Since 1972

Ceramic Protection Tubes Application Data

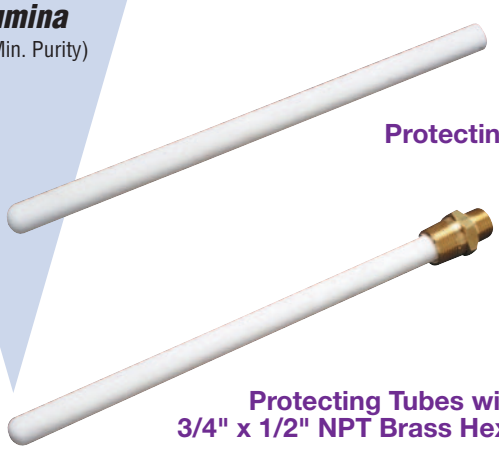
Ceramic Protection Tubes are used in applications where contamination from hostile environments or the cutting action of concentrated and direct flame impingement are factors. Such conditions usually require a noble metal thermocouple such as platinum and platinum alloys.

When selecting assemblies using ceramic components, the expected maximum temperatures must be considered. At elevated temperatures, some ceramic materials go through a glass phase. As silica is a prime contaminant of platinum, alumina protecting tubes and insulators are recommended for temperatures exceeding 2000°F (1093°C).

Material	Maximum Operating Temperature	Thermal Shock Characteristics	Maximum Available Length (in)	Typical Applications	Remarks
Alumina (99.7%)	3100°F (1700°C)	Fair (preheating to 900°F [482°C] recommended)	84	Iron, Barium, crown glass; non-ferrous metals; gas-tight protection for noble metal thermocouples in excess of 2400°F (1316°C)	Sags at 2900°F (1593°C) Prevents dry hydrogen penetration
Porcelain (Mullite)	2550°F (1400°C)	Poor (preheating to 900°F [482°C] recommended)	84	Non-ferrous metals; gas-tight protection for noble metal thermocouples to 2400°F (1316°C)	Sags at 2550°F (1400°C) Prone to attack by halogen gases; some penetration of dry hydrogen. Contains silica.

Alumina
(99% Min. Purity)

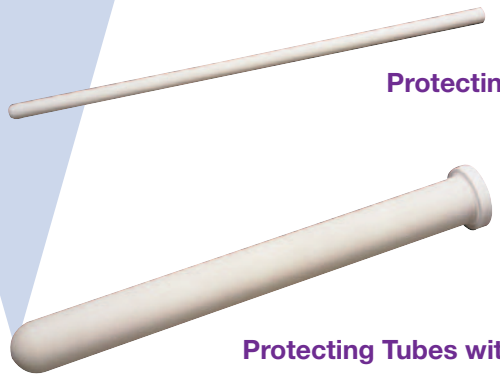
Protecting Tubes



Protecting Tubes with 3/4" x 1/2" NPT Brass Hex Fitting

Porcelain

Protecting Tubes



Protecting Tubes with Collar

Part Number	I.D. x O.D.†	Construction	Length
APT-101-☐	¼" × ⅜"	Plain End	12" thru 48" in 6" increments
APT-102-☐	7/16" × 11/16"	Plain End	12" thru 60" in 6" increments
APT-103-☐	¾" × 1"	Plain End	12" thru 72" in 6" increments
APT-104-☐	1" × 1¼"	Plain End	12" thru 72" in 6" increments
APT-105-☐	¼" × ⅜"	With Hex Fitting	12" thru 48" in 6" increments
APT-106-☐	7/16" × 11/16"	With Hex Fitting	12" thru 60" in 6" increments

Part Number	I.D. x O.D.†	Construction	Length
PPT-101-☐	¼" × ⅜"	Plain End	12" through 84" inch 6" increments
PPT-102-☐	7/16" × 11/16"	Plain End	
PPT-103-☐	¾" × 1"	Plain End	
PPT-104-☐	1" × 1¼"	Plain End	
PPT-105-☐	¼" × ⅜"	w/ Collar Approx. 5/16" × ¾"	
PPT-106-☐	7/16" × 11/16"	w/ Collar Approx. 5/16" × 1 1/16"	
PPT-107-☐	¾" × 1"	w/ Collar Approx. 5/16" × 1⅜"	
PPT-108-☐	1" × 1¼"	w/ Collar Approx. 5/16" × 1⅝"	
PPT-109-☐	¼" × ⅜"	w/Hex Fitting	
PPT-110-☐	7/16" × 11/16"	w/Hex Fitting	

Ordering Information

Complete the Part Number with 3 digits indicating length in whole inches.

Example: = APT-105-012 is 12" long and PPT-107-048 is 48" long.

†Dimensional tolerance:
Up to 1" Dia. ±5% or .025", whichever is greater
Over 1" Dia. ±4% or .050", whichever is greater

⚠ **WARNING:** Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

Made in USA

Metal Protection Tubes

For longer life and continued accuracy, most thermocouples in industrial applications should be protected from physical damage, corrosion, and contamination by some type of protecting tube or well. Metal tubes selected to suit the temperature, pressure and atmosphere are generally used with base metal thermocouples.

Typical Metal Protection Tube

Typical Cast Iron Protection Tube

Material	Maximum Operating Temperature	Typical Applications	Remarks
304 Stainless	1800°F (982°C)	Food and Dairy Products, Petroleum Products, Mild Acids, Alkalies	Embrittles in 800°F (427°C) to 1400°F (760°C) range.
Cast Iron	1300°F (704°C)	Molten Aluminum, Gas Ducts	Withstands sulphur and caustic solutions.
316 Stainless	1800°F (982°C)	Food and Dairy Products, Petroleum Products, Mild Acids, Alkalies	Greater corrosion resistance than 304 Stainless.
446 Stainless	2000°F (1093°C)	Sulphurous Atmospheres such as Hydrogen Sulphide, Neutral Salt Baths	Excellent resistance to corrosion and oxidation at high temperatures. Do not use in carburizing atmospheres.
Inconel 601®	2200°F (1204°C)	Neutral Salt Baths, Carburizing and Nitriding Atmospheres	Good resistance to corrosion at high temperatures; excellent resistance to oxidation at high temperatures. Do not use in carburizing atmospheres above 1000°F (538°C).
Black Steel Pipe per ASTM A120	1200°F (649°C)	Molten Babbitt, Tin, Lead, and Magnesium	Low Cost

304 Stainless Steel *(8% Nickel-18% Chrome)*

Part Number	I.D. x O.D.	NPT Thread	Const.	Length
*MPT-101-___	.622" × .840"	½"	Welded	12" and over in 6" increments
*MPT-102-___	.824" × 1.050"	¾"	Welded	
*MPT-103-___	1.049" × 1.315"	1"	Welded	

*If extra heavy wall is desired, specify.

446 Stainless Steel *(28% Chrome Iron)*

Part Number	I.D. x O.D.	NPT Thread	Const.	Length
MPT-109-___	.622" × .840"	½"	Seamless	12" and over in 6" increments
MPT-110-___	.824" × 1.050"	¾"	Seamless	
MPT-111-___	1.049" × 1.315"	1"	Seamless	

Cast Iron

Part Number	I.D. x O.D.	NPT Thread	Const.	Length
MPT-104-___	⅞" × 1⅝"	¾" Int.*	Cast	12" thru 72" in 6" increments
MPT-105-___	⅞" × 1⅜"	1" Ext.	Cast	12" thru 48" in 6" increments

*1" NPT external thread available on special request.

Inconel Alloy 601® *(60% Nickel-23% Chrome-14% Iron)*

Part Number	I.D. x O.D.	NPT Thread	Const.	Length
MPT-112-___	.622" × .840"	½"	Seamless	12" and over in 6" increments
MPT-113-___	.824" × 1.050"	¾"	Seamless	
MPT-114-___	1.049" × 1.315"	1"	Seamless	

316 Stainless Steel

Part Number	I.D. x O.D.	NPT Thread	Const.	Length
MPT-106-___	.622" × .840"	½"	Welded	12" and over in 6" increments
MPT-107-___	.824" × 1.050"	¾"	Welded	
MPT-108-___	1.049" × 1.315"	1"	Welded	

Black Steel Pipe *(Per ASTM A120)*

Part Number	I.D. x O.D.	NPT Thread	Const.	Length
MPT-115-___	.364" × .540"	¼"	Welded	12" and over in 6" increments
MPT-116-___	.302" × .540"	¼"	Welded	
MPT-117-___	.546" × .840"	½"	Welded	
MPT-118-___	.742" × 1.050"	¾"	Welded	
MPT-119-___	.957" × 1.315"	1"	Welded	

Ordering Information

Complete the Part Number with 3 digits indicating length in whole inches.

Example: = MPT-105-012 is 12" long and
MPT-107-048 is 48" long.

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