

CERAMIC PROTECTION TUBES


Alumina and mullite protection tubes are used at high temperatures that have a small slope of temperature change. Any thermocouple type can be used in these ceramic tubes; however, platinum-rhodium and chromel-alumel are used most often due to their high operating temperature range. "Alumina" is an alumina oxide ceramic (99.7% Al₂O₃) and "mullite" is a compound of alumina and silica. Alumina tubes can be used at 3400°F (1870°C) and mullite tubes can be used at 3100°F (1700°C). They are somewhat gas tight, sensitive to thermal shock, and can crack if one end of the tube is heated at a different rate than the other. If the tube is exposed to a significant sharp decline or rise in temperature, the tube may crack.

Platinum-Rhodium thermocouples should always be protected in a ceramic protection tube. Alumina should be used rather than mullite for all atmospheres except oxidizing, where mullite can be used. The silicon from the mullite can contaminate the platinum-rhodium thermocouple.

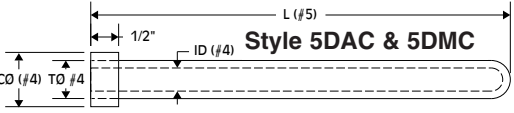
We recommend that the user preheat the entire tube to ≈ 900°F before installing it into a hot process environment.

#1	SERIES				
5D	Ceramic Protection Tubes - Add "W" here for a cap and chain to fit over open end. (i.e. 5DW)				
	#2	MATERIAL			
	A M	Alumina Mullite			
	#3	ATTACHING DEVICE			
	O P C B S X	No mounting fitting Open both ends, no mounting fitting Collar* (See chart below for collar dimensions) Mounting bushing (Standard) Carbon steel mounting sleeve - (4" standard) Other, specify			
	#4	TUBE SIZE I.D. x O.D.	*COLLAR OUTSIDE FOR APPROPRIATE TUBE SIZE		
	14 38 76 12 34 10 X	1/4" x 3/8" 3/8" x 1/2" 7/16" x 11/16" 1/2" x 3/4" (Standard) 3/4" x 1" 1" x 1 1/4" Other, specify	5/8" 3/4" 1" 1 1/8" 1 3/8" 1 3/4"		
	#5	LENGTH (L)			
	A B C D E F X	6" 12" (Standard) 18" 24" (Standard) 30" 36" Other, specify			
	#6	TAGGING OPTIONS			
	1 X Z	STAMPING Stamped on well (Standard) Other N/A Note: You must always specify information required on tag			

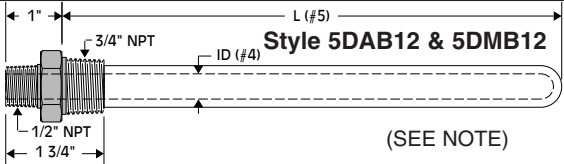
NOTE:
Bushings are always 1/2" NPT head connection, and 3/4" NPT process connection. Bushings are not standard for 3/4" x 1" or 1" x 1 1/4" ceramic tubes.
For tubes smaller than 11/16" OD, the "L" length will equal the total length including the bushing.



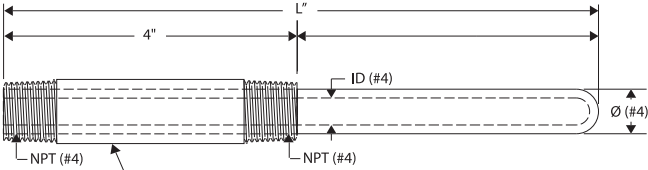
Style 5DAO & 5DMO



Style 5DAC & 5DMC



Style 5DAB12 & 5DMB12
(SEE NOTE)



CS sleeve for tube NPT will equal tube OD (ie: 1" OD will use 1" NPT threads). It can be used to attach adjustable flanges and bushings as shown on page 5-7. Use "X" in symbol number 3 and describe.

5D	A	B	12	B	1
----	---	---	----	---	---