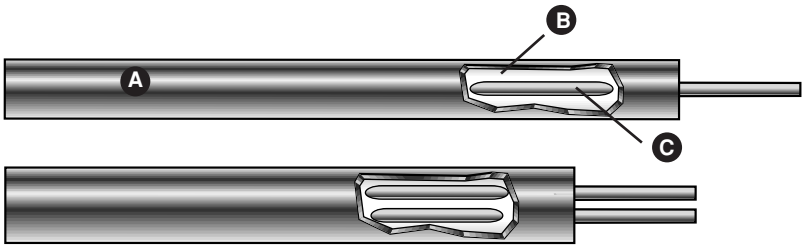
MI
Mineral Insulated High Temperature



- **Constant Wattage Series Resistance Heating Cable Sets**
- **Process Temperature Maintenance to 900°F**
- **Maximum Exposure Temperature (Power Off) 1100°F**
- **Wattages up to 50 W/Ft.**
- **Corrosion Resistant, Alloy 825 Sheath**
- **Factory Assembled Cable Sets—Ready for Installation**
- **Fully Annealed Sheath allows Field Bending**
- **Suitable for Hazardous Areas, Div. 1 and Div. 2 (Consult Factory for Div. 1 Applications)**
- **For Use on Metallic Pipes Only**

Description

Chromalox MI mineral insulated heating cables provide rugged and reliable heat tracing for a variety of demanding applications. The high nickel alloy sheath, magnesium oxide dielectric insulation and resistance wire construction allow the tracing of equipment up to 900°F maintenance temperatures and excellent resistance to many corrosive environments. At lower temperatures, watt densities of up to 50 W/Ft can be designed. Please contact factory for cable maintence temperature above 400˚F.

Applications

- Tank Heating
- High Temperature Process Maintenance
- Long, Single Circuit Runs
- Cryogenic Applications
- Freeze Protection

Construction

A Metal Sheath: High nickel content Alloy 825 is used for all heating cables and cold leads. Alloy 825 is recognized for its use in high temperature applications, and use in many corrosive environments. This alloy has excellent resistance to pitting, chloride-stress, acid, and alkali corrosion.

B MgO: Highly compacted Magnesium Oxide provides insulation of the resistance wire for voltages up to 600V. Completely sealed sheath protects the MgO from moisture & contamination.

C Resistance Wire: A large number of available resistances enables the design of a large range of lengths and wattages.

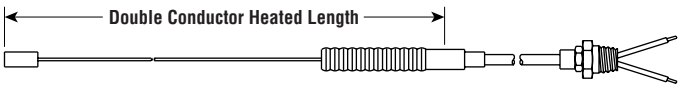
D Cold-Lead (Shown Below): Non-heating Alloy 825 sheathed MI cable extends the leads away from the high temperature equipment. 7 ft. long is standard.

E Gland Fitting (Shown Below): Every set includes one or two 1/2" NPT fittings for connection to a junction box. The number of fittings depends on the configuration of the cable set (i.e. single-end or double-end).

Available Designs

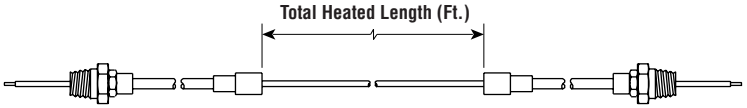
Form "A" (one cold section w/ 14 AWG - 12 in. pigtails and termination w/ end cap, 0.50" brass pressure fittings)

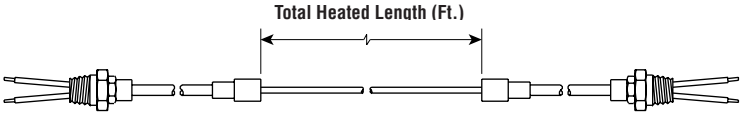
Available in two conductor only



Form "E" (two cold sections w/ 14 AWG - 12 in. pigtails, 0.50" brass pressure fittings)

Available in one conductor or two conductor





Accessories

QHT-3 High Temperature Adapter is used to heat sink the hot section transistion as it passes through the thermal insulation when the hot to cold connection must be located outside the thermal insulation due to sheath temperatures over 600˚F, and cable wattage above 20 w/ft.

Note — Standard cable sets include 7 feet non-heating cable with 12" pigtails, brazed to customer specified length of MI heating cable. Standard gland fittings are 1/2" NPT.

MINERAL INSULATED

MI
Mineral Insulated High Temperature *(cont'd.)*

1. **Heater Design**
   Determine heater design to use.

2. **Calculate Heat Loss**
   Using the Chromalox Design Guide for Heat Tracing (PJ304), calculate the heat loss of the system. To calculate the heat loss (Watts) you will need to know pipe diameter, insulation type and thickness, minimum ambient temperature and the pipe mainte nance temperature. In addition, Chromalox® offers ChromaTrace, a heat trace design program to facilitate heat tracing system design.

3. **Determine Total Cable Length**
   In addition to the system piping, in-line equipment such as valves, flanges and pipe supports require additional heat tracing to maintain the system operating temperature. See Chromalox Design Guide (PJ304) to determine the proper component cable allowances for your system. Add the heated pipe lenth and the component cable allowance lengths to calculate the total cable length.

   Guidelines for tracing tanks and vessels are also given in the Chromalox Design Guide (PJ304)

4. **Determine Available Voltage (V)**
   Determine what Voltage is available. At a given voltage, not every cable length and power output is available. For example, shorter lengths may require 120V supply. Trying several voltages may result in a more efficient design.

5. **Calculate Resistance per Foot (R/ft) using the desired Watts per Foot (W/ft) and cable length (L)**
   $R/ft_{desired} = V^2/(W/ft_{desired} \times L^2)$

6. **Select the Proper Resistance per Foot (R/ft) Rating**
   Choose a cable having equal or the next lower resistance per foot value from the Ordering Information Table

7. **Calculate Actual W/Ft. and Total Wattage (W_{TOTAL})**
   $W/ft_{actual} = V^2/(R/ft_{actual} \times L^2)$

   $W_{TOTAL} = W/ft_{actual} \times L$

8. **Determine Current Draw (I)**
   $I = V/(R/ft_{actual} \times L)$

9. **Select Heater Single or Double Conductor Length**
   The cold lead is determined by the customer or by using a standard 7 ft. Standard cold lead is #14 awg.

10. **Convert Design to a Model Number**.

Note:
Some cable resistances must be modified according to the resistance curves in the Order Information Table. Modify your resistance according to the following procedure:

a. Based on the desired power output in Watts/ft, use Graph-1 to determine the Sheath Temperature Rise for the particular cable diameter you select.

b. Add the sheath temperature rise to the desired maintenance temperature to determine the cable resistance at operating conditions.

c. From Graph-2, determine the cable resistance multiplier for your application. Multiply the resistance value given in the resistance tables by this multiplier to determine the cable resistance at operating conditions.

d. Determine the electrical and thermal conditions. Once the cable resistance has been selected, verify the performance of the cable you have selected from Graph-3 and 4.

Optional Construction

Prefix	Suffix	Description
P		Pulling Eye for "A" form only
X		Oversized cold section current >25 Amps and <40 Amps
	EM	Mounting of hot-cold junction outside thermal insulation (freeze protection of lines over 600ºF)
	QT	QHT-3 High temperature adapter
	UG	UL listing tag**
	UH	UL hazardous area listing tag**
	PH	FM hazardous area listing tag**
	CH	CSA hazardous area listing tag**
	CHB	CSA group B hazardous area listing tag**

**Required volts,amps, and watts with each cable order

Model	Heater Set Design "A" or "E"	Cable Number (determined by resistance value required for needed wattage output)	Cable Heated Section Length in Feet	Cable Cold Section Length in Feet	Heater Set Total Wattage (W_{TOTAL})	Operating Voltage (V)	
P	A	670B	150	07	1477W	120V	UG

Typical Model Number

(120V, 9.9 w/ft cable, 150 feet long, with pulling eye and UL listing tag)

MI
Mineral Insulated
High Temperature *(cont'd.)*

Ordering Information Available Resistances
Two Conductor, 3/16" Dia. O.D., Alloy 825, 300 Volts

Cable Number	Ohms/ft	Maximum Exposure Temperature Rating ˚F	Resistance Curve
556K	0.043	600	1
658K	0.0581		1
674K	0.0742		1
693K	0.0926		1
712K	0.1170		1
715K	0.1470		1
721K	0.213		3
732K	0.319	1100	N/A
742K	0.416		
752K	0.520		
766K	0.660		
774K	0.740		
783K	0.830		
810K	1.00		
813K	1.30		
818K	1.80		
824K	2.34		
830K	2.96		
838K	3.70		
846K	4.72		
860K	5.60		
866K	6.60		
894K	9.00		
919K	18.00		

Two Conductor, 5/16" Dia. O.D., Alloy 825, 600 Volts

Cable Number	Ohms/ft	Maximum Exposure Temperature Rating ˚F	Resistance Curve
588B	0.0071	600	1
614B	0.0149		1
627B	0.027		2
640B	0.040		3
670B	0.065	1100	N/A
710B	0.104		
715B	0.162		
720B	0.205		
732B	0.325		
750B	0.500		
774B	0.735		
810B	1.62		
819B	1.87		
830B	2.97		
840B	4.30		
859B	5.98		

One Conductor, 3/16" Dia. O.D., Alloy 825, 600 Volts

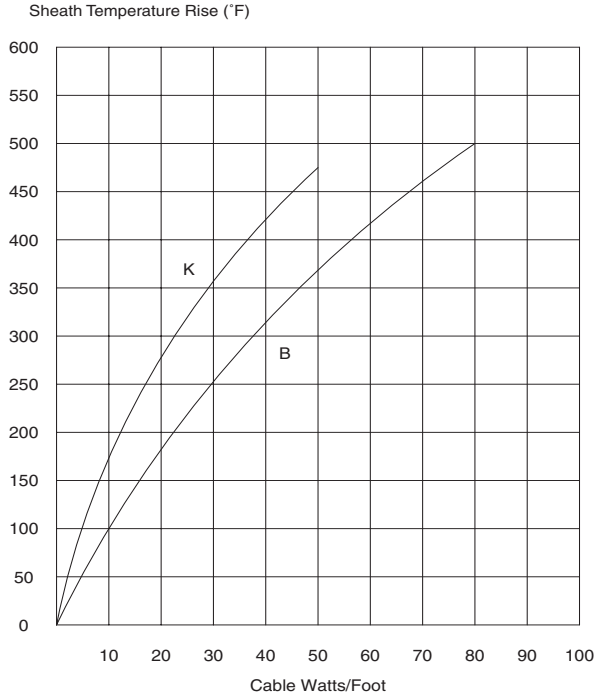
Cable Number	Ohms/ft	Maximum Exposure Temperature Rating ˚F	Resistance Curve
145K	0.0046	600	1
189K	0.0090		2
216K	0.0165		3
239K	0.069	1100	N/A
250K	0.050		
279K	0.079		
310K	0.095		
316K	0.157		
326K	0.260		
333K	0.330		
346K	0.457		
372K	0.730		
412K	1.17		
415K	1.48		
423K	2.36		
430K	2.80		
447K	4.50		

MI

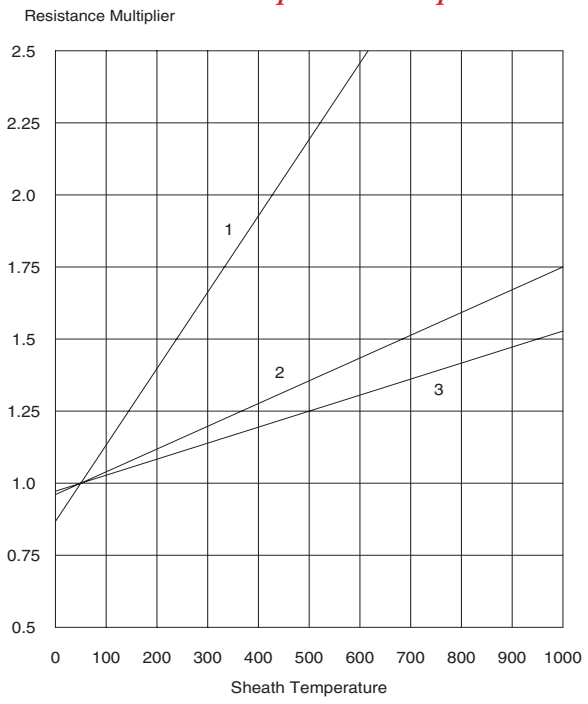
Mineral Insulated High Temperature *(cont'd.)*

Specification / Application Information

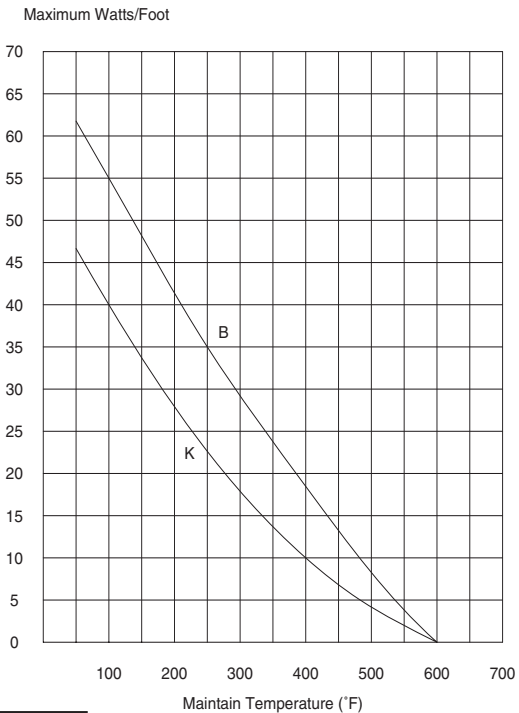
Graph-1
Cable Sheath Temperature Rise



Graph-2
Cable Resistance Temperature Multiplier



Graph-3
Maximum Wattages - All Cables With Hot/Cold Junction Under Insulation



Graph-4
Maximum Wattages - All 1100˚F Maximum Temperature Cables With Hot/Cold Junction Under Insulation