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71602387
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Technical Information
TU51, TU52, TU53 and TU54

Heavy duty - general purpose thermowell made of drilled barstock material

Application

The thermowell is designed for use with RTD and thermocouple assemblies mainly in heavy duty applications for process industries.

Your benefits

- Industry standard thermowells manufactured from round barstock.
- The process connections can be weld-in, socket weld, threaded, or flanged with double sided standard or full penetration welds.
- The thermowell stem shape can be straight, stepped, or tapered.
- Variable lag and immersion lengths.
- CRN approved thermowells
- The standard material of construction is 316/316L
- Special versions can be manufactured according to specifications.

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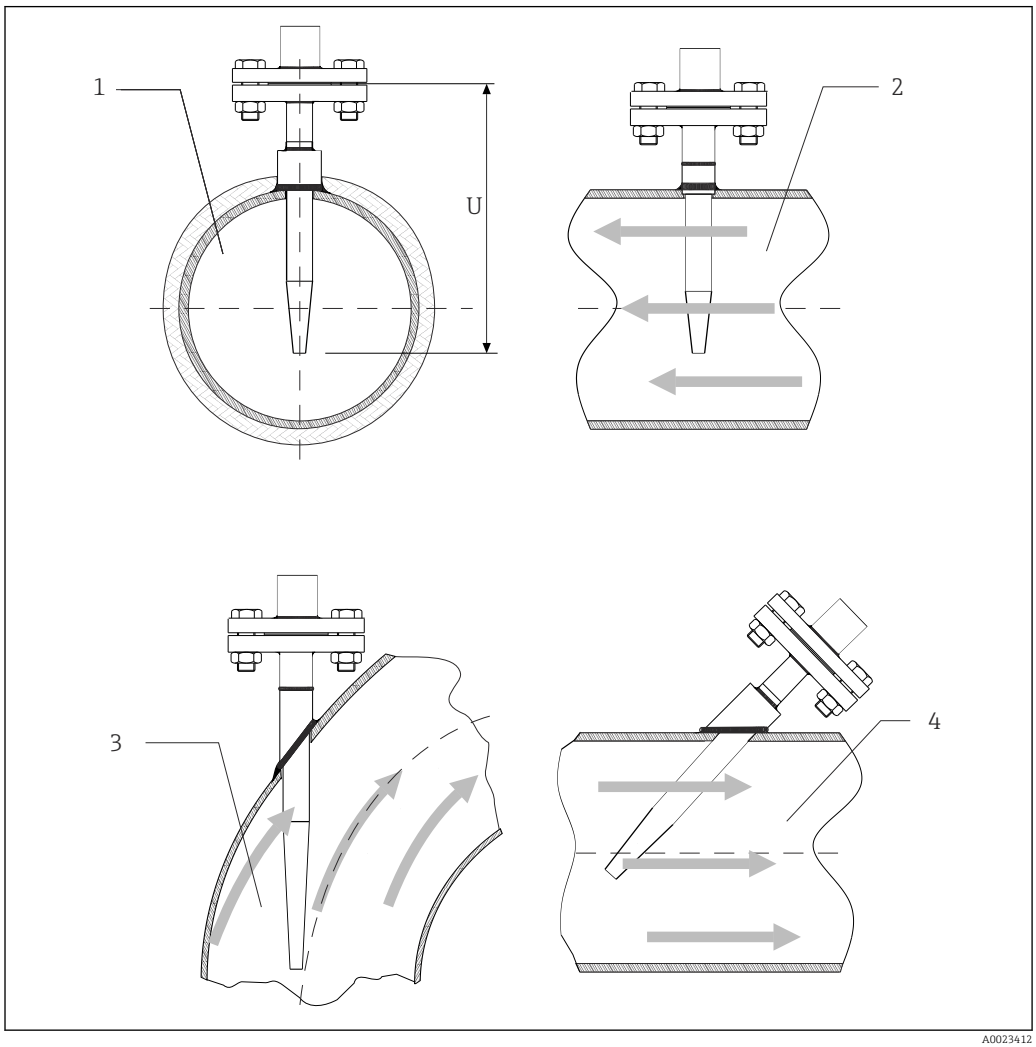
Installation

Installation instructions



1 *Installation examples*

1-2 In pipes with a small cross section the sensor tip should reach or extend slightly past the center line of the pipe (U).
3-4 Tilted installation

The immersion length of the thermometer influences the accuracy. If the immersion length is too short the measurement may be impacted by the pipe wall and process connection causing errors. If installing into a pipe then the ideal immersion length should extend to or slightly past the center line of the pipe, if possible (see 1 and 2), especially in laminar flow. A further solution could be an angled (tilted) installation (see 3 and 4). When determining the immersion length, take into account all process (e.g. flow velocity, viscosity, process pressure).

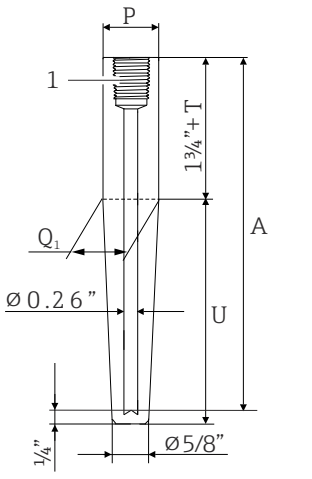
- Installation possibilities: Pipes, tanks or other plant components
- A general rule of thumb is to design the insertion length to be 10 times the diameter of the thermowell.

Mechanical Construction

Design, dimensions

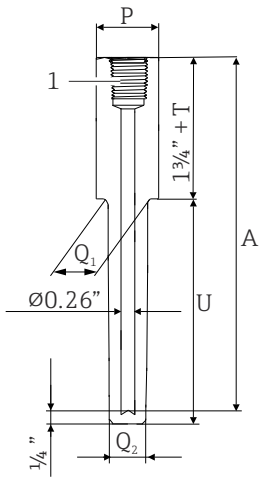
All dimensions in inches. For values related to the graphics please refer to the tables and equations below.

TU51



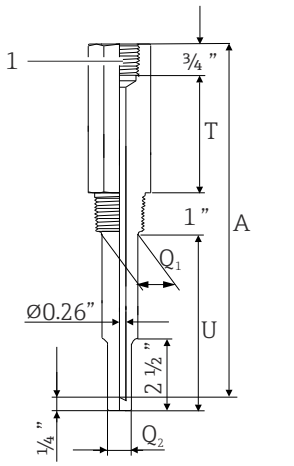
1 NPT ½" female thread
P Pipe size
Q1 Thermowell root diameter
Q2 Thermowell tip diameter
T Lag dimension
U Thermowell immersion length
A Drill depth of thermowell

TU52



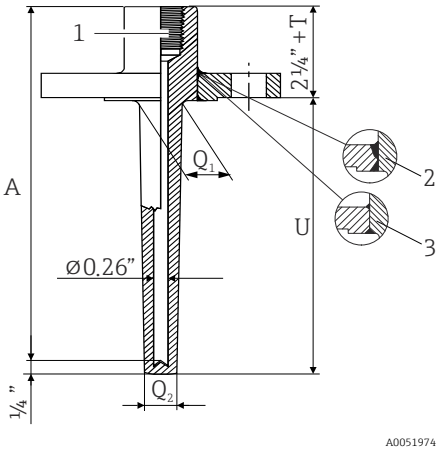
1 NPT ½" female thread
P Pipe size
Q1 Thermowell root diameter
Q2 Thermowell tip diameter
T Lag dimension
U Thermowell immersion length
A Drill depth of thermowell

TU53

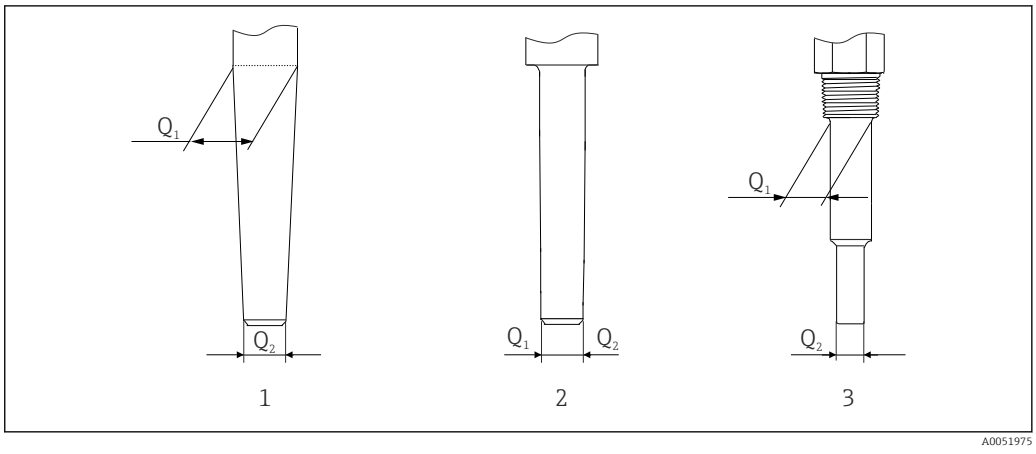


1 NPT ½" female thread
Q1 Thermowell root diameter
Q2 Thermowell tip diameter
T Lag dimension
U Thermowell immersion length
A Drill depth of thermowell

TU54



1 NPT ½" female thread
2 Full penetration weld
3 Standard weld
Q1 Thermowell root diameter
Q2 Thermowell tip diameter
T Lag dimension
U Thermowell immersion length
A Drill depth of thermowell



2 Thermowell shapes

1 Tapered
2 Straight
3 Stepped
Q1 Thermowell root diameter
Q2 Thermowell tip diameter

Dimensional details

General dimensions

	TU51	TU52	TU53	TU54
Type	Weld-in	Socket-weld	Threaded	Flanged
Process connections	¾" and 1"	¾" and 1"	½", ¾" and 1"	1", 1-½", 2" ANSI Flange 150 to 1500 RF
Immersion length	2" to 24"			
Lag length	Up to 6" (in ½" increments)			
Instrument connection	½" NPT			
Bore diameter	0.26"			
Tip thickness	0.25"			
Roughness	32µin (0.8µm)			

TU51 Weld-in Thermowells

NPS	¾"	1"
P	1.050"	1.315"
Q1 (root)	1.050"	1.315
Q2 (tip)	5/8"	5/8"

TU52 Socket-weld Thermowells

	Stepped		Straight		Tapered	
NPS	¾"	1"	¾"	1"	¾"	1"
P	1.050"	1.315"	1.050"	1.315"	1.050"	1.315"
Q1 (root)	¾"	7/8"	¾"	1"	7/8"	1"
Q2 (tip)	½"	½"	¾"	1"	5/8"	5/8"

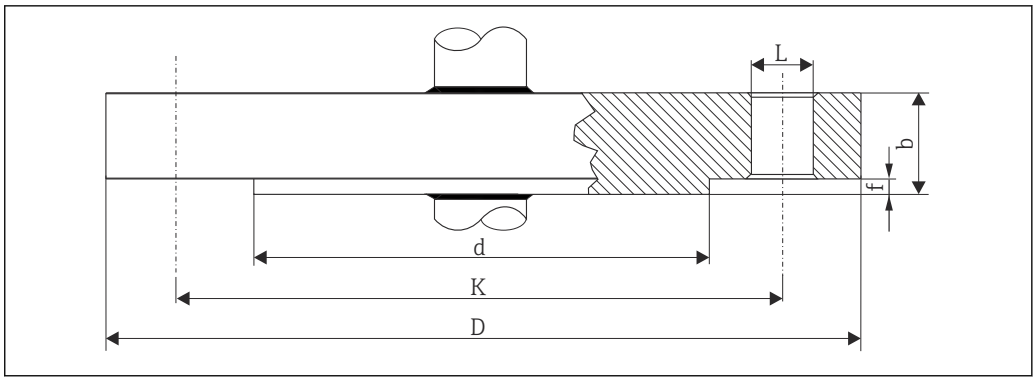
TU53 Threaded Thermowells

	Stepped*			Straight			Tapered	
NPT	½"	¾"	1"	½"	¾"	1"	¾"	1"
Q1 (root)	5/8"	¾"	7/8"	5/8"	¾"	7/8"	7/8"	1-1/16"
Q2 (tip)	½"	½"	½"	5/8"	¾"	7/8"	5/8"	5/8"
*Stepped versions with U < 3" will have Q = V = ½"								

TU54 Flanged Thermowells

	Stepped	Straight	Tapered	
Flange	1" and larger	1" and larger	1"	1-½" and larger
Q1 (root)	¾"	¾"	7/8"	1-1/16"
Q2 (tip)	½"	¾"	5/8"	5/8"

Flange



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For detailed information on the flange dimensions refer to the following flange standard: ANSI/ ASME B16.5.

The flange material must be the same as of the stem of the thermowell.

Specification Tolerances

Item	Tolerance
Well up thickness	¼" ± 1/16"
Root/Tip Diameter	± 0.01"
Insertion Length (A Dim.)	± 1/16"
Bore Diameter	+ 0.005" / - 0.003"
Barstock Thermowell OD	Milling Standard: + 0.000" / - 0.031"

Flanged Wells

Manufactured in accordance with ASME/ANSI B16.5

Pipe Threads

Manufactured in accordance with ANSI B1.20.1

Materials

In compliance with ASTM specifications (or other applicable National Standards)

Process connection and thermowell

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 operation temperatures are reduced considerably in some cases where abnormal conditions such as high mechanical load occur or in aggressive media.

Material name	Short form	Recommended max. temperature for continuous use in air	Properties
AISI 316L, complies with		650 °C (1 202 °F)[1)]	▪ Austenitic, stainless steel ▪ High corrosion resistance in general ▪ 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)
1.4401 or	X5CrNiMo17-12-2		

Material name	Short form	Recommended max. temperature for continuous use in air	Properties
1.4404	X2CrNiMo17-13-2		
AISI A105/1.0460	C22.8	450 °C (842 °F)	▪ Heat-resistant steel ▪ Resistant in nitrogen-containing atmospheres and atmospheres that are low in oxygen; not suitable for acids or other aggressive media ▪ Often used in steam generators, water and steam pipes, pressured vessels

Certificates and approvals

Current certificates and approvals that are available for the product can be selected via the Product Configurator at www.endress.com:

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

Ordering information

Detailed ordering information is available from your nearest sales organization www.addresses.endress.com or in the Product Configurator at 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

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) (depending on the selected device version):

Document	Purpose and content of the document
Technical Information (TI)	**Planning aid for your device** 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.
Brief Operating Instructions (KA)	**Guide that takes you quickly to the 1st measured value** The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

Document	Purpose and content of the document
Operating Instructions (BA)	**Your reference document** 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.
Description of Device Parameters (GP)	**Reference for your parameters** 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.
Safety Instructions (XA)	Depending on the approval, Safety Instructions (XA) are supplied with the device. The Safety Instructions are an integral part of the Operating Instructions. Information on the Safety Instructions (XA) that are relevant for the device is provided on the nameplate.
Supplementary device-dependent documentation (SD/FY)	Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is an integral part of the device documentation.

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