) or obtused-angled to the backside (**wst**); connection types: see pages 3 and 4

Capillary line TFChg / TFChgG only, stainless steel, Ø 2 mm (.08"), buckle protection at both ends, up to 1 m (~ 3 feet) standard, up to 15 m (~ 49 feet) at option (restrictions for some measuring ranges; capillary line > 15 m / ~ 49 feet up. request)

Stem material 316 stainless steel (1.4571)

Principle of measurement Inert gas expansion system (measuring system nitrogen-filled, non-toxic and environmentally safe)

Movement Brass / German silver

Adjustment ± 6 % with adjustment screw from outside

Dial Aluminum alloy, black figures, white background

Pointer Aluminum black

Nominal Range (°C)	Measuring Range (°C)	Scale Interval (°C)	Temperature Difference ΔT (K)
-50 / 50	-40 / 40	1	100
-30 / 50	-20 / 40	1	80
-30 / 120	-10 / 100	2	150
-30 / 170	-10 / 150	5	200
-20 / 60	-10 / 50	1	80
-20 / 80	-10 / 70	1	100
0 / 80	10 / 70	1	80
0 / 100	10 / 90	1	100
0 / 120	20 / 100	2	120
0 / 150	20 / 130	2	150
0 / 160	20 / 140	2	160
0 / 200	20 / 180	5	200
0 / 300	30 / 270	5	300
0 / 350	50 / 300	5	350
0 / 400	50 / 350	10	400
0 / 500 ³⁾	50 / 450	10	500
0 / 600 ²⁾³⁾	100 / 500	10	600
50 / 300	80 / 270	5	250
50 / 400	100 / 350	5	350
100 / 500	150 / 450	10	400
100 / 600 ²⁾	150 / 550	10	500

¹⁾ Stem A2 if used without thermowell only; stem A7 for medium without pressure only
²⁾ for stem Ø 6 mm (.24") upon request
³⁾ Capillary line > 5 m (~ 16 feet) upon request.
⁴⁾ Price and delivery time upon request.



Special Options

- Other process connections upon request
- Stem with compression fitting, adjustable on the stem, similar to A7, but sealing on the capillary
- Stem type A5: compression fitting made of carbon steel up. request
- Models TSChg, TSChgG: special capillary stem (without outer protection pipe) between female threaded union nut (stem type **A3.2**) or external (male) threaded loose nut (stem type **A4.2**) and vessel (sensitive portion of the temperature detecting element)
- Other stem diameter or configurations (e.g. for food industries) upon request
- Stem with thermowell, compare data sheets 8310 to 8320
- Other nominal ranges, other measuring units, e.g. °F or K, or other special scales, such as dual scales (e.g. °C/°F) or others
- TFChg, TFChgG: capillary line with flexible armour stainless steel
- Red mark on the dial or as movable plastic clip outside on the ring
- Movement stainless steel
- Other than vertical installation
- Gauge holder bracket (for versions TFChg Mgh / TFChgG Mgh) aluminum black or stainless steel, distance 60, 100 or 160 mm (2.36", 3.94", or 6.3"), compare page 2

How to Order

Model and NCS: **TSChg 80** (non-fillable case, rigid stem)
TFChg 80 (non-fillable case, capillary line)
TSChgG 80 (silicone oil filled case, rigid stem)
TFChgG 80 (silicone oil filled case, capillary line)

Code letters for case configuration: Rigid stem version (TSChg / TSChgG)
rm, wl, wr, w, wst (compare page 2)
(standard = bottom connection = without code letter)
Capillary line versions (TFChg / TFChgG)
Mgh, Rh, rmBFR (compare page 2)

Temperature range: Nominal range acc. EN resp. table left, e.g. **0-100 °C** or **-30/120 °C**

Length of capillary: (see left; for models TFChg/TFChg only)

Stem version: — Type: **A1, A2, A3, A4, A4.1, A5, A6, A7**
(see page 3-4)
— Ø **6⁵⁾, 8, 10** or **12 mm**
— Stem length **L** resp. **L1**
— Immersion length **ET**
— Process connection
e.g. **G ½ B** (½" BSP), **M 20 x 1.5**

Special options: e.g. version TFChg Mgh with gauge holder bracket (compare page 2), others see above

Examples for Ordering Information:

- TSChg 80, 0-100 °C, A3 Ø 12mm, L = 300 mm, ET 80 mm, M 20x15
- TFChgG 80, Rh, -30/170 °C, 1.5 m capillary line st.st., stem A6, Ø 8 mm, L1 = 180 mm (ETmin 75 mm), ½" BSP



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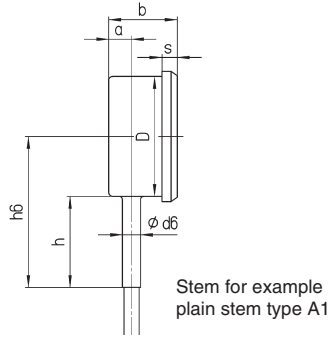
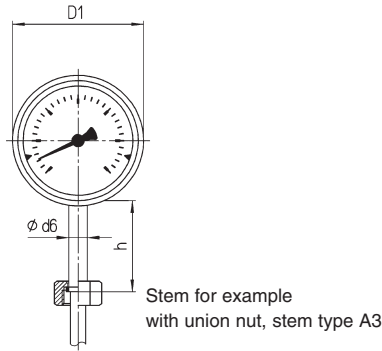
Am Gewerbepark 9 • D-08340 Beierfeld
Phone: (0 37 74) 58 - 0 • Fax: (0 37 74) 58 - 545
manotherm.com • mail@manotherm.com

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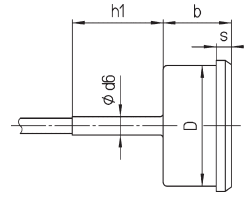
Case Configuration, Code Letters, Dimensions and Weight

Rigid Stem Versions TSChg / TSChgG:

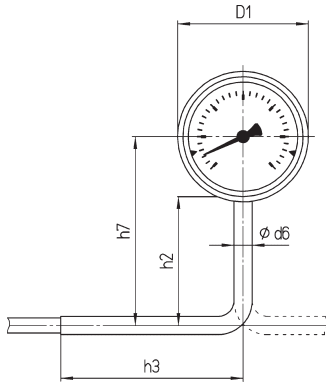
Bottom connection, standard version, no code letters



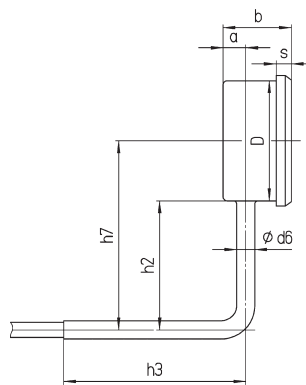
Center back connection, code letters: **rm**



Bottom connection, right angled to the left, code letters: **wl**

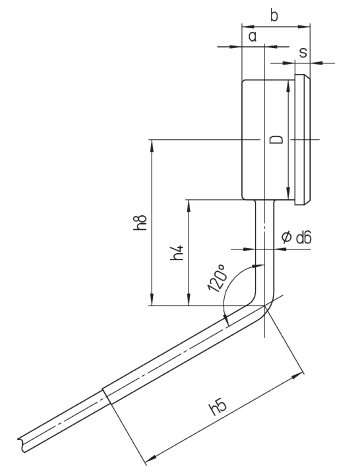


Bottom connection, right angled to the right, code letters: **wr**



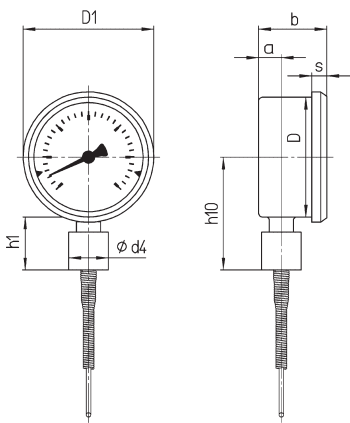
Bottom connection, right angled to the backside, code letter: **w**

Bottom connection, obtused-angled to the backside, code letters: **wst**

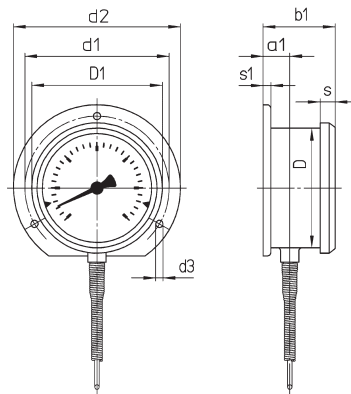


Capillary Line Version TFChg / TFChgG

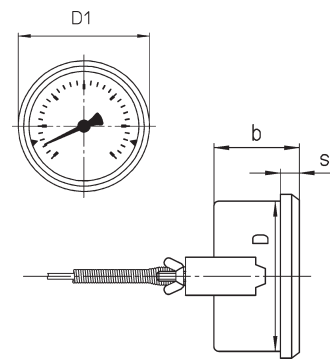
Bottom connection, for mounting with gauge holder bracket, code letters: **Mgh**



Bottom connection, rear mounting flange, code letters: **Rh**



Center back connection, U-clamp for panel mounting, code letters: **rmBFR**



Dimensions (mm / inches)

NCS	a	a1	b	b1	D	D1	d1	d2	d3	d4	d6	h	h1	h2	h3	h4	h5	h6	h7	h8	s	s1	s2	s3
80	15	17.5	45	47.5	79	86	95	110	4.8	26	12	60	85	120	70	120	99.5	124.5	109.5	10	5	2	6	
3"	.59	.69	1.77	1.87	3.11	3.39	3.74	4.33	.19	1.02	.47	2.36	3.35	4.72	2.76	4.72	3.92	4.90	4.31	.39	.2	.08	.24	

Accessories for Version Mgh: Gauge Holder Bracket

Material	d7	d8	m1	m2	Distance / Ordering Number*								
Aluminum black	26	7	65	56	60	Z-06 70 01		100	Z-06 70 02		160	Z-06 70 03	
Stainless steel	1.02	.28	2.56	2.20	2.36	06 30 01		3.94	Z-06 30 02		6.30	06 30 03	

*Ordering numbers beginning with Z = item available from stock (without obligation)

Weight approx. (for version with stem type A1, 250 mm (9.84")):

TSChg = 0.45 kg / 1 lb, TFChg = 0.45 kg / 1 lb plus 0.025 kg / 0.06 lb per each m capillary line

TSChgG = 0.60 kg / 1,3 lb, TFChgG = 0.60 kg / 1,3 lb plus 0.025 kg / 0.06 lb per each m capillary line

Stem Types and Connections / Rigid Stem (TSChg, TSChgG)

(For thermowells see data sheet 8310 to 8320).

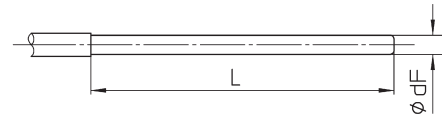
Stem Material: 316 stainless steel (1.4571, including fittings)⁶⁾

Stem type A 1 (EN 13190 Form 1)

Plain stem (without thread connection), stem length = **L** = free selection, but L has to be ≥ minimum length (see below), basic for stem type A5; suitable thermowells: see data sheet 8320.

Dimensions (mm / inches)

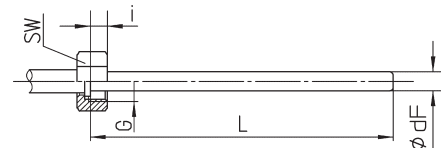
Ø d _F ³⁾	6 ²⁾	8	10	12
	.24	.31	.39	.47



Stem type A 3 (EN 13190 Form 5)

Stem with turnable union nut M 20x1.5 or G ½ (½" BSP female), stem length = **L** (immersion length up to the stop face of the union nut) free selection, but L has to be ≥ minimum length (see below), basis for stem type A 6; suitable thermowells: see data sheet 8312.

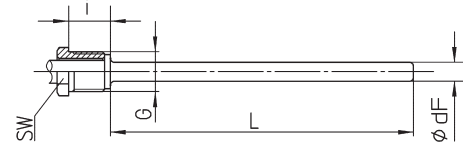
Ø d _F ³⁾	G	SW	i
6 ²⁾	M20x1.5	27	10
8	G ½	1.06	.39
10	½" BSP		
12	½" BSP		



Stem type A 4 (EN 13190 Form 4)

Stem with loose nut with external (male) thread M 20 x 1.5 or G ½ B (½" BSP male), stem length = **L** (immersion length up to the stop face for the male threaded nut) = free selection, but L has to be ≥ minimum length (see below), exclusively for installation into thermowell, see data sheets 8310, 8311.

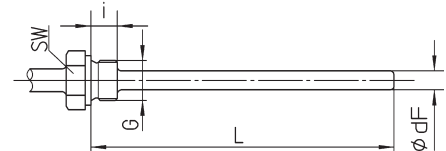
Ø d _F ³⁾	G	SW	i
6 ²⁾	M20x1.5	22	20
8	G ½ B	.87	.79
10	½" BSP		
12	½" BSP		



Stem Type A4.1

Stem with rigid male connection thread M 20 x 1.5, G ½ B (½" BSP), M 27 x 2, or G ¾ B (¾" BSP), stem length = **L** = (immersion length up to the upper sealing face of the thread connection) free selection, L has to be ≥ minimum length (see below); suitable thermowells: see data sheets 8310 and 8311.

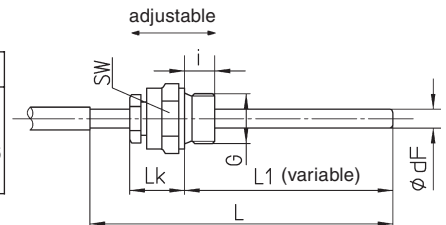
Ø d _F ²⁾	G	SW	i
6 ¹⁾	M20x1.5	27	14
8	½" BSP	1.06	.55
10	½" BSP		
6 ¹⁾	M27x2	32	16
8	¾" BSP	1.26	.63
10	¾" BSP		
12	¾" BSP		



Stem type A 5 (EN 13190 Form 2)

As type A 1, but with compression fitting, adjustable on the stem (attention: L1 has to be ≥ minimum length of stem type A1!), external (male) connection thread G ½ B (½" BSP), stem length = **L** = free selection, but L has to be ≥ minimum length (see below)

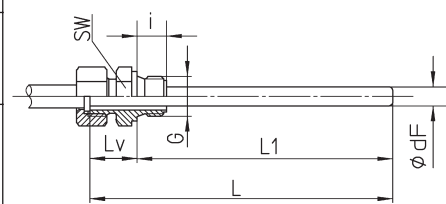
Ø d _F ³⁾	G	SW	i	L _k
6 ²⁾	G ½ B	27	14	~37
8	½" BSP	1.06	.55	1.46
10	½" BSP			
12	½" BSP			



Stem type A 6

As type A 3 (with union nut), but with double male adapter fitting, external (male) threads M 20 x 1.5 or G ½ B (½" BSP), M 24 x 1.5, M 27 x 2 or G ¾ B (¾" BSP), stem length = **L1** (immersion length up to sealing face of the fitting) = free selection, but L1 has to be ≥ minimum length (see below)

Ø d _F ³⁾	G	SW	i	L _v
6 ²⁾	M20x1.5	27	14	25
8	G ½ B	1.06	.55	.98
10	½" BSP			
6 ²⁾	M24x1.5	32	16	27
8	M27 x 2	1.26	.63	1.06
10	¾" BSP			
12	¾" BSP			



Stem type	Minimum immersion length ET min ³⁾ (mm/inches)				Minimum stem length ⁴⁾ L resp. L 1 ⁵⁾ (mm/inches)												
	all				A 1, A 4 (L) ⁵⁾				A 3, A 4.1 (L) ⁵⁾ / A 6 (L1) ⁵⁾				A 5 (L) ⁵⁾				
Stem diameter-Ø ²⁾ (mm/inches)	12	10	8	6 ¹⁾	12	10	8	6	12	10	8	6	12	10	8	6	
	.47	.39	.31	.24	.47	.39	.31	.24	.47	.39	.31	.24	.47	.39	.31	.24	
Full span	≤ 500 °C	35	45	75	120	40	50	80	125	50	60	90	135	75	85	115	160
	≤ 932 °F	1.38	1.77	2.95	4.72	1.57	1.97	3.15	4.92	1.97	2.36	3.54	5.31	2.95	3.35	4.53	6.30
	> 500 °C	75	105	165	285	80	110	170	290	90	120	180	300	115	145	205	325
	> 932 °F	2.95	4.13	6.50	11.22	3.15	4.33	6.69	11.42	3.54	4.72	7.09	11.81	4.53	5.71	8.07	12.80

¹⁾ Stem Ø 6 mm (.24"): delivery time and price upon request

²⁾ Other stem Ø upon request.

³⁾ The minimum immersion length of the stem is the length of that part of the vessel, which has to be completely immersed into the medium to receive an accurate temperature measurement.

⁴⁾ The minimum immersion length depends on the stem diameter and the temperature range. Out of the required minimum immersion length and the stem type results the minimum stem length.

⁵⁾ Depending on the stem type either the stem length L or L1 has to be stated when ordering, see the quoted dimension in brackets next to the stem type in this table.

⁶⁾ Stem type A5: clamp fitting carbon steel optional upon request

Stem Types and Connections / Stem with Capillary Line (Thermowells see data sheets 8310 to 8320.)

Stem Material: 316 stainless steel (1.4571, including fittings)¹⁾

Stem type A 1 (EN 13190 Form 1)

Plain stem (without thread connection), stem length = **L** = free selection, but L has to be ≥ minimum length (see below), basic for stem type A5; suitable thermowells: see data sheet 8320.

Dimensions (mm / inches)

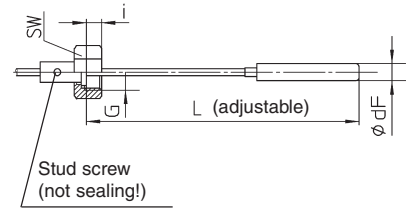
Ø d _F ³⁾	6 ²⁾	8	10	12
		.24	.31	.39



Stem type A 2

Plain stem, with union nut adjustable on the capillary line (acc. to the required immersion length), for thermowells (see data sheet 8312) or vertical installation in unpressurized medium (no sealing at the entrance of the capillary line!), female thread M 20 x 1.5 or G ½ (½" BSP female), stem length = **L** (≥ minimum length of stem type A1 plus capillary up to stop face of the union nut) = free selection, but L has to be ≥ minimum length (see below)

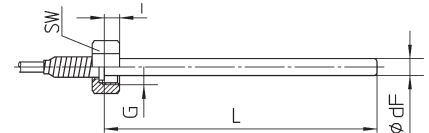
Ø d _F ³⁾	G	SW	i
6 ²⁾	.24	M20x1.5	27
8	.31		
10	.39	G ½	1.06
12	.47		



Stem type A 3 (EN 13190 Form 5)

Stem with turnable union nut M 20x1.5 or G ½ (½" BSP female), stem length = **L** (immersion length up to the stop face of the union nut) free selection, but L has to be ≥ minimum length (see below), basis for stem type A 6; suitable thermowells: see data sheet 8312.

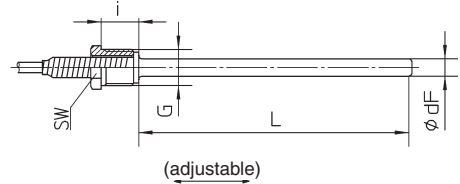
Ø d _F ³⁾	G	SW	i
6 ²⁾	.24	M20x1.5	27
8	.31		
10	.39	G ½	1.06
12	.47		



Stem type A 4 (EN 13190 Form 4)

Stem with loose nut with external (male) thread M 20 x 1.5 or G ½ B (½" BSP male), stem length = **L** (immersion length up to the stop face for the male threaded nut) = free selection, but L has to be ≥ minimum length (see below), exclusively for installation into thermowell, see data sheets 8310, 8311.

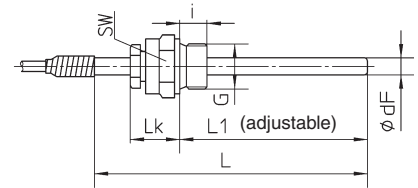
Ø d _F ³⁾	G	SW	i
6 ²⁾	.24	M20x1.5	22
8	.31		
10	.39	G ½ B	.87
12	.47		



Stem type A 5 (EN 13190 Form 2)

As type A 1, but with compression fitting, adjustable on the stem (attention: L1 has to be ≥ minimum length of stem type A1!), external (male) connection thread G ½ B (½" BSP), stem length = **L** = free selection, but L has to be ≥ minimum length (see below)

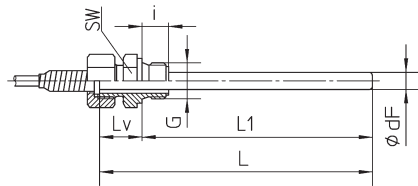
Ø d _F ³⁾	G	SW	i	L _K
6 ²⁾	.24	G ½ B	27	14
8	.31			
10	.39	½" BSP	1.06	.55
12	.47			



Stem type A 6

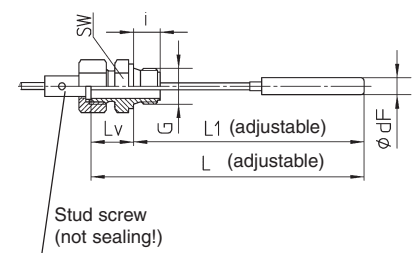
As type A 3 (with union nut), but with double male adapter fitting, external (male) threads M 20 x 1.5 or G ½ B (½" BSP), M 24 x 1.5, M 27 x 2 or G ¾ B (¾" BSP), stem length = **L1** (immersion length up to sealing face of the fitting) = free selection, but L1 has to be ≥ minimum length (see below)

Ø d _F ³⁾	G	SW	i	L _V
6 ²⁾	.24	M20x1.5	27	14
8	.31			
10	.39	G ½ B	1.06	.55
6 ²⁾	.24	M24x1,5	32	16
8	.31			
10	.39	M27 x 2	1.26	.63
12	.47			
		¾" BSP		



Stem type A 7

As type A 2, but with double male adapter fitting, for vertical installation in unpressurized medium (no sealing at the entrance of the capillary line!), external (male) threads M 20 x 1.5 or G ½ B (½" BSP), M 24x1.5, M 27x2 or G ¾ B (¾" BSP), stem length = **L1** (≥ minimum length of stem type A1 plus capillary up to sealing face of the fitting) = free selection, but L1 has to be ≥ minimum length (see below)



Minimum Immersion Length and Minimum Stem Length (mm / inches)

Stem type (relevant length L or L1)	Minimum Immersion Length ET min ⁴⁾				Minimum Stem Length L and L1 (mm) ⁵⁾												
	all				A1, A4 (L)				A2, A3 (L) / A6, A7 (L1)				A5 (L)				
	Stem Ø ^{2) 3)}	12	10	8	6 ²⁾	12	10	8	6 ²⁾	12	10	8	6 ²⁾	12	10	8	6 ²⁾
Capillary line < / = 5m	NR ⁶⁾ ≤ 500 °C	35	45	75	120	40	50	80	125	50	60	90	135	75	85	115	160
	NR ⁶⁾ > 500 °C	1.38	1.77	2.95	4.72	1.57	1.97	3.15	4.92	1.97	2.36	3.54	5.31	2.95	3.35	4.53	6.30
	NR ⁶⁾ ≤ 500 °C	75	105	165	285	80	110	170	290	90	120	180	300	115	145	205	325
	NR ⁶⁾ > 500 °C	2.95	4.13	6.50	11.22	3.15	4.33	6.69	11.42	3.54	4.72	7.09	11.81	4.53	5.71	8.07	12.80
Capillary line > 5 m	NR ⁶⁾ ≤ 500 °C	53	80	115	190	58	85	120	195	68	95	130	205	93	120	155	230
	NR ⁶⁾ > 500 °C	2.09	3.15	4.53	7.48	2.28	3.35	4.72	7.68	2.68	3.74	5.12	8.07	3.66	4.72	6.10	9.06
	< / = 15 m NR ⁶⁾ > 500 °C	150	200	320	570	155	205	325	575	165	215	335	585	190	240	360	610
		5.91	7.87	12.60	22.44	6.10	8.07	12.80	22.64	6.50	8.46	13.19	23.03	7.48	9.45	14.17	24.02

¹⁾ for A5: compression fitting carbon steel optional upon request

²⁾ Stem Ø 6 mm (.24"): Price and delivery time upon request

³⁾ other stem Ø upon request

⁴⁾ The minimum immersion length depends on the stem diameter and the temperature range. Out of the required minimum immersion length and the

stem type results the minimum stem length.

⁵⁾ Depending on the stem type either the stem length L or L1 has to be stated when ordering, see the quoted dimension in brackets next to the stem type in this table.

⁶⁾ NR = nominal temperature range (= scale)