

MANUAL

WellTEMP® 70

Thermowells for General and Harsh Industrial Applications



- Pressure up to 400 bar, temperature up to 620 °C.
- Designed for welding on, screwing in or flanged connection according to customer specifications.
- Cylindrical or conical shape for measuring inserts with diameter 3 to 8 mm.
- Protective coats with high resistance against corrosion and abrasion.
- Standard and highly resistive materials:
 - carbon steels 1.0570, 1.0425 (P265GH),
 - fire-resistant steels 1.7715, 1.4903,
 - stainless steels 1.4541, 1.4571,
 - special materials, Titanium Gr. 2, Tantalum 99 %, Monel 400, Hastelloy C-22, Nickel 200/201 and others.
- EU Certificate on type examination acc. to Directive 2014/68/EU, issued by TÜV.

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1. General instructions and information

1.1 Symbols used



Symbol of warning; for safe use it is necessary to proceed according to the instructions.



Symbol CE certifies compliance of the product with EU directives and the respective government directives.



This product does not belong to public waste and it is subjected to separate collection.

1.2 Safety warnings and cautions



The equipment may be installed maintained only by a qualified personnel who are familiar with national and international laws, directives, standards safety regulations and with the manual for installation and maintenance. Piping of technological equipment shall not be under pressure before dismounting the thermowell..

1.3 Scope of delivery

With the product is delivered:

- manual for installation, operation and maintenance.

Upon request can be provided:

- protocol on executed tests
- copy of the Inspection certificate 3.1 acc. to EN 10204 for material of the main body
- copy of the EU Type Examination Certificate acc. to Directive PED 2014/68/EU

1.4 Special conditions for safe use in explosion hazard environment

There are no requirements for use in explosion hazard environment that would relate to temperature thermowells. Therefore they may be used for such applications without any reservations..

1.5 Description of the delivery and packing

The product is packaged in a protective cover and provided with an identification label with a mark of the output control. The product must not be exposed to direct rain, vibrations and shocks during transport.

Outer surface of thermowells from varnished carbon steel are protected by anticorrosion wax Pfinder.

Cylindrical (cone) part of the thermowell including thermowell head is protected by Polynet mash.

Flanges of flange thermowells are wrapped with plastic packing foil.

Thermowells with plastic or ceramic surface are protected by combined cover from plastic bubble wrap and cardboard tube.

1.6 Storage

The products shall be stored dry places at temperatures from -40 to +80 °C without condensation of water vapors.

1.7 Installation and commissioning

During installation, commissioning, operation and maintenance follow the instructions in chapter 4.

1.8 Spare parts

Any of the compact parts of the product can be also ordered as a spare part if there is not required special procedures or technological operations for the exchange.

1.9 Repairs

Warranty and customer service is done by exchange of the thermowell.

1.9 Warranty

Products are covered by a warranty for a period of 24 months from the delivery date on the delivery note. The manufacturer guarantees technical and operational parameters of the products within scope of the applicable documentation. Warranty period is specified with individual items and begins from the day of takeover of the goods by the purchaser or delivery to the carrier. Any claims concerning to defects of the goods together can be filed in writing with the manufacturer within the warranty period and the claimed product shall be presented. The claiming party shall give identification of the product, number of the delivery note and description of the fault or defect.

The manufacturer is not responsible for any defects caused by improper storage, incorrect connection, damages caused by external effects, in particular by effects of factors with excessive values, unqualified installation, improper operation or common wearing.

2. End of service and disposal

2.1 End of service



During thermowell disassembly (screw out, cut out) it is necessary to take into account that thermowell cannot be removed unless the process medium is discharged from the piping or unless another suitable measure is taken to prevent escape of the medium, injury of the personnel or other dangerous consequences of such action.

2.2 Disposal



The products do not contain any environmentally hazardous parts. When disposing the packing and destroyed or irreparably damaged product proceed according to the local regulations.

3. Product description



WellTEMP® 70 Thermowells for General and Harsh Industrial Applications

- Pressure up to 400 bar, temperature up to 620 °C.
- Designed for welding on, screwing in or flanged connection according to customer specifications.
- Cylindrical or conical shape for measuring inserts with diameter 3 to 8 mm.
- Protective coats with high resistance against corrosion and abrasion.
- Standard and highly resistive materials:
 - carbon steels 1.0570, 1.0425 (P265GH),
 - fire-resistant steels 1.7715, 1.4903,
 - stainless steels 1.4541, 1.4571,
 - special materials, Titanium Gr. 2, Tantalum 99 %, Monel 400, Hastelloy C-22, Nickel 200/201 and others.
- EU Certificate on type examination acc. to Directive 2014/68/EU, issued by TÜV.

3.1 Application

Thermowells are designed to protect thermometer measuring stems against mechanical and chemical effect of measured medium. They are used for completion of resistance and thermocouple temperature sensors that do not have their own thermowell. Thermowells are designed for welding on, screwing in or flanged connection on pieces or walls of the technological equipment. Screwed thermowells for high parameters are usually secured by securing welds. Depending on used material and design the thermowells can be used within range of temperatures -200 to +620 °C and pressures up to 40 MPa. Conical thermowells for high parameters allow use for superheated steam with velocity of flow up to 90 m/s.

In the case that there is chosen a suitable material or protective coat, the thermowells can be also used for various corrosive and abrasive media.

Thermowells meet requirements of standards:

- EN 61152,
- EN ISO 15614-1,
- EN ISO 9606-1,
- EN 10204,
- EN ISO 9712,
- IEC 61520,
- DIN 43772.

Thermowells are certified as pressure accessories of energetic equipment, category III acc. to European Directive PED and certified acc. to Directive 2014/68/EU, issued by TÜV.

3.2 Description

Thermowells are either welded or drilled. Welded thermowells consist of head, thermowell body and bottom, possibly reduced end of the thermowell. Drilled thermowells are made from one piece and they are more resistant against high parameters of measured medium.

Design of the thermowells differ in their inner and outer connection threads, diameters for welding or used flanges. The connection dimensions are based on metric or inch size series. Thermowells WT70 D acc. to DIN 43772 are welded into special welded on pieces with tolerated diameter.

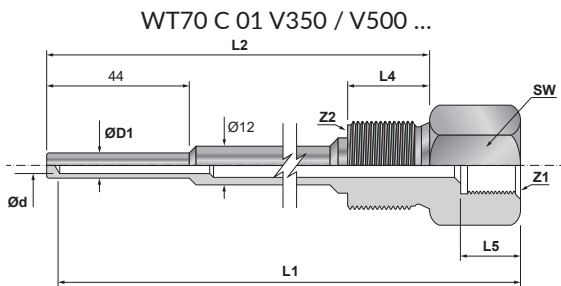
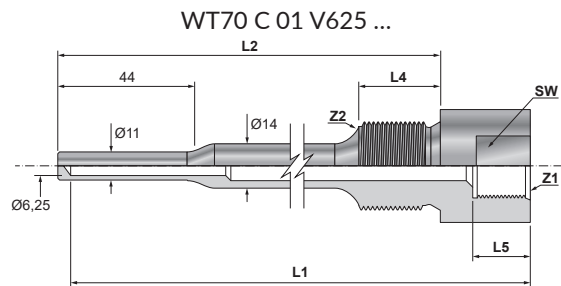
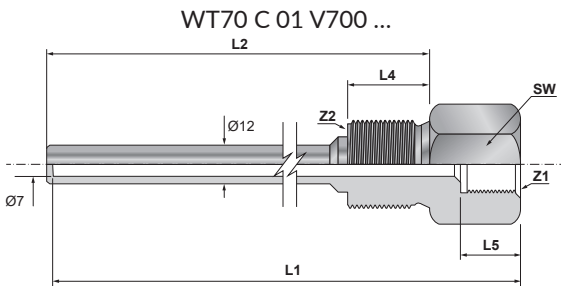
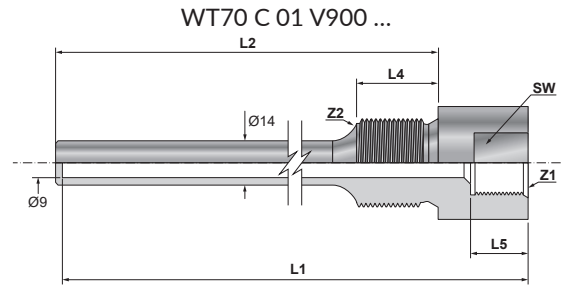
Basic materials of thermowells:

- Standard thermowells steel 1.0570, 1.0425, 1.4541, 1.4571,
- High parameter drilled thermowells steel 1.7715, 1.4541, 1.4903,
- High chemical resistance thermowells Monel 400, Nickel 200/201, Hastelloy C-22, Titanium Gr.2, Tantalum 99 %.

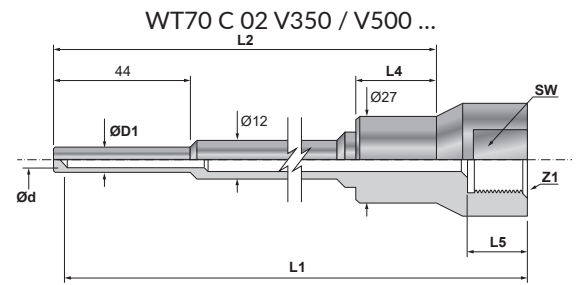
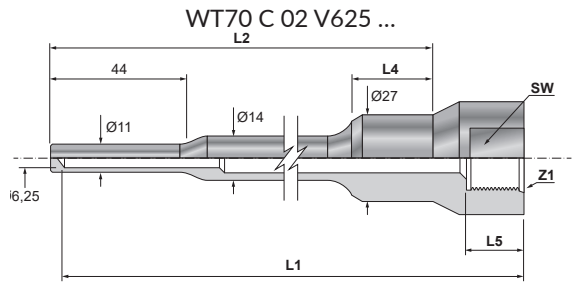
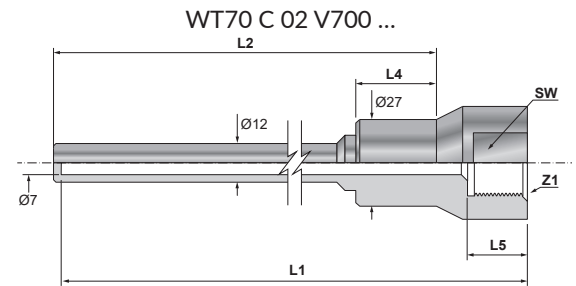
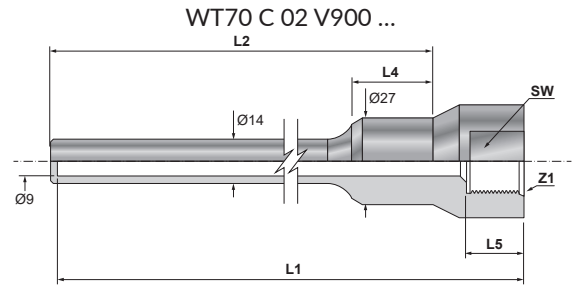
Quality of production of the thermowells is ensured using a quality system. Within the scope of this system all thermowells are subjected to checks of tightness using inner overpressure and drilled thermowells are additionally checked by X-ray snaps.

3.3 Dimensional Drawings

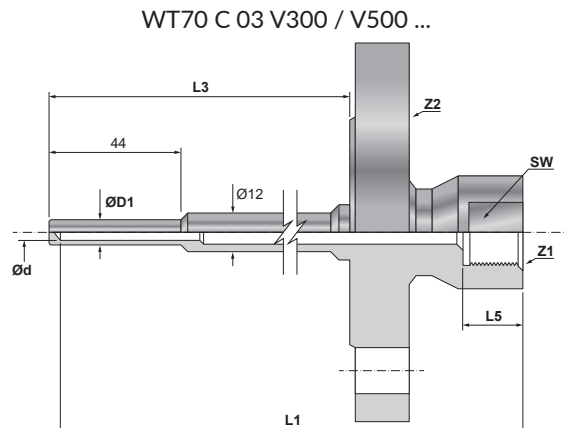
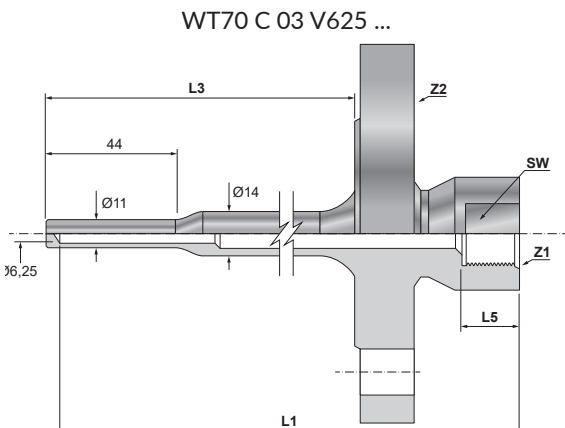
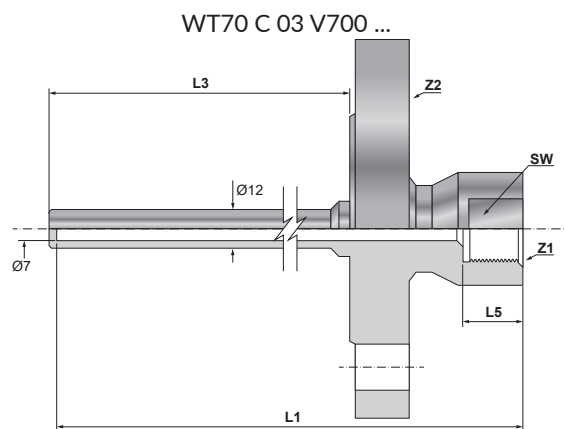
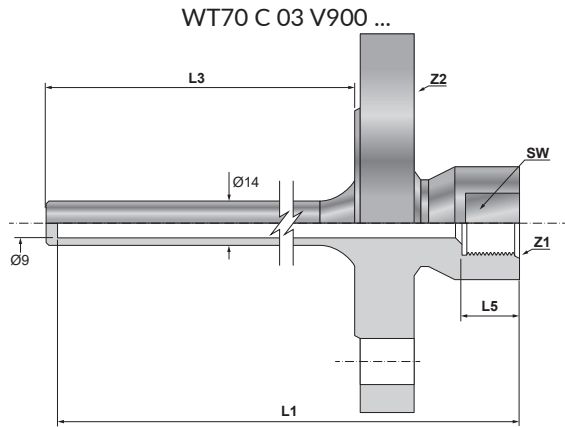
WT70 C, to Screwing



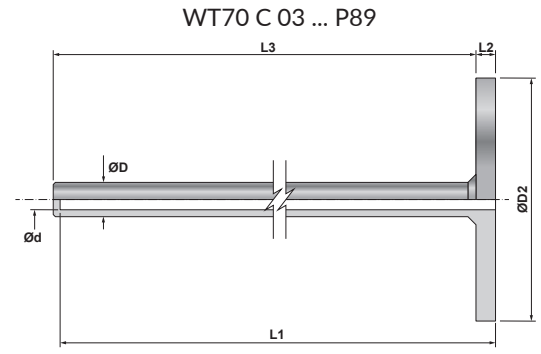
WT70 C, to Welding



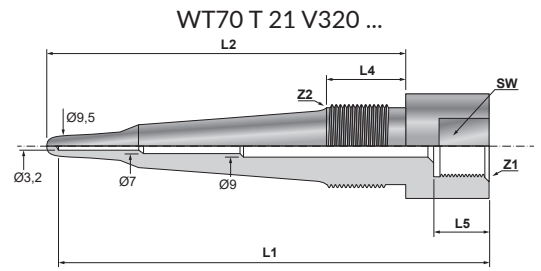
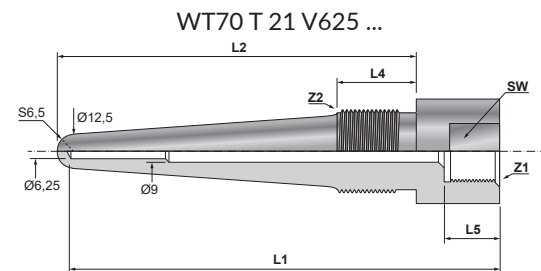
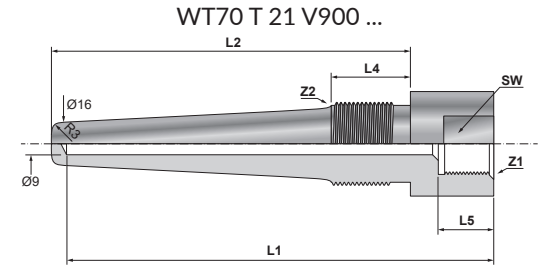
WT70 C, with Flange



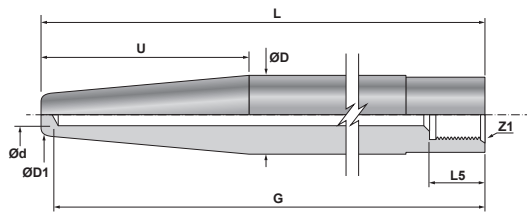
WT70 C, between Flanges



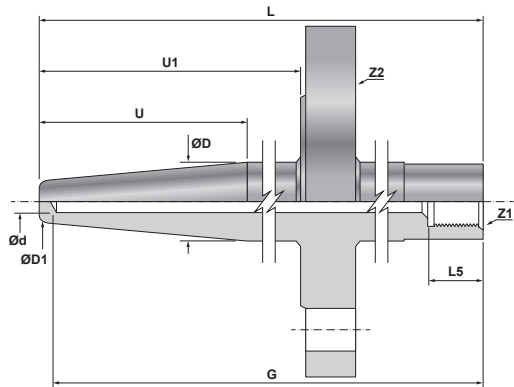
WT70 T, to Screwing



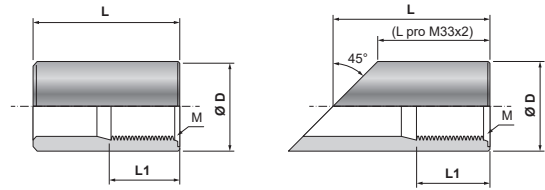
WT70 D, to Welding



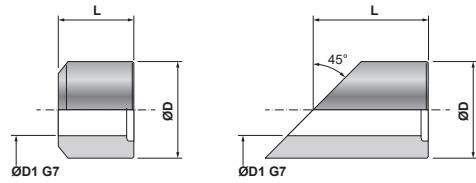
WT70 D, with Flange



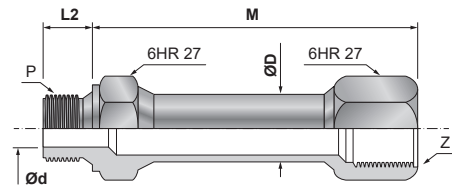
NV Welded on piece for WT70 C and WT70 T



NV D Welded on piece for WT70 D



NT70 Extension piece for temperature sensors



4. Installation, operation and maintenance

4.1 Installation and commissioning

4.1.1 General

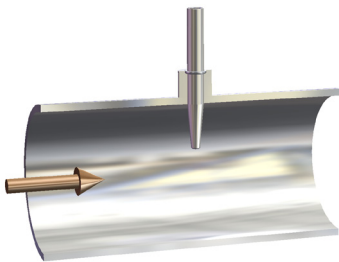
Installation and mounting of the thermowell shall be done according to the applicable regulations and project documentation. Thermowells are installed into horizontal, vertical or obliged piping or technological equipment (see 4.1.2 Examples of mounting of the thermowells in operation). Before installation, the piping or technological equipment shall be cleaned from any dirt preservative substances, rust and scales from welding. There shall be left enough space for mounting or dismantling of temperature sensor or temperature insert during its exchange. Minimal length of free space above the thermowell is approximately determined by the total length of used temperature sensor. For installation of thermowells apply provisions contained in the manual (included in the delivery).



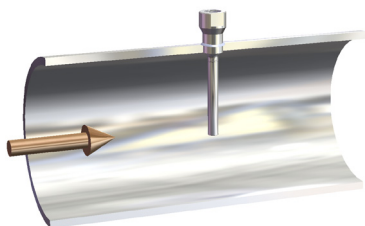
When both connections of threaded parts are made of stainless steel, there is danger of galling (formation of cold weld). This can also occur during ordinary screwing by hand without using tightening key. If the cold weld is made, the thread is then damaged and parts are unusable. Before first screwing, it is therefore necessary to check whether threads are free of impurities (and clean if needed) and then treat the threads against galling (formation of cold weld) by appropriate lubricant. For example use paste G-Rapid plus or Lukosan M11 (in case of connection for oxygen). For tapered threads is usually used Teflon tape.

4.1.2 Examples of mounting of the thermowells in operation

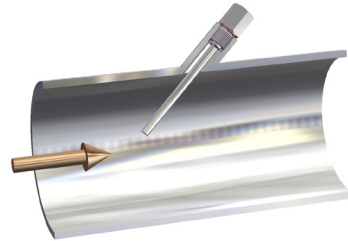
Thermowell DIN



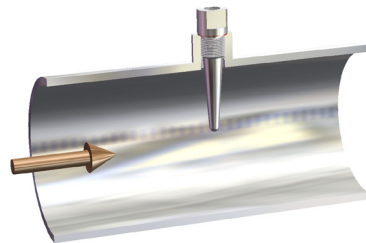
Thermowell for welding



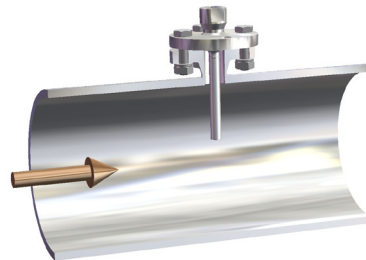
Thermowell for screwing in oblique welded on piece



Conical thermowell in straight welded on piece



Thermowell with flange



Thermowell for screwing in pipe elbow



4.2 Operation and maintenance

Thermowells do not need permanent operation.



Before any repair related with dismantling of the thermowell, it is necessary to ensure that the thermowell is not under pressure!

5. Product specifications

5.1 Technical specifications

Nominal pressure::

- PN 160 ... version WT70 C (according to used material)
- PN 250 ... version WT70 D (according to used material)
- PN 400 ... version WT70 T (according to used material)

Maximal operating temperature::

- 400 °C ... thermowell material 1.0570
- 450 °C ... thermowell material 1.0425 (P265GH)
- 500 °C ... thermowell material 1.4571
- 575 °C ... thermowell material 1.7715
- 600 °C ... thermowell material 1.4541
- 620 °C ... thermowell material 1.4903

Used materials:

- 1.0570 (11523)
- 1.0425 (11416, P265GH)
- 1.4571 (17348)
- 1.7715 (15128)
- 1.4541 (17248)
- 1.4903
- Monel 400 (2.4360)
- Hastelloy C-22 (2.4602)
- Nickel 200/201 (2.4068)
- Titan Gr. 2
- Tantal 99 %
- for other options contact the supplier

Process connection::

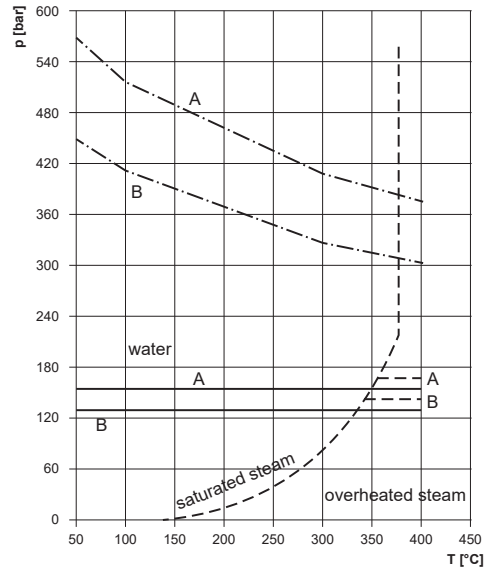
- outer thread
 - M33x2 • M27x2 • M20x1,5 • G1" • G3/4"
 - G1/2" • 1" NPT • 3/4" NPT • 1/2" NPT
- for welding
 - outer diameter (mm) • 27 • 26h7 • 24h7 • 18h7
- flange
 - acc. to EN 1092-1, design B1/B2/C/D/E/F, nominal size DN 25 to DN 50, PN 16 to PN 250
 - acc. to ANSI B 16.5, design RF/RJ, nominal size 1" to 2", 150 to 2500 lbs
- between flanges
- for other options contact the supplier

Inner thread::

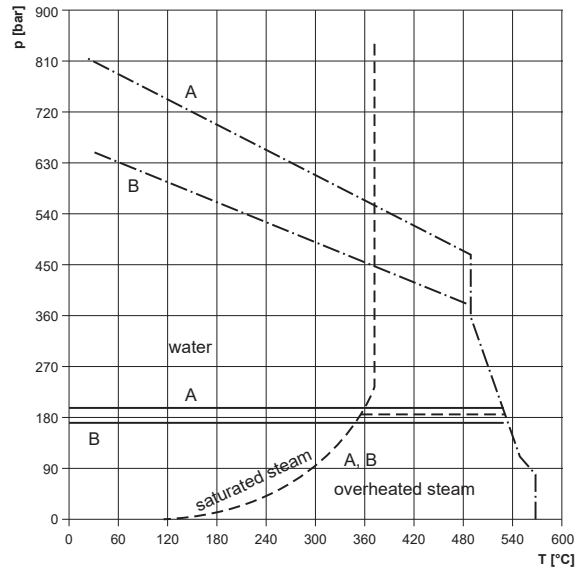
- M20x1,5 • M18x1,5 • M16x1,5 • M14x1,5 • G1/2"
- G1/4" • 1/2" NPT • for other options contact the supplier

5.2 Load diagrams

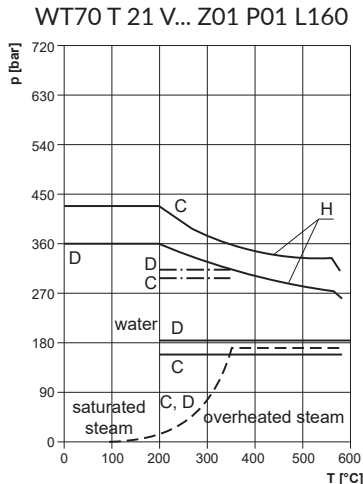
WT70 D 31 (32)



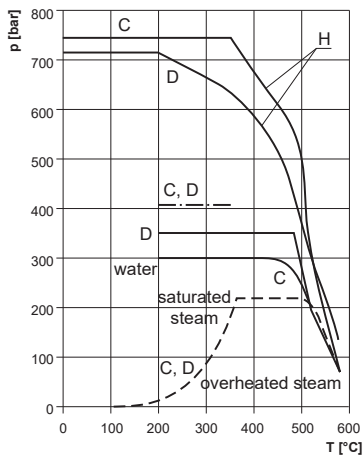
- A – version WT70 D 31 Z... L110 M04 (outside diameter 18h7 mm, inner diameter 3.5 mm, U = 65 mm, material 1.4571)
- B – version WT70 D 32 Z... L201 M04 (outside diameter 24h7 mm, inner diameter 7 mm, U = 125 mm, material 1.4571)
- air (v = 60 m/s)
- - - steam (v = 60 m/s)
- · - · water (v = 5 m/s)



- A – version WT70 D 31 Z... L110 M02 (outside diameter 18h7 mm, inner diameter 3,5 mm, U = 65 mm, material 1.7715)
- B – version WT70 D 32 Z... L201 M02 (outside diameter 24h7 mm, inner diameter 7 mm, U = 125 mm, material 1.7715)
- air (v = 60 m/s)
- - - steam (v = 60 m/s)
- · - · water (v = 5 m/s)



C – version WT70 T 21 V320 Z01 P01 L160 M03 (M33x2, inner diameter 3,2 mm, material 1.4571)
 D – version WT70 T 21 V625 Z01 P01 L160 M03 (M33x2, inner diameter 6,25 mm, material 1.4571)
 — air (v = 80 m/s)
 - - - steam (v = 80 m/s)
 - · - · - water (v = 10 m/s)



C – version WT70 T 21 V320 Z01 P01 L160 M02 (M33x2, inner diameter 3,2 mm, material 1.7715)
 D – version WT70 T 21 V625 Z01 P01 L160 M02 (M33x2, inner diameter 6,25 mm, material 1.7715)
 — air (v = 80 m/s)
 - - - steam (v = 80 m/s)
 - · - · - water (v = 10 m/s)

5.3 Supplementary parameters

For thermowells can be provided following (see the ordering table):

- stainless steel closing plug
- material certificate acc. to EN 10204
- pressure test by internal overpressure
- degreasing for oxygen
- check of the thermowell by a calculation

Surface treatment:

Standard thermowells are polished and can be also delivered with optional protective coats that increases resistance of the thermowells in hard chemical or abrasive environment.

Materials used for protective coats:

- polyamide PA11, $T_{MAX} = 100\text{ °C}^*$
- ethylene-chlorotrifluorethylene E-CTFE „Halar“, $T_{MAX} = 170\text{ °C}^*$
- perfluoroalkoxy-copolymer of tetrafluorethylene and perfluorated vinyl ether PFA, $T_{MAX} = 260\text{ °C}^*$
- ethyltetrafluorethylene ETFE „Hyflon“, $T_{MAX} = 130\text{ °C}^*$
- polytetrafluorethylene PTFE, $T_{MAX} = 260\text{ °C}^*$
- corundum spray for extremely abrasive media, T_{MAX} acc. to particular composition of the coat

* ... T_{MAX} depends on the measured medium

Based on the customer's requirement the particular design of the protective coat of the thermowell or protective pipe of the temperature sensor is developed after specification of the basic information concerning the measured medium (chemical composition, temperature, pressure, flow velocity and level of abrasion in case of abrasive media).

Operating medium	Steam								Air								
	40		60		40		60		40		60		40		60		
Thermowell material	1.7715				1.4541				1.7715				1.4541				
Wells version according to diagrams	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	
Coefficient S for temperature of operating medium	to 370 °C	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,54	1,37	1,36	1,25	1,51	1,36	1,32	1,19
	over 370 °C	1,10	1,05	1,07	1,03	1,17	1,16	1,11	1,06	1,20	1,12	1,12	1,07	1,32	1,19	1,20	1,11

The value of pressure found in the respective diagram is multiplied by the coefficient S according to the table below for velocities of steam and air flow 40 m/s and 60 m/s. However, the obtained values shall not exceed the limit H given in the diagrams.

Properties of protective coats based on fluoroplastic materials E-CTFE, PFA, ETFE, PTFE:

Resistance against high temperatures

Very good resistance against high temperatures, high melting points, limits of thermal degradation and self-ignition temperatures. Their flammability, released heat and amount of smoke are relatively low.

Fluoroplastic materials remain functional at temperatures highly above limits of other thermoplastic or elastomer materials.

Depending on the type of materials, they can be permanently exposed to approx. 260 ° C.

Non-adhesivity

Low surface energy in solid state creates excellent nonadhesive surfaces. Therefore only very few solid substances adheres to these coats and if so, it is very easy to remove them from the surface.

Friction coefficient

These coats show the lowest values of all known solid substances. The values of fluoroplastic coats vary from 0.05 to 0.2, depending on loading, velocity and type of the fluoroplastic material.

Wettability

Coats based on fluoroplastic materials are exceptionally hydrophobic and oleophobic. Cleaning of the surface is therefore easy and simple. In many cases surface is selfcleaning.

Dielectric properties

These materials show excellent dielectric properties, low relative permittivity, low loss coefficient and exceptionally high specific resistance. Therefore they exceed most materials in resistance against electric breakdown and electric arc within a wide scope of working conditions.

Cryogenic properties

These coats remain solid, stable and fully functional even at cryogenic temperatures, i.e. up to approximately -270 °C, without any loss of these properties.

Properties of protective coats based on polyamide PA 11:

Polyamide PA11 (meets requirements of the standards BSI WIS 4-52-01, KIWA BRL K759-01 and UL 1091) is suitable as coating material for use with media and showing excellent resistance against corrosion, abrasion, shocks and vibrations and all of them together. Therefore this coat is suitable e.g. for the applications below:

- salt mists
- electrochemical reactions
- hydrocarbons, solvents and other inorganic and organic media.

Properties of protective coats based on oxides or carbides of metals:

A series of coats based on oxides or carbides of metals is available for various applications. By combination and composition

of additional materials in the applied coat may provide properties that cannot be achieved by any known methods.

Based on the customer's requirement the particular design of the protective coat of the thermowell or protective pipe of the temperature sensor is developed after specification of the basic information concerning to the measured medium (chemical composition, temperature, pressure, flow velocity and size of solid particles)..

Lifetime of the thermowell

Lifetime of the thermowell depends on many parameters that relate to the design of the thermowell, parameters of the measured medium and other operational conditions.

The thermowell may be exposed to corrosive and erosive effects of corrosive substances, high temperatures, mechanical load from flowing medium or other technological elements.

As for mechanical load, the most important factor is load of the thermowell by vibrations that may be transferred to the thermowell from the technological equipment (pumps, motors, fans, etc.) or from the flowing medium. Flowing medium creates whirls behind the thermowell. Frequency of ripping off of these whirls is given, primarily by dimensions of the thermowell, velocity and viscosity of the measured medium. In case this frequency is close to own frequency of the thermowell, equality of these frequencies may cause massive absorption of energy by the thermowell and vibrations at the resonance frequency; this may result in strong vibrations of the thermowell and lead to its damage or damage of the built-in temperature sensor. Regulations ASME require the ratio of the excitation frequency from the flowing medium to the own frequency of the thermowell lower than 0.8. In case where the ratio is higher than 0.8, it is necessary to make some changes in the design of the thermowell and way of its installation. There are available following two basic solutions:

- A) Decrease the excitation frequency from the flowing medium
 - decrease velocity of the flow (enlarge diameter of the piping at the point of installation of the thermowell)
- B) Increase own frequency of the thermowell
 - shorten the length of the thermowell
 - change the material of the thermowell
 - use another type of the thermowell with a larger diameter
 - or other shapes

Applicability of use of the thermowell for a particular application can be read from the loading diagrams or let it checked by a strength calculation. Such strength calculation is based on theoretic methods and therefore it cannot be considered as a guarantee against possible failures of the thermowell, because the given particular application may be exposed to other effects that cannot be included in the calculation.

6. Ordering information

6.1 Ordering table for Cylindric thermowell (WT70 C)

Cylindric thermowell, PN 160		WT70 C ① ② ③ ④ ⑤ ⑥					
① Version		WT70 C ① ② ③ ④ ⑤ ⑥					
Code	Description						
01	for screwing						
02	for welding						
03	with flange						
99	other						
② Inner bore		WT70 C ① ② ③ ④ ⑤ ⑥					
Code	Inner bore Ø d	Outer diameter Ø D / Ø D1					
V900	9 mm	14 mm / 14 mm					
V700	7 mm	12 mm / 12 mm <small>D1 = 10 mm for thermowells material Monel 400 (M08) and Hastelloy C-22 (M09)</small>					
V625	6.25 mm	14 mm / 11 mm					
V500	5 mm	12 mm / 8 mm					
V350	3.5 mm	12 mm / 6.5 mm					
V999	other						
③ Inner thread		WT70 C ① ② ③ ④ ⑤ ⑥					
Code	Inner thread Z1	Length L5					
Z01	M20×1,5	18 mm					
Z02	M18×1,5	16 mm					
Z03	M16×1,5	14 mm					
Z04	M14×1,5	12 mm					
Z05	G1/2"	18 mm					
Z06	G1/4"	16 mm					
Z07	1/2" NPT	19 mm					
Z99	other						
④ Process connection Z2		WT70 C ① ② ③ ④ ⑤ ⑥					
Code	Threaded process connection	Length L4	Wrench size SW				
P02	M27×2	25.5 mm	30				
P03	M20×1,5	15 mm	27				
P05	G3/4"	25.5 mm	30				
P06	G1/2"	15 mm	27				
P08	3/4" NPT	21 mm	30				
P09	1/2" NPT	19 mm	27				
Code	Welded process connection	Length L4					
P31	diameter 27 mm	25 mm					
Code	Flanged process connection according to EN 1092-1						
P54	flange DN25 / PN10 to PN40						
P60	flange DN25 / PN63 to PN100						
P63	flange DN25 / PN160						
P66	flange DN25 / PN250						

Code	Flanged process connection according to EN 1092-1	
P55	flange DN40 / PN10 to PN40	
P61	flange DN40 / PN63 to PN100	
P64	flange DN40 / PN160	
P67	flange DN40 / PN250	
P53	flange DN50 / PN10 to PN16	
P56	flange DN50 / PN25 to PN40	
P59	flange DN50 / PN63	
P62	flange DN50 / PN100	
P65	flange DN50 / PN160	
P68	flange DN50 / PN250	
...B1	raised face	
...B2	raised face	
...C	large tongue	
...D	large groove	
...E	large male	
...F	large female	
Code	Flanged process connection according to ANSI B 16.5	
P71	flange 1" / 150 lbs	
P74	flange 1" / 300 lbs	
P77	flange 1" / 600 lbs	
P80	flange 1" / 1500 lbs	
P83	flange 1" / 2500 lbs	
P72	flange 1,5" / 150 lbs	
P75	flange 1,5" / 300 lbs	
P78	flange 1,5" / 600 lbs	
P81	flange 1,5" / 1500 lbs	
P84	flange 1,5" / 2500 lbs	
P73	flange 2" / 150 lbs	
P76	flange 2" / 300 lbs	
P79	flange 2" / 600 lbs	
P82	flange 2" / 1500 lbs	
P85	flange 2" / 2500 lbs	
... RF	raised face	
... RJ	RJ groove for metal sealing ring model R	
Code	Wafer process connection	
P89	between flanges	consult with supplier (see dimensional drawing)
P99	other	

5 Nominal length L				WT70 C ① ② ③ ④ ⑤ ⑥	
Code	Length L	Length L1	Length L2 *1	Length L3	
L100	100 mm	101 + 1 mm	76 mm / 80 mm	50	
L160	160 mm	161 + 1 mm	136 mm / 140 mm	110	
L250	250 mm	251 + 1 mm	226 mm / 230 mm	200	
L400	400 mm	401 + 1 mm	376 mm / 380 mm	350	
L630	630 mm	631 + 1 mm	606 mm / 610 mm	580	
L___	other	fill nominal length L and other dimensions in mm			

*1 - First value L2 applies only for process connection codes P02, P05, P31 / Second value applies for other process connections.

6 Thermowell material		WT70 C ① ② ③ ④ ⑤ ⑥					
Code	Material	T _{MAX}					
M01	1.0570 *1	400 °C					
M11	1.0425 *1	450 °C					
M03	1.4541	600 °C					
M04	1.4571	600 °C					
M06	Titanium grade 2	specific thermowell version consult with supplier					
M07	Tantalum 99%	specific thermowell version consult with supplier					
M08	Monel 400	specific thermowell version consult with supplier					
M09	Hastelloy C-22	specific thermowell version consult with supplier					
M10	Nickel 200/201	specific thermowell version consult with supplier					
M99	other	specific thermowell version consult with supplier					

*1 - As standard only for thermowell for welding (code P31) and nominal length max. 250 mm.

Optional versions and accessories		WT70 C ① ② ③ ④ ⑤ ⑥ [...]					
Code	Protective coat	T _{MAX} (with spray)					
X01	polyamide PA11	100 °C *1					
X02	ethylene-chlorotrifluorethylene E-CTFE "Halar"	170 °C *1					
X03	perfluoralkoxy-copolymer tetrafluorethylene and perfluorated vinyl ether PFA	260 °C *1					
X04	ethyltetrafluorethylene ETFE "Hyflon"	130 °C *1					
X05	polytetrafluorethylene PTFE	260 °C *1					
X07	hard metal coating (Fe-Cr-Mn-Si-B-C) for abrasive medium	925 °C					
X08	corundum spray for highly abrasive medium	according to specific composition of coating					
X10	enamel coating for highly aggressive medium	220 °C only with code M99 (carbon steel)					
X99	other						

*1 - Depending on measured medium.

Code	Accessories
BZS	Stainless steel tag (70 × 15 mm) with description according to order
PPZ	Product description according to customer requirements
UZ	Stainless steel plug, dimension according to thermowell inner thread, including coupling chain
Q1	Material certificate according to EN 10204, 3.1
TZI	Pressure test of thermowell by inside over-pressure
TZE	Pressure test of thermowell by outside over-pressure (consult with supplier)
PZ	Penetration test of thermowell welds
KY	Degreasing version for oxygen
VY	Strength calculation of thermowell (frequency, pressure stress)

Example of order:

WT70 C ① ② ③ ④ ⑤ ⑥ → WT70 C 01 V700 Z01 P02 L160 M03

6.2 Ordering table for Conical thermowell (WT70 T)

Conical thermowell, PN400				WT70 T ① ② ③ ④ ⑤ ⑥					
① Version				WT70 T ① ② ③ ④ ⑤ ⑥					
Code	Description								
21	for screwing								
99	other								
② Inner bore				WT70 T ① ② ③ ④ ⑤ ⑥					
Code	Inner bore Ø d								
V900	9 mm								
V625	6.25 mm								
V999	other								
③ Inner thread				WT70 T ① ② ③ ④ ⑤ ⑥					
Code	Inner thread Z1	Length L5							
Z01	M20×1,5	18 mm							
Z02	M18×1,5	16 mm							
Z03	M16×1,5	14 mm							
Z05	G1/2"	18 mm							
Z07	1/2" NPT	19 mm							
Z99	other								
④ Process connection Z2				WT70 T ① ② ③ ④ ⑤ ⑥					
Code	Threaded process connection	Length L4	Wrench size SW						
P01	M33×2	30 mm	30						
P02	M27×2	25.5 mm	30						
P04	G1"	30 mm	27						
P07	1" NPT	21 mm	30						
P99	other								
⑤ Nominal length L				WT70 T ① ② ③ ④ ⑤ ⑥					
Code	Nominal length L	Length L1	Length L2						
L160	160 mm	161 + 1 mm	136 mm						
L250	250 mm	251 + 1 mm	226 mm						
L___	other	fill nominal length L and other dimensions in mm							
⑥ Thermowell material				WT70 T ① ② ③ ④ ⑤ ⑥					
Code	Material	T _{MAX}							
M12	1.5415	500 °C							
M13	1.7335	550 °C							
M14	1.7380	580 °C							
M02	1.7715	575 °C							
M03	1.4541	600 °C							
M04	1.4571	600 °C							
M05	1.4903	620 °C							
M06	Titanium grade 2	specific thermowell version consult with supplier							
M07	Tantalum 99%	specific thermowell version consult with supplier							
M08	Monel 400	specific thermowell version consult with supplier							
M09	Hastelloy C-22	specific thermowell version consult with supplier							
M10	Nickel 200/201	specific thermowell version consult with supplier							
M99	other	specific thermowell version consult with supplier							

Optional versions and accessories **WT70 T** ① ② ③ ④ ⑤ ⑥ [...]

Code	Accessories
BZS	Stainless steel tag (70 × 15 mm) with description according to order
PPZ	Product description according to customer requirements
UZ	Stainless steel plug, dimension according to thermowell inner thread, including coupling chain
Q1	Material certificate according to EN 10204, 3.1
TZI	Pressure test of thermowell by inside over-pressure
KY	Degreasing version for oxygen
VY	Strength calculation of thermowell (frequency, pressure stress)

Example of order:

WT70 T ① ② ③ ④ ⑤ ⑥ → **WT70 T 21 V625 Z01 P01 L160 M03**

6.3 Ordering table for Welded on piece for thermowells WT70 C and WT70 T

Welded on piece for thermowells WT70 C and WT70 T NV ① ② ③

① Thread dimension NV ① ② ③

Code	Description	Nominal pressure	L / L1 / D *1
M20	M20x1,5	PN160	50 / 25 / 30 (28) mm
G1/2	G1/2"	PN160	50 / 25 / 30 (28) mm
M27	M27x2	PN160	65 / 30 / 40 (35) mm
G3/4	G3/4"	PN160	65 / 30 / 40 (35) mm
M30	M30x2	PN160	65 / 35 / 40 (38) mm
M33	M33x2	PN250	40 / 35 / 55 mm
G1	G1"	PN250	40 / 35 / 55 mm
99	other (specify thread in the order)		

*1 - Other length of the welded-on piece specify in brackets of ordering code, in brackets are information for material 1.0308.

② Version NV ① ② ③

Code	Description
P	straight
S	oblique 45°
J	other (specify angle in the order)

③ Material NV ① ② ③

Code	Description	T _{MAX}
M00	1.0308	300 °C
M01	1.0570	400 °C
M11	1.0425 (P265GH)	450 °C
M12	1.5415	500 °C
M13	1.7335	550 °C
M14	1.7380	580 °C
M02	1.7715	575 °C
M03	1.4541	600 °C
M04	1.4571	600 °C
M05	1.4903	620 °C
M99	other	

Optional versions and accessories NV ① ② ③ [...]

Code	Accessories
PPZ	Product description according to customer requirements
Q1	Material certificate according to EN 10204, 3.1

Example of order:
NV ① ② ③ → NV M27 P M01

6.4 Ordering table for Conical thermowell according to DIN 43772 (WT70 D)

Conical thermowell according to DIN 43772, PN250 WT70 D ① ② ③ ④

① Version WT70 D ① ② ③ ④

Code	Description	Process connection Ø D	Inner bore Ø d	Diameter D1
31	for welding, design 4 *1	Ø 18h7	3,5 mm	9 mm
32	for welding, design 4 *2	Ø 24h7	7 mm	12,5 mm
33	for welding, design 4	Ø 26h7	7 mm	12,5 mm
99	other			

*1 - Only for inner thread M14×1.5 and nom. length max L260. *2 - Only for inner thread M18×1.5.

② Inner thread Z1 WT70 D ① ② ③ ④

Code	Inner thread Z1	Length L5	
Z01	M20×1,5	19 mm	not for codes 31, 32
Z02	M18×1,5	16 mm	only for code 32
Z04	M14×1,5	16 mm	only for code 31
Z05	G1/2"	19 mm	not for codes 31, 32
Z07	1/2" NPT	19 mm	not for codes 31, 32
Z99	other		

③ Nominal length L WT70 D ① ② ③ ④

Code	Nominal length L	Length U	Length G	Length U1 *1
L140	140 mm	65 mm	135 + 1 mm	-
L200	200 mm	65 mm	195 + 1 mm	130 ± 2 mm
L___	other - fill nominal length L and other dimensions in mm			

*1 - Dimensions are valid only for conical thermowells with flange.

④ Thermowell material WT70 D ① ② ③ ④

Code	Material	T _{MAX}	
M01	1.0570	400 °C	not for version with flange
M11	1.0425	450 °C	not for version with flange
M12	1.5415	500 °C	not for version with flange
M13	1.7335	550 °C	not for version with flange
M14	1.7380	580 °C	not for version with flange
M02	1.7715	575 °C	not for version with flange
M03	1.4541	600 °C	
M04	1.4571	600 °C	
M05	1.4903	620 °C	
M06	Titanium grade 2		specific thermowell version consult with supplier
M07	Tantalum 99%		specific thermowell version consult with supplier
M08	Monel 400		specific thermowell version consult with supplier
M09	Hastelloy C-22		specific thermowell version consult with supplier
M10	Nickel 200/201		specific thermowell version consult with supplier
M99	other		specific thermowell version consult with supplier

Optional versions and accessories WT70 D ① ② ③ ④ [...]

Code	Flanged process connection according to EN 1092-1
P54	flange DN25 / PN10 to PN40
P60	flange DN25 / PN63 to PN100
P63	flange DN25 / PN160
P66	flange DN25 / PN250
P55	flange DN40 / PN10 to PN40
P61	flange DN40 / PN63 to PN100
P64	flange DN40 / PN160

Code	Flanged process connection according to EN 1092-1
P67	flange DN40 / PN250
P53	flange DN50 / PN10 to PN16
P56	flange DN50 / PN25 to PN40
P59	flange DN50 / PN63
P62	flange DN50 / PN100
P65	flange DN50 / PN160
P68	flange DN50 / PN250
...B1	raised face
...B2	raised face
...C	large tongue
...D	large groove
...E	large male
...F	large female
Code	Flanged process connection according to ANSI B 16.5
P71	flange 1" / 150 lbs
P74	flange 1" / 300 lbs
P77	flange 1" / 600 lbs
P80	flange 1" / 1500 lbs
P83	flange 1" / 2500 lbs
P72	flange 1,5" / 150 lbs
P75	flange 1,5" / 300 lbs
P78	flange 1,5" / 600 lbs
P81	flange 1,5" / 1500 lbs
P84	flange 1,5" / 2500 lbs
P73	flange 2" / 150 lbs
P76	flange 2" / 300 lbs
P79	flange 2" / 600 lbs
P82	flange 2" / 1500 lbs
P85	flange 2" / 2500 lbs
... RF	raised face
... RJ	RJ groove for metal sealing ring model R
P99	other
Code	Accessories
BZS	Stainless steel tag (70x15 mm) with description according to order
PPZ	Product description according to customer requirements
UZ	Stainless steel plug, dimension according to thermowell inner thread, including coupling chain
Q1	Material certificate according to EN 10204, 3.1
TZI	Pressure test of thermowell by inside over-pressure
TZE	Pressure test of thermowell by outside over-pressure (consult with supplier)
PZ	Penetration test of thermowell welds
KY	Degreasing version for oxygen
VY	Strength calculation of thermowell (frequency, pressure stress)

Example of order:

WT70 D ① ② ③ ④ → WT70 D 33 Z01 L170 M03

6.5 Ordering table for Welded on piece for thermowells WT70 D

Welded on piece for thermowells WT70 D NV ① ② ③

① Dimensions NV ① ② ③

Code	Inner Ø of welded on piece	Length / outer Ø D *1
D18	18G7	40 / 39 mm
D24	24G7	40 / 49 mm
D26	26G7	40 / 49 mm
D99	jiný	

*1 - Other length of the welded on piece specify in brackets of ordering code.

② Version NV ① ② ③

Code	Description
P	straight
S	oblique 45°
J	other (specify angle in the order)

③ Material NV ① ② ③

Code	Material	T _{MAX}
M01	1.0570	400 °C
M11	1.0425 (P265GH)	450 °C
M12	1.5415	500 °C
M13	1.7335	550 °C
M14	1.7380	580 °C
M02	1.7715	575 °C
M03	1.4541	600 °C
M04	1.4571	600 °C
M05	1.4903	620 °C
M99	other	

Optional versions and accessories NV ① ② ③ [...]

Code	Accessories
PPZ	Product description according to customer requirements
Q1	Material certificate according to EN 10204, 3.1

Example of order:

NV ① ② ③ → NV D26 P M03

6.6 Ordering table for Extension piece

Extension piece for temperature sensors NT70 ① ② ③ ④

① Version of extension piece NT70 ① ② ③ ④

Code	Diameter D	Material	Max. temperature
D14	14x2,5 mm	1.4541	600 °C
D20	20x3 mm	1.4541	600 °C
D99	other		

② Length of extension piece NT70 ① ② ③ ④

Code	Length of extension piece M
M060	60 mm
M090	90 mm
M150	150 mm
M200	200 mm
M240	240 mm
M___	other (fill in length of extension piece in mm)

③ Inner thread NT70 ① ② ③ ④

Code	Inner thread Z	Length L1
Z01	M20x1,5	18 mm
Z02	M18x1,5	16 mm
Z03	M16x1,5	14 mm
Z04	M14x1,5	12 mm
Z05	G1/2"	18 mm
Z06	G1/4"	16 mm
Z07	1/2" NPT	19 mm
Z99	other	

④ Process connection NT70 ① ② ③ ④

Code	Process connection P	Length L2	Diameter d
P1	outer thread M14x1,5	12 mm	7 mm <small>only for D14</small>
P2	outer thread M18x1,5	12 mm	9 mm <small>only for D14</small>
P3	outer thread M20x1,5	15 mm	9 mm
P5	outer thread G1/2"	15 mm	9 mm
P7	outer thread 1/2"NPT	8 mm	9 mm
P9	other		

Optional versions and accessories NT70 ① ② ③ ④ [...]

Code	Accessories
BZS	Stainless steel tag (70x15 mm) with description according to order
PPZ	Product description according to customer requirements
UZ	Stainless steel plug, dimension according to thermowell inner thread, including coupling chain
Q1	Material certificate according to EN 10204, 3.1
TZI	Pressure test of thermowell by inside over-pressure

Example of order:

NT70 ① ② ③ ④ → NT70 D20 M90 Z01 P3



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