

ITS TWWI Flanged Thermowells



ITS produces thermowells that have a proven track record in a wide range of industries and applications. Our Thermowell product line includes

- Threaded
- Sanitary Tri-Clover
- Socket-Weld
- Weld-in
- Flanged thermowells.

Large selection of thermowell materials to ensure proper process compatibility from stainless steel to exotic materials such as duplex and alloy C-276.

Product Overview

Temperature sensors are rarely inserted directly into an industrial process. They are installed into a thermowell to isolate them from the potentially damaging process conditions of flow-induced stresses, high pressure, and corrosive chemical effects. They also increase the longevity of the sensor, allow sensor removal for replacement or calibration without the need for draining the system and reduce the probability of contamination. Thermowells designed for high pressure applications are typically machined from bar stock to ensure integrity...

Product Features

- Solid Drilled Weld in Well
- Immersion depth configurable
- Various Configuration Options
- 316L (1.4404)

Materials

- EN 10088-3 ED2014 1.4404 316L
- EN 10088-3 ED2014 1.4435 316L
- Duplex 2205
- Super Duplex S32750
- Chrome Moly F11/F22
- Hastelloy C

Specification

Shank Style	Straight, Tapered, Stepped
Shank Diameter	Configurable
Immersion Length	30 ... 400 mm
Well Type	Weld Socket or Weld in
Instrument connection	½" BSP or ½" NPSM
Material Standard	EN 10088-3 ED2014 1.4404 316L
Internal Diameter	6.35mm, 6.7mm
Surface roughness	Ra ≤ 0.8 µm

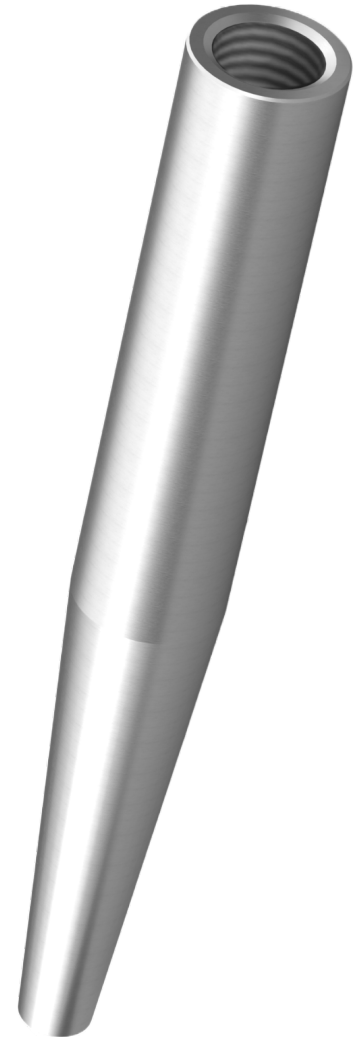
Operating Conditions

Max. Temperature & Pressure Depending on

- Thermowell design
 - Dimensions
 - Material
 - Flange pressure rating
- Process conditions
 - Flow rate
 - Density of medium

Certification Options

- 3.1b Material Cert
- Wake Frequency Cert
- Surface Finish Cert



Thermowell Stem Profile

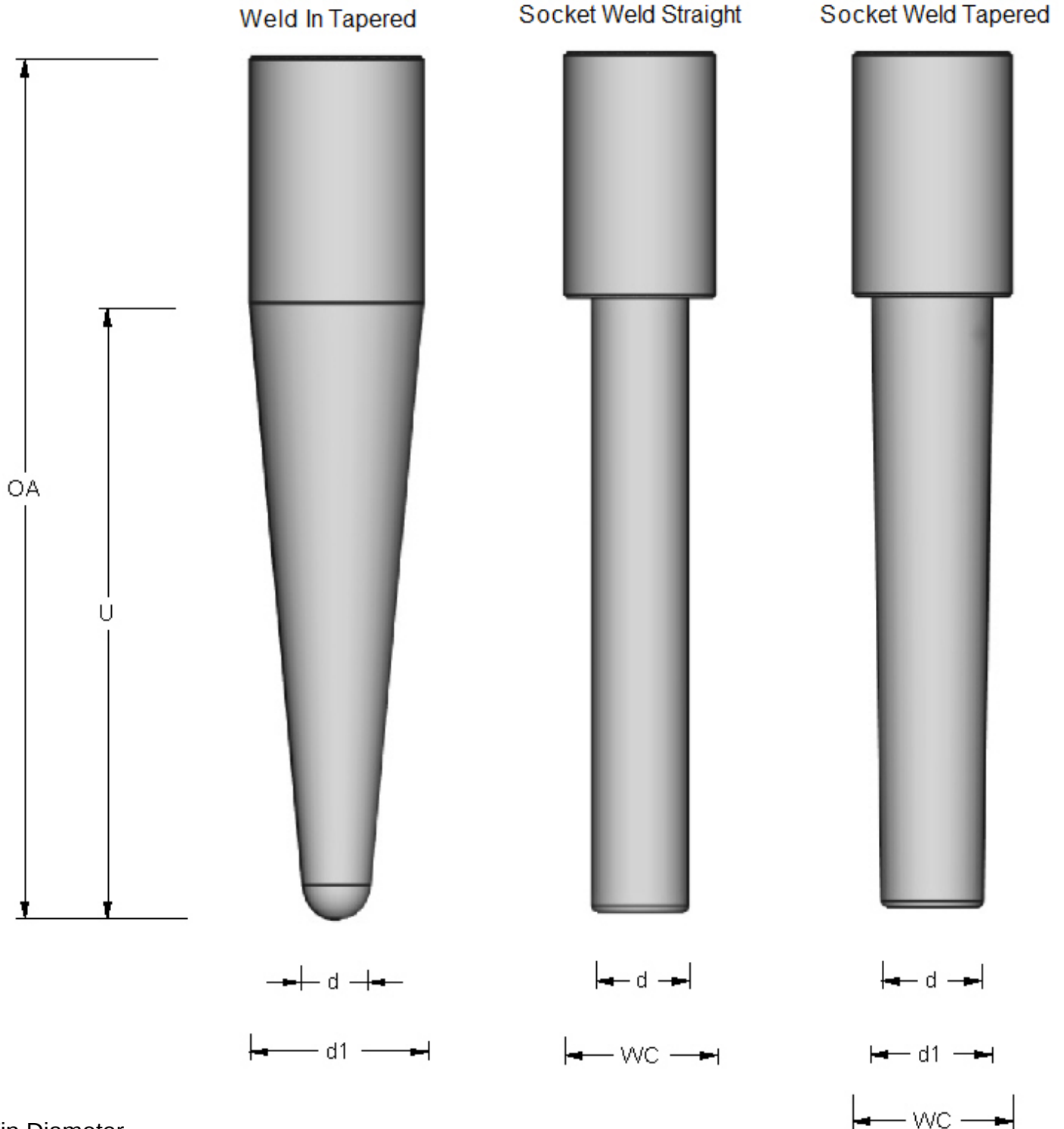
The stem or shank is the part of a thermowell that is inserted into the process piping. Common stem profiles are straight, stepped, and tapered. Factors to consider when selecting a stem style include...

- Process pressure
- Required speed of response of the measurement
- Drag force of the fluid flow on the well
- Vortex shedding induced vibration effects

Manufacturing Design Flexibility

ITS Thermowells are manufactured in our offices in Ireland to customer specific requirements allowing for flexibility of design to suit various applications and environments. Providing reduced delivery times to our many customers enabling efficient design and turnaround that meets with such demanding environments. An "Complete Assembly" option enables ITS to provide a Complete Solution for measuring temperature, delivering an installation-ready transmitter, sensor, and thermowell assembly...

Weld In Thermowells Drawings



d. Tip Diameter
d1. Root Diameter
id. Bore Diameter
SW. Socket Weld Diameter
U. Immersion Length
OA. Overall Length

Welded Thermowell

Solid drilled bar stock weld-in thermowells figure below shows the thermowell configuration available as standard with custom thermowells also available upon request

Model	Mounting Style	Stem Style	Stem Diameter	(U) Immersion Length	(L) Overall Length	Weld Diameter	Instrument Thread	Internal Bore	Material
TWWI	SW	T	XX/XX	XXX	XXX	XX	XXX	XXX	XXXX
1	2	3	4	5	6	7	8	9	10

(2) Mounting Style

(SW) Socket Weld

(W) Weld In

(4) Stem Diameter

Diameters in mm

(6) Overall Length

65 to 560mm

(8) Instrument Thread

12B ½"BSP

12N ½"NPSM

(10) Material

316L 1.4404

C22 N06022

(3) Stem Style

(S) Straight

(T) Tapered

(5) Immersion Length

25 to 500mm

(7) Weld Diameter

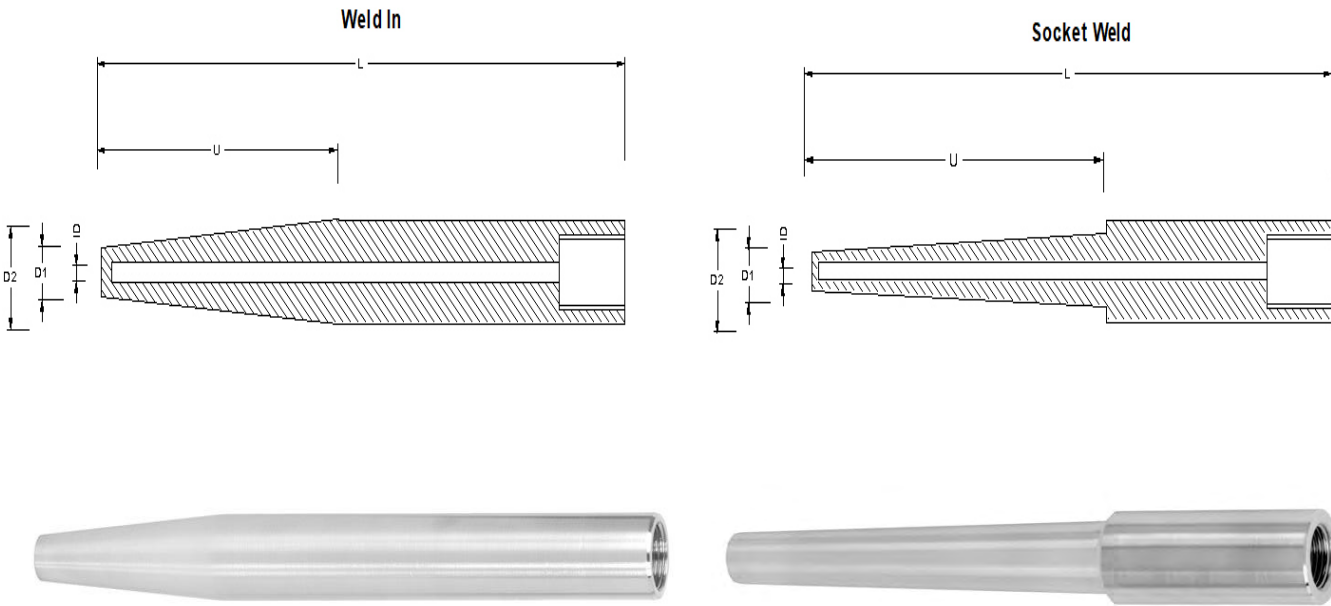
Standard 25mm

Specify mm

(9) Internal Bore

6.35

6.7



Thermowells are supplied as standard with 3.1b material certification.
Thermowell additional options include surface finish certification, pressure test certification & wake thermowell calculation

Configuration & Order Information

Product	TWWI	##	-	####	-	#####	-	###	-	#####	-	##	-	###	-	####	-	####	-	####
Mount Style																				
Weld in		W																		
Weld Socket		WS																		
Shank Style																				
Straight				S																
Tapered				T																
Stepped				RT																
Shank Diameter																				
19						19														
19mm/25mm						19/25														
12.5mm-35mm						12.5/35														
Specify						#####														
Insertion Length																				
40....450								###												
Overall Length																				
100....500										25										
Weld Collar Diameter																				
25mm																25				
35mm																35				
Instrument Thread																				
1/2" BSP																12B				
1/2" NPSM																12N				
Internal Diameter																				
6.35mm																6.35				
6.7mm																6.7				
Material																				
AISI 316L (1.4404)																		316L		
Hastelloy C22																		C22		
Hastelloy C276																		C276		
Duplex 2205																		DX		
Super Duplex S32750																		SDX		
Cerification																				
3.1b Material Cert																			MC	
Wake Frequency Cert																			WF	
Surface Finish Cert																			RA	

TWWI Flanged Thermowells

Installation

The immersion length of the thermometer influences the accuracy. If the immersion length is too small, then errors in the measurement are caused by heat conduction via the process connection and the container wall. If installing into a pipe then the immersion length should be half of the pipe diameter, if possible. A further solution could be an angled (tilted) installation. When determining the immersion length all thermometer parameters and the process to be measured must be considered (e.g., flow velocity, process pressure).

To ensure optimal performance, a general guideline for immersion length into a pipe is as follows:

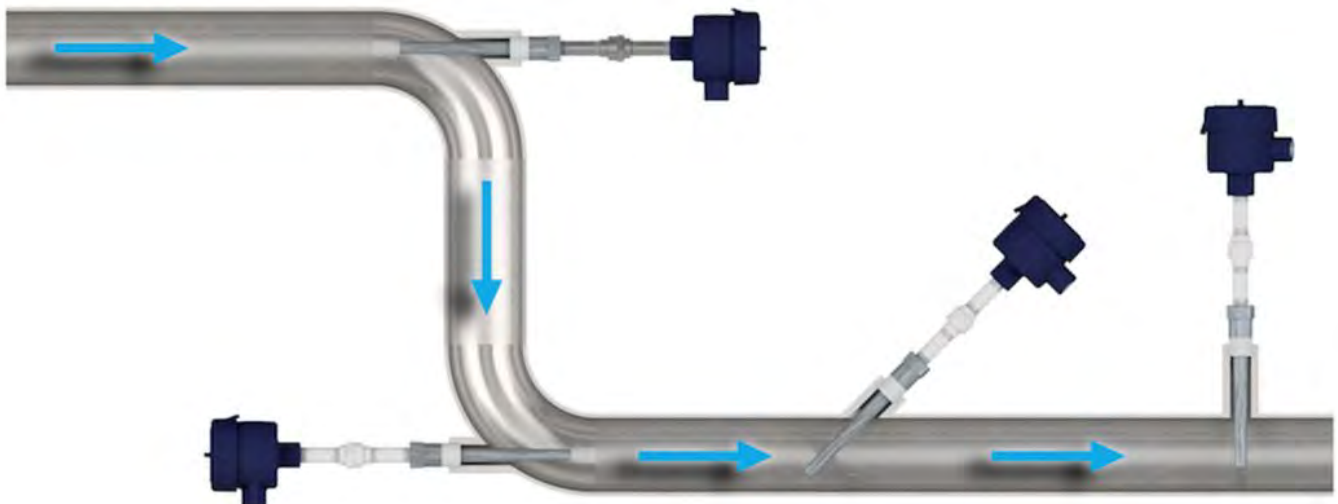
- 8× the thermowell root diameter for air or gas
- 5× the thermowell root diameter for liquids

Installation site, angle and length are three parameters that depend upon the space available and the diameter of the pipe. The manufacturer generally recommends three possible installation scenarios in pipes with flowing:

Small pipe diameter: Installation directly against the direction of flow in a bend in the pipe.

Small pipe diameter: Installation diagonally against the direction of flow, if a bend in the pipe is available.

Large pipe diameter: Vertical installation, if flow-induced periodic vortex shedding does not cause the thermometer to vibrate in its resonance frequency.



Thermowells

Thermowell calculation

The ASME PTC 19.3TW is internationally recognized as a mechanical design standard yielding reliable thermowell service in a wide range of temperature measurement applications. It includes evaluation of stresses applied to a bar stock thermowell as installed in a process based on the design, material, mounting method, and process conditions. The documentation provided will detail the process information, thermowell geometry, and comprehensive calculation analysis. It will also provide an acceptable or unacceptable statement based on the analysis. There are four quantitative criteria in ASME PTC 19.3 TW for a thermowell to be found acceptable for a particular set of process conditions:

Frequency Limit: the resonant frequency of the thermowell must be sufficiently high so that destructive oscillations are not excited by the fluid flow.

Dynamic Stress Limit: the maximum primary dynamic stress must not exceed the allowable fatigue stress limit. If the design requires that the thermowell pass through the in-line resonance to get to the operating conditions, there is an additional fatigue check at resonance.

Static Stress Limit: the maximum steady-state stress on the thermowell must not exceed the allowable stress, as determined by the Von Mises criteria.

Hydrostatic Pressure Limit: the external pressure must not exceed the pressure ratings of the thermowell tip, shank, and flange (or threads).

Material certification

Material certificate and traceability in accordance with EN 10204 Type 3.1 Inspection Certificate. The certificate provided will document the heat code, chemical analysis, and testing required by material standards.

Surface finish certification

Thermowell surface finish is typically done to remove all the burrs and sharp edges which smooths the thermowell stem surface.

The Thermowells come with a standard surface finish of 0.8 μm Ra or better. This option provides a certificate that documents the maximum surface finish reading for stem and a pass/fail statement. Improved surface finish options are also available which improves surface finish to be less than Ra 0.3 μm . An improved surface finish will increase corrosion resistance and make the thermowell easier to clean. This is common in sanitary applications.



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