

Accessories

Accessory Overview

Watlow offers a full line of thermowells and protecting tubes to meet varying requirements. While both types are designed to protect your sensor in an application, the two are different in terms of their construction and capabilities.

Thermowells

Manufactured from drilled bar stock, Watlow thermowells provide a pressure-tight connection at the point of installation. With thick walls, thermowells are sturdy enough to handle high pressure, high velocity and corrosive environments. They are frequently used in petrochemical and power plant applications.

Highly critical or demanding applications may require thermowells not only for protection of the temperature sensor, but also to withstand high pressure or erosion or both, caused by material flows through vessels.

Watlow offers numerous standard thermowell constructions, and special configurations can be designed on request.

Protecting Tubes

Both ceramic and metal (pipe type) protecting tubes serve the purpose of protecting the temperature sensor from harsh environments. Unlike thermowells, they are not primarily designed for pressure tight applications. Protection tubes are often used in heat treatment furnaces, ovens, open containers, flues and ducts.

Protecting tube construction styles are more limited than thermowells. The tubes offer the advantages of economy, corrosion resistance and, in some cases, higher temperature capabilities.



**For more information on
Watlow's protecting tubes
see page 149.**

Note: All accessories subject to minimum purchase quantities.

Accessories

Thermowells



Watlow designs and manufactures all types of thermowells. The thermowell designs shown in this catalog section are representative of the types of basic styles in popular usage throughout the industry. Special designs as well as modifications of our standard offerings are also available.

Drilled from solid bar stock, the thermowell protects the temperature sensor from corrosion, high pressure and high velocity environments.

Features and Benefits

Numerous standard thermowell constructions available

- Special configurations can be designed on request

The bar stock used (when available) to manufacture thermowells

- Protection against corrosion
- Round bar with wrench flats is substituted when hex not available

Plug and chain available for an additional charge

- Specify brass or stainless steel

Applications

- Petrochemical
- Chemical
- Oil refineries
- Power plants
- Storage tanks and lines

Manufacturing Standards	
Bar Stock	Mill Standards (± 0.010 inch approximately)
Process Connection	Threaded: Inspected with Standard Ring Gauge Flanged: Front J groove welds are $\frac{1}{4}$ inch wide by $\frac{1}{4}$ inch deep. Welds are machined, leaving $\frac{1}{8}$ inch radius. Rear welds are $\frac{1}{8}$ inch wide by $\frac{1}{8}$ inch deep "V". Welds are machined, leaving $\frac{1}{4}$ inch radius. Full penetration welds are available upon request. Must be specified.
Stem O.D.	Straight: ± 0.015 inch Tapered: ± 0.015 inch (Minor dimension)
U Dimension	$\pm \frac{1}{8}$ inch
Overall Dimension	$\pm \frac{1}{8}$ inch
End Thickness	$\frac{1}{4}$ inch $\pm \frac{1}{16}$ inch
Finish	63 RMS
Bore	+0.005 inch -0.003 inch
Tapered Wells	The maximum taper on all thermowells is 16 inches +0.5 - 1.0.

These specifications listed are for standard thermowells, or for thermowells manufactured where no other specifications prevail.

Note: All accessories subject to minimum purchase quantities.

Accessories

Thermowells

Thermowell Material Selection Guide

Application	Protecting Tube Material
Heat treating	
Annealing Up to 704°C (1300°F) Over 704°C (1300°F)	Black steel Inconel® 600, Type 446 SS
Carburizing hardening Up to 816°C (1500°F) 816 to 1093°C (1500 to 2000°F) Over 1093°C (2000°F) Nitriding salt baths Cyanide	Black steel, Type 446 SS Inconel® 600, Type 446 SS Ceramic* Type 446 SS Nickel (CP)
Neutral	Type 446 SS
High speed	Ceramic*
Iron and steel	
Blast furnaces Downcomer Stove dome Hot blast main Stove trunk Stove outlet flue	Inconel® 600, Type 446 SS Silicon carbide Inconel® 600 Inconel® 600 Black steel
Open hearth Flues and stack Checkers Waste heat boiler	Inconel® 600, Type 446 SS Inconel® 600, Cermets Inconel® 600, Type 446 SS
Billet heating slab heating and butt welding Up to 1093°C (2000°F) Over 1093°C (2000°F)	Inconel® 600, Type 446 SS Silicon ceramic carbide*
Bright annealing batch Top work temperature Bottom work temperature	Not required (use bare Type J thermocouple) Type 446 SS
Continuous furnace section	Inconel® 600, ceramic*
Forging	Silicon carbide, ceramic*
Soaking pits Up to 1093°C (2000°F) Over 1093°C (2000°F)	Inconel® 600 Silicon ceramic carbide*
Nonferrous metals	
Aluminum Melting Heat treating	Hexoloy® Black steel
Brass or bronze	Not required (use dip-type thermocouple)
Lead	Type 446 SS, black steel
Magnesium	Black steel, cast iron
Tin	Extra heavy carbon steel
Zinc	Extra heavy carbon steel
Pickling tanks	Chemical lead
Cement	
Exit flues Kilns, heating zone	Inconel® 600, Type 446 SS Inconel® 600
Ceramic	
Kilns	Ceramic* and silicon carbide*
Dryers	Silicon carbide, black steel
Vitreous enameling	Inconel® 600, Type 446 SS
Barium chloride, all concentration, 21°C (70°F)	Monel®, Hastelloy C®

* Due to susceptibility to cracking, sudden thermal shocks should be avoided.

Inconel® and Monel® are registered trademarks of the Special Metals Corporation.

Hexoloy® is a registered trademark of Carborundum Company.

Hastelloy C® is a registered trademark of Haynes International.

Note: All accessories subject to minimum purchase quantities.

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Accessories

Thermowells

Thermowell Material Selection Guide

Continued

Application	Protecting Tube Material
Barium hydroxide, all concentration, 21°C (70°F)	Low carbon steels
Barium sulphite	Nichrome®, Hastelloy C®
Brines	Monel®
Bromine	Tantalum, Monel®
Butadiene	Type 304 SS
Butane	Type 304 SS
Butylacetate	Monel®
Butyl alcohol	Type 304 SS
Calcium chlorate, dilute, 21 to 66°C (70 to 150°F)	Type 304 SS
Calcium hydroxide 10 to 20%, 100°C (212°F) 50%, 100°C (212°F)	Type 304 SS, Hastelloy C® Type 316 SS, Hastelloy C®
Carbolic acid, all, 100°C (212°F)	Type 316 SS
Carbon dioxide, wet or dry	2017-T4 aluminum, Monel®, nickel
Chlorine gas Dry, 21°C (70°F) Moist, -7 to 100°C (20 to 212°F)	Type 316 SS, Monel® Hastelloy C®
Chromic acid, 10 to 50% 100°C (212°F)	Type 316 SS, Hastelloy C® (all concentrations)
Citric acid 15%, 21°C (70°F) 15%, 100°C (212°F) Concentrated, 100°C (212°F)	Type 304 SS, Hastelloy C® (all concentrations) Type 316 SS, Hastelloy C® (all concentrations) Type 316 SS, Hastelloy C® (all concentrations)
Copper nitrate	Types 304 SS, 316 SS
Copper sulphate	Types 304 SS, 316 SS
Cresols	Type 304 SS
Cyanogen gas	Type 304 SS
Dow therm®	Low carbon steels
Ether	Type 304 SS
Ethyl acetate	Monel®, Type 304 SS
Ethyl chloride, 21°C (70°F)	Type 304 SS, low carbon steel
Ethyl sulphate, 21°C (70°F)	Monel®
Ferric chloride, 5%, 21°C (70°F) to boiling	Tantalum, Hastelloy C®
Ferric sulphate, 5%, 21°C (70°F)	Type 304 SS
Ferrous sulphate, dilute, 21°C (70°F)	Type 304 SS
Formaldehyde	Types 304 SS, 316 SS
Formic acid, 5%, 21 to 66°C (70 to 150°F)	Type 316 SS
Freon	Monel®
Gallic acid, 5%, 21 to 66°C (70 to 150°F)	Monel®
Gasoline, 21°C (70°F)	Type 304 SS, low carbon steel
Glucose, 21°C (70°F)	Type 304 SS
Glycerine, 21°C (70°F)	Type 304 SS
Glycerol	Type 304 SS
Hydrobromic acid, 98%, 100°C (212°F)	Hastelloy B®
Hydrochloric acid 1%, 5% 21°C (70°F) 1%, 5% 100°C (212°F) 25%, 21 to 100°C (70 to 212°F)	Hastelloy C® Hastelloy B® Hastelloy B®
Hydrofluoric acid, 60%, 100°C (212°F)	Hastelloy C®, Monel®
Hydrogen peroxide, 21 to 100°C (70 to 212°F)	Types 316 SS, 304 SS
Hydrogen sulphide, wet and dry	Type 316 SS

CONTINUED

Nichrome® is a registered trademark of the Driver-Harris Co.

Dow therm® is a registered trademark of the Dow Chemical Corporation.

* Due to susceptibility to cracking, sudden thermal shocks should be avoided.

Note: All accessories subject to minimum purchase quantities.

Accessories

Thermowells

Thermowell Material Selection Guide

Continued

Application	Protecting Tube Material
Glass	
Fore hearths and feeders	Platinum thimble
Lehrs	Black steel
Tanks	
Roof and wall	Ceramic*
Flues and checkers	Inconel® 600, Type 446 SS
Paper	
Digesters	Type 316 SS, Type 446 SS
Petroleum	
Dewaxing	Types 304, 310, 316, 321, 347 SS, carbon steel
Towers	Types 304, 310, 316, 321, 347 SS, carbon steel
Transfer lines	Types 304, 310, 316, 321, 347 SS, carbon steel
Factioning column	Types 304, 310, 316, 321, 347 SS, carbon steel
Bridgewall	Types 304, 310, 316, 321, 347 SS, carbon steel
Power	
Coal-air mixtures	304 SS
Flue gases	Black steel, Type 446 SS
Preheaters	Black steel, Type 446 SS
Steel lines	Types 347 or 316 SS
Water lines	Low carbon steels
Boiler tubes	Types 304, 309, or 310 SS
Gas producers	
Producer gas	Type 446 SS
Water gas	
Carburetor	Inconel® 600, Type 446 SS
Superheater	Inconel® 600, Type 446 SS
Tar stills	Low carbon steels
Incinerators	
Up to 1093°C (2000°F)	Inconel® 600, Type 446 SS
Over 1093°C (2000°F)	Ceramic (primary) Hexoloy® (secondary)*
Food	
Baking ovens	Black steel
Charretort, sugar	Black steel
Vegetables and fruit	Type 304 SS
Chemical	
Acetic acid	
10 to 50%, 21°C (70°F)	Type 304, Hastelloy C®, Monel®
50%, 100°C (212°F)	Type 316, Hastelloy C®, Monel®
99%, 21 to 100°C (70 to 212°F)	Type 430, Hastelloy C®, Monel®
Alcohol, ethyl, methyl	
21 to 100°C (70 to 212°F)	Type 304
Ammonia	
All concentration 21°C (70°F)	Types 304, 316 SS
Ammonium chloride	
All concentration 100°C (212°F)	Types 316 SS, Monel®
Ammonium nitrate	
All concentration 21 to 100°C (70 to 212°F)	Type 316 SS
Ammonium sulphate, 10% to saturated	
100°C (212°F)	Type 316 SS

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Accessories

Thermowells

Thermowell Material Selection Guide

Continued

Application	Protecting Tube Material
Iodine, 21°C (70°F)	Tantalum
Lactic acid	
5%, 21°C (70°F)	Type 304 SS, 316 SS
5%, 66°C (150°F)	Type 316 SS
10%, 100°C (212°F)	Tantalum
Magnesium chloride	
5%, 21°C (70°F)	Monel®, nickel
5%, 100°C (212°F)	Nickel
Magnesium sulphate, hot and cold	Monel®
Muriatic acid, 21°C (70°F)	Tantalum
Naptha, 21°C (70°F)	Type 304 SS
Natural gas, 21°C (70°F)	Types 304 SS, 316 SS, 317 SS
Nickel chloride, 21°C (70°F)	Type 304 SS
Nickel sulphate, hot and cold	Type 304 SS
Nitric acid	
5%, 21°C (70°F)	Types 304 SS, 316 SS
20%, 21°C (70°F)	Types 304 SS, 316 SS
50%, 21°C (70°F)	Types 304 SS, 316 SS
50%, 100°C (212°F)	Types 304 SS, 316 SS
65%, 100°C (212°F)	Type 316 SS
Concentrated, 21°C (70°F)	Types 304 SS, 316 SS
Concentrated, 100°C (212°F)	Tantalum
Nitrobenzene, 21°C (70°F)	Type 304 SS
Oleic acid, 21°C (70°F)	Type 316 SS
Oleum, 21°C (70°F)	Type 316 SS
Oxalic acid	
5% hot and cold	Type 304 SS
10%, 100°C (212°F)	Monel®
Oxygen	
21°C (70°F)	Steel
Liquid	SS
Elevated temperatures	SS
Palmitic acid	Type 316 SS
Pentane	Type 340 SS
Phenol	Types 304 SS, 316 SS
Phosphoric acid	
1%, 5%, 21°C (70°F)	Type 304 SS
10%, 21°C (70°F)	Type 316 SS
10%, 100°C (212°F)	Hastelloy C®
30%, 21 to 100°C (70 to 212°F)	Hastelloy B®
85%, 21 to 100°C (70 to 212°F)	Hastelloy B®
Picric acid, 21°C (70°F)	Type 304 SS
Potassium bromide, 21°C (70°F)	Type 316 SS
Potassium carbonate, 1%, 21°C (70°F)	Types 304 SS, 316 SS
Potassium chlorate, 21°C (70°F)	Type 304 SS
Potassium hydroxide	
5%, 21°C (70°F)	Type 304 SS
25%, 100°C (212°F)	Type 304 SS
60%, 100°C (212°F)	Type 316 SS
Potassium nitrate	
5%, 21°C (70°F)	Type 304 SS
5%, 100°C (212°F)	Type 304 SS

* Due to susceptibility to cracking, sudden thermal shocks should be avoided.

CONTINUED

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Accessories

Thermowells

Thermowell Material Selection Guide

Continued

Application	Protecting Tube Material
Potassium permanganate, 5%, 21°C (70°F)	Type 304 SS
Potassium sulphate, 5%, 21°C (70°F)	Types 304 SS, 316 SS
Potassium sulphide, 21°C (70°F)	Types 304 SS, 316 SS
Propane	Type 304 SS, low carbon steel
Pyrogallic acid	Type 304 SS
Quinine bisulphate, dry	Type 316 SS
Quinine sulphate, dry	Type 304 SS
Seawater	Monel® or Hastelloy C®
Salicylic acid	Nickel
Sodium bicarbonate All concentration, 21°C (70°F) 5%, 66°C (150°F)	Type 304 SS Types 304 SS, 316 SS
Sodium carbonate, 5%, 21 to 66°C (70 to 150°F)	Types 304 SS, 316 SS
Sodium chloride 5%, 21 to 66°C (70 to 150°F) Saturated, 21 to 100°C (70 to 212°F)	Type 316 SS Type 316 SS, Monel®
Sodium fluoride, 5%, 21°C (70°F)	Monel®
Sodium hydroxide	Types 304 SS, 316 SS, Hastelloy C®
Sodium hypochlorite, 5% still	Type 316 SS, Hastelloy C®
Sodium nitrate, fused	Type 316 SS
Sodium peroxide	Type 304 SS
Sodium sulphate, 21°C (70°F)	Types 304 SS, 316 SS
Sodium sulphide, 21°C (70°F)	Type 316 SS
Sodium sulphite, 30%, 66°C (150°F)	Type 304 SS
Sulphur dioxide Moist gas, 21°C (70°F) Gas, 302°C (575°F)	Type 316 SS Types 304 SS, 316 SS
Sulphur Dry molten Wet	Type 304 SS Type 316 SS
Sulphuric acid 5%, 21 to 100°C (70 to 212°F) 10%, 21 to 100°C (70 to 212°F) 50%, 21 to 100°C (70 to 212°F) 90%, 21°C (70°F) 90%, 100°C (212°F)	Hastelloy B®, 316 SS Hastelloy B® Hastelloy B® Hastelloy B® Hastelloy D®
Tannic acid 21°C (70°F)	Type 304 SS, Hastelloy B®
Tartaric acid 21°C (70°F) 66°C (150°F)	Type 304 SS Type 316 SS
Toluene	2017-T4 aluminum, low carbon steel
Turpentine	Types 304 SS, 316 SS
Whiskey and wine	Type 304 SS, nickel
Xylene	Copper
Zinc chloride	Monel®
Zinc sulphate 5%, 21°C (70°F) Saturated, 21°C (70°F) 25%, 100°C (212°F)	Types 304 SS, 316 SS Types 304 SS, 316 SS Types 304 SS, 316 SS

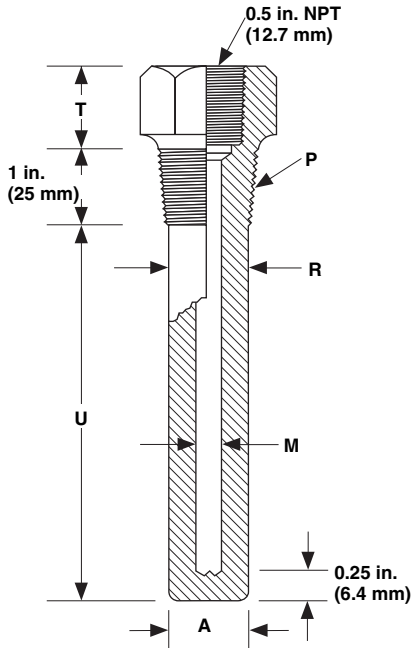
Reference charts and tables on pages 139 to 143 courtesy of the American Society for Testing and Materials. Taken from publication MNL 12, **“Manual on the Use of Thermocouples in Temperature Measurement.”**

Note: All accessories subject to minimum purchase quantities.

Accessories

Thermowells

Threaded Type—Straight



Standard Bore Size: 0.260 inch

Standard Materials: 304 SS, 316 SS, Monel®, Hastelloy C®

Typical Dimensions

Process Conn. NPT P in.	A in.	R in.	T in.
1	$\frac{49}{64}$	$\frac{49}{64}$	$\frac{3}{4}$
$\frac{3}{4}$	$\frac{49}{64}$	$\frac{49}{64}$	$\frac{3}{4}$

Rapid Ship Sensors

Rapid Ship straight thermowells come in four lengths in 316 SS with a $\frac{1}{2}$ inch NPT process connection, a $\frac{1}{2}$ inch lag length and a 0.260 bore diameter with a $\frac{1}{2}$ inch NPT connection.

"U" Length		Part Number
in.	(mm)	
2.5	64	TTS024CD00006A0
4.5	114	TTS044CD00006A0
7.5	191	TTS074CD00006A0
10.5	267	TTS104CD00006A0

Custom Ordering Information—Items in **Bolded Green Type** are preferred with shorter lead times.

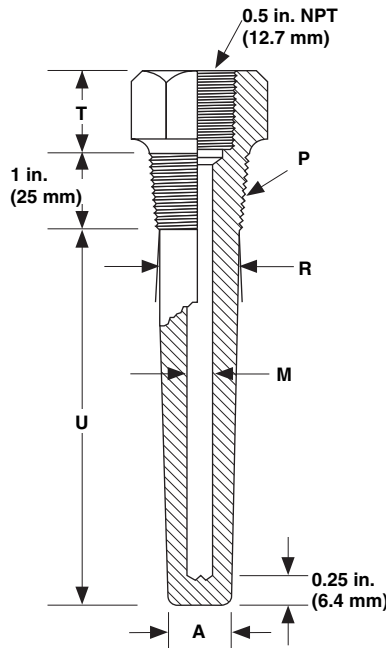
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	T	T	S												
2. Thermowell Style	T = Threaded														
3. Stem Configuration	S = Straight														
4-5. "U" Dimension (inches)	Whole inches: 00 to 99														
6. "U" Dimension (fractional inch)	0 = 0 4 = $\frac{1}{2}$ 1 = $\frac{1}{8}$ 5 = $\frac{3}{8}$ 2 = $\frac{1}{4}$ 6 = $\frac{1}{2}$ 3 = $\frac{3}{8}$ 7 = $\frac{7}{8}$														
7. Thermowell Material	A = 304 SS C = 316 SS H = Monel® M = Hastelloy C-276® X = Other														
8. Process Connection Size "P" (inch)	D = $\frac{1}{2}$ NPT E = 1 NPT X = Other														
9. Flange Rating	0 = No flange														
10. Flange Face Type	0 = No flange														
11. Flange Material	0 = No flange														
12. Lag "T" (inches)	Whole inches: 0 to 9														
13. Lag "T" (fractional inch)	0 = 0 4 = $\frac{1}{2}$ 1 = $\frac{1}{8}$ 5 = $\frac{3}{8}$ 2 = $\frac{1}{4}$ 6 = $\frac{1}{2}$ Industry Standard 3 = $\frac{3}{8}$ 7 = $\frac{7}{8}$														
14. Bore Diameter "M" (inch)	A = 0.260 B = 0.385 X = Other														
15. Special Options	0 = None X = Special requirements, consult factory														

Note: All accessories subject to minimum purchase quantities.

Accessories

Thermowells

Threaded Type–Tapered



Standard Bore Size: 0.260 inch
Standard Materials: 304 SS, 316 SS, Monel®, Hastelloy C®

Typical Dimensions

Process Conn. NPT P in.	A in.	M in.	R in.	T in.
1	4/64	0.385	1 1/16	3/4
3/4	4/64	0.385	7/8	3/4
1	5/8	0.260	1 1/16	3/4
3/4	5/8	0.260	7/8	3/4

Rapid Ship Sensors

Rapid Ship tapered thermowells come in four lengths in 316 SS with a 3/4 inch NPT process connection, a 3/8 inch lag length and a 0.260 bore diameter with a 1/2 inch NPT connection.

"U" Length in.	(mm)	Part Number
2.5	64	TTT024CD00006A0
4.5	114	TTT044CD00006A0
7.5	191	TTT074CD00006A0
10.5	267	TTT104CD00006A0

Custom Ordering Information—Items in **Bolded Green Type** are preferred with shorter lead times.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	T	T	T												
2. Thermowell Style	_____														
T = Threaded															
3. Stem Configuration	_____														
T = Standard taper															
4-5. "U" Dimension (inches)	_____														
Whole inches: 00 to 99															
6. "U" Dimension (fractional inch)	_____														
0 = 0 4 = 1/2															
1 = 1/8 5 = 3/8															
2 = 1/4 6 = 1/2															
3 = 3/8 7 = 3/4															
7. Thermowell Material	_____														
A = 304 SS															
C = 316 SS															
H = Monel®															
M = Hastelloy C-276®															
X = Other															
8. Process Connection Size "P" (inch)	_____														
D = 3/4 NPT															
E = 1 NPT															
X = Other															
9. Flange Rating	_____														
0 = No flange															
10. Flange Face Type	_____														
0 = No flange															
11. Flange Material	_____														
0 = No flange															
12. Lag "T" (inches)	_____														
Whole inches: 0 to 9															
13. Lag "T" (fractional inch)	_____														
0 = 0 4 = 1/2															
1 = 1/8 5 = 3/8															
2 = 1/4 6 = 1/2 Industry Standard															
3 = 3/8 7 = 3/4															
14. Bore Diameter "M" (inch)	_____														
A = 0.260															
B = 0.385															
X = Other															
15. Special Options	_____														
0 = None															
X = Special requirements, consult factory															

Note: All accessories subject to minimum purchase quantities.

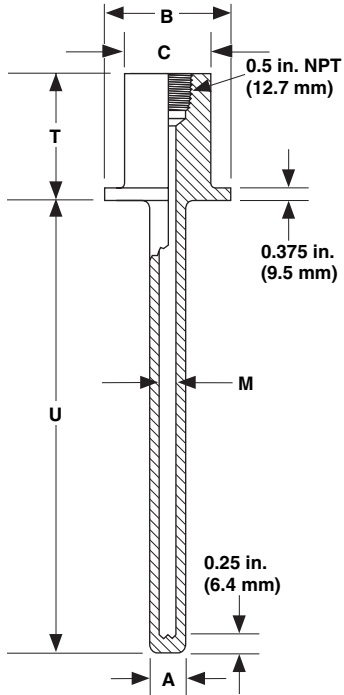
Accessories

Thermowells

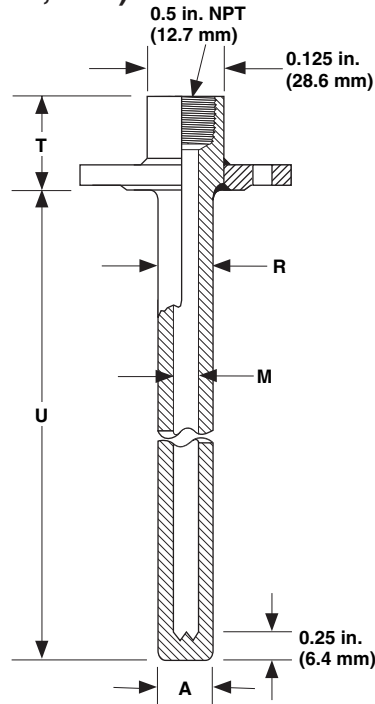
Other Available Thermowells

Consult factory for availability and pricing.

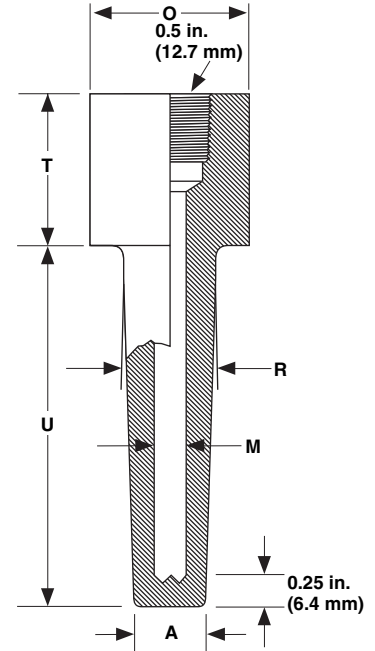
Van Stone Type (TVS)



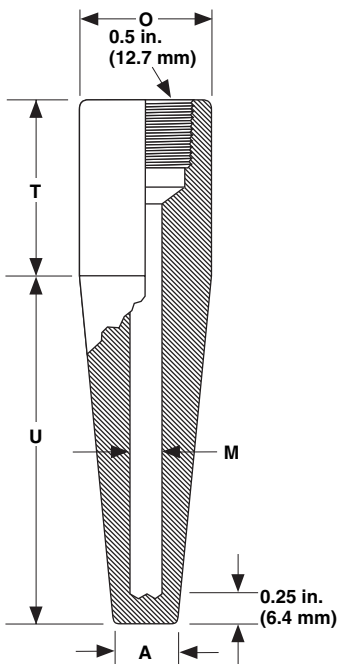
Welded Flange Well (TFS, TFT)



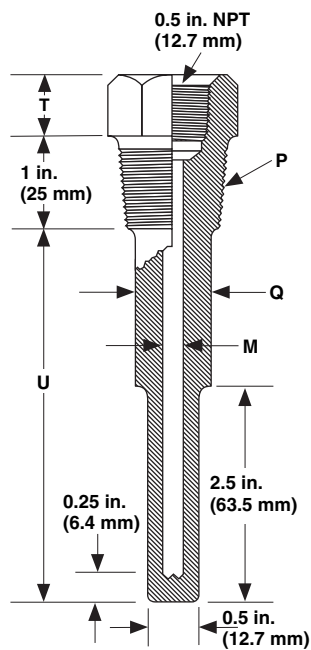
Socket Weld Type (TST)



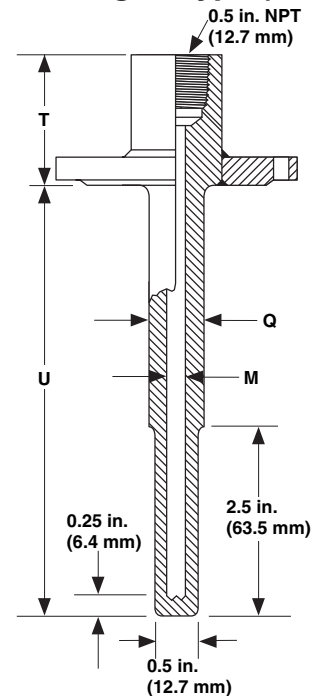
Weld-In Type (TWT)



Bimetallic Thermometer Wells—Threaded Type (TBD)

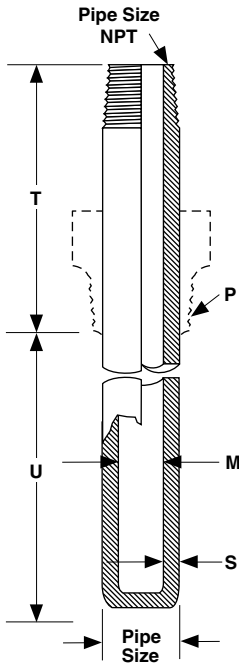


Bimetallic Thermometer Well—Flanged Type (TFD)



Accessories

Thermowells Pipe Type



Standard Materials: 304 SS and 316 SS, 446 SS and Alloy 601

Note: When no bushing or flange is required, "U" becomes the overall length.

Standard "T" Dimension: 3 inches

Custom Ordering Information—Items in **Bolded Green Type** are preferred with shorter lead times.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	P		N												
2. Pipe Size (inch)	_____														
C = ½ E = 1															
D = ¾															
3. Pipe Type "S"	_____														
N = Schedule 40															
4-5. "U" Dimension (inches)	_____														
Whole inches: 00 to 99															
6. "U" Dimension (fractional inch)	_____														
0 = 0 2 = ¼ 4 = ½ 6 = ¾															
1 = ⅛ 3 = ⅜ 5 = ⅝ 7 = ⅞															
7. Pipe Material	_____														
A = 304 SS K = 446 SS															
C = 316 SS W = Alloy 601															
8. Process Connection Size "P" (inch)	_____														
* Nonflanged or with Mounting Bushing	_____														
Flanged: Flange Size	_____														
D = ¾ NPT	1 = ¾														
E = 1 NPT	2 = 1														
F = 1 ¼ NPT	3 = 1 ½														
0 = No bushing or flange	4 = 2														
	5 = 3														
9. Flange Rating (lbs)	_____														
0 = No flange															
A = 150															
B = 300															
C = 600															
10. Flange Face Type	_____														
0 = No flange															
1 = Raised face															
2 = Flat face															
11. Flange or Bushing Alloy	_____														
0 = No flange or bushing K = 446 SS															
A = 304 SS W = Alloy 601															
C = 316 SS															
G = Carbon steel															
12. Lag "T" (inches)	_____														
Whole inches: 0 to 9															
13. Lag "T" (fractional inch)	_____														
0 = 0 4 = ½															
1 = ⅛ 5 = ⅝															
2 = ¼ 6 = ¾															
3 = ⅜ 7 = ⅞															
14. Bore Diameter "M" (inch)	_____														
J = Per pipe size															
15. Special Options	_____														
0 = None															
X = Special requirements, consult factory															

*Must be at least one size larger than pipe size.

Note: All accessories subject to minimum purchase quantities.

Accessories

Thermowells

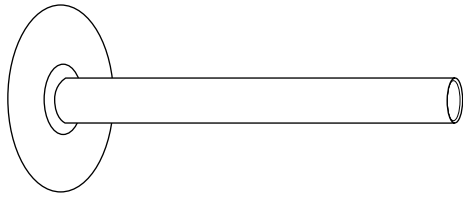
Pipe Type

Continued

Dimensions of Welded and Seamless Pipe

Nominal Pipe Size	O.D.	Nominal Wall Thickness		
		SCH 40	SCH 80	SCH 160
1/8	0.405	0.068	0.095	—
1/4	0.540	0.088	0.119	—
3/8	0.675	0.091	0.126	—
1/2	0.840	0.109	0.147	0.187
3/4	1.050	0.113	0.154	0.218
1	1.315	0.133	0.179	0.250
1 1/4	1.660	0.140	0.191	0.250
1 1/2	1.900	0.145	0.200	0.281
2	2.375	0.154	0.218	0.344
2 1/2	2.875	0.203	0.276	0.375
3	3.50	0.216	0.300	0.438
3 1/2	4.00	0.226	0.318	—
4	4.50	0.237	0.337	0.531

Options



Tantalum Oversheaths for Thermowells

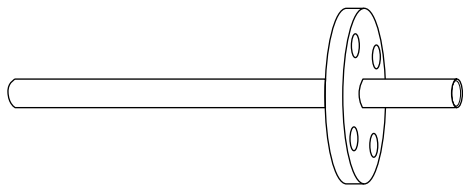
Tantalum oversheaths provide protection to thermowells with unequaled efficiency. In applications of corrosive processes such as chlorine, bromine, hydrochloric, nitric and sulphuric acids, oversheaths withstand product contamination without measurable deterioration.

Tantalum oversheaths are designed with thin walls. This has the advantages of economy and efficiency. Tantalum's high thermal conductivity and thin-wall design make rapid heat transfer possible, and its low fouling factor extends the operational life of

the oversheath and the thermowell. Since corrosion and metal loss are not problems with the use of tantalum, it is best suited for thermowells immersed directly into the corrosive process.

Standard oversheaths are designed for thermowell sizes of 1/8, 1/4, 3/8 and 1 inch stem O.D.s up to 60 inches in length; and for 1, 1 1/2, 2, 3 and 4 inch flanges. Standard oversheaths are constructed with 0.013 inch thin-wall welded and redrawn tubing with a 0.013 inch tantalum formed cup at the bottom of the well (0.015 inch is also available.)

Note: To ensure proper fit, please order with thermowell.



Coated Thermowells

Coated thermowells are recommended in applications of severe abrasion, corrosion, impact, high temperature and oxidation. The purpose of coated thermowells is to achieve longer

thermowell life, better thermowell performance, and both hardness and strength. We offer coatings of Stellite® No. 1, Stellite® No. 6, chromium carbide, Teflon®, Kynar®, glass and ceramic.

Stellite® is a registered trademark of Cabot Corporation.

Teflon® is a registered trademark of E.I. du Pont de Nemours & Company.

Kynar® is a registered trademark of Pennwalt Corporation.

Note: All accessories subject to minimum purchase quantities.