Thermowell
For sanitary applications
Model TW22

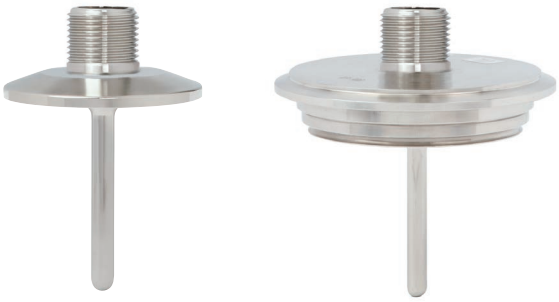
Applications

- Sanitary applications
- Food and beverage production
- Bio and pharmaceutical industry, production of active ingredients
- Paint finishing systems

Special features

- Materials and surface finish quality in accordance with standards of hygienic designs
- Fully welded
- Can be combined with models TR21-A and TR22-A electrical resistance thermometers, measuring insert exchangeable
- Can be combined with mechanical thermometers, resistance thermometers and DiwiTherm®

Model TW22 thermowells with welding ball (left) and connection for the VARINLINE® housing (right)



Model TW22 thermowells with clamp connection with G ⅜" (left) and VARIVENT® with G ⅜" (right)

Description

The model TW22 thermowell is used to adapt thermometers and measuring inserts to the process and protects the sensor against harsh process conditions. The thermowell is mounted to a weld-in nozzle equipped with a respective hygienic connection and is built in pipelines and tanks.

Through the rotatable threaded connection, the connection head or display can be loosened and adjusted to the desired position.

With a combination of a model TR21-A or TR22-A resistance thermometer, the connection head is removable along with the measuring insert. This enables the thermometer to be calibrated along with the complete measuring chain, i.e. without disconnecting the electrical connections. In addition, this avoids having to open the process, and thus the risk of contamination is minimised.

Data sheets showing similar instruments:
Resistance thermometer for sanitary applications; model TR22-A; see data sheet TE 60.22
Miniature resistance thermometer for sanitary applications; model TR21-A; see data sheet TE 60.26
DiwiTherm®, resistance thermometer with digital display; model TR75; see data sheet TE 60.75
Bimetal thermometer, process industry series; model 55; see data sheet TM 55.01
Gas-actuated thermometer, stainless steel version; model 73; see data sheet TM 73.01

Specifications

Nominal width
see table of dimensions

Pressure ratings PN
see table of dimensions

Material
Wetted parts: stainless steel 1.4435 (316L, UNS S31603)

Surface roughness of wetted parts
Standard: $R_a < 0.8$ µm
Option: $R_a < 0.8$ µm electropolished
$R_a < 0.4$ µm
$R_a < 0.4$ µm electropolished

Connection to thermometer
In combination with:
- Resistance thermometer model TR21-A
  - G ⅜" fixed

- Resistance thermometer model TR22-A
  - M24 x 1.5 male nut, rotatable
  - Option: ½ NPT, fixed

- Models 55 and 73 mechanical thermometers, design 3 (union nut), DiwiTherm® model TR75
  - M24 x 1.5 male nut, rotatable
  - Option: Mechanical thermometers with design S (fixed), design 2 (rotatable threaded connection), design 4 (compression fitting), design 5 (union nut and loose threaded connection): G ½ female or ½ NPT female

Thermowell diameter
- For models TR21-A and TR22-A resistance thermometers
  - Ø 6 mm for Ø 3 mm sensor
  - Ø 6 mm tapered to Ø 4.5 mm for Ø 3 mm sensors (quick responding)
  - Ø 4.5 mm for Ø 3 mm sensors (quick responding, only insertion length $U_1 \leq 25$ mm)

- For mechanical thermometers models 55 und 73, DiwiTherm® model TR75
  - Ø 8 x 0.9 mm for Ø 6 mm sensors
  - Ø 12 x 1.5 mm for Ø 8 mm sensors

Neck tube length M
85 mm
other neck tube lengths on request

Neck tube diameter
- Resistance thermometer model TR22-A
  - up to DN 20: 9 mm (except per DIN 11851 (milk thread fitting): 12 mm)
  - from DN 25: 12 mm

- Mechanical thermometers models 55 und 73, DiwiTherm® model TR75
  - same diameter as the thermowell diameter

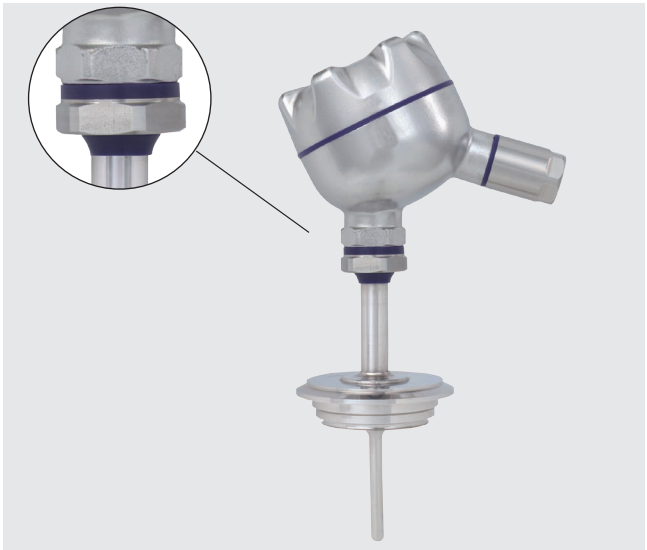
Insertion length U_1
25, 50, 75, 100, 150, 200 mm
Option: in acc. with customer specification up to 400 mm

Insertion lengths for BioControl® flow-through housing: see table “Dimensions for NEUMO BioControl® process connection”

Sealing combination (option)

The transition from the connection head to the thermowell is effected via an optional sealing combination (polyurethane) of flat gasket and wiper. This combination permanently prevents the penetration and depositing of humidity and impurities in this area (IP 68). Additionally, the sealing combination simplifies the cleaning process significantly.

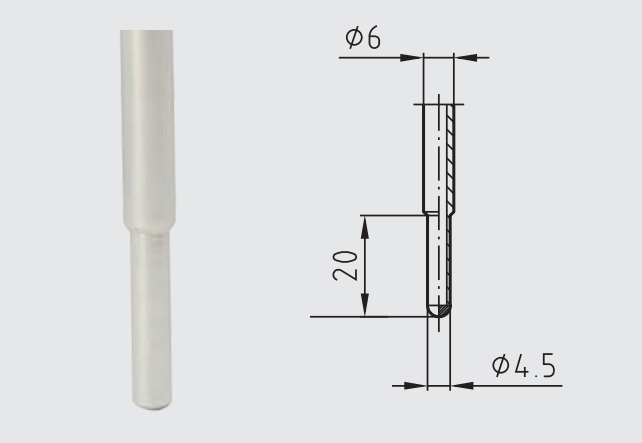
In combination with the patented BVS head (Patent No. GM 000984349) and the hygienic cable gland, an easy to clean and hygienic measuring location results, even in non-wetted areas. The BVS head is designed in such a way that cleaning agents can run off easily and that no residues can accumulate on the case.



Thermowell with tapered tip (option)

To optimise the response time, the thermowell can be designed with a tapered tip. The bulkier part of the shaft bears the mechanical loading. Through the mass reduction at the sensor tip, the heat transfer to the sensor element is considerably improved. This shortens the response time of the measurement assembly. The minimum insertion length must thus be taken into account.

Thermowells with a tapered tip are favoured in media with poor heat transfer and are particularly recommended with gases.



Approvals (option)

- **3-A**, food, USA
- **EHEDG**, food, Germany

Certificates (option)

- 2.2 test report
- 3.1 inspection certificate
- Manufacturer's declaration regarding regulation (EC) 1935/2004
- Hygiene certificates

Approval	3-A (74-06)	EHEDG
Clamp	yes	yes [2]
VARIVENT®	yes	yes
BioConnect®	yes	no
DIN 11851	yes [1]	yes [1]
DIN 11864-1	yes	yes
DIN 11864-2	yes	yes
DIN 11864-3	yes	yes
Welding ball	yes	no
Compression fitting	no	no
SMS	no	no

1) In combination with
- ASEPTO-STAR k-flex upgrade gaskets from Kieselmann GmbH, Germany or
- SKS gasket set DIN 11851 EHEDG from Siersema Komponenten Service (S.K.S.) B.V., Netherlands

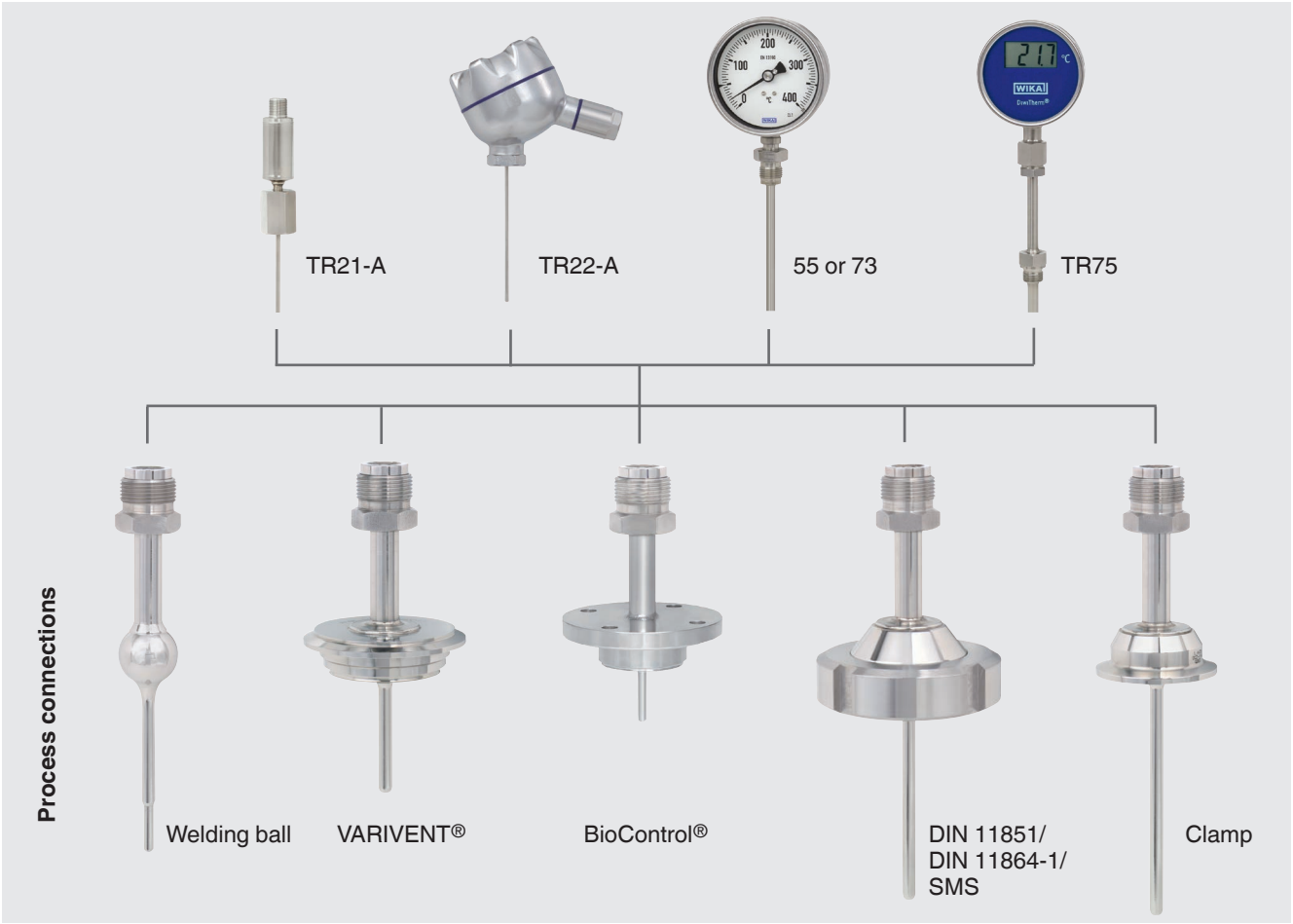
2) In combination with
- Kalrez/Stainless steel gasket from Dupont de Nemours, Switzerland or
- T-ring seals from Combifit International B. V., Netherlands

Approvals and certificates, see website

Combination possibilities

- Models TR21-A or TR22-A resistance thermometers
- Models 55 or 73 mechanical thermometers
- DiwiTherm® model TR75

Combination examples



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BioControl® is a registered trademark of the company NEUMO.

Calculation of the insertion length of the thermometer

Mechanical thermometers models 55 and 73

- Design 2
  $L_1 = U_1$ (TW22) + 30 mm
- Design 3
  $L_1 = U_1$ (TW22) + M – 10 mm

DiwiTherm® model TR75

$A(l_1) = U_1$ (TW22) + M (TW22) - 15 mm

Resistance thermometer model TR21-A

$A_{TR21\text{-}A} = U_1 + M$ [1)]

1) Neck tube length M see data sheet TE 60.26 (TR21-A)

Resistance thermometer model TR22-A

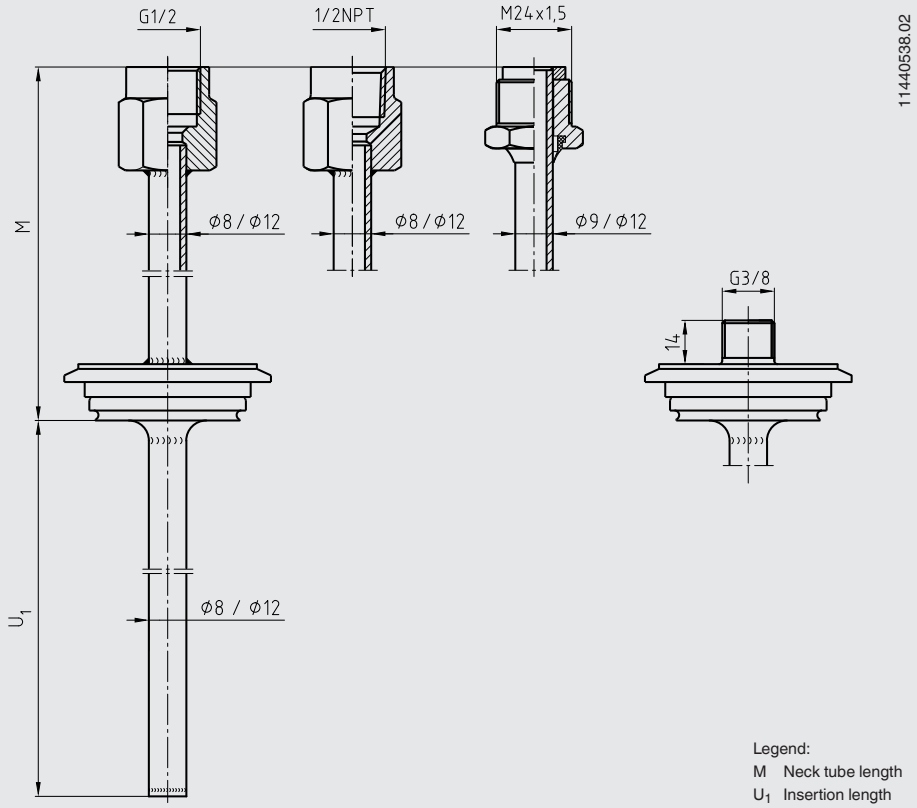
Sensor length $A(l_5) = U_1 + M + 10$ mm

Legend:

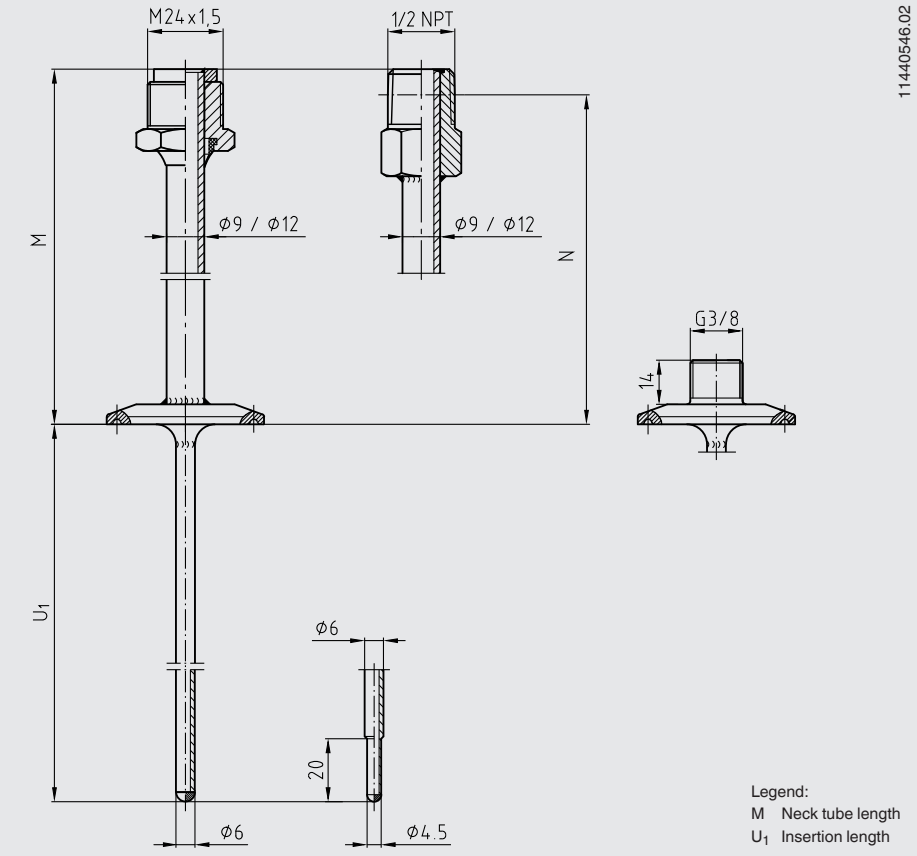
M	Neck tube length
U_1	Insertion length thermowell
L_1	Insertion length mechanical thermometers
$A(l_1)$	Insertion length DiwiTherm®
$A_{TR21\text{-}A}$	Insertion length TR21-A
$A(l_5)$	Insertion length TR22-A

Principle thermowell design

For models 55 and 73 mechanical thermometers

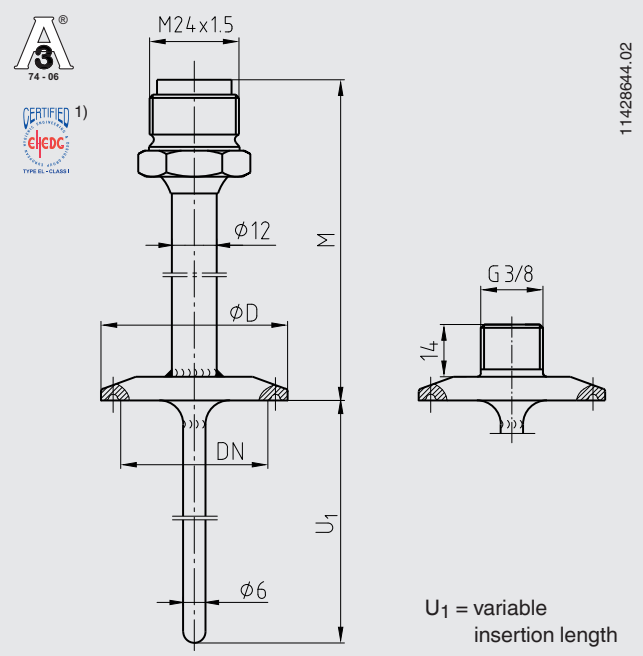


For model TR21-A resistance thermometer

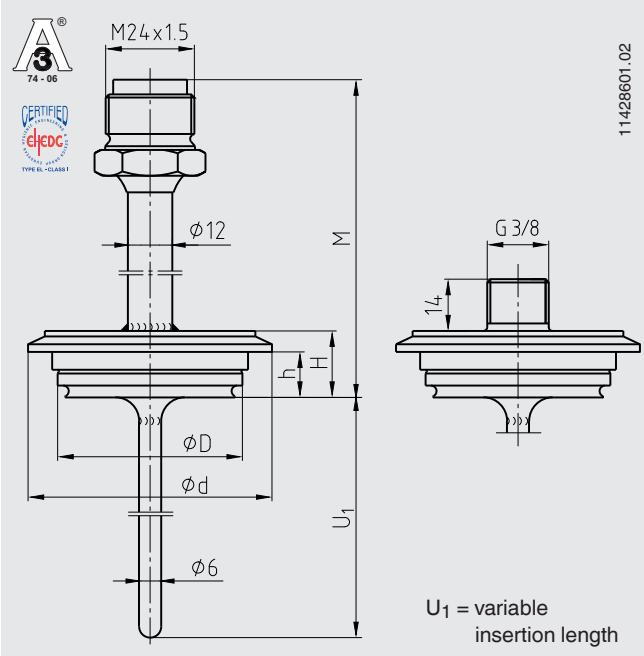


Dimensions of the process connections in mm

Clamp process connection



VARIVENT® process connection



1) In combination with
- Kalrez/Stainless steel gasket from Dupont de Nemours, Switzerland or
- T-ring seals from Combifit International B. V., Netherlands

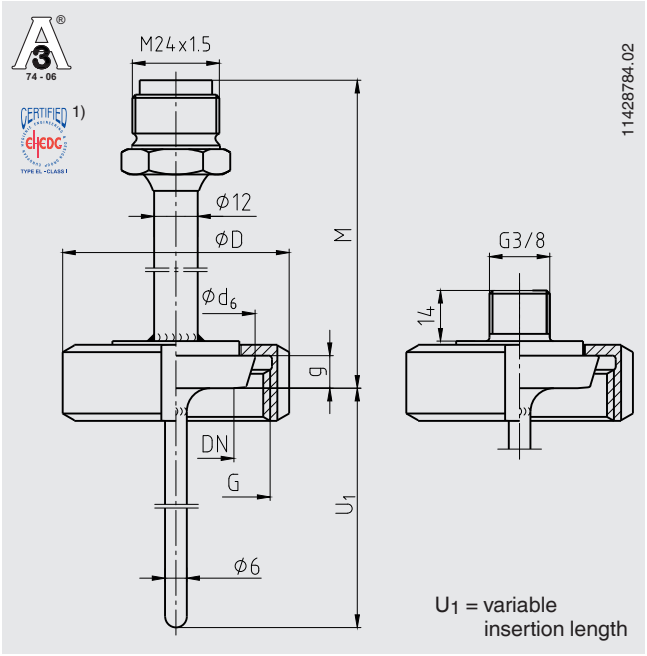
Dimensions for clamp process connection

Process connection	Nominal width in mm/inch	PN in bar	Dimensions in mm Ø D	Weight in kg
DIN 32676 for pipes per DIN 11866 row A	DN 10 ... 20	16	34.0	0.2
	DN 25 ... 40	16	50.5	0.3
	DN 50	16	64.0	0.4
DIN 32676 for pipes per DIN 11866 row B	13.5 ... 17.2	16	25.0	0.2
	21.3 ... 33.7	16	50.5	0.3
	42.4 ... 48.3	16	64.0	0.3
DIN 32676 for pipes per DIN 11866 row C	½" ... ¾"	16	25.0	0.2
	1" ... 1 ½"	16	50.5	0.3
	2"	16	64.0	0.4
Tri-clamp	½"	16	25.0	0.2
	¾"	16	25.0	0.2
	1"	16	50.5	0.3
	1 ½"	16	50.5	0.3
	2"	16	64.0	0.4
	2 ½"	16	77.5	0.4
	3"	16	91.0	0.5
	4"	16	119.0	0.5
ISO 2852	DN 12 ... 21.3	16	34.0	0.2
	DN 25 ... 38	16	50.5	0.3
	DN 40 ... 51	16	64.0	0.4

Dimensions for VARIVENT® process connection

Process connection	Nominal width in mm	PN in bar	Dimensions in mm Ø D	Ø d	H	h	Weight in kg
Form B	DN 10, DN 15	25	31	52.7	20	13.65	0.3
Form F	DN 25, DN 32	25	50	66.0	18	12.30	0.4
Form N	DN 40, DN 50	25	68	84.0	18	12.30	0.6

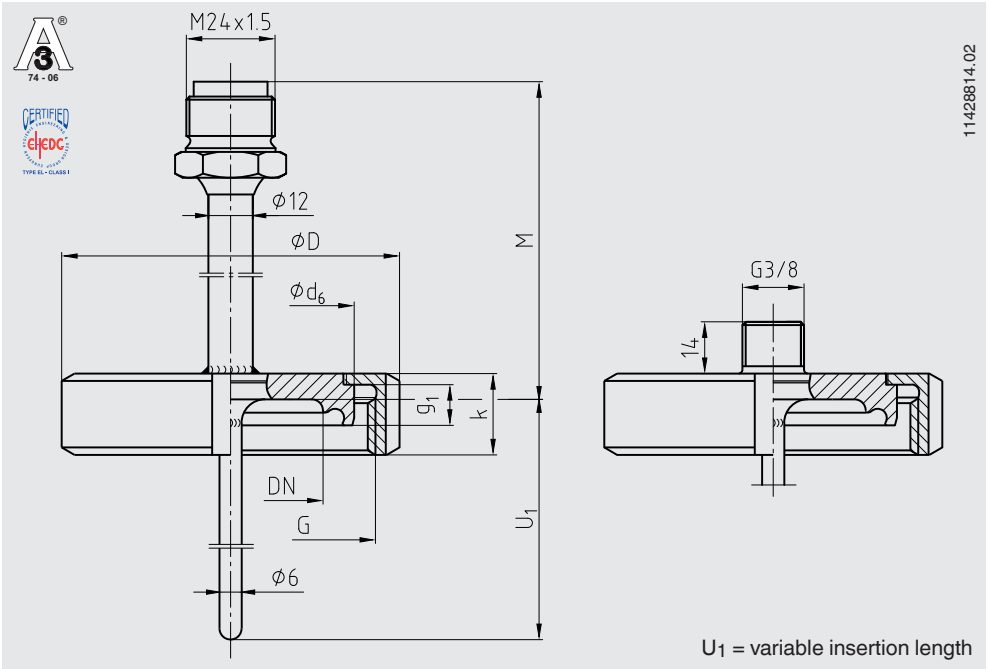
Union nut process connection DIN 11851 with conical coupling (milk thread fitting)



Nominal width in mm	PN in bar	Dimensions in mm Ø d_6	G	Ø D	g	Weight in kg
DN 20	40	36.5	RD 44 x $^1/_6$	54	8	0.40
DN 25	40	44.0	RD 52 x $^1/_6$	63	10	0.50
DN 32	40	50.0	RD 58 x $^1/_6$	70	10	0.60
DN 40	40	56.0	RD 65 x $^1/_6$	78	10	0.80
DN 50	25	68.5	RD 78 x $^1/_6$	92	11	0.90

1) In combination with
- ASEPTO-STAR k-flex upgrade gaskets from Kieselmann GmbH, Germany or
- SKS gasket set DIN 11851 EHEDG from Siersema Komponenten

Aseptic threaded pipe process connection, DIN 11864-1 with collar connection Form A, for pipes in accordance with DIN 11866 row A



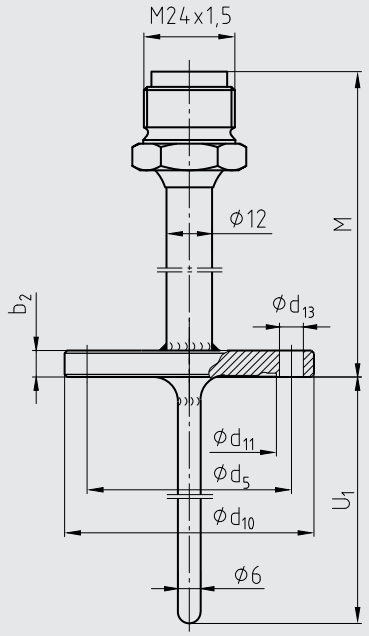
Nominal width in mm	PN in bar	Dimensions in mm Ø D	Ø d_6	G	k	g_1	Aseptic O-ring	Weight in kg
DN 10	40	38	21.9	RD 28 x $^1/_8$	18	6	12 x 3.5	0.20
DN 15	40	44	27.9	RD 34 x $^1/_8$	18	6	18 x 3.5	0.20
DN 20	40	54	35.9	RD 44 x $^1/_6$	20	7	22 x 3.5	0.25
DN 25	40	63	42.9	RD 52 x $^1/_6$	21	9	28 x 3.5	0.40
DN 32	40	70	48.9	RD 58 x $^1/_6$	21	10	34 x 5	0.45
DN 40	40	78	54.9	RD 65 x $^1/_6$	21	10	40 x 5	0.55
DN 50	25	92	66.9	RD 78 x $^1/_6$	22	11	52 x 5	0.70

Connections for pipes in accordance with DIN 11866 row B (ISO pipes) and row C (ASME pipes) available on request.

Process connection Aseptic flange DIN 11864-2, Form A for pipes according to DIN 11866 row A

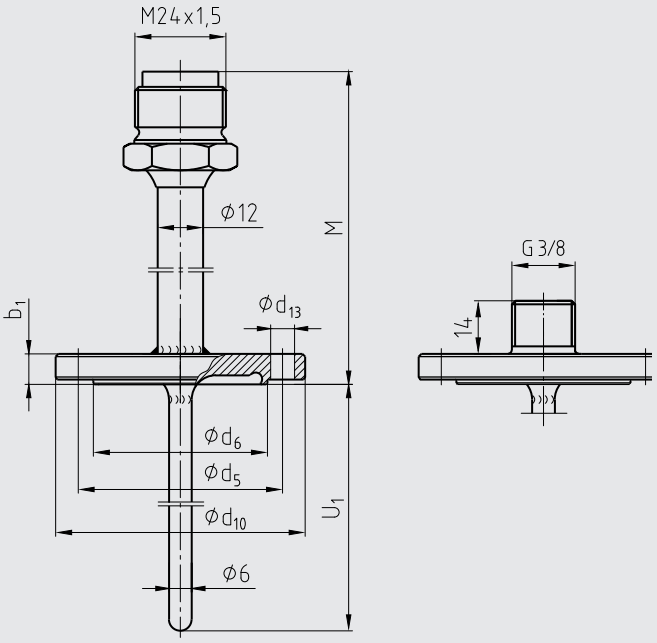
Flange with notch

Aseptic flange with notch, DIN 11864-2 Form A



Flange with groove

Aseptic flange with groove DIN 11864-2 Form A



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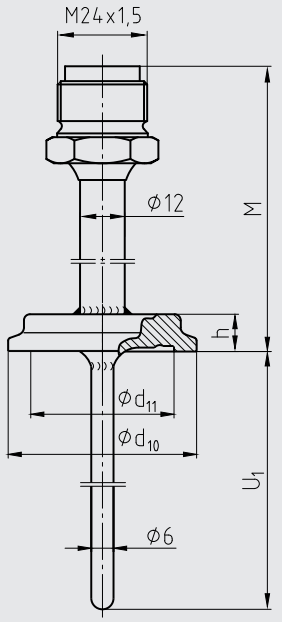
Process connection	Nominal width in mm	PN in bar	Dimensions in mm b_1	b_2	Ø d_5	Ø d_6	Ø d_{10}	Ø d_{11}	Ø d_{13}	Aseptic O-ring	Weight in kg
Flange with notch	DN 10	25	-	10	37	-	54	22.4	4 x Ø 9	12 x 3.5	0.2
	DN 15	25	-	10	42	-	59	28.4	4 x Ø 9	18 x 3.5	0.25
	DN 20	25	-	10	47	-	64	32.4	4 x Ø 9	22 x 3.5	0.3
	DN 25	25	-	10	53	-	70	38.4	4 x Ø 9	28 x 3.5	0.1
	DN 32	25	-	10	59	-	76	47.7	4 x Ø 9	34 x 5	0.4
	DN 40	25	-	10	65	-	82	53.7	4 x Ø 9	40 x 5	0.5
	DN 50	16	-	10	77	-	94	65.7	4 x Ø 9	52 x 5	0.6
Flange with groove	DN 10	25	11.5	-	37	22.3	54	-	4 x Ø 9	12 x 3.5	0.25
	DN 15	25	11.5	-	42	28.3	59	-	4 x Ø 9	18 x 3.5	0.3
	DN 20	25	11.5	-	47	32.3	64	-	4 x Ø 9	22 x 3.5	0.3
	DN 25	25	11.5	-	53	38.3	70	-	4 x Ø 9	28 x 3.5	0.4
	DN 32	25	11.5	-	59	47.6	76	-	4 x Ø 9	34 x 5	0.45
	DN 40	25	11.5	-	65	56.6	82	-	4 x Ø 9	40 x 5	0.6
	DN 50	16	11.5	-	77	65.6	94	-	4 x Ø 9	52 x 5	0.7

Connections for pipes in accordance with DIN 11866 row B (ISO pipes) and row C (ASME pipes) available on request.

Aseptic clamp process connection, DIN 11864-3, Form A for pipes in accordance with DIN 11866 row A

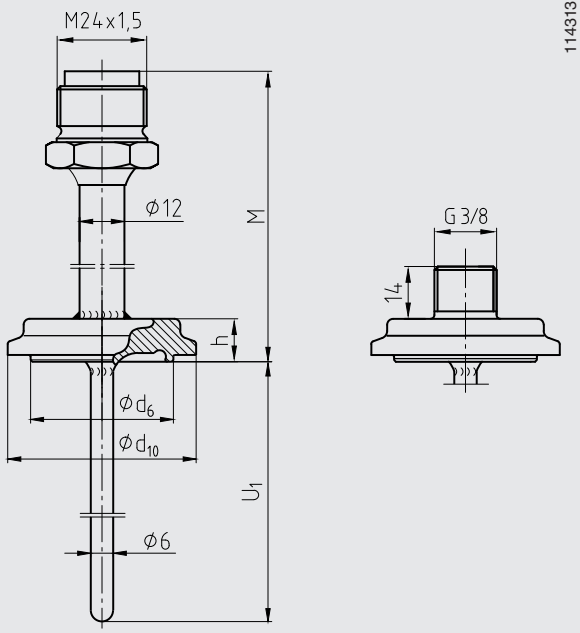
Clamp with notch

Aseptic clamp with notch DIN 11864-3 Form A



Clamp with groove

Aseptic clamp with groove DIN 11864-3 Form A



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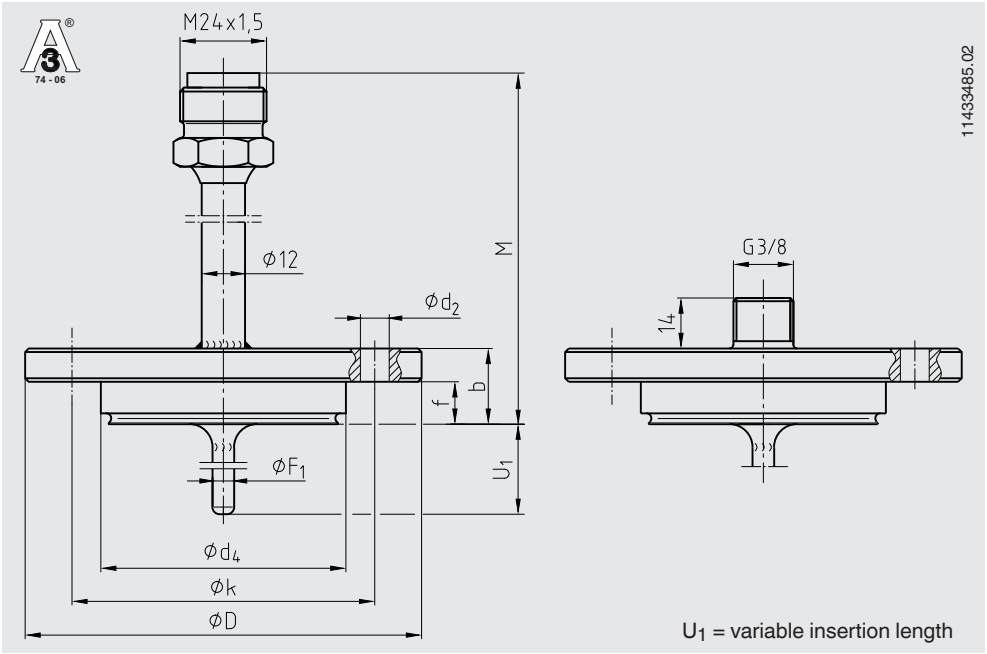
Process connection	Nominal width in mm	PN in bar	Dimensions in mm Ø d_6	Ø d_{10}	Ø d_{11}	h	Aseptic O-ring	Weight in kg
Clamp with notch	DN 10	40	-	34	22.4	10	12 x 3.5	0.2
	DN 15	40	-	34	28.4	10	18 x 3.5	0.2
	DN 20	40	-	50.5	32.4	10	22 x 3.5	0.3
	DN 25	40	-	50.5	38.4	10	28 x 3.5	0.3
	DN 32	40	-	50.5	47.7	10	34 x 5	0.3
	DN 40	40	-	64	53.7	10	40 x 5	0.4
	DN 50	25	-	77.5	65.7	10	52 x 5	0.5
Clamp with groove	DN 10	40	22.3	34	-	11.5	12 x 3.5	0.2
	DN 15	40	28.3	34	-	11.5	18 x 3.5	0.2
	DN 20	40	32.3	50.5	-	11.5	22 x 3.5	0.3
	DN 25	40	38.3	50.5	-	11.5	28 x 3.5	0.3
	DN 32	40	47.6	50.5	-	11.5	34 x 5	0.3
	DN 40	40	53.6	64	-	11.5	40 x 5	0.4
	DN 50	25	65.6	77.5	-	11.5	52 x 5	0.5

Connections for pipes in accordance with DIN 11866 row B (ISO pipes) and row C (ASME pipes) available on request.

NEUMO BioControl® process connection

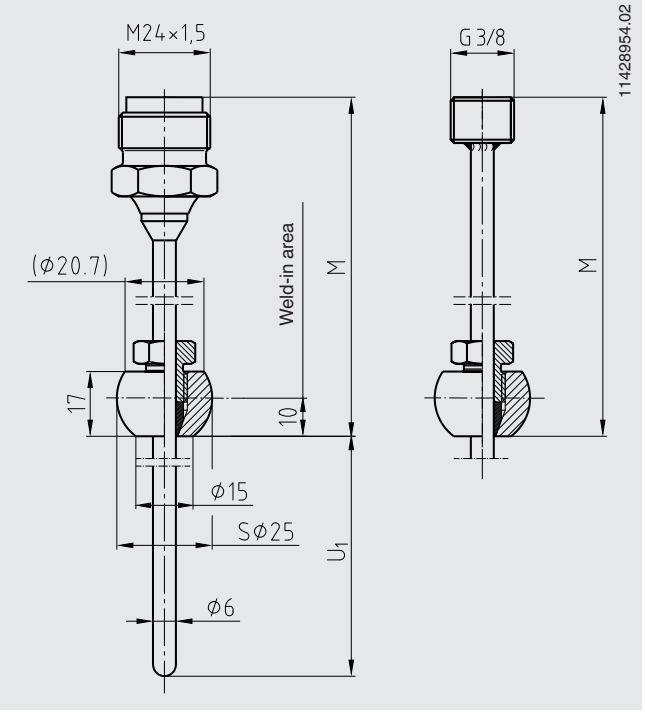


For fitting into a flow-through housing, the insertion length U_1 and the thermowell diameter must be matched. For angular housings, the insertion length U_1 must be specified by the customer.
The housings are not part of the scope of delivery of the resistance thermometers and can be ordered as a separate item. For a detailed description of the BioControl® housings, see data sheet AC 09.14.

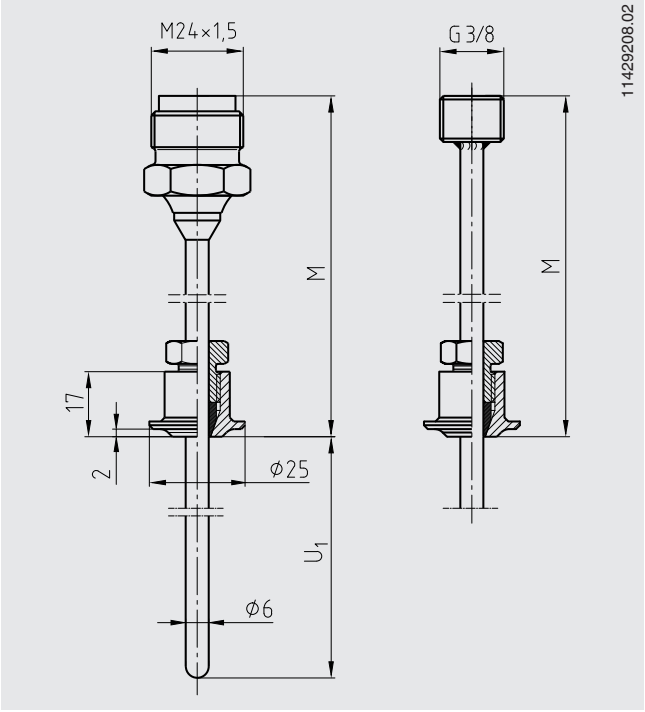
Case size	Nominal width of pipe	PN in bar	Dimensions in mm U_1	Ø d_4	Ø D	f	b	Ø k	Ø d_2	Weight in kg
Size 25	DN 8	16	5	30.5	64	11	20	50	4 x Ø 7	0.4
	DN 10	16	6	30.5	64	11	20	50	4 x Ø 7	0.4
	DN 15	16	9	30.5	64	11	20	50	4 x Ø 7	0.4
	DN 20	16	11	30.5	64	11	20	50	4 x Ø 7	0.4
Size 50	DN 25	16	15	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 40	16	20	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 50	16	25	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 65	16	35	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 80	16	45	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 100	16	55	50.0	90	17	27	70	4 x Ø 9	0.8
Size 65	DN 40	16	20	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 50	16	25	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 65	16	35	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 80	16	45	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 100	16	55	68.0	120	17	27	95	4 x Ø 11	1.4

Compression fitting process connection

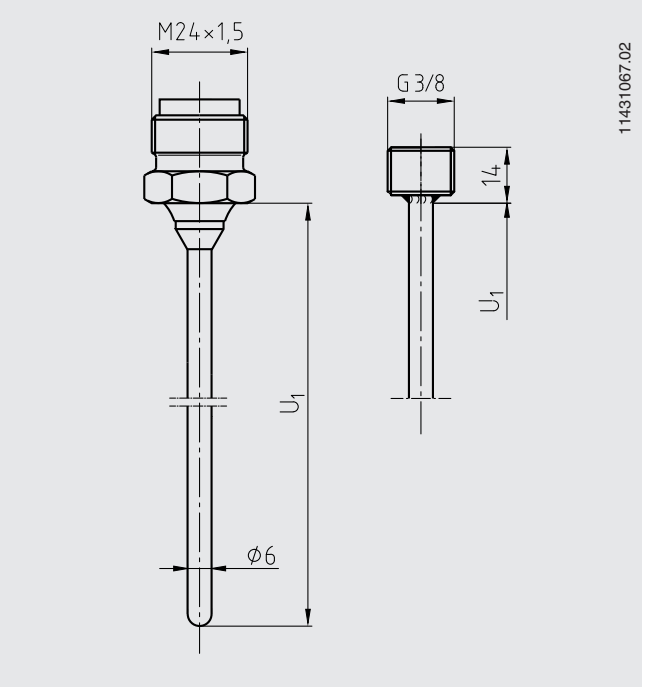
Ball-type compression fitting



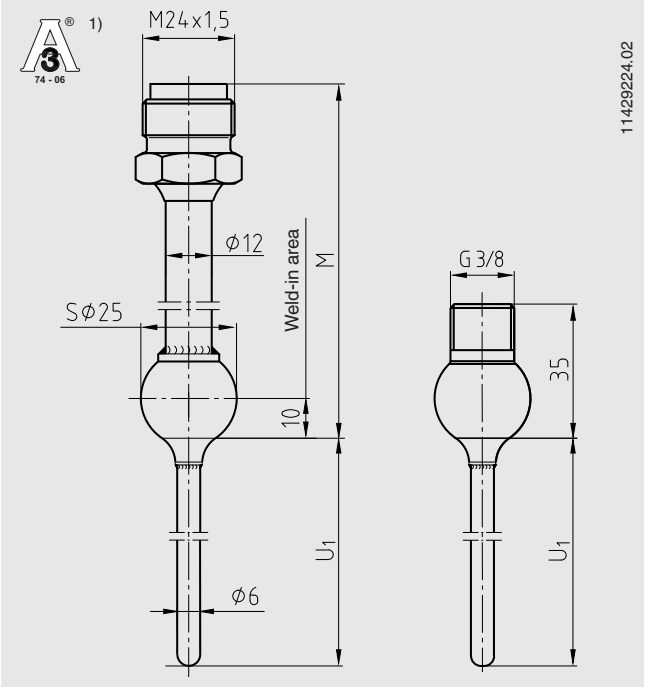
Collar-type compression fitting



Smooth process connection, Ø 6 mm, basic shape for compression fitting

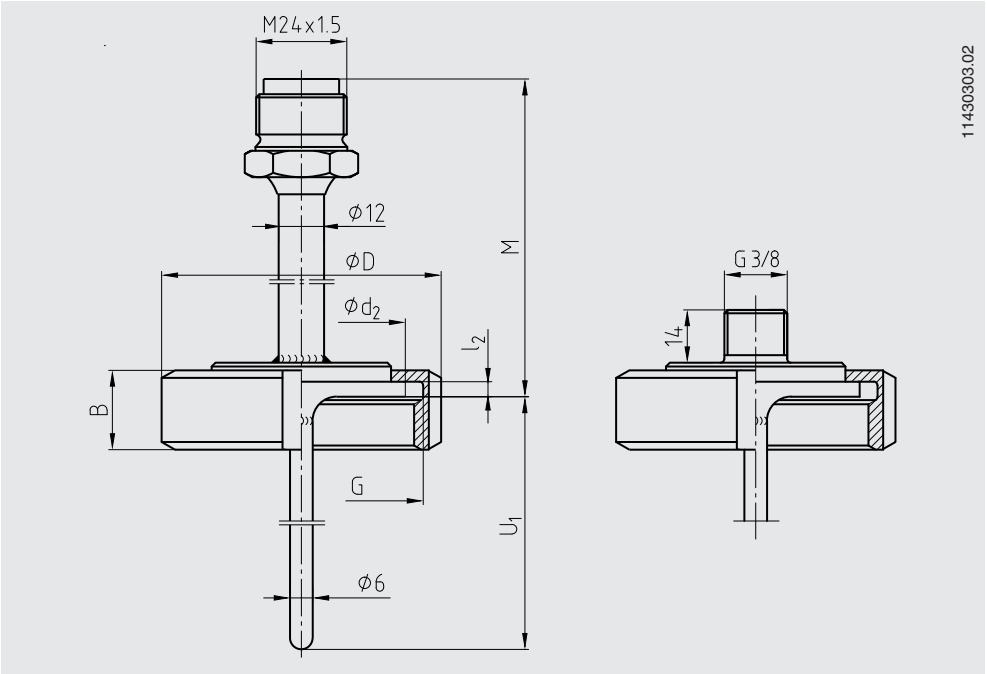


Welding ball process connection



1) In order to meet the 3-A standard, the weld seam must be finished with a minimum radius of 3.2 mm on the product side. In this way, no weld defects, such as recesses or gaps, remain.

Union nut process connection SMS



Nominal width in inches	PN in bar	Dimensions in mm					Weight in kg
		Ø D	Ø d_2	B	l_2	G	
1"	40	51	35.5	25	3.5	RD 40 x 1/6	0.4
1½"	40	74	55	25	4	RD 60 x 1/6	0.8
2"	40	84	65	26	4	RD 70 x 1/6	1

Ordering information

Model / Type of process connection / Nominal width / Thermowell material / Surface roughness of the wetted parts / Connection to thermometer (N) / Insertion length U_1 / Thermowell diameter / Neck tube length M / Neck tube diameter / Assembly with resistance thermometer / Thermometer / Certificates / Options

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03/2014 GB