

THERMOWELLS & PROTECTION TUBES

Section TWPT



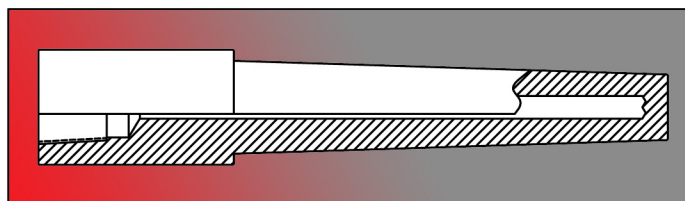
Thermowells and protection tubes are generally attached into the process three ways, threaded, welded or a flanged connection. For smaller diameters where the well will not be required to be removed on a regular basis and corrosion is not a serious problem, threaded process connections are preferred. By threading into a coupling, thread-o-let or TEE the well is attached directly to the vessel or run pipe.

For installations where the well needs to be removed more frequently due to corrosion or other requirements, a flange connection is used. The flange connection will bolt to a mating flange mounted to the process. Flange connections are more appropriate for high pressure applications and larger pipe sizes.

For applications where access is not required a weld-in or socket well can be used. These provide a high quality connection, but obviously cannot be removed without significant effort. Welded connections are also preferred for high pressure, high temperature steam lines.

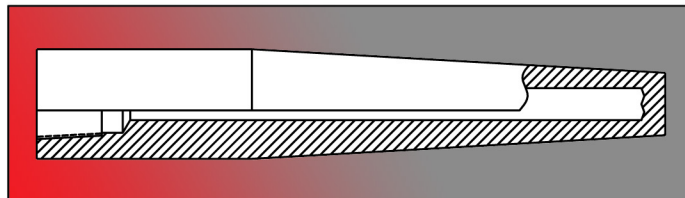
Protection tubes or pipe wells are generally less expensive than drilled bar stock styles and are used in applications where pressure and velocity are low enough that the stronger drilled bar stock types aren't required or where long lengths are needed. A typical application is in stack gas temperature monitoring where a high temperature alloy is used as pipe material. Protection tubes can be welded directly into a vessel or supplied with a threaded bushing or flange welded in place for threaded or flanged process connection.

THERMOWELLS & PROTECTION TUBES



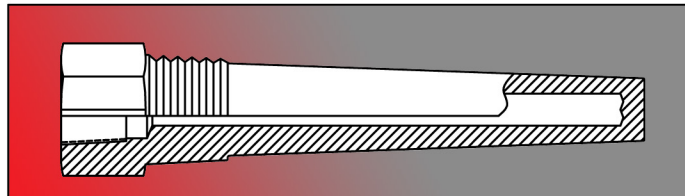
DRILLED SOCKET THERMOWELLS

See Document Number: TE-CO010109-TWPT-010



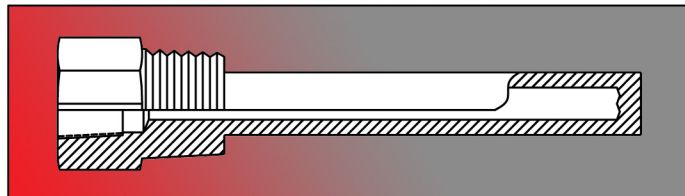
DRILLED WELD-IN THERMOWELLS

See Document Number: TE-CO010109-TWPT-020



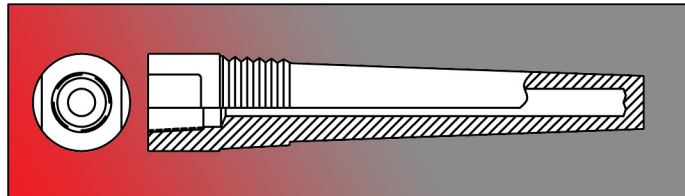
DRILLED THREADED THERMOWELLS, TAPERED SHANK

See Document Number: TE-CO010109-TWPT-030



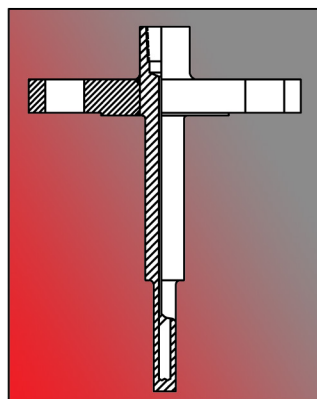
DRILLED THREADED THERMOWELLS, STRAIGHT SHANK

See Document Number: TE-CO010109-TWPT-040



DRILLED THREADED THERMOWELLS, TAPERED SHANK, ALLOY METALS

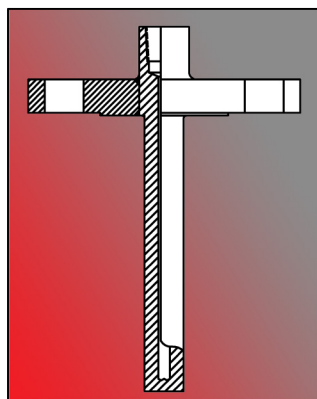
See Document Number: TE-CO010109-TWPT-050



DRILLED FLANGED THERMOWELLS, STEP DOWN

See Document Number:

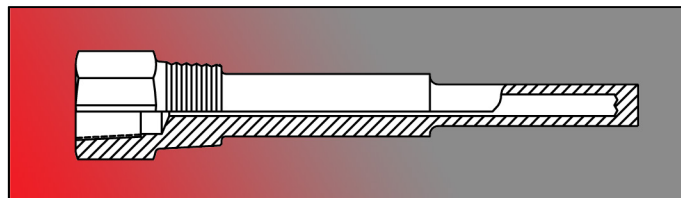
TE-CO010109-TWPT-060



DRILLED FLANGED THERMOWELLS, TAPERED & STRAIGHT

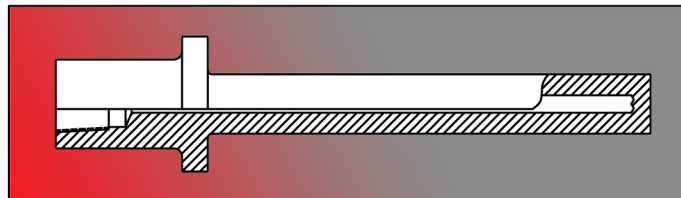
See Document Number:

TE-CO010109-TWPT-080



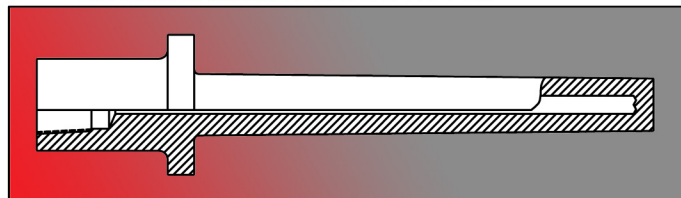
DRILLED THREADED THERMOWELLS, STEP DOWN SHANK

See Document Number: TE-CO-010109-TWPT-060



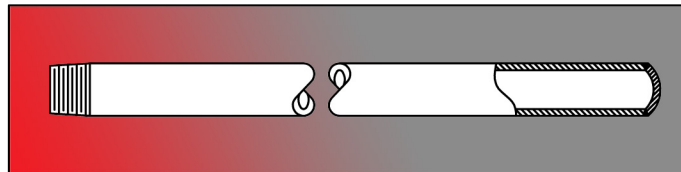
DRILLED VAN STONE THERMOWELLS, STRAIGHT SHANK

See Document Number: TE-CO010109-TWPT-080



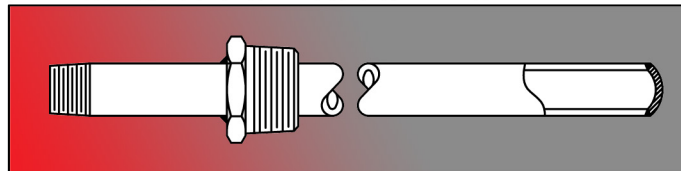
DRILLED VAN STONE THERMOWELLS, TAPERED SHANK

See Document Number: TE-CO010109-TWPT-090



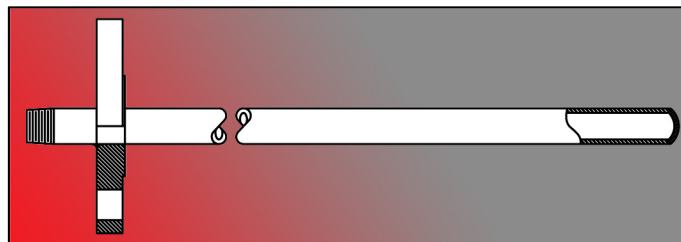
PROTECTION TUBES, PLAIN CONNECTION

See Document Number: TE-CO010109-TWPT-100



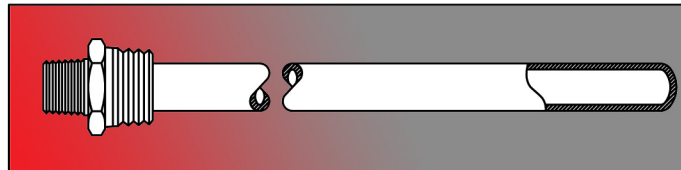
PROTECTION TUBES, THREADED CONNECTION

See Document Number: TE-CO010109-TWPT-100



PROTECTION TUBES, FLANGED CONNECTION

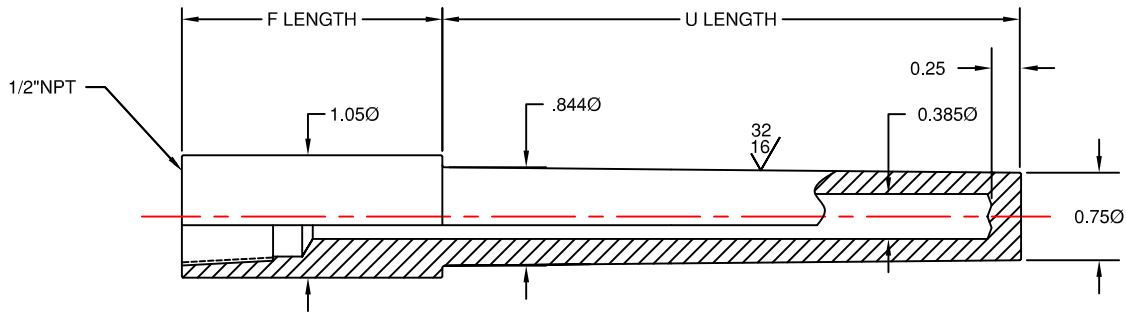
See Document Number: TE-CO010109-TWPT-110



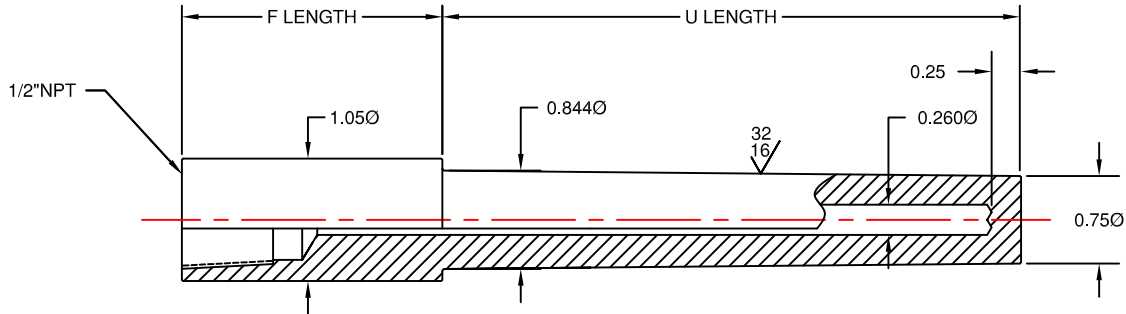
CERAMIC PROTECTION TUBES, THREADED and FLANGED CONNECTION

See Document Number: TE-CO010109-TWPT-120

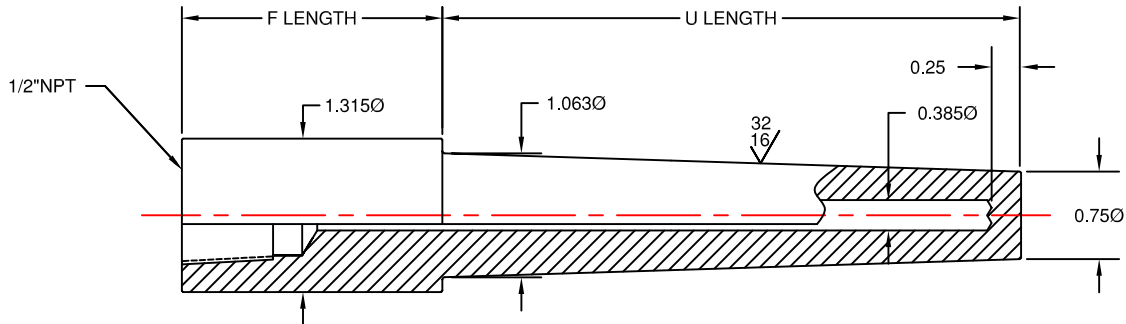
THERMOWELLS



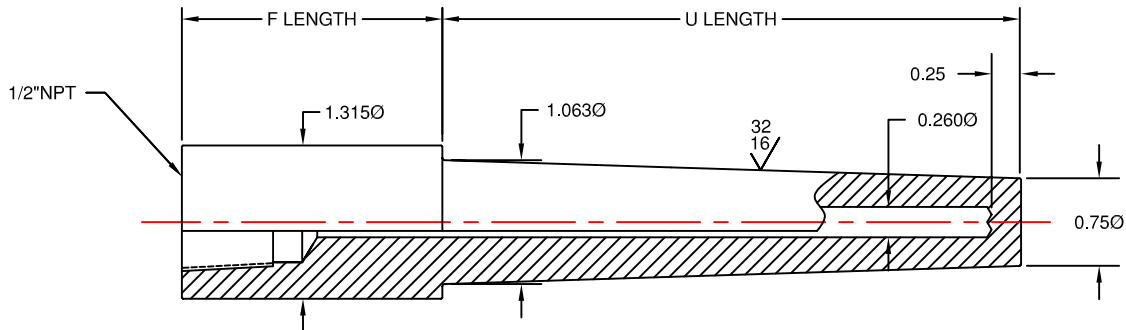
TYPE 01



TYPE 011



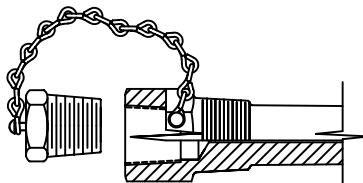
TYPE 02



TYPE 021

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+ .005 / - .003$
END THICKNESS
 $\pm .063$



PLUG & CHAIN
Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.
To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.

ORDERING CODE

TW

CODE	THERMOWELL TYPE (INSERT WELL TYPE)
------	---------------------------------------

CODE	WELL MATERIAL
P	304 STN. STL.
R	316 STN. STL.
PLorRL (F11)	304 or 316L STN. STL. 1.25% CR. - .5 MO.
N	CARBON STEEL

CODE	U LENGTH (IN INCHES)
------	-------------------------

CODE	F LENGTH (IN INCHES)
------	-------------------------



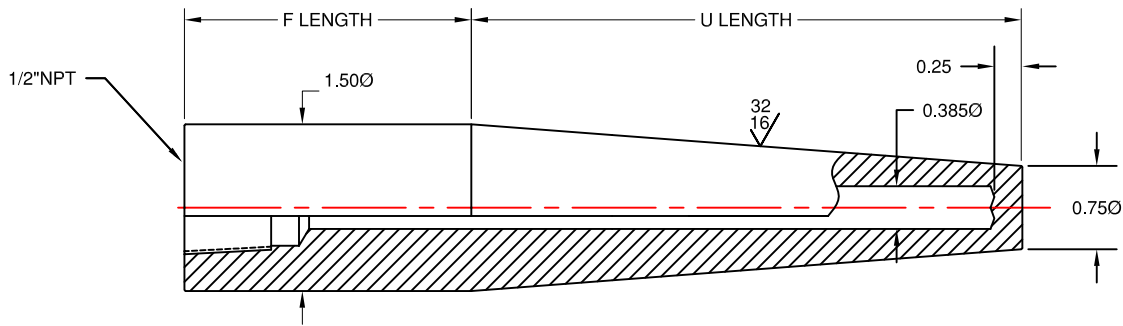
TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT DRILLED SOCKET THERMOWELLS

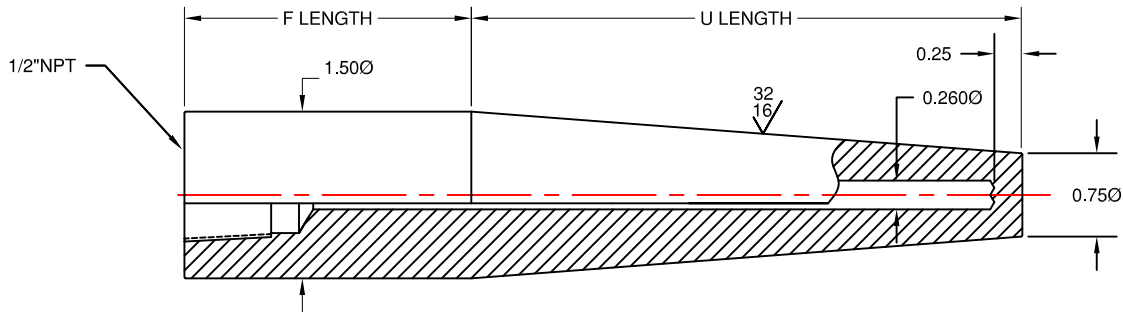
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-010

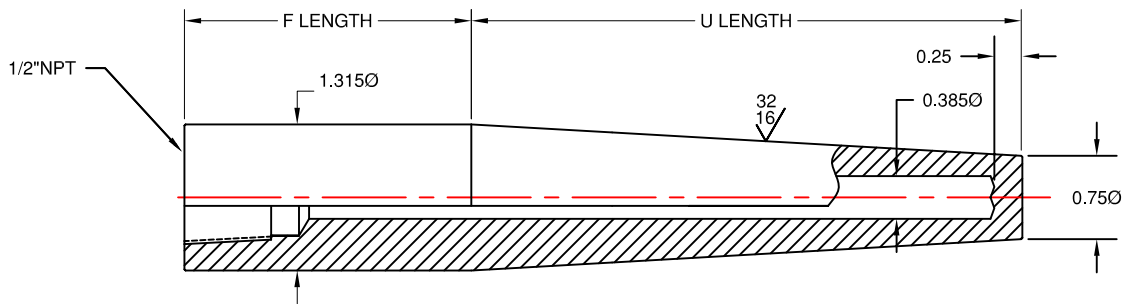
THERMOWELLS



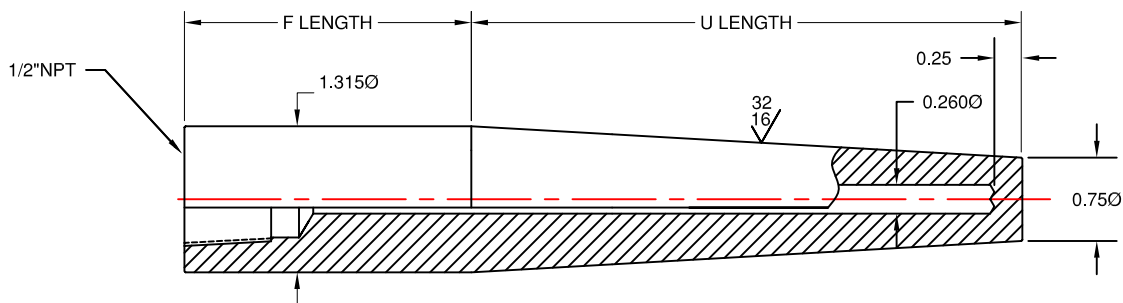
TYPE 03



TYPE 031



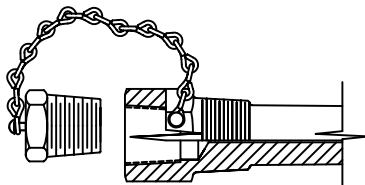
TYPE 04



TYPE 041

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+.005/- .003$
END THICKNESS
 $\pm .063$



PLUG & CHAIN
Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.
To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.

ORDERING CODE

TW

CODE	THERMOWELL TYPE (INSERT WELL TYPE)
------	---------------------------------------

CODE	U LENGTH (IN INCHES)
------	-------------------------

CODE	WELL MATERIAL
P	304 STN. STL.
R	316 STN. STL.
PLorRL (F11)	304 or 316L STN. STL. 1.25% CR. - .5 MO.
N	CARBON STEEL

CODE	F LENGTH (IN INCHES)
------	-------------------------



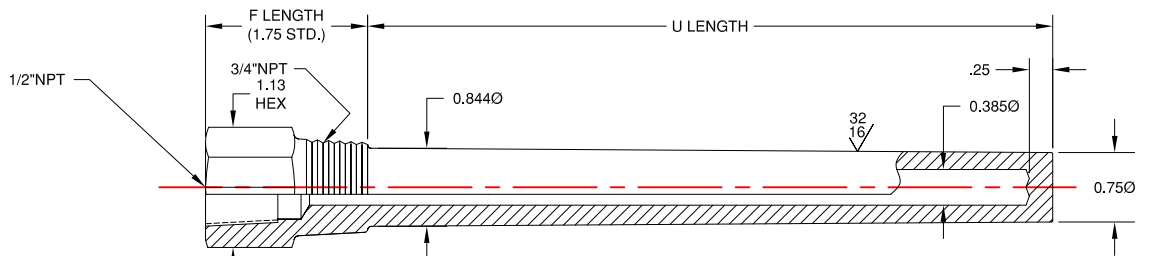
TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT DRILLED WELD-IN THERMOWELLS

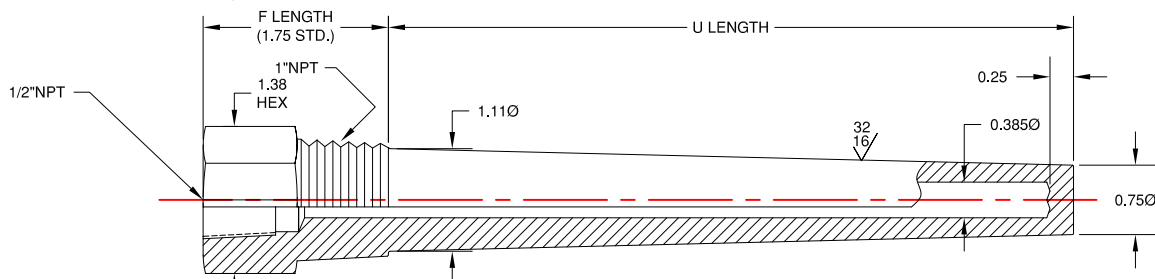
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-020

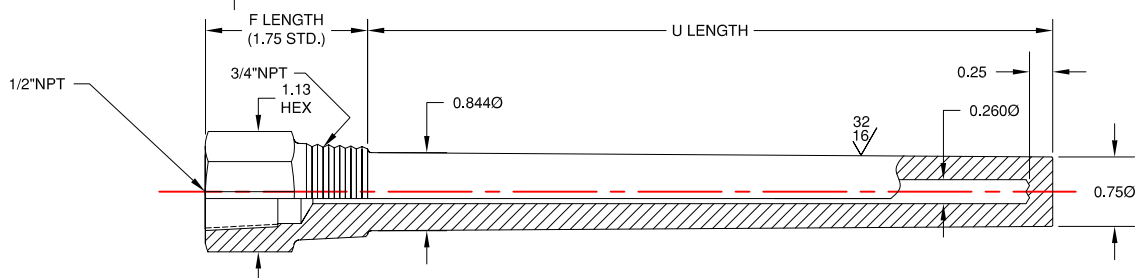
THERMOWELLS



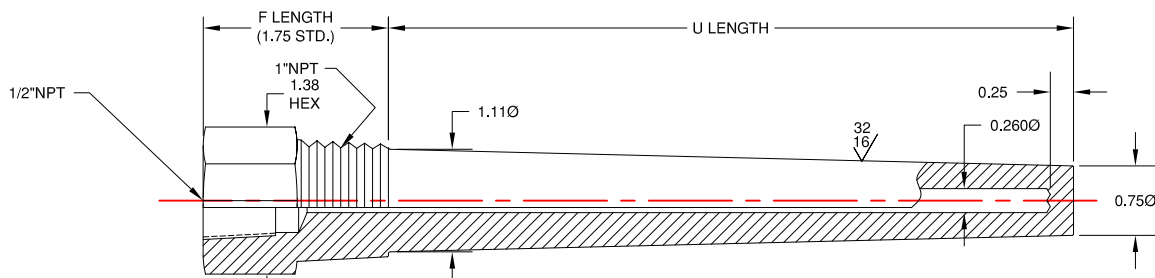
TYPE 12



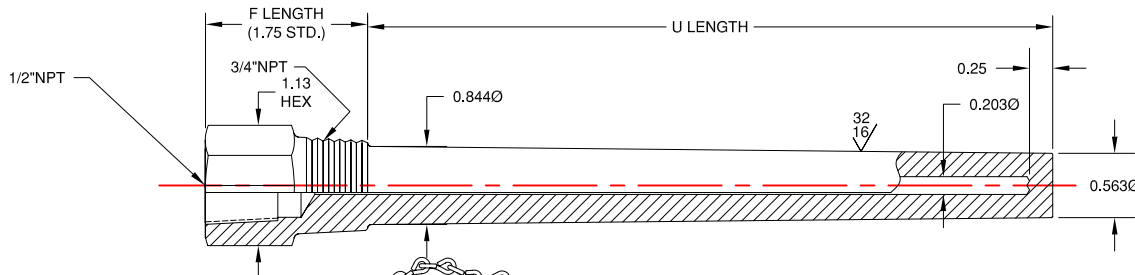
TYPE 14



TYPE 121



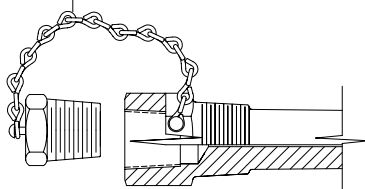
TYPE 141



TYPE 11

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+ .005 / - .003$
END THICKNESS
 $\pm .063$



PLUG & CHAIN

Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss. To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.

ORDERING CODE

TW

CODE	THERMOWELL TYPE (INSERT WELL TYPE)
------	---------------------------------------

CODE	WELL MATERIAL
P	304 STN. STL.
B	BRASS
R	316 STN. STL.
PLorRL	304 or 316L STN. STL.
N	CARBON STEEL

CODE	U LENGTH (IN INCHES)
------	-------------------------

CODE	F LENGTH (IN INCHES)
------	-------------------------



TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

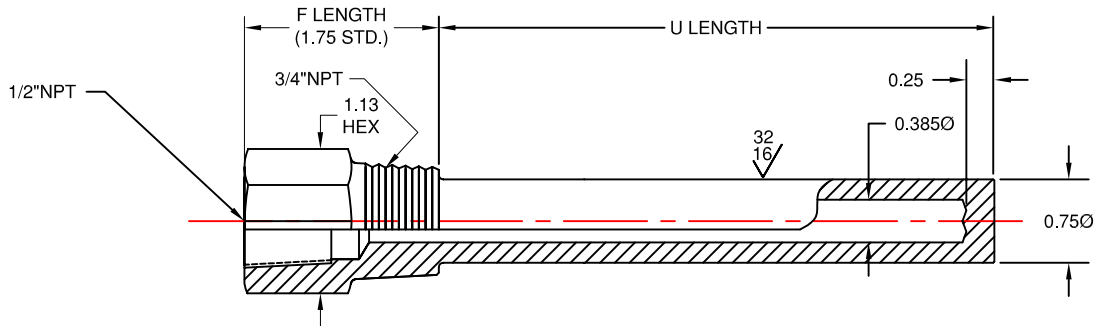
SECTION TWPT

DRILLED THREADED THERMOWELLS, TAPERED SHANK

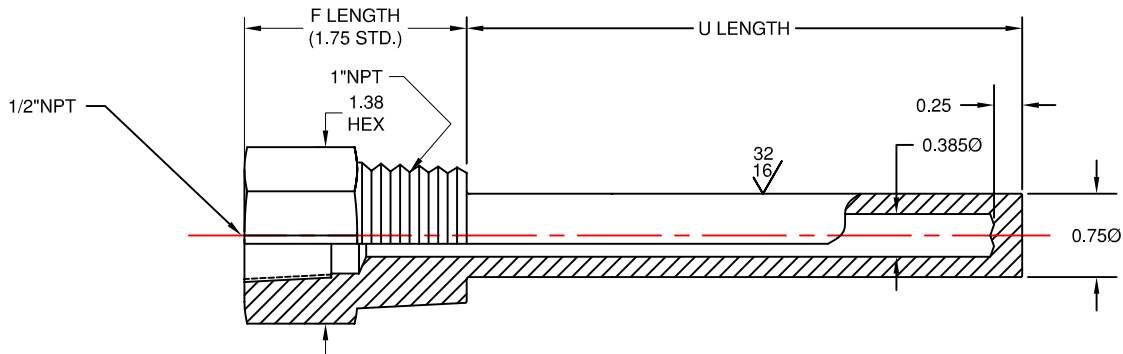
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-030

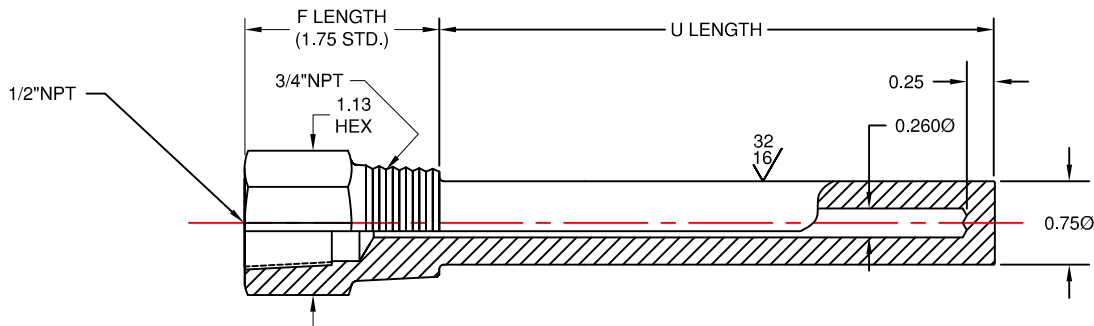
THERMOWELLS



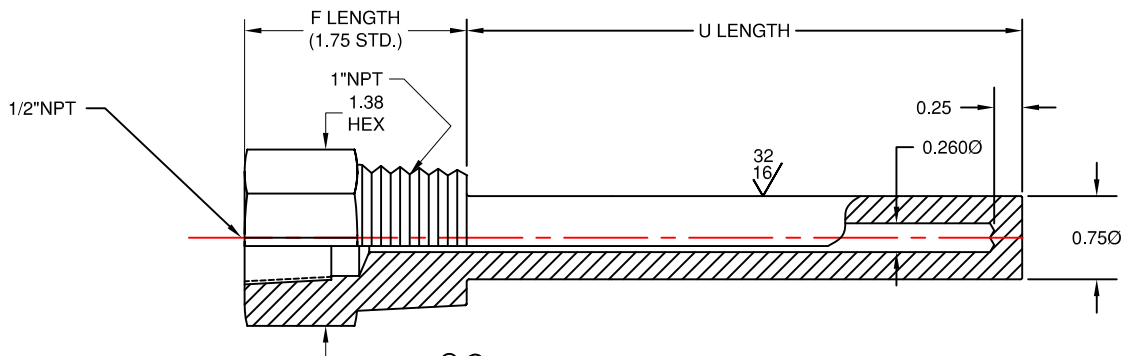
TYPE 16



TYPE 18



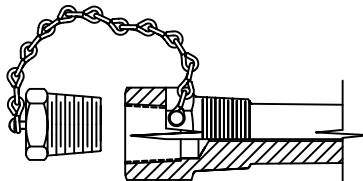
TYPE 161



TYPE 181

STANDARD TOLERANCES

U LENGTH
12" or Less ± 0.063
12" or Over ± 0.13
F LENGTH
 ± 0.25
STEM DIAMETER
 ± 0.015
BORE DIAMETER
 $+0.005/-0.003$
END THICKNESS
 ± 0.063



PLUG & CHAIN
Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.
To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.

ORDERING CODE

TW

CODE	THERMOWELL TYPE (INSERT WELL TYPE)
------	---------------------------------------

CODE	U LENGTH (IN INCHES)
------	-------------------------

CODE	WELL MATERIAL
P	304 STN. STL.
B	BRASS
R	316 STN. STL.
PLorRL	304 or 316L STN. STL.
N	CARBON STEEL

CODE	F LENGTH (IN INCHES)
------	-------------------------



TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT DRILLED THREADED THERMOWELLS, STRAIGHT SHANK

The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-040

1/2" NPT

1.38"

1.13 (WRENCH FLATS)

F LENGTH (1.75 STD.)

1" NPT

1.11"

32/16

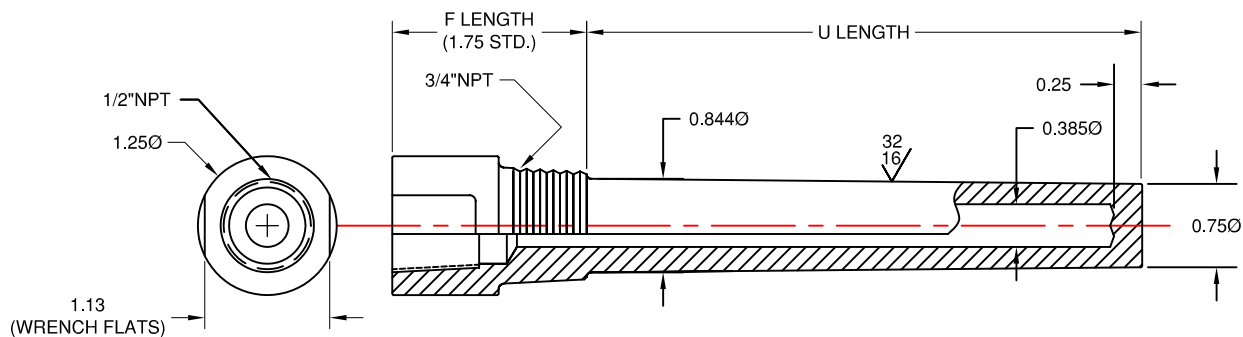
0.25"

0.385"

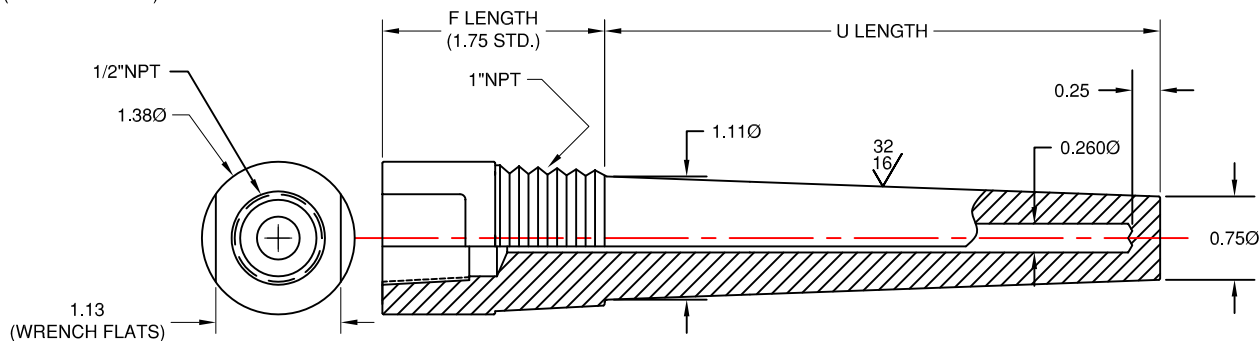
0.75"

TYPE 24

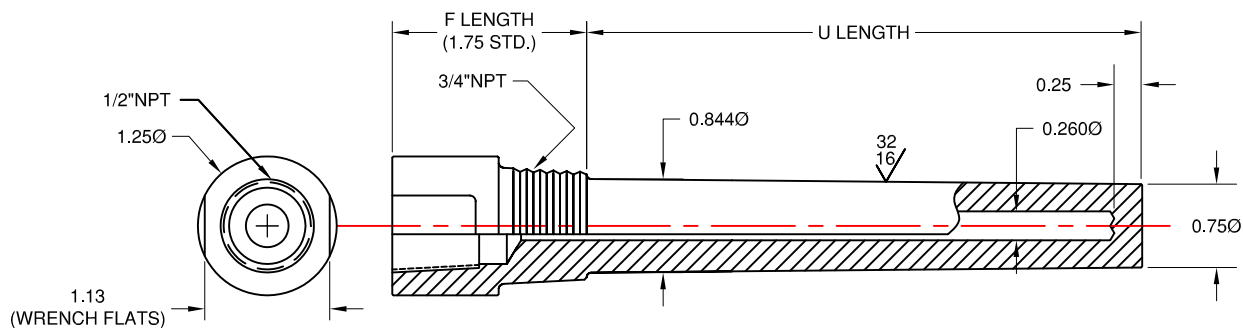
TYPE 24



TYPE 25



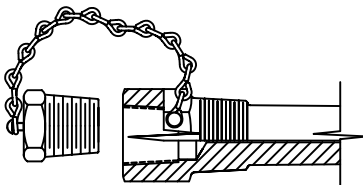
TYPE 241



TYPE 251

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+.005/- .003$
END THICKNESS
 $\pm .063$



PLUG & CHAIN

Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.

ORDERING CODE

TW

--	--	--	--

 -

--

CODE	THERMOWELL TYPE
	(INSERT WELL TYPE)

CODE	U LENGTH (IN INCHES)
------	-------------------------

CODE	WELL MATERIAL
Y	446 STN. STL.
H	HASTELLOY C276
L	MONEL 400
J	INCONEL 600
Q	310 STN. STL.
(F11)	1.25%CR - .5%MO
(F22)	2.25%CR - 1%MO

CODE	F LENGTH (IN INCHES)



THERMO ELECTRIC

TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

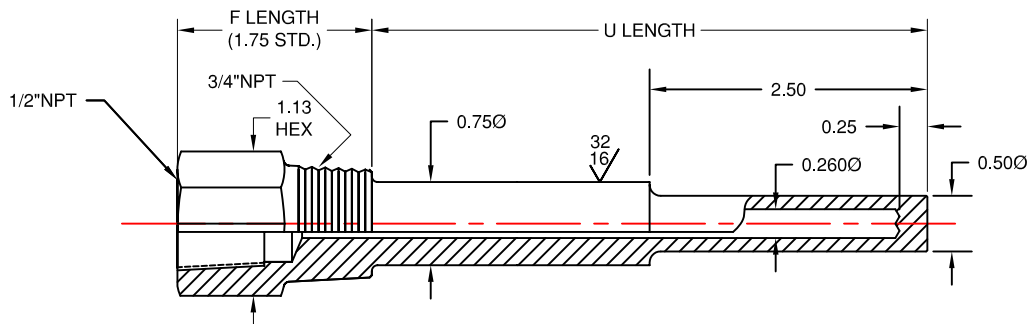
SECTION TWPT

DRILLED THREADED THERMOWELLS TAPERED SHANK, ALLOY MATERIALS

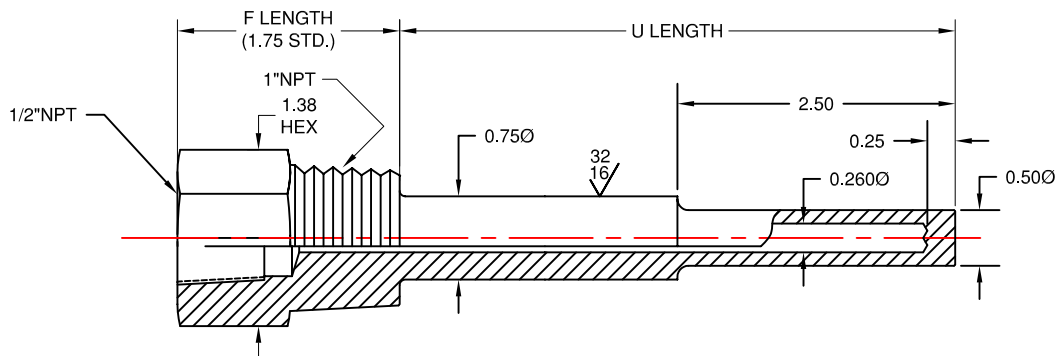
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipients organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-050

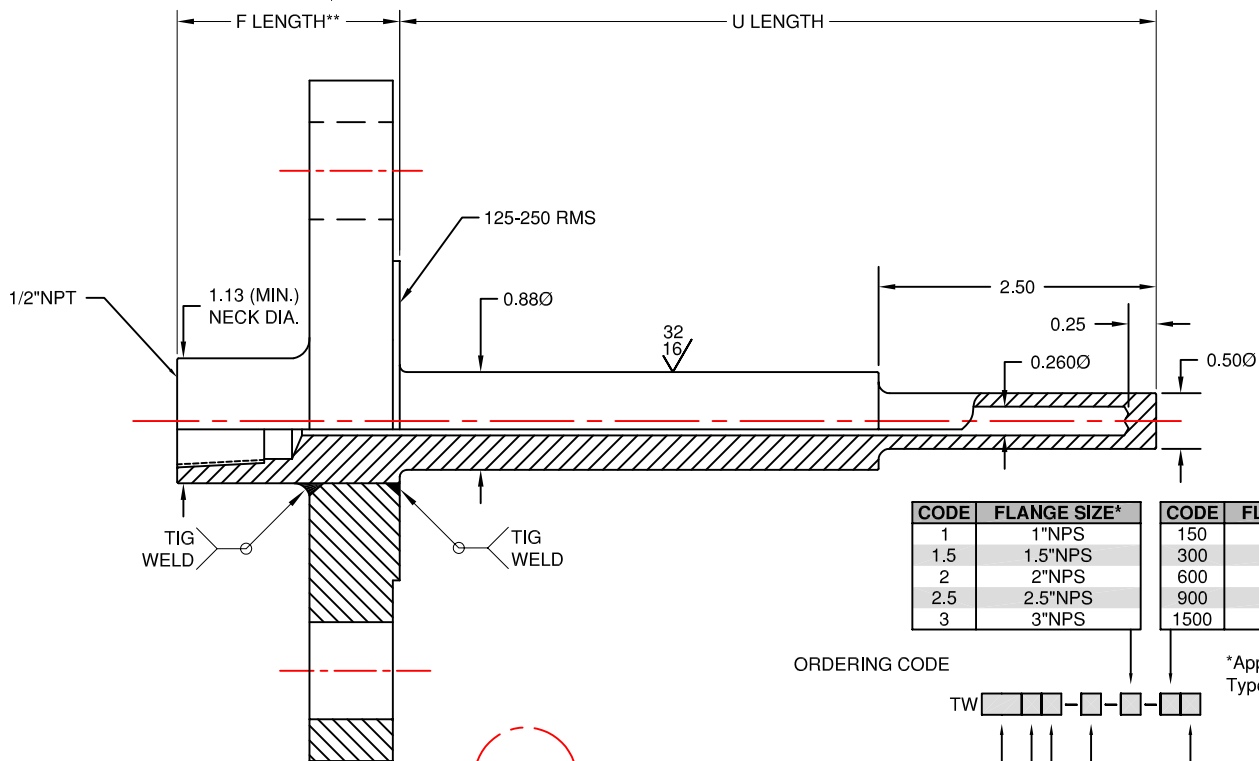
THERMOWELLS



TYPE 122



TYPE 142



TYPE 432

CODE	FLANGE SIZE*	CODE	FLANGE RATING*
1	1"NPS	150	150 LBS.
1.5	1.5"NPS	300	300 LBS.
2	2"NPS	600	600 LBS.
2.5	2.5"NPS	900	900 LBS.
3	3"NPS	1500	1500 LBS.

ORDERING CODE

*Applies to
Type 432 Only

TW

--	--	--

 -

--

 -

--

 -

--	--

CODE	THERMOWELL TYPE
	(INSERT WELL TYPE)

CODE	WELL MATERIAL
P	304 STN. STL.
R	316 STN. STL.
PLorRL (F11)	304 or 316L STN. STL. 1.25% CR. - .5 MO.
N	CARBON STEEL

CODE	FLANGE TYPE*
FF	FLAT FACE
RF	RAISED FACE
RJ	RING JOINT

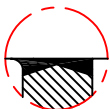
CODE	U LENGTH (IN INCHES)
------	-------------------------

CODE	F LENGTH** (IN INCHES)
------	---------------------------

****2" Minimum Length For Flanged Thermowells, May Be Longer For Larger Flange Sizes.**

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+ .005/- .003$
END THICKNESS
 $\pm .063$



OPTIONAL
FULL PENETRATION WELD
(Add (FP) to end of Ordering Code)

PLUG & CHAIN

Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.



THERMO ELECTRIC

TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT

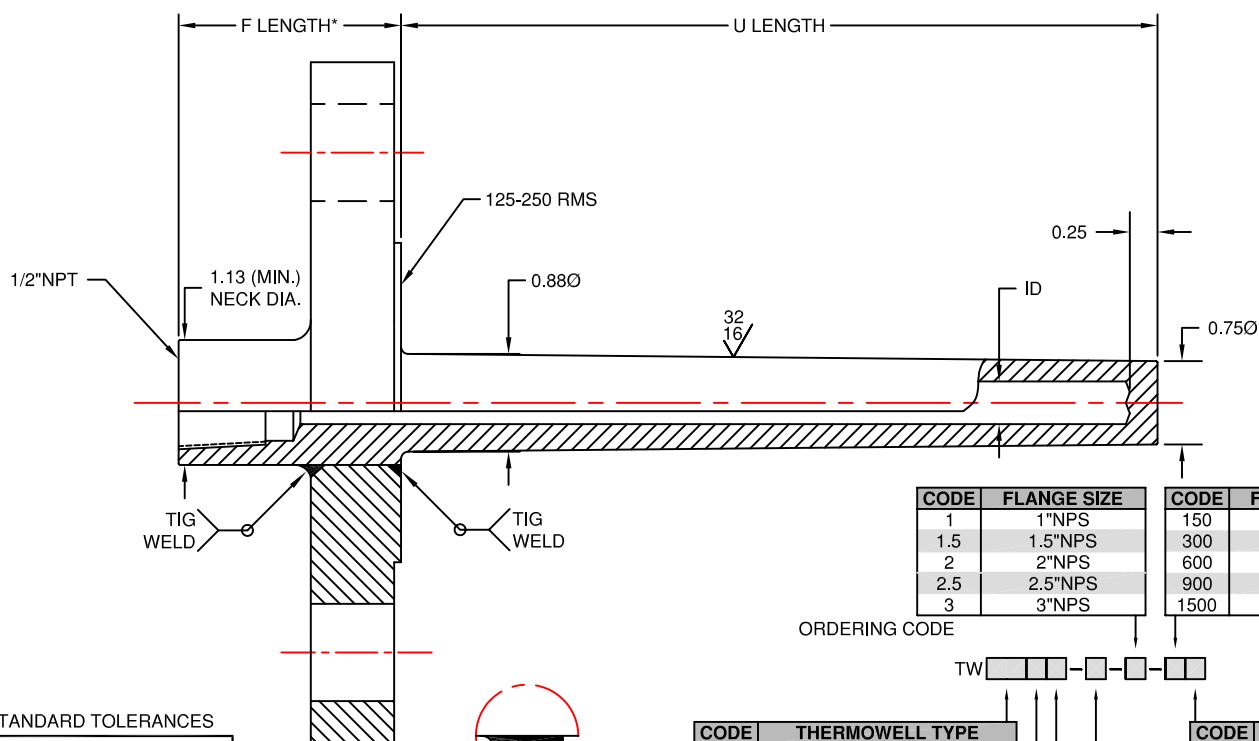
DRILLED THREADED & FLANGED
THERMOWELLS
STEPPED DOWN SHANK

The information contained herein shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-060

Technical drawing of a 1/2 inch diameter, 125-250 RMS, 32/16 threaded pipe with a TIG weld. The drawing shows a cross-section of the pipe with a neck diameter of 1.13 (min.) and a wall thickness of 0.118 (3mm) min. The drawing includes dimensions for F LENGTH** and U LENGTH, and a note for 0.88Ø. The drawing is labeled with 'TIG WELD' and 'ID'.

TYPE 42
TYPE 43



CODE	FLANGE SIZE
1	1"NPS
1.5	1.5"NPS
2	2"NPS
2.5	2.5"NPS
3	3"NPS

CODE	FLANGE RATING
150	150 LBS.
300	300 LBS.
600	600 LBS.
900	900 LBS.
1500	1500 LBS.

ORDERING CODE

TW

--	--	--

 -

--

 -

--

 -

--	--

CODE	THERMOWELL TYPE
42	STRAIGHT, .385"ID
43	STRAIGHT, .260"ID
47	TAPERED, .385"ID
48	TAPERED, .260"ID

CODE	FLANGE TYPE
FF	FLAT FACE
RF	RAISED FACE
RJ	RING JOINT

CODE	U LENGTH (IN INCHES)
------	-------------------------

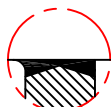
CODE	F LENGTH*
	(IN INCHES)

CODE	WELL MATERIAL
P	304 STN. STL.
R	316 STN. STL.
PLorRL	304 or 316L STN. STL.
(F11)	1.25% CR. - .5 MO.
N	CARBON STEEL

*2" Minimum Length For Flanged Thermowells, May Be Longer For Larger Flange Sizes.

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+ .005/- .003$
END THICKNESS
 $\pm .063$



OPTIONAL
FULL PENETRATION WELD
(Add (FP) to end of Ordering Code)

PLUG & CHAIN

Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.



THERMO ELECTRIC

TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

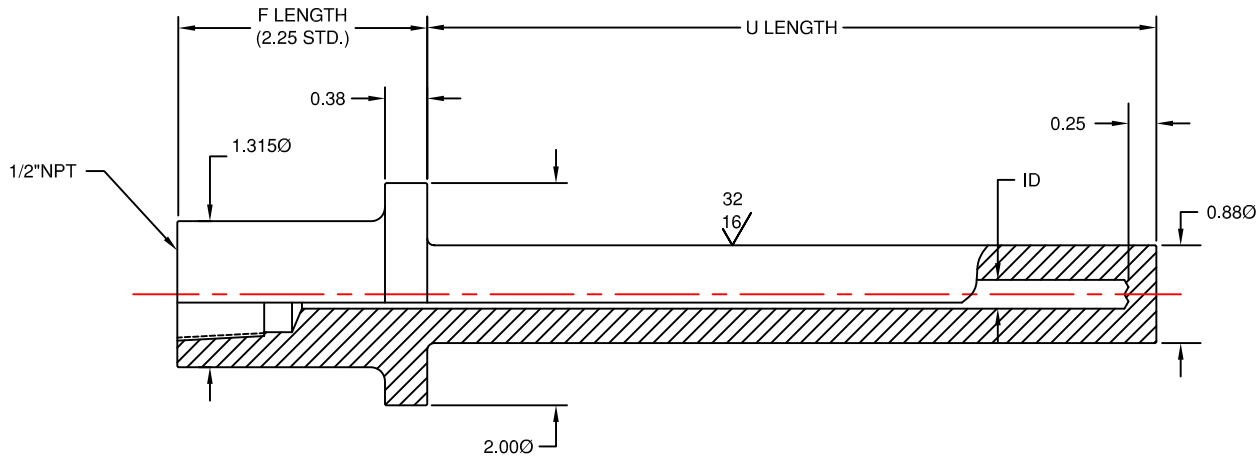
SECTION TWPT

DRILLED FLANGED THERMOWELLS TAPERED & STRAIGHT SHANK

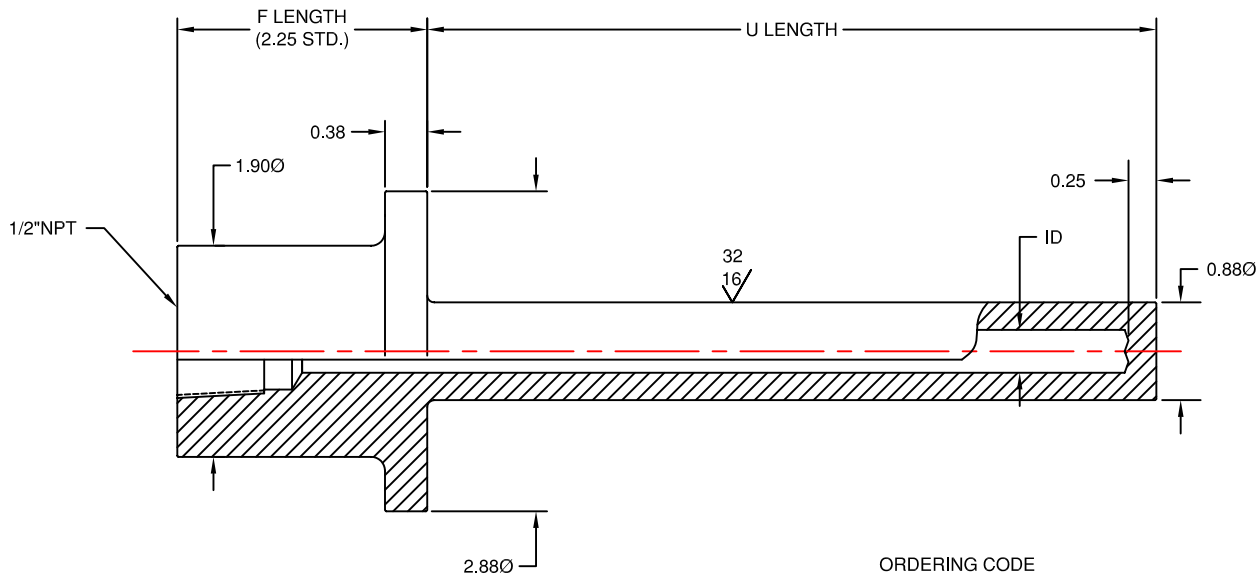
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-070

THERMOWELLS



**TYPE 45
TYPE 451**



**TYPE 46
TYPE 461**

ORDERING CODE

TW

CODE	U LENGTH (IN INCHES)

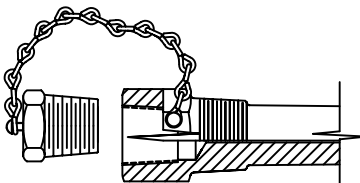
CODE	F LENGTH (IN INCHES)

CODE	WELL MATERIAL
P	304 STN. STL.
R	316 STN. STL.
PLorRL (F11)	304 or 316L STN. STL. 1.25% CR. - .5 MO.
N	CARBON STEEL

CODE	THERMOWELL TYPE
45	1" FLANGE SIZE, .385" ID
46	1.5" FLANGE SIZE, .385" ID
451	1" FLANGE SIZE, .260" ID
461	1.5" FLANGE SIZE, .260" ID

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+.005/- .003$
END THICKNESS
 $\pm .063$



PLUG & CHAIN

Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.



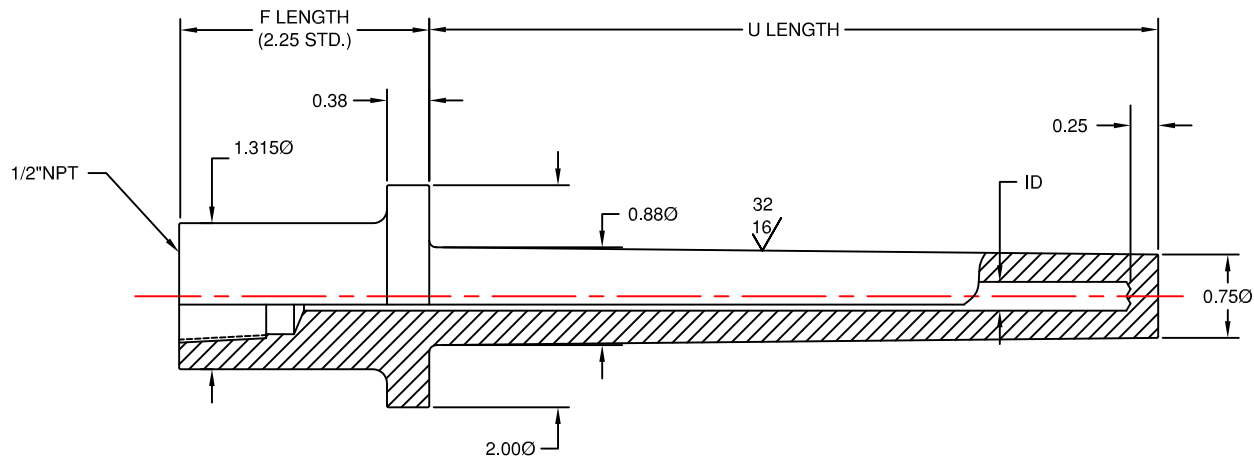
TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT DRILLED VAN STONE THERMOWELLS STRAIGHT SHANK

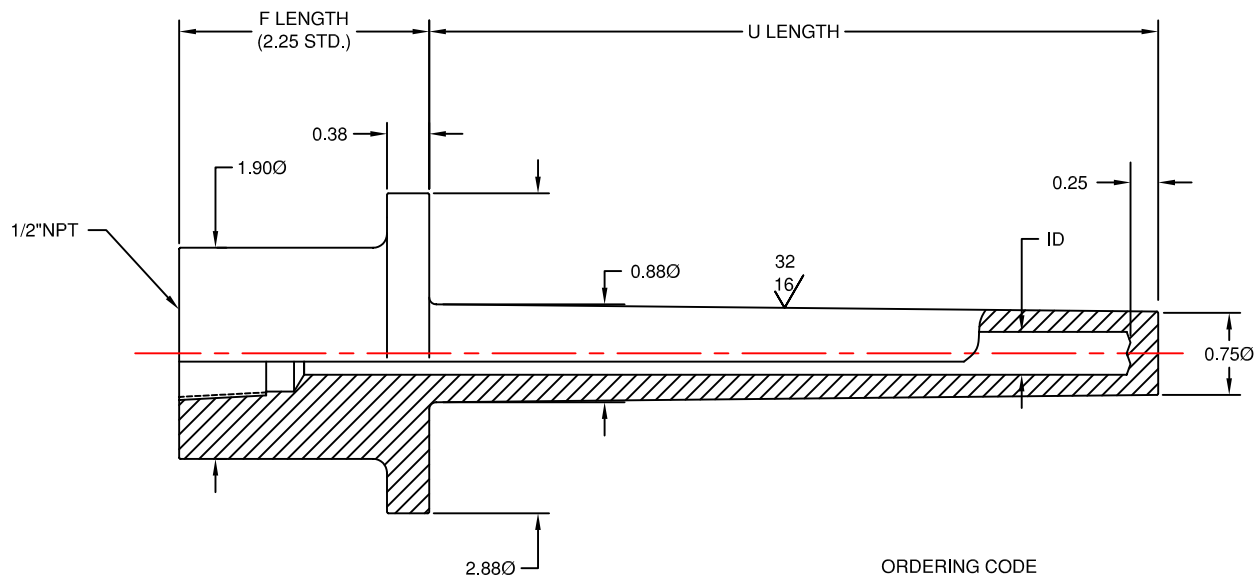
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-080

THERMOWELLS



**TYPE 41
TYPE 411**



**TYPE 44
TYPE 441**

ORDERING CODE

TW

CODE	U LENGTH (IN INCHES)

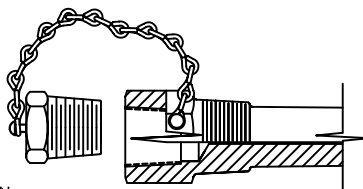
CODE	F LENGTH (IN INCHES)

CODE	WELL MATERIAL
P	304 STN. STL.
R	316 STN. STL.
PLorRL (F11)	304 or 316L STN. STL. 1.25% CR. - .5 MO.
N	CARBON STEEL

CODE	THERMOWELL TYPE
41	1" FLANGE SIZE, .385" ID
44	1.5" FLANGE SIZE, .385" ID
411	1" FLANGE SIZE, .260" ID
441	1.5" FLANGE SIZE, .260" ID

STANDARD TOLERANCES

U LENGTH
12" or Less $\pm .063$
12" or Over $\pm .13$
F LENGTH
 $\pm .25$
STEM DIAMETER
 $\pm .015$
BORE DIAMETER
 $+ .005 / - .003$
END THICKNESS
 $\pm .063$



PLUG & CHAIN

Prevent foreign matter from entering test wells when not in use. Plugs are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify plug & chain code letters after well ordering code.

CODE	PLUG & CHAIN
-BPC	BRASS
-SSPC	STN. STL.



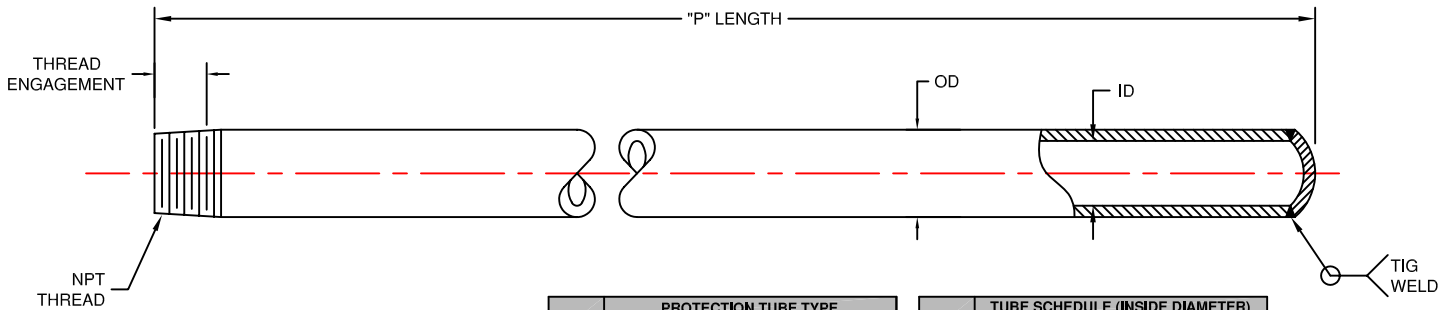
TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT DRILLED VAN STONE THERMOWELLS TAPERED SHANK

The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-090

PROTECTION TUBES

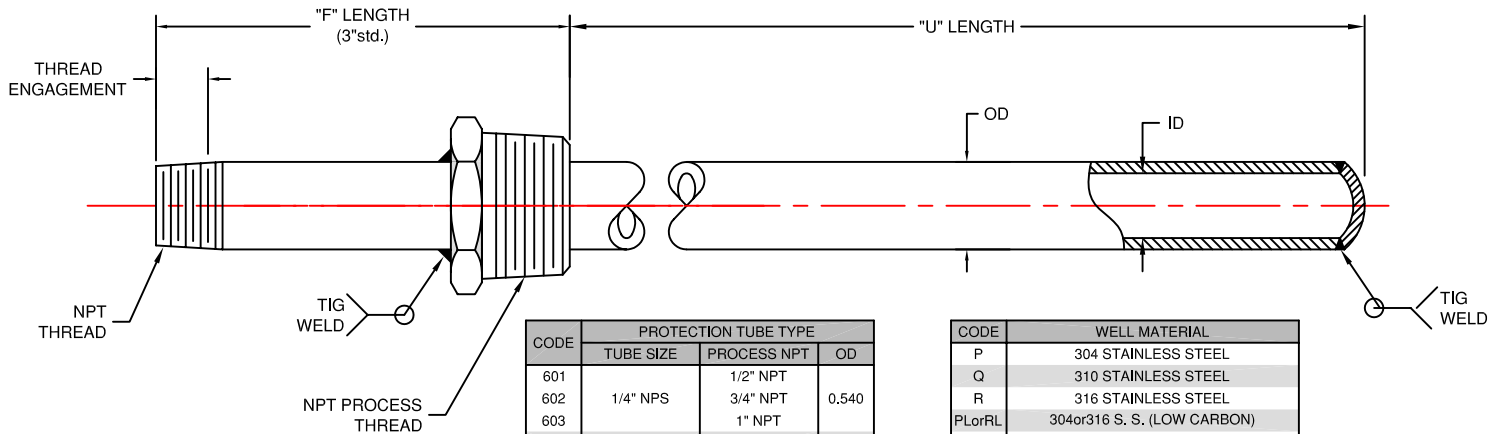


CODE	PROTECTION TUBE TYPE		TUBE SCHEDULE (INSIDE DIAMETER)			
	TUBE SIZE	OD	1/4"NPT	1/2"NPT	3/4"NPT	1"NPT
51	1/4" NPS	0.540	0.364	0.622	0.824	1.049
52	1/2" NPS	0.840	0.302	0.546	0.742	0.957
53	3/4" NPS	1.050	N/A	0.464	0.612	0.815
54	1" NPS	1.315	N/A	N/A	0.434	0.599

53-40-Q-36

CODE	WELL MATERIAL
P	304 STAINLESS STEEL
Q	310 STAINLESS STEEL
R	316 STAINLESS STEEL
PLorRL	304or316 S. S. (LOW CARBON)
N	CARBON STEEL
J	INCONEL 600
H	HASTELLOY C276

CODE	"P" LENGTH
	IN INCHES



CODE	PROTECTION TUBE TYPE		
	TUBE SIZE	PROCESS NPT	OD
601	1/4" NPS	1/2" NPT	0.540
602		3/4" NPT	
603		1" NPT	
606	1/2" NPS	3/4" NPT	0.840
607		1" NPT	
608		1 1/4" NPT	
610	3/4" NPS	1" NPT	1.050
611		1 1/4" NPT	
612		1 1/2" NPT	
613	1" NPS	1 1/4" NPT	1.315
614		1 1/2" NPT	

CODE	WELL MATERIAL
P	304 STAINLESS STEEL
Q	310 STAINLESS STEEL
R	316 STAINLESS STEEL
PLorRL	304or316 S. S. (LOW CARBON)
N	CARBON STEEL
J	INCONEL 600
H	HASTELLOY C276

611-80-R-3-48(N)

CODE	TUBE SCHEDULE (INSIDE DIAMETER)			
	1/4"NPT	1/2"NPT	3/4"NPT	1"NPT
40	0.364	0.622	0.824	1.049
80	0.302	0.546	0.742	0.957
160	N/A	0.464	0.612	0.815
XXS	N/A	N/A	0.434	0.599

CODE	"U" LENGTH
	IN INCHES

CODE	"F" LENGTH
	IN INCHES (3" STD.)

CAP & CHAIN

Prevent foreign matter from entering protection tubes when not in use. Caps are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify cap & chain code letters after protection tube ordering code.

CODE	CAP & CHAIN
-BCC	BRASS
-SSCC	STN. STL.



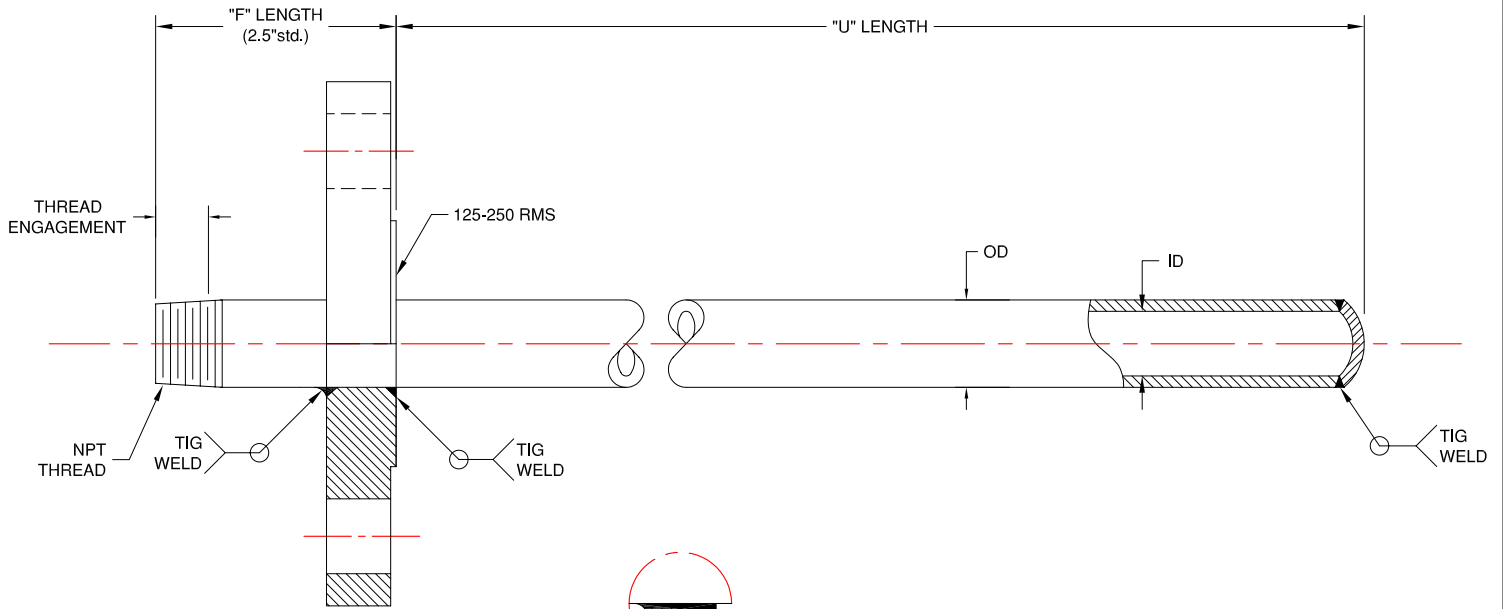
TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT PROTECTION TUBES PLAIN & THREADED CONNECTION

The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-100

PROTECTION TUBES



OPTIONAL
FULL PENETRATION WELD
(Add (FP) to end of Ordering Code)

CODE	PROTECTION TUBE TYPE	
	TUBE SIZE	OD
81	1/4" NPS	0.540
82	1/2" NPS	0.840
83	3/4" NPS	1.050
84	1" NPS	1.315

CODE	WELL MATERIAL
P	304 STAINLESS STEEL
Q	310 STAINLESS STEEL
R	316 STAINLESS STEEL
PLorRL	304or316 S. S. (LOW CARBON)
N	CARBON STEEL
J	INCONEL 600
H	HASTELLOY C276

USE ONLY IF FLANGE
MATERIAL IS NOT THE
SAME AS TUBE MATERIAL

OPTIONAL FULL
PENETRATION WELD

83 - 40 - Q - 2.5 - 72 - 1.5 - 300 RF (N) (FP)

CODE	TUBE SCHEDULE (INSIDE DIAMETER)			
	1/4"NPT	1/2"NPT	3/4"NPT	1"NPT
40	0.364	0.622	0.824	1.049
80	0.302	0.546	0.742	0.957
160	N/A	0.464	0.612	0.815
XXS	N/A	N/A	0.434	0.599

CODE	FLANGE TYPE
FF	FLAT FACE
RF	RAISED FACE
RJ	RING TYPE JOINT

CODE	FLANGE RATING
	SPECIFY

CODE	"F" LENGTH
	IN INCHES (3" STD.)

CODE	FLANGE SIZE
	IN INCHES

CODE	"U" LENGTH
	IN INCHES

CODE	CAP & CHAIN
-BCC	BRASS
-SSCC	STN. STL.

CAP & CHAIN

Prevent foreign matter from entering protection tubes when not in use. Caps are available in Brass or Stainless Steel. A captive chain is attached to prevent loss.

To order as a test well specify cap & chain code letters after protection tube ordering code.



TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT PROTECTION TUBES FLANGED CONNECTION

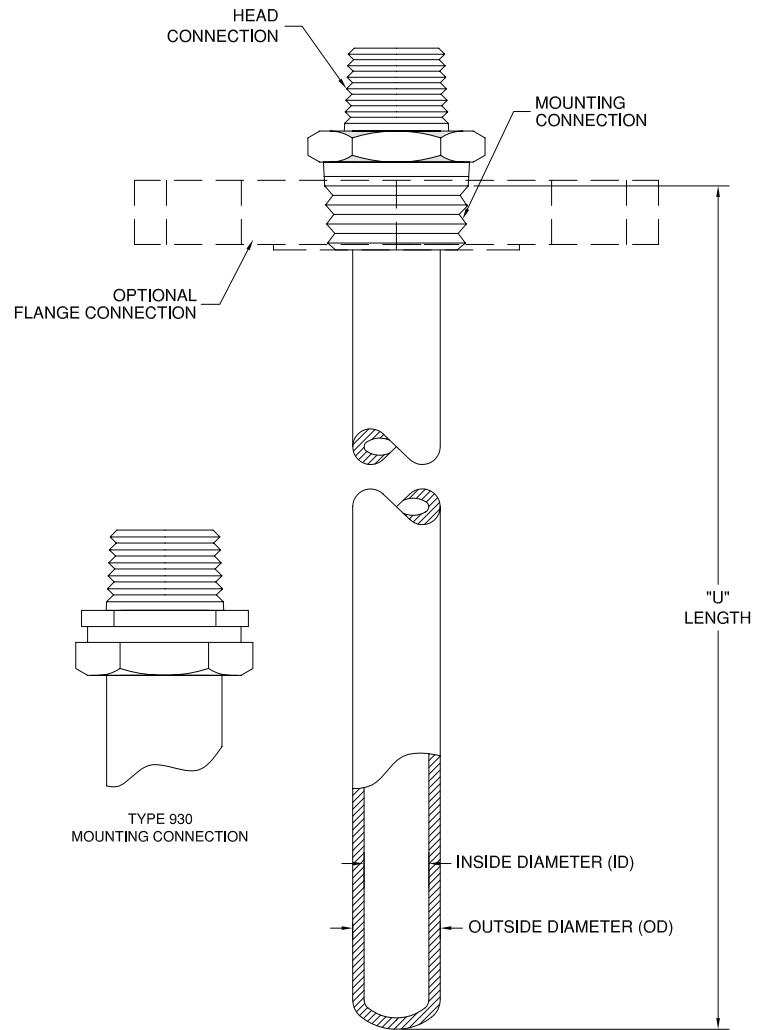
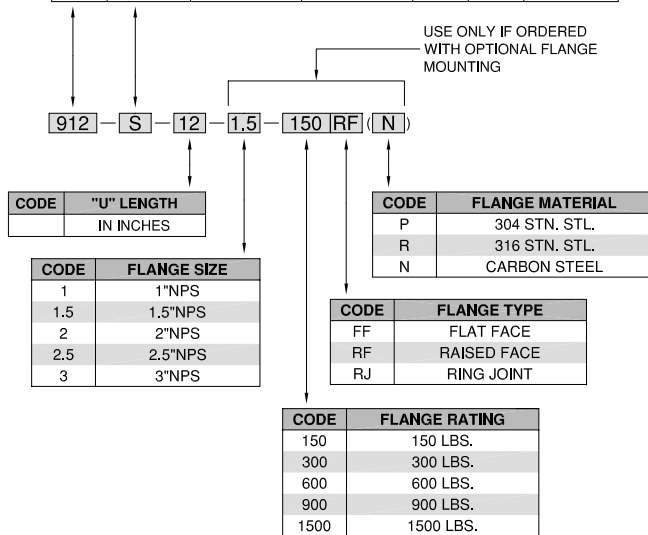
The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-110

PROTECTION TUBES

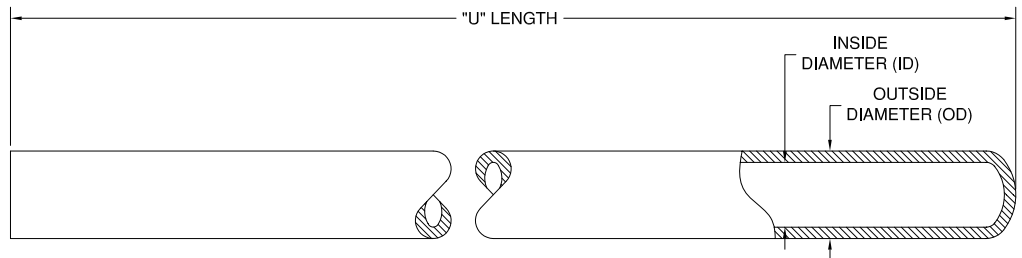
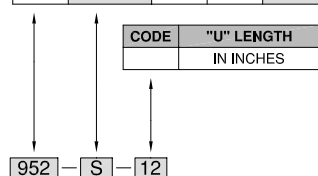
PROTECTION TUBES WITH THREADED OR FLANGED PROCESS CONNECTIONS

PROTECTION TUBE TYPE & MATERIAL					
CODE	CODE	MOUNTING CONNECTION	HEAD CONNECTION	TUBE SIZE I.D. O.D.	MATERIAL
900	U	1/2"NPT	1/2"NPT	1/4" 3/8"	MULLITE
901		3/4"NPT	1/2"NPT	3/8" 1/2"	
902		1"NPT	3/4"NPT	7/16" 11/16"	
903		1 1/4"NPT	3/4"NPT	5/8" 7/8"	
904	S	1 1/4"NPT	3/4"NPT	3/4" 1"	99.5% PURE ALUMINA
910		1/2"NPT	1/2"NPT	5/32" 1/4"	
911		1/2"NPT	1/2"NPT	3/16" 5/16"	
912		1/2"NPT	1/2"NPT	1/4" 3/8"	
913		3/4"NPT	1/2"NPT	5/16" 1/2"	
914		3/4"NPT	1/2"NPT	7/16" 9/16"	
915		3/4"NPT	1/2"NPT	7/16" 9/16"	
916	CERMET	1 1/4"NPT	3/4"NPT	5/8" 7/8"	CERMET
917		1 1/4"NPT	3/4"NPT	3/4" 1"	
930		NONE	1/2"NPT	5/8" 7/8"	
930T		3/4"NPT	1/2"NPT	5/8" 7/8"	



PLAIN END PROTECTION TUBES

PROTECTION TUBE TYPE & MATERIAL				
CODE	CODE	TUBE SIZE		MATERIAL
		I.D.	O.D.	
950	U	1/4"	3/8"	MULLITE
951		3/8"	1/2"	
952		7/16"	11/16"	
953		5/8"	7/8"	
954	S	3/4"	1"	99.5% PURE ALUMINA
960		5/32"	1/4"	
961		3/16"	5/16"	
962		1/4"	3/8"	
963		5/16"	1/2"	
964		7/16"	9/16"	
965		7/16"	9/16"	
966		5/8"	7/8"	
967		3/4"	1"	



Mullite Vitreous refractory mullite (silica - alumina) protection tubes can be used to 3000°F. They are impervious to air to 3000°F, to dry hydrogen and carbon monoxide to 2550°F, and will maintain 10 - 5 millimeters of mercury to 2600°F. Low rate of thermal expansion imparts good thermal shock resistance.

High Purity Alumina Sintered alumina oxide (over 99.5% Alumina Oxide) tubes have a maximum working temperature of 3450°F. The high thermal conductivity of 99.5% alumina oxide guarantees quick temperature response. It is highly resistant to reducing, oxidizing, and high vacuum atmospheres, corrosive alkaline vapors and aluminum chloride vapors. Stable to acids, alkalis, metal melts, most glass fluxes, salt melts and slags. Dense structure prevents penetration of melts providing longer life in environments which normally react within 96% alumina temperatures..

Cermet Cermet metal - ceramic is a combination of chromium and aluminum oxide stable in oxidizing atmospheres to 2500°F. Cermet tubes are stronger and more resistant to repeated thermal and mechanical shock than ceramic materials, but are relatively brittle as compared to metals. Abrasive conditions at temperatures to 2300°F have little effect on cermet tubes, and chemicals such as sulphur dioxide, sulphur trioxide and concentrated sulphuric acid have a low rate of attack on the material.

Silicon Carbide Thermo Electric also offer several grades of silicon carbide protection tubes which can be used in temperatures up to 3000°F where an extremely hard and chemically inert material is required. It resists most acids, molten salts and acid slags making it ideal for use with molten metals such as aluminum, copper, brass, cadmium, lead and zinc.



TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION TWPT

CERAMIC PROTECTION TUBES

The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO010109-TWPT-120

INTRODUCTION

THERMO ELECTRIC COMPANY INC.

CORPORATE OFFICES

1193 McDermott Drive

WEST CHESTER, PENNSYLVANIA 19380

Phone: 1-610-692-7990

Toll Free Number: 1-800-766-4020

Fax: 1-610-430-1325

E-Mail: tepasales@te-direct.com



THERMO ELECTRIC

THERMO ELECTRIC COMPANY INDIA PVT. LTD.

No. 362, SECTOR-7

IMT MANESAR - 122050 GURGAON

HARYANA

Phone: 91-124-400-6371

GSM: 91-9654305463 & 91-9871903246

Fax: 91-124-400-6372

E-Mail: teinsales@te-direct.com



THERMO ELECTRIC

THERMO ELECTRIC COMPANY UK LTD.

Building 1000

KENT SCIENCE PARK

SITTINGBOURNE

ME9 8PS

UNITED KINGDOM

Phone: 0044-1795-410414

Fax: 0044-1795-410415

E-Mail: teuksales@te-direct.com



THERMO ELECTRIC

THERMO ELECTRIC (CANADA) LTD.

12-4580 EASTGATE PKWY

MISSISSAUGA, ON L4W4K4 - CANADA

Phone: 1-905-451-0813

Toll Free Number: 1-800-663-3278

Fax: 905-451-4606

E-Mail: tecasales@te-direct.com



THERMO ELECTRIC

THERMO ELECTRIC COMPANY BVBA

Rijsberdijk 57

2490 BALEN, BELGIUM

Phone: 0032-14/81.52.47

Fax: 0032-14/81.52.49

E-Mail: sales@thermo-electric.be

*Temperature Measurement and
Sensor Solutions from
The Global Leader in Manufacture & Design*

THERMO ELECTRIC



THERMO ELECTRIC

TEMPERATURE MEASUREMENT DESIGNER'S GUIDE
WWW.THERMO-ELECTRIC-DIRECT.COM

SECTION INTR

CONTACTS

The information contained hereon shall be considered the sole property of Thermo Electric Company, Inc. The recipient thereof agrees not to disclose or reproduce said information to parties outside the recipient's organization without the written permission of Thermo Electric.

Doc. No.: TE-CO062916-INTR-020