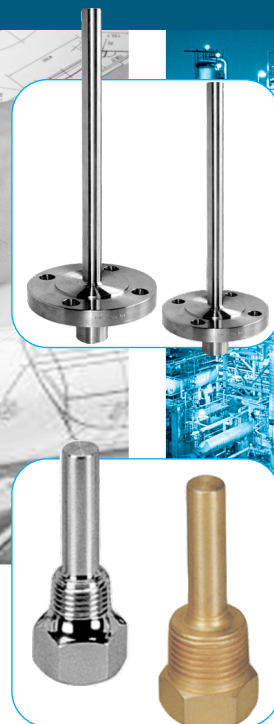
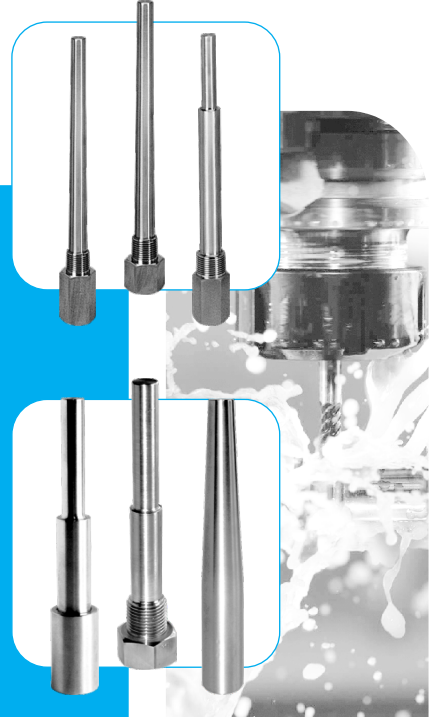




PANAM[®]
ENGINEERING
BEYOND
LIMITS

Thermowells

Maximum Working Pressure upto
6000 psi (414 bar)



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www.panam.in

Rev/03/2022

Introduction

PANAM[®] has emerged as renowned name in Global market for 'Instrumentation Fittings & Valves'. Since its inception in 1998 to present day, **PANAM**[®] has added new product every year and has broadened its product portfolio and its clientele base by supplying to potential customers worldwide. Key core values like Timely Delivery, Quality Consistency, Product Improvisation and after sales service has been instrumental in the phase wise evolution of company. Continuous improvement is the key to success, Customer feedback are taken with positive attitude and product are constantly groomed to a new quality and performance level to cope up with the competition. Our products are known for providing high-quality, high-reliability, low-cost options for the oil and gas industry. Over the year, the company has evolved from a product based company to a complete system solution provider. Over the coming years the entity of the company will attain state of the art operational efficiency for maintaining a competitive edge, with the advent increase in the utilization of its products in oil, gas and power sector.

PANAM[®] is having state of the art manufacturing facility span over an area of 65,000 sqft with a fleet of CNC machines, VMC machines, Semi-Automatic Lathe machines, High pressure test bench with SCADA control, Configuration centre for transmitters and dedicated R&D Team.

PANAM[®] Thermowell is a pressure fitting used in various pressure application as it acts as a separator between the process medium and temperature sensor. It protects against the corrosive media as well as process media flowing at high speed. Thermowells also allows the temperature sensor to be removed from the application while maintaining the closed system.

PANAM[®] Thermowells are available in a variety of process connection sizes. Threaded, Tapered, Socket Weld, Weld In, Raised Flanged and a variety of other styles are available with Thermowells are available in U length from 2" to 41". The U length must equal or exceed the length of the sensitive portion of the temperature instrument stems.

PANAM[®] offers thermowells in a variety of materials viz Brass, Carbon Steel, Stainless Steel 316 & 304, Monel, Inconel 600, Titanium etc. Other alloys or materials are also available upon customer request. Bore of each thermowells is designed to fit the sensing element of all major Temperature instrument Manufacturers. Thermowells can be supplied to meet the requirement of NACE MR-01-75.

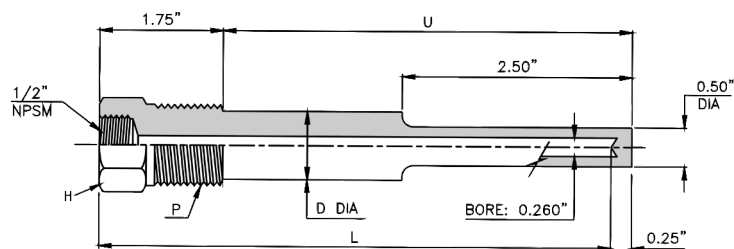
PANAM[®] performs Hydro static pressure testing on all its thermowells for leaks or pressure drops. Test pressures are generally one and half times the maximum allowable pressure of the process. has in-house capabilities for hydrostatic testing of thermowells.

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Standard Thermowells

PANAM® Standard Threaded Thermowells for 1/4" Elements (.260 Bore)

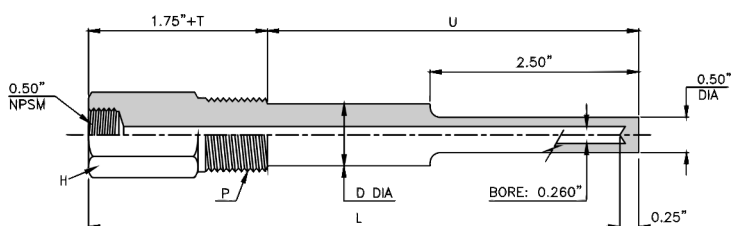


NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Standard well is stepped to 1/2" OD except U=2 1/2" Please specify if straight shank is required.
- * Additional lagging extension are available upon request.

Part #	P	U	L	D	H
050TW-0250-T-260	1/2"	2-1/2"	4"	1/2"	1-1/8"
050TW-0450-T-260		4-1/2"	6"	5/8"	1-1/8"
050TW-0750-T-260		7-1/2"	9"	5/8"	1-1/8"
050TW-1050-T-260		10-1/2"	12"	5/8"	1-1/8"
050TW-1350-T-260		13-1/2"	15"	5/8"	1-1/8"
050TW-1650-T-260		16-1/2"	18"	5/8"	1-1/8"
050TW-2250-T-260		22-1/2"	24"	5/8"	1-1/8"
075TW-0250-T-260	3/4"	2-1/2"	4"	1/2"	1-1/8"
075TW-0450-T-260		4-1/2"	6"	3/4"	1-1/8"
075TW-0750-T-260		7-1/2"	9"	3/4"	1-1/8"
075TW-1050-T-260		10-1/2"	12"	3/4"	1-1/8"
075TW-1350-T-260		13-1/2"	15"	3/4"	1-1/8"
075TW-1650-T-260		16-1/2"	18"	3/4"	1-1/8"
075TW-2250-T-260		22-1/2"	24"	3/4"	1-1/8"
100TW-0250-T-260	1"	2-1/2"	4"	1/2"	1-3/8"
100TW-0450-T-260		4-1/2"	6"	7/8"	1-3/8"
100TW-0750-T-260		7-1/2"	9"	7/8"	1-3/8"
100TW-1050-T-260		10-1/2"	12"	7/8"	1-3/8"
100TW-1350-T-260		13-1/2"	15"	7/8"	1-3/8"
100TW-1650-T-260		16-1/2"	18"	7/8"	1-3/8"
100TW-2250-T-260		22-1/2"	24"	7/8"	1-3/8"

PANAM® Standard Threaded Thermowells for 1/4" Elements (.260 Bore). w/Lagging Extension



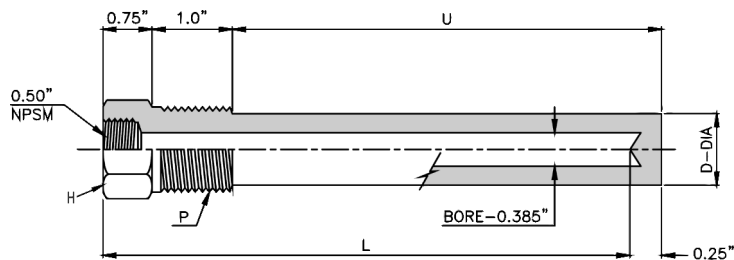
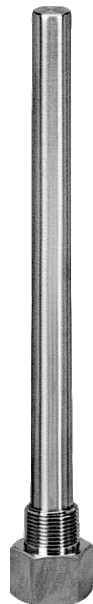
NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Standard well is stepped to 1/2" OD except U=2 1/2" Please specify if straight shank is required.
- * Additional lagging extension are available upon request

Part #	P	U	L	T	D	H
050TW-0250-TL-260	1/2"	2-1/2"	6"	2"	1/2"	1-1/8"
050TW-0450-TL-260		4-1/2"	9"	3"	5/8"	1-1/8"
050TW-0750-TL-260		7-1/2"	12"	3"	5/8"	1-1/8"
050TW-1050-TL-260		10-1/2"	15"	3"	5/8"	1-1/8"
050TW-1350-TL-260		13-1/2"	18"	3"	5/8"	1-1/8"
050TW-1950-TL-260		19-1/2"	24"	3"	5/8"	1-1/8"
075TW-0250-TL-260	3/4"	2-1/2"	6"	2"	1/2"	1-1/8"
075TW-0450-TL-260		4-1/2"	9"	3"	3/4"	1-1/8"
075TW-0750-TL-260		7-1/2"	12"	3"	3/4"	1-1/8"
075TW-1050-TL-260		10-1/2"	15"	3"	3/4"	1-1/8"
075TW-1350-TL-260		13-1/2"	18"	3"	3/4"	1-1/8"
075TW-1950-TL-260		19-1/2"	24"	3"	3/4"	1-1/8"
100TW-0250-TL-260	1"	2-1/2"	6"	2"	1/2"	1-3/8"
100TW-0450-TL-260		4-1/2"	9"	3"	7/8"	1-3/8"
100TW-0750-TL-260		7-1/2"	12"	3"	7/8"	1-3/8"
100TW-1050-TL-260		10-1/2"	15"	3"	7/8"	1-3/8"
100TW-1350-TL-260		13-1/2"	18"	3"	7/8"	1-3/8"
100TW-1950-TL-260		19-1/2"	24"	3"	7/8"	1-3/8"

Standard Thermowells

PANAM® Standard Threaded Thermowells for 3/8" Elements (.385 Bore)

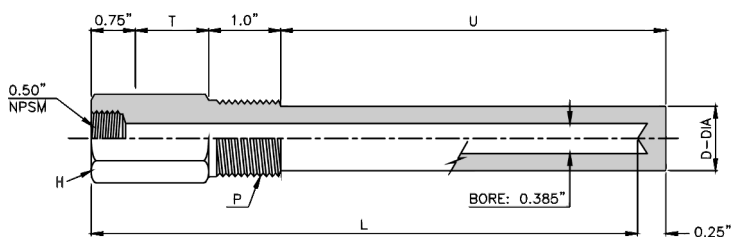
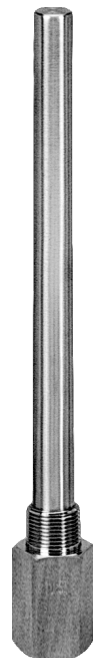


Part #	P	U	L	D	H
075TW-0250-T-385	3/4"	2-1/2"	6"	49/64"	1-1/8"
075TW-0450-T-385		4-1/2"	9"	49/64"	1-1/8"
075TW-0750-T-385		7-1/2"	12"	49/64"	1-1/8"
075TW-1050-T-385		10-1/2"	15"	49/64"	1-1/8"
075TW-1350-T-385		13-1/2"	18"	49/64"	1-1/8"
075TW-1950-T-385		19-1/2"	24"	49/64"	1-1/8"
100TW-0250-T-260	1"	2-1/2"	6"	7/8"	1-3/8"
100TW-0450-T-385		4-1/2"	9"	7/8"	1-3/8"
100TW-0750-T-385		7-1/2"	12"	7/8"	1-3/8"
100TW-1050-T-385		10-1/2"	15"	7/8"	1-3/8"
100TW-1350-T-385		13-1/2"	18"	3/4"	1-3/8"
100TW-1950-T-385		19-1/2"	24"	3/4"	1-3/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.

PANAM® Standard Threaded Thermowells for 3/8" Elements (.385 Bore). w/Lagging Extension

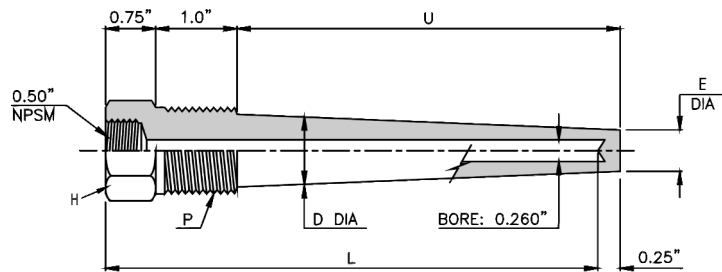
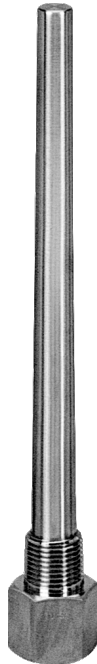


Part #	P	U	L	T	D	H
075TW-0250-TL-385	3/4"	2-1/2"	6"	2"	49/64"	1-1/8"
075TW-0450-TL-385		4-1/2"	9"	3"	49/64"	1-1/8"
075TW-0750-TL-385		7-1/2"	12"	3"	49/64"	1-1/8"
075TW-1050-TL-385		10-1/2"	15"	3"	49/64"	1-1/8"
075TW-1350-TL-385		13-1/2"	18"	3"	49/64"	1-1/8"
075TW-1950-TL-385		19-1/2"	24"	3"	49/64"	1-1/8"
100TW-0250-TL-260	1"	2-1/2"	6"	2"	7/8"	1-3/8"
100TW-0450-TL-385		4-1/2"	9"	3"	7/8"	1-3/8"
100TW-0750-TL-385		7-1/2"	12"	3"	7/8"	1-3/8"
100TW-1050-TL-385		10-1/2"	15"	3"	7/8"	1-3/8"
100TW-1350-TL-385		13-1/2"	18"	3"	7/8"	1-3/8"
100TW-1950-TL-385		19-1/2"	24"	3"	7/8"	1-3/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Additional lagging extension are available upon request.

PANAM® Threaded Heavy Duty Thermowells for 1/4" Elements (.260 Bore)

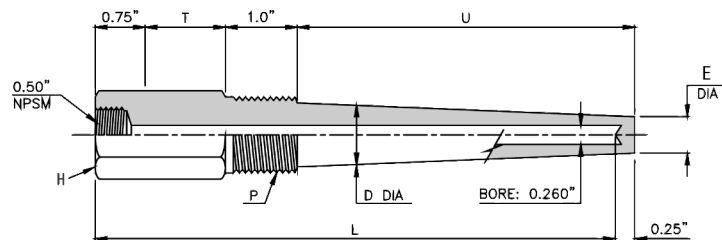
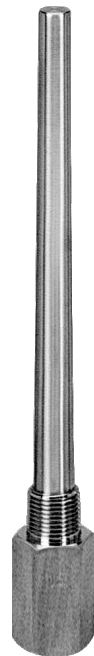


Part #	P	U	L	D	E	H
050TW-0250-GT-260	1/2"	2-1/2"	4"	5/8"	1/2"	1-1/8"
050TW-0450-GT-260		4-1/2"	6"	5/8"	1/2"	1-1/8"
050TW-0750-GT-260		7-1/2"	9"	5/8"	1/2"	1-1/8"
050TW-1050-GT-260		10-1/2"	12"	5/8"	1/2"	1-1/8"
050TW-1350-GT-260		13-1/2"	15"	5/8"	1/2"	1-1/8"
050TW-1650-GT-260		16-1/2"	18"	5/8"	1/2"	1-1/8"
050TW-2250-GT-260		22-1/2"	24"	5/8"	1/2"	1-1/8"
075TW-0250-GT-260	3/4"	2-1/2"	4"	7/8"	5/8"	1-1/8"
075TW-0450-GT-260		4-1/2"	6"	7/8"	5/8"	1-1/8"
075TW-0750-GT-260		7-1/2"	9"	7/8"	5/8"	1-1/8"
075TW-1050-GT-260		10-1/2"	12"	7/8"	5/8"	1-1/8"
075TW-1350-GT-260		13-1/2"	15"	7/8"	5/8"	1-1/8"
075TW-1650-GT-260		16-1/2"	18"	7/8"	5/8"	1-1/8"
075TW-2250-GT-260		22-1/2"	24"	7/8"	5/8"	1-1/8"
100TW-0250-GT-260	1"	2-1/2"	4"	1-1/16"	5/8"	1-3/8"
100TW-0450-GT-260		4-1/2"	6"	1-1/16"	5/8"	1-3/8"
100TW-0750-GT-260		7-1/2"	9"	1-1/16"	5/8"	1-3/8"
100TW-1050-GT-260		10-1/2"	12"	1-1/16"	5/8"	1-3/8"
100TW-1350-GT-260		13-1/2"	15"	1-1/16"	5/8"	1-3/8"
100TW-1650-GT-260		16-1/2"	18"	1-1/16"	5/8"	1-3/8"
100TW-2250-GT-260		22-1/2"	24"	1-1/16"	5/8"	1-3/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.

PANAM® Threaded Heavy Duty Thermowells for 1/4" Elements (.260 Bore). w/Lagging Extension



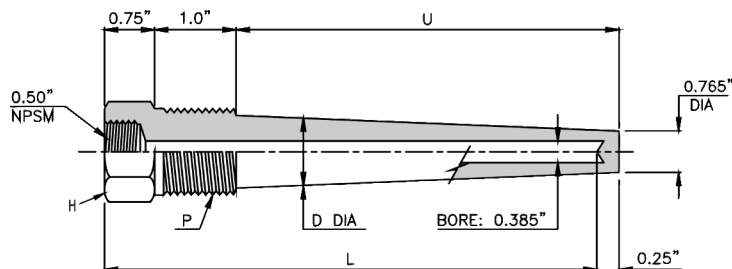
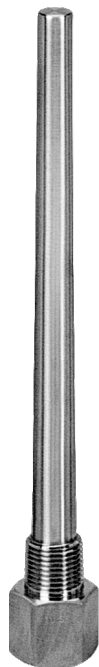
Part #	P	U	L	T	D	E	H
050TW-0250-GTL-260	1/2"	2-1/2"	6"	2"	5/8"	1/2"	1-1/8"
050TW-0450-GTL-260		4-1/2"	9"	3"	5/8"	1/2"	1-1/8"
050TW-0750-GTL-260		7-1/2"	12"	3"	5/8"	1/2"	1-1/8"
050TW-1050-GTL-260		10-1/2"	15"	3"	5/8"	1/2"	1-1/8"
050TW-1350-GTL-260		13-1/2"	18"	3"	5/8"	1/2"	1-1/8"
050TW-1950-GTL-260		19-1/2"	24"	3"	5/8"	1/2"	1-1/8"
075TW-0250-GTL-260	3/4"	2-1/2"	6"	2"	7/8"	5/8"	1-1/8"
075TW-0450-GTL-260		4-1/2"	9"	3"	7/8"	5/8"	1-1/8"
075TW-0750-GTL-260		7-1/2"	12"	3"	7/8"	5/8"	1-1/8"
075TW-1050-GTL-260		10-1/2"	15"	3"	7/8"	5/8"	1-1/8"
075TW-1350-GTL-260		13-1/2"	18"	3"	7/8"	5/8"	1-1/8"
075TW-1950-GTL-260		19-1/2"	24"	3"	7/8"	5/8"	1-1/8"
100TW-0250-GTL-260	1"	2-1/2"	6"	2"	1-1/16"	5/8"	1-3/8"
100TW-0450-GTL-260		4-1/2"	9"	3"	1-1/16"	5/8"	1-3/8"
100TW-0750-GTL-260		7-1/2"	12"	3"	1-1/16"	5/8"	1-3/8"
100TW-1050-GTL-260		10-1/2"	15"	3"	1-1/16"	5/8"	1-3/8"
100TW-1350-GTL-260		13-1/2"	18"	3"	1-1/16"	5/8"	1-3/8"
100TW-1950-GTL-260		19-1/2"	24"	3"	1-1/16"	5/8"	1-3/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Additional lagging extension are available upon request.

Heavy Duty Thermowells

PANAM® Threaded Heavy Duty Thermowells for 3/8" Elements (.385 Bore)

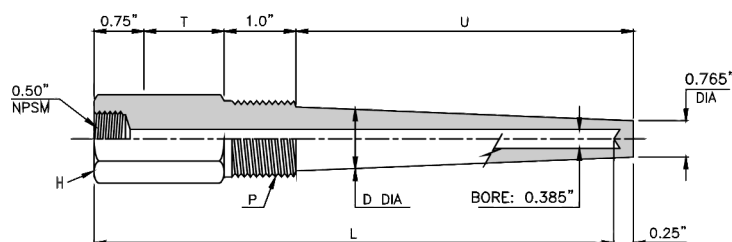
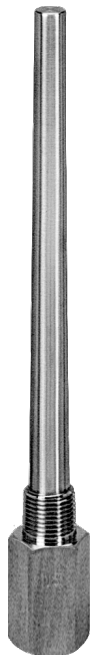


Part #	P	U	L	D	H
075TW-0250-GT-385	3/4"	2-1/2"	4"	7/8"	1-1/8"
075TW-0450-GT-385		4-1/2"	6"	7/8"	1-1/8"
075TW-0750-GT-385		7-1/2"	9"	7/8"	1-1/8"
075TW-1050-GT-385		10-1/2"	12"	7/8"	1-1/8"
075TW-1350-GT-385		13-1/2"	15"	7/8"	1-1/8"
075TW-1650-GT-385		16-1/2"	18"	7/8"	1-1/8"
075TW-2250-GT-385		22-1/2"	24"	7/8"	1-1/8"
100TW-0250-GT-385	1"	2-1/2"	4"	1-1/16"	1-3/8"
100TW-0450-GT-385		4-1/2"	6"	1-1/16"	1-3/8"
100TW-0750-GT-385		7-1/2"	9"	1-1/16"	1-3/8"
100TW-1050-GT-385		10-1/2"	12"	1-1/16"	1-3/8"
100TW-1350-GT-385		13-1/2"	15"	1-1/16"	1-3/8"
100TW-1650-GT-385		16-1/2"	18"	1-1/16"	1-3/8"
075TW-2250-GT-385		22-1/2"	24"	1-1/16"	1-3/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.

PANAM® Threaded Heavy Duty Thermowells for 3/8" Elements (.385 Bore). w/Lagging Extension

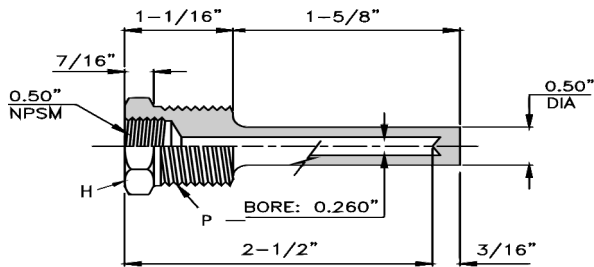


Part #	P	U	L	T	D	H
075TW-0250-GTL-385	3/4"	2-1/2"	6"	2"	7/8"	1-1/8"
075TW-0450-GTL-385		4-1/2"	9"	3"	7/8"	1-1/8"
075TW-0750-GTL-385		7-1/2"	12"	3"	7/8"	1-1/8"
075TW-1050-GTL-385		10-1/2"	15"	3"	7/8"	1-1/8"
075TW-1350-GTL-385		13-1/2"	18"	3"	7/8"	1-1/8"
075TW-1950-GTL-385		19-1/2"	24"	3"	7/8"	1-1/8"
100TW-0250-GTL-385	1"	2-1/2"	6"	2"	1-1/16"	1-3/8"
100TW-0450-GTL-385		4-1/2"	9"	3"	1-1/16"	1-3/8"
100TW-0750-GTL-385		7-1/2"	12"	3"	1-1/16"	1-3/8"
100TW-1050-GTL-385		10-1/2"	15"	3"	1-1/16"	1-3/8"
100TW-1350-GTL-385		13-1/2"	18"	3"	1-1/16"	1-3/8"
100TW-1950-GTL-385		19-1/2"	24"	3"	1-1/16"	1-3/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Additional lagging extension are available upon request.

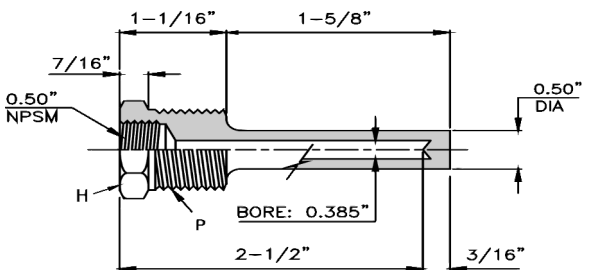
**PANAM[®] Limited Space Thermowells
for 1/4" Elements (.260 Bore)**



Part #	P	H
050TW-LS-T-260	1/2"	1-1/8"
075TW-LS-T-260	3/4"	1-1/8"
100TW-LS-T-260	1"	1-3/8"

NOTES:
* Cap and chain are available upon request.
* Special finishes are available upon request.

**PANAM[®] Limited Space Thermowells
for 1/4" Elements (.385 Bore)**



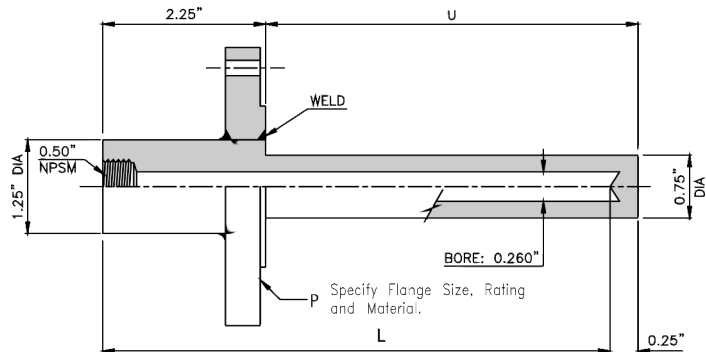
Part #	P	H
050TW-LS-T-385	1/2"	1-1/8"
075TW-LS-T-385	3/4"	1-1/8"
100TW-LS-T-385	1"	1-3/8"

NOTES:
* Cap and chain are available upon request.
* Special finishes are available upon request.

**PANAM[®] Standard Flange Thermowells
for 1/4" Elements (.260 Bore)**



NOTES:
* Cap and chain are available upon request.
* Special finishes are available upon request.
* For F-260, Stepped shanks are available upon request.

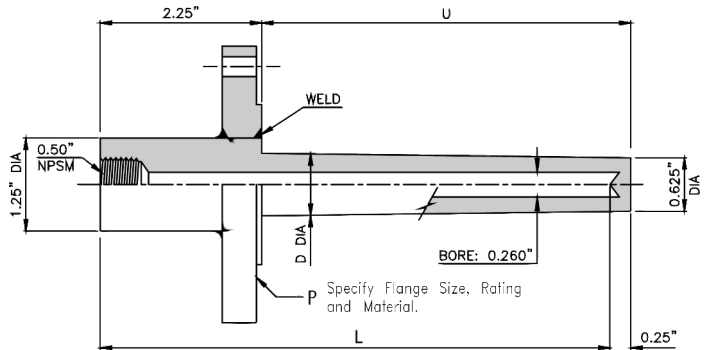


Part #	P	U	L
10TW-0200-F-260	1"	2"	4"
10TW-0400-F-260		4"	6"
10TW-0700-F-260		7"	9"
10TW-1000-F-260		10"	12"
10TW-1300-F-260		13"	15"
10TW-1600-F-260		16"	18"
10TW-2200-F-260		22"	24"
15TW-0200-F-260	1-1/2"	2"	4"
15TW-0400-F-260		4"	6"
15TW-0700-F-260		7"	9"
15TW-1000-F-260		10"	12"
15TW-1300-F-260		13"	15"
15TW-1600-F-260		16"	18"
15TW-2200-F-260		22"	24"
20TW-0200-F-260	2"	2"	4"
20TW-0400-F-260		4"	6"
20TW-0700-F-260		7"	9"
20TW-1000-F-260		10"	12"
20TW-1300-F-260		13"	15"
20TW-1600-F-260		16"	18"
20TW-2200-F-260		22"	24"

**PANAM[®] Heavy Duty Flange Thermowells
for 1/4" Elements (.260 Bore).**



NOTES:
* Cap and chain are available upon request.
* Special finishes are available upon request.



Part #	P	U	L	D
10TW-0200-FG-260	1"	6"	4"	7/8"
10TW-0400-FG-260		4"	6"	7/8"
10TW-0700-FG-260		7"	9"	7/8"
10TW-1000-FG-260		10"	12"	7/8"
10TW-1300-FG-260		13"	15"	7/8"
10TW-1600-FG-260		16"	18"	7/8"
10TW-2200-FG-260		22"	24"	7/8"
15TW-0200-FG-260	1-1/2"	6"	4"	7/8"
15TW-0400-FG-260		4"	6"	7/8"
15TW-0700-FG-260		7"	9"	7/8"
15TW-1000-FG-260		10"	12"	7/8"
15TW-1300-FG-260		13"	15"	7/8"
15TW-1600-FG-260		16"	18"	7/8"
15TW-2200-FG-260		22"	24"	7/8"
20TW-0200-FG-260	2"	6"	4"	7/8"
20TW-0400-FG-260		4"	6"	7/8"
20TW-0700-FG-260		7"	9"	7/8"
20TW-1000-FG-260		10"	12"	7/8"
20TW-1300-FG-260		13"	15"	7/8"
20TW-1600-FG-260		16"	18"	7/8"
20TW-2200-FG-260		22"	24"	7/8"

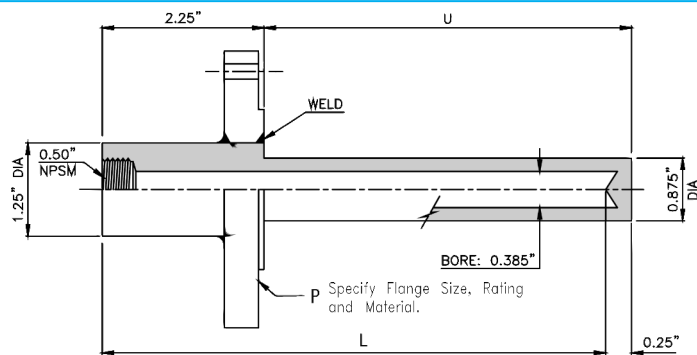
Standard Flange Thermowells

PANAM® Standard Flange Thermowells for 3/8" Elements (.385 Bore)



NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * For F-260, Stepped shanks are available upon request.



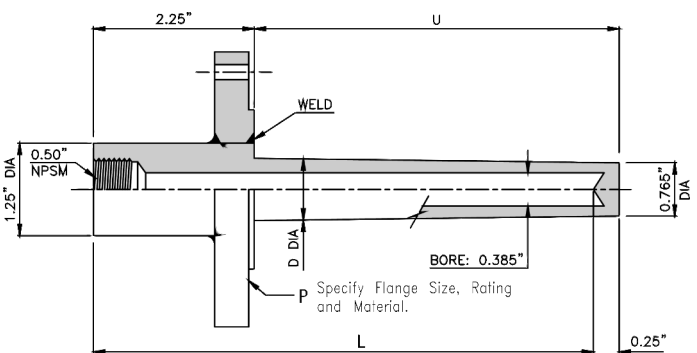
Part #	P	U	L
10TW-0200-F-385	1"	2"	4"
10TW-0400-F-385		4"	6"
10TW-0700-F-385		7"	9"
10TW-1000-F-385		10"	12"
10TW-1300-F-385		13"	15"
10TW-1600-F-385		16"	18"
10TW-2200-F-385		22"	24"
15TW-0200-F-385	1-1/2"	2"	4"
15TW-0400-F-385		4"	6"
15TW-0700-F-385		7"	9"
15TW-1000-F-385		10"	12"
15TW-1300-F-385		13"	15"
15TW-1600-F-385		16"	18"
15TW-2200-F-385		22"	24"
20TW-0200-F-385	2"	2"	4"
20TW-0400-F-385		4"	6"
20TW-0700-F-385		7"	9"
20TW-1000-F-385		10"	12"
20TW-1300-F-385		13"	15"
20TW-1600-F-385		16"	18"
20TW-2200-F-385		22"	24"

PANAM® Heavy Duty Flange Thermowells for 3/8" Elements (.385 Bore).



NOTES:

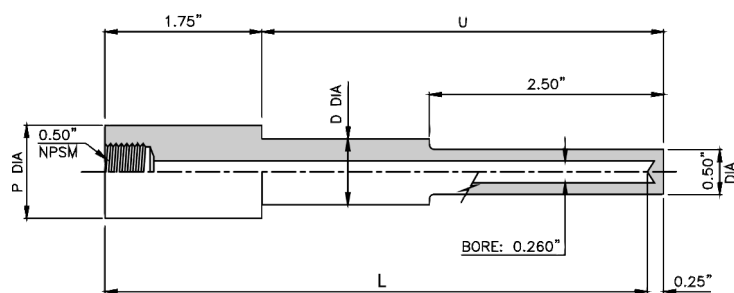
- * Cap and chain are available upon request.
- * Special finishes are available upon request.



Part #	P	U	L	D
10TW-0200-FG-385	1"	6"	4"	7/8"
10TW-0400-FG-385		4"	6"	7/8"
10TW-0700-FG-385		7"	9"	7/8"
10TW-1000-FG-385		10"	12"	7/8"
10TW-1300-FG-385		13"	15"	7/8"
10TW-1600-FG-385		16"	18"	7/8"
10TW-2200-FG-385		22"	24"	7/8"
15TW-0200-FG-385	1-1/2"	6"	4"	7/8"
15TW-0400-FG-385		4"	6"	7/8"
15TW-0700-FG-385		7"	9"	7/8"
15TW-1000-FG-385		10"	12"	7/8"
15TW-1300-FG-385		13"	15"	7/8"
15TW-1600-FG-385		16"	18"	7/8"
15TW-2200-FG-385		22"	24"	7/8"
20TW-0200-FG-385	2"	6"	4"	7/8"
20TW-0400-FG-385		4"	6"	7/8"
20TW-0700-FG-385		7"	9"	7/8"
20TW-1000-FG-385		10"	12"	7/8"
20TW-1300-FG-385		13"	15"	7/8"
20TW-1600-FG-385		16"	18"	7/8"
20TW-2200-FG-385		22"	24"	7/8"

Socket-Weld Thermowells

PANAM® Socket-Weld Thermowells for 1/4" Elements (.260 Bore)

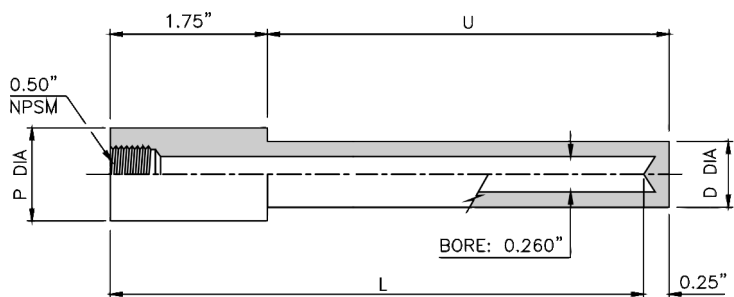


Part #	P	U	L	D
075TW-0250-SW-260		2-1/2"	4"	1/2"
075TW-0450-SW-260		4-1/2"	6"	3/4"
075TW-0750-SW-260		7-1/2"	9"	3/4"
075TW-1050-SW-260	3/4" Nomial 1.05" Dia	10-1/2"	12"	3/4"
075TW-1350-SW-260		13-1/2"	15"	3/4"
075TW-1650-SW-260		16-1/2"	18"	3/4"
075TW-2250-SW-260		22-1/2"	24"	3/4"
100TW-0250-SW-260		2-1/2"	4"	7/8"
100TW-0450-SW-260		4-1/2"	6"	7/8"
100TW-0750-SW-260		7-1/2"	9"	7/8"
100TW-1050-SW-260	1" Nomial 1.315" Dia	10-1/2"	12"	7/8"
100TW-1350-SW-260		13-1/2"	15"	7/8"
100TW-1650-SW-260		16-1/2"	18"	7/8"
100TW-2250-SW-260		22-1/2"	24"	7/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Standard well is stepped to 1/2" OD except U=2 1/2 Please specify if straight shank is required.
- * Other P dimensions are available upon request
- * Lagging extensions are available upon request
- * Tapered (Heavy Duty) design are also available

PANAM® Socket-Weld Thermowells for 3/8" Elements (.385 Bore).

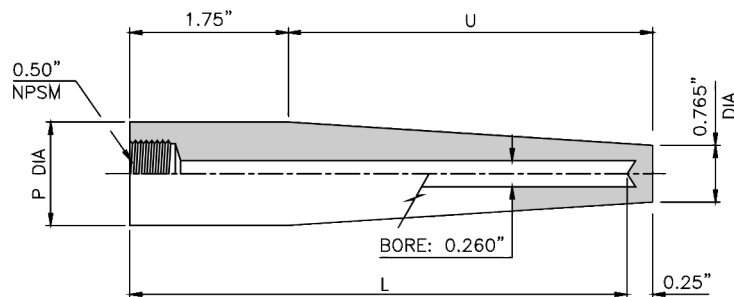


Part #	P	U	L	D
075TW-0250-SW-385		2-1/2"	4"	49/64"
075TW-0450-SW-385		4-1/2"	6"	49/64"
075TW-0750-SW-385		7-1/2"	9"	49/64"
075TW-1050-SW-385	3/4" Nomial 1.05" Dia	10-1/2"	12"	49/64"
075TW-1350-SW-385		13-1/2"	15"	49/64"
075TW-1650-SW-385		16-1/2"	18"	49/64"
075TW-2250-SW-385		22-1/2"	24"	49/64"
100TW-0250-SW-385		2-1/2"	4"	7/8"
100TW-0450-SW-385		4-1/2"	6"	7/8"
100TW-0750-SW-385		7-1/2"	9"	7/8"
100TW-1050-SW-385	1" Nomial 1.315" Dia	10-1/2"	12"	7/8"
100TW-1350-SW-385		13-1/2"	15"	7/8"
100TW-1650-SW-385		16-1/2"	18"	7/8"
100TW-2250-SW-385		22-1/2"	24"	7/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Other P dimensions are available upon request
- * Lagging extensions are available upon request
- * Tapered (Heavy Duty) design are also available

PANAM® Weld-In Thermowells for 1/4" Elements (.260 Bore)

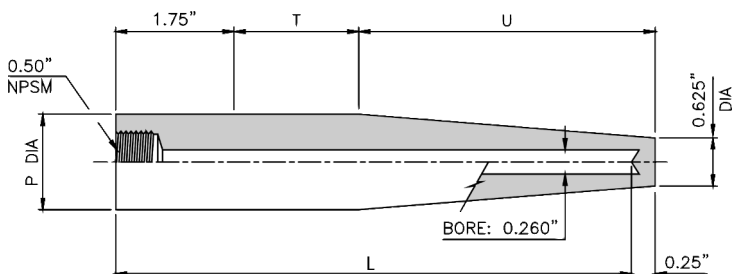


Part #	P	U	L
075TW-0250-W-260	3/4" Nomial 1.05" Dia	2-1/2"	4"
075TW-0450-W-260		4-1/2"	6"
075TW-0750-W-260		7-1/2"	9"
075TW-1050-W-260		10-1/2"	12"
075TW-1350-W-260		13-1/2"	15"
075TW-1650-W-260		16-1/2"	18"
075TW-2250-W-260		22-1/2"	24"
100TW-0250-W-260	1" Nomial 1.315" Dia	2-1/2"	4"
100TW-0450-W-260		4-1/2"	6"
100TW-0750-W-260		7-1/2"	9"
100TW-1050-W-260		10-1/2"	12"
100TW-1350-W-260		13-1/2"	15"
100TW-1650-W-260		16-1/2"	18"
100TW-2250-W-260		22-1/2"	24"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Other P dimensions are available upon request

PANAM® Weld-In Thermowells for 1/4" Elements (.260 Bore). w/Lagging Extension

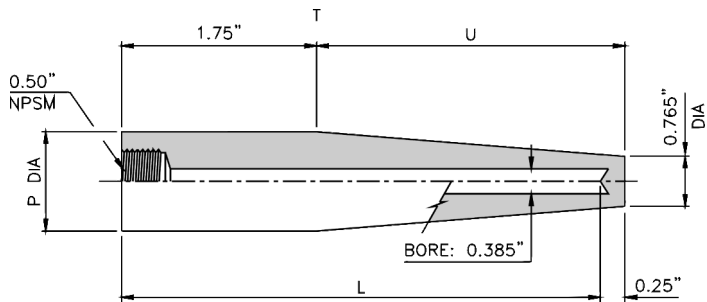


Part #	P	U	T	L
075TW-0450-WL-260	3/4" Nomial 1.05" Dia	2-1/2"	2"	6"
075TW-0750-WL-260		7-1/2"	3"	9"
075TW-1050-WL-260		10-1/2"	3"	12"
075TW-1350-WL-260		13-1/2"	3"	15"
075TW-1650-WL-260		16-1/2"	3"	18"
075TW-2250-WL-260		22-1/2"	3"	24"
100TW-0450-WL-260	1" Nomial 1.315" Dia	4-1/2"	2"	6"
100TW-0750-WL-260		7-1/2"	3"	9"
100TW-1050-WL-260		10-1/2"	3"	12"
100TW-1350-WL-260		13-1/2"	3"	15"
100TW-1650-WL-260		16-1/2"	3"	18"
100TW-2250-WL-260		22-1/2"	3"	24"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Other P dimensions are available upon request
- * Lagging extensions are available upon request

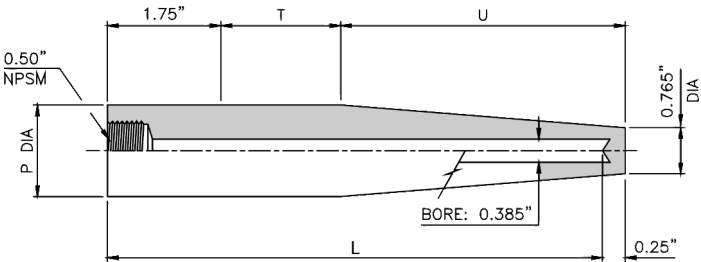
**PANAM® Weld-In Thermowells
for 3/8" Elements (.385 Bore)**



Part #	P	U	L
075TW-0250-W-385	3/4" Nomial 1.05" Dia	2-1/2"	4"
075TW-0450-W-385		4-1/2"	6"
075TW-0750-W-385		7-1/2"	9"
075TW-1050-W-385		10-1/2"	12"
075TW-1350-W-385		13-1/2"	15"
075TW-1650-W-385		16-1/2"	18"
075TW-2250-W-385		22-1/2"	24"
100TW-0250-W-385	1" Nomial 1.315" Dia	2-1/2"	4"
100TW-0450-W-385		4-1/2"	6"
100TW-0750-W-385		7-1/2"	9"
100TW-1050-W-385		10-1/2"	12"
100TW-1350-W-385		13-1/2"	15"
100TW-1650-W-385		16-1/2"	18"
100TW-2250-W-385		22-1/2"	24"

NOTES:
* Cap and chain are available upon request.
* Special finishes are available upon request.
* Other P dimensions are available upon request

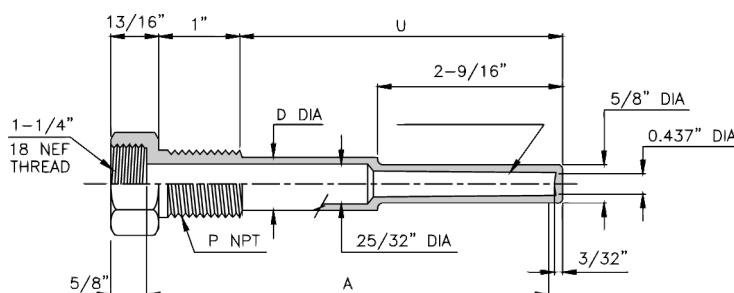
**PANAM® Weld-In Thermowells
for 3/8" Elements (.385 Bore). w/Lagging Extension**



Part #	P	U	T	L
075TW-0450-WL-385	3/4" Nomial 1.05" Dia	2-1/2"	2"	6"
075TW-0750-WL-385		7-1/2"	3"	9"
075TW-1050-WL-385		10-1/2"	3"	12"
075TW-1350-WL-385		13-1/2"	3"	15"
075TW-1650-WL-385		16-1/2"	3"	18"
075TW-2250-WL-385		22-1/2"	3"	24"
100TW-0450-WL-385	1" Nomial 1.315" Dia	4-1/2"	2"	6"
100TW-0750-WL-385		7-1/2"	3"	9"
100TW-1050-WL-385		10-1/2"	3"	12"
100TW-1350-WL-385		13-1/2"	3"	15"
100TW-1650-WL-385		16-1/2"	3"	18"
100TW-2250-WL-385		22-1/2"	3"	24"

NOTES:
* Cap and chain are available upon request.
* Special finishes are available upon request.
* Other P dimensions are available upon request
* Lagging extensions are available upon request

PANAM® Thermowells for Industrial Glass Thermometers.

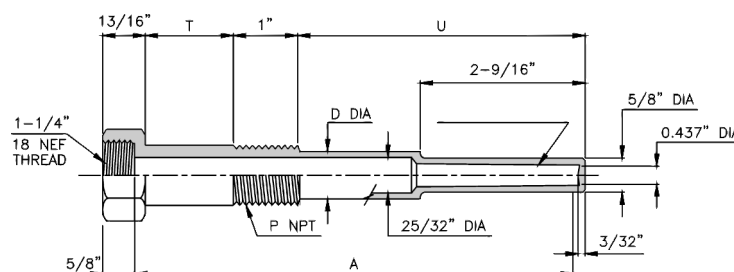


Part #	P	Nomial Element Length	Insert Length U	Element Length L	Shank Dia D
075TW-0350-TI-260	3/4"	3-1/2"	2-9/16"	3-5/8"	11/16"
075TW-0600-TI-260		6"	5-1/16"	6-1/8"	7/8"
075TW-0900-TI-260		9"	8-1/16"	9-1/8"	7/8"
075TW-1200-TI-260		12"	11-1/16"	12-1/8"	7/8"
075TW-1800-TI-260		18"	17-1/16"	18-1/8"	7/8"
075TW-2400-TI-260		24"	23-1/16"	24-1/8"	7/8"
100TW-0350-TI-260	1"	3-1/2"	2-9/16"	3-5/8"	11/16"
100TW-0600-TI-260		6"	5-1/16"	6-1/8"	7/8"
100TW-0900-TI-260		9"	8-1/16"	9-1/8"	7/8"
100TW-1200-TI-260		12"	11-1/16"	12-1/8"	7/8"
100TW-1800-TI-260		18"	17-1/16"	18-1/8"	7/8"
100TW-2400-TI-260		24"	23-1/16"	24-1/8"	7/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Other P dimensions are available upon request

PANAM® Thermowells for Industrial Glass Thermometers. w/Lagging Extension



Part #	P	Nomial Element Length	Insert Length U	Lagging Extension T	Element Length L	Shank Dia D
075TW-0600-TIL-260	3/4"	6"	2-9/16"	2-1/2"	6-5/8"	11/16"
075TW-0900-TIL-260		9"	5-1/16"	3"	9-1/8"	7/8"
075TW-1200-TIL-260		12"	8-1/16"	3"	12-1/8"	7/8"
075TW-1800-TIL-260		18"	14-1/16"	3"	18-1/8"	7/8"
075TW-2400-TIL-260		24"	20-1/16"	3"	24-1/8"	7/8"
100TW-0600-TIL-260	1"	6"	2-9/16"	2-1/2"	6-5/8"	11/16"
100TW-0900-TIL-260		9"	5-1/16"	3"	9-1/8"	7/8"
100TW-1200-TIL-260		12"	8-1/16"	3"	12-1/8"	7/8"
100TW-1800-TIL-260		18"	14-1/16"	3"	18-1/8"	7/8"
100TW-2400-TIL-260		24"	20-1/16"	3"	24-1/8"	7/8"

NOTES:

- * Cap and chain are available upon request.
- * Special finishes are available upon request.
- * Other P dimensions are available upon request
- * Lagging extensions are available upon request

Surface Finish

In an ideal world as a machine cutting tool removes material from a part, it leaves no Imperfections. Minute clearances in the machine tool, moving parts, vibration of the tool, wear of the cutting insert, small variations in the pressure applied by the machine to the cutting insert and Irregularities in the material all affect the final surface finish of the part. Following the cutting Process, the surface is characterized by microscopic peaks and valleys. There are two common methods of expressing roughness. They are the Arithmetic Average Roughness Height (AARH) and the Root Mean Square (RMS) Average. Calculation of the Arithmetic Average Roughness Height involves measuring the distance of the peaks and valleys and performing an arithmetic average of the measurements. Alternately the calculation of Root Mean Square Average involves measuring the distance of peaks and valleys, adding the square of these measurements and calculating the square root of the total. The RMS value is approximately 11% higher than the AARH value.

Flange Face Surface Finish

The American National Standards Institute (ANSI) code for flanges and flanged fittings (B16.5) requires that the flange face has a specific roughness to ensure that this surface be compatible with the gasket and provide a high quality seal. A serrated finish, either concentric or spiral, is required with 30 to 55 grooves per inch and a resultant roughness between 125 and 500 micro inches.

Welding

Welding is a process of joining two metals by heating the metals to a suitable temperature. It may be carried out with or without the application of pressure, and with or without a filler metal. If a filler metal is used then it must be compatible with the base materials. Welds may be a *Full Penetration* or *Partial Penetration*,. A full penetration weld ensures a fully welded interface between the two parts and is generally the strongest joint. A partial penetration weld, on the other hand, consists of a partially welded interface with filler metal being laid on to the surface of the two metals. Welding is a generic term for several different welding processes. The process may be manual, semiautomatic or automatic. Generally arc welding is implied. Common techniques are Shielded Metal Arc Welding (SMAW), Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW). **PANAM**® standard procedure for thermo well welding is GTAW, full penetration welds. This technique provides for an efficient application of weld metal, strong joint, clean weld surface and homogenous weld. Homogeneity is especially important in services where weld voids can lead to hydrogen induced cracking.

Non-Destructive Test

Positive Material Identification (PMI)

As part of our quality assurance program, **PANAM**® traces all materials used to construct thermowells and protection tubes e.g., bar, flanges and pipe. For critical service where additional confidence in the materials is required, the material composition can be measured using a nuclear analyzer. This non-destructive technique utilizes a probe that exposes the metal to low energy X-rays. A sensor receives the resulting radiation from the metal and determines the chemical composition. The analyzer is limited to certain metals e.g., Cr, Ni, Mo, Mn, Ti, V, Nb, Cu, W, Co and Fe. Nonmetals such as Carbon, Sulphur and Phosphorus are not detected. This technique works best on stainless steels e.g., grade 304, 316, 410 and low alloy steels (Cr-Mo), but poorly on alloys with low Nickel content (less than 1%). PMI service is provided as an option and is carried out by independent technicians. Full reports are available on request.

Liquid Penetrant Inspection (LPI)

Liquid Penetrant inspection is a non-destructive technique used to locate and evaluate surface defects on nonporous materials. It is used commonly on weldments where additional confidence is needed to ensure a high quality weld surface. The major advantages of this technique are cost, portability and ease of use. The surface to be examined must be cleaned before testing. A penetrant is applied to the surface. This penetrant leaches into any surface defects that may be present. After a short time, excess penetrant is removed and a developer is applied. The developer draws penetrant out of any defects that may be present and gives an indication of location, shape and approximate size. Following the test, both penetrant and developer are removed by washing to restore the original clean surface. **PANAM**® has qualified personnel, complete with documented procedures for performing liquid penetrant inspection. Inspection reports can be provided upon request.

Hydrostatic Pressure Testing (External and Internal)

Hydrostatic testing is a non-destructive test used to examine the integrity of a thermowell by subjecting it to a pressure for a specified time. The thermowell is tested for leaks or pressure drops using chart recorders and visual inspection methods. Test pressures are generally one and a half times the maximum allowable working pressure of the process and may be applied to the internal or external surface of the thermowell depending on the requirements of the customer. **PANAM**® has in-house capabilities for hydrostatic testing thermowells in both external and internal configurations. We are able to use these techniques to verify welds, threaded connections and wall thicknesses.

Frequency 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 also-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

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

f_w ...Wake frequency (Hz)

V ...Fluid velocity (Ft/second)

B ...Tip diameter (Inches)

MODULUS OF ELASTICITY (TENSION), PSI x 10⁶

MAT'L TEMP °F	302	304	309	310	316	321	347	ALLOY 400	ALLOY 600	A10 5	ALUM 1100	ALUM 6061	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	A10 5	ALUM 1100	ALUM 6061	NICKEL 200	410	446	COPPER	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

Frequency Calculations

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 with stand for a given material at a given temperature shall be computed from the following:

$$P = K, S$$

P.....Maximum allowable static gage pressure (PSI)

S.....Allowable stress for material at operating temperature (See Table II)

K 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:

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

Amax 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: $F_m = r^2 / (1 - r^2)$

r..... Frequency ratio

(See section 1.3 - Vibration)

TABLE I: VALUES OF K.

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 - PSI ¹

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
310S.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
41 OS. 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	—	—	—	—	—
Monel400 *	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

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

TABLE I: VALUES OF K.

INSERTION LENGTH A, INCHES	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

Material Selection Guide

Chemical	Temp	Concentration	Material
A			
Acetic Acid	212/100	All	Monel400
Acetic Anhydride	300/149		Nickel 200
Acetone	212/100	All	304, 304/304L SS
Acetylene	400/205		304, 304/304L
Alcohols	212/100	All	304, 304/304L SS
Aluminum (Potassium/Sodium)	300/149	All	Hastelloy C276
Aluminum Chloride	212/100	All	Hastelloy B-2
Aluminum Sulfate	212/100	All	316, 316/316L SS
Ammonia, Dry	212/100	All	304/304L., 316/316L SS
Ammonia Hydroxide (Ammonia, Aqua)	212/100	All	304/304L., 316/316L SS
Ammonium Chloride	300/149	50%	Monel 400
Ammonium Nitrate	300/149	All	304, 304/304L SS
Ammonium Sulfate	212/100	All	316, 316/316L SS
Amyl Acetate	300/149	All	304, 304/304L SS
Aniline	75/24		Monel400
Asphalt	250/121		304, 304/304L SS
Atmosphere (industrial and Marine)			304, 304/304L SS
B			
Barium Compounds			See Calcium
Beer	70/21		304, 304/304L SS
Benzene (Benzol)	212/100		Carbon Steel
Benzoic Acid	212/100	All	316, 316/316L SS
Bleaching Powder	70/21	15%	Monel 400
Borax	212/100	All	Brass
Bordeaux Mixture	200/93		304,304/304L SS
Boric Acid	400/205	All	316, 316/316L SS
Bromine	125/52	Dry	Monel400
Butane	400/205	All	Carbon Steel
Butyl Alcohol	212/100	All	304, 304/304L SS
Butyric Acid	212/100		Hastelloy C276
C			
Calcium Bisulphite	75/24	All	Hastelloy C276
Calcium Chloride	212/100	All	Hastelloy C276
Calcium Hydroxide	300/149	20%	Hastelloy C276
Calcium Hypochlorite	70/21	15%	Monel 400
Carbolic Acid	212/100	All	316, 316/316L SS
Carbon Dioxide, Dry	800/427	All	Brass
Carbonated Water	212/100	All	304, 304/304L SS
Carbonated Beverages	212/100		304, 304/304L SS
Carbon Disulfide	200/93		304, 304/304L SS
Carbon Tetrachloride	125/52	All	Monel 400
Chlorine, Dry	100/38		Monel400

Material Selection Guide

Chemical	Temp	Concentration	Material
Chlorine, Moist	100/38	All	Monel 400
Chloracetic Acid	212/100	All	Monel 400
Chloroform, Dry	212/100		Monel 400
Chromic Add	300/149	All	Hastelloy C276
Cider	300/149	All	304, 304/304L SS
Citric Acid	212/100	All	Hastelloy C276
Copper (10) Chloride	212/100	All	Hastelloy C276
Copper (10) Nitrate	300/149	All	316, 316/316L SS
Copper (10) Sulfate	300/149	All	316, 316/316L SS
Copper Platina Solution (Cyanide)	180/82		304, 304/304L SS
Copper Platting Solution (Acid)	75/24		304, 304/304L SS
E			
Ethyl Acetate	300/149	All	304, 304/304L SS
Ethyl Chloride, Dry	500/260		Carbon Steel
Ethanol	212/100	AH	304, 304/304L SS
Ethylene Glycol (Uninhibited)	212/100	AB	304, 304/304L SS
Ethylene Oxide	75/24		Carbon Steel
F			
Fatty Acids	500/260	All	316, 316/316L SS
Ferric Chloride	75/24	Alt	Hastelloy C276
Ferric Sulfate	300/149	All	304, 304/304L SS
Formaldehyde	212/100	40%	316, 316/316L SS
Formic Acid	300/149	All	316, 316/316L SS
Freon	300/149		Carbon Steel
Fluorine, Anhydrous	100/38		304, 304/304L SS
Furfural	450/232		316, 316/316L SS
G			
Gasoline	300/149		Carbon Steel
Glucose	300/149		304, 304/304L SS
Glue, pH 6-8	300/149	All	304, 304/304L SS
Glycerine	212/100	All	Brass
H			
Hydrobromic Acid	212/100	All	Hastelloy C276
Hydrochloric Add, (37%-38%)	225/107	AH	Hastelloy B-2
Hydrogen Chloride, Dry	500/260		304, 304/304L SS
Hydrocyanic Acid	212/100	AH	304, 304/304L SS
Hydrofluoric Acid	212/100	60%	Monel 400
Hydrogen Fluoride, Dry	175/80		Carbon Steel
Hydrogen Peroxide	125/52	10-100%	304, 304/304L SS

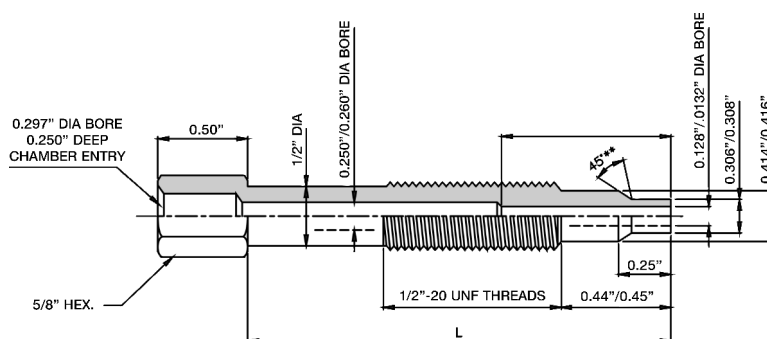
Material Selection Guide

Chemical	Temp	Concentration	Material
K			
Kerosene	300/149	All	Carbon Steel
L			
Lacquers and Thinners	300/149	All	304, 304/304L SS
Lactic Acid	300/149	AH	316, 316/316L SS
Lime	212/100	All	316, 316/316L SS
Linseed Oil	75/24		Carbon Steel
M			
Magnesium Chloride	212/100	50%	Nitro 200
Magnesium Hydroxide (or Oxide).	75/24	All	304, 304/304L SS
Magnesium Sulfate	212/100	40%	304, 304/304L SS
Mercuric Chloride	75/24	10%	Hastelloy C276
Mercury	700/371	100%	Carbon Steel
Methylene Chloride	212/100	All	304, 304/304L SS
Methyl Chloride, Dry	75/24		Carbon Steel
Milk, Fresh or Sour	180/82		304, 304/304L SS
Molasses	300/149		304, 304/304L SS
N			
Natural Gas	70/21		304, 304/304L SS
Nitric Acid	75/24	All	304, 304/304L SS
Nitric Acid	300/149	AH	316, 316/316L SS
O			
Oxygen	75/24	M	Carbon Steel
Oleic Acid	500/260	All	316, 316/316L SS
Oxalic Acid	212/100	All	Monel 400
P			
Photoresist Batching	100/38	AH	304, 304/304L SS
Palmitic Acid	500/260	AH	316, 316/316L SS
Phosphoric Acid	212/100	All	316, 316/316L SS
Phenol	212/100	All	316, 316/316L SS
Potassium Compounds			See Sodium Compounds
Propane	300/149		Carbon Steel
R			
Rosin	700/371	100%	316, 316/316L SS
S			
Sea Water	75/24		Monel 400
Soap & Detergents	212/100	AM	304, 304/304L SS

Material Selection Guide

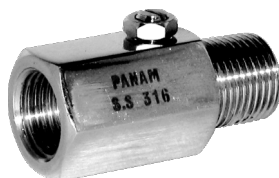
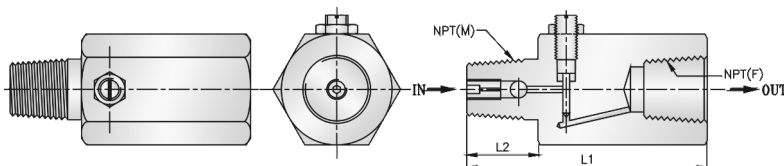
Chemical	Temp	Concentration	Material
Sodium Bicarbonate	212/100	20%	316.316/316LSS
Sodium Bisutohite	212/100	20%	304.304/304L SS
Sodium Bisutohate	212/100	20%	304, 304/304LSS
Sodium Carbonate	212/100	40%	316.316/316LSS
Sodium Chloride	300/149	30%	Monel 400
Sodium Chromate	212/100	AH	316.316/316LSS
Salt or Brine	300/149	30%	Monel400
Sodium Cvanlde	212/100	AH	304. 304/304LSS
Sodium Hydroxide	212/100	30%	316.316/316LSS
Sodium Hvnocltorite	75/24	20%	HastettoYC276
Sodium Nitrate	212/100	40%	304. 304/304L SS
Sodium Nitrite	75/24	20%	316.316/316LSS
Sodium Phosphate	212/100	10%	Carbon Steel
SodiuroStlicate	212/100	10%	Carbon Steel
Sodium Sulfate	212/100	30%	316.316/316LSS
Sodium Sufflde	212/100	10%	316. 316/316LSS
Sodium Sulfite	212/100	30%	304. 304/304L SS
Sodium ThtosuKate	212/100	AH	304. 304/304LSS
Steam			304. 304/304LSS
StearicAcjd	500/260	AB	316. 316/316L SS
Sugar Solutions	300/149		304. 304/304L SS
Sulfur	500/260		304. 304/304LSS
Sulfur Chloride	75/24	Dry	316, 316/316LSS
Sulfur Dioxide	500/260	Dry	316.316/316LSS
Sulfur Trioxide	500/260	Dry	316, 316/316LSS
SutfuricAcid	212/100	10%	316, 316/316L SS
Sulfuric Acid	212/100	10-90%	Hastelloy B-2
Sulfuric Acid	212/100	90-100%	316, 316/316L SS
Sulfuric Acid, Fuming	175/80		Hastelloy C276
Sulfurous Acid	75/24	20%	316,316/316L SS
T			
Titanium Tetrachloride	75/24	Alt	316, 316/316LSS
Tannic Acid	75/24	40%	Hastelloy B-2
Toluene	75/24		Carbon Steel
TrichloraceticAcid	75/24	All	316.316/316LSS
Trichloroethylene	300/149	Dry	Monel 400
Turpentine	75/24		316.316/316LSS
V			
Varnish	150/66		Carbon Steel
Z			
Zinc Chloride	212/100	All	Hastelloy B-2
Zinc Sulfate	212/100	AH	316.316/316L SS

PANAM[®] Melt Bolt-X/125



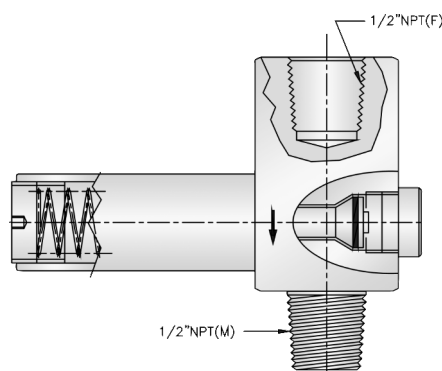
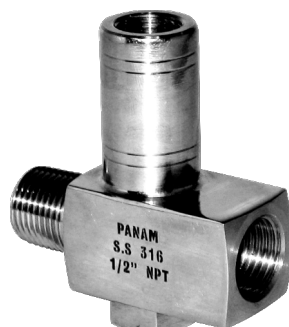
Part No.	L
PMB-3/125	3"
PMB-4/125	4"
PMB-6/125	6"
PMB-9/125	9"

PANAM[®] Pulsation Dampner/Snubber

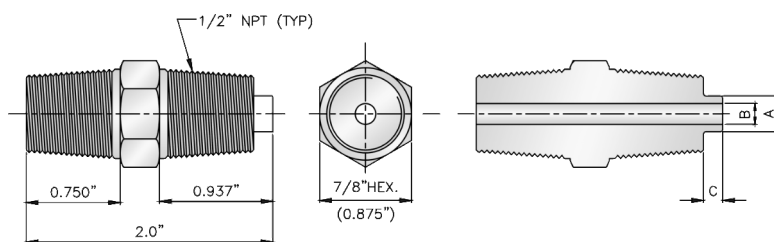


Part No.	Description (Pipe)	Thread Size	L1 IN.	L2 IN.	Max. W. P. P.S.I.G. (bar)
PS-150BH	MALE x FEMALE	1/2" NPT	2.31	0.75	5.000 (340)
PS-150SO	MALE x FEMALE	1/4" NPT	1.73	0.56	5.000 (340)

PANAM[®] Gauge Guard PE-SNU

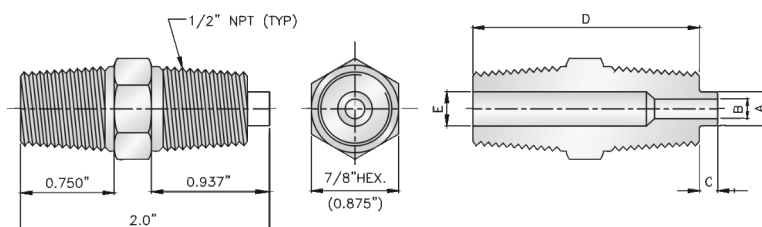


PANAM® Hex Fittings 9610 Series



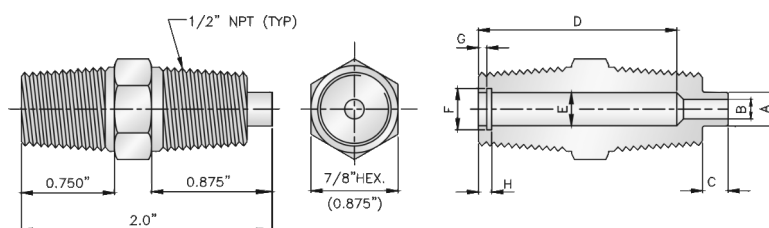
PART #	A	B	C
PH-9610-250A	0.371	0.260	0.185
PH-9610-187A	0.295	0.197	0.185
PH-9610-125A	0.234	0.138	0.185
PH-9610-6mm	0.234	0.2242	0.185

PANAM® Hex Fittings 9710 Series



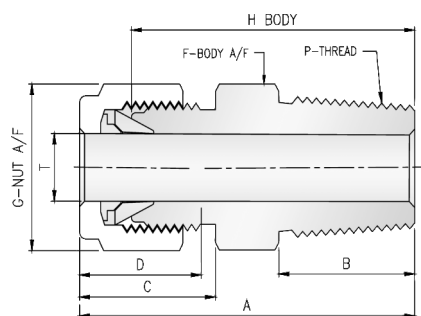
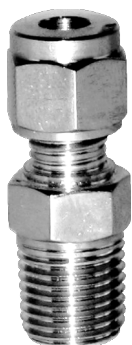
PART #	A	B	C	D	E
PH-9710-250A	0.371	0.260	0.185	1.500	0.515
PH-9710-187A	0.295	0.197	0.185	1.500	0.515
PH-9710-125A	0.234	0.138	0.185	1.500	0.515

PANAM® Hex Fittings 9810 Series



PART #	A	B	C	D	E	F	G	H
PH-9810-250A	0.500	0.264	0.125	1.625	0.425	0.500	0.062	0.125
PH-9810-187A	0.500	0.200	0.125	1.625	0.425	0.500	0.062	0.125
PH-9810-125A	0.500	0.138	0.125	1.625	0.425	0.500	0.062	0.125
PH-9810-6mm	0.500	0.242	0.125	1.625	0.425	0.500	0.062	0.125

PANAM® Bore Through Male Connector



Part No.	Tube O.D.	NPT Pipe Thread	A	C	H	B	F Body
PMC-01-01-BT	1/16	1/16	.93	.43	.78	.38	5/16
PMC-01-02-BT	1/16	1/8	1.03	.43	.88	.38	7/16
PMC-01-04-BT	1/16	1/4	1.23	.43	1.08	.56	9/16
PMC-02-01-BT	1/8	1/16	1.17	.60	.91	.38	3/8
PMC-02-02-BT	1/8	1/8	1.20	.60	.94	.38	7/16
PMC-02-04-BT	1/8	1/4	1.40	.60	1.14	.56	9/16
PMC-03-02-BT	3/16	1/8	1.23	.64	.97	.38	7/16
PMC-03-04-BT	3/16	1/4	1.43	.64	1.17	.56	9/16
PMC-04-02-BT	1/4	1/8	1.29	.70	1.00	.38	1/2
PMC-04-04-BT	1/4	1/4	1.49	.70	1.20	.56	9/16
PMC-04-06-BT	1/4	3/8	1.60	.70	1.22	.56	11/16
PMC-04-08-BT	1/4	1/2	1.87	.70	1.47	.75	7/8
PMC-05-04-BT	5/16	1/4	1.52	.73	1.22	.56	9/16
PMC-06-04-BT	3/8	1/4	1.57	.76	1.28	.56	5/8
PMC-06-06-BT	3/8	3/8	1.57	.76	1.28	.56	11/16
PMC-06-08-BT	3/8	1/2	1.82	.76	1.53	.75	7/8
PMC-06-12-BT	3/8	3/4	1.88	.76	1.59	.75	1-1/16
PMC-08-08-BT	1/2	1/2	1.93	.87	1.53	.76	7/8
PMC-08-12-BT	1/2	3/4	1.99	.87	1.59	.75	1-1/16
PMC-10-12-BT	5/8	3/4	1.99	.87	1.59	.75	1-1/16
PMC-12-12-BT	3/4	3/4	1.99	.87	1.59	.75	1-1/16
PMC-16-16-BT	1	1	2.46	1.05	1.97	.94	1-3/8

Standard Manufacturing Tolerances

Lengths: $\pm 1/16"$ on lengths 12" or less.
 $\pm 1/8"$ on lengths 12" or over.

O.D. Tolerances: $\pm .015$

Bore LD: $+.005$
 $-.003$

End Thickness: $1/4" \pm 1/16"$ except Model 050TW-LS-T-260. and Model 050TW-LS-T-385. See catalogue for specifications on these wells.

Concentricity of Bore to O.D.: of min. wall thickness.

Wetted Surfaces Finish: 16-32 Ra is standard. Special finishes are available upon request.

Male Threads (NPT): ± 1 turn on thread gage.

Female Threads: Both 1/2" NPSM and 1/2" NPT are stocked. Please specify. Go gage to 5/8" depth of thread. No go gage 2 turns max.

End of Wells: Break corners - no burrs.

Lagging Ext.: Hex on threaded wells.

Stamping: Type of material and identification code stamped on hex or round.

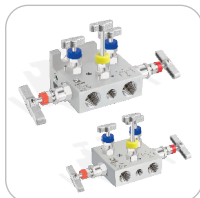
Flanged Wells: are made in accordance with ANSI B16.5. Raised face is serrated.

Welding: Full penetration welds are standard.

Eighteen Months Warranty

PANAM products are sold subject to the mutual agreement that they are warranted by PANAM to be free from defects in material and work-manship, but PANAM's liability and the buyer's exclusive remedy shall be limited to repair or replacement without charge, at PANAM's factory, of any material defects which become apparent within Eighteen months of the date of shipment, and which shall be determined to be defective by PANAM upon their return to the factory, freight prepaid, or at PANAM's option to a refund of the purchase price, and PANAM shall have no liability for damages of any kind, direct or indirect, arising from an installation and/or use of any material, and by accepting the material the buyer will assume all liability for any damages, direct or consequential, which may result from its use or misuse.

Other Products



2-3-5 VALVE MANIFOLDS



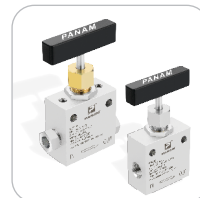
BELLOW SEAL VALVES



GAUGE ROOT VALVES



NEEDLE VALVES



HP NEEDLE VALVES



BALL VALVES



HP BALL VALVES



DOUBLE BLOCK & BLEED VALVES



MONO FLANGE VALVES



CHECK VALVES



RELIEF VALVES



FILTERS



TUBE FITTINGS



PIPE FITTINGS



HP PIPE FITTINGS



SWIVEL FITTINGS



JIC FITTINGS



WELD FITTINGS



HIGH PRESSURE FITTINGS



GAUGE SAVERS



PRESSURE GAUGES



TEMPERATURE GAUGES



PRESSURE TRANSMITTERS



TEMPERATURE TRANSMITTERS



PRESSURE REGULATORS



CONDENSATE POTS



AIR HEADERS



GRAB SAMPLING SYSTEM



PRE-FABRICATED HOOK UPS



FLANGE ADAPTERS



SWIVEL GAUGE ADAPTERS



THERMOWELLS



BLEED PLUGS



DIE-ELECTRIC FITTINGS



TUBING



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