THERMO KINETICS
MEASUREMENT & CONTROL

Thermowells

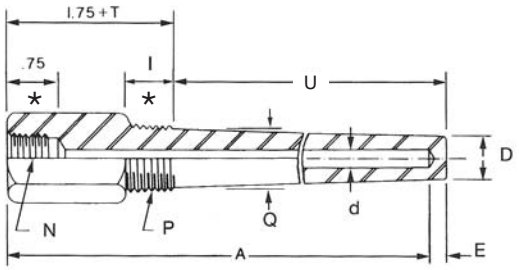
Thermowells are principally used with Thermocouples, RTDs (Resistance Temperature Detectors) and Bimetal Thermometers in applications where it is necessary to measure temperature at high pressure (above 75 psig) or in hostile environments. Thermowells are machined from solid barstock. Safe working pressures depend on the well material, operating temperature and the velocity of the flowing medium.

Tapered wells are used in many process applications and provide greater strength, faster response times and more resistance to vibration than straight wells. The taper provides a higher natural frequency which permits use at higher fluid velocities. The reduced tip on a straight well improves response time when it is used with a length sensitive sensor such as an RTD or Bimetal Thermometer. Thermowells are more likely to fail from vibratory stress than from the effects of temperature and pressure. ASME calculations can be used to determine if the selected thermowell dimensions are adequate to withstand the specified service conditions of temperature, pressure, velocity and vibration.

Thermo-Kinetics stocks a complete range of standard thermowells to meet most applications. Flanged, Socket Weld, Van Stone, Ground Joint and Weld-in thermowells are also available. Special wells in various materials, sheaths and coatings are also available to meet unique requirements. A Material Selection Guide is included in this Product Reference Guide.

Please visit our website for our other Product Literature Guides : T-PAK® Thermocouples, Resistance Temperature Detectors, Industrial Thermocouples, Protection Tubes, Calibration Services

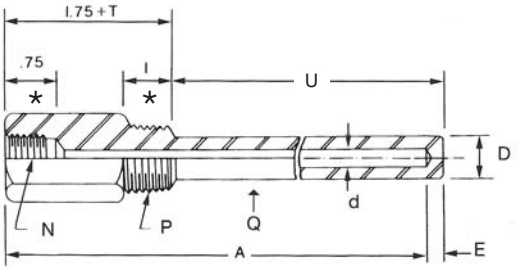
Tapered Thermowell



Catalog Number	Bore Size d	Process Conn P	Root Diam Q	Tip Diam D
WT21-12	.260"	3/4" NPT	.875"	.625"
WT21-16	.260"	1" NPT	1.063"	.625"
WT31-16	.385"	1" NPT	1.063"	.766"

N = 1/2" NPT
E = .25" nominal
* Dimensions reversed when P=1/2"

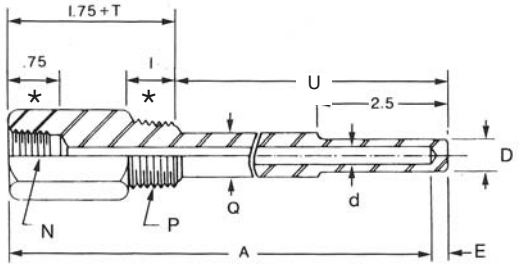
Straight Thermowell



Catalog Number	Bore Size d	Process Conn P	Root Diam Q	Tip Diam D
WT22-08	.260"	1/2" NPT	.625"	.625"
WT22-12	.260"	3/4" NPT	.750"	.750"
WT22-16	.260"	1" NPT	.875"	.875"
WT32-12	.385"	3/4" NPT	.766"	.766"
WT32-16	.385"	1" NPT	.875"	.875"

N = 1/2" NPT
E = .25" nominal
* Dimensions reversed when P=1/2"

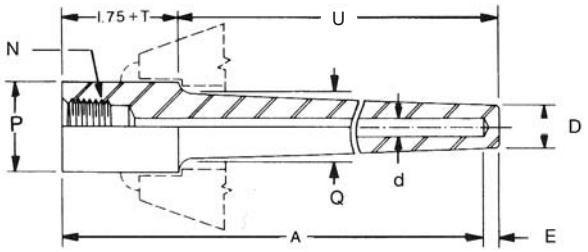
Reduced Tip Thermowell



Catalog Number	Bore Size d	Process Conn P	Root Diam Q	Tip Diam D
WT23-08	.260"	1/2" NPT	.625"	.500"
WT23-12	.260"	3/4" NPT	.750"	.500"
WT23-16	.260"	1" NPT	.875"	.500"

N = 1/2" NPT
E = .25" nominal
* Dimensions reversed when P=1/2"

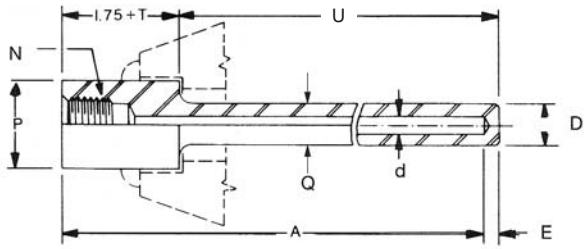
Tapered Thermowell



Catalog Number	Bore Size d	Pipe Size	Conn Diam P	Root Diam Q	Tip Diam D
WS21-12	.260"	3/4" NPT	1.050"	.875"	.625"
WS21-16	.260"	1" NPT	1.315"	1.063"	.625"
WS31-16	.385"	1" NPT	1.315"	1.063"	.766"

N = 1/2" NPT
E = .25" nominal

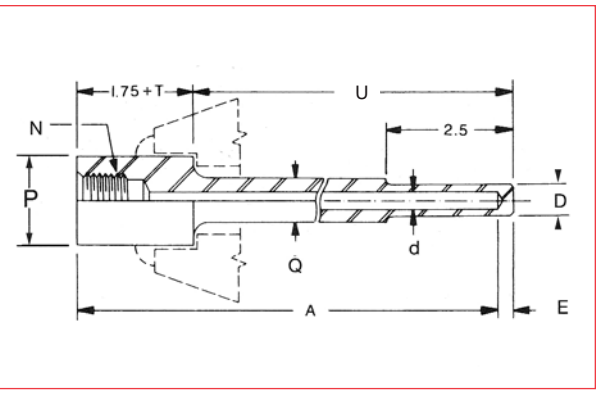
Straight Thermowell



Catalog Number	Bore Size d	Pipe Size	Conn Diam P	Root Diam Q	Tip Diam D
WS22-12	.260"	3/4" NPT	1.050"	.750"	.750"
WS22-16	.260"	1" NPT	1.315"	.875"	.875"
WS32-12	.385"	3/4" NPT	1.050"	.766"	.766"
WS32-16	.385"	1" NPT	1.315"	.875"	.875"

N = 1/2" NPT
E = .25" nominal

Reduced Tip Thermowell

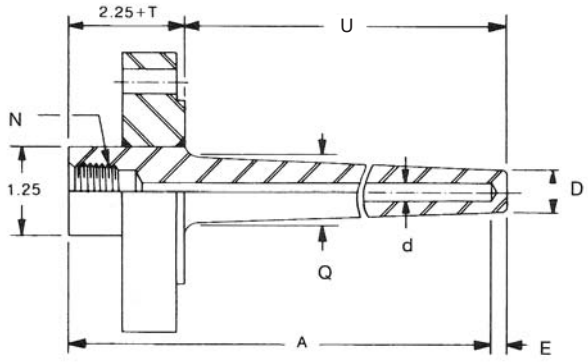


Catalog Number	Bore Size d	Pipe Size	Conn Diam P	Root Diam Q	Tip Diam D
WS23-12	.260"	3/4" NPT	1.050"	.750"	.500"
WS23-16	.260"	1" NPT	1.315"	.875"	.500"

N = 1/2" NPT
E = .25" nominal

Tapered Thermowell

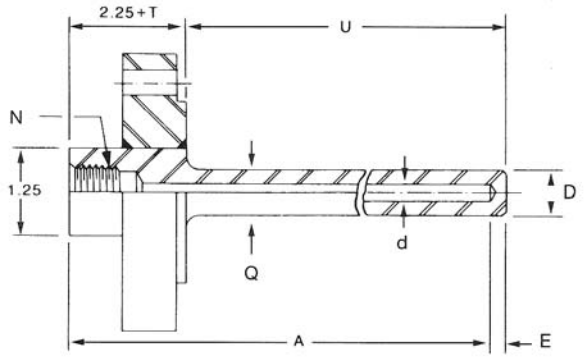
Catalog Number	Bore Size d	Flange Size	Root Diam Q	Tip Diam D
WF21	.260"	3/4" 1" 1 1/2" & >	.750" .875" 1.063"	.625" .625" .625"
WF31	.385"	3/4" 1" 1 1/2" & >	.750" .875" 1.063"	.625" .766" .766"



N = 1/2" NPT
E = .25" nominal

Straight Thermowell

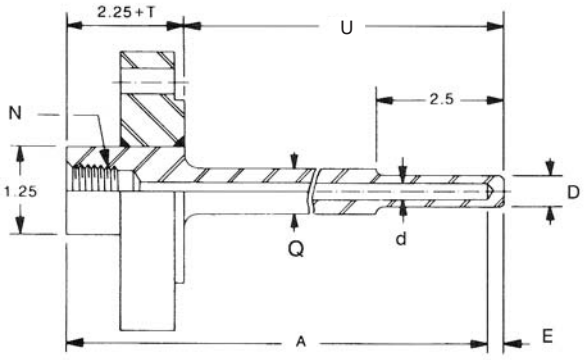
Catalog Number	Bore Size d	Flange Size	Root Diam Q	Tip Diam D
WF22	.260"	3/4" 1" & >	.750" .750"	.750" .750"
WF32	.385"	3/4" 1" & >	.750" .875"	.750" .875"



N = 1/2" NPT
E = .25" nominal

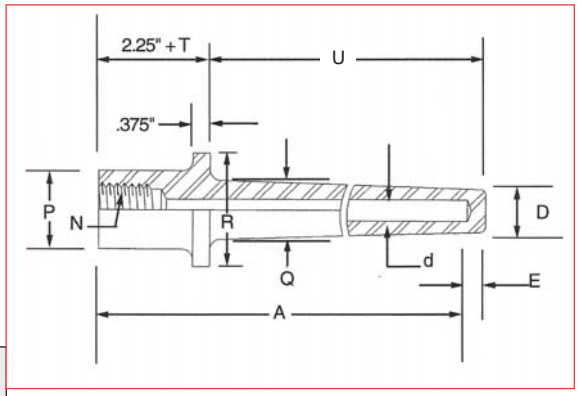
Reduced Tip Thermowell

Catalog Number	Bore Size d	Flange Size	Root Diam Q	Tip Diam D
WF23	.260"	3/4"	.750"	.500"



N = 1/2" NPT
E = .25" nominal

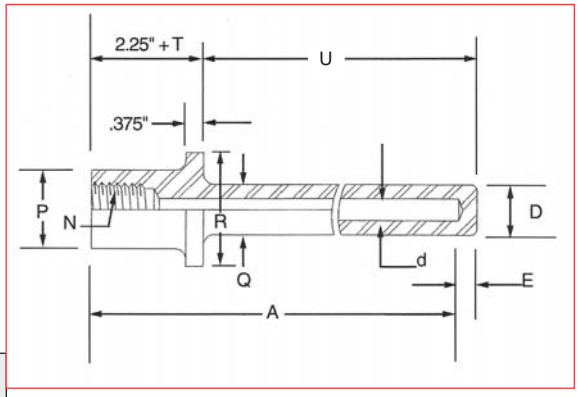
Tapered Thermowell



Catalog Number	Bore Size d	Nominal Pipe Size	Actual Diam P	R.F. Diam R	Root Diam Q	Tip Diam D
WV21-16	.260"	1" NPT	1.315"	2.000"	.875"	.625"
WV21-24	.260"	1½" NPT	1.900"	2.875"	1.063"	.625"
WV31-16	.385"	1" NPT	1.315"	2.000"	.875"	.766"
WV31-24	.385"	1½" NPT	1.900"	2.875"	1.063"	.766"

N = ½" NPT
E = .25" nominal

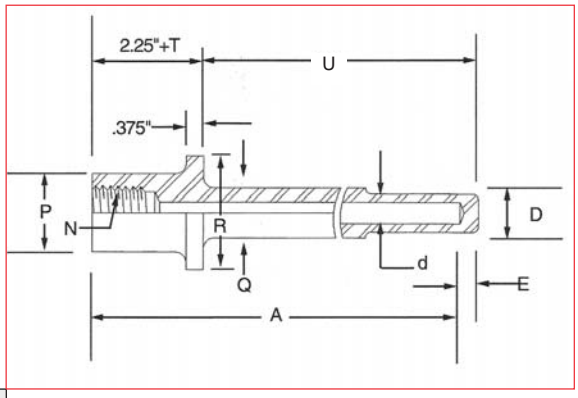
Straight Thermowell



Catalog Number	Bore Size d	Nominal Pipe Size	Actual Diam P	R.F. Diam R	Root Diam Q	Tip Diam D
WV22-16	.260"	1" NPT	1.315"	2.000"	.750"	.750"
WV22-24	.260"	1½" NPT	1.900"	2.875"	.875"	.875"
WV32-16	.385"	1" NPT	1.315"	2.000"	.766"	.766"
WV32-24	.385"	1½" NPT	1.900"	2.875"	.875"	.875"

N = ½" NPT
E = .25" nominal

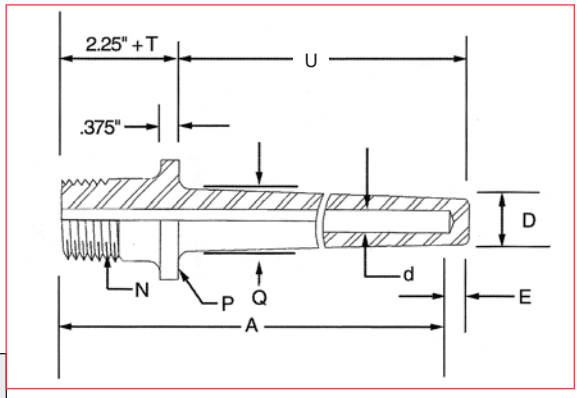
Reduced Tip Thermowell



Catalog Number	Bore Size d	Nominal Pipe Size	Actual Diam P	R.F. Diam R	Root Diam Q	Tip Diam D
WV23-16	.260"	1" NPT	1.315"	2.000"	.750"	.500"
WV23-24	.260"	1½" NPT	1.900"	2.875"	.875"	.500"

N = ½" NPT
E = .25" nominal

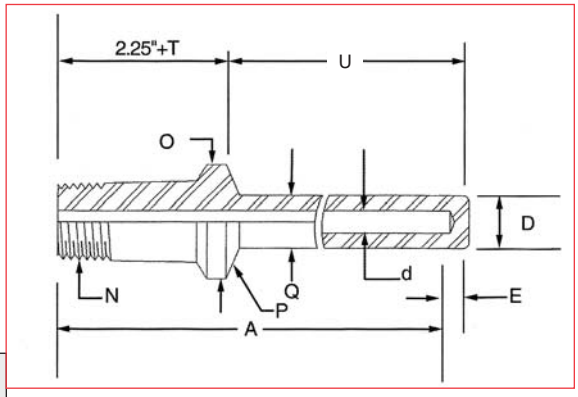
Tapered Thermowell



Catalog Number	Bore Size d	Spherical Radius P	Conn Diam R	Root Diam Q	Tip Diam D
WG21-16	.260"	1" NPT	1.375"	.875"	.625"
WG21-24	.260"	1¼" NPT	1.750"	1.063"	.625"
WG31-16	.385"	1" NPT	1.375"	.875"	.766"
WG31-24	.385"	1¼" NPT	1.750"	1.063"	.766"

N = ¾" NPT
E = .25" nominal

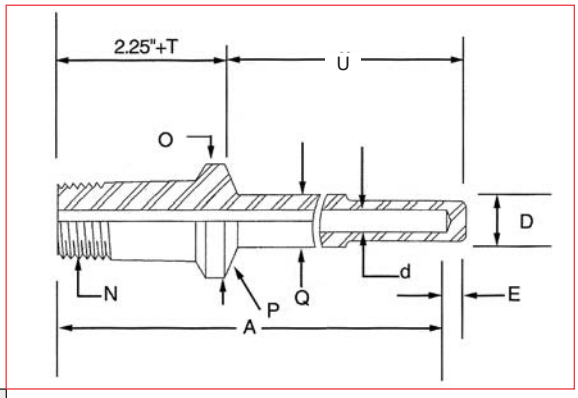
Straight Thermowell



Catalog Number	Bore Size d	Spherical Radius P	Conn Diam R	Root Diam Q	Tip Diam D
WG22-16	.260"	1" NPT	1.375"	.750"	.750"
WG22-24	.260"	1¼" NPT	1.750"	.875"	.875"
WG32-16	.385"	1" NPT	1.375"	.766"	.766"
WG32-24	.385"	1¼" NPT	1.750"	.875"	.875"

N = ¾" NPT
E = .25" nominal

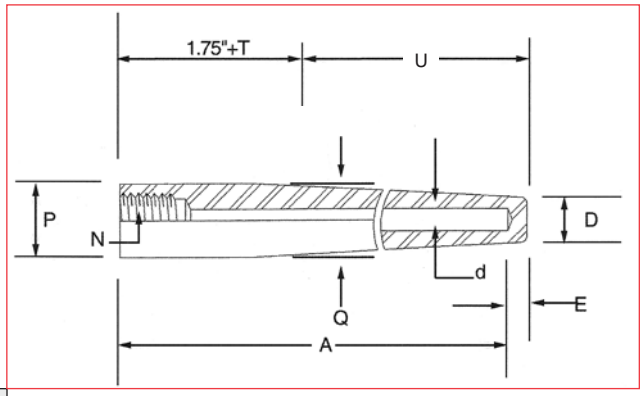
Reduced Tip Thermowell



Catalog Number	Bore Size d	Spherical Radius P	Conn Diam R	Root Diam Q	Tip Diam D
WG23-16	.260"	1" NPT	1.375"	.750"	.500"
WG23-24	.260"	1¼" NPT	1.750"	.875"	.500"

N = ¾" NPT
E = .25" nominal

Tapered Thermowell



Catalog Number	Bore Size d	Nominal Size P	Root Diam Q	Tip Diam D
WW21-24	.260"	1 1/2" NPT	1.500"	.625"
WW31-24	.385"	1 1/2" NPT	1.500"	.766"

N = 1/2" NPT
E = .25" nominal

STANDARD MANUFACTURING TOLERANCES

"U" Length:	± .063" for "U" < 25"	Bore Concentricity:	.0015"drift/in, .035" max
Overall Length:	Nominal	Stem Diameter:	± .010"
Outside Diameter:	+0/-.032"	Tip Thickness:	.250" ± .063"
Bore Diameter:	+.005/-.003"	Instrument Connection:	1/2" - 14 NPT, 5/8" deep
Bore Depth:	+.030/-0"	Surface Finish:	16-32 RMS

THERMOWELL IMMERSION LENGTH

The insertion length ("U" length) of a thermowell should be long enough to permit the entire length of the sensing element to project into the medium being measured in order to prevent errors resulting from insufficient immersion.

For liquids, insertion length = sensitive length + 2 diameters

For air & gases, insertion length = sensitive length + 4 diameters

Pipes should be insulated to minimize heat loss due to heat flow along the thermowell.
For higher velocities, refer to chart on page 9 or the calculations on our web site.

PRESSURE-TEMPERATURE RATINGS

(per ASME PTC 19.3)

$P = k_1 \times S$

P = Max Operating pressure (psi)
S = Allowable Stress (psi)
k_1 = .41 (for .260" bore)

ALLOWABLE STRESS (PSI X 1000)							
	TEMPERATURE (°F)						
Material	70°F	300°F	500°F	700°F	900°F	1100°F	1300°F
C.Stl	14.3	14.3	13.6	11.9	5.0	-	-
304 SS	20.0	15.0	12.9	11.7	10.8	9.8	3.7
310 SS	20.0	16.1	14.3	13.3	12.5	-	-
316 SS	20.0	15.6	13.3	12.1	11.5	11.1	4.1
321 SS	20.0	16.5	14.3	13.0	12.3	6.9	1.7
446 SS	18.6	18.3	18.1	17.9	-	-	-
Inconel	23.3	19.9	18.6	18.2	-	-	-
Hast C-22	28.6	24.6	21.5	19.6	18.6	17.5	-
Hast B-3	31.4	30.3	27.4	25.4	-	-	-
Hast X	23.3	19.2	16.5	15.1	14.5	-	-
F22 SS	21.4	20.9	20.5	20.0	15.8	3.2	-

Inconel is a trademark of International Nickel.
Hastelloy is a trademark of Haynes International Inc.

Tapered vs Straight Wells

Tapered shank wells provide greater stiffness with the same sensitivity. The higher strength-to-weight ratio gives these wells a higher natural frequency than the equivalent length straight shank well, thus permitting operation at a higher fluid velocity.

If vibratory stress is a potential problem, tapered wells should be used.

Velocity Rating

Thermowells are more likely to fail from the vibratory stress to which they are subjected, rather than from the effects of temperature and pressure.

Fluid flowing past a thermowell creates a turbulent wake, which causes alternating lateral forces on the well perpendicular to the direction of flow. This wake (or Strouhal) frequency (fw) is proportional to fluid velocity and well dimensions. If the wake frequency coincides with (or comes within 20% of) the natural frequency of the well, the resultant vibration could cause mechanical failure of the well. Thermowells are also normally safe if the natural frequency is well below the wake frequency or if the fluid velocity continually fluctuates through the critical velocity point.

The ASME calculations (PTC 19.3) are used to determine if the selected well dimensions provide a well strong enough to withstand the specified service conditions of temperature, pressure, velocity and vibration. The calculations are applicable for tapered wells with a fluid velocity less than 300 fps.

Recommended Maximum Fluid Velocity (fps)

The maximum velocities were calculated using the equations from the paper "Power Test Code Themometer Wells" by J W Murdock. Based on well material 316 SS, water at 25 ºF, air at 100 ºF, steam at 1000 ºF & 1000 psig. Maximum velocity limited to 300 fps. ( ) # indicates velocity at which in-line resonance may occur.

WT, WS, WG, WW				"U" Length (in)							
Liquid	Bore	Tip	Root	2.5	4.5	7.5	10.5	13.5	16.5	19.5	22.5
Water	.260	.625	0.875	121	67	40 (38)	29 (20)	22 (12)	15 (8)	11 (6)	8 (4)
			1.063	170	94	56 (49)	40 (25)	30 (15)	20 (10)	14 (7)	10 (5)
			1.500	300 (74)	167 (38)	100 (23)	71 (15)	45 (11)	30 (8)	21	16
	.385	.766	0.875	92	51	30	22	17 (14)	14 (9)	11 (7)	10 (5)
			1.063	146	80	48	42 (30)	26 (18)	23 (12)	17 (9)	13 (7)
			1.500	272	151	90 (89)	64 (45)	50 (28)	36 (18)	26 (13)	19 (10)
Air	.260	.625	0.875	300	211	76	39	23	15	11	8
			1.063	300	269	97	49	30	20	14	10
			1.500	300	300	147	75	45	30	21	16
	.385	.766	0.875	300	251	91	46	28	18	13	10
			1.063	300	300	116	59	36	24	17	13
			1.500	300	300	177	90	55	36	26	19
Steam	.260	.625	0.875	300	188 (94)	68 (34)	34 (17)	27 (14)	18 (9)	13 (7)	9 (5)
			1.063	300	243 (122)	87 (44)	44 (22)	27 (14)	18 (9)	13 (7)	9 (5)
			1.500	300	300 (185)	133 (67)	68 (34)	41 (21)	27 (14)	19 (10)	14 (7)
	.385	.766	0.875	300	227 (114)	82 (41)	42 (21)	25 (13)	17 (9(	12 (6)	9 (5)
			1.063	300	292 (146)	105 (53)	54 (27)	32 (16)	21 (11)	15 (8)	11 (6)
			1.500	300	300 (222)	161 (80)	82 (41)	49 (25)	33 (17)	23 (12)	17 (9)

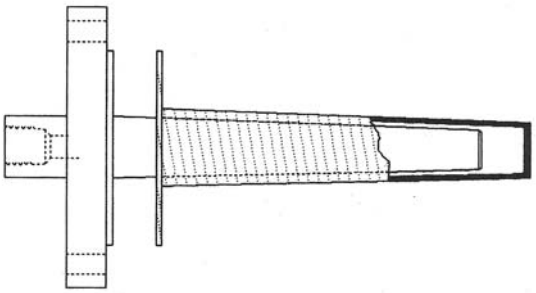
WF, WV				"U" Length (in)							
Liquid	Bore	Tip	Root	2	4	7	10	13	16	19	22
Water	.260	.625	0.875	151	75	43 44	30 (27)	23 13	16 8	11 6	8 4
			1.063	213	106	60 (56)	42 (27)	32 (16)	21 (11)	15 (8)	11 (6)
	.385	.766	0.875	115	57	33	23 (26)	17 (15)	14 (10)	12 (7)	10 (5)
			1.063	181	90	51	36 (33)	27 (20)	22 (13)	18 (9)	13 (7)
Air	.260	.625	0.875	300	267	87	43	25	16	11	8
			1.063	300	300	111	54	32	21	15	11
	.385	.766	0.875	300	300	104	51	30	20	14	10
			1.063	300	300	134	65	39	25	18	13
Steam	.260	.625	0.875	300	300 (121)	79 (40)	38 (19)	23 (12)	15 (8)	10 (5)	8 (4)
			1.063	300	300 (154)	100 (50)	49 (25)	29 (15)	19 (10)	13 (7)	10 (5)
	.385	.766	0.875	300	300 (144)	94 (47)	46 (23)	27 (14)	18 (9)	12 (6)	9 (5)
			1.063	300	300 (184)	121 (61)	59 (30)	35 (18)	23 (12)	16 (8)	12 (6)

TANTALUM SHEATH

Tantalum sheaths protect Thermowells in corrosive processes such as chlorine, bromine, hydrochloric, nitric and sulphuric acids. Tantalum's high thermal conductivity and the thin-wall design of the sheath allow for rapid heat transfer. Since corrosion is not a problem with tantalum, it is best suited for Thermowells immersed directly into the process. The sheath covers the wetted parts of the well and must be ordered with the well to ensure correct fit. Standard thickness is .013" with a .015" flange. When using a sheath, a lower grade material may be used for the well.

Option code **A** is for tantalum, code **B** for user specified material. Other sheath materials include titanium, zirconium, and molybdenum.

Applies to straight wells only.



PROTECTIVE COATINGS

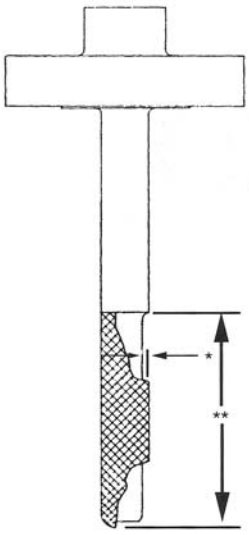
Chemical corrosion resistance can be improved by the addition of a fluoroplastic protective coating such as Teflon, to the thermowell. Teflon's ability to tolerate harsh chemical environments, makes it ideal for use in highly corrosive applications such as acid and caustics, food and beverage, pharmaceuticals, etc, where the temperature is less than 200°C (400°F). The Teflon coating is applied to the wetted parts of the thermowell (most commonly to flanged or Van Stone type) and is approximately 8 – 10 mil thick.

Option code **C** specifies Teflon coating; code **E** is for user specified material. Other protective coatings are materials such as Kynar, Tantalum, Hastelloy C are available.

Hard facing the thermowell with wear resistant material such as stellite, can enhance wear resistance and minimize erosion due to particle bombardment encountered in processes such as coal pulverizing, decoking, etc.

The hard face coating is usually applied on the finished dimensions of the well, and is approximately 1/32" thick (therefore the well OD will be 1/16" larger).

Option code **D** is for Stellite #6 coating; code **E** allows for user specified coating. Other hard face coatings can include: tungsten carbide, metco, alumina ceramic, boron nitride, chrome oxide. Specify coating material, length to be coated, thickness of coating and finish to be applied to coating.



*Coating thickness
**Coated length

Teflon is a trademark of E I du Pont
Kynar is a trademark of Pennwalt Corp.
Stellite is a trade name of Deloro Stellite
Hastelloy is a trademark of Haynes International Inc.

Process Fluid	Conc.	Temp.	Well Material
Acetate Solvents	All		Monel
Acetic Acid	10%	20°C	304SS
Acetic Acid	50%	100°C	316SS
Acetic Acid	99%	100°C	Monel
Acetic Anhydride			Monel
Acetone	All	100°C	304SS
Acetylene			304SS
Alcohols	All		304SS
Aluminum		Molten	Cast Iron
Aluminum Acetate	Saturated		304SS
Aluminum Sulphate	All	100°C	316SS
Ammonia	All	20°C	304SS
Ammonium Chloride	All	20°C	316SS
Ammonium Fluoride	25%	65°C	Hast.C
Ammonium Nitrate	All	20°C	304SS
Ammonium Sulphate	5%	20°C	304SS
Ammonium Sulphate	All	100°C	316SS
Aniline	All	20°C	304SS
Amyl Acetate	All	150°C	Monel
Asphalt		120°C	304SS
Barium Carbonate		20°C	304SS
Barium Chloride	Saturated	20°C	Monel
Barium Chloride	Aqueous		316SS
Barium Hydroxide			C.Stl.
Barium Sulphide			304SS
Barium Sulphite			Nichrome
Baroacic Acid	5%		304SS
Beer		20°C	304SS
Benzaldehyde			304SS
Benzene, Benzol		100°C	304SS
Benzoic Acid	All	100°C	316SS
Black Liquor			Hast.C
Bleaching Powder	15%	20°C	Monel
Borax	All	100°C	Brass
Bordeaux Mixture	All	100°C	304SS
Boric Acid	All	200°C	316SS
Bromine	Wet	20°C	Tant.
Bromine	Dry	20°C	Tant.
Butadiene		70°C	Brass
Butane		200°C	C.Stl.
Butylacetate			Monel
Butyl Alcohol			Copper
Butylenes			C.Stl.
Butyric Acid		20°C	304SS
Butyric Acid		100°C	Hast.C
Calcium Bisulfite		20°C	316SS
Calcium Chlorate	Dilute	65°C	304SS
Calcium Bicarbonate			304SS
Calcium Carbonate			Hast.B
Calcium Chloride	All	100°C	Hast.C
Calcium Fluoride			304SS
Calcium Hydroxide	20%	100°C	304SS
Calcium Hydroxide	50%	100°C	Hast.C
Calcium Hypochlorite	15%	20°C	Monel
Carbolic Acid	All	100°C	316SS
Carbon Dioxide	Dry		C.Stl.
Carbon Dioxide	Wet		C.Stl.
Carbon Tetrachloride	All	20°C	Monel
Carbonic Acid		100°C	304SS
Chloracetic Acid	All	150°C	Hast.C
Chlorex Caustic			316SS
Chlorine Gas	Dry	20°C	C.Stl.
Chlorine Gas	Moist	20°C	Hast.C
Chloroform	Dry	100°C	Monel
Chromic Acid	5%	20°C	304SS
Chromic Acid	50%	100°C	Hast.C
Cider	All	150°C	304SS
Citric Acid	15%	20°C	304SS
Citric Acid	All	100°C	Hast.C
Coal Tar		Hot	304SS
Coke Oven Gas		20°C	Alum.
Copper Nitrate	All	150°C	316SS
Copper Sulphate	All	150°C	316SS
Corn Oils		100°C	316SS
Cottenseed Oil			C.Stl.
Creosols		100°C	304SS
Cyanogen Gas			304SS
Dowtherm			C.Stl.
Epson Salt			304SS
Ether		20°C	304SS
Ethyl Acetate			Monel
Ethyl Chloride		20°C	304SS
Ethylene Glycol	All	100°C	304SS
Ethylene Oxide		20°C	C.Stl.
Ethyl Sulphate		20°C	Monel
Ferric Chloride	1%	20°C	316SS
Ferric Chloride		100°C	Tant.
Ferric Nitrate		100°C	Tant.
Ferric Sulphate	All	150°C	Tant.
Fluorine		100°C	Hast.C
Fluosilicic Acid		20°C	Carp.20
Formaldehyde	40%	100 °C	316SS
Formic Acid	All	150°C	316SS
Furfural		200°C	316SS
Galic Acid	5%	65°C	Monel
Gasoline		20°C	304SS
Glucose		20°C	304SS
Glycerine		100°C	Brass
Glycerol		20°C	304SS
Hydrobromic Acid	All	100°C	Hast.B
Hydrochloric Acid	All	100°C	Tant.
Hydrocyanic Acid	All	100°C	304SS
Hydrogen Chloride	Dry	250°C	304SS
Hydrofluoric Acid	60%	100°C	Hast.C
Hydrogen Peroxide		100°C	304SS
Hydrogen Sulphide	Dry	100°C	316SS
Iodine		20°C	Hast.C
Kerosene		150°C	304SS
Lactic Acid	5%	65°C	316SS
Lactic Acid	10%	100°C	Tant.
Lacquer		100°C	316SS
Latex		100°C	C.Stl.
Lime Sulphur			PVC
Linseed Oil		20°C	304SS
Magnesium Carbonate		65°C	304SS
Magnesium Chloride	5%	20°C	Monel
Magnesium Chloride	5%	100°C	Nickel
Magnesium Hydroxide	All	20°C	304SS
Magnesium Nitrate		65°C	304SS
Magnesium Oxide	All	20°C	304SS
Magnesium Sulphate	40%	100°C	304SS
Mailic Acid		100°C	316SS
Mercury	100%	350°C	C.Stl.
Methane		20°C	C.Stl.
Mercuric Chloride	10%	20°C	Hast.C
Methyl Chloride	Dry	20°C	C.Stl.
Methylene Chloride	All	100°C	304SS
Milk		80°C	304SS
Molasses		150°C	304SS
Muriatic Acid		20°C	Tant.
Naphta		20°C	304SS
Natural Gas		20°C	304SS
Neon		20°C	304SS
Nickel Chloride		20°C	304SS
Nickel Sulphate		100°C	304SS
Nitric Acid	50%	100°C	304SS
Nitric Acid	65%	100°C	316SS
Nitric Acid	100%	100°C	Tant.
Nitrobenzene		20°C	304SS
Nitrous Acid		20°C	304SS
Oleic Acid	All	200°C	316SS
Oleum		20°C	316SS
Oxalic Acid	5%	20°C	304SS
Oxalic Acid	10%	100°C	Monel
Oxygen		20°C	C.Stl.
Oxygen	Liquid		304SS
Palmitic Acid	All	200°C	316SS
Pentane			304SS
Petroleum Ether			304SS
Phenol	All	100°C	316SS
Phosphoric Acid	10%	20°C	316SS
Phosphoric Acid	85%	100°C	Hast.C
Picric Acid		20°C	304SS
Pot.Permanganate	5%	20°C	304SS
Potassium Bromide		20°C	316SS
Potassium Carbonate	20%	100°C	316SS
Potassium Chlorate		20°C	304SS
Potassium Chloride	20%	20°C	316SS
Potassium Chloride	20%	100°C	Monel
Potassium Hydroxide	30%	100°C	316SS
Potassium Nitrate	40%	100°C	316SS
Potassium Nitrite	20%	20°C	416SS
Potassium Sulphate	30%	100°c	316SS
Potassium Sulphide	10%	100°C	304SS
Potassium Sulphite	30%	100°C	304SS
Propane		150°C	C.Stl.
Pyrogallic Acid			304SS
Quinine Bisulphate	Dry		316SS
Quinine Sulphate	Dry		304SS
Resin			316SS
Salicylic Acid			Nickel
Salommoniac		20°C	Monel
Sea Water		20°C	Monel
Shellac			304SS
Silver Chloride		20°C	Carp.20
Silver Nitrate		100°C	304SS
Sodium Bicarbonate	All	65°C	316SS
Sodium Bisulphate	20%	100°C	Hast.B
Sodium Bisulphite	20%	100°C	Hast.C
Sodium Carbonate	20%	100°C	316SS
Sodium Chloride	30%	20°C	316SS
Sodium Chloride	30%	100°C	Monel
Sodium Chromate	All	100°C	316SS
Sodium Fluoride	5%	20°C	Hast.B
Sodium Hydroxide	30%	100°C	316SS
Sodium Hypochlorite			Tant.
Sodium Nitrate	40%	100°C	304SS
Sodium Nitrate	20%	20°C	304SS
Sodium Peroxide	Fused		304SS
Sodium Phosphate	10%	100°C	C.Stl.
Sodium Silicate	10%	100°C	C.Stl.
Sodium Sulphide	10%	100°C	316SS
Sodium Sulphite	30%	100°C	304SS
Sodium Sulphate	30%	100°C	316SS
Steam			304SS
Stearic Acid			316SS
Sulphur		Molten	304SS
Sulphur	Wet		316SS
Sulphur Dioxide		250°C	316SS
Sulphur Trioxide	Dry	250°C	316SS
Sulphuric Acid	All	100°C	Hast.B
Sulphuric Acid	Fuming	185°C	Carp.20
Sulphurous Acid	20%	20°C	316SS
Tannic Acid	40%	20°C	Hast.B
Tar			C.Stl.
Tartaric Acid		20°C	304SS
Tartaric Acid		65°C	316SS
Tin		Molten	Cast Iron
Tinan. Tetrachloride	All	20°C	316SS
Toluene			304SS
Trichloracetic Acid	All	20°C	Hast.B
Trichlorethylene	Dry	150°C	Monel
Turpentine		20°C	316SS
Varnish		65°C	C.Stl.
Vegetable Oils			304SS
Vinegar			304SS
Water	Fresh		Copper
Whiskey, Wine			304SS
Xylene			Copper
Zinc		Molten	Cast Iron
Zinc Chloride	All	100°C	Hast.B
Zinc Sulphate	All	100°C	316SS

The materials recommended above are a guide only. This information does not imply a guarantee of adequate or successful use of any of the listed materials in any specific application.

WF	22	-	16	-	316	-	125	-	20	-	1R	-	316	-	0
1	2		3		4		5		6		7		8		9

1: STYLE CODE

WT – Threaded
WS – Socket Weld
WV – Van Stone
WF – Flanged
WW – Weld-In
WG – Ground Joint

2: BORE / STEM CODE

21 – .260", Tapered
22 – .260", Straight
23 – .260", Reduced
31 – .385", Tapered
32 – .385", Straight
99 – Special

If root/tip dimensions are not standard. Use Code 99 and specify details.

3: PROCESS CONNECTION CODE

Threaded: 08 – 1/2" NPT
12 – 3/4" NPT
16 – 1" NPT

Weld-In: 24 – 1 1/2"

Flanged: 16 – 1" Flg
24 – 1 1/2" Flg
All std sizes

Van Stone: 16 – 1" Pipe
24 – 1 1/2" Pipe

Socket Weld: 12 – 3/4" Pipe
16 – 1" Pipe

Ground Joint: 16 – 1"
20 – 1 1/4"

Special:* 99

4: WELL MATERIAL CODE

304 – 304 SS
310 – 310 SS
316 – 316 SS
321 – 321 SS
347 – 347 SS
446 – 446 SS
600 – Inconel 600
601 – Inconel 601
825 – Incoloy 825
020 – Carp 20
400 – Monel 400
NIK – Nickel
BRS – Brass
TAT – Tantalum
TIT – Titanium
CST – Carbon Steel
ALM – Aluminum
HSB – Hastelloy B-3
HSX – Hastelloy X
HSC – Hastelloy C-22
TEF – Teflon
KYN – Kynar
PVC – PVC
ZIR – Zirconium
XXX – Special*

Inconel, Incoloy & Monel are trademarks of International Nickel
Hastelloy is a trademark of Haynes International Inc.
Carp 20 is a trademark of Carpenter Technology Corp.
Stellite is a trademark name of Deloro Stellite

5: "U" LENGTH CODE

3-digit code representing "U" length
Code = length in mm x .3937 (eg: U = 150mm; Code = 059)
= length in inches x 10 (eg: U = 7.5", Code = 075)
Standard lengths for WT, WS, WG, WW:
with no lag ext: 2.5", 4.5", 7.5", 10.5", 13.5", 16.5", 22.5"
with std lag ext: 2.5", 4.5", 7.5", 10.5", 13.5", 19.5"
Standard lengths for WF, WV:
with no lag ext: 2, 4, 7, 10, 13, 16, 22
with std lag ext: 2, 4, 7, 10, 13, 19

6: "T" LENGTH CODE

2-digit code representing "T" length
Code same as for "U" length code (except 2 digits)
Use "00" for no lag extension
Standard lag extension is 3" (Code 30); 2" for U = 2 1/2"

7: FLANGE RATING/FACE CODE

1 – 150 #
3 – 300 #
4 – 400 #
6 – 600 #
9 – 900 #
5 – 1500 #
2 – 2500 #

R – Raised Face
F – Flat Face
J – Ring Joint

XX – Special*
00 – not applicable (for Styles other than WF)

8: FLANGE MATERIAL CODE

Same codes as Well Material
(Use for backing flange for WV and WG, if required)
000 – none or n/a (use for Styles WT, WS, WW)

9: OPTION CODE

0 – None
1 – Brass Plug/Chain
2 – SS Plug/Chain
3 – Hydrostatic Test
4 – Dye Penetrant Test
5 – Full Penetration Weld
6 – Heat Treat
7 – Mill Test Report
8 – O_2 Cleaned

A – Tantalum Sheath
B – User Specified Sheath
C – Teflon Coated
D – Stellite Coated
E – User Specified Coating
F – 4-10 RMS Hi Polish Finish
G – 6-100 RMS Satin Finish
H – Stress Relieving
J – Radiograph (X-Ray)
S – Special*

*specify details

THERMO KINETICS MEASUREMENT & CONTROL
1-800-268-0967
www.thermo-kinetics.com

Mississauga
(905) 670-2266
Fax (905) 670-8530

Montréal
(514) 856-0370
Fax (514) 856-0373

Québec
(418) 655-6505
Fax (514) 856-0373

Calgary
(403) 252-2522
Fax (403) 252-2778

Edmonton
(780) 448-1580
Fax (780) 463-5164

Vancouver
(604) 231-0711
Fax (604) 270-3644