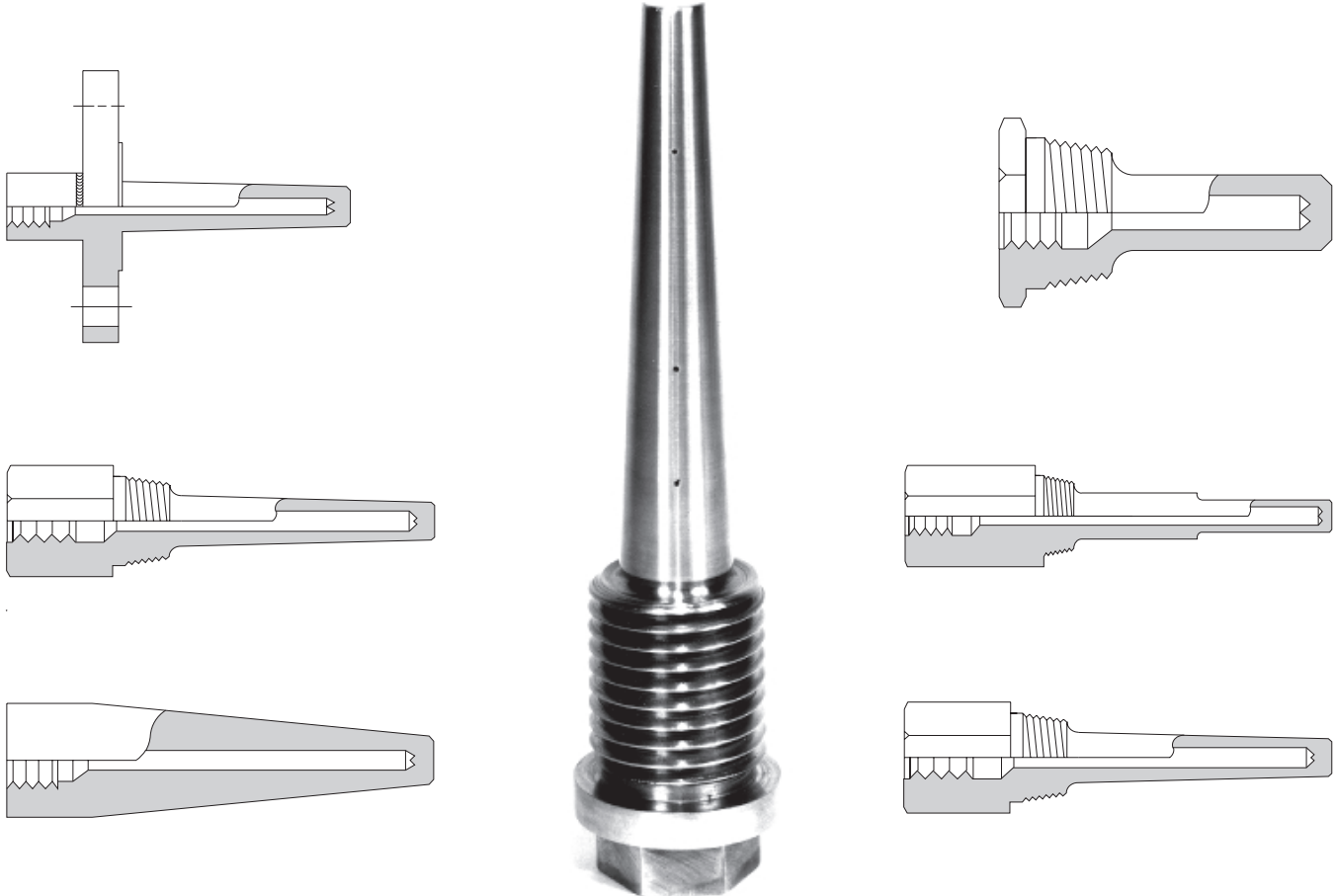


THERMOWELL CATALOG



STANDARD & CUSTOM DESIGN / IN-HOUSE MANUFACTURE

- Cement Kiln Wells
- Flanged Thermowells
- Industrial Thermometer Wells
- Protection Tubes (Pipe Wells)
- Tantalum / Titanium Sheathed Wells
- Weld-in Thermowells - Socket Fitting
- Coated Thermowells
- Ground Joint Thermowells
- Molten Metal Wells
- Screw-In Thermowells
- Van Stone Thermowells
- Weld-in Thermowells - Straight Hole



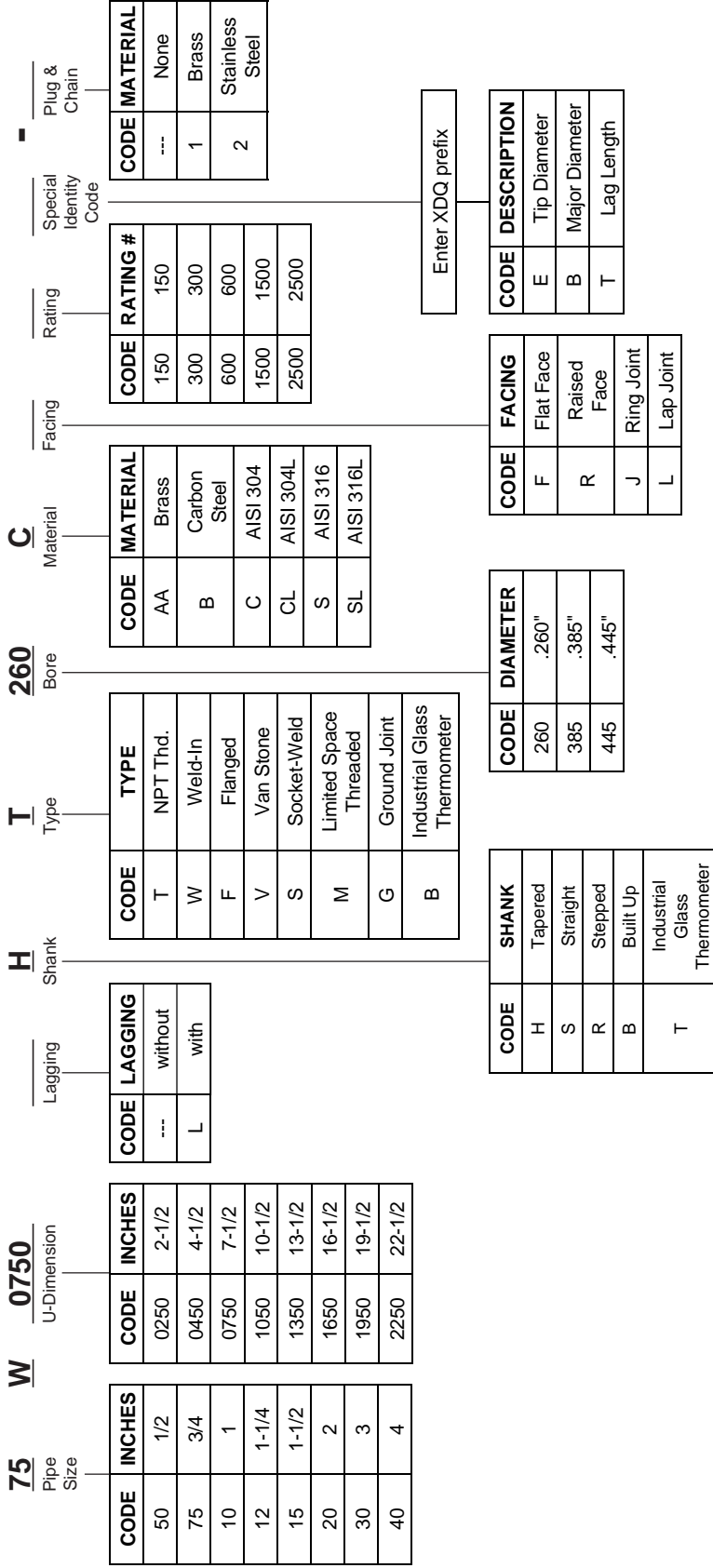
ISO 9001

Reg. No. 950 98 0142



TEMP-PRO Inc. • 200 Industrial Drive • Northampton, MA 01060
Telephone: (413) 584-3165 • Toll Free: (800) 991-9093 • Fax: (413) 586-3625
E-Mail: sales@temp-pro.com • Web Site: www.temp-pro.com

Typical Code = 75 W 0750 HT 260C



Note 1 - Examples

- 3/4" NPT, U = 7-1/2", Tapered, NPT Thread, 0.260" Bore, AISI 75W 0750 HT 260C
- Same as "a" except Lagging (Standard Length) 75W 0750 LHT 260C
- Same as "b" except Special Lagging = 3-1/2" 75W 0750 LHT 260C XDQ T3.5
- Same as "a" except Tip Diameter (E) = .500" 75W 0750 HT 260C XDQ E0.500
- 1-1/2", U = 10-1/2", Lagging Extension, Straight, Flanged, .385 Bore, AISI 316, Raised Face Flange, 300#, With Stainless Steel Plug & Chain 15W 1050 LSF 385S R 300-2

Note 2 - For Special (Non-Standard) Lagging - Enter XDQ _ _ _ _ _ where
 _ _ _ _ = Lagging Length in Inches
 Example XDQ T3.5

Note 3 - For Special Variations - Enter XDQ and write Identity Code & Value,
 such as E0.500

TO MAKE UP A PART NUMBER

A. Begin with base part number. ex: **10W0700LHF260**

B. Add:

- material code ex. 10W0700LHF260 **S** (316 SS)
- flange type code ex. 10W0700LHF260S **R** (raised face)
- flange rating ex. 10W0700LHF260SR **150** (150# rating)
- any variables ex. 10W0700LHF260SR 150 **XDQ T5** (5" lagging)
- plug/chain ex. 10W0700LHF260SR 150 XDQ T5 -**2** (ss p & c)

C. Final part number: 10W0700LHF260SR150 XDQ T5 -2

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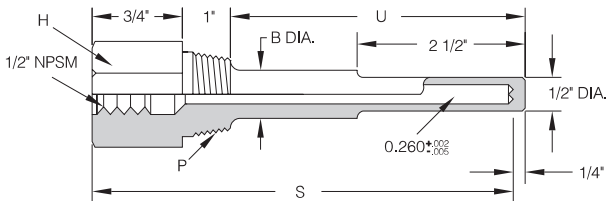
REGISTRY OF TRADEMARKS™

TRADEMARK	COMPANY
Carbofrax	Carborundum
Everdur	Anaconda American Brass
Hastelloy B, C, D, X	Haynes International
Inconel 600, 601, 800	Inco Alloys
Kanthal	Kanthal Corporation
Monel 400, K-500	Inco Alloys
Nichrome V	Driver-Harris
Refrax	Carborundum
Yoloy	Youngstown Steel

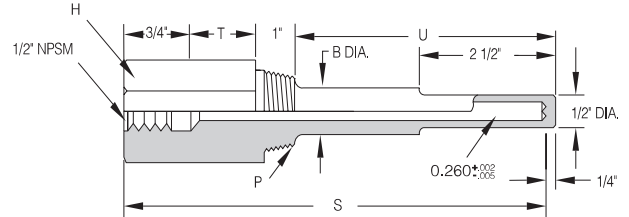


Threaded, Stepped Shank, 1/4" Nominal Bore

Standard



With Lagging Extension



GENERAL INFORMATION					PART #
B	H	S	U	P	
1/2"	1-1/8"	4"	2-1/2"	1/2	50 W 0250 ST 260
1/2"	1-1/8"			3/4	75 W 0250 ST 260
1/2"	1-3/8"			1	10 W 0250 ST 260
5/8"	1-1/8"	6"	4-1/2"	1/2	50 W 0450 RT 260
3/4"	1-1/8"			3/4	75 W 0450 RT 260
7/8"	1-3/8"			1	10 W 0450 RT 260
5/8"	1-1/8"	9"	7-1/2"	1/2	50 W 0750 RT 260
3/4"	1-1/8"			3/4	75 W 0750 RT 260
7/8"	1-3/8"			1	10 W 0750 RT 260
5/8"	1-1/8"	12"	10-1/2"	1/2	50 W 1050 RT 260
3/4"	1-1/8"			3/4	75 W 1050 RT 260
7/8"	1-3/8"			1	10 W 1050 RT 260
5/8"	1-1/8"	15"	13-1/2"	1/2	50 W 1350 RT 260
3/4"	1-1/8"			3/4	75 W 1350 RT 260
7/8"	1-3/8"			1	10 W 1350 RT 260
5/8"	1-1/8"	18"	16-1/2"	1/2	50 W 1650 RT 260
3/4"	1-1/8"			3/4	75 W 1650 RT 260
7/8"	1-3/8"			1	10 W 1650 RT 260
5/8"	1-1/8"	24"	22-1/2"	1/2	50 W 2250 RT 260
3/4"	1-1/8"			3/4	75 W 2250 RT 260
7/8"	1-3/8"			1	10 W 2250 RT 260

GENERAL INFORMATION						PART #
B	H	T	S	U	P	
1/2"	1-1/8"	2"	6"	2-1/2"	1/2	50 W 0250 LST 260
1/2"	1-1/8"	2"			3/4	75 W 0250 LST 260
1/2"	1-3/8"	2"			1	10 W 0250 LST 260
5/8"	1-1/8"	3"	9"	4-1/2"	1/2	50 W 0450 LRT 260
3/4"	1-1/8"	3"			3/4	75 W 0450 LRT 260
7/8"	1-3/8"	3"			1	10 W 0450 LRT 260
5/8"	1-1/8"	3"	12"	7-1/2"	1/2	50 W 0750 LRT 260
3/4"	1-1/8"	3"			3/4	75 W 0750 LRT 260
7/8"	1-3/8"	3"			1	10 W 0750 LRT 260
5/8"	1-1/8"	3"	15"	10-1/2"	1/2	50 W 1050 LRT 260
3/4"	1-1/8"	3"			3/4	75 W 1050 LRT 260
7/8"	1-3/8"	3"			1	10 W 1050 LRT 260
5/8"	1-1/8"	3"	18"	13-1/2"	1/2	50 W 1350 LRT 260
3/4"	1-1/8"	3"			3/4	75 W 1350 LRT 260
7/8"	1-3/8"	3"			1	10 W 1350 LRT 260
5/8"	1-1/8"	3"	24"	19-1/2"	1/2	50 W 1950 LRT 260
3/4"	1-1/8"	3"			3/4	75 W 1950 LRT 260
7/8"	1-3/8"	3"			1	10 W 1950 LRT 260

LEGEND

- U = Shank length below threads
- P = Process connection NPT
- S = Bore depth = instrument element length including its threads
- B = Max Shank Diameter
- H = Hex size across flats
- T = Lagging Extensions

Specify Material Coding At End Of Part #
(See Inside Cover)

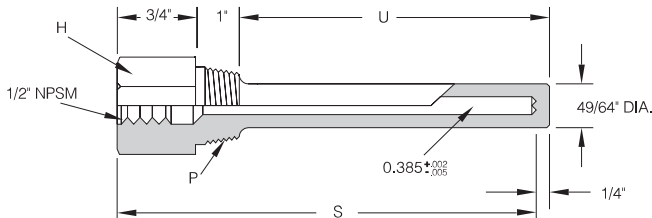
- AA - Brass
- B - Carbon Steel
- C - AISI 304
- S - AISI 316

To order plug and chain, add a suffix to the part number.
For brass, add 1. For stainless, add 2.

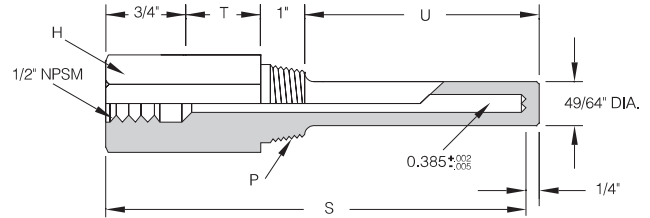


Threaded, Straight Shank, 3/8" Nominal Bore

STANDARD



WITH LAGGING EXTENSION



GENERAL INFORMATION				PART #
H	S	U	P	
1-1/8"	4"	2-1/2"	3/4	75 W 0250 ST 385
1-3/8"			1	10 W 0250 ST 385
1-1/8"	6"	4-1/2"	3/4	75 W 0450 ST 385
1-3/8"			1	10 W 0450 ST 385
1-1/8"	9"	7-1/2"	3/4	75 W 0750 ST 385
1-3/8"			1	10 W 0750 ST 385
1-1/8"	12"	10-1/2"	3/4	75 W 1050 ST 385
1-3/8"			1	10 W 1050 ST 385
1-1/8"	15"	13-1/2"	3/4	75 W 1350 ST 385
1-3/8"			1	10 W 1350 ST 385
1-1/8"	18"	16-1/2"	3/4	75 W 1650 ST 385
1-3/8"			1	10 W 1650 ST 385
1-1/8"	24"	22-1/2"	3/4	75 W 2250 ST 385
1-3/8"			1	10 W 2250 ST 385

GENERAL INFORMATION					PART #
H	T	S	U	P	
1-1/8"	2"	6"	2-1/2"	3/4	75 W 0250 LST 385
1-3/8"				1	10 W 0250 LST 385
1-1/8"	3"	9"	4-1/2"	3/4	75 W 0450 LST 385
1-3/8"				1	10 W 0450 LST 385
1-1/8"	3"	12"	7-1/2"	3/4	75 W 0750 LST 385
1-3/8"				1	10 W 0750 LST 385
1-1/8"	3"	15"	10-1/2"	3/4	75 W 1050 LST 385
1-3/8"				1	10 W 1050 LST 385
1-1/8"	3"	18"	13-1/2"	3/4	75 W 1350 LST 385
1-3/8"				1	10 W 1350 LST 385
1-1/8"	3"	24"	19-1/2"	3/4	75 W 1950 LST 385
1-3/8"				1	10 W 1950 LST 385

LEGEND

- U = Shank length below threads
- P = Process connection NPT
- S = Bore depth = instrument element length including its threads
- H = Hex size across flats
- T = Lagging Extensions

Specify Material Coding At End Of Part

(See Inside Cover)

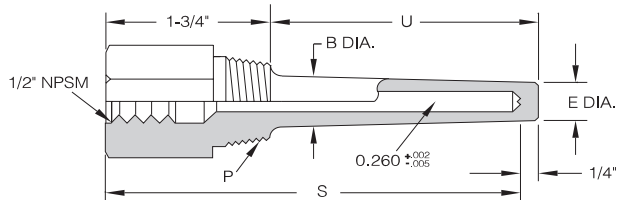
- AA - Brass
- B - Carbon Steel
- C - AISI 304
- S - AISI 316

To order plug and chain add a suffix to the part number.
For brass add 1. For stainless add 2.

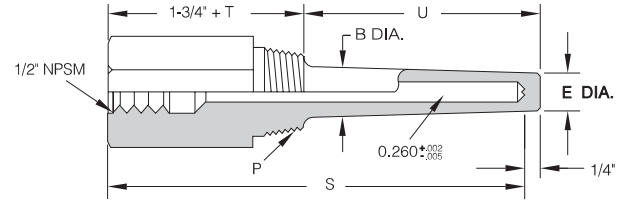


Threaded, Tapered Shank, 1/4" Nominal Bore

STANDARD



WITH LAGGING EXTENSION



GENERAL INFORMATION						PART #
B	E	H	S	U	P	
5/8"	1/2"	1-1/8"	4"	2-1/2"	1/2	50 W 0250 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 0250 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 0250 HT 260
5/8"	1/2"	1-1/8"	6"	4-1/2"	1/2	50 W 0450 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 0450 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 0450 HT 260
5/8"	1/2"	1-1/8"	9"	7-1/2"	1/2	50 W 0750 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 0750 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 0750 HT 260
5/8"	1/2"	1-1/8"	12"	10-1/2"	1/2	50 W 1050 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 1050 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 1050 HT 260
5/8"	1/2"	1-1/8"	15"	13-1/2"	1/2	50 W 1350 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 1350 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 1350 HT 260
5/8"	1/2"	1-1/8"	18"	16-1/2"	1/2	50 W 1650 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 1650 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 1650 HT 260
5/8"	1/2"	1-1/8"	24"	22-1/2"	1/2	50 W 2250 HT 260
7/8"	5/8"	1-1/8"			3/4	75 W 2250 HT 260
1-1/16"	5/8"	1-3/8"			1	10 W 2250 HT 260

GENERAL INFORMATION							PART #
B	E	H	T	S	U	P	
5/8"	1/2"	1-1/8"	2"	6"	2-1/2"	1/2	50 W 0250 LHT 260
7/8"	5/8"	1-1/8"	2"			3/4	75 W 0250 LHT 260
1-1/16"	5/8"	1-3/8"	2"			1	10 W 0250 LHT 260
5/8"	1/2"	1-1/8"	3"	9"	4-1/2"	1/2	50 W 0450 LHT 260
7/8"	5/8"	1-1/8"	3"			3/4	75 W 0450 LHT 260
1-1/16"	5/8"	1-3/8"	3"			1	10 W 0450 LHT 260
5/8"	1/2"	1-1/8"	3"	12"	7-1/2"	1/2	50 W 0750 LHT 260
7/8"	5/8"	1-1/8"	3"			3/4	75 W 0750 LHT 260
1-1/16"	5/8"	1-3/8"	3"			1	10 W 0750 LHT 260
5/8"	1/2"	1-1/8"	3"	15"	10-1/2"	1/2	50 W 1050 LHT 260
7/8"	5/8"	1-1/8"	3"			3/4	75 W 1050 LHT 260
1-1/16"	5/8"	1-3/8"	3"			1	10 W 1050 LHT 260
5/8"	1/2"	1-1/8"	3"	18"	13-1/2"	1/2	50 W 1350 LHT 260
7/8"	5/8"	1-1/8"	3"			3/4	75 W 1350 LHT 260
1-1/16"	5/8"	1-3/8"	3"			1	10 W 1350 LHT 260
5/8"	1/2"	1-1/8"	3"	24"	19-1/2"	1/2	50 W 1950 LHT 260
7/8"	5/8"	1-1/8"	3"			3/4	75 W 1950 LHT 260
1-1/16"	5/8"	1-3/8"	3"			1	10 W 1950 LHT 260

Specify Material Coding
At End Of Part #
(See Inside Cover)

AA - Brass
B - Carbon Steel
C - AISI 304
S - AISI 316

LEGEND

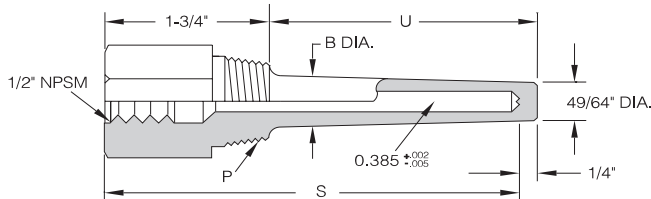
U = Shank length below threads
P = Process connection NPT
S = Bore depth = instrument element length including its threads
B = Max Shank Diameter
H = Hex size across flats
T = Lagging Extensions

To order plug and chain add a suffix to the part number.
For brass, add 1. For stainless, add 2.

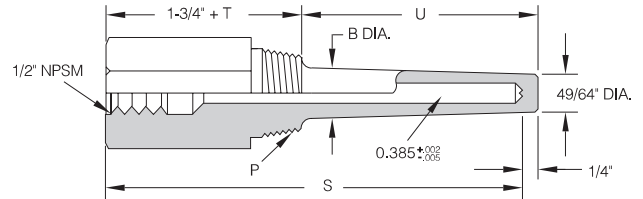


Threaded, Tapered Shank, 3/8" Nominal Bore

STANDARD



WITH LAGGING EXTENSION



GENERAL INFORMATION					PART #
B	H	S	U	P	
7/8"	1-1/8"	4"	2-1/2"	3/4	75 W 0250 HT 385
1-1/16"	1-3/8"			1	10 W 0250 HT 385
7/8"	1-1/8"	6"	4-1/2"	3/4	75 W 0450 HT 385
1-1/16"	1-3/8"			1	10 W 0450 HT 385
7/8"	1-1/8"	9"	7-1/2"	3/4	75 W 0750 HT 385
1-1/16"	1-3/8"			1	10 W 0750 HT 385
7/8"	1-1/8"	12"	10-1/2"	3/4	75 W 1050 HT 385
1-1/16"	1-3/8"			1	10 W 1050 HT 385
7/8"	1-1/8"	15"	13-1/2"	3/4	75 W 1350 HT 385
1-1/16"	1-3/8"			1	10 W 1350 HT 385
7/8"	1-1/8"	18"	16-1/2"	3/4	75 W 1650 HT 385
1-1/16"	1-3/8"			1	10 W 1650 HT 385
7/8"	1-1/8"	24"	22-1/2"	3/4	75 W 2250 HT 385
1-1/16"	1-3/8"			1	10 W 2250 HT 385

GENERAL INFORMATION						PART #
B	H	T	S	U	P	
7/8"	1-1/8"	2"	6"	2-1/2"	3/4	75 W 0250 LHT 385
1-1/16"	1-3/8"				1	10 W 0250 LHT 385
7/8"	1-1/8"	3"	9"	4-1/2"	3/4	75 W 0450 LHT 385
1-1/16"	1-3/8"				1	10 W 0450 LHT 385
7/8"	1-1/8"	3"	12"	7-1/2"	3/4	75 W 0750 LHT 385
1-1/16"	1-3/8"				1	10 W 0750 LHT 385
7/8"	1-1/8"	3"	15"	10-1/2"	3/4	75 W 1050 LHT 385
1-1/16"	1-3/8"				1	10 W 1050 LHT 385
7/8"	1-1/8"	3"	18"	13-1/2"	3/4	75 W 1350 LHT 385
1-1/16"	1-3/8"				1	10 W 1350 LHT 385
7/8"	1-1/8"	3"	24"	19-1/2"	3/4	75 W 1950 LHT 385
1-1/16"	1-3/8"				1	10 W 1950 LHT 385

LEGEND

U = Shank length below threads
P = Process connection NPT
S = Bore depth = instrument element length including its threads
B = Max Shank Diameter
H = Hex size across flats
T = Lagging Extensions

Specify Material Coding At End Of Part # (See Inside Cover)

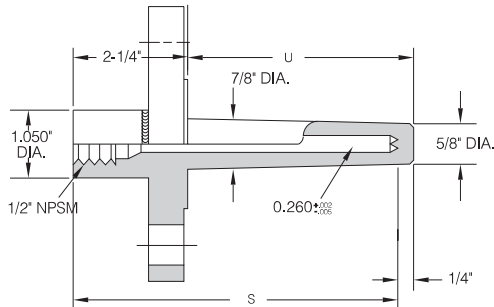
AA - Brass
B - Carbon Steel
C - AISI 304
S - AISI 316

To order plug and chain add a suffix to the part number.
For brass, add 1. For stainless, add 2.

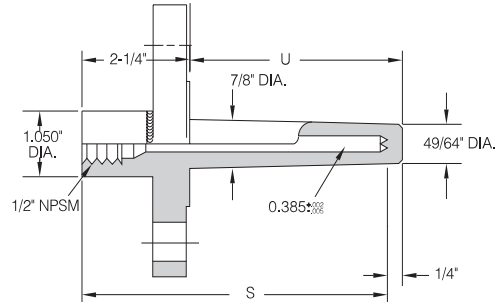


Raised Face, Flanged, Tapered Shank

1/4" NOMINAL BORE



3/8" NOMINAL BORE



GENERAL INFORMATION			PART #
S	U	FLANGE SIZE	
4"	2"	1"	10 W 0200 HF 260
		1-1/2"	15 W 0200 HF 260
		2"	20 W 0200 HF 260
6"	4"	1"	10 W 0400 HF 260
		1-1/2"	15 W 0400 HF 260
		2"	20 W 0400 HF 260
9"	7"	1"	10 W 0700 HF 260
		1-1/2"	15 W 0700 HF 260
		2"	20 W 0700 HF 260
12"	10"	1"	10 W 1000 HF 260
		1-1/2"	15 W 1000 HF 260
		2"	20 W 1000 HF 260
15"	13"	1"	10 W 1300 HF 260
		1-1/2"	15 W 1300 HF 260
		2"	20 W 1300 HF 260
18"	16"	1"	10 W 1600 HF 260
		1-1/2"	15 W 1600 HF 260
		2"	20 W 1600 HF 260
24"	22"	1"	10 W 2200 HF 260
		1-1/2"	15 W 2200 HF 260
		2"	20 W 2200 HF 260

GENERAL INFORMATION			PART #
S	U	FLANGE SIZE	
4"	2"	1"	10 W 0200 HF 385
		1-1/2"	15 W 0200 HF 385
		2"	20 W 0200 HF 385
6"	4"	1"	10 W 0400 HF 385
		1-1/2"	15 W 0400 HF 385
		2"	20 W 0400 HF 385
9"	7"	1"	10 W 0700 HF 385
		1-1/2"	15 W 0700 HF 385
		2"	20 W 0700 HF 385
12"	10"	1"	10 W 1000 HF 385
		1-1/2"	15 W 1000 HF 385
		2"	20 W 1000 HF 385
15"	13"	1"	10 W 1300 HF 385
		1-1/2"	15 W 1300 HF 385
		2"	20 W 1300 HF 385
18"	16"	1"	10 W 1600 HF 385
		1-1/2"	15 W 1600 HF 385
		2"	20 W 1600 HF 385
24"	22"	1"	10 W 2200 HF 385
		1-1/2"	15 W 2200 HF 385
		2"	20 W 2200 HF 385

LEGEND

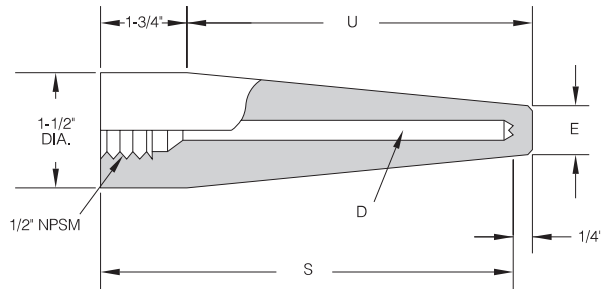
U = Shank length below flange face
S = Bore depth = instrument element length including its threads

1. See inside cover to compose part number.
2. To order plug and chain add a suffix to the part number. For brass add 1. For stainless, add 2.

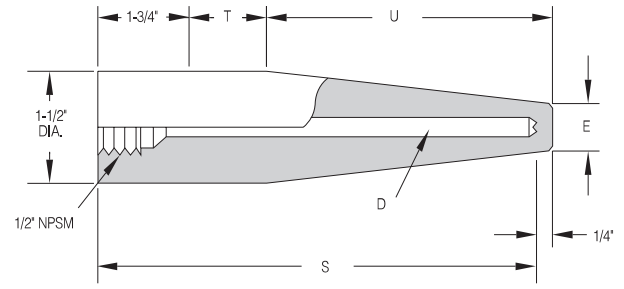


Weld-In, Tapered Shank, 1/4" and 3/8" Nominal Bore

STANDARD



WITH LAGGING EXTENSION



GENERAL INFORMATION		PART #	PART #
S	U	.260 BORE	.385 BORE
4"	2-1/2"	15 W 0250 HW 260	15 W 0250 HW 385
6"	4-1/2"	15 W 0450 HW 260	15 W 0450 HW 385
9"	7-1/2"	15 W 0750 HW 260	15 W 0750 HW 385
12"	10-1/2"	15 W 1050 HW 260	15 W 1050 HW 385
15"	13-1/2"	15 W 1350 HW 260	15 W 1350 HW 385
18"	16-1/2"	15 W 1650 HW 260	15 W 1650 HW 385
24"	22-1/2"	15 W 2250 HW 260	15 W 2250 HW 385

GENERAL INFORMATION			PART #	PART #
T	S	U	.260 BORE	.385 BORE
2"	6"	2-1/2"	15 W 0250 LHW 260	15 W 0250 LHW 385
3"	9"	4-1/2"	15 W 0450 LHW 260	15 W 0450 LHW 385
3"	12"	7-1/2"	15 W 0750 LHW 260	15 W 0750 LHW 385
3"	15"	10-1/2"	15 W 1050 LHW 260	15 W 1050 LHW 385
3"	18"	13-1/2"	15 W 1350 LHW 260	15 W 1350 LHW 385
3"	24"	19-1/2"	15 W 1950 LHW 260	15 W 1950 LHW 385

GENERAL INFORMATION	
D	E
.260	5/8
.385	49/64

Specify Material Coding At End Of Part # (See Inside Cover)	
CL	- AISI 304L
SL	- AISI 316L

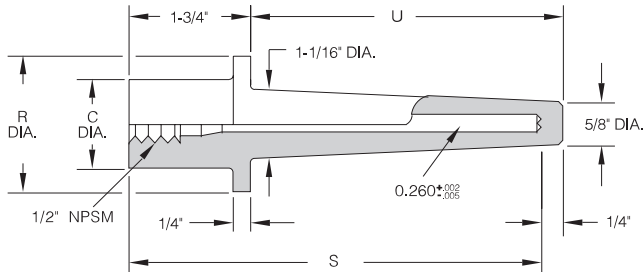
LEGEND
U = Shank length
S = Bore depth = instrument element length including its threads
T = Lagging Extensions
D = Bore Diameter
E = Shank End Diameter

To order plug and chain add a suffix to the part number.
For brass, add 1. For stainless, add 2.

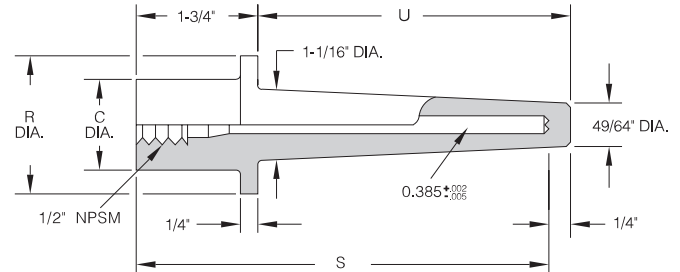


Van Stone, Tapered Shank, 1" and 1-1/2" Nominal Pipe Size

1/4" NOMINAL BORE



3/8" NOMINAL BORE



GENERAL INFORMATION					PART #
C	R	S	U	P	
1.315"	2"	4"	2-1/2"	1	10 W 0250 HV 260
1.900"	2-7/8"			1-1/2	15 W 0250 HV 260
1.315"	2"	6"	4-1/2"	1	10 W 0450 HV 260
1.900"	2-7/8"			1-1/2	15 W 0450 HV 260
1.315"	2"	9"	7-1/2"	1	10 W 0750 HV 260
1.900"	2-7/8"			1-1/2	15 W 0750 HV 260
1.315"	2"	12"	10-1/2"	1	10 W 1050 HV 260
1.900"	2-7/8"			1-1/2	15 W 1050 HV 260
1.315"	2"	15"	13-1/2"	1	10 W 1350 HV 260
1.900"	2-7/8"			1-1/2	15 W 1350 HV 260
1.315"	2"	18"	16-1/2"	1	10 W 1650 HV 260
1.900"	2-7/8"			1-1/2	15 W 1650 HV 260
1.315"	2"	24"	22-1/2"	1	10 W 2250 HV 260
1.900"	2-7/8"			1-1/2	15 W 2250 HV 260

GENERAL INFORMATION					PART #
C	R	S	U	P	
1.315"	2"	4"	2-1/2"	1	10 W 0250 HV 385
1.900"	2-7/8"			1-1/2	15 W 0250 HV 385
1.315"	2"	6"	4-1/2"	1	10 W 0450 HV 385
1.900"	2-7/8"			1-1/2	15 W 0450 HV 385
1.315"	2"	9"	7-1/2"	1	10 W 0750 HV 385
1.900"	2-7/8"			1-1/2	15 W 0750 HV 385
1.315"	2"	12"	10-1/2"	1	10 W 1050 HV 385
1.900"	2-7/8"			1-1/2	15 W 1050 HV 385
1.315"	2"	15"	13-1/2"	1	10 W 1350 HV 385
1.900"	2-7/8"			1-1/2	15 W 1350 HV 385
1.315"	2"	18"	16-1/2"	1	10 W 1650 HV 385
1.900"	2-7/8"			1-1/2	15 W 1650 HV 385
1.315"	2"	24"	22-1/2"	1	10 W 2250 HV 385
1.900"	2-7/8"			1-1/2	15 W 2250 HV 385

LEGEND	
C =	Base diameter
R =	Raised face diameter
S =	Bore depth = instrument element length including its threads
U =	Shank length
P =	Nominal backup flange size

Specify Material Coding At End Of Part # (See inside cover)	
C	- AISI 304
S	- AISI 316

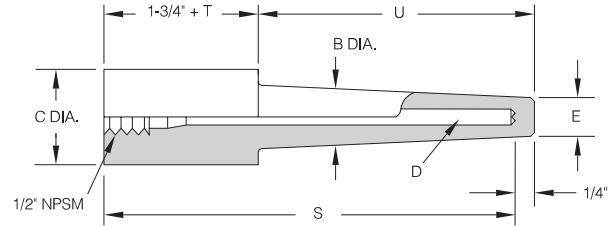
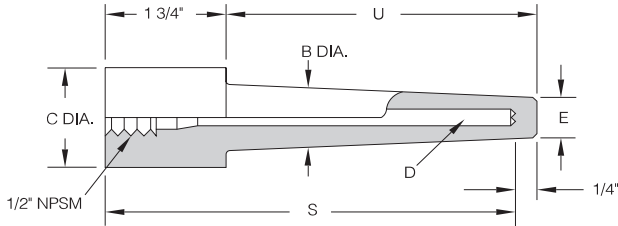
To order plug and chain add a suffix to the part number.
For brass, add 1. For stainless add 2.



Socket-Weld, Tapered Shank, 3/4" & 1" Pipe Sizes, 1/4" & 3/8" Nominal Bore

STANDARD

WITH LAGGING EXTENSION



GENERAL INFORMATION			PART #	PART #
S	U	P	.260 BORE	.385 BORE
4"	2-1/2"	3/4	75 W 0250 HS 260	75 W 0250 HS 385
		1	10 W 0250 HS 260	10 W 0250 HS 385
6"	4-1/2"	3/4	75 W 0450 HS 260	75 W 0450 HS 385
		1	10 W 0450 HS 260	10 W 0450 HS 385
9"	7-1/2"	3/4	75 W 0750 HS 260	75 W 0750 HS 385
		1	10 W 0750 HS 260	10 W 0750 HS 385
12"	10-1/2"	3/4	75 W 1050 HS 260	75 W 1050 HS 385
		1	10 W 1050 HS 260	10 W 1050 HS 385
15"	13-1/2"	3/4	75 W 1350 HS 260	75 W 1350 HS 385
		1	10 W 1350 HS 260	10 W 1350 HS 385
18"	16-1/2"	3/4	75 W 1650 HS 260	75 W 1650 HS 385
		1	10 W 1650 HS 260	10 W 1650 HS 385
24"	22-1/2"	3/4	75 W 2250 HS 260	75 W 2250 HS 385
		1	10 W 2250 HS 260	10 W 2250 HS 385

GENERAL INFORMATION				PART #	PART #
T	S	U	P	.260 BORE	.385 BORE
2"	6"	2-1/2"	3/4	75 W 0250 LHS 260	75 W 0250 LHS 385
			1	10 W 0250 LHS 260	10 W 0250 LHS 385
3"	9"	4-1/2"	3/4	75 W 0450 LHS 260	75 W 0450 LHS 385
			1	10 W 0450 LHS 260	10 W 0450 LHS 385
3"	12"	7-1/2"	3/4	75 W 0750 LHS 260	75 W 0750 LHS 385
			1	10 W 0750 LHS 260	10 W 0750 LHS 385
3"	15"	10-1/2"	3/4	75 W 1050 LHS 260	75 W 1050 LHS 385
			1	10 W 1050 LHS 260	10 W 1050 LHS 385
3"	18"	13-1/2"	3/4	75 W 1350 LHS 260	75 W 1350 LHS 385
			1	10 W 1350 LHS 260	10 W 1350 LHS 385
3"	24"	19-1/2"	3/4	75 W 1950 LHS 260	75 W 1950 LHS 385
			1	10 W 1950 LHS 260	10 W 1950 LHS 385

GENERAL INFORMATION				
P	B	C	BORE DIA. D	E
3/4	25/32	1.05	.260	5/8
			.385	49/64
1	1-1/32	1.315	.260	5/8
			.385	49/64

LEGEND	
U =	Shank length below threads
P =	Process connection NPT
S =	Bore depth = instrument element length including its threads
B =	Max Shank Diameter
H =	Hex size across flats
T =	Lagging Extensions

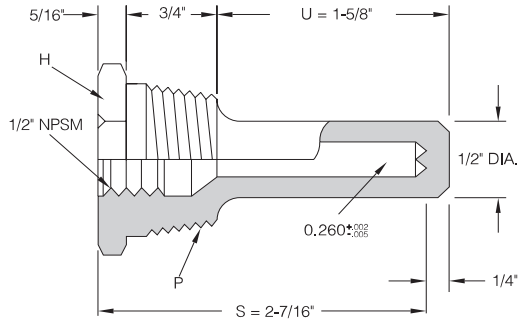
Specify Material Coding At End Of Part # (See Inside Cover)	
AA	- Brass
B	- Carbon Steel
C	- AISI 304
S	- AISI 316

To order plug and chain add a suffix to the part number.
For brass, add 1. For stainless, add 2.

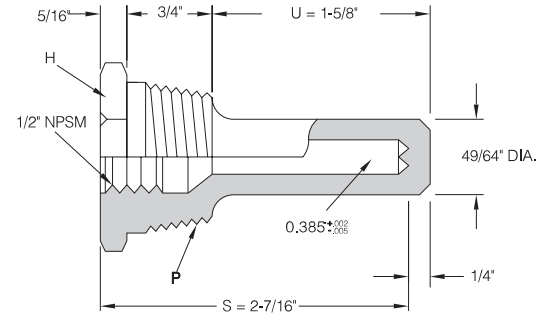


Limited Space, Threaded, Straight Shank

1/4" NOMINAL BORE



3/8" NOMINAL BORE



LEGEND

P = Process Connection
NPT
H = Hex size across flats

MATERIAL	H	P	PART #
Brass	1-1/8"	3/4	75 W 0162 SM 260AA
	1-3/8"	1	10 W 0162 SM 260AA
Carbon Steel	1-1/8"	3/4	75 W 0162 SM 260B
	1-3/8"	1	10 W 0162 SM 260B
AISI 304	1-1/8"	3/4	75 W 0162 SM 260C
	1-3/8"	1	10 W 0162 SM 260C
AISI 316	1-1/8"	3/4	75 W 0162 SM 260S
	1-3/8"	1	10 W 0162 SM 260S

MATERIAL	H	P	PART #
BRASS	1-1/8"	3/4	75 W 0162 SM 385AA
	1-3/8"	1	10 W 0162 SM 385AA
CARBON STEEL	1-1/8"	3/4	75 W 0162 SM 385B
	1-3/8"	1	10 W 0162 SM 385B
AISI 304	1-1/8"	3/4	75 W 0162 SM 385C
	1-3/8"	1	10 W 0162 SM 385C
AISI 316	1-1/8"	3/4	75 W 0162 SM 385S
	1-3/8"	1	10 W 0162 SM 385S

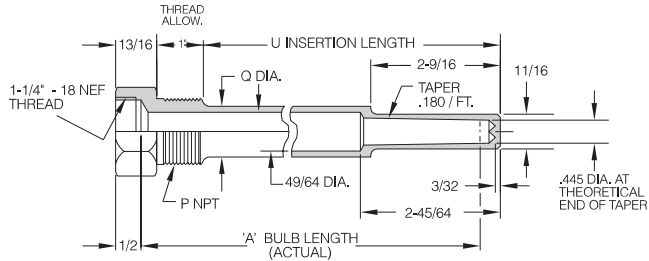
1. Due to the short insertion length of this thermowell, significant temperature indication error is to be expected. This will be greatly increased when the sensitive portion of the instrument exceeds 1-1/2" in length.

2. To order plug and chain add a suffix to the part number. For brass, add 1. For stainless, add 2.

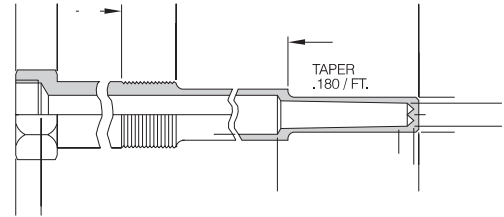


Thermowells For Industrial Glass Thermometers

STANDARD



WITH LAGGING



EXT. TH'D P	TYPE NUMBER	NOM. BULB LGTH.	BULB LGTH. A	INSERT LGTH U	SHANK DIA. Q
3/4" NPT	75 W 0250 TB 445	3-1/2	3-5/8	2-9/16	11/16
	75 W 0500 TB 445	6	6-1/8	5-1/16	7/8
	75 W 0800 TB 445	9	9-1/8	8-1/16	7/8
	75 W 1100 TB 445	12	12-1/8	11-1/16	7/8
	75 W 1700 TB 445	18	18-1/8	17-1/16	7/8
	75 W 2300 TB 445	24	24-1/8	23-1/16	7/8
1" NPT	10 W 0250 TB 445	3-1/2	3-5/8	2-9/16	11/16
	10 W 0500 TB 445	6	6-1/8	5-1/16	1
	10 W 0800 TB 445	9	9-1/8	8-1/16	1
	10 W 1100 TB 445	12	12-1/8	11-1/16	1
	10 W 1700 TB 445	18	18-1/8	17-1/16	1
	10 W 2300 TB 445	24	24-1/8	23-1/16	1

EXT. TH'D P	TYPE NUMBER	NOM. BULB LGTH.	LAG. EXT. T	BULB LGTH A	INSERT LGTH U	SHANK DIA. Q
3/4" NPT	75 W 0500 LTB 445	6	2-1/2	6-1/8	2-9/16	11/16
	75 W 0800 LTB 445	9	3	9-1/8	5-1/16	7/8
	75 W 1100 LTB 445	12	3	12-1/8	8-1/16	7/8
	75 W 1700 LTB 445	18	3	18-1/8	14-1/16	7/8
	75 W 2300 LTB 445	24	3	24-1/8	20-1/16	7/8
	1" NPT	10 W 0500 LTB 445	6	2-1/2	6-1/8	2-9/16
10 W 0800 LTB 445		9	3	9-1/8	5-1/16	1
10 W 1100 LTB 445		12	3	12-1/8	8-1/16	1
10 W 1700 LTB 445		18	3	18-1/8	14-1/16	1
10 W 2300 LTB 445		24	3	24-1/8	20-1/16	1

Specify Material Coding
At End Of Part #
(See Inside Cover)

- AA - Brass
- B - Carbon Steel
- C - AISI 304
- S - AISI 316

To order plug and chain add a suffix to the part number.
For brass, add 1. For stainless, add 2.



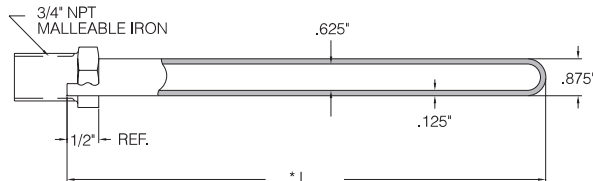
SPECIAL PROTECTION TUBES

TYPE 54 - SPECIAL CAST (77% CR, 23% AL₂O₃) PROTECTION TUBE FOR USE IN OXIDIZING ATMOSPHERES UP TO 2500° F

- Thermal conductivity comparable to stainless steel.
- Resistant to wetting by most molten metals except Aluminum.
- Chemically inert to sulfur dioxide and hydrofluoric acid.
- NOT recommended for use in carburizing or nitrogen atmospheres.

TYPICAL APPLICATIONS:

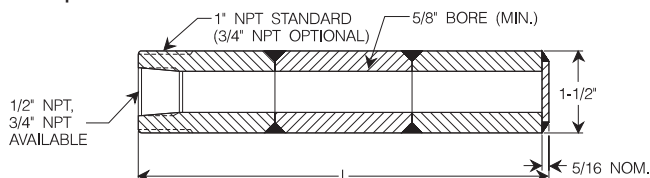
Blast furnace and stack gases to 2400° F
 Sulphur burner gases to 2000° F
 Chemical process reactors to 2500° F
 Copper base alloys to 2100° F



*Lengths Available (In inches): 9, 12, 18, 24, 30, and 48.

TYPE 563 - SECTIONAL-WELDED PROTECTION TUBE LONG LIFE CAST ALLOY (35% NI, 26% CR, 15% CO, 5% W)

Noted for abrasion resistance at high temperature (2300° F max. operating). Frequently used by petro-chemical, cement and heat-treating industries. Also used in smelting, refining and steel mill furnaces. Excellent properties for use in sulphurous, oxidizing and reducing atmospheres.



Specify length and sensor connection required.
 Straightness of OD is prohibitive - emphasis is placed on straightness of bore.

TYPE 57 - HEAVY WALL (1-11/16" OD X 15/16" ID) CAST IRON PROTECTION TUBES WHICH ARE *CERAMIC REFRACTORY COATED FOR TEMPERATURES UP TO 1400° F

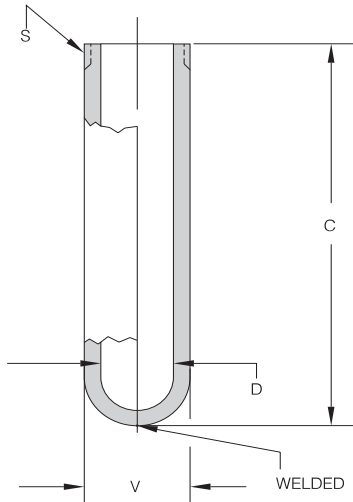
*Coated with a combination of Alumina, Cobalt, Borax and Feldspar
 -Used for Molten Aluminum, Zinc and Lead.
 Sizes are 12" to 72" in 6" increments.



PIPE PROTECTION TUBES

PIPE PROTECTION TUBES - TYPE 171

Pipe Size 1/4", 1/2", 3/4", 1"
 Pipe Schedule 40, 80

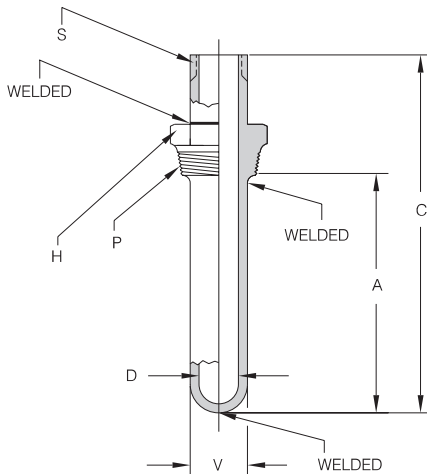


PIPE SIZE	(S) INSTR. CONN.	PIPE SCHED.	(V) NOM. O.D.	(D) NOM. I.D.	PART #	PIPE MAT.	(C) OVER. LGTH.
1/4"	1/4" NPT	40	.540"	.364"	T-171-001	HAS TO BE SPECIFIED	
		80		.302"	T-171-002		
1/2"	1/2" NPT	40	.840"	.622"	T-171-003		
		80		.546"	T-171-004		
3/4"	3/4" NPT	40	1.05"	.824"	T-171-005		
		80		.742"	T-171-006		
1"	1" NPT	40	1.315"	1.049"	T-171-007		
		80		.957"	T-171-008		

EXAMPLE: T-171-004 304 C24

SCREW-IN PIPE PROTECTION TUBES - TYPE 172

Pipe Size 1/4", 1/2", 3/4", 1"
 Pipe Schedule 40, 80



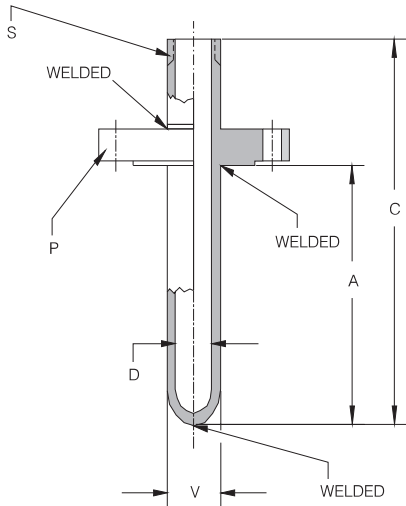
PIPE SIZE	(S) INSTR. CONN.	PIPE SCHED.	(V) NOM. O.D.	(D) NOM. I.D.	PART #	PIPE MAT.	(C) OVER. LGTH.	(A) INSERT LGTH.	(P) MIN. PROC. CONN. REQ'D.
1/4"	1/4" NPT	40	.540"	.364"	T-172-001	HAS TO BE SPECIFIED			1/2" NPT
		80		.302"	T-172-002				3/4" NPT
1/2"	1/2" NPT	40	.840"	.622"	T-172-003				
		80		.546"	T-172-004				1" NPT
3/4"	3/4" NPT	40	1.05"	.824"	T-172-005				
		80		.742"	T-172-006				1 1/4" NPT
1"	1" NPT	40	1.315"	1.049"	T-172-007				
		80		.957"	T-172-008				

EXAMPLE: T-172-003 CSTL C24 A18 P3/4 NPT



FLANGED PIPE PROTECTION TUBES - TYPE 173

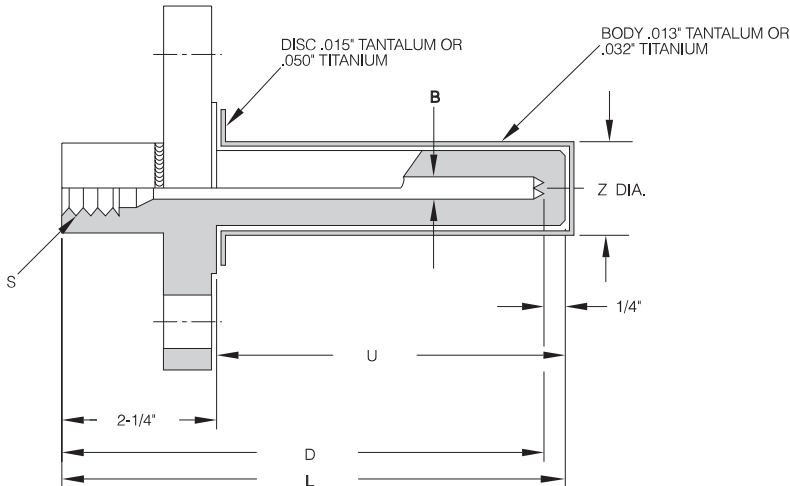
Pipe Size.....1/4", 1/2", 3/4", 1"
Pipe Schedule.....40, 80



PIPE SIZE	(S) INSTR. CONN.	PIPE SCHED.	(V) NOM. O.D.	(D) NOM. I.D.	PART #	PIPE MAT.	(P) FLANGE	(C) OVER. LGTH.	(A) INSERT LGTH.
1/4"	1/4" NPT	40	.540"	.364"	T-173-001	HAS TO BE SPECIFIED			
		80		.302"	T-173-002				
1/2"	1/2" NPT	40	.840"	.622"	T-173-003				
		80		.622"	T-173-004				
3/4"	3/4" NPT	40	1.05"	.824"	T-173-005				
		80		.742"	T-173-006				
1"	1" NPT	40	1.315"	1.049"	T-173-007				
		80		.957"	T-173-008				

EXAMPLE: T-173-005 316 2-150R C18A12

WETTED PARTS TANTALUM OR TITANIUM SHEATHED SPECIAL FLANGE THERMOWELLS - TYPE 49



TEMP-PRO	BORE DIAMETER	OD	STANDARD	OPTIONAL "S" AVAILABLE	
				MIN NPT	MIN UNS
P/N	B	Z	S NPT		
4901	0.197	0.5	1/2	1/8	3/8
4902	0.260	0.5	1/2	1/8	3/8
4903	0.328	0.75	1/2	1/8	3/8
4904	0.385	0.75	1/2	1/4	1/2
4905	0.437	0.75	1/2	1/4	1/2
4906	0.510	0.75	1/2	3/8	5/8
4907	0.575	0.875	1/2	3/8	5/8
4908	0.635	0.875	1/2	1/2	3/4
4909	0.709	0.875	1/2	1/2	3/4
4910	0.765	1	3/4	3/4	1
4911	0.885	1	3/4	3/4	1
4912	1.015	1.25	1	1	1-1/4

TO ORDER - SPECIFY:

1. P/N
2. Carbon steel or 304 SS material
3. Size S unless using standard (See Table)
4. Dimension U
5. Flange size, rating, type
6. Sheath Material (TAN. or TI.)

EXAMPLE: 4904 304 U9 1-150R TAN



METAL PROTECTION TUBE MATERIALS

MATERIAL	APPROXIMATE COMPOSITION	RECOM. MAX. TEMP. (OXIDIZING)	DESCRIPTION	
			APPLICATION	REMARKS
Carbon Steel	SAE 1018 or SAE 1020	1000° F 540° C	Tinning, Galvanizing, Petroleum	Non corrosive gases and liquids. Scales quickly at higher temperatures.
Wrought Iron or Yoloy*	Wrought Iron 0.48% Mn 0.98% Cu Balance Fe	1250° F 675° C	Food Ovens, Asphalt Mixers, Preheaters, Glass Lehrs, Dryers	Non corrosive atmospheres. Low temperature molten metals.
304 Stainless Steel	18% Cr 8% Ni 2% Mn Balance Fe	1650° F 900° C	Petroleum Products, Mild Acids, Steam Lines, Food Processing	Good resistance to corrosion. Embrittles in the 900-1475° F range.
309 Stainless Steel	23% Cr 12% Ni 2% Mn Balance Fe	2000° F 1090° C	Sulphur-Dioxide, Mild Acids	High resistance to scaling up to 1900° F. Strong, tough material.
310 Stainless Steel	25% Cr 20% Ni 2% Mn Balance Fe	2100° F 1150° C	Chemical Applications, Petroleum Products, Kilns	High mechanical and creep strength at elevated temperatures. Very good corrosion resistance.
316 Stainless Steel	18% Cr 12% Ni 2-1/2% Mo Balance Fe	1700° F 925° C	Chemical Applications, Food Products, Steam Lines	Higher corrosion resistance than 304. Resists pitting in sulphuric and phosphoric acids.
321 Stainless Steel	18% Cr 9% Ni Ti Stabilized Balance Fe	1700° F 925° C	Petroleum Products, Steam Lines	Stability against carbide precipitation. Resists inter-granular corrosion.
330 Stainless Steel	19% Cr 35% Ni 1-1/2% Mn Balance Fe	2100° F 1150° C	Heat Treating Furnaces, Kilns	Good in oxidizing or reducing atmospheres.
347 Stainless Steel	18% Cr 10% Ni Cb + Ta Stabilized	1700° F 925° C	Steam Lines, Petroleum Products, Boiler Tubes	Used for severe stress and corrosion resistance applications.
446 Stainless Steel	27% Cr Balance Fe	2100° F 1150° C	Neutral Salt Baths, Some Molten Metals, Furnaces	Highly resistant to sulphur attack. General purpose alloy.
Nickel	99% Ni	2000° F 1090° C	Chemical Applications, Food Products, Autoclaves	Do not use in the presence of sulphur or reducing atmosphere.

* Note: See Registry of Trademarks in Table of Contents.

Continued on next page...



METAL PROTECTION TUBE MATERIALS

MATERIAL	APPROXIMATE COMPOSITION	RECOM. MAX. TEMP. (OXIDIZING)	DESCRIPTION	
			APPLICATION	REMARKS
Inconel 600 *	77% Ni, 15% Cr	2200° F 1215° C	Salt Baths, Furnaces, Kilns	Generally used for high temperature. Excellent resistance to oxidation. Should not be used where sulphur is present.
Inconel 601 *	60% Ni, 23% Cr, 14% Fe	2100° F 1150° C	Carburizing, Nitriding, Heat Treating	Resists scaling to 2100° F. Good resistance to corrosion at high temperature.
Incoloy 800 *	32% Ni, 20.5% Cr, Balance Fe	2000° F 1090° C	Furnaces, Cyanide Baths	Superior to Inc. 600 in resistance to green rot. Retains strength at elevated temperature.
Monel 400 *	67% Ni, 30% Cu	1000° F 535° C	Marine Conditions, Chemical Applications, Food Processing	Combines high strength and ductility. Withstands many corrosives.
Cast Iron	Cast Fe	1600° F 870° C	Molten Aluminum, Die Castings	Needs daily application of whitewash solution.
Kanthal *	22% Cr, 5% Al, Balance Fe	2200° F 1215° C	Molten Copper, Furnace Tubes	Has good resistance to sulphides.
Hastelloy X *	47% Ni, 22% Cr, 18% Fe, 9% Mo	2350° F 1290° C	Furnace Tubes, Chemical Field, Nuclear Reactors	Develops an oxide scale. Unusual resistance to oxidizing, reducing and neutral atmospheres.

REFRACTORY METAL PROTECTION TUBE MATERIALS

Molybdenum	99% Mo, Desilicized	3100° F 1700° C	Special Exotic Applications (Inert or Vacuum Atmosphere Only)	Sensitive to oxidation above 925° F.
Tantalum	99% Ta, Chromalized	4200° F 2320° C	Same as Molybdenum	Extremely sensitive to traces of oxygen above 500° F.
Metal-Ceramic	77% Cr, 23% Al Oxide	2500° F 1370° C	High Temperature Applications	Good resistance to mechanical and thermal shock.

CERAMIC PROTECTION TUBE MATERIALS

Quartz	Fused Silicon Dioxide	2200° F 1215° C	Can be used in molten silver or gold. Excellent resistance to thermal shock.	
Silica	Silica	2900° F 1600° C	Usually used for glass tank applications.	
Mullite (Porcelain)	63% Al ₂ O ₃ , Balance Silica & traces of other materials	3100° F 1700° C	Good thermal shock resistance due to low rate of thermal expansion. Some possible contamination of platinum above 2400° F due to silica.	
Alumina	> 99% Al ₂ O ₃	3400° F 1870° C	Impervious to gases at high temperature - Fair resistance to thermal and mechanical shock.	
Carbofrax *	90% Si-Carbide, 9% Si-Dioxide	3000° F 1650° C	Secondary protection for mullite or alumina tubes. Can take flame impingement. Fair thermal shock resistance.	
Refrax *	Silicon Nitrate, Bonded Si-Carbide	3150° F 1730° C	Not wetted by molten aluminum. Better resistance to mechanical and thermal shock.	
Beryllium Oxide	99% BeO	4200° F 2315° C	High thermal conductivity. Poor resistance to mechanical shock. Possible reaction with others oxides at high temperature. Should be used with caution as fumes and powders are toxic.	



CHEMICAL AND PHYSICAL PROPERTIES OF MATERIALS

	THERMAL CONDUCTIVITY (32 - 212o F.) BTU / SQ. FT. HR. o F. IN.	APPROXIMATE MELTING POINT ° F	TENSILE STRENGTH (PSI)	YIELD STRENGTH (0.2% OFFSET, PSI)	CHROMIUM	NICKEL	CARBON	COPPER	IRON	LEAD	ALUMINUM	TANTALUM	MANGANESE	MOLYBDENUM	PHOSPHORUS	SULFUR	SILICON	ZINC	OTHER
					Cr	Ni	C	Cu	Fe	Pb	Al	Ta	Mn	Mo	P	S	Si	Zn	
ALUMINUM 6061-T6	1110	1080	45,000	40,000	0.25	---	---	0.25	0.25	---	---	---	---	---	---	---	0.6	---	Mg 1.0
STEEL (C-1018)	460	2760	70,000	40,000	---	---	0.2	---	Bal.	---	---	---	0.75	---	0.04	0.05	---	---	
ALUMINUM (1100)	1070	1200	39,000	33,000	---	---	---	---	---	---	99	---	---	---	---	---	---	---	1% Imp. ¹
CR. MOLY. A182 F11	---	2750	70,000	40,000	1.25	---	0.15	---	---	---	---	---	0.5	0.5	0.04	0.04	0.75	---	
CR. MOLY. A182 F22	---	2750	70,000	40,000	2.25	---	0.15	---	---	---	---	---	0.45	1	0.04	0.04	0.5	---	
HARDWARE BRONZE	1100	1850	70,000	65,000	---	---	---	85	---	1.75	---	---	---	---	---	---	---	---	
EVERDUR (1010) *	---	1920	67,000	30,000	---	---	---	95.8	---	---	---	---	1.1	---	---	---	3.1	13.25	
DEOXIDIZED COPPER	2680	1980	45,000	30,000	---	---	---	99.9	---	---	---	---	---	0.02	---	---	---	---	
TYPE 303 STAINLESS	105	2550	85,000	40,000	18	8	0.15	---	---	---	---	---	2	0.6	---	---	---	---	2
TYPE 304 STAINLESS	105	2600	87,000	40,000	18	8	0.08	---	---	---	---	---	2	---	---	---	1	---	
TYPE 309 STAINLESS	110	2550	95,000	45,000	23	12	0.2	---	---	---	---	---	2	---	---	---	1	---	
TYPE 310 STAINLESS	105	2550	100,000	50,000	25	20	0.25	---	---	---	---	---	2	---	---	---	1.5	---	
TYPE 316 STAINLESS	105	2525	85,000	40,000	18	12	0.1	---	---	---	---	---	2	2.5	---	---	1	---	
TYPE 317 STAINLESS	110	2525	85,000	40,000	18	12	0.1	---	---	---	---	---	2	3.5	---	---	1	---	
TYPE 321 STAINLESS	105	2575	85,000	40,000	18	9	0.1	---	---	---	---	---	2	---	---	---	1	---	Ti 4x C
TYPE 347 STAINLESS	105	2575	85,000	40,000	18	10	0.1	---	---	---	---	---	2	---	---	---	1	---	Nb 10x C
TYPE 410 STAINLESS	160	2775	65,000	35,000	12	---	0.15	---	---	---	---	---	1	---	---	---	1	---	
TYPE 416 STAINLESS	180	2425	77,000	50,000	13	---	0.15	---	---	---	---	---	1.25	0.6	---	---	1	---	2
TYPE 430 STAINLESS	155	2725	75,000	45,000	16	---	0.12	---	---	---	---	---	1	---	---	---	1	---	
TYPE 446 STAINLESS	140	2725	80,000	50,000	27	---	0.35	---	---	---	---	---	1.5	---	---	---	1	---	
MONEL 400 *	160	2450	100,000	80,000	---	67	---	30	1.4	---	---	---	1	---	---	---	0.1	---	
MONEL K-500 *	130	2430	115,000	85,000	---	65	0.15	29	0.9	---	2.75	---	0.085	---	---	0.01	0.15	---	Ti 0.50
INCONEL 600 *	104	2575	135,000	110,000	16	76.5	0.04	0.1	7.2	---	---	---	0.2	---	---	0.005	0.2	---	
NICKEL 200	420	2625	95,000	70,000	---	99.4	0.1	0.1	0.15	---	---	---	0.2	---	---	0.007	0.05	---	
NICHROME	94	2460	110,000	60,000	15	61	---	---	Bal.	---	---	---	---	---	---	0.005	---	---	
NICHROME V *	104	2550	110,000	60,000	20	80	---	---	Bal.	---	---	---	---	---	---	---	---	---	
INCOLOY 800*	82	2475	87,500	45,000	20.5	32	0.04	0.3	46	---	0.3	---	0.75	---	---	---	0.35	---	Ti 0.30
TANTALUM	375	5425	110,000	---	---	---	---	---	---	---	99.9+	---	---	---	---	0.007	---	---	
TITANIUM	105	3150	90,000	70,000	---	---	0.1	---	---	---	---	---	---	---	---	---	---	---	
HASTELLOY B *	78	2430	135,000	62,000	---	61+	---	---	6	---	---	---	Trace	32	---	---	Trace	---	
HASTELLOY C *	87	2350	122,000	60,000	17	52+	---	---	6	---	---	---	Trace	19	---	---	Trace	---	W 5
HASTELLOY D *	145	2040	38,000	38,000	---	86+	---	3	---	---	Trace	---	Trace	---	---	---	10	---	
ZIRCONIUM	612	3375	64,000	53,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
ALLOY 20	---	2650	70,000	30,000	20	29	0.07	3.25	Bal.	---	---	---	---	2.5	---	---	1	---	Nb 10x C

*Note: See Registry Of Trademarks in Table of Contents.

¹Impurities

²S or Se 0.07 minimum



CORROSIVE SERVICE GUIDE TO MATERIALS

CORRODENT	TEMP °F.	CONC. %	RECOM. MATERIAL	CORRODENT	TEMP °F.	CONC. %	RECOM. MATERIAL	CORRODENT	TEMP °F.	CONC. %	RECOM. MATERIAL
Acetic Acid	212	ALL	Monel	Copper Plating Solution (Cyanide)	180		304 SS	Oleic Acid			SEE FATTY ACIDS
Acetic Anhydride	300		Nickel	Copper Plating Solution (Acid)	75		304 SS	Oxalic Acid	212	ALL	Monel
Acetone	212	ALL	304 SS	Corn Oil	200		304 SS	Photographic Bleaching	100	ALL	304 SS
Acetylene	400		304 SS	Creosote	200	ALL	304 SS	Palmitic Acid			SEE FATTY ACIDS
Alcohols	212	ALL	304 SS	Crude Oil	300		Monel	Phosphoric Acid	212	ALL	316 SS
Alum (Potassium or Sodium)	300	ALL	Hast. C	Ethyl Acetate			SEE LACQUERS AND THINNERS	Phenol	212	ALL	316 SS
Aluminum Chloride	212	ALL	Hast. B	Ethyl Chloride, Dry	500		Steel	Potassium Compounds			SEE SODIUM COMPOUNDS
Aluminum Sulfate	212	ALL	316 SS	Ethanol			SEE ALCOHOLS	Propane	300		Steel
Ammonia, Dry	212	ALL	304, 316 SS	Ethylene Glycol (Uninhibited)	212	ALL	304 SS	Rosin	700	100%	316 SS
Ammonium Hydroxide (Ammonia, Aqua)	212	ALL	304, 316 SS	Ethylene Oxide	75		Steel	Sea Water	75		Monel
Ammonium Chloride	300	50%	Monel	Fatty Acids	500	ALL	316 SS	Soap and Detergents	212	ALL	304 SS
Ammonium Nitrate	300	ALL	304 SS	Ferric Chloride	75	ALL	Hast. C	Sodium Bicarbonate	212	20%	316 SS
Ammonium Sulfate	212	ALL	316 SS	Ferric Sulfate	300	ALL	304 SS	Sodium Bisulphite	212	20%	304 SS
Amyl Acetate	300	ALL	304 SS	Formaldehyde	212	40%	316 SS	Sodium Bisulphate	212	20%	304 SS
Aniline	75		Monel	Formic Acid	300	ALL	316 SS	Sodium Carbinatate	212	40%	316 SS
Asphalt	250		304 SS	Freon	300		Steel	Sodium Chloride	300	30%	Monel
Atmosphere (Industrial and Marine)			304 SS	Flourine, Anhydrous	100		304 SS	Sodium Chromate	212	ALL	316 SS
Barium Compounds			SEE CALCIUM	Furfural	450		316 SS	Salt or Brine			SEE SODIUM CHLORIDE
Beer	70		304 SS	Gasoline	300		Steel	Sodium Cyanide	212	ALL	304 SS
Benzene (Benzol)	212		Steel	Glucose	300		304 SS	Sodium Hydroxide	212	30%	316 SS
Benzoic Acid	212	ALL	316 SS	Glue ph 6-8	300	ALL	304 SS	Sodium Hypochlorite	75	10%	Hast. C
Bleaching Powder	70	15%	Monel	Glycerine	212	ALL	Brass	Sodium Nitrate	212	40%	304 SS
Borax	212	ALL	Brass	Hydrobromic Acid	212	ALL	Hast. C	Sodium Nitrite	75	20%	316 SS
Bordeaux Mixture	200		304 SS	Hydrochloric Acid (37-38%)	225	ALL	Hast. B	Sodium Phosphate	212	10%	Steel
Boric Acid	400	ALL	316 SS	Hydrogen Chloride, Dry	500		304 SS	Sodium Silcate	212	10%	Steel
Bromine	125	DRY	Monel	Hydrocyanic Acid	212	ALL	304 SS	Sodium Sulfate	212	30%	316 SS
Butane	400	ALL	Steel	Hydrofluoric Acid	212	60%	Monel	Sodium Sulfide	212	10%	316 SS
Butyl Alcohol			SEE ALCOHOLS	Hydrogen Flouride, Dry	175		Steel	Sodium Sulfite	212	30%	304 SS
Butyric Acid	212		Hast. C	Hydrofluogilicic Acid	212	40%	Monel	Sodium Thiosulfate	212	ALL	304 SS
Calcium Bisulphite	75	ALL	Hast. C	Hydrogen Peroxide	125	10-100%	304 SS	Steam			304 SS
Calcium Chloride	212	ALL	Hast. C	Kerosene	300	ALL	Steel	Stearic Acid			SEE FATTY ACIDS
Calcium Hydroxide	300	20%	Hast. C	Lacquers and Thinners	300	ALL	304 SS	Sugar Solutions			SEE GLUCOSE
Calcium Hypochlorite			SEE BLEACHING POWDER	Lactic Acid	300	ALL	316 SS	Sulfur	500		304 SS
Carbolic Acid			SEE PHENOL	Lime	212	ALL	316 SS	Sulfur Chloride	75	DRY	316 SS
Carbon Dioxide, Dry	800	ALL	Brass	Linseed Oil	75		Steel	Sulfur Dioxide	500	DRY	316 SS
Carbonated Water	212	ALL	304 SS	Magnesium Chloride	212	50%	Nickel	Sulfur Trioxide	500	DRY	316 SS
Carbonated Beverages	212		304 SS	Magnesium Hydroxide (or Oxide)	75	ALL	304 SS	Sulfuric Acid	212	10%	316 SS
Carbon Disulfide	200		304 SS	Magnesium Sulfate	212	40%	304 SS	Sulfuric Acid	212	10-90%	Hast. B
Carbon Tetrachloride	125	ALL	Monel	Meccuric Chloride	75	10%	Hast. C	Sulfuric Acid, Fuming	175		Alloy 20
Chlorine, Dry	100		Monel	Mercury	700	100%	Steel	Sulfurous Acid	75	20%	316 SS
Chlorine, Moist	100	ALL	Monel	Methylene Chloride	212	ALL	304 SS	Titanium Tetrachloride	75	ALL	316 SS
Chloracetic Acid	212	ALL	Monel	Methyl Chloride, Dry	75		Steel	Tannic Acid	75	40%	Hast. B
Chloroform, Dry	212		Monel	Milk, fresh or sour	180		304 SS	Toluene	75		Steel
Chromic Acid	300	ALL	Hast. C	Molasses			SEE GLUCOSE	Trichloracetic Acid	75	ALL	Hast. B
Cider	300	ALL	304 SS	Natural Gas	70		304 SS	Trichlorethylene	300	DRY	Monel
Citric Acid	212	ALL	Hast. C	Nitric Acid	75	ALL	304 SS	Turpentine	75		316 SS
Copper (10) Chloride	212	ALL	Hast. C	Nitric Acid	110	ALL	316 SS	Varnish	150		Steel
Copper (10) Nitrate	300	ALL	316 SS	Oxygen	75	ALL	Steel	Zinc Chloride	212	ALL	Hast. B
Copper (10) Sulfate	300	ALL	316 SS					Zinc Sulfate	212	ALL	316 SS

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POWER TEST CODE CALCULATIONS

(For limitations of this method see ASME Power Test Code Supplement, Part 3)

To insure that a thermowell is designed adequately to withstand operating conditions (temperature, pressure, velocity and vibrations generated by steam or water) the following evaluations should be made.

1. VIBRATION

Liquids, flowing transverse to a thermowell, generate a vibration at the thermowell with a so-called "wake frequency". Any thermowell itself has a so-called "natural frequency". A sufficient lifetime of the thermowell can only be expected if the thermowell is not working in resonance. To verify frequencies for tapered thermowells the following calculations should be made:

1.1. Natural Frequency

$$f_n = \frac{K_f}{A^2} \sqrt{\frac{E}{d}}$$

f_n ...Natural frequency of thermowell (Hz)

K_f ...A constant according to Table I

A ...Insertion length of well (Inches)

E ...Modulus of elasticity of well material at use temperature (PSI)

d ...Specific weight of well material at use temperature (Lb/cu inch)

1.2. Wake Frequency

$$f_w = \frac{2.64 V}{B}$$

f_w ...Wake frequency (Hz)

V ...Fluid velocity (Ft/second)

B ...Tip diameter (Inches)

MODULUS OF ELASTICITY (TENSION), PSI x 10 6

MAT'L	302	304	309	310	316	321	347	ALLOY 400	ALLOY 600	A105	ALUM 1100	ALUM 6061-T	NICKEL 200	410	446	COPPER	BRASS	INC 800	HAST B
200	27.9	27.9		28.2	28.1	28.0	28.2	26.8	31.0	29.5	10.0	10.0	29.1	29.0	29.0	14.0	9.0	28.0	30.0
300	27.3	27.1		27.5	27.5	27.3	27.5			29.0				28.3					
400	26.7	26.6		26.8	26.9	26.5	26.8			28.3			28.3	27.7				26.6	29.7
500	26.0	26.0		26.2	26.3	25.8	26.1			27.4				27.0					
600	25.4	25.6		25.5	25.6	25.3	25.4	25.6	29.5	26.7			27.4	26.0					
700	24.8	24.7		24.9	24.9	24.5	24.8			25.4				24.8					
800	24.2	24.1	23.1	24.2	24.2	23.8	24.1	24.8	28.0	23.8			26.4	23.1				24.4	27.9
900	23.6	23.2		23.6	23.5	23.2	23.1							21.4					
1000	23.0	22.5	22.6	23.0	22.8	22.5	22.8	23.7	26.8				25.2	19.7					26.9
1100	22.3	21.8		22.4	22.2	21.9	22.0												
1200	21.8	21.1	21.8	21.8	21.5	21.2	21.4	22.6	25.5									22.3	26.0
1300	21.2	20.4	21.2	21.2	20.8	20.4	20.7												
1400	20.6	19.4		20.5	20.0	19.7	20.0	21.3	24.0									21.1	24.7
1500	20.0	18.1	19.8	19.0	19.1	19.1	19.4												
1600			19.2	19.2			18.7	18.3	22.5									20.0	23.3
1700																			
1800								21.0										18.7	21.6

SPECIFIC WEIGHT (POUNDS PER CUBIC INCH)

MAT'L	302	304	309	310	316	321	347	ALLOY 400	ALLOY 600	A105	ALUM 1100	ALUM 6061-T	NICKEL 200	410	446	COPPER	NAVAL BRASS	INC 800	HAST B
d	.290	.290	.290	.290	.290	.290	.290	.319	.304	.283	.098	.098	.321	.28	.270	.323	.304	.290	.334



1.3. Relationship wake/natural frequency

(r) shall not exceed the value of 0.8, in formula:

$$r = \frac{f_w}{f_n} \leq 0.8$$

2. MAX OPERATING PRESSURE

The maximum pressure that a thermowell can withstand for a given material at a given temperature shall be computed from the following:

$$P = K_1 S$$

- P Maximum allowable static gage pressure (PSI)
 S Allowable stress for material at operating temperature (See Table II)
 K₁ See Table III

3. MAXIMUM INSERTION LENGTH

One limitation is given by vibratory considerations, as considered in section 1. The other limitation on maximum insertion length is one of steady state stress considerations as given by the following formula:

$$A_{max} = \frac{K_2}{V} \sqrt{\frac{v(S - K_3 P_o)}{1 + F_m}}$$

- A_{max} Max. Insert Length (Inches)
 V Fluid Velocity (FPS)
 K₂, K₃ Constants, see Table III
 v Specific volume of fluid (Ft³ / lbs)
 S Allowable stress, see Table II (PSI)
 P_o Operating press (PSI)
 F_m Magnification factor: F_m = r² / (1 - r²)
 r Frequency ratio (See section 1.3 - Vibration)

TABLE I: VALUES OF K₁

INSERTION LENGTH A, INCHES	NOMINAL WELL BORE DIAMETER				
	1/4	3/8	9/16	11/16	7/8
2-1/2	2.06	2.42	2.97	3.32	3.84
4-1/2	2.07	2.45	3.01	3.39	3.96
7-1/2	2.08	2.46	3.05	3.44	4.03
10-1/2	2.09	2.47	3.06	3.46	4.06
16	2.09	2.47	3.07	3.47	4.08
24	2.09	2.47	3.07	3.48	4.09

TABLE II: ALLOWABLE STRESS VALUES - PSI¹

MATERIAL	TEMPERATURE° F						
	0	300	500	700	900	1100	1300
Aluminum (1100)	2350	1850	---	---	---	---	---
Aluminum (6061-T6)	6000	5000	---	---	---	---	---
Nickel	10,000	10,000	9500	---	---	---	---
Steel (2)	11,250	11,000	10,250	9000	7750	6500	---
304 S. Stl.	18,750	13,750	11,400	10,500	10,000	8250	3400
310 S. Stl.	18,750	16,400	15,500	15,100	11,650	8500	3500
316 S. Stl.	18,750	14,600	12,600	11,300	10,300	9450	4000
321-347 S. Stl.	18,750	15,300	13,500	12,200	11,300	9100	2200
410 S. Stl.	15,000	13,800	12,850	12,050	9650	2900	---
446 S. Stl.	17,500	16,100	15,000	---	---	---	---
A182-F11	16,150	16,150	16,150	16,150	13,100	4000	---
A182-F22	17,500	17,500	17,500	17,500	14,000	4200	---
Copper	6000	5000	---	---	---	---	---
Admiralty Brass	10,000	10,000	---	---	---	---	---
Monel 400 *	16,600	13,600	13,100	13,100	8000	---	---
Inconel 600 *	20,000	18,800	18,500	18,500	16,000	3000	---
Incoloy 800 * (3)	15,600	12,100	10,400	9600	9100	8800	4150
Hastelloy B * (4)	25,000	24,750	21,450	---	---	---	---
Hastelloy X * (5)	23,350	18,850	16,000	15,500	15,500	15,500	9500

- ...Values from ASME Boiler and Pressure Vessel Code Section VIII - Unfired Pressure Vessels, 1965.
- ...ASME Spec. Min. Tensile = 45,000 PSI
- ...ASME Code (See Note 1), Case 1325 (special ruling)
- ...ASME Code (See Note 1), Case 1323 (special ruling)
- ...ASME Code (See Note 1), Case 1321 (special ruling)

TABLE III

CONSTANT	NOMINAL WELL BORE DIAMETER				
	1/4	3/8	9/16	11/16	7/8
K1	0.412	0.334	0.223	0.202	0.155
K2	37.5	42.3	46.8	48.7	50.1
K3	0.116	0.205	0.389	0.548	0.864



COMMITMENT TO QUALITY

TEMP-PRO Inc. became an ISO 9001 registered corporation in 1998. Our commitment to the customer and a quality product is demonstrated within the company quality policy:

"TEMP-PRO Inc. is committed to understanding and responding to our customers requirements in a manner that provides value through on-time delivery of a quality product.

We believe this is the key to our mutual success."

TEMP-PRO Inc. is committed to providing only the highest quality materials and excellence in workmanship for all our products. All materials and components used in the manufacture and assembly of our sensors and wells meet or exceed the standards of the temperature industry.

We are especially sensitive to maintaining excellence in the pressure boundary and sensor segments of our product line. Materials used in the manufacture of our thermowells and sensors are procured from approved suppliers. Where specified, full traceability of raw materials is maintained throughout the TEMP-PRO Inc. manufacturing process. Quality records including drawings, work order travelers, material certificates, PO's, inspections, etc. are maintained for a period of seven years, unless otherwise specified by the customer.

WE DESIGN AND MANUFACTURE CUSTOM THERMOWELLS TO YOUR SPECIFICATIONS. PROTOTYPE/PRODUCTION. ANY QUANTITY. CONTACT TEMP-PRO INC.

TEMP-PRO THERMOWELL STANDARDS

Bore	Diameter	+ .002" - .005"
	Depth	up to 30", ± 1/32" 30" to 60", ± 1/16" above 60", ± 1/8"
	Bottom Shape	Gundrill shape unless otherwise specified
Well	External diameter	± 1/64"
	Standard Finish.....	63 rms
	Insertion tip thickness	± 1/16" (3/16" minimum)
Concentricity	Bore vs. outside.....	10% of wall or better
Pressure test	Hydrostatic pressure	200 PSIG

The machining tolerances above are for standard wells. If closer tolerances are required, please contact TEMP-PRO Inc. for quotation.

In the event that certain materials are unavailable in hex bar stock, TEMP-PRO Inc. furnishes screw-in thermowells with (2) parallel wrench flats.



OTHER PRODUCTS

- **Thermocouples**
 - Sub-Zero up to 5,000 °F.
 - Gas Turbine T/C
 - Multipoint
 - Specials
 - Plastics Industry
 - Platinum
- **RTDs**
 - Copper
 - Platinum
 - Nickel
 - Ni-Iron
 - Flat Strip (Stator)
 - Immersion
 - Custom
- **Thermistors**
 - All Applications,
Including Compressor
- **Thermocouple & RTD Wire**
- **Compensated Terminal Blocks**
- **Plugs, Jacks, and Fittings**
- **Selector Switches**
- **Reference Junctions**
- **Transmitters/Controllers/Scanners**
- **Thermometers**
 - Bimetal Thermometers
 - Filled System Thermometers
- **Electrical Accessories**
 - Junction Boxes
 - Turning Gear Boxes
 - Wiring Harnesses
 - Cable Assemblies
 - Gauge Panels
 - Control Panels
 - Circuit Boards
 - Liquid Level Detectors
- **Remote Terminal Units (RTUs)**
 - Remote Sensing
- **Sanitary Thermowells**
- **Steam Sampling Nozzles**
- **Hydrogen Activity Probes**
- **Swamping (Averaging) T/C Boards**
- **Logistics Management**
 - Purchasing
 - Warehousing
 - Assembling/Kitting
 - Shipping Services
- **Research & Development in
Temperature Sensing Products**



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