



L.H. MARSHALL THERMOCOUPLES™



CERAMIC PROTECTION TUBES



CERAMIC PROTECTION TUBES (CPT)

Protection tubes are used to help shield sensors, generally thermocouples, from contamination and/or mechanical damage. These tubes usually incorporate some manner by which the tube, sensor, and terminal are assembled and mounted into the process.

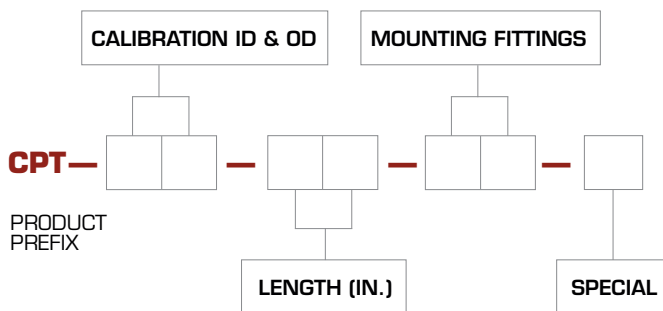
A fine grained, nonporous material, ceramic tubing is gas tight and is used at high temperatures to protect either platinum or base metal thermocouples. Ceramic tubes should either be preheated or slowly heated from 400°F to 800°F to dissipate any moisture that might be collected while at room temperature. Moisture that remains trapped in the tube may affect its performance.

Mullite protection tubes are impervious to gases at high temperatures. This type of tube possesses good thermal shock resistance, having a maximum temperature range of 2800°F.

Alumina protection tubes have a fair resistance to thermal and mechanical shock. Designed for very high temperature processes, these tubes are impervious to gases up to 3200°F.

Both Mullite and Alumina tubes are available in many sizes.

To order, use Specification Codes shown to assemble a complete Ordering Number.



APPLICATION NOTES

MULLITE CERAMIC PROTECTION TUBES

- Maximum temperature: 2800°F
- Good resistance to thermal shock and chemicals
- Good mechanical strength
- Can contaminate the platinum element above 2400°F
- Glazed tube-recommended for generator & atmosphere furnaces

ALUMINA CERAMIC PROTECTION TUBES

- Maximum temperature: 3400°F
- Susceptible to thermal shock. Needs preheating
- Good mechanical strength
- Resists chemicals and will not contaminate platinum

SPECIFICATIONS / CODES

MATERIAL ID & OD	LENGTH (INCHES)	MOUNTING FITTINGS	SPECIAL	
M5 - 5mm x 7mm Mullite M8 - 1/4" x 3/8" Mullite M3 - 3/8" x 1/2" Mullite M6 - 7/16" x 11/16" Mullite M4 - 1/2" x 3/4" Mullite G0 - 1/2" x 3/4" Mullite G-0 G2 - 1/2" x 3/4" Mullite G-2 M1 - 3/4" x 1" Mullite M7 - 1" x 1-1/4" Mullite M9 - 1-1/4" x 1-1/2" Mullite A5 - 5mm x 7mm Alumina A8 - 1/4" x 3/8" Alumina A2 - 5/16" x 1/2" Alumina A3 - 3/8" x 1/2" Alumina A6 - 7/16" x 11/16" Alumina A4 - 1/2" x 3/4" Alumina A1 - 3/4" x 1" Alumina A7 - 1" x 1-1/4" Alumina A9 - 1-1/4" x 1-1/2" Alumina A0 - 5mm x 8mm Alumina	12 - 1-5/8" x 1-7/8" Mullite 11 - 5/8" x 7/8" Alumina 13 - 1" x 2" Mullite 14 - 3/4" x 1-1/4" Mullite 15 - 3/16" x 1/4" Mullite 16 - 5/16" x 7/16" Mullite 17 - 5/8" x 7/8" Mullite 18 - 1-5/8" x 1-7/8" Alumina 19 - 3/16" x 5/16" Alumina 20 - 15mm x 10mm Alumina 21 - 15mm x 11mm Mullite M2 - 3/16" x 1/4" Mullite 22 - 1/8" x 3/16" Alumina 23 - 9/16" x 3/4" Mullite 26 - 9/16" x 3/4" Alumina	Specify from 000" to 999"	00 - No Fitting B3 - Brass Sleeve B4 - 3/4" x 1" Brass Hex Ftg 24 - 1/2" x 3/4" Hex Ftg 05 - Pipe Nipple 06 - Ceramic Collar D2 - 1/2-Hex -1/2 Ftg D3 - 3/4-Hex -3/4 Ftg D1 - 1"-Hex -1" Ftg H2 - Hex-1/2 Ftg H3 - Hex-3/4 Ftg C1 - 1-1/4" Coupling C2 - 1" Coupling C3 - 1-1/2" Coupling H1 - Hex -1" Ftg 31 - 3/4" x 1" Hex Ftg 32 - 3/4" x 1-1/4" Hex Ftg 25 - 1" x 1-1/4" Hex Ftg AS - Alloy Sleeve 21 - 1/2" x 1" Hex Ftg	0 - None B - Open Both Ends E - Effective Length X - Special (Consult Factory)

EXAMPLE ORDERING NUMBERS

IMAGE GOES HERE

7/16" x 11/16" Mullite Protection Tube with 1/2" x 3/4" NPT Hex Fitting (1/2" x 3/4" NPT Hex Fitting (1/2" fitting for use with connecting head), 16" long.

CPT - M 6 - 1 6 - 2 4 - 0

IMAGE GOES HERE

7/16" x 11/16" Alumina Protection Tube with Brass Ferrule (threaded for use with open terminal head only). Similar ferrule available for 1/4" x 3/8" protection tube, 36" long.

CPT - A 6 - 3 6 - B 3 - 0