

ITS TWTC Sanitary 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 sanitary Well
- Immersion depth configurable
- Various Tri-Clover Sizes
- AISI 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	Standard 16mm/19mm
Immersion Length	30 ... 400 mm
Tri-Clover Connection	ANSI 1/2" to 4"
Instrument connection	1/2"BSP or 1/2"NPSM
Material Standard	EN 10088-3 ED2014 1.4404 316L
Internal Diameter	6.35mm, 6.7mm
Surface roughness	Ra ≤ 0.4 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

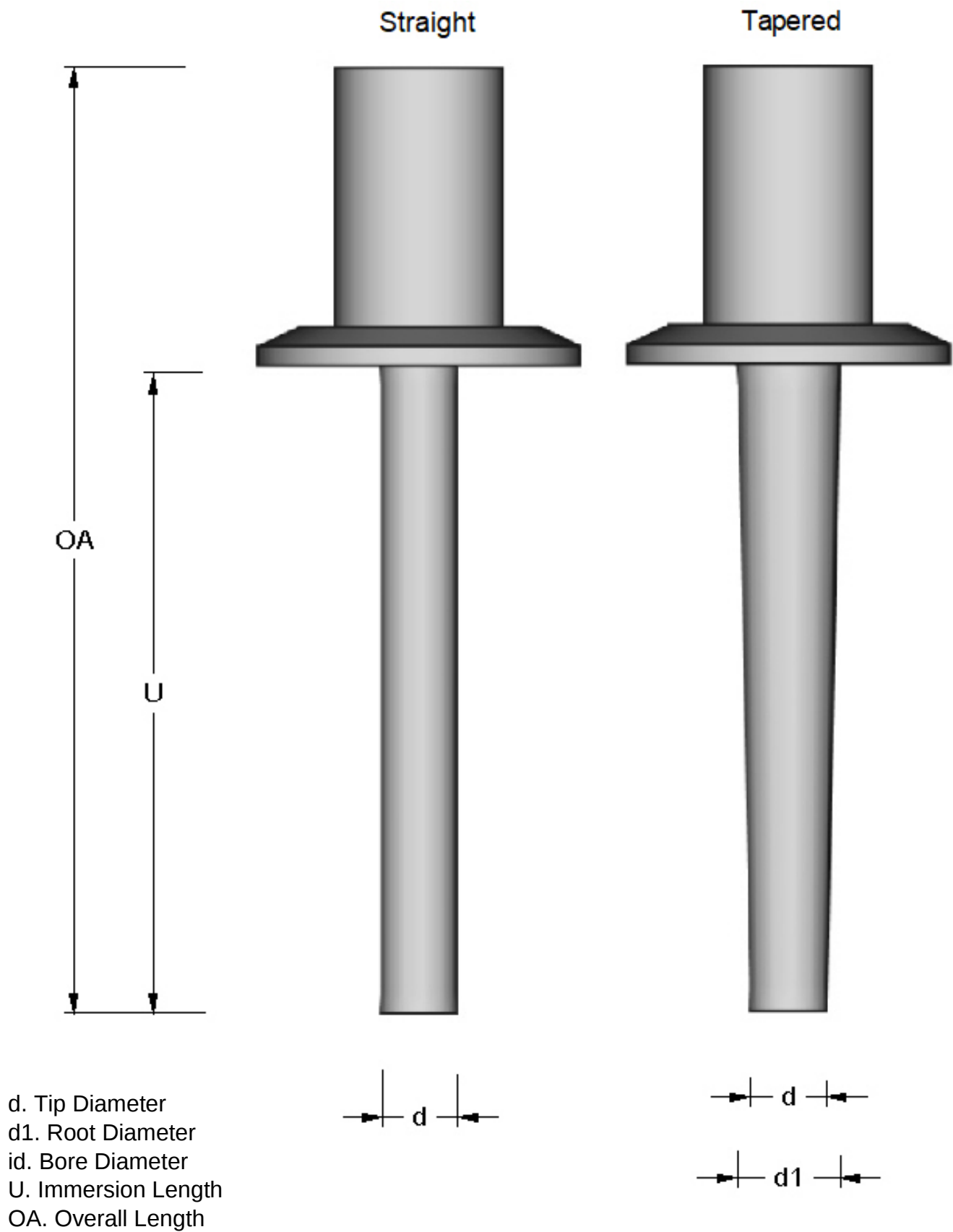
The stem or shank is the part of a thermowell that is inserted into the process piping. Common stem profiles are straight, stepped, and tapered. Factors to consider when selecting a stem style include...

- 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

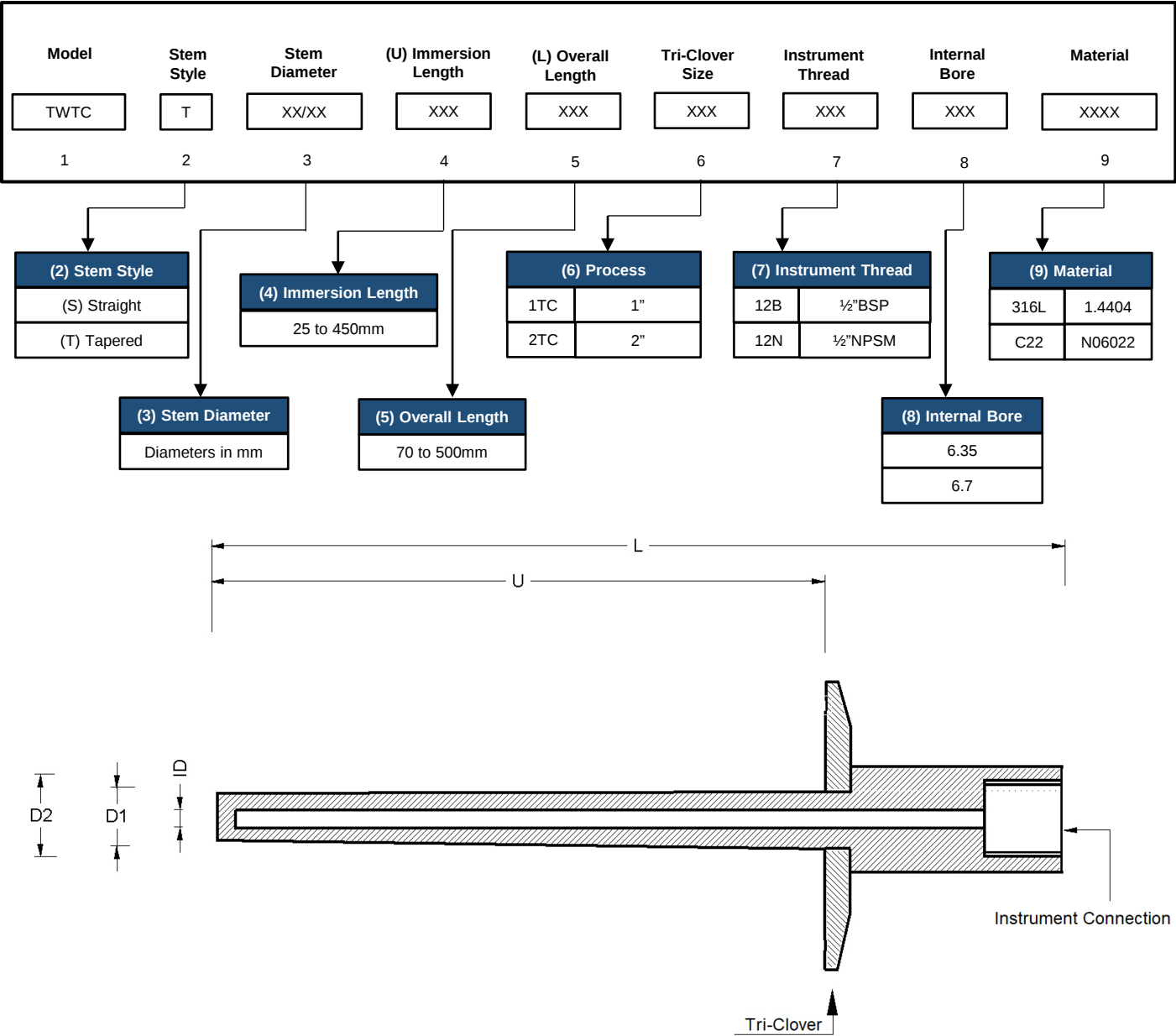
ITS Thermowells are manufactured in our offices in Ireland to customer specific requirements allowing for flexibility of design to suit various applications and environments. Providing reduced delivery times to our many customers enabling efficient design and turnaround that meets with such demanding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

Tri-Clover Thermowells Drawings



Sanitary Tri-Clover Thermowell

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



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



Temperature measurement

TWTC

Solid Drilled Sanitary Well

Configuration & Order Information																		
Product	TWTC	####	-	#####	-	###	-	###	-	####	-	##	-	###	-	####	-	##
Shank Shape																		
Straight		S																
Tapered		T																
Stepped		RT																
Shank Diameter																		
16mm						16												
13mm/16mm						13/16												
16mm/19mm						16/19												
Immersion Length																		
30mm....400mm							###											
Overall Length																		
Specify in mm								###										
Tri-Clover Size																		
½" to 4"															##TC			
Instrument Connection																		
1/2"BSP																12B		
1/2"NPSM																12N		
Internal Diameter																		
6.35mm																	6.35	
6.7mm																	6.7	
Material																		
EN 10088-3 ED2014 1.4404 316L																		316L
EN 10088-3 ED2014 1.4435 316L Low Sulphur																		316LS
Certification																		
3.1b Material Cert																		MC
Wake Frequency Cert																		WF
Surface Finish Cert																		RA

TWTC Sanitary 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.

Installation with minimal 3° inclination because of self draining.

Care should be taken by the user in the execution of the welding on the process side (suitable weld material, welding radius > 3.2 mm, absence of pits, folds, crevices, ...). As a general rule, the thermometers should be installed in such a way that does not adversely affect their cleanability (3-A® requirements must be adhered to).



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.

