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Thermowells

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Thermowells

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Ceramic Protection Tubes

AccuTru ExL ALUMINA

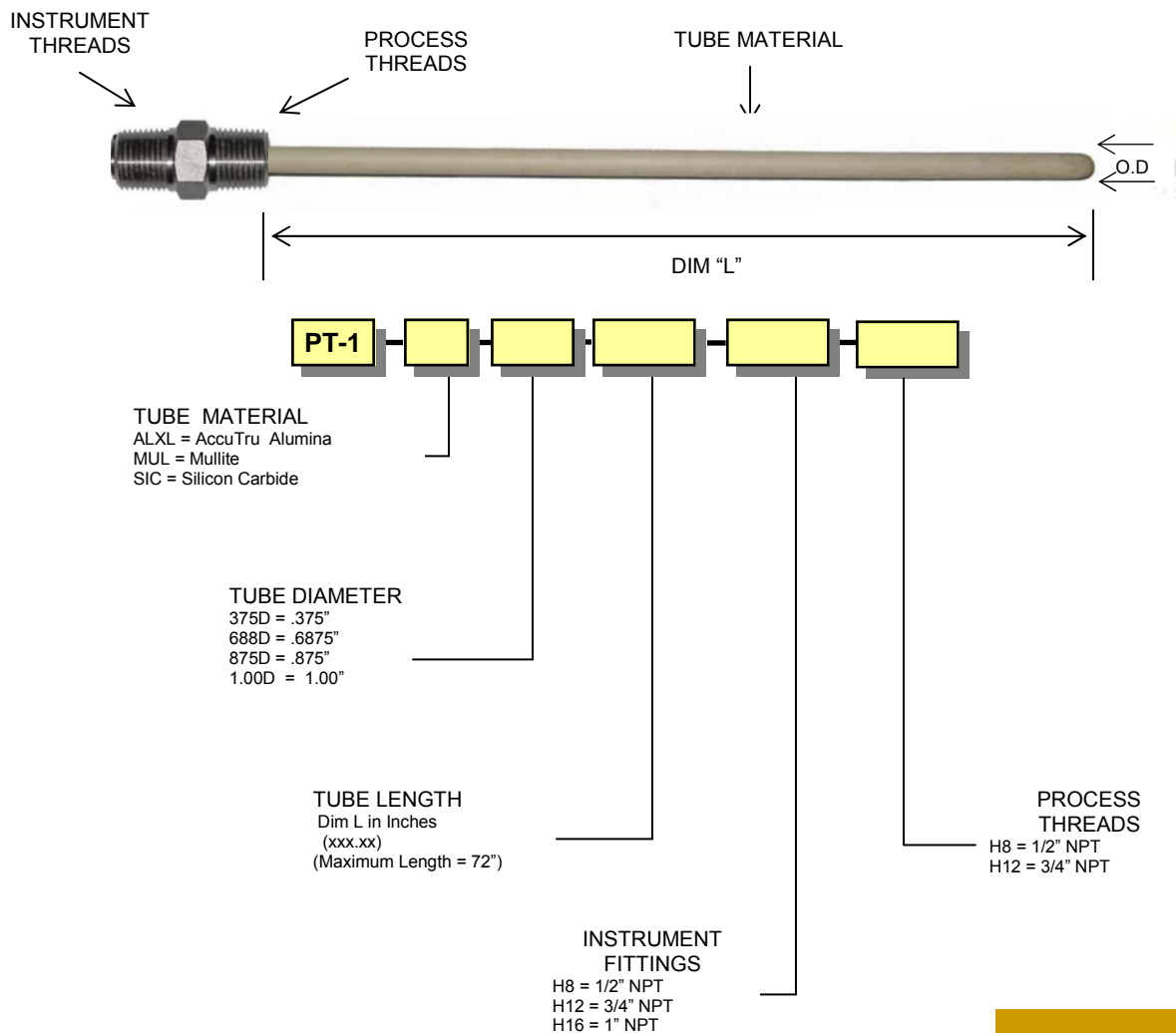
Alumina is the protection tube of choice for noble metal (platinum-rhodium) thermocouples—Type S, R, and B. Care must be taken when inserting into a process as the tube can crack if not preheated. AccuTru used extremely dense alumina and treats the tubes with a proprietary process to increase sensor life. High density alumina is nearly impermeable to most gasses.

MULLITE

Mullite tubes can be used in applications up to 3000°F. (1643°C) They have a better shock resistance than alumina. Most often used with Type K, J, and E thermocouples.

SILICON CARBIDE

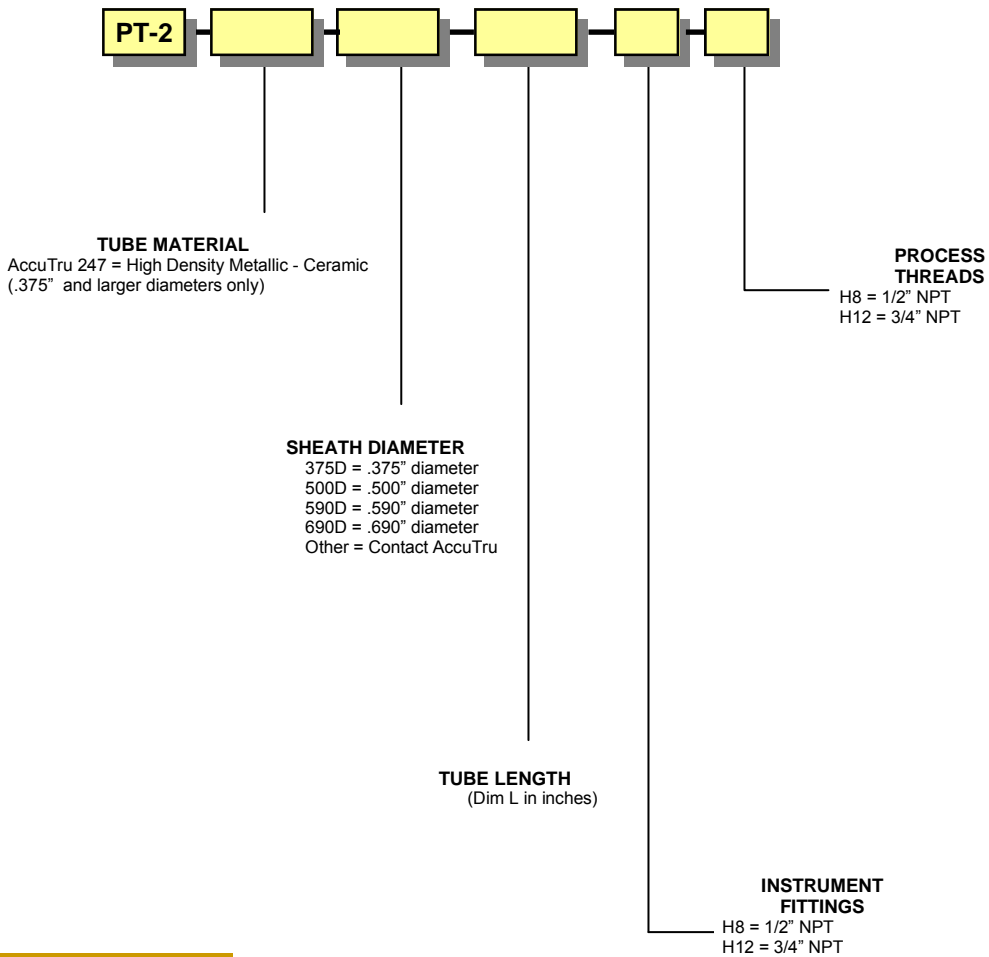
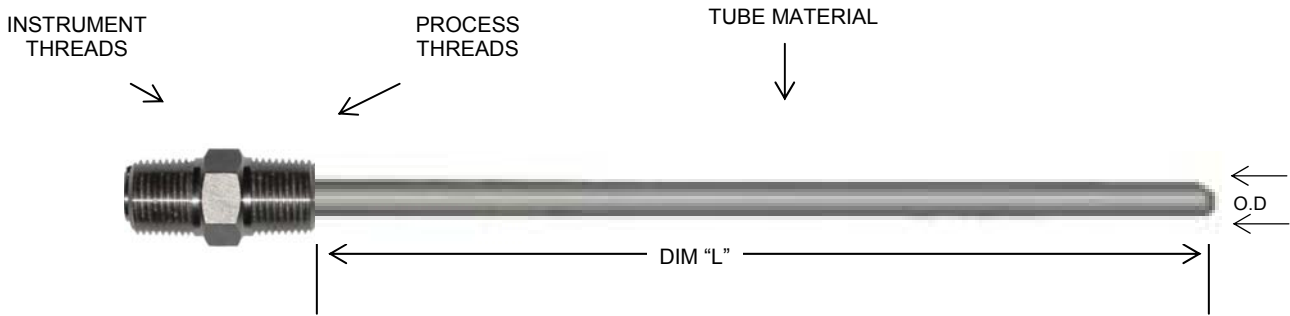
Offers superior chemical resistance in oxidizing and reducing environments. Also offers superior abrasion resistance.



Metallic—Ceramic Protection Tubes

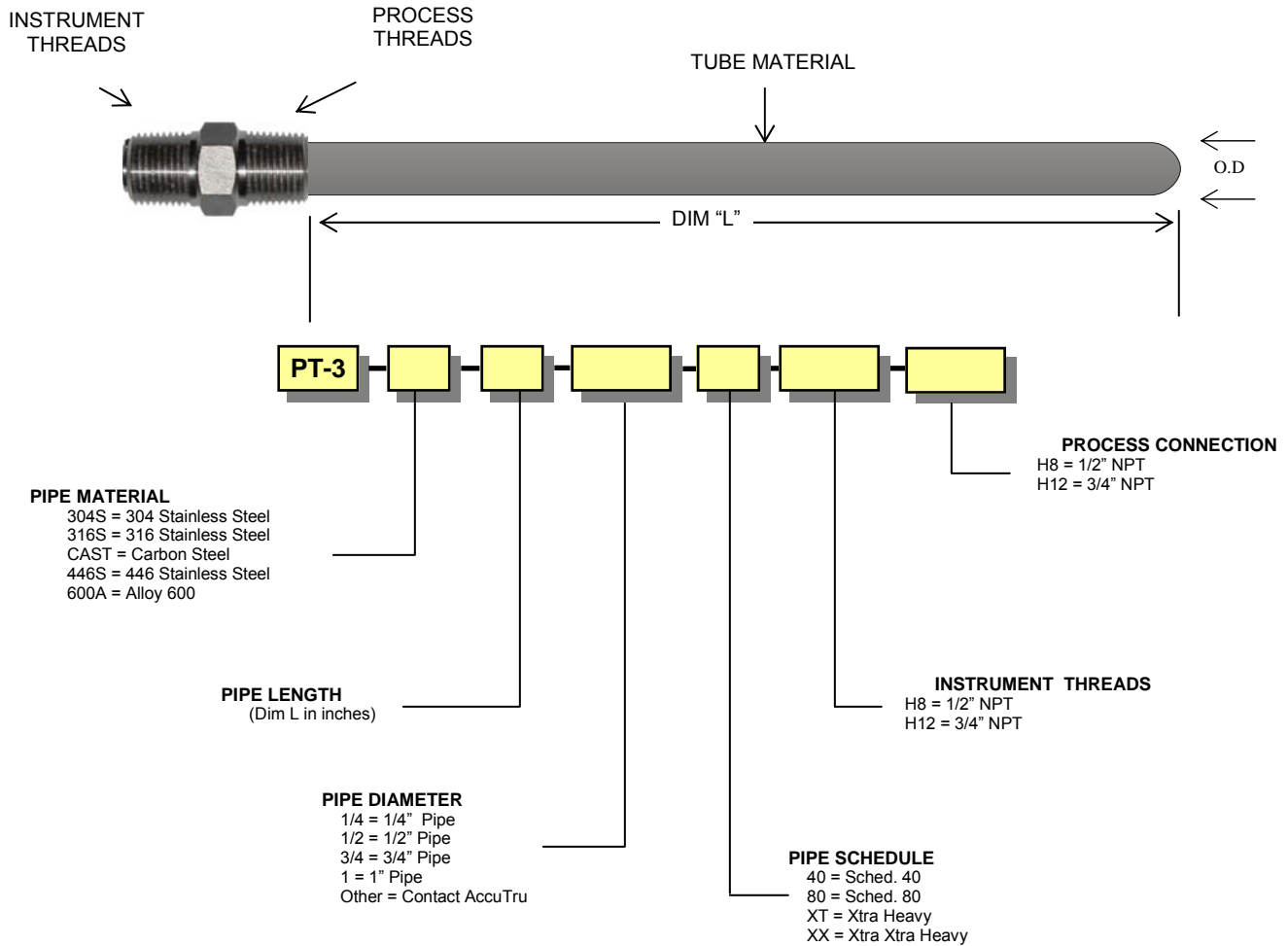
ACCUTRU—247

AccuTru-247 protection tubes offer superior chemical resistance and work well to temperatures above 3000 F. These tubes have excellent thermal conductivity and withstand thermal shock better than Alumina. Additionally, these tubes have outstanding abrasion and erosion characteristics.



Metal Protection Tubes

Metal protection tubes are used when additional protection is needed for a sensor, but the application does not require a thermowell, or where the length of the thermocouple exceeds the length limits of ceramic protection tubes. These tubes can also be used for multi-point thermocouple or RTD applications.



MODEL FT

Flanged Thermowells

Stem Manufacturing Standard
Valid for Overall Length "OAL" maximum of 42" and/or one-piece construction barstock stems.

Tolerances

KEY	DESCRIPTION	STANDARD TOLERANCE
A	Bore Depth	+ .030"/- .000"; W-shaped bore bottom
B	Bore Diameter	+/- .007"/.005"
C	Chamfer	Nominal
D	Diameter	Option 1) Barstock O.D.: Mill Standard tolerance/- .032" Option 2) Machined O.D.: +/- .015"
E	Tip Thickness	+/- .063"
F	Flange Thickness	
	Post-fabricated ANSI B16.5 flanges:	Mill standard/- .063"
G	GTAW Weld	ASME Section IX, B&PVC – certified welders
I	Instrument Conn.	ANSI B1.20.1
J	Radius	Nominal
K	Head Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
L	Overall Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
P	Process Conn.	ANSI B16.5 Pre-fabricated flange
Q	Shank Diameter(s)	+/- .010"
T	Lag ext. length	Nominal – See "A", "E", and "U" for accumulated length tolerances
U	Insertion Length	+/- .063"
V	Tapered Length	+/- .500" when "U" length is longer than 16"
Y	Reduced Length	Nominal

Standard Specifications

Bore Concentricity: .0015" per inch / maximum T.I.R .035".

Instrument Connection: ½" NPT compliant to ANSI B1.20.1.

Standard dimensions: Entrance bevel 60° +/-2°. I.D. .718" +/- .005" x 1.00" +/- .015" depth with 59° nominal drill bottom. Tap ½" NPT threads x .875" nominal depth.

Tolerance: ANSI compliant 3 full plug gauge turns minimum x 4.5 turns maximum.

*Note: Request alternate thread dimensions for any Style with a "K" length of >1.00".

Materials: In compliance with the applicable governing National Standard such as ASTM, ASME, AWS etc.

Post-fabricated Flange dimensions: Reference document titled **AST** Style PFD.

Stamping: 3/32" minimum height characters indicating material grade & traceability code. **AST** reserves the option to relocate standard stamp locations if there are surface area constraints.

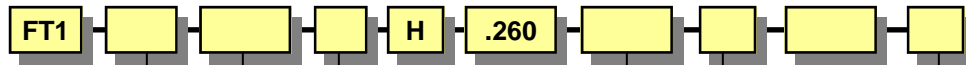
Surface Finish: 16-32 RMS over 85% of the "U" length – the remainder of the stem area is belt sanded. Surface finish varies for "high carbon/low alloy" materials due to inherent rusting characteristics. Gasket surface finishes for flanges/connectors are provided on document **AST** Style PFD.

Tapered length "V": Full length taper is provided for "U" dimensions of 16" or less. Longer lengths are tapered over the last 16" as a standard. A full length taper for all lengths is available for an additional charge.

Welding: Request the applicable welding specification.

MODEL FT-1

Flanged Thermowells Tapered Shank, .260



1. FLANGE SIZE CONNECTION

F10 = 1"
 F15 = 1.5"
 F20 = 2"
 F30 = 3"
 Additional Sizes—Consult Factory

2. STANDARD FLANGE RATINGS

150 = 150#
 300 = 300#
 600 = 600#
 900/1500 = 900/1500#
 1500 = 1500#
 2500 = 2500#

3. FLANGE FACING

RF = Raised Face
 FF = Flat Face
 RTJ = Ring Type Joint

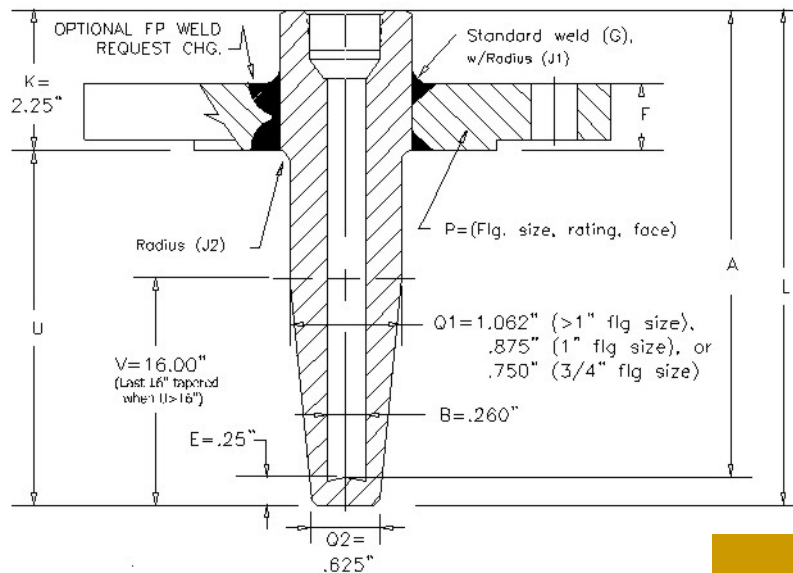
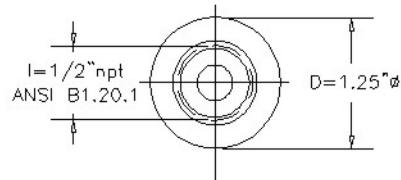
8. "L" DIMENSION

7. STEM MATERIAL

600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

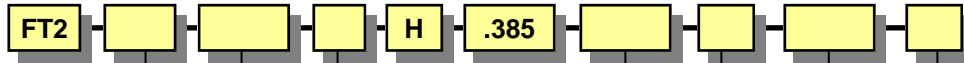
6. "U" DIMENSION

5. FLANGE MATERIAL
 (if different from stem material)



MODEL FT-2

Flanged Thermowells Tapered Shank, .385 Bore



1. FLANGE SIZE CONNECTION
 F10 = 1"
 F15 = 1.5"
 F20 = 2"
 F30 = 3"
 Additional Sizes—Consult Factory

2. STANDARD FLANGE RATINGS
 150 = 150#
 300 = 300#
 600 = 600#
 900/1500 = 900/1500#
 1500 = 1500#
 2500 = 2500#

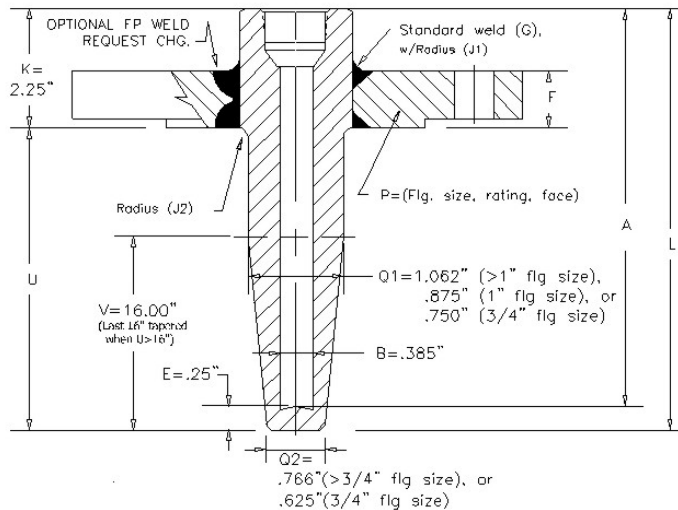
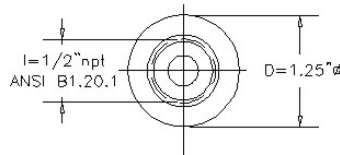
3. FLANGE FACING
 RF = Raised Face
 FF = Flat Face
 RTJ = Ring Type Joint

8. "L" DIMENSION

7. STEM MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

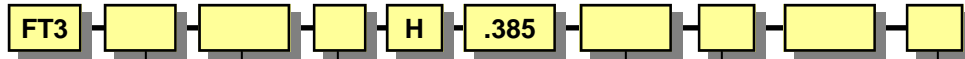
6. "U" DIMENSION

5. FLANGE MATERIAL
 (if different from stem material)



MODEL FT-3

Flanged Thermowells Reduced Shank, .260 Bore



1. FLANGE SIZE CONNECTION

F10 = 1"
F15 = 1.5"
F20 = 2"
F30 = 3"
Additional Sizes—Consult Factory

2. STANDARD FLANGE RATINGS

150 = 150#
300 = 300#
600 = 600#
900/1500 = 900/1500#
1500 = 1500#
2500 = 2500#

3. FLANGE FACING

RF = Raised Face
FF = Flat Face
RTJ = Ring Type Joint

8. "L" DIMENSION

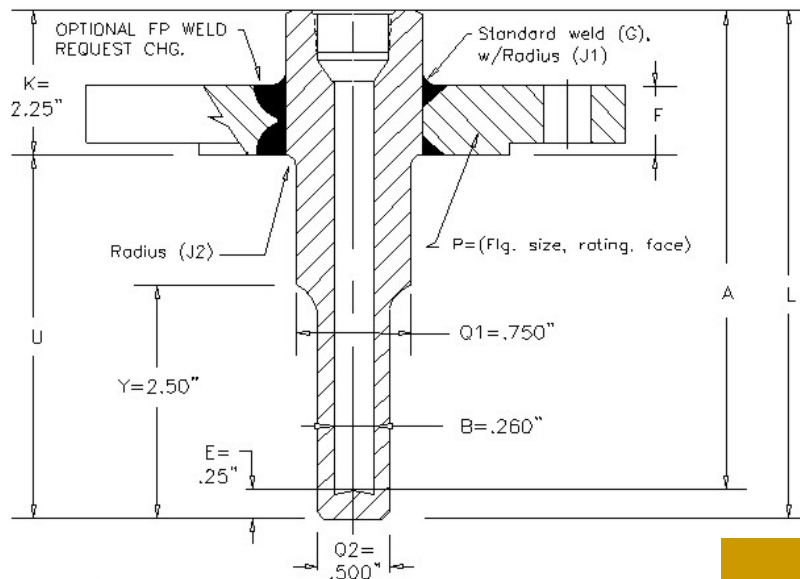
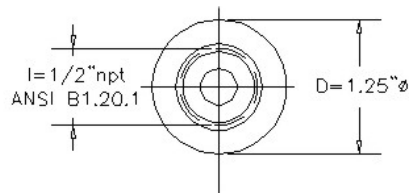
7. STEM MATERIAL

600A = Alloy 600
316S = 316 SS
304S = 304 SS
Other alloys and exotics
available—Consult factory

6. "U" DIMENSION

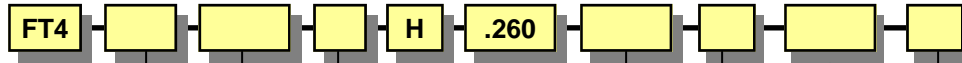
5. FLANGE MATERIAL

(if different from stem material)



MODEL FT-4

Flanged Thermowells Straight Shank, .260 Bore



1. FLANGE SIZE CONNECTION
 F10 = 1"
 F15 = 1.5"
 F20 = 2"
 F30 = 3"
 Additional Sizes—Consult Factory

2. STANDARD FLANGE RATINGS
 150 = 150#
 300 = 300#
 600 = 600#
 900/1500 = 900/1500#
 1500 = 1500#
 2500 = 2500#

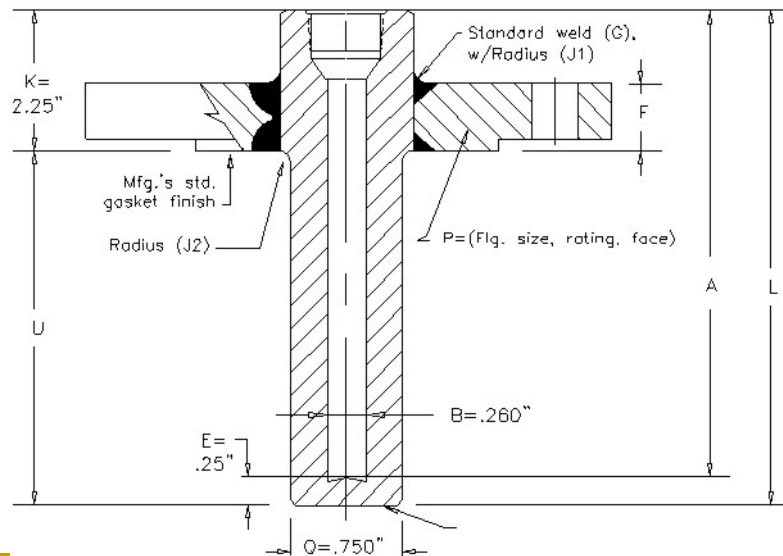
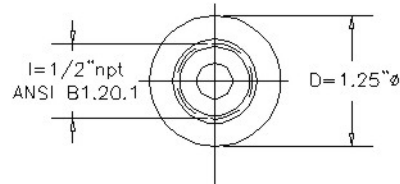
3. FLANGE FACING
 RF = Raised Face
 FF = Flat Face
 RTJ = Ring Type Joint

8. "L" DIMENSION

7. STEM MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

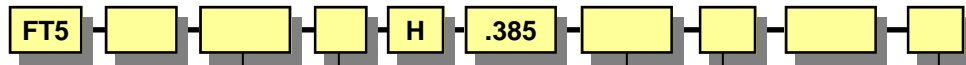
6. "U" DIMENSION

5. FLANGE MATERIAL
 (if different from stem material)



MODEL FT-5

Flanged Thermowells Straight Shank, .385 Bore



1. FLANGE SIZE CONNECTION
 F10 = 1"
 F15 = 1.5"
 F20 = 2"
 F30 = 3"
 Additional Sizes—Consult Factory

2. STANDARD FLANGE RATINGS
 150 = 150#
 300 = 300#
 600 = 600#
 900/1500 = 900/1500#
 1500 = 1500#
 2500 = 2500#

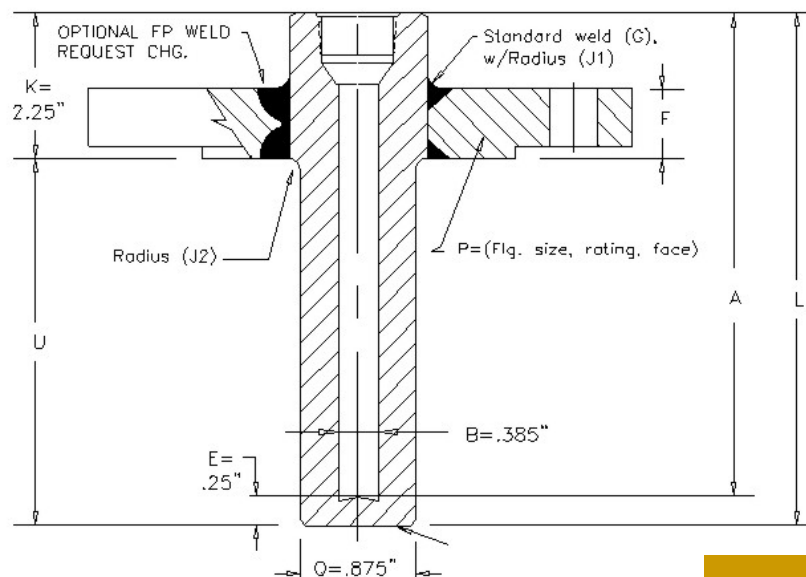
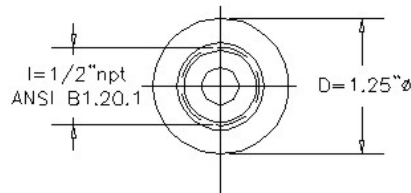
3. FLANGE FACING
 RF = Raised Face
 FF = Flat Face
 RTJ = Ring Type Joint

7. STEM MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

5. FLANGE MATERIAL
 (if different from stem material)

8. "L" DIMENSION

6. "U" DIMENSION



MODEL ST Socket Weld Style Thermowells

Manufacturing Standard

Valid for Overall Length "OAL" maximum of 42" and/or one-piece construction barstock stems.

Tolerances

DESCRIPTION

STANDARD TOLERANCE

Bore Depth	+ .030"/- .000"; W-shaped bore bottom
Bore Diameter	+/- .005"
Chamfer	Nominal
Diameter	Standard) Machined O.D.: +/- .015" Option) Barstock O.D.: Mill Standard tolerance +/- .032"
Tip Thickness	+/- .063"
Instrument Conn.	ANSI B1.20.1
Radius	Nominal
Head Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
Overall Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
Shank Diameter(s)	+/- .010"
Lag ext. length	Nominal – See "A", "E", and "U" for accumulated length tolerances
Insertion Length	+/- .063"
Tapered Length	+/- .500" when "U" length is longer than 16"
Reduced Length	Nominal

Manufacturer's Standard Specifications

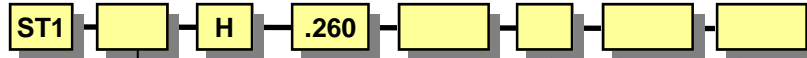
1. Bore Concentricity: .0015" per inch / maximum T.I.R .035".
2. Instrument Connection: 1/2" NPT compliant to ANSI B1.20.1. Standard dimensions: Entrance bevel 60° +/-2°. I.D. .718" +/- .005" x 1.00" +/- .015" depth with 59° nominal drill bottom. Tap 1/2" NPT threads x .875" nominal depth. Tolerance: ANSI compliant 3 full plug gauge turns minimum x 4.5 turns maximum.

*Note: Request alternate thread dimensions for any Style with a "K" length of >1.00".

3. Materials: In compliance with the applicable governing National Standard such as ASTM, ASME, AWS etc.
4. Stamping: 3/32" minimum height characters indicating material grade and traceability code. **AST** reserves the option to relocate standard stamp locations if there are surface area constraints.
5. Surface Finish: 16-32 RMS over 85% of the "U" length – the remainder of the stem area is belt-sanded. Surface finish varies for "high-carbon/low alloy" materials due to inherent rusting characteristics.
6. Tapered Length "V": Full length taper is provided for "U" dimensions of 16" or less. Longer lengths are tapered over the last 16" as a standard. A full length taper for all lengths is available for an additional charge.

MODEL ST-1

Socket-Weld Thermowells Tapered Shank, .260 Bore



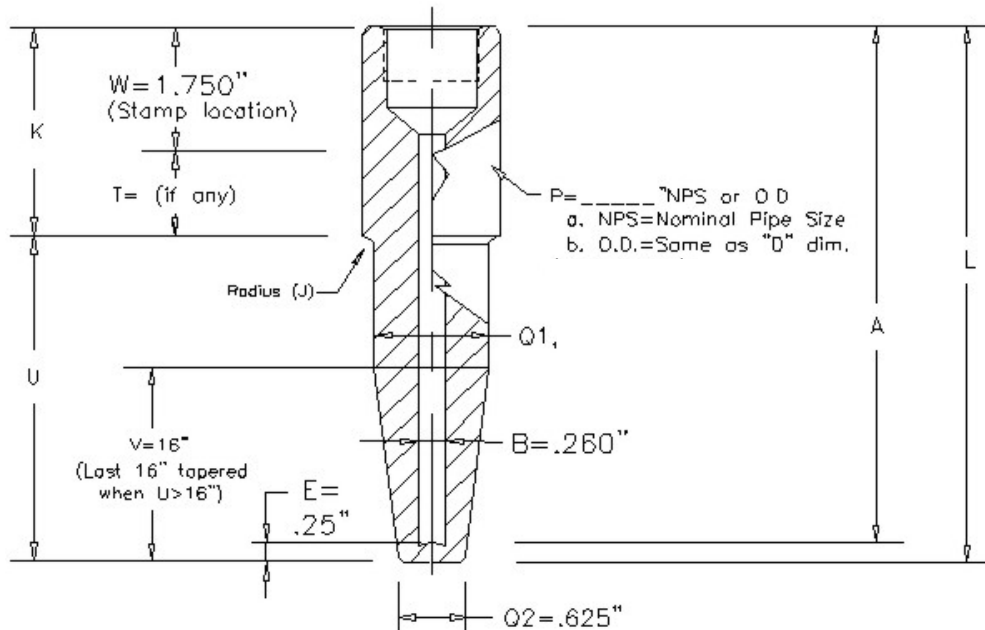
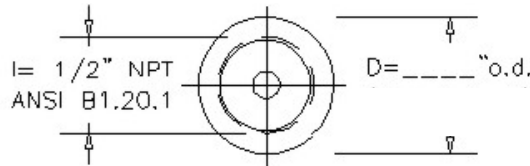
PROCESS CONNECTION
 50 = 1/2" Process Connection
 75 = 3/4" Process Connection
 10 = 1" Process Connection
 1.5 = 1.5 O.D. Process Connection

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

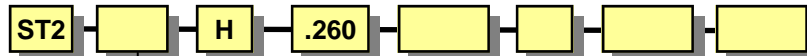
"U" DIMENSION

"L" DIMENSION

"T" DIMENSION



MODEL ST-2 Socket-Weld Thermowells Reduced Shank, .260



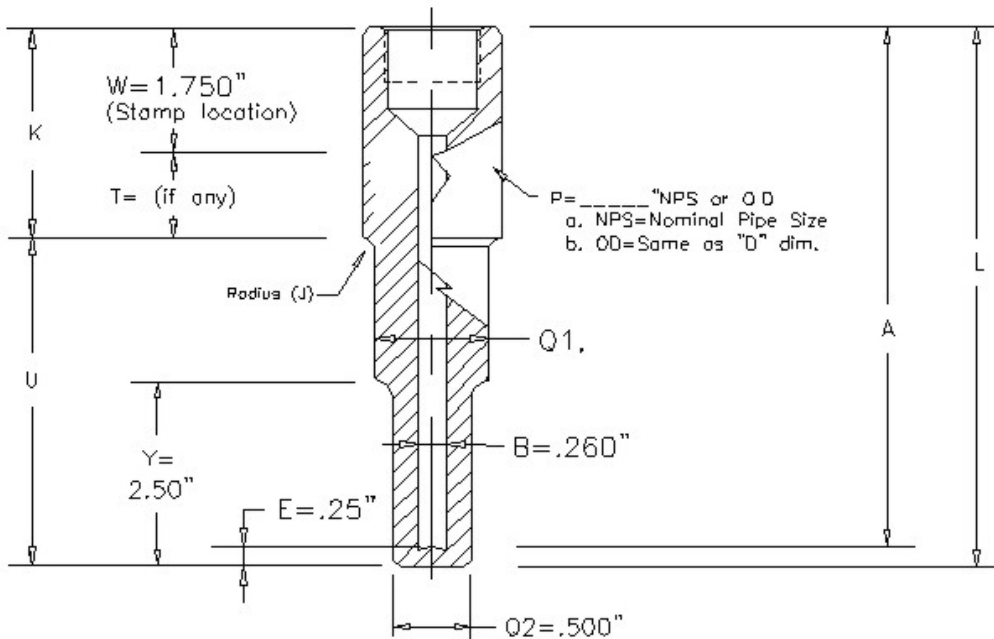
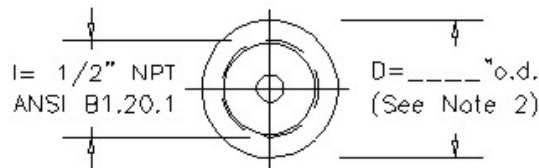
PROCESS CONNECTION
 50 = 1/2" Process Connection
 75 = 3/4" Process Connection
 10 = 1" Process Connection
 1.5 = 1.5 O.D. Process Connection

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION

"L" DIMENSION

"T" DIMENSION



MODEL ST-3

Socket-Weld Thermowells Straight Shank, .260 Bore



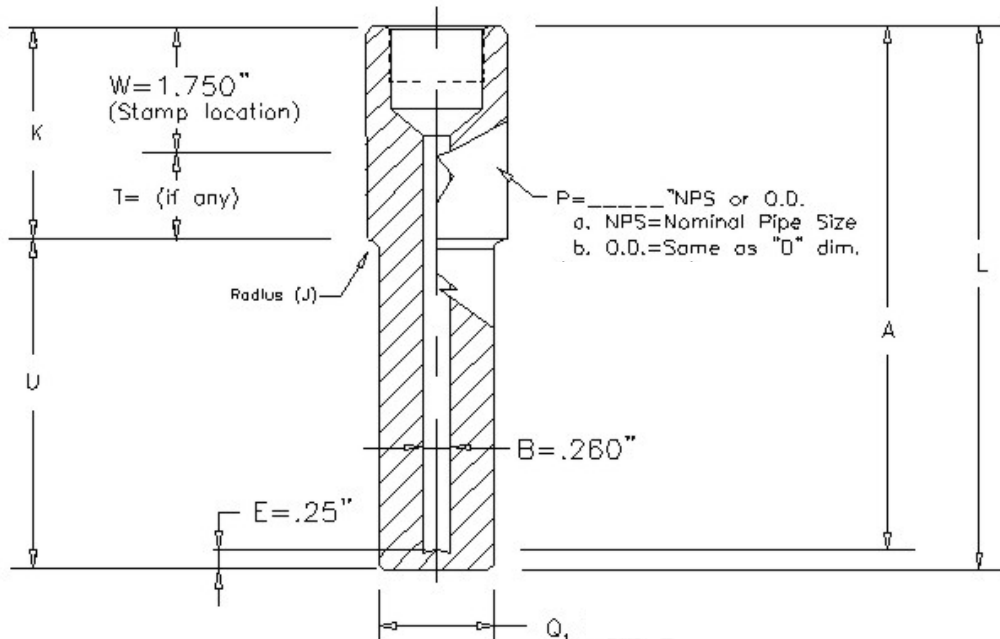
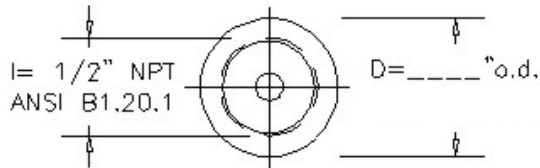
PROCESS CONNECTION
 50 = 1/2" Process Connection
 75 = 3/4" Process Connection
 10 = 1" Process Connection
 1.5 = 1.5 O.D. Process Connection

"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

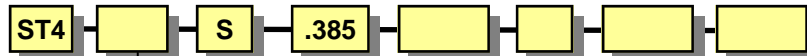
"U" DIMENSION

"T" DIMENSION



MODEL ST-4

Socket-Weld Thermowells
Straight Shank, .385 Bore



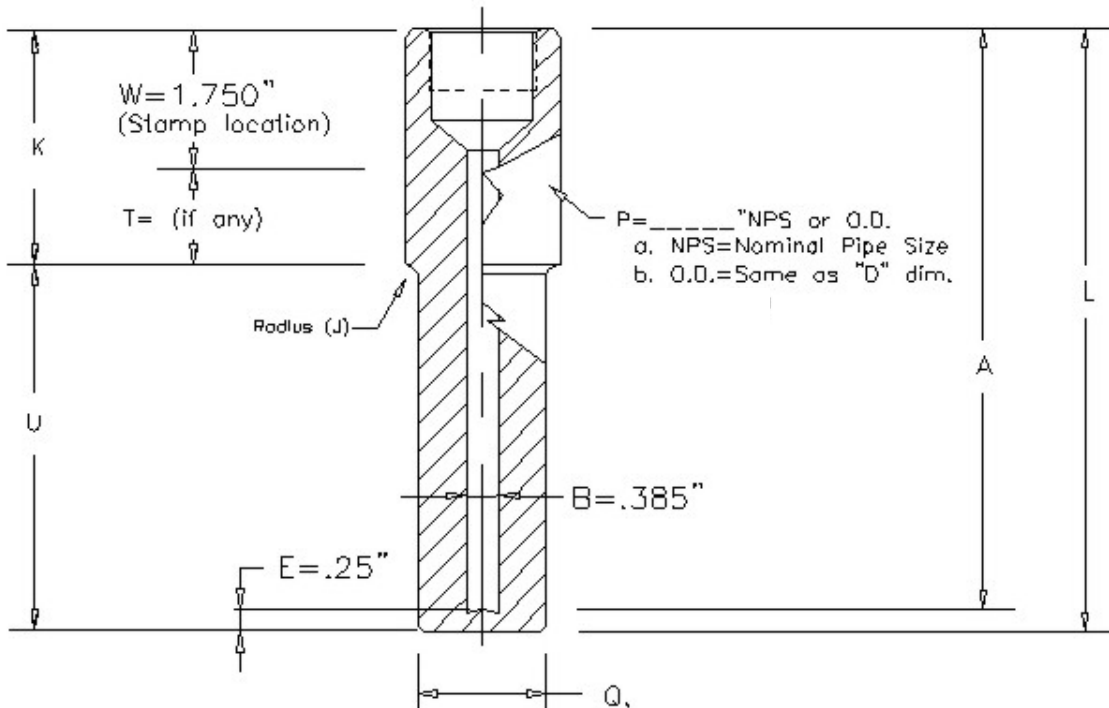
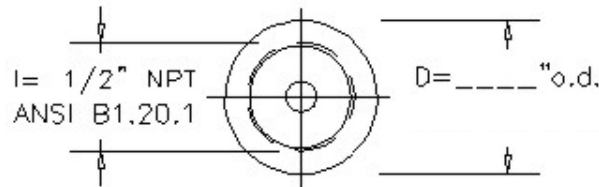
PROCESS CONNECTION
 50 = 1/2" Process Connection
 75 = 3/4" Process Connection
 10 = 1" Process Connection
 1.5 = 1.5 O.D. Process Connection

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION

"L" DIMENSION

"T" DIMENSION



MODEL TT

Threaded Thermowells

Manufacturing Standard

Valid for Overall Length "OAL" maximum of 42" and/or one-piece construction barstock stems.

Tolerances

KEY	DESCRIPTION	STANDARD TOLERANCE
A	Bore Depth	+.030"/-.000"; W-shaped bore bottom
B	Bore Diameter	+/- .005"
C	Chamfer	Nominal
D	Diameter	Machined O.D.: +/- .015"
E	Tip Thickness	+/- .063"
F	RF Dia. Thickness	+/- .063"
I	Instrument Conn.	ANSI B1.20.1
J	Radius	Nominal
K	Head Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
L	Overall Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
P	Pipe Size Dia.	+/- .015"
Q	Shank Diameter(s)	+/- .010"
T	Lag ext. length	Nominal – See "A", "E", and "U" for accumulated length tolerances
U	Insertion Length	+/- .063"
V	Tapered Length	+/- .500" when "U" length is longer than 16"
Y	Reduced Length	Nominal

Standard Specifications

Bore Concentricity: .0015" per inch / maximum T.I.R .035".

Instrument Connection: ½" NPT compliant to ANSI B1.20.1.

Standard dimensions: Entrance bevel 60° +/-2°. I.D. .718" +/- .005" x 1.00" +/- .015" depth with 59° nominal drill bottom. Tap ½" NPT threads x .875" nominal depth.

Tolerance: ANSI compliant 3 full plug gauge turns minimum x 4.5 turns maximum.

*Note: Request alternate thread dimensions for any Style with a "K" length of >1.00".

Materials: In compliance with the applicable governing National Standard such as ASTM, ASME, AWS etc.

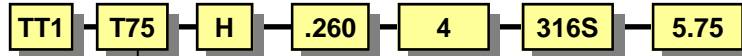
Stamping: 3/32" minimum height characters indicating material grade and traceability code. **AST** reserves the option to relocate standard stamp locations if there are surface area constraints.

Surface Finish: 16-32 RMS over 85% of the "U" length – the remainder of the stem area is belt-sanded. Surface finish varies for "high-carbon/low alloy" materials due to inherent rusting characteristics.

Tapered Length "V": Full length taper is provided for "U" dimensions of 16" or less. Longer lengths are tapered over the last 16" as a standard. A full length taper for all lengths is available for an additional charge.

MODEL TT-1

Threaded Thermowells Tapered Shank, .260 Bore

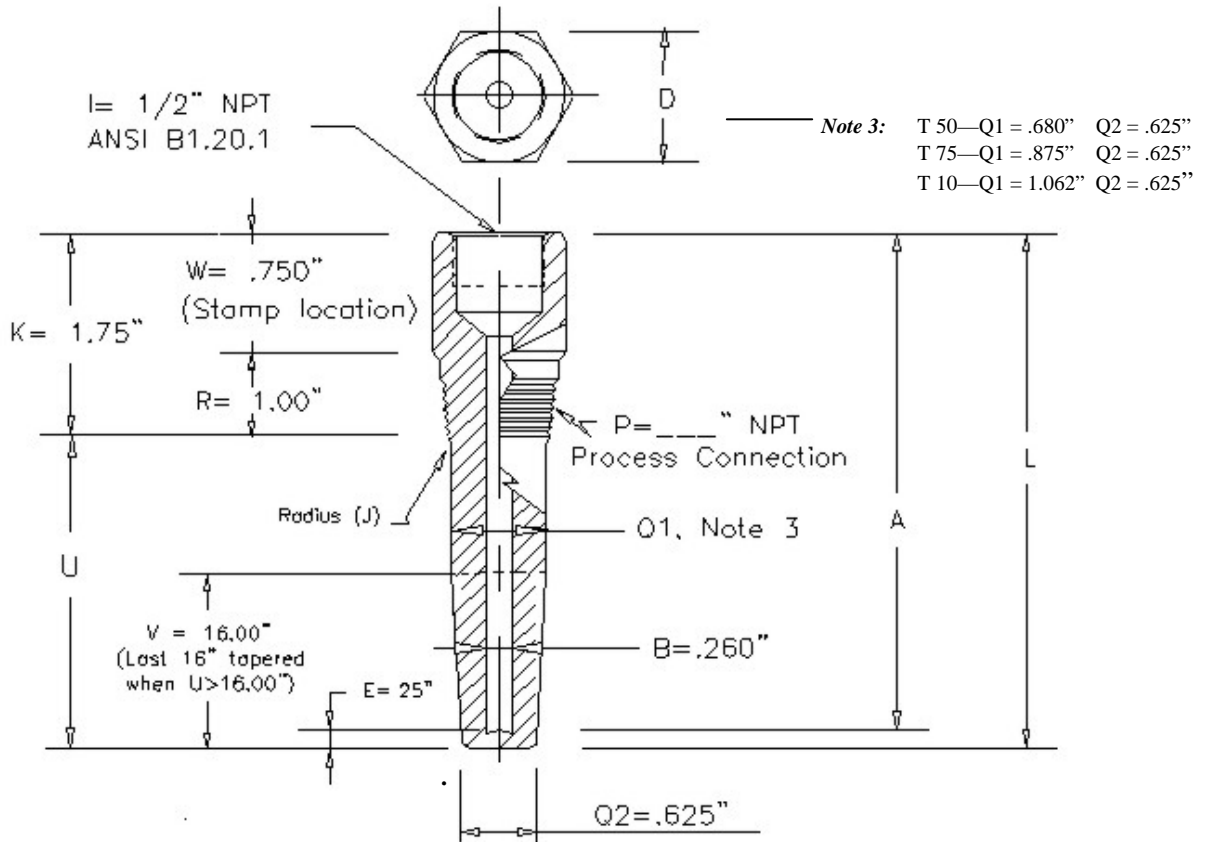


PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

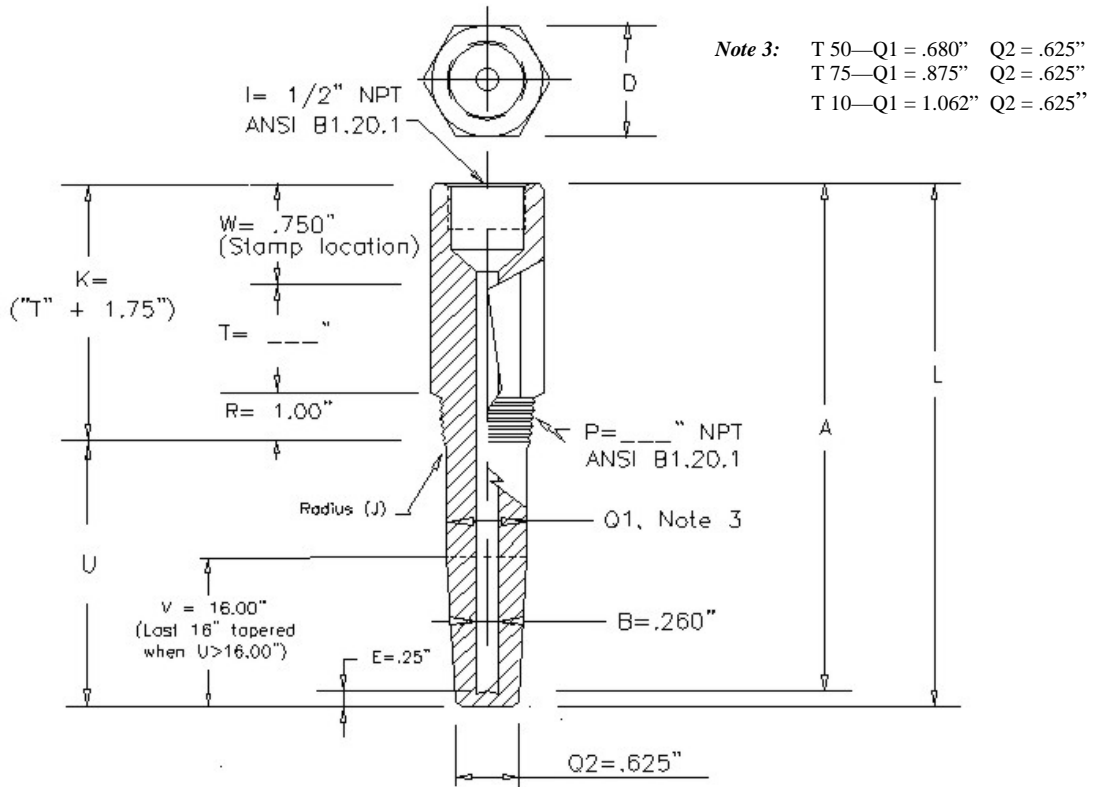
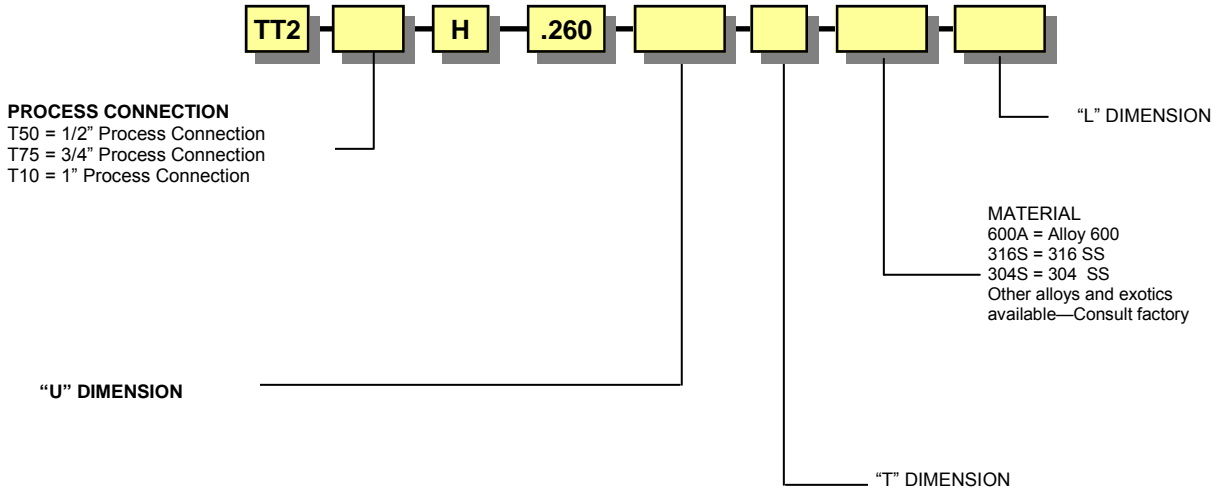
"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION

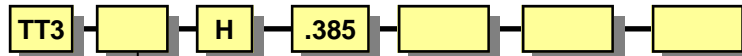


MODEL TT-2 Threaded Thermowells Tapered w/Insulation Lag, .260 Bore



MODEL TT-3

Threaded Thermowells Tapered, .385 Bore

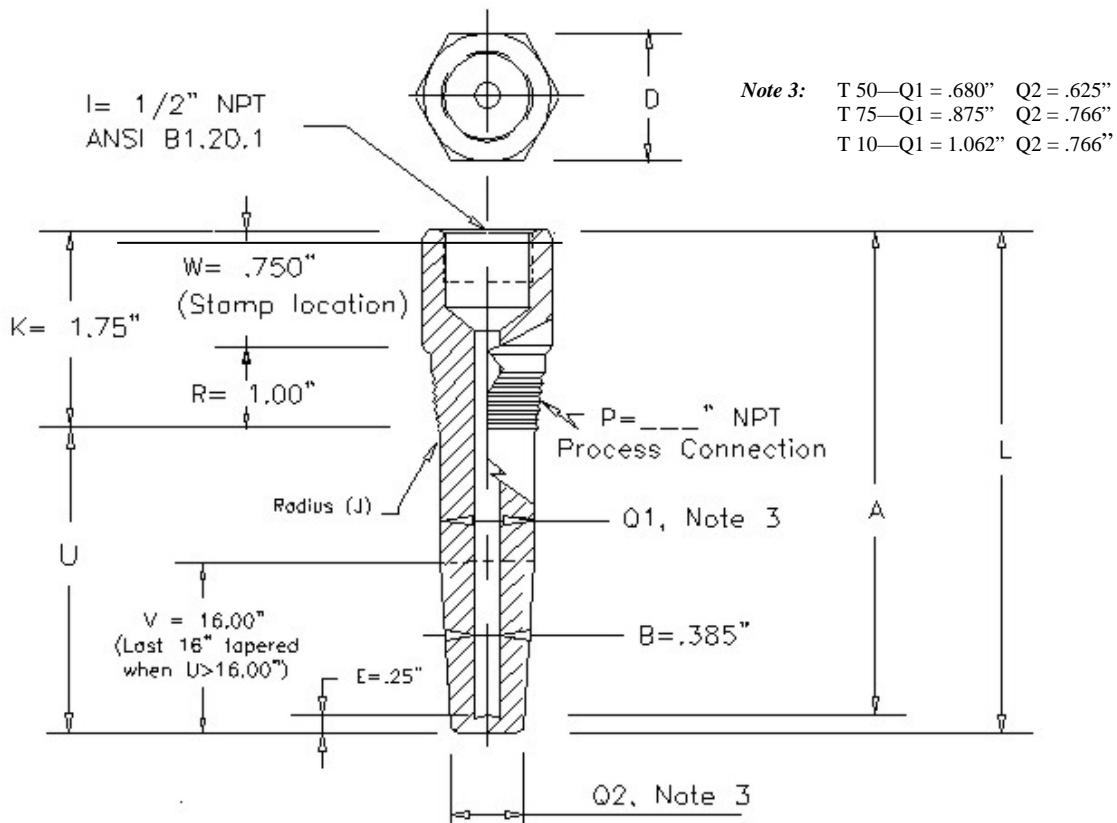


PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

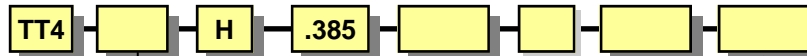
"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION



MODEL TT-4 Threaded Thermowells Tapered w/Insulation Lag, .385 Bore



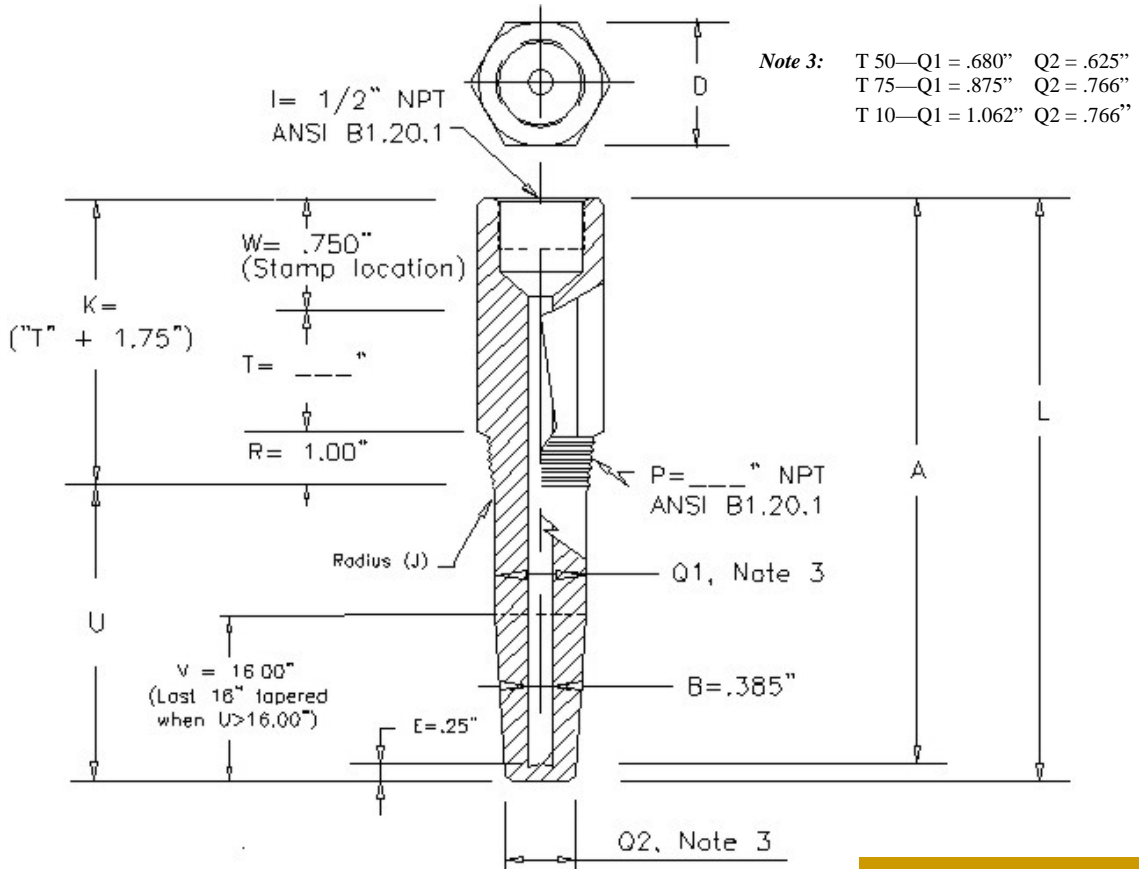
PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

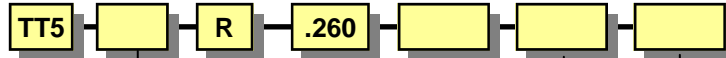
"U" DIMENSION

"T" DIMENSION



MODEL TT-5

Threaded Thermowells Reduced, .260 Bore

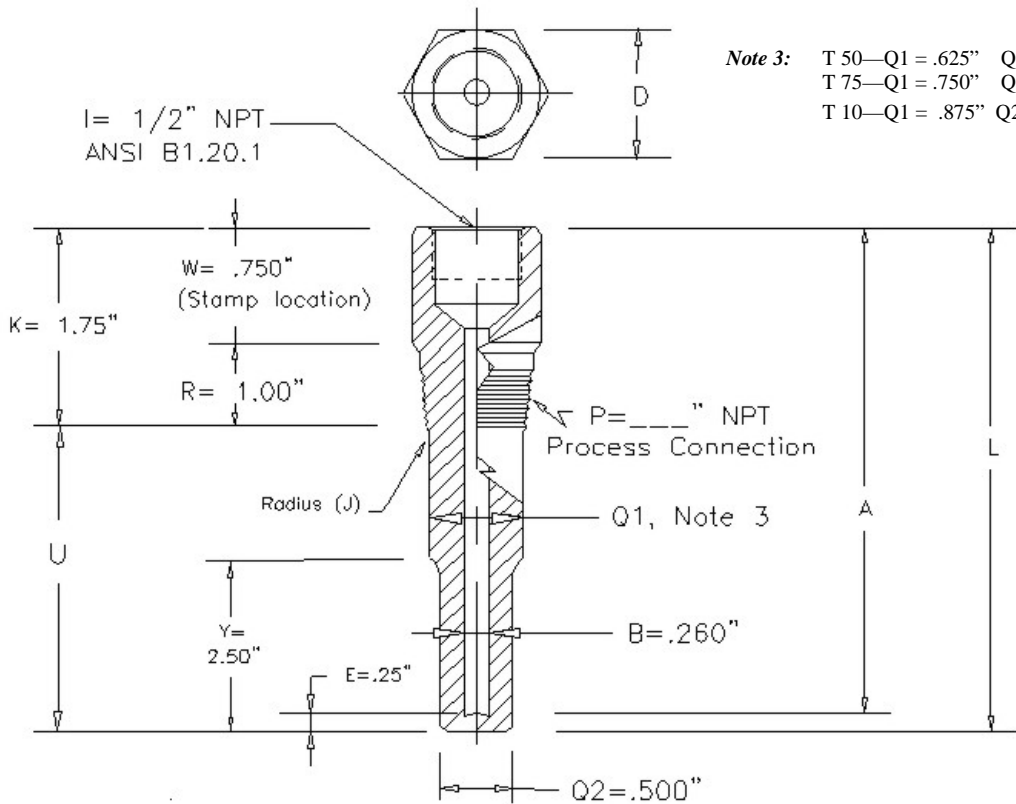


PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION



Note 3:
 T 50—Q1 = .625" Q2 = .500"
 T 75—Q1 = .750" Q2 = .500"
 T 10—Q1 = .875" Q2 = .500"

MODEL TT-6 Threaded Thermowells

Reduced w/Insulation Lag, .260 Bore



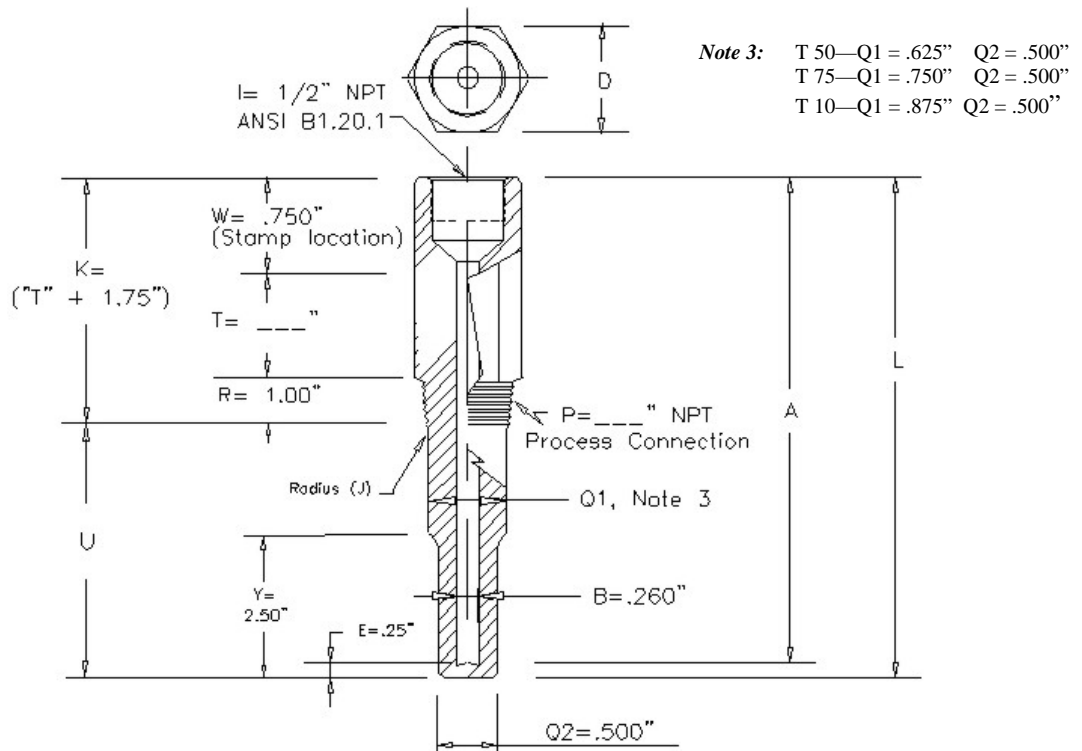
PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

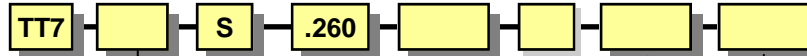
"U" DIMENSION

"T" DIMENSION



MODEL TT-7

Threaded Thermowells Straight .260 Bore



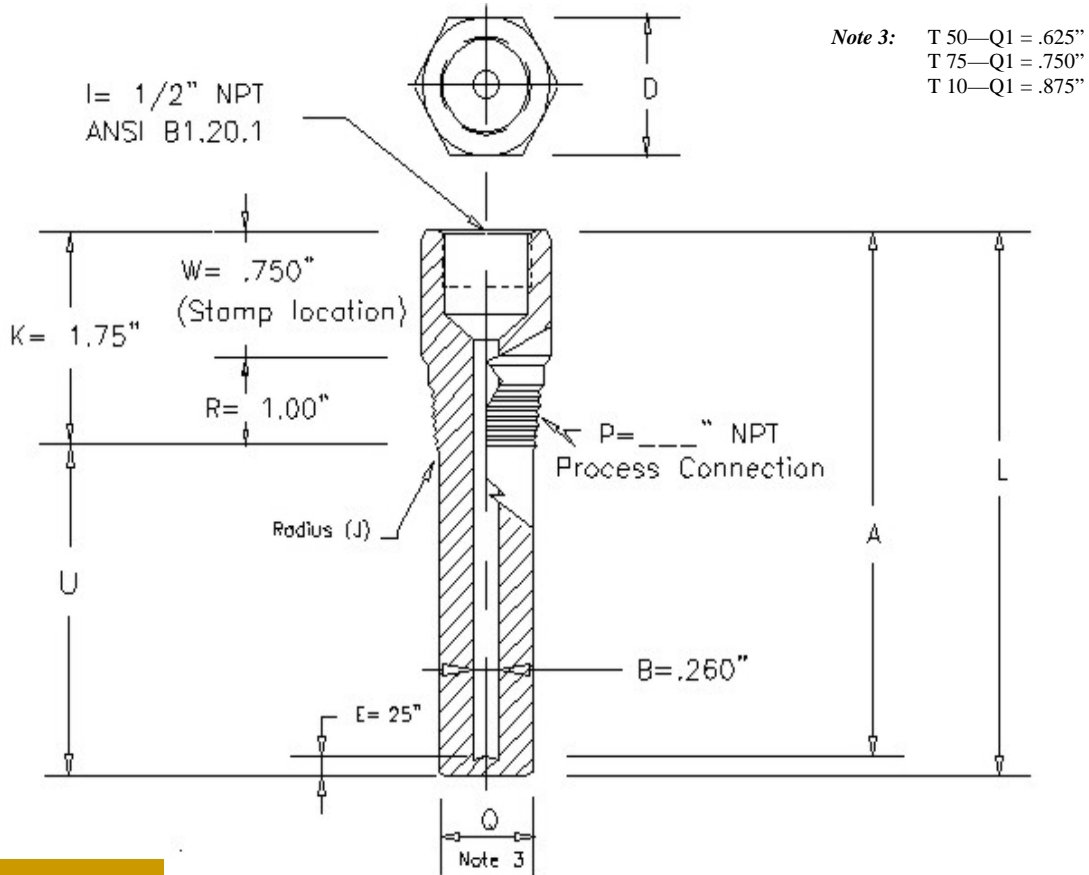
PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

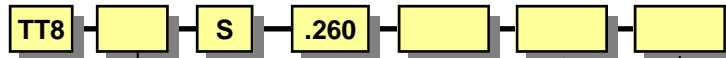
"U" DIMENSION

"T" DIMENSION



MODEL TT-8 Threaded Thermowells

Straight w/Insulation Lag, .260 Bore



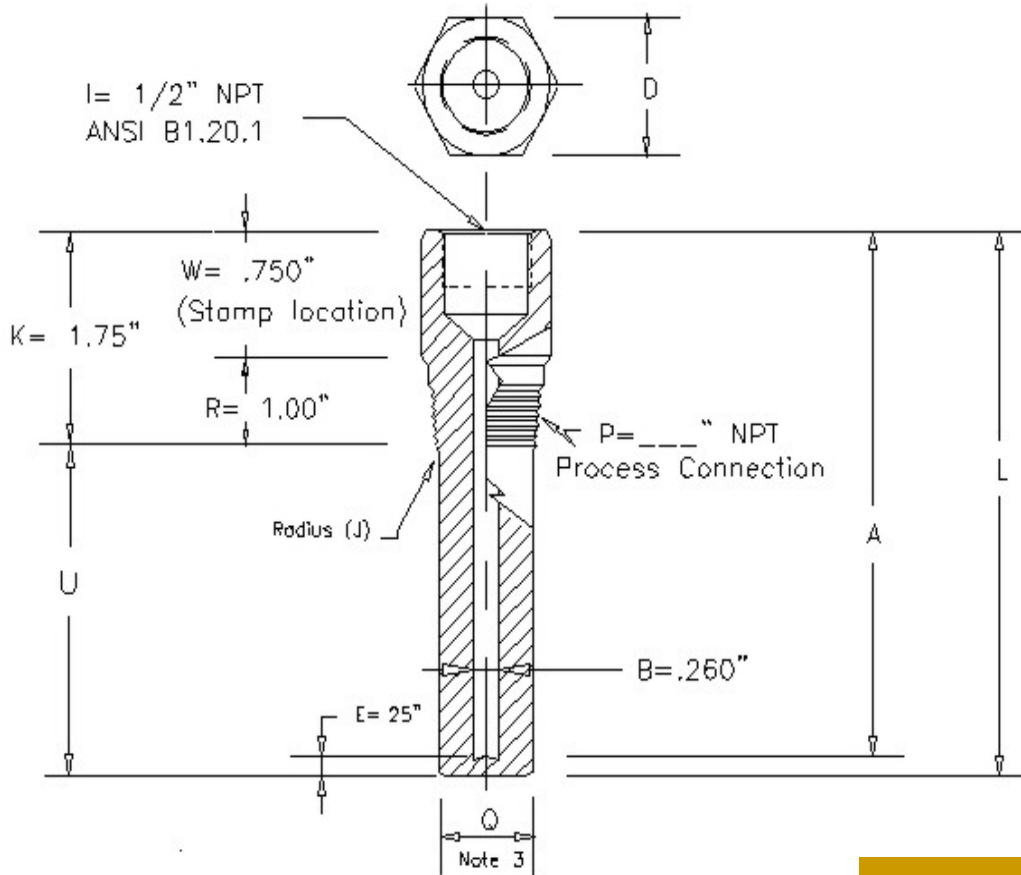
PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

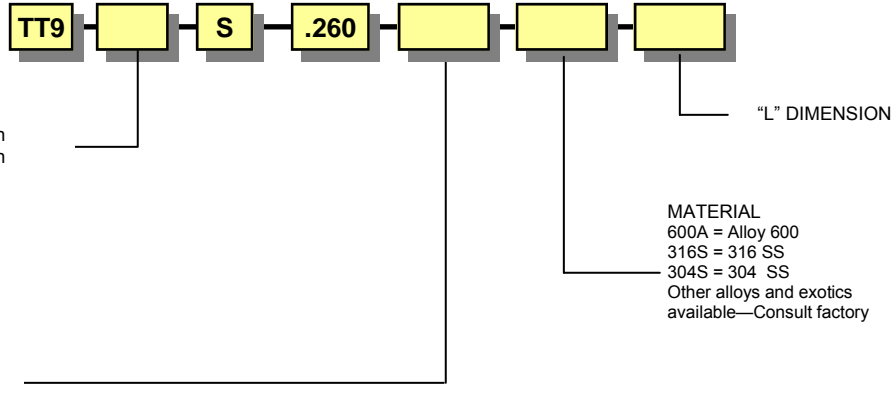
"U" DIMENSION

Note 3: T 50—Q1 = .500"
 T 75—Q1 = .750"
 T 10—Q1 = .875"



MODEL TT-9

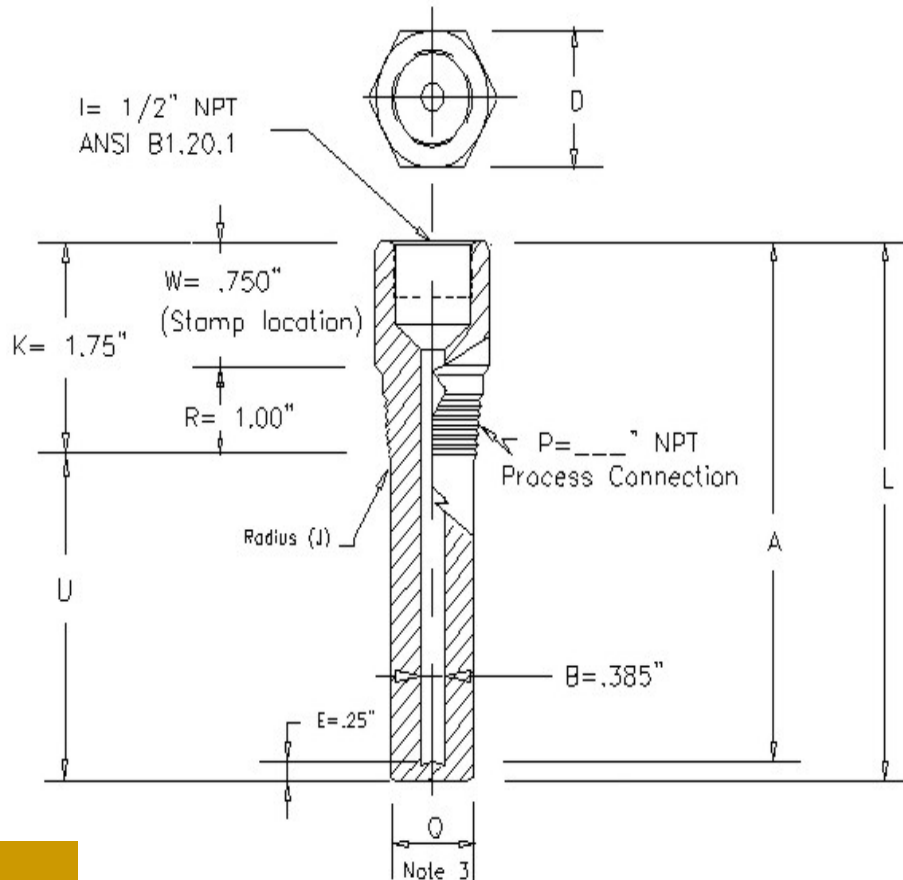
Threaded Thermowells Straight .385 Bore



PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

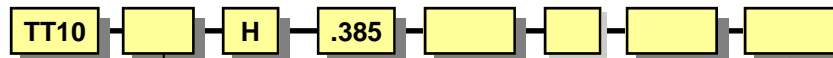
MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

Note 3: T 50—Q1 = .680"
 T 75—Q1 = .766"
 T 10—Q1 = .875"



MODEL TT-10

Threaded Thermowells Straight w/Insulation Lag, .385



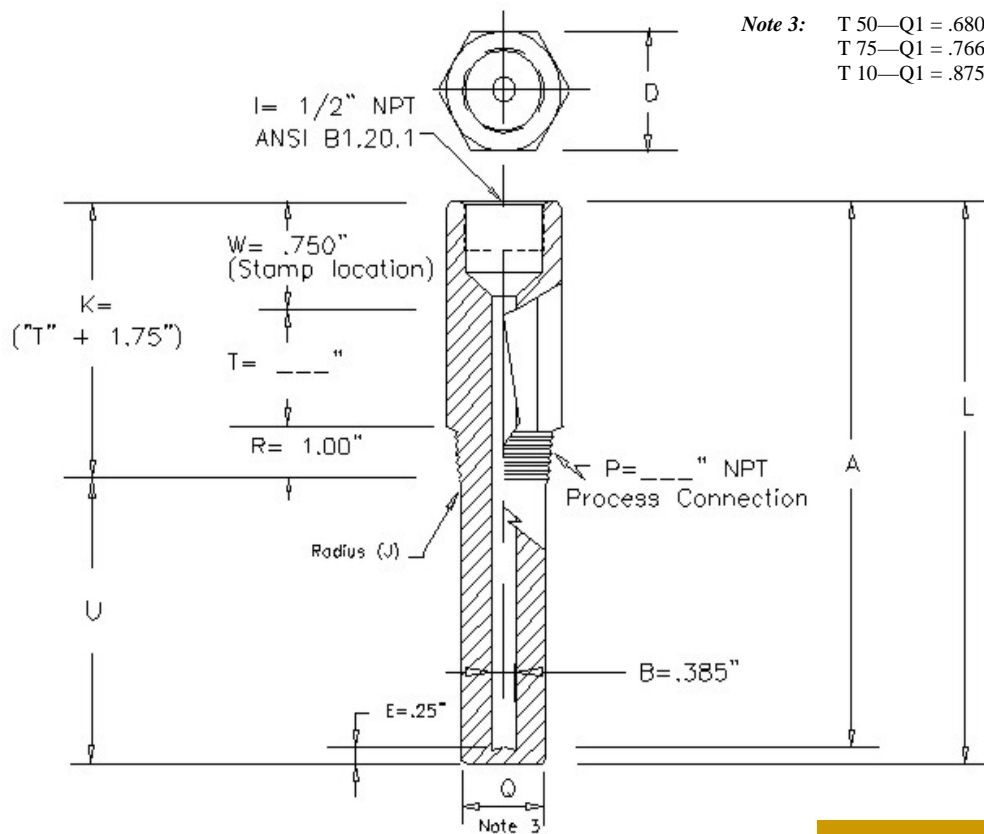
PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

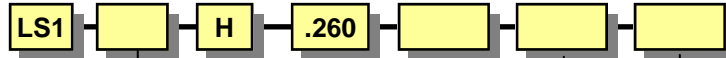
MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION

"T" DIMENSION



MODEL LS-1 Limited Space Thermowells Threaded, .260 Bore

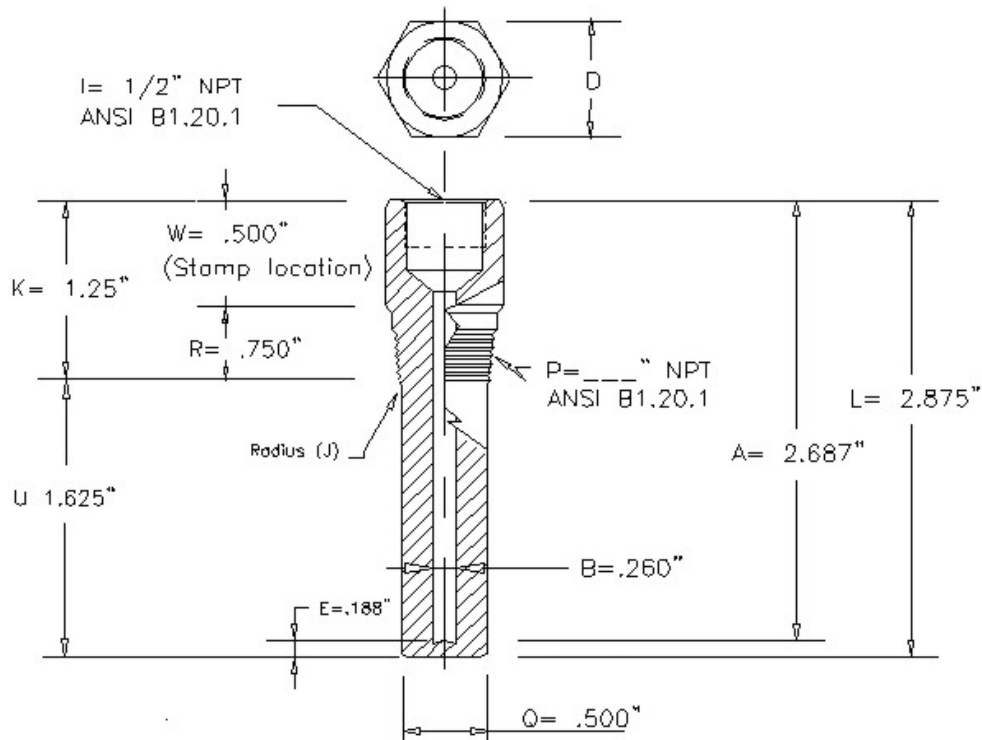


PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection

"L" DIMENSION

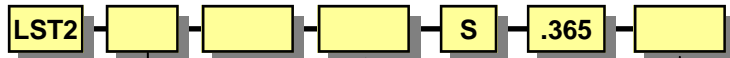
MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics available—Consult factory

"U" DIMENSION



MODEL LS-2

Limited Space Thermowells Threaded, .385 Bore

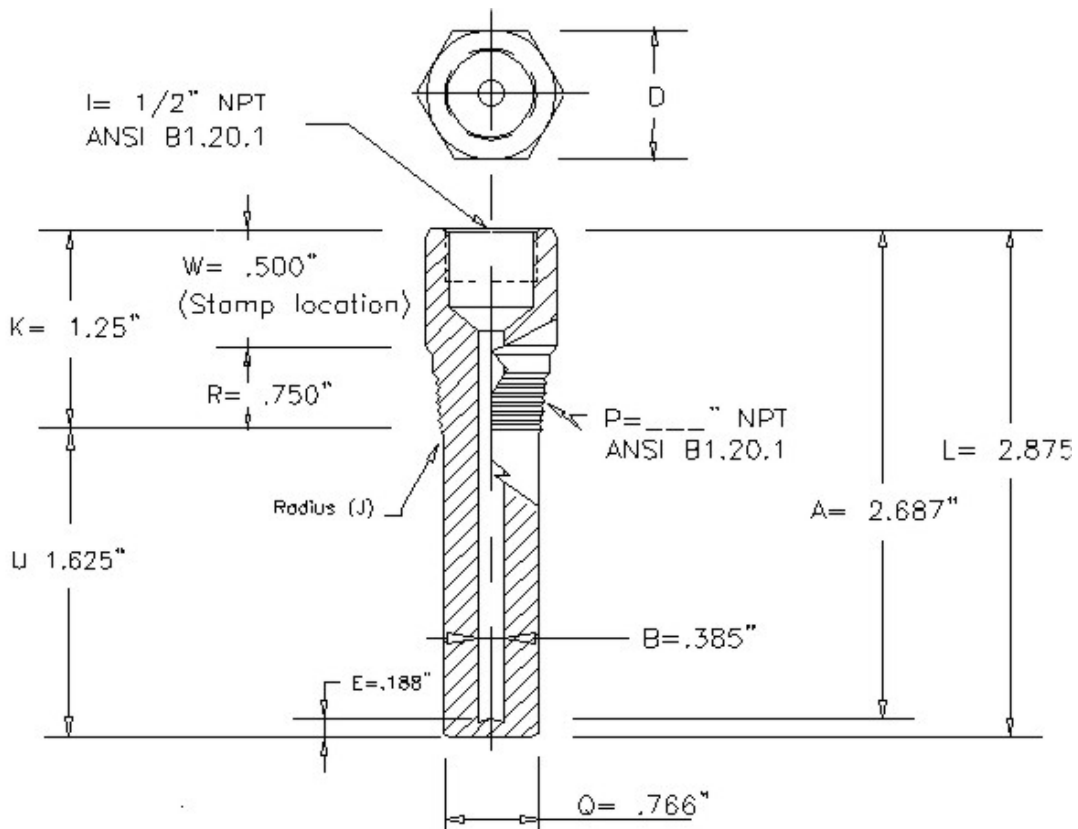


PROCESS CONNECTION
 T50 = 1/2" Process Connection
 T75 = 3/4" Process Connection
 T10 = 1" Process Connection
 *Additional sizes—consult factory

MATERIAL
 600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics available—Consult factory

"U" DIMENSION

"L" DIMENSION



MODEL VT

Vanstone Thermowells

Manufacturing Standard

Valid for Overall Length "OAL" maximum of 42" and/or one-piece construction barstock stems.

Tolerances

KEY	DESCRIPTION	STANDARD TOLERANCE
A	Bore Depth	+ .030"/- .000"; W-shaped bore bottom
B	Bore Diameter	+/- .005"
C	Chamfer	Nominal
D	Diameter	Standard) Machined O.D.: +/- .015" Option) Barstock O.D.: Mill Standard tolerance +/- .032"
E	Tip Thickness	+/- .063"
I	Instrument Conn.	ANSI B1.20.1
J	Radius	Nominal
K	Head Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
L	Overall Length	Nominal – See "A", "E", and "U" for accumulated length tolerances
Q	Shank Diameter(s)	+/- .010"
T	Lag ext. length	Nominal – See "A", "E", and "U" for accumulated length tolerances
U	Insertion Length	+/- .063"
V	Tapered Length	+/- .500" when "U" length is longer than 16"
Y	Reduced Length	Nominal

Standard Specifications

Bore Concentricity: .0015" per inch / maximum T.I.R .035".

Instrument Connection: ½" NPT compliant to ANSI B1.20.1. Standard dimensions: Entrance bevel 60° +/-2°. I.D. .718" +/- .005" x 1.00" +/- .015" depth with 59° nominal drill bottom. Tap ½" NPT threads x .875" nominal depth. Tolerance: ANSI compliant 3 full plug gauge turns minimum x 4.5 turns maximum.

*Note: Request alternate thread dimensions for any Style with a "K" length of >1.00".

Materials: In compliance with the applicable governing National Standard such as ASTM, ASME, AWS etc.

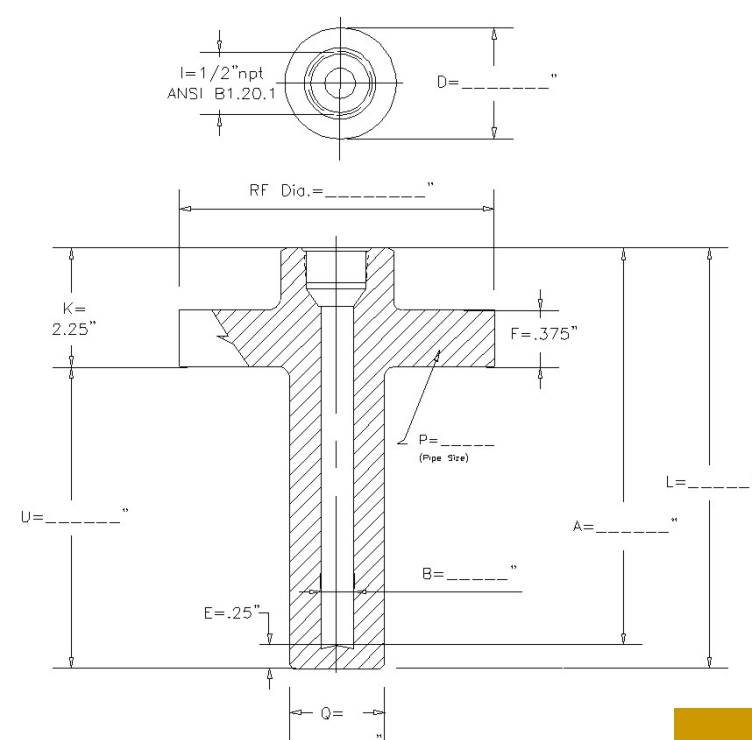
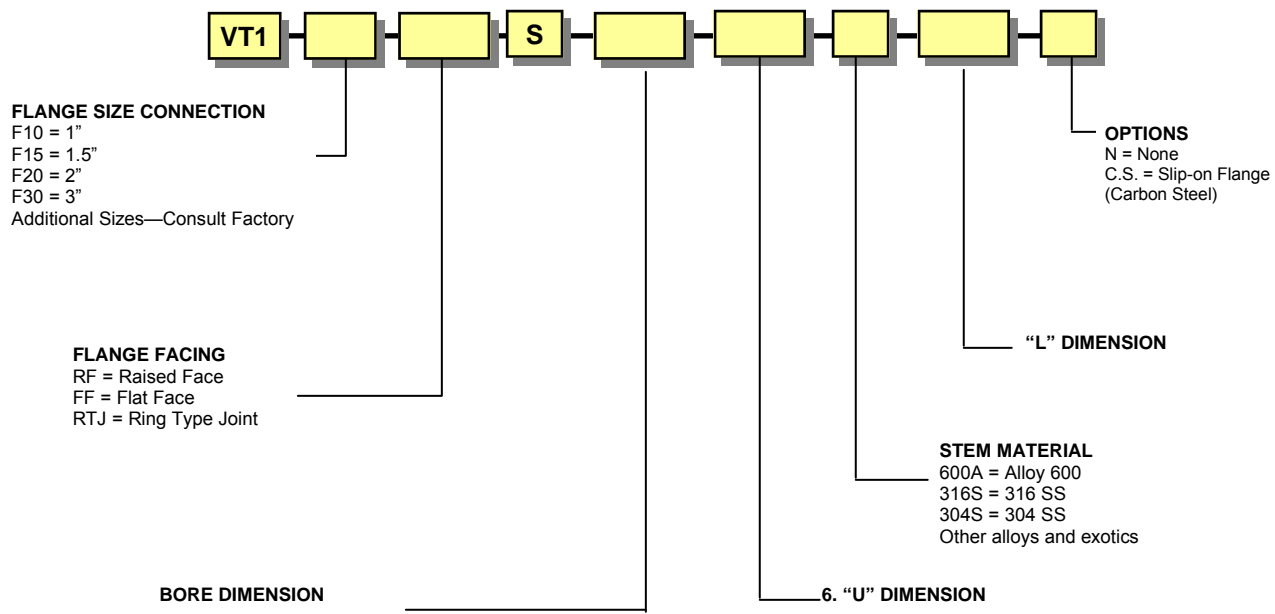
Stamping: 3/32" minimum height characters indicating material grade and traceability code. **AST** reserves the option to relocate standard stamp locations if there are surface area constraints.

Surface Finish: 16-32 RMS over 85% of the "U" length – the remainder of the stem area is belt-sanded. Surface finish varies for "high-carbon/low alloy" materials due to inherent rusting characteristics.

Tapered Length "V": Full length taper is provided for "U" dimensions of 16" or less. Longer lengths are tapered over the last 16" as a standard. A full length taper for all lengths is available for an additional charge.

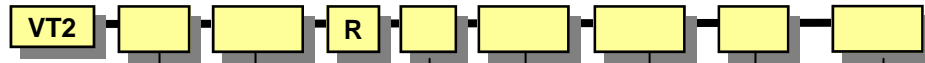
MODEL VT-1

Vanstone Thermowells Straight Shank



MODEL VT-2

Vanstone Thermowells Reduced Shank



FLANGE SIZE CONNECTION
 F10 = 1"
 F15 = 1.5"
 F20 = 2"
 F30 = 3"
 Additional Sizes—Consult Factory

FLANGE FACING
 RF = Raised Face
 FF = Flat Face
 RTJ = Ring Type Joint

BORE DIMENSION

OPTIONS

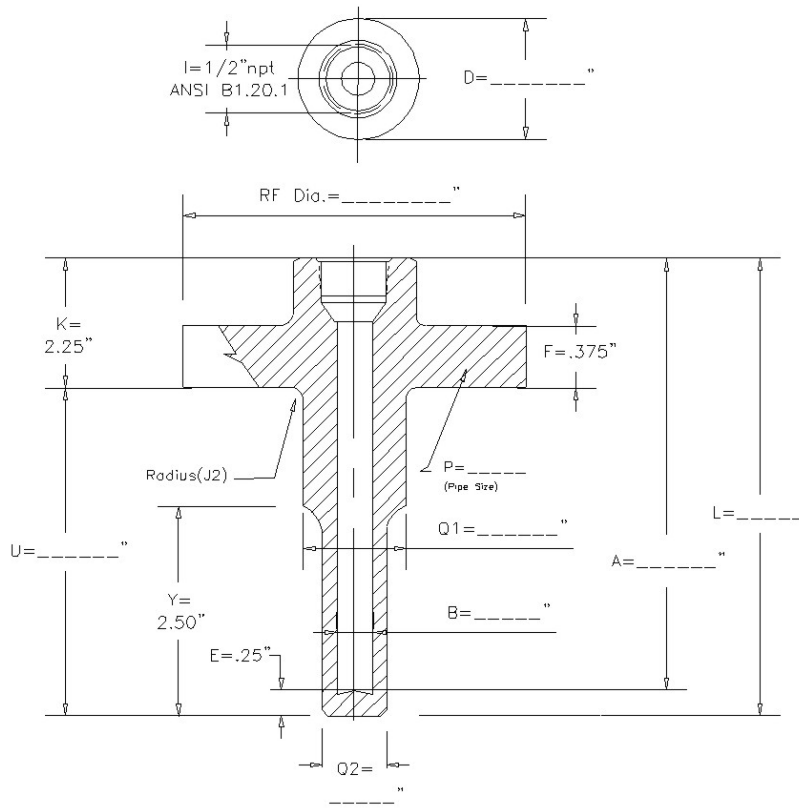
N = None
 C.S. = Slip-on Flange (Carbon Steel)
 S.S. = Slip-on Flange (Stainless Steel)

"L" DIMENSION

MATERIAL

600A = Alloy 600
 316S = 316 SS
 304S = 304 SS
 Other alloys and exotics
 available—Consult factory

"U" DIMENSION



MODEL VT-3

Vanstone Thermowells Tapered

