

# Technical Information

## iTHERM TT412

Thermometer thermowell 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

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## Installation

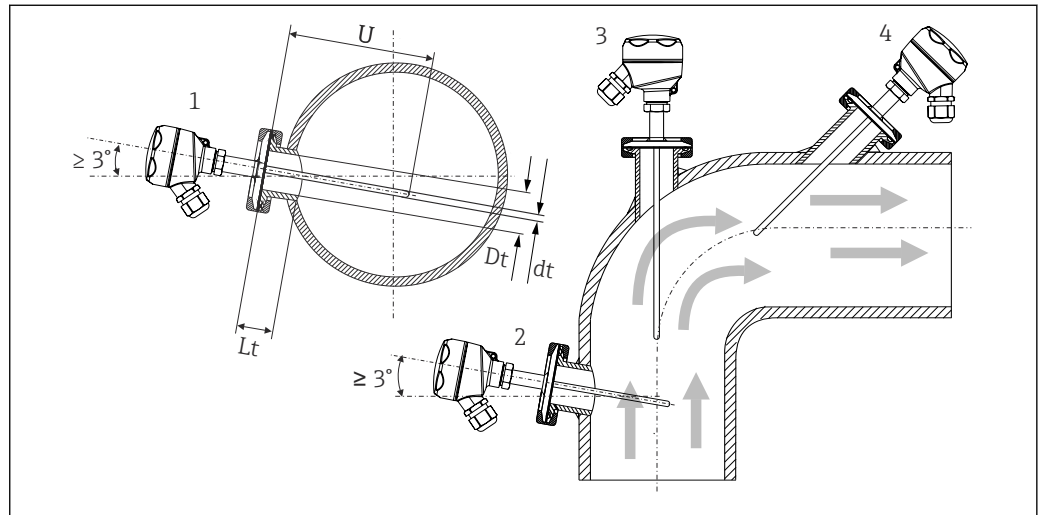
### Orientation

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



1 Installation examples

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

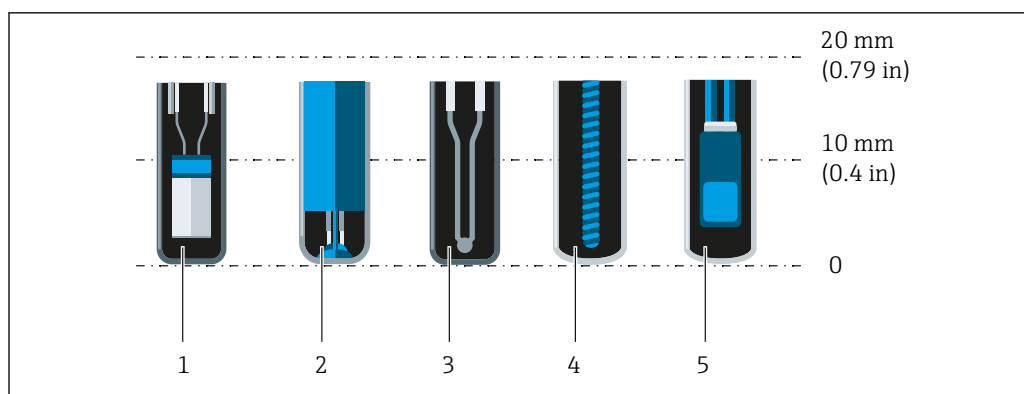
**i** The requirements of the EHEDG and the 3-A Sanitary Standard must be adhered to.

Installation instructions EHEDG/cleanability:  $L_t \leq (D_t - d_t)$

Installation instructions 3-A/cleanability:  $L_t \leq 2(D_t - d_t)$

**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).

Pay attention to the exact position of the sensor element in the thermometer tip.



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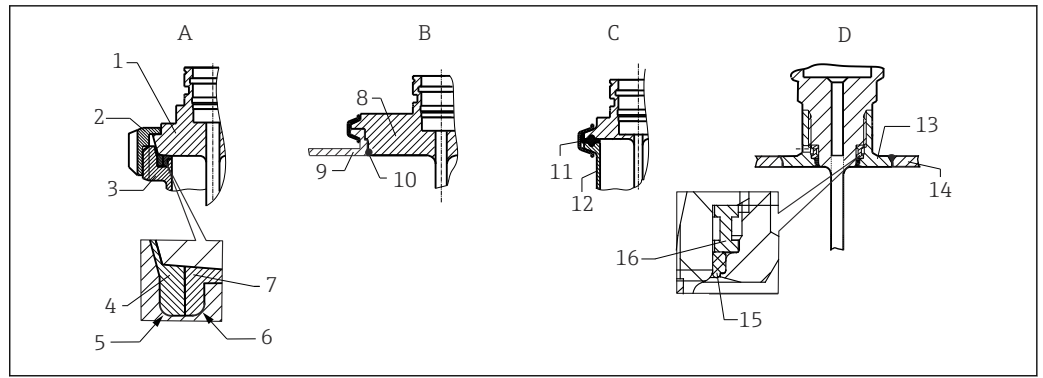
- 1 StrongSens or TrustSens at 5 to 7 mm (0.2 to 0.28 in)
- 2 QuickSens at 0.5 to 1.5 mm (0.02 to 0.06 in)
- 3 Thermocouple (not grounded) at 3 to 5 mm (0.12 to 0.2 in)
- 4 Wire wound sensor at 5 to 20 mm (0.2 to 0.79 in)
- 5 Standard thin-film sensor at 5 to 10 mm (0.2 to 0.39 in)

To keep the influence of heat dissipation to a minimum and to achieve the best possible measurement results, 20 to 25 mm (0.79 to 0.98 in) should be in contact with the medium in addition to the actual sensor element.

This results in the following recommended minimum immersion lengths

- TrustSens or StrongSens 30 mm (1.18 in)
- QuickSens 25 mm (0.98 in)
- Wire wound sensor 45 mm (1.77 in)
- Standard thin-film sensor 35 mm (1.38 in)

It is particularly important to take this into consideration for T-pieces, as the immersion length is very short on account of their design, and the measured error is higher as a result. It is therefore recommended to use elbow pieces with QuickSens sensors.



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

- A** Milk pipe connection according to DIN 11851, only in connection with EHEDG certified and self-centering sealing ring
- 1 Sensor with milk pipe connection
  - 2 Groove slip-on nut
  - 3 Counterpart connection
  - 4 Centering ring
  - 5 R0.4
  - 6 R0.4
  - 7 Sealing ring
- B** Varivent® process connection for VARINLINE® housing
- 8 Sensor with Varivent connection
  - 9 Counterpart connection
  - 10 O-ring
- C** Clamp according to ISO 2852
- 11 Molded seal
  - 12 Counterpart connection
- D** Process connection Liquiphant-M G1", horizontal installation
- 13 Weld-in adapter
  - 14 Vessel wall
  - 15 O-ring
  - 16 Thrust collar

#### NOTICE

**The following actions must be taken if a sealing ring (O-ring) or seal fails:**

- ▶ The thermometer must be removed.
- ▶ The thread and the O-ring joint/sealing surface must be cleaned.
- ▶ The sealing ring or seal must be replaced.
- ▶ CIP must be performed after installation.




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

1. Use suitable welding material.
2. Flush-weld or weld with welding radius  $\geq 3.2$  mm (0.13 in).
3. Avoid crevices, folds or gaps.
4. Ensure the surface is honed and polished,  $R_a \leq 0.76$   $\mu\text{m}$  (30  $\mu\text{in}$ ).

Pay attention to the following when installing the thermometer to ensure that the cleanability is not affected:

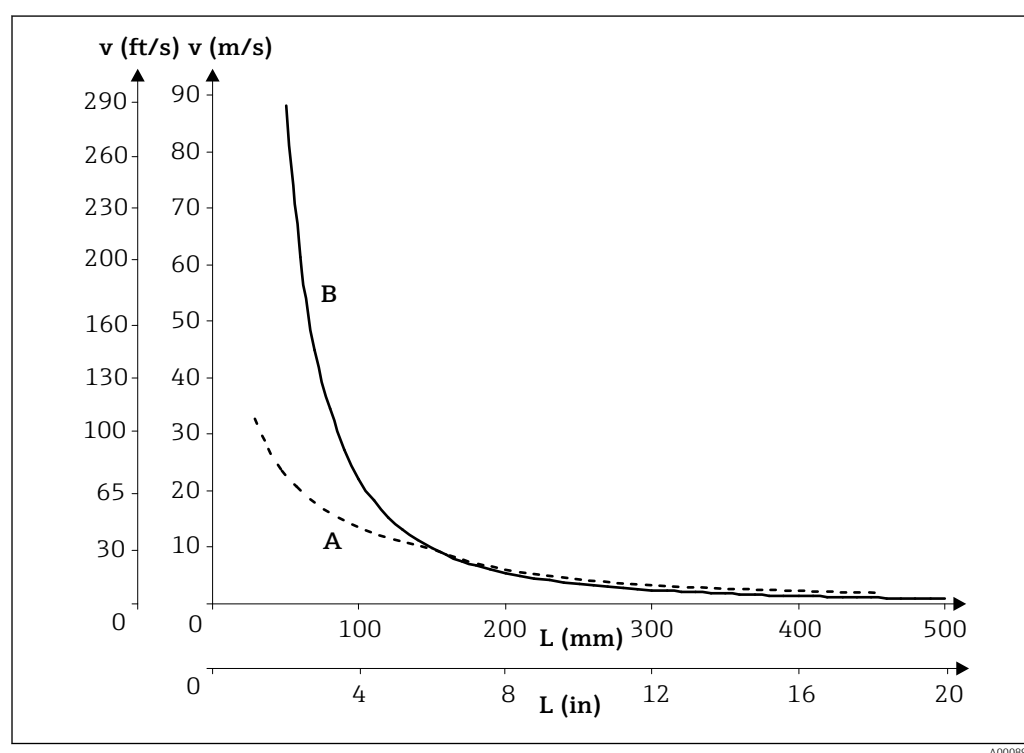
1. The installed sensor is suitable for CIP (cleaning in place). Cleaning is performed together with the pipe or tank. In the case of internal tank fixtures using process connection nozzles, it is important to ensure that the cleaning assembly directly sprays this area so that it is cleaned properly.
2. The Varivent® couplings enable flush-mount installation.

## Process


<b>Process temperature range</b>	Maximum -200 to +650 °C (-328 to +1202 °F) →  8
<b>Thermal shock</b>	Thermal shock resistance in CIP/SIP process with a temperature increase from +5 to +130 °C (+41 to +266 °F) within 2 seconds.
<b>Process pressure range</b>	<p>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. →  9</p> <p> 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 thermowells in the Endress+Hauser Applicator software. See 'Accessories' section.</p>

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

The highest flow velocity tolerated by the thermowell 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 thermowell, 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).



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 3 Permitted flow velocities, thermowell diameter 9.53 mm (3/8 in)


- A Medium water at  $T = 50\text{ °C}$  (122 °F)  
 B Medium superheated steam at  $T = 400\text{ °C}$  (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).

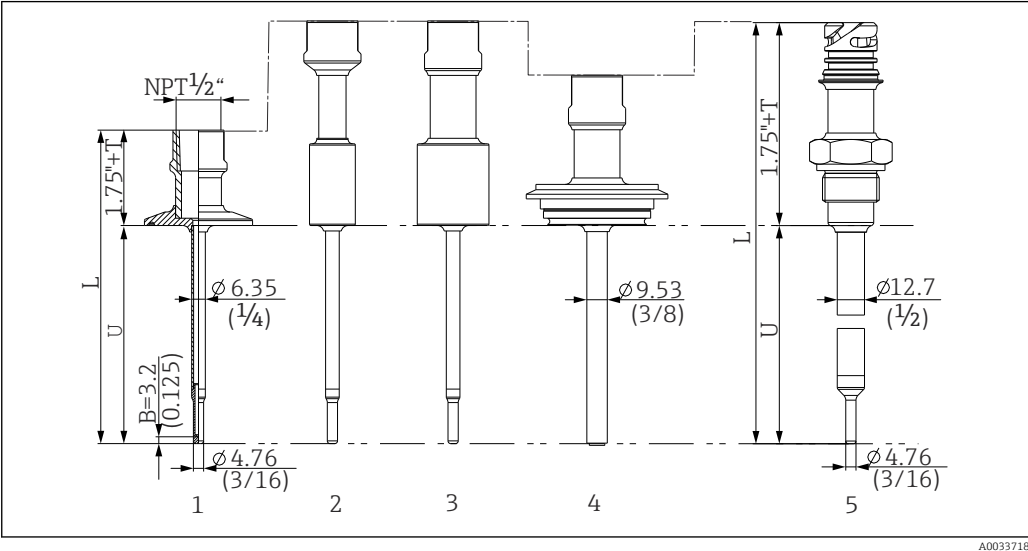
Mechanical construction


Design, dimensions

- All dimensions in mm (in). The design depends on the thermowell version:
- Diameter 6.35 mm (¼ in)
  - Diameter 9.53 mm (⅜ in)
  - Diameter 12.7 mm (½ in)
  - Tee and elbow thermowell version as per DIN 11865 / ASME BPE for weld-in
-  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	Thermowell length (U+T+1.75 ")
B	Thermowell base thickness: predefined, depends on thermowell version (see also the individual table data)
T	Length of thermowell shaft: variable or predefined, depends on thermowell version (see also the individual table data)
U	Immersion length: variable, depending on the configuration

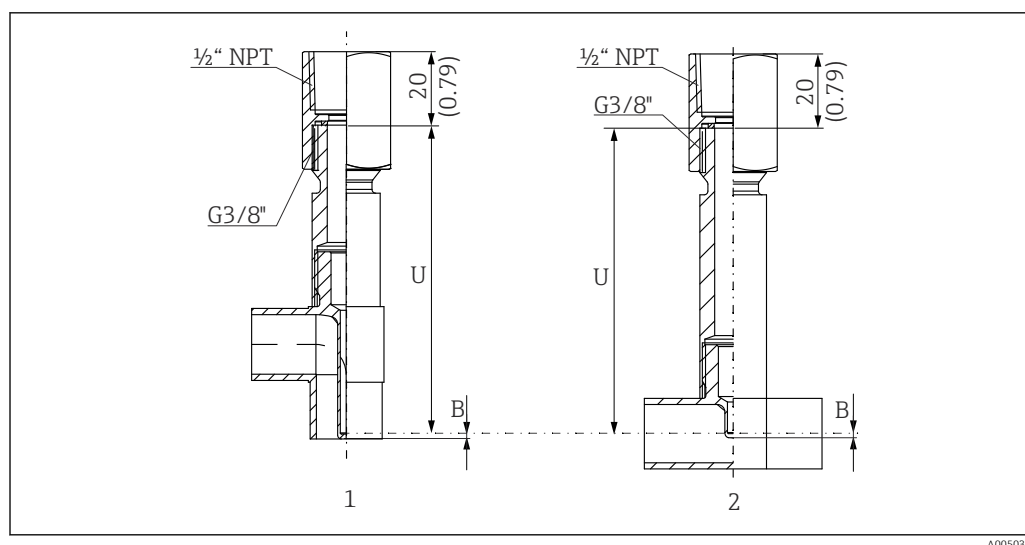


-  4 Thermowell with neck connection NPT ½", diameter ¼", ⅜" and ½" and various process connection versions:
- 1 Tri-clamp
  - 2 Cylindrical weld-in adapter  $\phi D \frac{3}{8}"$  NPS
  - 3 Cylindrical weld-in adapter  $\phi D 1"$  NPS
  - 4 Varivent®
  - 5 Liquiphant adapter with QuickNeck

Item	Version	Length
Length of thermowell 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"
Immersion length U	Weld-in with QuickNeck	2-6"
	Independent of the version	Variable, depending on the configuration

Item	Version	Length
Base thickness B	<b>6.35 mm (1/4 in) Thermowell:</b> Reduced tip $\phi 4.76 \text{ mm } (3/16 \text{ in})$	3.2 mm (0.125 in)
	<b>9.53 mm (3/8 in) Thermowell:</b> Reduced tip $\phi 4.76 \text{ mm } (3/16 \text{ in})$ Straight tip	3.2 mm (0.125 in) 3 mm (0.12 in)
	<b>12.7 mm (1/2 in) Thermowell:</b> Reduced tip $\phi 4.76 \text{ mm } (3/16 \text{ in})$ Straight tip	3.2 mm (0.125 in) 6.3 mm (0.25 in)

1) Depends on the process connection



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5 Tee and elbow thermowell version as per DIN 11865 / ASME BPE for weld-in

- 1 Tee thermowell  
2 Elbow thermowell

Item	Version	Length
Immersion length U	Independent of the version	83 mm (3.27 in)
Base thickness B		0.7 mm (0.03 in)

**i** All process connections are available for diameter 1/4" and 3/8".  
For diameter 1/2" not available: Tri-Clamp 3/4"

**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 (1202 °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 thermowell withstand a passivation process with a 3% sulphuric acid</li> <li>■ Available with 3-A marked sensors</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:

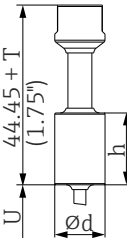
Standard surface, mechanically polished <sup>1)</sup>	$R_a \leq 0.76 \mu\text{m}$ (30 $\mu\text{in}$ )
Mechanically polished <sup>1)</sup> , buffed <sup>2)</sup>	$R_a \leq 0.38 \mu\text{m}$ (15 $\mu\text{in}$ )
Mechanically polished <sup>1)</sup> , buffed and electropolished	$R_a \leq 0.38 \mu\text{m}$ (15 $\mu\text{in}$ ) + electropolished

- 1) Or equivalent treatment that guarantees  $R_a$  max  
 2) Not compliant with ASME BPE

#### Process connections

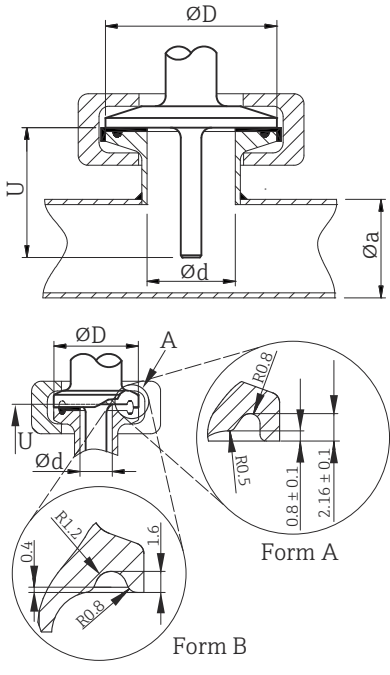
All dimensions in mm (in).

For welding in

Type	Version	Dimensions	Technical properties
Weld-in adapter 	Cylindrical ½" NPS	$\varnothing d = \frac{1}{2}"$ NPS, $h = 38.1 \text{ mm}$ (1.5 in), $U =$ immersion length from lower edge, $T = \text{min. } 50.8 \text{ mm}$ (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 ¾" NPS	$\varnothing d = \frac{3}{4}"$ NPS, $h = 38.1 \text{ mm}$ (1.5 in), $U =$ immersion length from lower edge, $T = \text{min. } 50.8 \text{ mm}$ (2 in)	
	Cylindrical 1" NPS	$\varnothing d = 1"$ NPS, $h = 38.1 \text{ mm}$ (1.5 in), $U =$ immersion length from lower edge, $T = \text{min. } 50.8 \text{ mm}$ (2 in)	

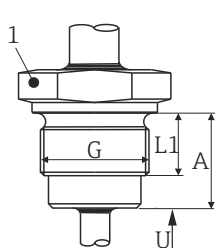
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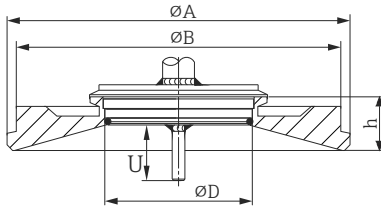

## Releasable process connection

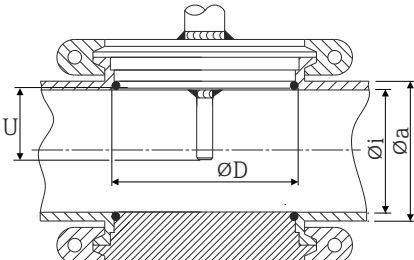
Type	Version	Dimensions		Technical properties	Conformity
	Ød: <sup>1)</sup>	ØD	Øa		
 <p>Form A: In compliance with ASME BPE Type A</p> <p>Form B: In compliance with ASME BPE Type B and ISO 2852</p>	Tri-clamp ¾" (DN18), Form A <sup>2)</sup>	25 mm (0.98 in)	-	<ul style="list-style-type: none"> <li>■ P<sub>max.</sub> = 16 bar (232 psi), depends on clamp ring and suitable seal</li> <li>■ 3-A marked</li> </ul>	ASME BPE type A
	Clamp ISO 2852 ½" (DN12 - 21.3) Form B	34 mm (1.34 in)	16 to 25.3 mm (0.63 to 0.99 in)		ISO 2852
	Tri-clamp 1" - 1½" (DN25 - 38) Form B	50.5 mm (1.99 in)	29 to 42.4 mm (1.14 to 1.67 in)	<ul style="list-style-type: none"> <li>■ P<sub>max.</sub> = 16 bar (232 psi), depends on clamp ring and suitable seal</li> <li>■ 3-A marked and EHEDG certified (combined with Combifit seal)</li> <li>■ Can be used with 'Novaseptic Connect (NA Connect)' which enables flush-mount installation</li> </ul>	ASME BPE type B
	Tri-clamp 2" (DN40 - 51) Form B	64 mm (2.52 in)	44.8 to 55.8 mm (1.76 to 2.2 in)		
	Tri-clamp 2½" (DN63.5) Form B	77.5 mm (3.05 in)	68.9 to 75.8 mm (2.71 to 2.98 in)		
	Tri-clamp 3" (DN70-76.5) Form B	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 ¾" only possible with thermowell diameter 6.35 mm (¼ in) or 9.53 mm (⅜ in)

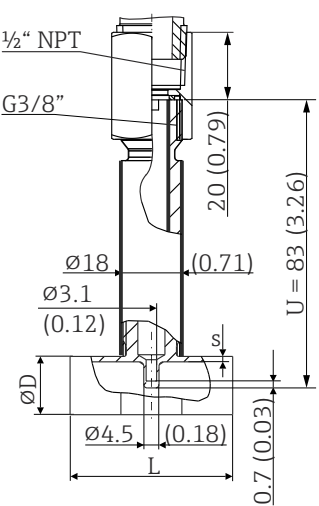
Type	Version G	Dimensions			Technical properties
		L1 thread length	A	1 (SW/AF)	
Thread according to ISO 228 (for Liquiphant weld-in adapter) 	G¾" for FTL20 adapter	16 mm (0.63 in)	25.5 mm (1 in)	32	<ul style="list-style-type: none"> <li>■ P<sub>max.</sub> = 25 bar (362 psi) at max. 150 °C (302 °F)</li> <li>■ P<sub>max.</sub> = 40 bar (580 psi) at max. 100 °C (212 °F)</li> <li>■ In connection with FTL31/33/50 adapter, see TI00426F for details about 3-A conformity and EHEDG tested O-ring</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>	
<div>Varivent®  <small>A0021307</small></div>	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>■ 3-A marked and EHEDG certified</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)		
<div> 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).</div>							

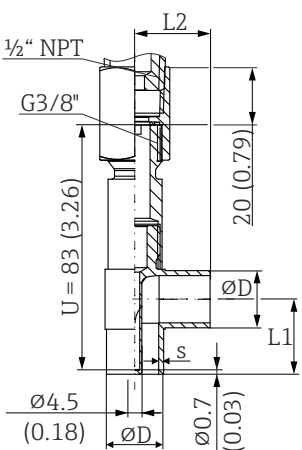
Type				Technical properties
Varivent® for VARINLINE® housing for installation in pipes  A0009564				<ul style="list-style-type: none"> <li>3-A marked and EHEDG certified</li> <li>ASME BPE compliance</li> </ul>
Version	Dimensions			$P_{max.}$
	$\varnothing D$	$\varnothing i$	$\varnothing a$	
Type N, 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)
		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)




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

Type	Version		Dimensions in mm (in)			Technical properties
			ØD	L	s <sup>1)</sup>	
Tee thermowell for weld-in as per DIN 11865 (Part C)  	Part C <sup>2)</sup>	DN12.7 PN25 (½")	12.7 mm (0.5 in)	48 mm (1.89 in)	1.65 mm (0.065 in)	<ul style="list-style-type: none"><li>■ P<sub>max.</sub> = 25 bar (362 psi)</li><li>■ R<sub>a</sub> ≤ 0.38 µm (15 µin) + electropolished<sup>3)</sup></li></ul>
		DN19.05 PN25 (¾")	19.05 mm (0.75 in)			
		DN25.4 PN25 (1")	19.05 mm (0.75 in)			
		DN38.1 PN25 (1½")	38.1 mm (1.5 in)			

- 1) Wall thickness  
 2) Dimensions as per ASME BPE 2012  
 3) Exception: internal welded seams

Type	Version		Dimensions				Technical properties
			øD	L1	L2	s <sup>1)</sup>	
Elbow thermowell for weld-in as per DIN 11865 (Part C)  	Part C	DN12.7 PN25 (½") <sup>2)</sup>	12.7 mm (0.5 in)	24 mm (0.95 in)	1.65 mm (0.065 in)	<ul style="list-style-type: none"><li>■ P<sub>max.</sub> = 25 bar (362 psi)</li><li>■ R<sub>a</sub> ≤ 0.38 µm (15 µin)+ electropolished<sup>3)</sup></li></ul>	
		DN19.05 PN25 (¾")	19.05 mm (0.75 in)	25 mm (0.98 in)			
		DN25.4 PN 25 (1")	19.05 mm (0.75 in)	28 mm (1.1 in)			
		DN38.1 PN25 (1½")	38.1 mm (1.5 in)	35 mm (1.38 in)			

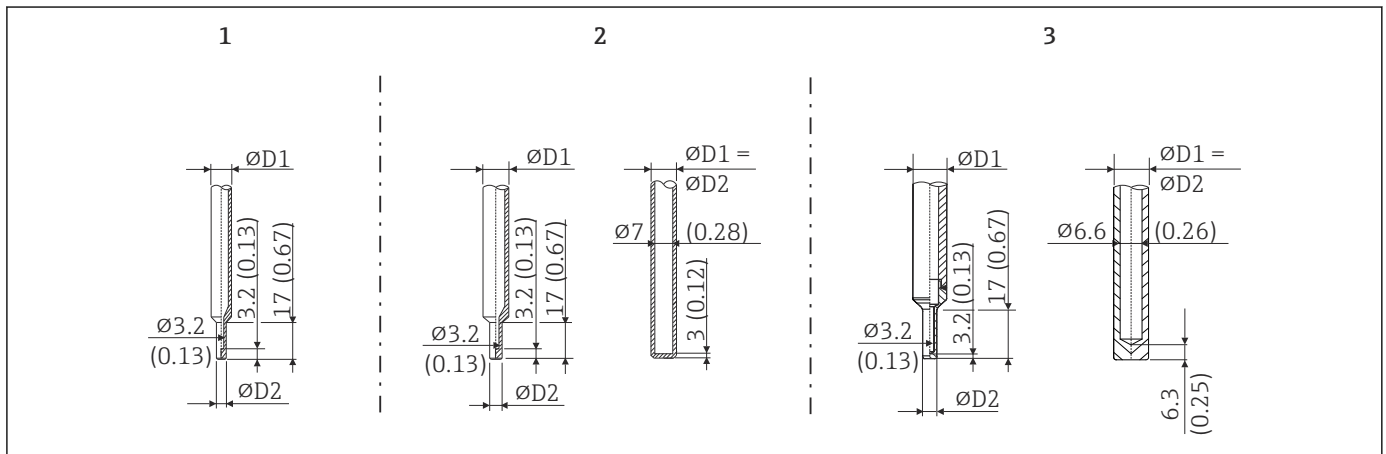
- 1) Wall thickness  
 2) Dimensions as per ASME BPE 2012  
 3) Exception: internal welded seams

 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 thermowell.
- Endress+Hauser offers users a range of thermowell tips to meet every requirement:
  - Straight tip
  - Reduced tip with  $\phi 4.76 \text{ mm}$  ( $\frac{3}{16} \text{ in}$ ): walls of lower thickness significantly reduce the response times of the overall measuring point
  - Reduced tip for Tee and Elbow thermowell with  $\phi 4.5 \text{ mm}$  (0.18 in)



6 Thermowell tips available (reduced or straight)

Item No.	Thermowell (ØD1)	Tip (ØD2)	Insert (ØID)
1	$\phi 6.35 \text{ mm}$ ( $\frac{1}{4} \text{ in}$ )	Reduced tip with $\phi 4.76 \text{ mm}$ ( $\frac{3}{16} \text{ in}$ )	$\phi 3 \text{ mm}$ (0.12 in)
2	$\phi 9.53 \text{ mm}$ ( $\frac{3}{8} \text{ in}$ )	<ul style="list-style-type: none"> <li>■ Reduced tip with <math>\phi 4.76 \text{ mm}</math> (<math>\frac{3}{16} \text{ in}</math>)</li> <li>■ Straight tip</li> </ul>	<ul style="list-style-type: none"> <li>■ <math>\phi 3 \text{ mm}</math> (0.12 in)</li> <li>■ <math>\phi 6.35 \text{ mm}</math> (<math>\frac{1}{4} \text{ in}</math>) or 6 mm (0.24 in)</li> </ul>
3	$\phi 12.7 \text{ mm}$ ( $\frac{1}{2} \text{ in}$ )	<ul style="list-style-type: none"> <li>■ Reduced tip with <math>\phi 4.76 \text{ mm}</math> (<math>\frac{3}{16} \text{ in}</math>)</li> <li>■ Straight tip</li> </ul>	<ul style="list-style-type: none"> <li>■ <math>\phi 3 \text{ mm}</math> (0.12 in)</li> <li>■ <math>\phi 6.35 \text{ mm}</math> (<math>\frac{1}{4} \text{ in}</math>) 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 thermowells in the Endress+Hauser Applicator software. See 'Accessories' section. → 15

## Certificates and approvals

Current certificates and approvals that are available for the product can be selected via the Product Configurator at [www.endress.com](http://www.endress.com):

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

## Hygiene standard

- EHEDG certification, type EL CLASS I. EHEDG certified/tested process connections. → 9
- 3-A Authorization No. 1144, 3-A Sanitary Standard 74-06. Listed process connections. → 9
- ASME BPE, Declaration of Conformity, can be ordered for options indicated
- FDA-compliant
- All surfaces in contact with the medium are free from materials derived from bovine animals or other livestock (ADI/TSE)

<b>Materials in contact with food/product (FCM)</b>	<p>The materials of the thermometer in contact with food/product (FCM) 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>■ (EU) No. 10/2011 on plastic materials and articles intended to come into contact with food.</li> </ul>
<b>Material resistance</b>	<p>Material resistance - including resistance of housing - to the following Ecolab cleaning/disinfection agents:</p> <ul style="list-style-type: none"> <li>■ P3-topax 66</li> <li>■ P3-topactive 200</li> <li>■ P3-topactive 500</li> <li>■ P3-topactive OKTO</li> <li>■ And demineralized water</li> </ul>
<b>CRN approval</b>	<p>The CRN approval is only available for certain thermowell versions. These versions are identified and displayed accordingly during the configuration of the device.</p> <p>Detailed ordering information is available for your nearest sales organization <a href="http://www.addresses.endress.com">www.addresses.endress.com</a> or in the Download Area under <a href="http://www.endress.com">www.endress.com</a> :</p> <ol style="list-style-type: none"> <li>1. Select the country</li> <li>2. Select Downloads</li> <li>3. In the search area: select Approvals/approval type</li> <li>4. Enter the product code or device</li> <li>5. Start the search</li> </ol>
<b>Surface purity</b>	Free from oil and grease, optional
<b>Thermowell testing and load capacity calculation</b>	<ul style="list-style-type: none"> <li>■ Thermowell pressure tests are carried out in accordance with the specifications in DIN 43772. With regard to thermowells with reduced tip that do not comply with this standard, these are tested using the pressure of corresponding straight thermowells. 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 thermowell.</li> <li>■ PMI test, dye penetration test, TW welding, internal hydrostatic pressure, etc. each with inspection certificate</li> <li>■ Load capacity calculation for the thermowell as per DIN43772</li> </ul>

## Ordering information

Detailed ordering information is available from your nearest sales organization [www.addresses.endress.com](http://www.addresses.endress.com) or in the Product Configurator at [www.endress.com](http://www.endress.com):

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.



### 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



For more information about order codes and hygienic compliance of the adapters and spare parts, see Technical Information (TI00426F).

Weld-in adapter						
	G 3/4", d=29 for pipe-mounting A0008246	G 3/4", d=50 for vessel-mounting A0008251	G 3/4", d=55 with flange A0008256	G 1", d=53 without flange A0011924	G 1", d=60 with flange A0008248	G 1" adjustable A0008253
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)



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 country -&gt; Click "Products" -&gt; Select the product using the filters and search field -&gt; Open 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 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>
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## Supplementary documentation

The following types of documentation are available on the product pages and in the Download Area of the Endress+Hauser website ([www.endress.com/downloads](http://www.endress.com/downloads)) (depending on the selected device version):

Document	Purpose and content of the document
Technical Information (TI)	<p><b>Planning aid for your device</b></p> <p>The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.</p>
Brief Operating Instructions (KA)	<p><b>Guide that takes you quickly to the 1st measured value</b></p> <p>The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.</p>
Operating Instructions (BA)	<p><b>Your reference document</b></p> <p>The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.</p>
Description of Device Parameters (GP)	<p><b>Reference for your parameters</b></p> <p>The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.</p>
Safety Instructions (XA)	<p>Depending on the approval, Safety Instructions (XA) are supplied with the device. The Safety Instructions are an integral part of the Operating Instructions.</p> <p> Information on the Safety Instructions (XA) that are relevant for the device is provided on the nameplate.</p>
Supplementary device-dependent documentation (SD/FY)	<p>Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is an integral part of the device documentation.</p>



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

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