

# Technical Information

## iTHERM TT412

Thermometer protection tube for hygienic and aseptic applications



### Applications

- Specially designed for use in hygienic and aseptic applications in the Food & Beverages and Life Sciences industries
- Pressure range up to 40 bar (580 psi)
- For increased protection requirements of the temperature sensor regarding physical and chemical effects
- For use in pipes and containers or tanks
- Ideally suited to all measuring points that require regular recalibration by simply replacing the insert in closed processes

### Your benefits

- iTHERM QuickNeck – cost and time savings thanks to simple, tool-free recalibration of the insert used
- All common hygienic process connections
- International certification: 3-A Sanitary Standard, EHEDG, ASME BPE, FDA, TSE Certificate of Suitability
- Fast response time owing to reduced tips with thin walls

---

## Table of contents

<b>Installation</b> .....	<b>3</b>
Orientation .....	3
Installation instructions .....	3
<b>Process</b> .....	<b>5</b>
Process temperature range .....	5
Thermal shock .....	5
Process pressure range .....	5
Medium - state of aggregation .....	5
<b>Mechanical construction</b> .....	<b>6</b>
Design, dimensions .....	6
Weight .....	7
Material .....	7
Surface roughness .....	7
Process connections .....	8
Tip shape .....	10
<b>Certificates and approvals</b> .....	<b>11</b>
CE mark .....	11
Hygiene standard .....	11
Other standards and guidelines .....	11
Parts in contact with the medium .....	11
CRN approval .....	11
Surface purity .....	11
Material resistance .....	11
Material certification .....	11
Protection tube testing and load capacity calculation .....	11
<b>Ordering information</b> .....	<b>12</b>
<b>Accessories</b> .....	<b>13</b>
Device-specific accessories .....	13
Service-specific accessories .....	14
<b>Documentation</b> .....	<b>14</b>

# Installation

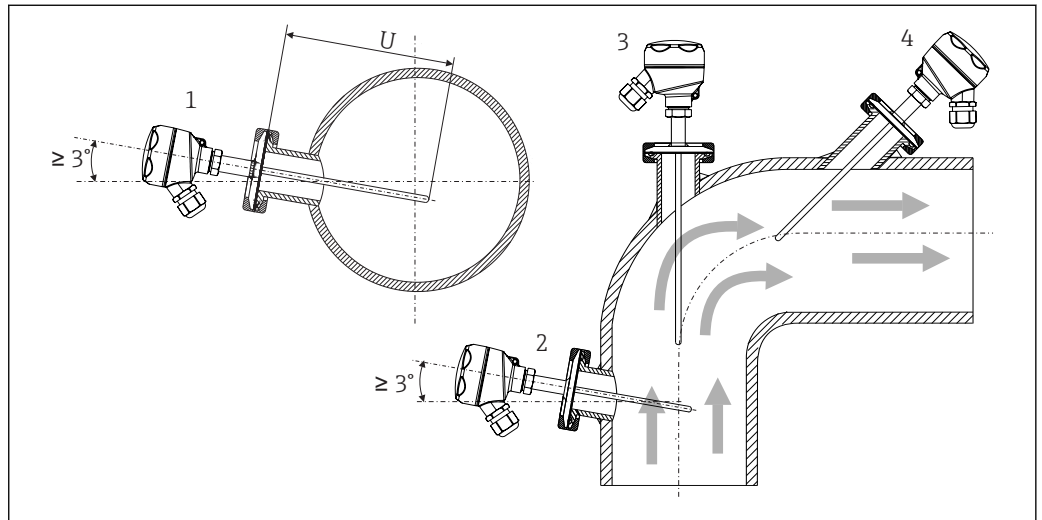
**Orientation**

No restrictions. However, self-draining in the process must be guaranteed. If there is an opening to detect leaks at the process connection, this opening must be at the lowest possible point.

**Installation instructions**

The immersion length of the thermometer can influence the accuracy. If the immersion length is too small then errors in the measurement are caused by heat conduction via the process connection. If installing into a pipe then the immersion length should ideally be half of the pipe diameter.

Installation possibilities: Pipes, tanks or other plant components



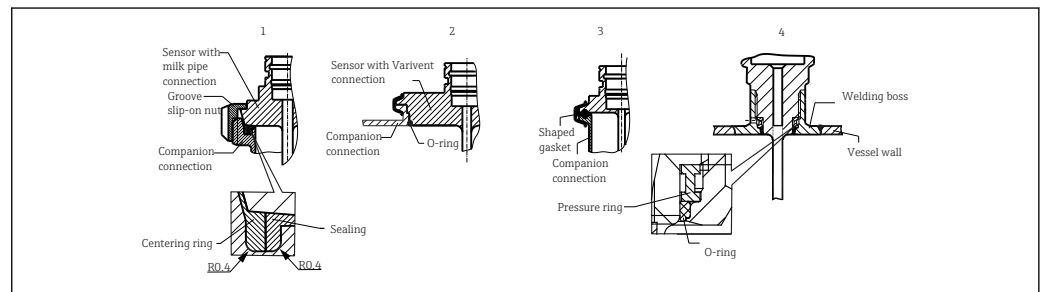
A0008946

**1 Installation examples**

- 1, 2 Perpendicular to flow direction, installed at a minimum angle of 3° to ensure self-draining
- 3 On elbows
- 4 Inclined installation in pipes with a small nominal diameter
- U Immersion length

**i** In the case of pipes with a small nominal diameter, it is advisable for the tip of the thermometer to project well into the process so that it extends past the pipe axis. Installation at an angle (4) could be another solution. When determining the immersion length or installation depth all the parameters of the thermometer and of the medium to be measured must be taken into account (e.g. flow velocity, process pressure).


The use of iTHERM QuickSens inserts is recommended for immersion lengths  $U < 70 \text{ mm (2.75 in)}$ .



A0011758-EN

**2 Detailed installation instructions for hygiene-compliant installation**

- 1 Sanitary connection according to DIN 11851, only in connection with EHEDG-certified and self-centering sealing ring
- 2 Varivent® process connection for VARINLINE® housing
- 3 Clamp according to ISO 2852, only in connection with seal according to EHEDG position paper
- 4 Liquiphant-M G1" process connection

 The counterpieces for the process connections and the seals or sealing rings are not included in the scope of supply for the thermometer. Liquiphant M weld-in adapters with associated seal kits are available as accessories.

Procedure in case of seal failure:

- Disassembling of the thermometer, validated cleaning procedure of thread and sealing ring groove
- Replacement of the seal or sealing ring
- CIP after re-assembly

In the case of weld-in connections, exercise the necessary degree of care when performing the welding work on the process side:

- Suitable welding material
- Flush-welded or with welding radius  $> 3.2 \text{ mm}$  ( $0.13 \text{ in}$ )
- No recesses, folds or gaps
- Honed and polished surface,  $R_a \leq 0.76 \text{ }\mu\text{m}$  ( $30 \text{ }\mu\text{in}$ )

## Process

**Process temperature range** Maximum -200 to +650 °C (-328 to +1202 °F) → 7

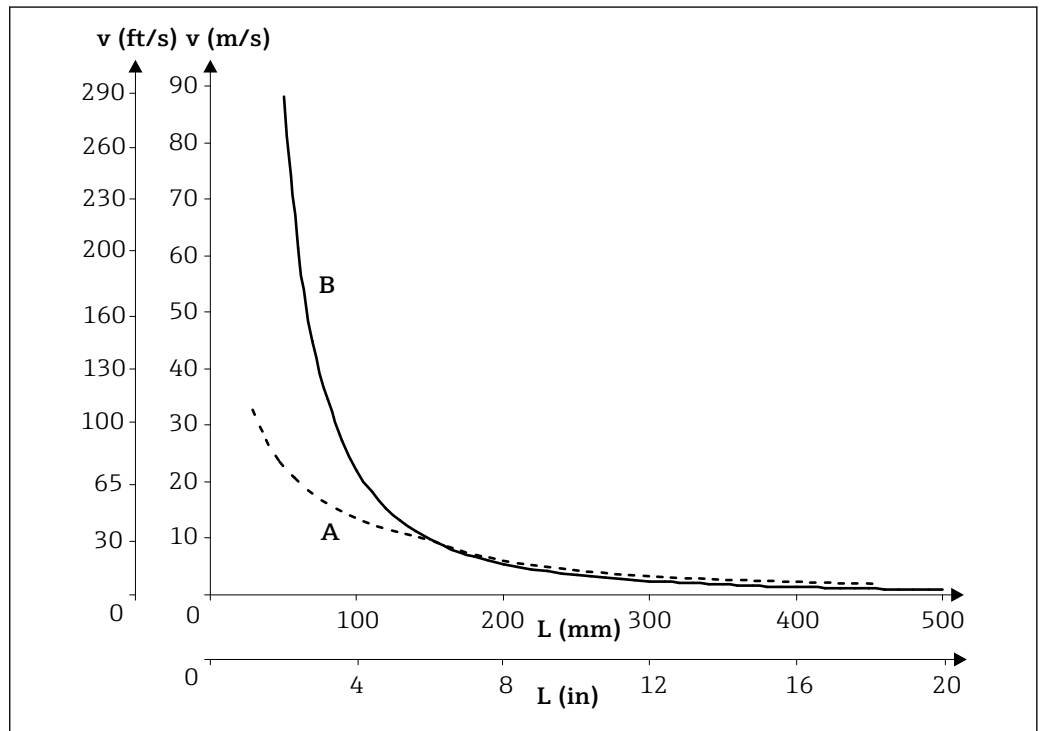
**Thermal shock** Thermal shock resistance in CIP/SIP process with a temperature increase from +5 to +130 °C (+41 to +266 °F) within 2 seconds.

**Process pressure range** The maximum possible process pressure depends on various influencing factors, such as the design, process connection and process temperature. For information on the maximum possible process pressures for the individual process connections, see the 'Process connection' section. → 8

**i** It is possible to check the mechanical loading capacity as a function of the installation and process conditions online in the Thermowell (TW) Sizing Module for protection tubes in the Endress+Hauser Applicator software. See 'Accessories' section.

### Example of the permitted flow velocity depending on the immersion length and process medium

The highest flow velocity tolerated by the protection tube diminishes with increasing insert immersion length exposed to the stream of the fluid. In addition, it is dependent on the diameter of the tip of the protection tube, the medium type, process temperature and process pressure. The following figures exemplify the maximum permitted flow velocities in water and superheated steam at a process pressure of 40 bar (580 PSI).



**3** Permitted flow velocities, protection tube diameter 9.53 mm (3/8 in)

- A Medium water at T = 50 °C (122 °F)
- B Medium superheated steam at T = 400 °C (752 °F)
- L Immersion length exposed to flow
- v Flow velocity

**Medium - state of aggregation** Gaseous or liquid (also with high viscosity, e.g. yogurt).

## Mechanical construction

### Design, dimensions

All dimensions in mm (in). The design depends on the protection tube version:

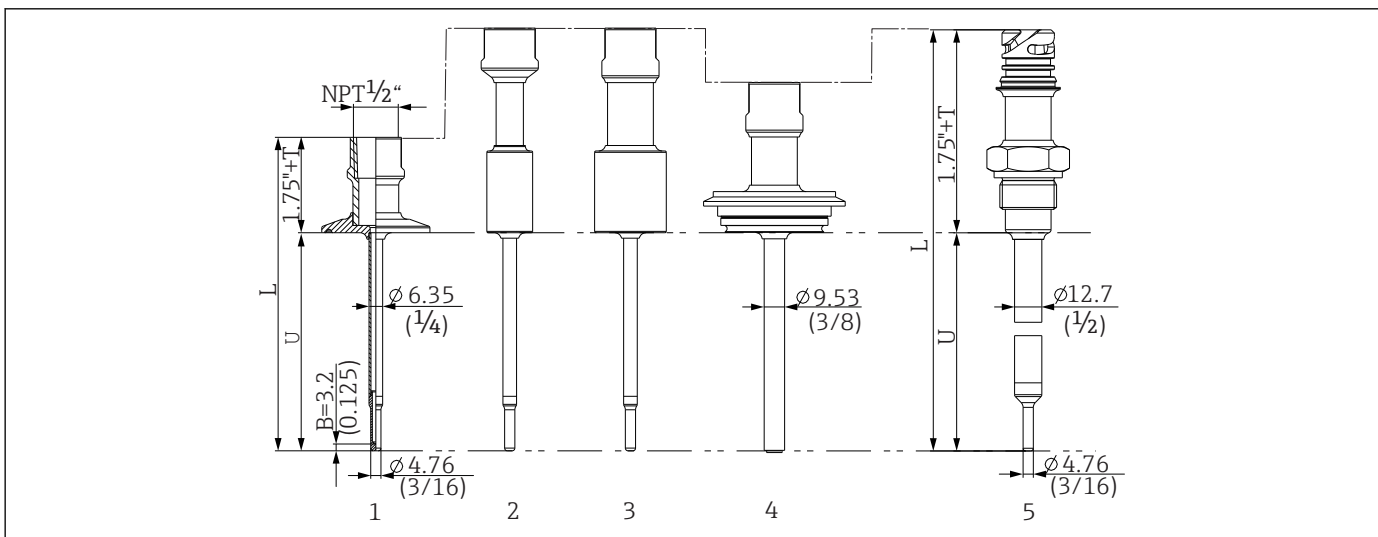
- Diameter 6.35 mm ( $\frac{1}{4}$  in)
- Diameter 9.53 mm ( $\frac{3}{8}$  in)
- Diameter 12.7 mm ( $\frac{1}{2}$  in)

**i** Various dimensions, such as the immersion length U for instance, are variable values and are therefore indicated as items in the following dimensional drawings.

Variable dimensions:

Item	Description
L	Protection tube length (U+T+1.75")
B	Protection tube base thickness: predefined, depends on protection tube version (see also the individual table data)
T	Length of protection tube shaft: variable or predefined, depends on protection tube version (see also the individual table data)
U	Immersion length: variable, depending on the configuration

### Protection tube diameter (1/4, 3/8, 1/2 in)



A0033718

**4** Protection tube with neck connection NPT 1/2" and various process connection versions:

- 1 Tri-clamp
- 2 Cylindrical weld-in adapter  $\phi D$  3/4" NPS
- 3 Cylindrical weld-in adapter  $\phi D$  1" NPS
- 4 Varivent®
- 5 Liquiphant adapter with QuickNeck

Item	Version	Length
Length of protection tube shaft T <sup>1)</sup>	Triclamp with NPT	0-6"
	Triclamp with QuickNeck	1-6"
	Varivent® with NPT	1-6"
	Varivent® with QuickNeck	1.5-6"
	Liquiphant with NPT	2-6"
	Liquiphant with QuickNeck	2-6"
	Weld-in with NPT	2-6"
	Weld-in with QuickNeck	2-6"
Immersion length U	Independent of the version	Variable, depending on the configuration

Item	Version	Length
Base thickness B	<b>6.35 mm (¼ in) Protection tube:</b> Reduced tip $\phi 4.76$ mm ( $\frac{3}{16}$ in)	3.2 mm (0.125 in)
	<b>9.53 mm (⅜ in) Protection tube:</b> Reduced tip $\phi 4.76$ mm ( $\frac{3}{16}$ in) Straight tip	3.2 mm (0.125 in) 3 mm (0.12 in)
	<b>12.7 mm (½ in) Protection tube:</b> Reduced tip $\phi 4.76$ mm ( $\frac{3}{16}$ in) Straight tip	3 mm (0.12 in) 6.3 mm (0.25 in)

1) Depends on the process connection

### Weight

0.3 to 2.5 kg (0.66 to 5.5 lbs) for standard options.

### Material

The temperatures for continuous operation specified in the following table are only intended as reference values for use of the various materials in air and without any significant compressive load. The maximum operating temperatures can be reduced considerably in cases where abnormal conditions such as high mechanical load occur or in aggressive media.

Designation	Recommended max. temperature for continuous use in air	Properties
AISI 316L	650 °C (1 202 °F) <sup>1)</sup>	<ul style="list-style-type: none"> <li>▪ Austenitic, stainless steel</li> <li>▪ High corrosion resistance in general</li> <li>▪ Particularly high corrosion resistance in chlorine-based and acidic, non-oxidizing atmospheres through the addition of molybdenum (e.g. phosphoric and sulfuric acids, acetic and tartaric acids with a low concentration)</li> <li>▪ Increased resistance to intergranular corrosion and pitting</li> <li>▪ The wetted part from a 316L or 1.4435+316L thermowell withstand a passivation process with a 3% sulphuric acid</li> </ul>

1) Can be used to a limited extent up to 800 °C (1472 °F) for low compressive loads and in non-corrosive media. Contact your Endress+Hauser sales team for further information.

### Surface roughness

Values for wetted surfaces: <sup>1)</sup>

Standard surface	$R_a \leq 0.76 \mu\text{m}$ (30 $\mu\text{in}$ )
Finely honed surface <sup>2)</sup>	$R_a \leq 0.38 \mu\text{m}$ (15 $\mu\text{in}$ )
Finely honed surface and electropolished	$R_a \leq 0.38 \mu\text{m}$ (15 $\mu\text{in}$ )+ electropolished

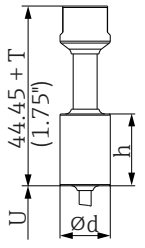
1) Exception: Inside welding seams of the tee and elbow thermowells

2) Not compliant with ASME BPE

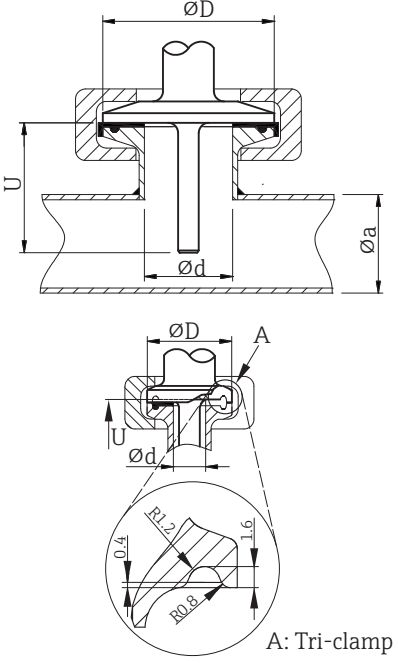
## Process connections

All dimensions in mm (in).

## For welding in

Type	Version	Dimensions	Technical properties
Weld-in adapter 	Cylindrical 1/2" NPS	$\phi d = 1/2$ " NPS, $h = 38.1$ mm (1.5 in), $U =$ immersion length from lower edge of thread, $T = \text{min. } 50.8$ mm (2 in)	<ul style="list-style-type: none"> <li>▪ <math>P_{\text{max.}}</math> depends on the weld-in process</li> <li>▪ With 3-A symbol and EHEDG certification</li> <li>▪ ASME BPE compliance</li> </ul>
	Cylindrical 3/4" NPS	$\phi d = 3/4$ " NPS, $h = 38.1$ mm (1.5 in), $U =$ immersion length from lower edge of thread, $T = \text{min. } 50.8$ mm (2 in)	
	Cylindrical 1" NPS	$\phi d = 1$ " NPS, $h = 38.1$ mm (1.5 in), $U =$ immersion length from lower edge of thread, $T = \text{min. } 50.8$ mm (2 in)	

## Releasable process connection

Type	Version	Dimensions		Technical properties
	$\phi d$ : <sup>1)</sup>	$\phi D$	$\phi a$	
Clamp according to ASME BPE or ISO 2852 	Tri-clamp 3/4" (DN18) <sup>2)</sup>	25 mm (0.98 in)	-	<ul style="list-style-type: none"> <li>▪ <math>P_{\text{max.}} = 16</math> bar (232 psi), depends on clamp ring and suitable seal</li> <li>▪ With 3-A symbol</li> </ul>
	Clamp ISO 2852 1/2" (DN12 - 21.3)	34 mm (1.34 in)	16 to 25.3 mm (0.63 to 0.99 in)	
	Tri-clamp 1" - 1 1/2" (DN25 - 38)	50.5 mm (1.99 in)	29 to 42.4 mm (1.14 to 1.67 in)	<ul style="list-style-type: none"> <li>▪ <math>P_{\text{max.}} = 16</math> bar (232 psi), depends on clamp ring and suitable seal</li> <li>▪ With 3-A symbol and EHEDG certification (sealing according to EHEDG position paper, DN25, DN40, DN63,5)</li> <li>▪ ASME BPE compliance <sup>3)</sup></li> </ul>
	Tri-clamp 2" (DN40 - 51)	64 mm (2.52 in)	44.8 to 55.8 mm (1.76 to 2.2 in)	
	Tri-clamp 2 1/2" (DN63.5)	77.5 mm (3.05 in)	68.9 to 75.8 mm (2.71 to 2.98 in)	
	Tri-clamp 3" (DN70-76.5)	91 mm (3.58 in)	> 75.8 mm (2.98 in)	

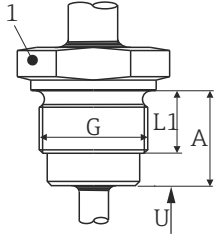
1) Pipes in accordance with ISO 2037 and BS 4825 Part 1

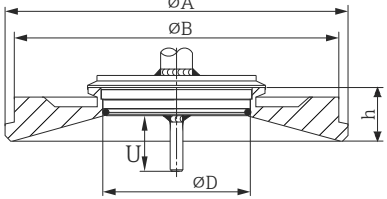
2) Tri-clamp 3/4" only possible with protection tube diameter 6.35 mm (1/4 in) or 9.53 mm (3/8 in)

3) Not for DN12-21.3

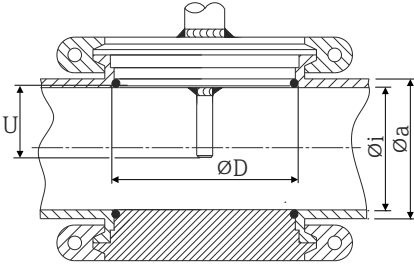
4) Not for DN12-21.3



Type	Version G	Dimensions			Technical properties
		L1 thread length	A	1 (SW/AF)	
Thread according to ISO 228 (for Liquiphant weld-in adapter) 	G¾" for FTL20 adapter	16 mm (0.63 in)	25.5 mm (1 in)	32	<ul style="list-style-type: none"> <li>▪ P<sub>max.</sub> = 25 bar (362 psi) at max. 150 °C (302 °F)</li> <li>▪ P<sub>max.</sub> = 40 bar (580 psi) at max. 100 °C (212 °F)</li> <li>▪ In connection with FTL31/33/50 adapter 3-A symbol and EHEDG certification</li> <li>▪ ASME BPE compliance</li> <li>▪ Minimum extension neck lengths: ≥ 76.2 mm (3 in)</li> </ul>
	G¾" for FTL50 adapter				
	G1" for FTL50 adapter	18.6 mm (0.73 in)	29.5 mm (1.16 in)	41	

Type	Version	Dimensions				Technical properties	
		øD	øA	øB	h	P <sub>max.</sub>	
Varivent® 	Type B	31 mm (1.22 in)	105 mm (4.13 in)	-	22 mm (0.87 in)	10 bar (145 psi)	<ul style="list-style-type: none"> <li>▪ With 3-A symbol and EHEDG certification</li> <li>▪ ASME BPE compliance</li> </ul>
	Type F	50 mm (1.97 in)	145 mm (5.71 in)	135 mm (5.31 in)	24 mm (0.95 in)		
	Type N	68 mm (2.67 in)	165 mm (6.5 in)	155 mm (6.1 in)	24.5 mm (0.96 in)		

**i** The VARINLINE® housing connection flange is suitable for weld-in into the conical or torispherical head in tanks or containers with a small diameter (≤ 1.6 m (5.25 ft)) and up to a wall thickness of 8 mm (0.31 in).

Type	Technical properties
Varivent® for VARINLINE® housing for installation in pipes 	<ul style="list-style-type: none"> <li>▪ With 3-A symbol and EHEDG certification</li> <li>▪ ASME BPE compliance</li> </ul>

Version	Dimensions			P <sub>max.</sub>
	øD	øi	øa	
Type N, according to DIN 11866, series C	68 mm (2.67 in)	OD 1½": 34.9 mm (1.37 in)	OD 1½": 38.1 mm (1.5 in)	OD 1½" to OD 2½": 16 bar (232 psi)
		OD 2": 47.2 mm (1.86 in)	OD 2": 50.8 mm (2 in)	
		OD 2½": 60.2 mm (2.37 in)	OD 2½": 63.5 mm (2.5 in)	
Type N, according to DIN 11866, series C	68 mm (2.67 in)	OD 3": 73 mm (2.87 in)	OD 3": 76.2 mm (3 in)	OD 3" to OD 4": 10 bar (145 psi)

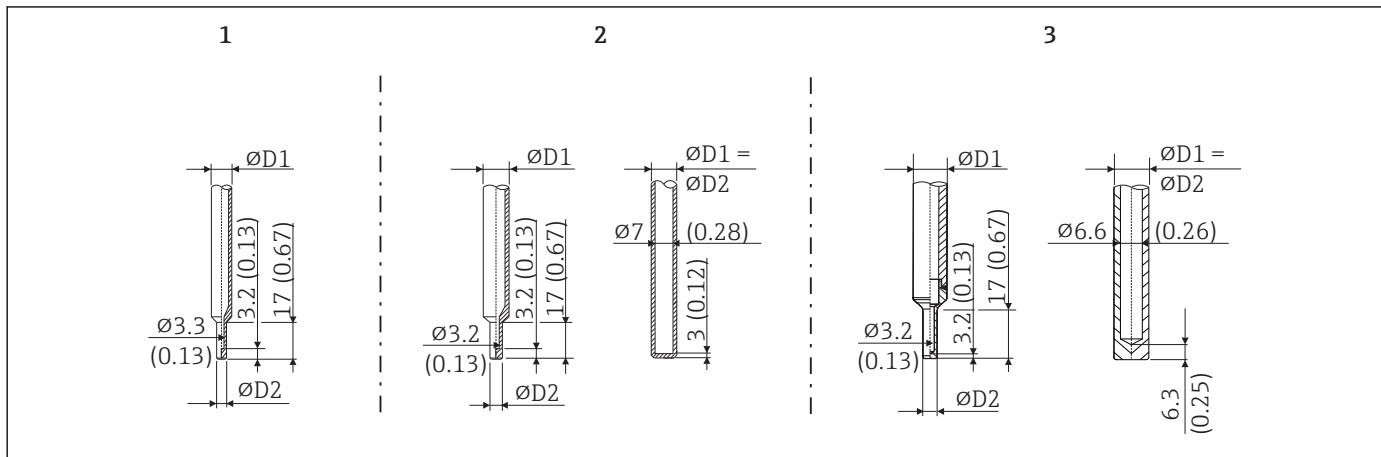
Type		Technical properties	
		OD 4": 97.6 mm (3.84 in)	OD 4": 101.6 mm (4 in)
Type F, according to DIN 11866, series C	50 mm (1.97 in)	OD 1": 22.2 mm (0.87 in)	OD 1": 25.4 mm (1 in)
16 bar (232 psi)			

**i** Due to the small immersion length U, the use of iTHERM QuickSens inserts is recommended.

### Tip shape

The thermal response time, the reduction of the flow cross-section and the mechanical load that occurs in the process are the criteria that matter when selecting the shape of the tip. Advantages of using reduced thermometer tips:

- A smaller tip shape has less impact on the flow characteristics of the pipe carrying the medium.
- The flow characteristics are optimized, thereby increasing the stability of the protection tube.





A0033991

**5** Protection tube tips available (reduced or straight)

Item No.	Protection tube ( $\phi D1$ )	Tip ( $\phi D2$ )	Insert ( $\phi ID$ )
1	$\phi 6.35$ mm ( $\frac{1}{4}$ in)	Reduced tip with $\phi 4.76$ mm ( $\frac{3}{16}$ in)	$\phi 3$ mm (0.12 in)
2	$\phi 9.53$ mm ( $\frac{3}{8}$ in)	<ul style="list-style-type: none"> <li>■ Reduced tip with <math>\phi 4.76</math> mm (<math>\frac{3}{16}</math> in)</li> <li>■ Straight tip</li> </ul>	<ul style="list-style-type: none"> <li>■ <math>\phi 3</math> mm (0.12 in)</li> <li>■ <math>\phi 6.35</math> mm (<math>\frac{1}{4}</math> in) or 6 mm (0.24 in)</li> </ul>
3	$\phi 12.7$ mm ( $\frac{1}{2}$ in)	<ul style="list-style-type: none"> <li>■ Reduced tip with <math>\phi 4.76</math> mm (<math>\frac{3}{16}</math> in)</li> <li>■ Straight tip</li> </ul>	<ul style="list-style-type: none"> <li>■ <math>\phi 3</math> mm (0.12 in)</li> <li>■ <math>\phi 6.35</math> mm (<math>\frac{1}{4}</math> in) or 6 mm (0.24 in)</li> </ul>

**i** It is possible to check the mechanical loading capacity as a function of the installation and process conditions online in the TW Sizing Module for protection tubes in the Endress+Hauser Applicator software. See 'Accessories' section. → [13](#)

## Certificates and approvals

<b>CE mark</b>	The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE-mark.
<b>Hygiene standard</b>	<ul style="list-style-type: none"> <li>▪ EHEDG certification, type EL - CLASS I. Permitted process connections in accordance with EHEDG, see 'Process connections' section →  8</li> <li>▪ 3-A authorization no. 1144, 3-A sanitary standard 74-06. Permitted process connections in accordance with 3-A, see 'Process connections' section →  8</li> <li>▪ ASME BPE 2009, certificate of conformity can be ordered for indicated options</li> </ul>
<b>Other standards and guidelines</b>	ASME PTC 19.3 TW-2010: thermowells
<b>Parts in contact with the medium</b>	<p>Parts of the thermometer in contact with the medium comply with the following European regulations:</p> <ul style="list-style-type: none"> <li>▪ (EC) No. 1935/2004, Article 3, paragraph 1, Articles 5 and 17 on materials and articles intended to come into contact with food.</li> <li>▪ (EC) No. 2023/2006 on good manufacturing practice for materials and articles intended to come into contact with food.</li> <li>▪ (EC) No. 10/2011 on plastic materials and articles intended to come into contact with food.</li> <li>▪ FDA-compliant</li> <li>▪ All product contact surfaces are produced without animal derived ingredients (ADI/TSE)</li> </ul>
<b>CRN approval</b>	The CRN approval is only available for certain options of protection tubes. These will be marked and shown during the configuration of this device.
<b>Surface purity</b>	Free from oil and grease, optional
<b>Material resistance</b>	Material resistance - including housing - to the following cleaning agents/disinfectants from the company Ecolab: P3-topax 66, P3-topactive 200, P3-topactive 500 and P3-topactive OKTO as well as demineralized water.
<b>Material certification</b>	The material certificate 3.1 (according to standard EN 10204) can be requested separately.
<b>Protection tube testing and load capacity calculation</b>	<ul style="list-style-type: none"> <li>▪ Protection tube pressure tests are carried out in accordance with the specifications in DIN 43772. With regard to protection tubes with reduced tip that do not comply with this standard, these are tested using the pressure of corresponding straight protection tubes. Tests according to other specifications can be carried out on request. The liquid penetration test verifies that there are no cracks in the welded seams of the protection tube.</li> <li>▪ PMI test, dye penetration test, TW welding, internal hydrostatic pressure, etc. each with inspection certificate</li> <li>▪ Load capacity calculation for the protection tube as per DIN43772</li> </ul>

## Ordering information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: [www.endress.com](http://www.endress.com) -> Click "Corporate" -> Select your country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.
- From your Endress+Hauser Sales Center: [www.addresses.endress.com](http://www.addresses.endress.com)



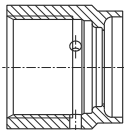
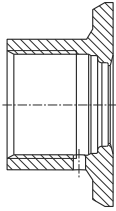
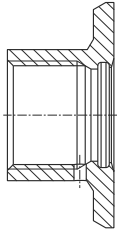
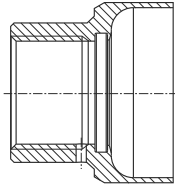
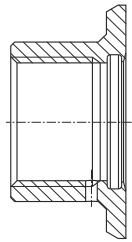
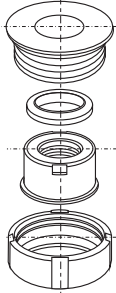
### **Product Configurator - the tool for individual product configuration**

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

## Accessories

Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: [www.endress.com](http://www.endress.com).

### Device-specific accessories

Weld-in adapter	 A0008246	 A0008251	 A0008256	 A0011924	 A0008248	 A0008253
	G 3/4", d=29 for pipe-mounting	G 3/4", d=50 for vessel-mounting	G 3/4", d=55 with flange	G 1", d=53 without flange	G 1", d=60 with flange	G 1" adjustable
Material	316L (1.4435)	316L (1.4435)	316L (1.4435)	316L (1.4435)	316L (1.4435)	316L (1.4435)
Roughness $\mu\text{m}$ ( $\mu\text{in}$ ) process side	$\leq 1.5$ (59.1)	$\leq 0.8$ (31.5)	$\leq 0.8$ (31.5)	$\leq 0.8$ (31.5)	$\leq 0.8$ (31.5)	$\leq 0.8$ (31.5)
Order number weld-in adapter	71258357	71258355	52001052	71258358	52001051 <sup>1)</sup>	52001221 <sup>2)</sup>
Order number weld-in adapter with inspection certificate <sup>3) 4)</sup>	52028295	52018765	52011897	71093129	52011896 <sup>1)</sup>	52011898 <sup>2)</sup>
Order number for seal replacement (5 pieces) <sup>5)</sup>	Silicone O-ring 52021717	Silicone O-ring 52021717	Silicone O-ring 52014473	Silicone O-ring 52014472	Silicone O-ring 52014472	Silicone profile gasket 52014424
Order number welding dummy <sup>6)</sup>	71174959	71174959	71168889	71166879	71166879	71181945
Order number blind plug <sup>6)</sup>	71167850	71167850	71177193	71173810	71173810	71166366
Order number blind plug with inspection certificate <sup>4) 6)</sup>	-	-	71190074	71167291	71167291	71196853

- 1) Replace the weld-in adapter with order number 917969-1000.
- 2) Replace the weld-in adapter with order number 215159-0000.
- 3) AD2000: The material 316L (in contact with process) corresponds to AD2000 – W0/W2.
- 4) Inspection certificate EN10204-3.1 material
- 5) One seal is included in scope of delivery.
- 6) TSP modification number. Can be ordered only FTSP, PTSP or NTSP.



For more information on the weld-in adapters, see Technical Information (TI00426F).



Maximum process pressure for the weld-in adapters:

- 25 bar (362 PSI) at maximum 150 °C (302 °F)
- 40 bar (580 PSI) at maximum 100 °C (212 °F)

## Service-specific accessories

Accessories	Description
Applicator	<p>Software for selecting and sizing Endress+Hauser measuring devices:</p> <ul style="list-style-type: none"> <li>Calculation of all the necessary data for identifying the optimum measuring device: e.g. pressure loss, accuracy or process connections.</li> <li>Graphic illustration of the calculation results</li> </ul> <p>Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project.</p> <p>Applicator is available:</p> <ul style="list-style-type: none"> <li>Via the Internet: <a href="https://portal.endress.com/webapp/applicator">https://portal.endress.com/webapp/applicator</a></li> <li>On CD-ROM for local PC installation.</li> </ul>
Configurator	<p>Product Configurator - the tool for individual product configuration</p> <ul style="list-style-type: none"> <li>Up-to-the-minute configuration data</li> <li>Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language</li> <li>Automatic verification of exclusion criteria</li> <li>Automatic creation of the order code and its breakdown in PDF or Excel output format</li> <li>Ability to order directly in the Endress+Hauser Online Shop</li> </ul> <p>The Configurator is available on the Endress+Hauser website: <a href="http://www.endress.com">www.endress.com</a> -&gt; Click "Corporate" -&gt; Select your country -&gt; Click "Products" -&gt; Select the product using the filters and the search field -&gt; Open the product page -&gt; The "Configure" button to the right of the product image opens the Product Configurator.</p>
W@M	<p>Life cycle management for your plant</p> <p>W@M supports you with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle.</p> <p>The application already contains the data of your Endress+Hauser device. Endress+Hauser also takes care of maintaining and updating the data records.</p> <p>W@M is available:</p> <ul style="list-style-type: none"> <li>Via the Internet: <a href="http://www.endress.com/lifecyclemanagement">www.endress.com/lifecyclemanagement</a></li> <li>On CD-ROM for local PC installation.</li> </ul>

## Documentation

Technical information:



Resistance thermometer for hygienic and aseptic applications iTHERM TM402: TI01349T



Modular resistance thermometer for hygienic and aseptic applications iTHERM TM412: TI01348T



Insert for thermometer installation iTHERM TS212: TI01336T



Thermometer protection tube for hygienic and aseptic applications iTHERM TT412: TI01350T

---

[www.addresses.endress.com](http://www.addresses.endress.com)

---