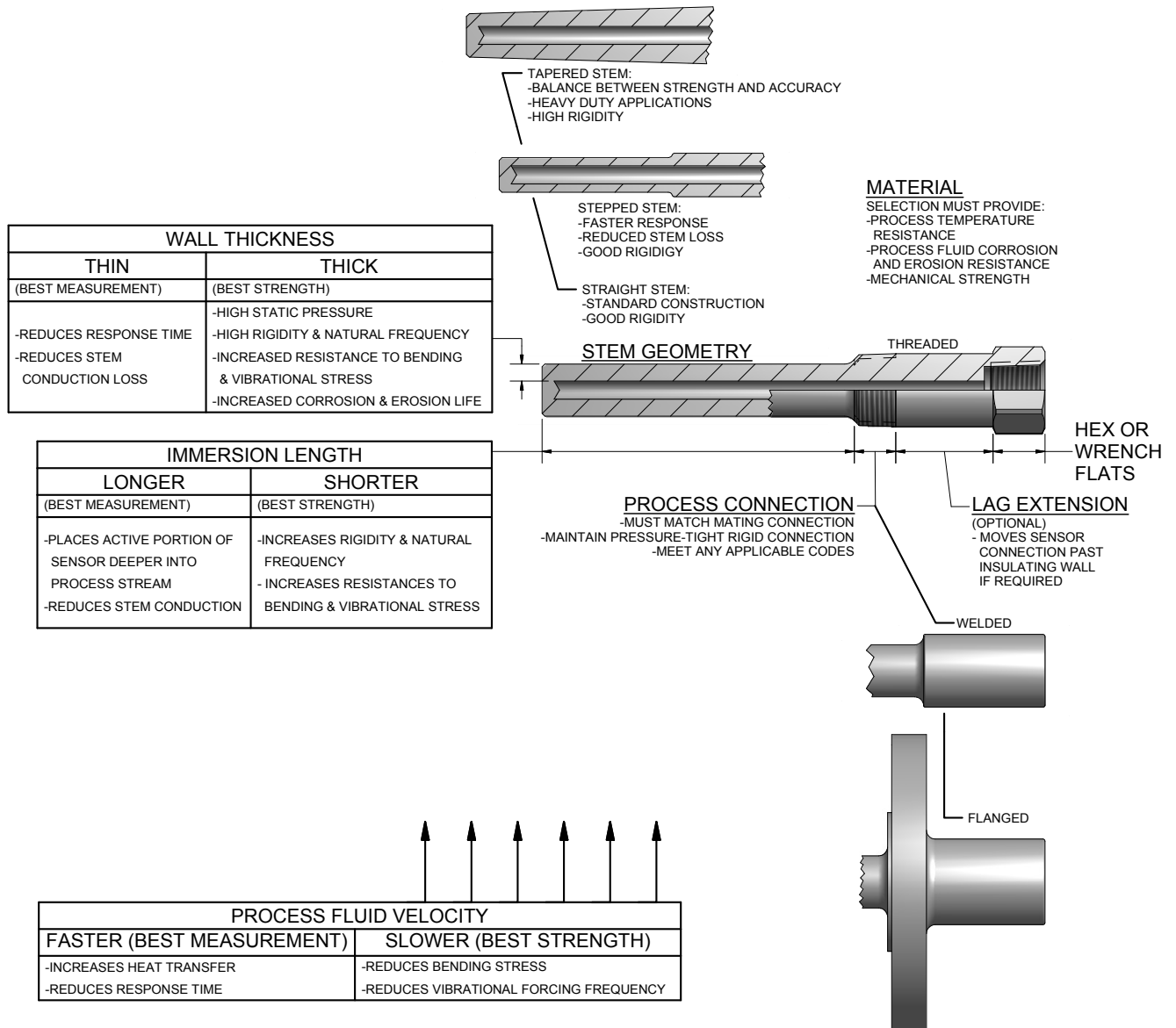


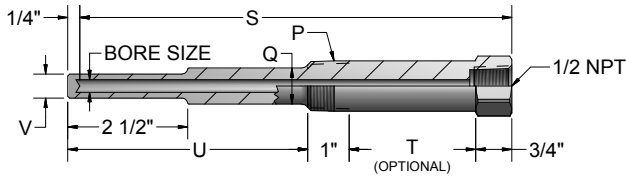
A thermowell is a pressure-tight receptacle that protects and extends the life of a temperature sensor in processing applications where the sensor is not mechanically or chemically compatible with the process environment. Installed directly into the piping systems, thermowells facilitate sensor replacement in high-pressure pipelines and eliminate the need to interrupt the process flow or drain the process system for sensor maintenance functions. The use of standardized thermowells permits simple relocation of sensors throughout a plant.

Strength versus accurate and fast temperature measurement is a balancing act. The factors which tend to produce high strength also tend to reduce the temperature sensor's accuracy and speed of response. A properly selected thermowell will balance these opposing factors to produce a design capable of functioning satisfactorily in the intended application. The listed factors are a general guide and are not all inclusive. Refer to ASME PTC 19.3 TW for a more authoritative dissertation on proper thermowell selection.

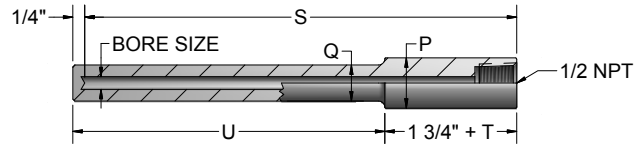


The drilled thermowells listed below are those most commonly found in process applications. Other types and styles are listed later in this section. The thermowells listed below are available as separate component wells and can be ordered by the code numbers listed below. They can also be ordered as a part of a complete sensor assembly. Consult factory for wells with different mounting threads, lengths, and materials.

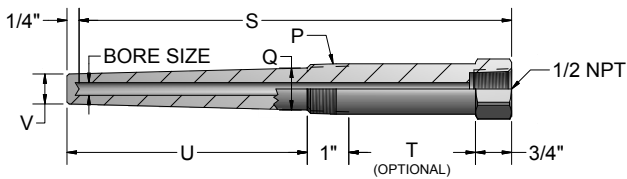
### STANDARD-DUTY WELLS



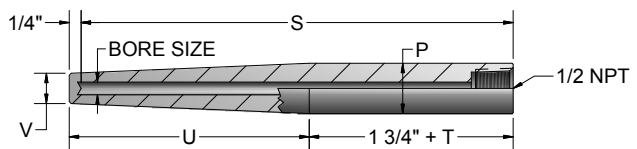
### STRAIGHT-SHANK, SOCKET-WELD



### HEAVY-DUTY WELLS



### WELD-IN WELLS



## ORDER CODES

### Example Order Number:

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**S 4 D 06 08 T2 S**

#### 1-0 Well Type

CODE	DESCRIPTION
S	Standard-duty threaded (NPT)
H	Heavy-duty threaded (NPT)
SW	Straight-shank, socket-weld
WI	Weld-in

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260 Dia. Bore

#### 1-2 Pipe Size "P"

CODE	DESCRIPTION
C	1/2" Pipe <sup>[1]</sup>
D	3/4" Pipe
E	1" Pipe

[1] Only available with well type S or H

#### 1-3 Length Dimensions (inches)

CODE	"S" DIMENSIONS	"U" DIMENSIONS	
		NO LAG	WITH STANDARD LAG
04	4	2(1/2)	N/A
06	6	4(1/2)	2(1/2)
09	9	7(1/2)	4(1/2)
12	12	10(1/2)	7(1/2)
15	15	13(1/2)	10(1/2)
18	18	16(1/2)	13(1/2)
24	24	22(1/2)	19(1/2)

#### 1-6 Well Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Customer specified part number marked on the thermowell - (10 digit maximum)

#### 1-5 Optional "T" Lag Dimension

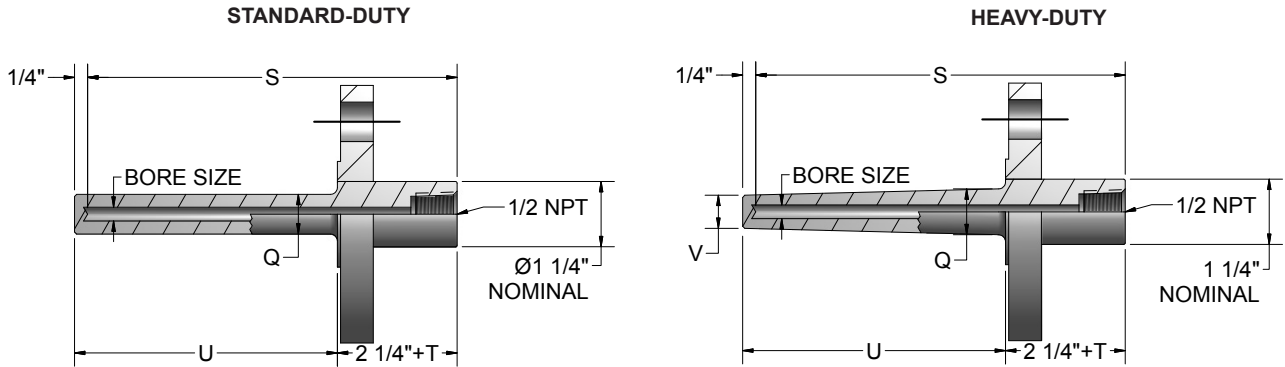
CODE	DESCRIPTION
Leave blank if No Lag is required	
T2	2" Lag standard on 6" well
T3	3" Lag standard on 9, 12, 15, 18, 24" wells
T__	Special Lag specify "T" dimension in inches

#### 1-4 Material

CODE	DESCRIPTION
8	316 stainless steel
9	304 stainless steel

The flanged thermowells described on this page are those commonly found in most process applications. These wells are supplied as standard- or heavy-duty with raised-faced flanges. Other types and styles are listed later in this section. Consult factory for wells with different flange sides, lengths, and materials.

## FLANGED THERMOWELLS



## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8  
**SF 4 15 R 3 12 08 T2 C8**

### 1-0 Well Type

CODE	DESCRIPTION
SF	Standard-duty flanged
HF	Heavy-duty flanged

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260 Bore

### 1-2 Flange Size

CODE	DESCRIPTION
10	1"
15	1 1/2"
20	2"

### 1-3 Flange Type

CODE	DESCRIPTION
R	Raised face

### 1-4 Pressure Rating

CODE	DESCRIPTION
1	150 class
3	300 class

### 1-8 Well Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Customer specified part number marked on thermowell (10 digit maximum)

### 1-7 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

### 1-6 Well Material

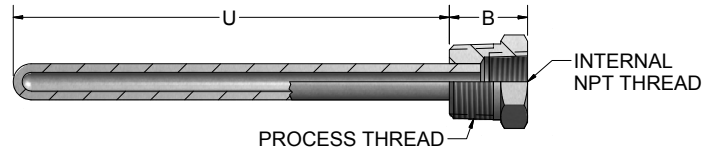
CODE	DESCRIPTION
08	316 Stainless steel
09	304 Stainless steel

### 1-5 Well Length (inches)

CODE	DESCRIPTION	
	"S" DIMENSION	"U" DIMENSION
06	6	4
09	9	7
12	12	10
15	15	13
18	18	16
24	24	22

## ORDER CODES

Built-Up Protection Wells are small diameter general-purpose wells for use in low temperature, low pressure, and low fluid velocity applications. Built-Up Protection Wells are constructed by welding or brazing bushings onto tubing. Built-Up Protection Wells of all stainless steel construction have welded-on bushings. Built-Up Protection Wells with brass bushings have brazed-on bushings.



**Example Order Number:**

**26 - 48 - 06 - 803**

### 1 Well Size and Material

CODE	TUBE (inches)		MATERIAL
	O.D.	I.D.	
48	0.250	0.194	316 SS
58	0.313	0.257	316 SS
88	0.500	0.260	316 SS
Z	Special (Consult factory)		

### 2 Well 'U' Dimensions

Insert (2) digit 'U' length in inches.  
 EXAMPLES: 06 = 6" U Dim. 02 (1/2) = 2(1/2)" U Dim.

### 3 Mounting Bushing Material - Dimensions

CODE	BRASS	316 SS	BUSHING THREADS (inches)		BUSHING 'B' DIM. (inches)
			EXT.	INT.	
2201 <sup>[1]</sup>	801 <sup>[1]</sup>		1/4	1/8	3/4
2202	802		3/8	1/8	3/4
2203	803		3/8	1/4	3/4
2204	804		1/2	1/8	15/16
2205	805		1/2	1/4	15/16
2206	806		1/2	3/8	15/16
2207	807		1/2	1/2	1 1/2
2208	808		3/4	1/8	1
2209	809		3/4	1/4	1
2210	810		3/4	3/8	1
2211	811		3/4	1/2	1

[1] Not available with 1/2" O.D. wells

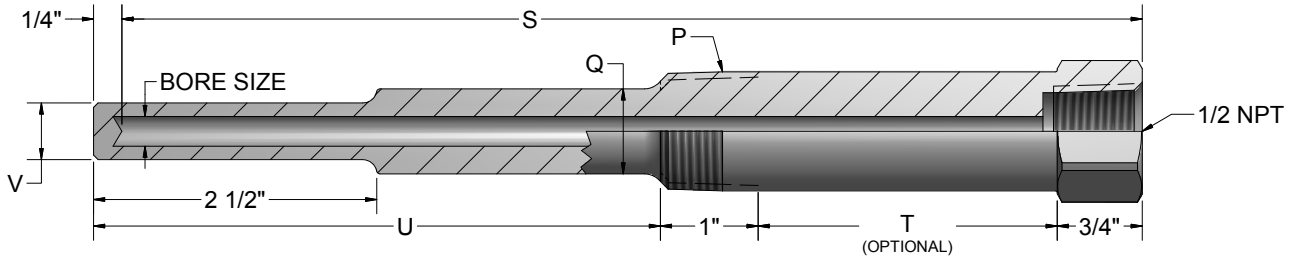
Code	Description	UNS Number	Trade Names
03	Alloy 600	N06600	Inconel®
04	310 SS	S31000	
05	446 SS	S44600	
07	Alloy 601	N06601	Inconel®
08	316 SS/316 L	S31603	
09	304 SS/304 L	S30403	
22	Brass <sup>[1]</sup>		
27	Alloy 400	N04400	Monel®
28	Alloy B-3	N10675	Hastelloy®
29	Alloy C-276	N10276	Hastelloy®
31	Nickel 200	N02200	
35	321 SS	S32100	
36	347 SS	S34700	
37	Alloy 800	N08800	Incoloy®
38	Alloy 20	N08020	Carpenter
41	HR-160	N12160	Haynes®
50	Zirconium	R60702	
51	Alloy X		Hastelloy®
56	Fluoropolymer		Fluoropolymer
59	F22	K21590	
60	F11	K11572	
61	A105	K03504	
91	F91	K90901	
[1] Materials available in various alloys - Consult factory.			

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The following options are available on Pyromation thermowells. Please contact our sales department for information and current pricing.

Documentation/Testing	
Certificate of Compliance	C of C
Hydrostatic Test (Internal or External)	ASTM E1003 Compliant
Liquid Dye Penetrant Test	ASTM E165 Compliant
Material Test Reports	MTR
NACE	NACE Certification available for applicable materials. (Barstock thermowells meet this specification. Flanged thermowells can be heat treated to comply.)
Positive Material Identification (PMI)	X-Ray Fluorescence Spectrometry
Surface Roughness Test	ASME B46.1
Wake Frequency Calculation	ASME PTC 19.3 TW
Weld X-Ray Inspection	Call for Pricing
Services	
Expedited Delivery	Call for Pricing
Oxygen cleaning	ASTM G93 Compliant (when specified)
Stamping	10 Characters Maximum
Full-Penetration Weld	Performed by welders certified to ASME Section IX, Boiler and Pressure Vessel Code
Components/Coatings	
Abrasive Coatings	Call for Pricing
Plug and Chain - Brass	Call for Pricing
Plug and Chain - Stainless Steel	Call for Pricing
Ring-Joint Flange	Call for Pricing
Tantalum Jacket	Call for Pricing
FEP Coating	Call for Pricing
Industry Specifications	
Canadian Registration Numbers (CRN)	ASME B31.3 Process Piping
Flanged Thermowells	ASME B16.5 prior to fabrication
Heat Treating	Stress relief, annealing, and custom heat treating available upon request.
Material	ASTM Compliance and other applicable National Standards
Pipe Threads	ASME B1.20.1
Sanitary Thermowells	3-A Sanitary Council Standard. Authorization Number: 487 32 $\mu$ m R <sub>a</sub> Food Grade Surface Finish
Manufacturing Tolerances and Maximums	
"S" Length Maximum	32" maximum for standard drilled thermowells. For over 32" or for multi-piece construction, consult factory.
Bore "Bottom" Shape	"W" (nominal)
Bore Concentricity	± 10% of minimum wall thickness
Bore Depth	±0.020" (through 32.00")
Bore Diameter	+0.005" / -0.003" (bore sizes 0.125" through 0.406" I.D.)
Insertion Length	Lengths up to 22.50" ± 0.0625". Lengths from 22.50" through 48" ±0.125". Lengths over 48" ±0.25".
Stem Outside Diameter	±0.010"
Tapered Allowance	Maximum tapered length is 16.00". "U" dimensions greater than 16.00" in length are manufactured with a straight O.D. beginning below the process connection radius and following throughout with only the last 16.00" of "U" dimension tapered to minor O.D.
Surface Finish	32 $\mu$ m R <sub>a</sub> standard
Internal Threads	1/2"-14 - NPT per ANSI B1.20.1 (1 to 3 turns deep per UL 866 and CSA C22.2 No. 30-M1986)
Marking	Standard marking includes material grade, material traceability codes, and CRN when applicable on drilled barstock and flanged thermowells

Standard-Duty, Threaded Thermowells are available in a variety of materials, process connection sizes, lengths, and optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. The stepped construction is used in standard-duty applications and increases the speed of response while maintaining mechanical strength. These thermowells are designed with standard 0.260" bore diameters to accommodate sensing elements with a 0.252" maximum diameter. These wells are available as separate components or as part of complete sensor assemblies.



Wells are made from round bar with milled wrench hex. 1 1/4" NPT and 1 1/2" NPT wells are supplied as round bar with milled wrench flats.

("U" length for non-lagging wells) = "S" - 1 1/2"  
 ("U" length for lagging wells) = "S" - 1 1/2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

### Thermowell Dimensions

"P"	"Q"	"V"
1/2" NPT	5/8" Dia.	1/2" Dia.
3/4" NPT	3/4" Dia.	1/2" Dia.
1" NPT	7/8" Dia.	1/2" Dia.
1 1/4" NPT	1 1/4" Dia.	7/8" Dia.
1 1/2" NPT	1 1/2" Dia.	7/8" Dia.

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**S 4 D 06 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
S	Standard-duty threaded

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore

### 1-2 Pipe Size "P"

CODE	DESCRIPTION
C	1/2" NPT
D	3/4" NPT
E	1" NPT
F	1 1/4" NPT
G	1 1/2" NPT

### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

### 1-5 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

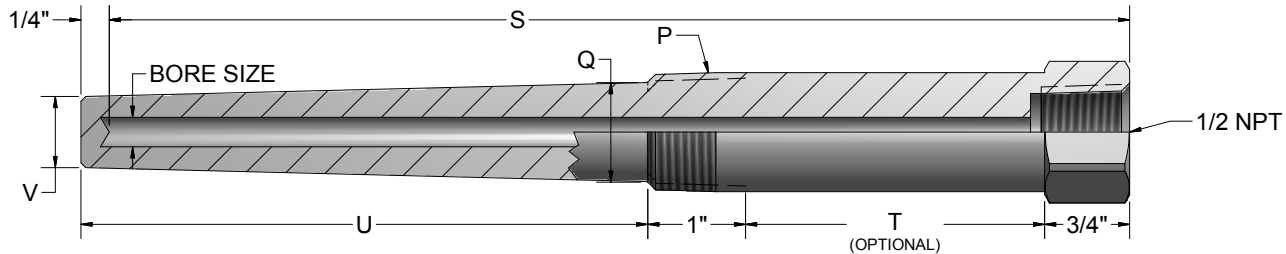
### 1-4 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

### 1-3 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Heavy-Duty, Threaded Thermowells are available in a variety of materials, process connection sizes, lengths and optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. They are designed with a standard 0.260" or 0.385" bore diameter to accommodate sensing elements with either a 0.252" or 0.377" maximum diameter, respectively. The tapered design is suited for heavy-duty applications where greater rigidity is required for increased pressure and flow due to process conditions. These wells are available as separate components or as part of complete sensor assemblies.



**Thermowell Dimensions**

"P"	"Q"	"V" (0.260")	"V" (0.385")
1/2" NPT	11/16" Dia.	5/8" Dia.	N/A
3/4" NPT	7/8" Dia.	5/8" Dia.	49/64" Dia.
1" NPT	1 1/16" Dia.	5/8" Dia.	49/64" Dia.
1 1/4" NPT	1 3/8" Dia.	7/8" Dia.	7/8" Dia.
1 1/2" NPT	1 5/8" Dia.	1" Dia.	1" Dia.

Wells are made from round bar with milled wrench hex. 1 1/4" NPT and 1 1/2" NPT wells are supplied as round bar with milled wrench flats.

("U" length for non-lagging wells) = "S" - 1 1/2"

("U" length for lagging wells) = "S" - 1 1/2" - "T"

(To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

Maximum tapered length is 16"

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**H 4 D 06 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
H	Heavy-duty threaded

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

### 1-2 Pipe Size "P"

CODE	DESCRIPTION
C <sup>[1]</sup>	1/2" NPT
D	3/4" NPT
E	1" NPT
F	1 1/4" NPT
G	1 1/2" NPT

<sup>[1]</sup>Not available with 0.385" Dia. Bore

### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

### 1-5 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

### 1-4 Material

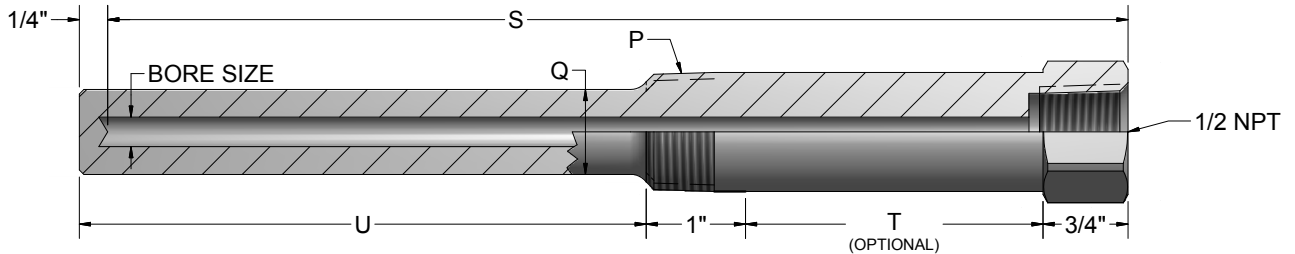
CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

### 1-3 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length



Straight-Shank, Threaded Thermowells are available in a variety of materials, process connection sizes, lengths, and optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. They are designed with a standard 0.260" or 0.385" bore diameter to accommodate sensing elements with either a 0.252" or 0.377" maximum diameter, respectively. These wells are available as separate components or as part of complete sensor assemblies.



Wells are made from round bar with milled wrench hex. 1 1/4" NPT and 1 1/2" NPT wells are supplied as round bar with milled wrench flats.

("U" length for non-lagging wells) = "S" - 1 1/2"

("U" length for lagging wells) = "S" - 1 1/2" - "T"

(To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

### Thermowell Dimensions

"P"	"Q"
1/2" NPT	5/8" Dia.
3/4" NPT	3/4" Dia.
1" NPT	7/8" Dia.
1 1/4" NPT	1 1/4" Dia.
1 1/2" NPT	1 1/2" Dia.

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**ST 4 D 09 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
ST	Straight-shank threaded

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260 Dia. bore
6	0.385" Dia. bore

### 1-2 Pipe Size "P"

CODE	DESCRIPTION
C	1/2" NPT
D	3/4" NPT
E	1" NPT
F	1 1/4" NPT
G	1 1/2" NPT

### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

### 1-5 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

### 1-4 Material

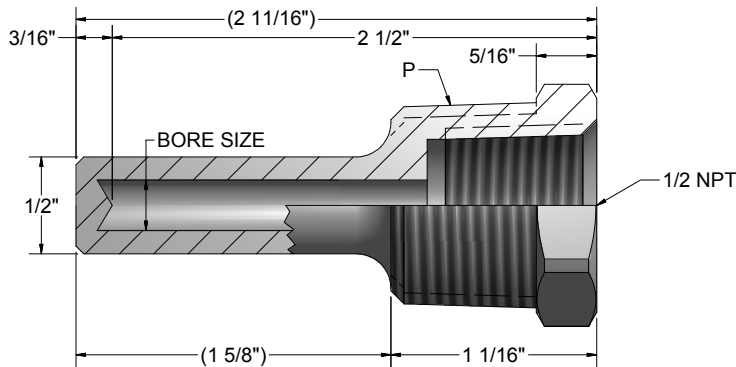
CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

### 1-3 "S" Length

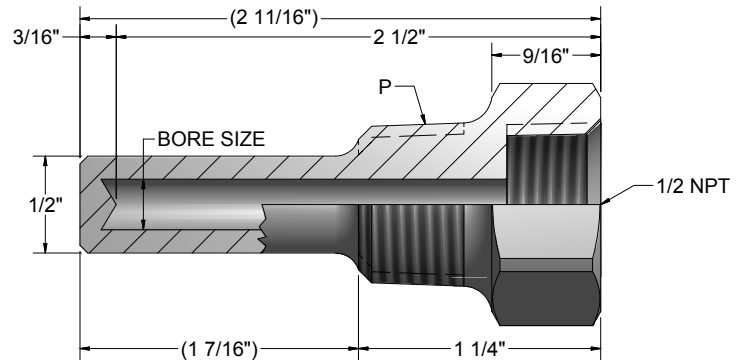
CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Limited-Space Thermowells are available in a variety of materials and process connection sizes. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. They are intended for use in piping systems where space is limited. They are designed with a standard 0.260" bore diameter to accommodate sensing elements with a 0.252" maximum diameter. These wells are available as separate components or as part of complete sensor assemblies.

### 3/4" and 1" NPT



### 1/2" NPT



## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4  
**LS 4 D 2.5 08 C8**

#### 1-0 Well Type

CODE	DESCRIPTION
LS	Limited-space threaded

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore

#### 1-2 Pipe Size "P"

CODE	DESCRIPTION
C	1/2" NPT
D	3/4" NPT
E	1" NPT

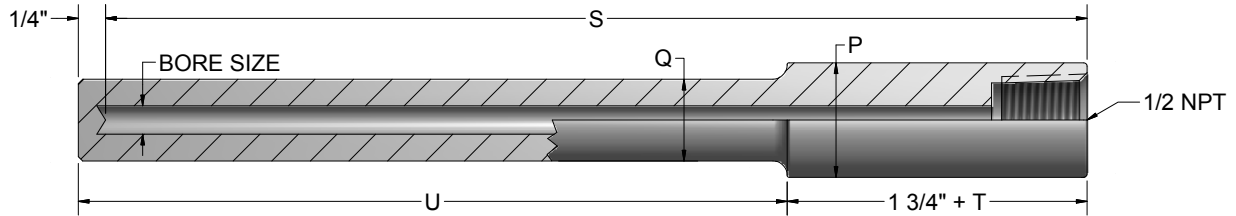
#### 1-4 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

#### 1-3 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

Straight-Shank, Socket-Weld Thermowells are available in a variety of materials, process connection sizes, lengths, and optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. The Straight-Shank Socket-Weld is designed to be used with a 3000 class weld-o-let which allows the thermowell to be welded permanently into the process. They are designed with a standard 0.260" or 0.385" bore diameter to accommodate sensing elements with either a 0.252" or 0.377" maximum diameter, respectively. These wells are available as separate components or as part of complete sensor assemblies.



("U" length for non-lagging wells) = "S" - 1 1/2"  
 ("U" length for lagging wells) = "S" - 1 1/2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

### Thermowell Dimensions

"P" PIPE SIZE		"Q"
NOM.	DIA.	
3/4"	1.050"	3/4" Dia.
1"	1.315"	7/8" Dia.
1 1/4"	1.660"	1 1/4" Dia.
1 1/2"	1.900"	1 1/2" Dia.

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**SW 4 D 09 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
SW	Straight- shank socket-weld

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

### 1-2 Pipe Size "P"

CODE	DESCRIPTION
D	3/4" NPS
E	1" NPS
F	1 1/4" NPS
G	1 1/2" NPS

### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

### 1-5 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

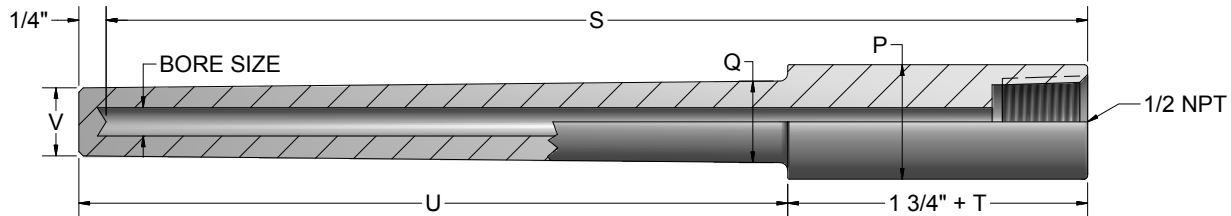
### 1-4 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

### 1-3 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Heavy-Duty, Socket-Weld Thermowells are available in a variety of materials, process connection sizes, lengths and optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. The Heavy-Duty Socket-Weld is designed to be used with a 3000 class weld-o-let which allows the thermowell to be welded permanently into the process. They are designed with a standard 0.260" or 0.385" bore diameter to accommodate sensing elements with a 0.252" or 0.377" maximum diameter, respectively. The tapered design is suited for heavy-duty applications where greater rigidity is required due to process conditions. These wells are available as separate components or as part of complete sensor assemblies.



**Thermowell Dimensions**

"P" PIPE SIZE		"Q"	"V" 0.260	"V" 0.385
NOM.	DIA.			
3/4"	1.050"	3/4" Dia.	5/8" Dia.	5/8" Dia.
1"	1.315"	7/8" Dia.	5/8" Dia.	49/64" Dia.
1 1/4"	1.660"	1 1/4" Dia.	7/8" Dia.	7/8" Dia.
1 1/2"	1.900"	1 1/2" Dia.	7/8" Dia.	7/8" Dia.

("U" length for non-lagging wells) = "S" - 1 1/2"

("U" length for lagging wells) = "S" - 1 1/2" - "T"

(To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

### ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**HW 4 D 09 08 T2 C8S**

**1-0 Well Type**

CODE	DESCRIPTION
HW	Heavy-duty socket-weld

**1-1 Bore Size**

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

**1-2 Pipe Size "P"**

CODE	DESCRIPTION
D	3/4" NPS
E	1" NPS
F	1 1/4" NPS
G	1 1/2" NPS

**1-6 Options**

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

**1-5 Optional "T" Lag Dimension**

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

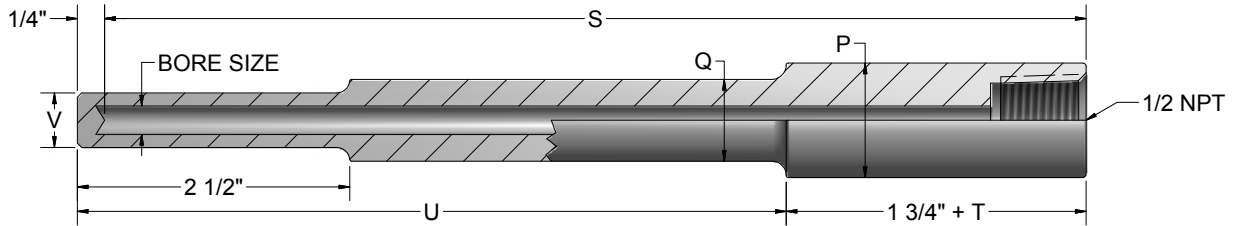
**1-4 Material**

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

**1-3 "S" Length**

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Reduced-Tip, Socket-Weld Thermowells are available in a variety of materials, process connection sizes, lengths, and optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. The Reduced-Tip Socket-Weld is designed to be used with a class 3000 weld-o-let which allows the thermowell to be welded permanently into the process. The stepped construction is used in standard-duty applications and increases the speed of response while maintaining mechanical strength. They are designed with standard 0.260" bore diameters to accommodate sensing elements with a 0.252" maximum diameter. These wells are available as separate components or as part of complete sensor assemblies.



("U" length for non-lagging wells) = "S" - 1 1/2"  
 ("U" length for lagging wells) = "S" - 1 1/2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

**Thermowell Dimensions**

"P" PIPE SIZE		"Q"	"V"
NOM.	DIA.		
3/4"	1.050"	3/4" Dia.	1/2" Dia.
1"	1.315"	7/8" Dia.	1/2" Dia.
1 1/4"	1.660"	1 1/4" Dia.	7/8" Dia.
1 1/2"	1.900"	1 1/2" Dia.	7/8" Dia.

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**RW 4 D 09 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
RW	Reduced-tip socket-weld

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore

### 1-2 Pipe Size "P"

CODE	DESCRIPTION
D	3/4" NPS
E	1" NPS
F	1 1/4" NPS
G	1 1/2" NPS

### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

### 1-5 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

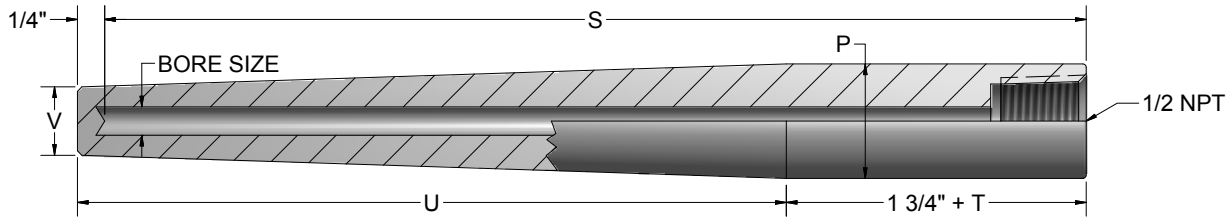
### 1-4 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

### 1-3 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Weld-In Thermowells are available in a variety of materials, process connection sizes, lengths and optional lagging extensions. Thermowell specifications should be based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. Weld-In thermowells are welded directly into the process apparatus. They are designed with a standard 0.260" or 0.385" bore diameter to accommodate sensing elements with a 0.252" or 0.377" maximum diameter, respectively. The tapered design is suited for heavy-duty applications where greater rigidity is required due to process conditions. These wells are available as separate components or as part of complete sensor assemblies.



**Thermowell Dimensions**

"P" PIPE SIZE		"V" (0.260")	"V" (0.385")
NOM.	DIA.		
3/4"	1.050"	5/8" Dia.	49/64" Dia.
1"	1.315"	49/64" Dia.	49/64" Dia.
1 1/4"	1.660"	1" Dia.	1" Dia.
1 1/2"	1.900"	1 1/8" Dia.	1 1/8" Dia.

("U" length for non-lagging wells) = "S" - 1 1/2"

("U" length for lagging wells) = "S" - 1 1/2" - "T"

(To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**WI 4 D 09 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
WI	Weld-In

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

### 1-2 Pipe Size "P"

CODE	DESCRIPTION
D	3/4" NPS
E	1" NPS
F	1 1/4" NPS
G	1 1/2" NPS

### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

### 1-5 "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

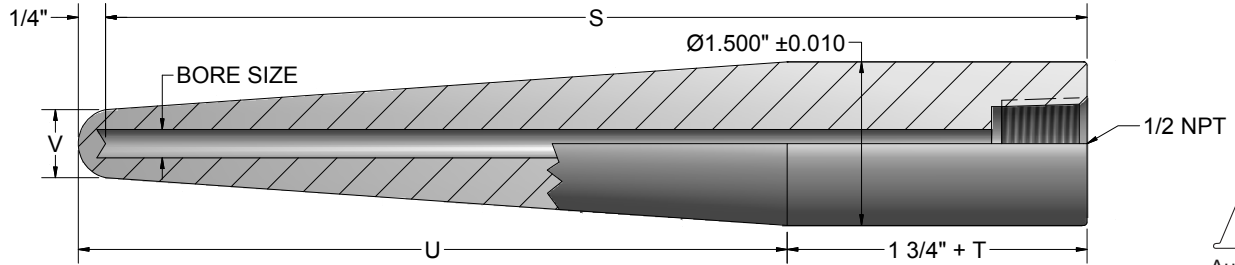
### 1-4 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

### 1-3 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Sanitary, Weld-In Thermowells are offered in 304 and 316 stainless steel. They are available in a variety of lengths, process connection sizes, and optional lagging extensions. This type of thermowell is designed to be welded into a tank or vat with a full crevice-free fillet-weld to prevent corrosion, bacteria growth, and product contamination. Thermowells are supplied with a surface finish that meets or exceeds  $32\mu\text{in } R_a$ . Surface finishes of  $15\mu\text{in } R_a$  or better are available upon request. These thermowells are designed with standard 0.260" or 0.385" bore diameter to accommodate sensing elements with a 0.252" or 0.377" maximum diameter, respectively. These wells are available as separate components or as part of complete sensor assemblies.



### Thermowell Dimensions

BORE SIZE	"V"
0.260" Dia.	5/8" Dia.
0.385" Dia.	49/64" Dia.

("U" length for non-lagging wells) = "S" - 1 1/2"  
 ("U" length for lagging wells) = "S" - 1 1/2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 1 1/2" (When "U" and "S" are specified)

## ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**WS 4 09 08 T2 C8S**

### 1-0 Well Type

CODE	DESCRIPTION
WS	Sanitary weld-in

### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260 Dia. bore
6	0.385 Dia. bore

### 1-2 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

### 1-5 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

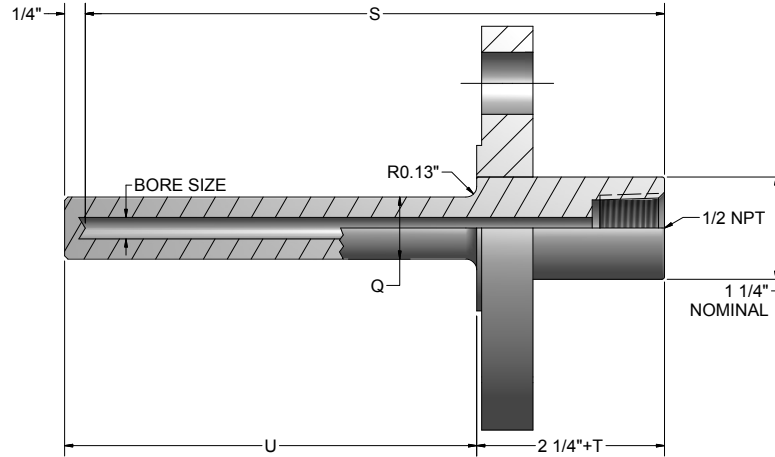
### 1-4 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

### 1-3 Material

CODE	DESCRIPTION
08	316 stainless steel
09	304 stainless steel

Standard Flanged Thermowells are available in a variety of materials, flange types, flange sizes, and pressure ratings. They are also available in various lengths and with optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. Standard flanged thermowells are supplied with a straight shank and are designed with a 0.260" or 0.385" bore diameter to accommodate sensing elements with a 0.252" or 0.377 maximum diameter, respectively. These wells are available as separate components or as part of complete sensor assemblies.



**Thermowell Dimensions**

BORE	"Q" Dim.
0.260	3/4"
0.385	7/8"

("U" length for non-lagging wells) = "S" - 2"  
 ("U" length for lagging wells) = "S" - 2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 2" (When "U" and "S" are specified)

### ORDER CODES

**Example Order Number:** **SF 4 15 R 1 09 08 T2 C8S**

1-0 1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8

#### 1-0 Well Type

CODE	DESCRIPTION
SF	Standard flanged

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

#### 1-2 Flange Size

CODE	DESCRIPTION
10	1" (DN 25)
13	1 1/4" (DN 32)
15	1 1/2" (DN 40)
20	2" (DN 50)
30	3" (DN 80)

#### 1-3 Flange Type

CODE	DESCRIPTION
F	Flat face
J	Ring joint
R	Raised face

#### 1-4 Pressure Rating

CODE	DESCRIPTION
1	150 Class
3	300 Class
6	600 Class
9	900 Class
15	1500 Class

#### 1-8 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
F	Full penetration weld
S	Well stamped with customer-specified part number

#### 1-7 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches using two digits plus any fractional length

#### 1-6 Material

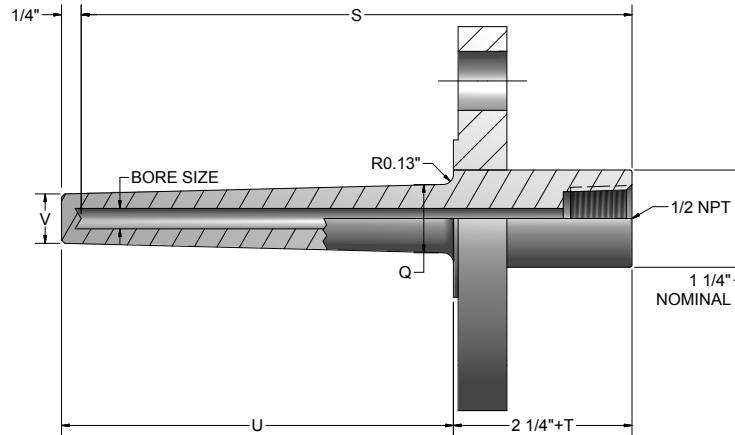
CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

#### 1-5 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length



Heavy-Duty, Flanged Thermowells are available in a variety of materials, flange types, flange sizes, and pressure ratings. They are also available in various lengths and with optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. Heavy-duty flanged thermowells are supplied with a 0.260" or 0.385" bore diameter to accommodate sensing elements with a 0.252" or 0.377" maximum diameter, respectively. The tapered design is suited for heavy-duty applications where greater rigidity is required for increased pressure and flow due to process conditions. These wells are available as separate components or as part of complete sensor assemblies.



Maximum tapered length is 16"  
 ("U" length for non-lagging wells) = "S" - 2"  
 ("U" length for lagging wells) = "S" - 2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 2" (When "U" and "S" are specified)

Thermowell Dimensions			
FLANGE	"Q" (0.260")	"V"(0.260")	"V"(0.385")
1"	7/8" Dia.	5/8" Dia.	49/64" Dia.
1 1/4" thru 3"	1 1/16" Dia.	5/8" Dia.	49/64" Dia.

### ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8  
**HF 4 15 R 1 09 08 T2 C8S**

#### 1-0 Well Type

CODE	DESCRIPTION
HF	Heavy-duty flanged

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

#### 1-2 Flange Size

CODE	DESCRIPTION
10	1" (DN 25)
13	1 1/4" (DN 32)
15	1 1/2" (DN 40)
20	2" (DN 50)
30	3" (DN 80)

#### 1-3 Flange Type

CODE	DESCRIPTION
F	Flat face
J	Ring joint
R	Raised face

#### 1-4 Pressure Rating

CODE	DESCRIPTION
1	150 Class
3	300 Class
6	600 Class
9	900 Class
15	1500 Class

#### 1-8 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
F	Full penetration weld
S	Well stamped with customer specified part number

#### 1-7 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

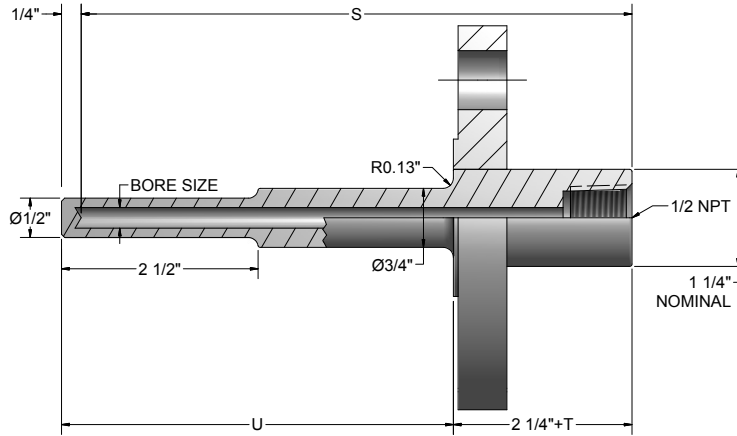
#### 1-6 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

#### 1-5 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Reduced-Tip, Flanged Thermowells are available in a variety of materials, flange types, flange sizes, and pressure ratings. They are also available in various lengths and with optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. The stepped construction is normally used in standard-duty applications, and increases the speed of response while maintaining mechanical strength. They are designed with standard 0.260" bore diameters to accommodate sensing elements with a 0.252" maximum diameter. These wells are available as separate components or as part of complete sensor assemblies.



("U" length for non-lagging wells) = "S" - 2"  
 ("U" length for lagging wells) = "S" - 2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 2" (When "U" and "S" are specified)

### ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8  
**RF 4 15 R 1 09 08 T2 C8S**

#### 1-0 Well Type

CODE	DESCRIPTION
RF	Reduced-tip flanged

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore

#### 1-2 Flange Size

CODE	DESCRIPTION
10	1" (DN 25)
13	1 1/4" (DN 32)
15	1 1/2" (DN 40)
20	2" (DN 50)
30	3" (DN 80)

#### 1-3 Flange Type

CODE	DESCRIPTION
F	Flat face
J	Ring joint
R	Raised face

#### 1-4 Pressure Rating

CODE	DESCRIPTION
1	150 Class
3	300 Class
6	600 Class
9	900 Class
15	1500 Class

#### 1-8 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
F	Full penetration weld
S	Well stamped with customer specified part number

#### 1-7 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

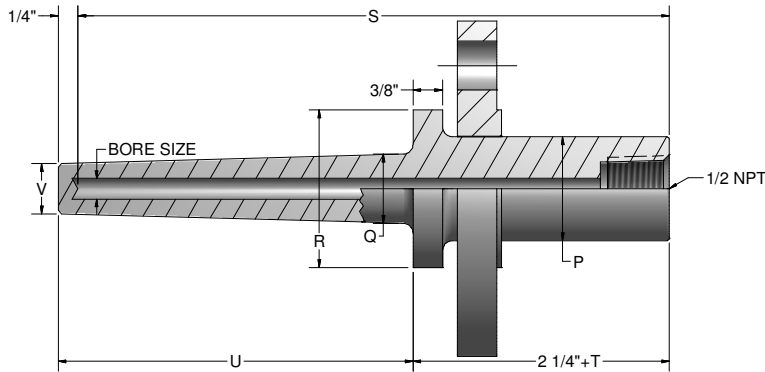
#### 1-6 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

#### 1-5 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Heavy-Duty Van Stone Thermowells are available in a variety of materials, flange sizes, and pressure ratings. They are also available in various lengths and with optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. Heavy-duty Van Stone thermowells are supplied with a 0.260" or 0.385" bore diameter to accommodate sensing elements with 0.252" or 0.377" maximum diameter, respectively. Van Stone thermowells are connected using a separate and reusable backing flange, eliminating the need for expensive flange materials. The tapered design is suited for heavy-duty applications where greater rigidity is required for increased pressure and flow due to process conditions. These wells are available as separate components or as part of complete sensor assemblies.



Maximum tapered length is 16"  
 ("U" length for non-lagging wells) = "S" - 2"  
 ("U" length for lagging wells) = "S" - 2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 2" (When "U"  
 and "S" are specified)

Thermowell Dimensions					
"P" PIPE SIZE		"R" DIA.	"Q" DIA.	"V" 0.260" DIA.	"V" 0.385" DIA.
NOM.	DIA.				
1"	1.315"	2"	7/8"	5/8"	49/64"
1 1/2"	1.900"	2 7/8"	1 1/16"	5/8"	49/64"

### ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8  
**HF 4 15 V 1 09 08 T2 C8S**

#### 1-0 Well Type

CODE	DESCRIPTION
HF	Heavy-Duty Van Stone

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

#### 1-2 Flange Size

CODE	DESCRIPTION
10	1" (DN 25)
15	1 1/2" (DN 40)

#### 1-3 Flange Type

CODE	DESCRIPTION
V	Van Stone (lap joint)

#### 1-4 Pressure Rating

CODE	DESCRIPTION
0	No backing flange
1	150 Class
3	300 Class
6	600 Class
9	900 Class
15	1500 Class
	Carbon steel lap joint flange standard

#### 1-8 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

#### 1-7 "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches using two digits plus any fractional length

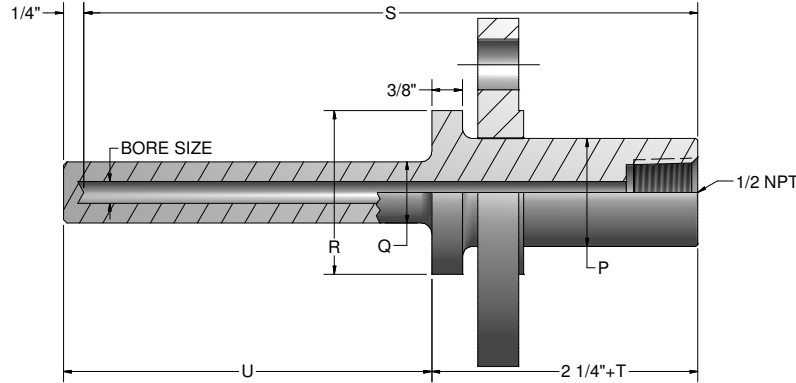
#### 1-6 Material

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

#### 1-5 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Straight Van Stone Thermowells are available in a variety of materials, flange sizes, and pressure ratings. They are also available in various lengths and with optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. Straight Van Stone thermowells are supplied with a 0.260" or 0.385" bore diameter to accommodate sensing elements with a 0.252" or 0.377" maximum diameter, respectively. Van Stone thermowells are connected using a separate and reusable backing flange, eliminating the need for expensive flange materials. These wells are available as separate components or as part of complete sensor assemblies.



("U" length for non-lagging wells) = "S" - 2"  
 ("U" length for lagging wells) = "S" - 2" - "T"  
 (To solve for "T"), "T" = "S" - "U" - 2"  
 (When "U" and "S" are specified)

**Thermowell Dimensions**

"P" PIPE SIZE		"R" DIA.	"Q" 0.260" DIA.	"Q" 0.385" DIA.
NOM.	DIA.			
1"	1.315"	2"	3/4"	7/8"
1 1/2"	1.900"	2 7/8"	3/4"	7/8"

### ORDER CODES

**Example Order Number:** **SF 4 15 V 1 09 08 T2 C8S**

**1-0 Well Type**

CODE	DESCRIPTION
SF	Straight Van Stone

**1-1 Bore Size**

CODE	DESCRIPTION
4	0.260" Dia. bore
6	0.385" Dia. bore

**1-2 Flange Size**

CODE	DESCRIPTION
10	1" (DN25)
15	1 1/2" (DN40)

**1-3 Flange Type**

CODE	DESCRIPTION
V	Van Stone (lap joint)

**1-4 Pressure Rating**

CODE	DESCRIPTION
0	No backing flange
1	150 Class
3	300 Class
6	600 Class
9	900 Class
15	1500 Class
Carbon steel lap joint flange standard	

**1-8 Options**

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer specified part number

**1-7 Optional "T" Lag Dimension**

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

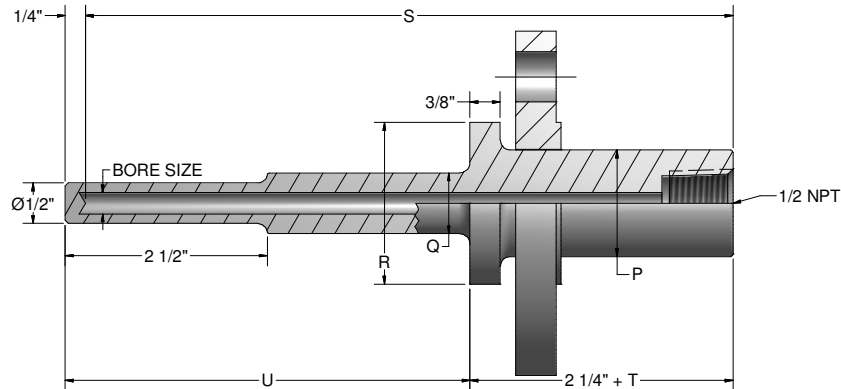
**1-6 Material**

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

**1-5 "S" Length**

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Reduced-Tip Van Stone Thermowells are available in a variety of materials, flange sizes, and pressure ratings. They are also offered in various lengths and with optional lagging extensions. Thermowell specifications should be determined based on process conditions which include strength, temperature, pressure and corrosion-resistance requirements. The Reduced Tip Van Stone thermowell is supplied with a 0.260" bore diameter to accommodate sensing elements with a 0.252" maximum diameter. The stepped construction is normally used in standard-duty applications and increases the speed of response while maintaining mechanical strength. Van Stone thermowells are connected using a separate and reusable backing flange, eliminating the need for expensive flange materials. These wells are available as separate components or as part of complete sensor assemblies.



**Thermowell Dimensions**

"P" PIPE SIZE NOM.	"p" DIA.	"R" DIA.	"Q" DIA.
1"	1.315"	2"	3/4"
1 1/2"	1.900"	2 7/8"	7/8"

("U" length for non-lagging wells) = "S" - 2"

("U" length for lagging wells) = "S" - 2" - "T"

(To solve for "T"), "T" = "S" - "U" - 2" (When "U" and "S" are specified)

### ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8  
**RF 4 15 V 1 09 08 T2 C8S**

**1-0 Well Type**

CODE	DESCRIPTION
RF	Reduced-Tip Van Stone

**1-1 Bore Size**

CODE	DESCRIPTION
4	0.260" Dia. bore

**1-2 Flange Size**

CODE	DESCRIPTION
10	1" (DN25)
15	1 1/2" (DN40)

**1-3 Flange Type**

CODE	DESCRIPTION
V	Van Stone (lap joint)

**1-4 Pressure Rating**

CODE	DESCRIPTION
0	No backing flange
1	150 Class
3	300 Class
6	600 Class
9	900 Class
15	1500 Class
Carbon steel backing flange standard	

**1-8 Options**

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
C22	Brass well cap and chain
S	Well stamped with customer-specified part number

**1-7 Optional "T" Lag Dimension**

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

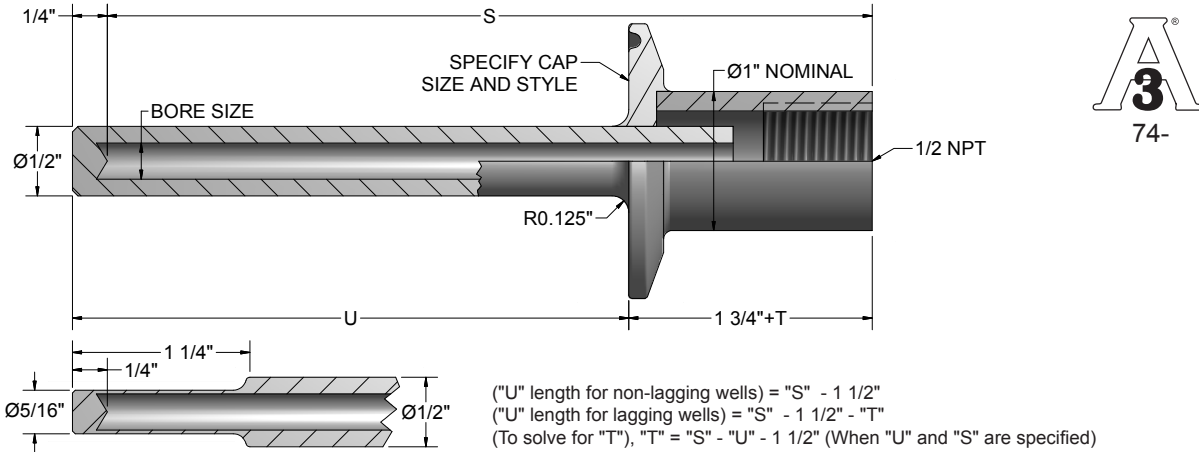
**1-6 Material**

CODE	DESCRIPTION
XX	Specify two digit material code as stated in the Thermowell Material Table located earlier in section

**1-5 "S" Length**

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Sanitary-Connected Thermowells are offered in 316 stainless steel. The DW and DR series are welded constructions, and they are available in a variety of lengths, cap styles, cap sizes, and optional lagging extensions. Thermowells are supplied with a surface finish that meets or exceeds  $32\mu\text{in } R_a$ . Surface finishes of  $15\mu\text{in } R_a$  or better are available upon request. They are designed with standard 0.260" bore diameters to accommodate sensing elements with a 0.252" maximum diameter. These wells are available as separate components or as part of complete sensor assemblies.



### ORDER CODES

**Example Order Number:**

1-0 1-1 1-2 1-3 1-4 1-5 1-6  
**DW 4 25 09 08 T2 C8S**

#### 1-0 Well Type

CODE	DESCRIPTION
DW	Sanitary well
DR	Reduced-tip sanitary well

#### 1-1 Bore Size

CODE	DESCRIPTION
4	0.260" Dia. bore

#### 1-2 Cap Size & Style

CODE	DESCRIPTION
15	1", 1 1/2" Tri-clamp® 16 AMP
25	2" Tri-clamp® 16 AMP
35	2 1/2" Tri-clamp® 16 AMP
45	3" Tri-clamp® 16 AMP
Other styles - sizes available. Consult factory.	

Tri-clamp® is a registered trademark of Alfa Laval, Inc.

#### 1-6 Options

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
S	Well stamped with customer-specified part number

#### 1-5 Optional "T" Lag Dimension

CODE	DESCRIPTION
	Leave blank if no lag is required
T__	Specify "T" dimension in inches

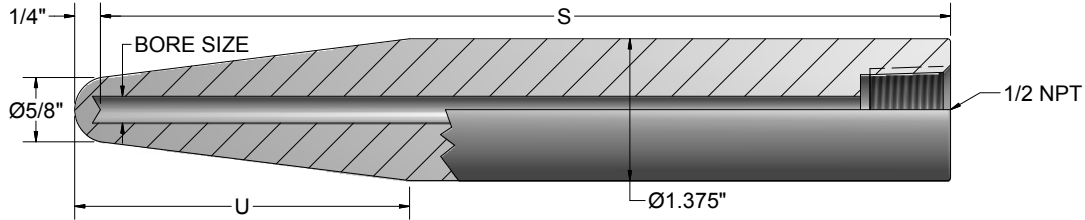
#### 1-4 Material

CODE	DESCRIPTION
08	316 stainless steel

#### 1-3 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits plus fractional length

Sanitary Weld-In Thermowells are offered in 316 stainless steel. The thermowell is designed to be welded into a tank or vat with a full crevice-free fillet-weld to prevent corrosion, bacteria growth, and product contamination. Thermowells are supplied with a surface finish that meets or exceeds 32 $\mu$ in R<sub>a</sub>. Surface finishes of 15 $\mu$ in R<sub>a</sub> or better are available upon request. They are designed with a standard 0.260" bore diameter to accommodate sensing elements with a 0.252" maximum diameter. These wells are available as separate components or as part of complete sensor assemblies.



### ORDER CODES

**Example Order Number:**

1-0      1-1   1-2   1-3  
**W81 - 1 8 S**

**1-0 Well Type**

CODE	DESCRIPTION
W81	Sanitary weld-in

**1-1 Length**

CODE	"S" LENGTH	"U" LENGTH
1	8 1/4"	3 1/4"
2	9 7/8"	3 1/4"
3	11 5/8"	5"
4	12 7/8"	3 3/4"

**1-3 Options**

CODE	DESCRIPTION
C8	316 stainless steel well cap and chain
S	Well stamped with customer-specified part number

**1-2 Material**

CODE	DESCRIPTION
8	316 stainless steel

[www.Pyromation.com/TechInfo/WakeFreq.aspx](http://www.Pyromation.com/TechInfo/WakeFreq.aspx)

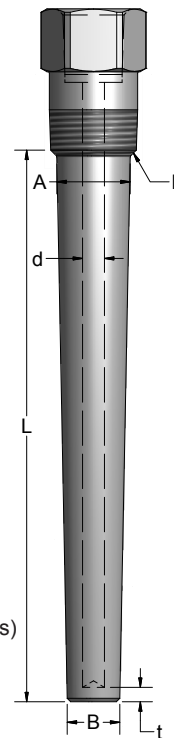
Based on calculations in accordance with ASME PTC 19.3 TW

ASME PTC 19.3 TW, the U.S. standard for evaluating the mechanical design of a thermowell used in a broad range of applications, was updated in 2010 to include a greater number of thermowell and process variables. Sometimes referred to as "Wake Frequency Calculation", the revision incorporates new elements for evaluating thermowell constructions that will reduce the chance of vibration and stress damage to the vessel, as well as avoid vibration damage to the temperature sensor it protects.

Please input data regarding your thermowell dimensions, thermowell properties and material/media/process properties in the designated spaces below. We will review the data, process the calculations and contact you with the results. Feel free to contact one of our Product Engineers to go through the process calculations.

Unit of Measure:	English Units	▼
Mounting Type:	Threaded	▼
Shank Profile:	Tapered	▼
Material:	316SS	▼
Process Connection:	1" NPT	▼
Unsupported Length (L):	6	in
Bore Diameter (d):	0.260	▼ in
Root Diameter (A):	1.0625	in
Tip Diameter (B):	0.625	in
Minimum Tip Thickness (t):	0.188	in
? Fillet Radius at Support Plane (b):	0.178	in
? Fillet Radius at Base of Step (b <sub>s</sub> ):		in
Reduced-Diameter Shank Length (L <sub>s</sub> ):		in
? Damping Factor (ζ):	0.0005	
? Shielded Length of T-Well (L <sub>s</sub> ):	0	in
Max. Fluid Velocity (V):	15.5	ft/s
Fluid Density (ρ):	4.3	lb/ft <sup>3</sup>
Max. Operating Temperature (T):	450	F
Max. Operating Pressure (P):	150	psig
Dynamic Viscosity (μ):		cP (1 centipoise = mPa*s)
Tag/Reference #:	TW-100	

1. Input your data online
2. We review and process the calculations
3. We will contact you with results
4. (Optional) Contact one of our Product Engineers to go through process calculation questions



Find this page at: [www.Pyromation.com/TechInfo/WakeFreq.aspx](http://www.Pyromation.com/TechInfo/WakeFreq.aspx)

Pyromation makes no claims regarding performance or safety based on the calculations provided. The results communicated are based on the ASME PTC 19.3 TW design standard for reliable service of tapered, straight and stepped-shank thermowells in a broad range of applications. The user assumes full responsibility for installation, application and operation of the product.





THIS IS A RESPONSE EXAMPLE ONLY - DO NOT USE DATA FOR ANY OTHER PURPOSE



5211 Industrial Road, Fort Wayne, IN 46825

**Straight or Tapered Thermowell  
Wake Frequency Evaluation Results**  
per PTC 19.3-TW 2010

**Date:** 8/3/2011  
**Customer Name:** Dave Myers  
**Company/Org. Name:** Pyromation, Inc  
**E-mail Address:** dmyers@pyromation.com  
**Tag Number:** TW-100

**OUTPUTS**

<b>Frequency Condition</b>	<b>PASS</b>
Frequency Ratio	0.073
<b>Steady State Stress Limit</b>	<b>PASS</b>
<b>Dynamic Stress Limit</b>	<b>PASS</b>
<b>Pressure Limit</b>	<b>PASS</b>

**INPUTS**

**Mounting Type:** Threaded  
**Material type:** 316SS

**Dimensions:**

Length	L=	6.000	in	0.152	m
Root diameter	A=	1.063	in	0.027	m
Tip diameter	B=	0.625	in	0.016	m
Bore diameter	d=	0.260	in	0.007	m
Tip thickness	t=	0.188	in	0.005	m
Fillet radius at base	b=	0.178	in	0.005	m
Damping Factor	ζ=	0.0005			
Shielded length	L <sub>0</sub> =	0.000	in	0.000	m
Sensor density	ρ <sub>s</sub> =	2700	kg/m <sup>3</sup>		

**Fluid Properties:**

Fluid velocity	V=	15.50	ft/s	4.72	m/s
Fluid density	ρ=	4.300	lb/ft <sup>3</sup>	68.9	kg/m <sup>3</sup>
Fluid temperature	T=	450.0	°F	232.2	°C
Gauge pressure	P=	150.0	psig	1034214.0	Pa
Viscosity	μ=	0.019	cp		

**T-Well Material Properties**

Allowable stress	S=	18000	psi	1.24E+08	Pa
Fatigue limit	S <sub>f</sub> =	5400	psi	3.72E+07	Pa
Modulus at temperature	E=	25900000	lbf/in <sup>2</sup>	1.79E+11	Pa
Density of t-well material	ρ <sub>m</sub> =	0.290	lbf/in <sup>3</sup>	8026.9	kg/m <sup>3</sup>

Summary/ Suggestions:

\*Pyromation makes no claims regarding performance or safety based on the calculations provided. The results communicated are based on the ASME PTC 19.3 TW-2010 design standard for reliable service of tapered, straight and stepped-shank thermowells in a broad range of applications. The user assumes full responsibility for installation, application and operation of the product.

Flanges comply with ASME B16.5 and are welded in accordance with the Boiler Code ASME Section IX. Certified welders use ASME Section II Compliant materials. Gaskets are not supplied with flanged thermowells and assemblies.

Nominal Pipe Size (inches)	Nominal Diameter DN	Flange Class	"O" Outside Diameter of Flange	"R" Outside Diameter Raised Face Large Male and Large Tongue	"W" Diameter of Bolt Circle	Number of Bolts	"t <sub>f</sub> " Thickness of Flange Min.
1/2	15	150	3.50	1.38	2.38	4	0.38
3/4	20	150	3.88	1.69	2.75	4	0.44
1	25	150	4.25	2.00	3.12	4	0.50
1 1/4	32	150	4.62	2.50	3.50	4	0.56
1 1/2	40	150	5.00	2.88	3.88	4	0.62
2	50	150	6.00	3.62	4.75	4	0.69
2 1/2	65	150	7.00	4.12	5.50	4	0.81
3	80	150	7.50	5.00	6.00	4	0.88
3 1/2	90	150	8.50	5.50	7.00	8	0.88
4	100	150	9.00	6.19	7.50	8	0.88
1/2	15	300	3.75	1.38	2.62	4	0.50
3/4	20	300	4.62	1.69	3.25	4	0.56
1	25	300	4.88	2.00	3.50	4	0.62
1 1/4	32	300	5.25	2.50	3.88	4	0.69
1 1/2	40	300	6.12	2.88	4.50	4	0.75
2	50	300	6.50	3.62	5.00	8	0.81
2 1/2	65	300	7.50	4.12	5.88	8	0.94
3	80	300	8.25	5.00	6.62	8	1.06
3 1/2	90	300	9.00	5.50	7.25	8	1.12
4	100	300	10.00	6.19	7.88	8	1.19
1/2	15	600	3.75	1.38	2.62	4	0.56
3/4	20	600	4.62	1.69	3.25	4	0.62
1	25	600	4.88	2.00	3.50	4	0.69
1 1/4	32	600	5.25	2.50	3.88	4	0.81
1 1/2	40	600	6.12	2.88	4.50	4	0.88
2	50	600	6.50	3.62	5.00	8	1.00
2 1/2	65	600	7.50	4.12	5.88	8	1.12
3	80	600	8.25	5.00	6.62	8	1.25
3.50	90	600	9.00	5.50	7.25	8	1.38
4.00	100	600	10.75	6.19	8.50	8	1.50

