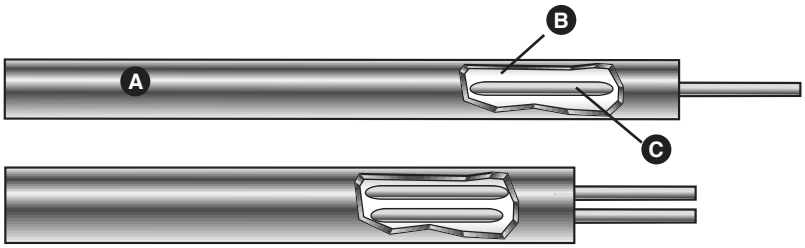
MI
Mineral Insulated High Temperature



- **Constant Wattage Series Resistance Heating Cable Sets**
- **Process Temperature Maintenance to 1112°F (600˚C)**
- **Maximum Exposure Temperature 1200°F (648˚C) (Power Off)**
- **Corrosion Resistant Alloy 825 or Stainless Steel Sheath**
- **Factory Assembled Cable Sets—Ready for Installation**
- **Fully Annealed Sheath allows Field Bending**
- **Min. Bend Radius 6 x Diameter of Cable**
- **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 1112°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 maintenance temperature above 400˚F.

WARNING — A ground fault protection device is required by NEC to minimize the danger of fire if the heating cable is damaged or improperly installed. A minimum trip level of 30 mA is recommended to minimize nuisance tripping.

Construction

A Metal Sheath: High nickel content 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. Stainless steel is also available.

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. Double and single conductor available

D Cold-Lead (Shown Below): Non-heating MI cable extends the leads away from the high temperature equipment. 4 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. (Optional 3/4" NPT)

Approvals

Factory Mutual (FM) Approved and CSA certified for ordinary areas. FM, CSA, ATEX and IECEx Approved for hazardous (classified) areas.

CSA and FM Approved:
- Class I, Div. 1* & 2 Groups A*, B, C, D (gases, vapors)
- Class II, Div. 1*& 2 Groups E*, F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers & fillings)
- Consult Chromalox for T ratings

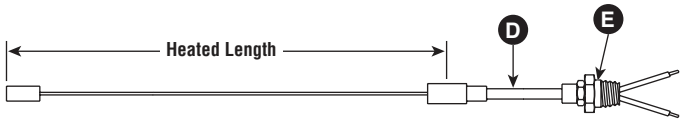
ATEX Approved:
- II 2 G Ex e II T1 to T6 Gb

IECEx Approved:
- Ex IIC T1 to T6 Gb

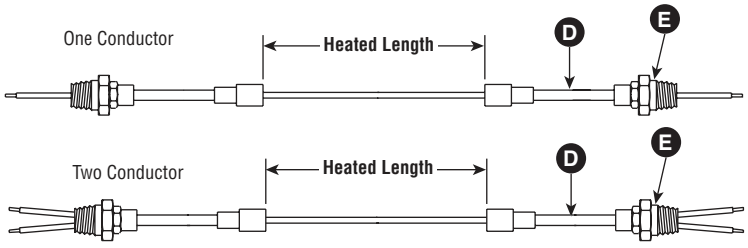
*CSA Only

Available Designs

Form "A" (one cold section w/12 AWG - 12 in. pigtails and termination w/ end cap, 0.50" SST pressure fittings) Available in two conductor only



Form "E" (two cold sections w/12 AWG - 12 in. pigtails, 0.50" SST pressure fittings) Available in one conductor or two conductor



MINERAL INSULATED

MI

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

Heating Cable System Design

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

2. **Calculate Heat Loss**
   Using the Technical Section of this catalog (Determining Heat Energy Requirements), calculate the heat energy requirements of the pipe or tank to be heated. 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. Refer to Technical Section of this catalog (Pipe Component Allowance Table) to determine the proper component cable allowances for your system. Add the heated pipe length and the component cable allowance lengths to calculate the total cable length.

   Guidelines for tracing tanks and vessels are also given in the Technical Section of this catalog

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 Resistance fer Foot at Maintain Temperature (R/ft actual)**
   R/ft actual = R/ft (1+ (TCR Value (Maintain Temp ˚C-20)))

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

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

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

10. **Select Heater Single or Double Conductor Length**
    The cold lead is determined by the customer or by using a standard 4 ft. Standard cold lead pigtails are #12 awg.

11. **Convert Design to a Model Number**.
    Use order table and optional construction adders below to convert design to a complete model number.

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

Optional Construction Adders

Prefix	Suffix	Description
P		Pulling Eye for "A" form only
	F12	1/2" NPT Brass Cold Lead Fitting
	F34	3/4" NPT Brass Cold Lead Fitting
	FS12	1/2" NPT SS Cold Lead Fitting
	FS34	3/4" NPT SS Cold Lead Fitting

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

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

Available Resistances

Two conductor, Alloy 825, 300 Volts

Cable Model	Nominal Resistance Ω/ft	Nominal Resistance Ω/m	Approx. Cable Diameter (In.)	Approx. Cable Diameter (mm.)	TCR Multiplier
532K	0.0323	0.1060	0.169	4.3	0.00393
556K	0.0457	0.1500	0.169	4.3	0.00393
658K	0.0582	0.1910	0.169	4.3	0.00393
674K	0.0735	0.2410	0.169	4.3	0.00130
710K	0.1000	0.3280	0.181	4.6	0.00130
715K	0.1500	0.4920	0.161	4.1	0.00130
721K	0.1990	0.6560	0.146	3.7	0.00130
725K	0.2500	0.8200	0.169	4.3	0.00070
729K	0.2930	0.9610	0.169	4.3	0.00070
737K	0.3750	1.2300	0.169	4.3	0.00045
747K	0.4726	1.5500	0.169	4.3	0.00045
752K	0.4998	1.6400	0.161	4.1	0.00045
770K	0.7012	2.3000	0.161	4.1	0.00006
774K	0.7742	2.5400	0.161	4.1	0.00006
810K	0.9990	3.2800	0.169	4.3	0.00006
811K	1.1402	3.7400	0.169	4.3	0.00006
814K	1.4000	4.5920	0.169	4.3	0.00010
817K	1.7012	5.5800	0.161	4.1	0.00010
820K	2.0000	6.5600	0.181	4.6	0.00010
825K	2.5000	8.2000	0.146	3.7	0.00010
830K	2.7492	9.0200	0.146	3.7	0.00010
831K	3.0640	10.0500	0.146	3.7	0.00010
839K	3.9939	13.1000	0.146	3.7	0.00010
850K	5.0000	16.4000	0.138	3.5	0.00010
875K	7.5000	24.6000	0.138	3.5	0.00010
894K	8.9900	29.5000	0.138	3.5	0.00010
911K	11.0061	36.1000	0.130	3.3	0.00010
919K	18.0000	59.0580	0.188	4.8	0.00010

Two conductor, Alloy 825, 600 Volts

Cable Model	Nominal Resistance Ω/ft	Nominal Resistance Ω/m	Approx. Cable Diameter (In.)	Approx. Cable Diameter (mm.)	TCR Multiplier
508B	0.0082	0.0268	0.311	7.9	0.00393
513B	0.0130	0.0427	0.303	7.7	0.00393
520B	0.0200	0.0656	0.283	7.2	0.00393
528B	0.0281	0.0922	0.276	7.0	0.00130
640B	0.0402	0.1320	0.260	6.6	0.00130
656B	0.0561	0.1840	0.244	6.2	0.00130
677B	0.0774	0.2540	0.232	5.9	0.00130
710B	0.1000	0.3280	0.264	6.7	0.00070
715B	0.1500	0.4920	0.244	6.2	0.00070
720B	0.2000	0.6560	0.244	6.2	0.00045
728B	0.2860	0.9380	0.217	5.5	0.00045
730B	0.3000	0.9840	0.217	5.5	0.00045
750B	0.5059	1.6600	0.205	5.2	0.00045
770B	0.7012	2.3000	0.264	6.7	0.00006
810B	1.0000	3.2800	0.232	5.9	0.00006
811B	1.1494	3.7700	0.213	5.4	0.00006
815B	1.5000	4.9200	0.244	6.2	0.00010
820B	2.0000	6.5600	0.244	6.2	0.00010
841B	4.1463	13.6000	0.213	5.4	0.00010
844B	4.4590	14.6300	0.213	5.4	0.00010
960B	6.0043	19.7000	0.217	5.5	0.00010
989B	8.9939	29.5000	0.217	5.5	0.00010
1110B	11.0061	36.1000	0.217	5.5	0.00010

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

One conductor, Alloy 825, 600 Volts

Cable Model	Nominal Resistance Ω/ft	Nominal Resistance Ω/m	Approx. Cable Diameter (In.)	Approx. Cable Diameter (mm.)	TCR Multiplier
140SC	0.00064	0.0021	0.3189	8.1	0.00393
145SC	0.00104	0.0034	0.2874	7.3	0.00393
170SC	0.00162	0.0053	0.2717	6.9	0.00393
189SC	0.00259	0.0085	0.2165	5.5	0.00393
216SC	0.00396	0.0130	0.1929	4.9	0.00393
226SC	0.00640	0.0210	0.1850	4.7	0.00393
239SC	0.01128	0.0370	0.1850	4.7	0.00393
250SC	0.01463	0.0480	0.1850	4.7	0.00130
262SC	0.01829	0.0600	0.1850	4.7	0.00130
279SC	0.02316	0.0760	0.1850	4.7	0.00070
310SC	0.02895	0.0950	0.1850	4.7	0.00070
313SC	0.03657	0.1200	0.1850	4.7	0.00045
316SC	0.04663	0.1530	0.1811	4.6	0.00045
321SC	0.05821	0.1910	0.1850	4.7	0.00045
326SC	0.07315	0.2400	0.1850	4.7	0.00045
333SC	0.11521	0.3780	0.1811	4.6	0.00045
346SC	0.14995	0.4920	0.1811	4.6	0.00006
372SC	0.19994	0.6560	0.1811	4.6	0.00006
412SC	0.27979	0.9180	0.1811	4.6	0.00010
415SC	0.49985	1.6400	0.1811	4.6	0.00010
423SC	0.69979	2.2960	0.1614	4.1	0.00010
430SC	0.84974	2.7880	0.1693	4.3	0.00010
439SC	0.99970	3.2800	0.1614	4.1	0.00010
447SC	1.29838	4.2600	0.1614	4.1	0.00010
459SC	1.59951	5.2480	0.1614	4.1	0.00010
499SC	1.99939	6.5600	0.1457	3.7	0.00010

Two conductor, Stainless Steel, 300 Volts

Cable Model	Nominal Resistance Ω/ft	Nominal Resistance Ω/m	Approx. Cable Diameter (In.)	Approx. Cable Diameter (mm.)	TCR Multiplier
710S	0.03231	0.1060	0.169	4.3	0.00393
715S	0.04572	0.1500	0.169	4.3	0.00393
719S	0.05821	0.1910	0.169	4.3	0.00393
724S	0.07345	0.2410	0.169	4.3	0.00130
732S	0.09997	0.3280	0.181	4.6	0.00130
749S	0.14995	0.4920	0.161	4.1	0.00130
765S	0.19994	0.6560	0.146	3.7	0.00130
796S	0.29290	0.9610	0.169	4.3	0.00070
812S	0.37489	1.2300	0.169	4.3	0.00045
815S	0.47242	1.5500	0.169	4.3	0.00045
816S	0.49985	1.6400	0.161	4.1	0.00045
823S	0.70101	2.3000	0.161	4.1	0.00006
825S	0.77415	2.5400	0.161	4.1	0.00006
832S	0.99970	3.2800	0.169	4.3	0.00006
837S	1.13990	3.7400	0.169	4.3	0.00006
845S	1.39957	4.5920	0.169	4.3	0.00010
855S	1.70070	5.5800	0.161	4.1	0.00010
865S	1.99939	6.5600	0.181	4.6	0.00010
882S	2.49924	8.2000	0.146	3.7	0.00010
890S	2.74916	9.0200	0.146	3.7	0.00010
900S	3.06309	10.0500	0.146	3.7	0.00010
913S	3.99269	13.1000	0.146	3.7	0.00010
916S	4.99848	16.4000	0.138	3.5	0.00010
924S	7.49771	24.6000	0.138	3.5	0.00010
929S	8.99116	29.5000	0.138	3.5	0.00010
936S	11.00274	36.1000	0.130	3.3	0.00010

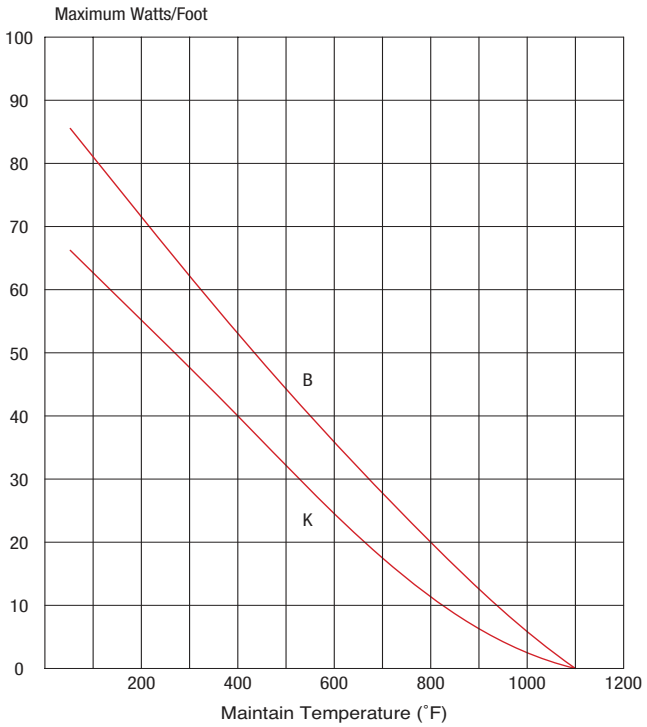
MI Mineral Insulated High Temperature *(cont'd.)*

Two conductor, Stainless Steel, 600 Volts

Cable Model	Nominal Resistance Ω/ft	Nominal Resistance Ω/m	Approx. Cable Diameter (In.)	Approx. Cable Diameter (mm.)	TCR Multiplier
242S	0.00128	0.0042	0.500	12.7	0.00393
267S	0.00204	0.0067	0.449	11.4	0.00393
300S	0.00323	0.0106	0.390	9.9	0.00393
301S	0.00515	0.0169	0.346	8.8	0.00393
302S	0.00817	0.0268	0.311	7.9	0.00393
304S	0.01300	0.0426	0.303	7.7	0.00393
306S	0.01999	0.0656	0.283	7.2	0.00393
309S	0.02810	0.0922	0.276	7.0	0.00130
413S	0.04023	0.1320	0.260	6.6	0.00130
418S	0.05608	0.1840	0.244	6.2	0.00130
425S	0.07742	0.2540	0.232	5.9	0.00130
432S	0.09997	0.3280	0.264	6.7	0.00070
449S	0.14995	0.4920	0.244	6.2	0.00070
465S	0.19994	0.6560	0.244	6.2	0.00045
493S	0.28589	0.9380	0.217	5.5	0.00045
498S	0.29991	0.9840	0.217	5.5	0.00045
516S	0.50594	1.6600	0.205	5.2	0.00045
523S	0.70101	2.3000	0.264	6.7	0.00006
532S	0.99970	3.2800	0.232	5.9	0.00006
537S	1.14904	3.7700	0.213	5.4	0.00006
549S	1.49954	4.9200	0.244	6.2	0.00010
565S	1.99939	6.5600	0.244	6.2	0.00010
613S	4.14508	13.6000	0.213	5.4	0.00010
614S	4.45901	14.6300	0.213	5.4	0.00010
619S	6.00427	19.7000	0.217	5.5	0.00010
629S	8.99116	29.5000	0.217	5.5	0.00010
636S	11.00274	36.1000	0.217	5.5	0.00010

Specification / Application Information

Maximum Wattages with Hot/Cold Junction Under Insulation



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

Accessories

HTC-30-1 (392286)

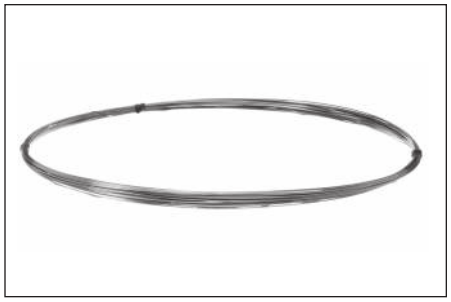
Heat Transfer Cement, 1 Gal. Pail, Non-Stock

HTC-30-5 (392294)

Heat Transfer Cement, 5 Gal. Pail, Non-Stock

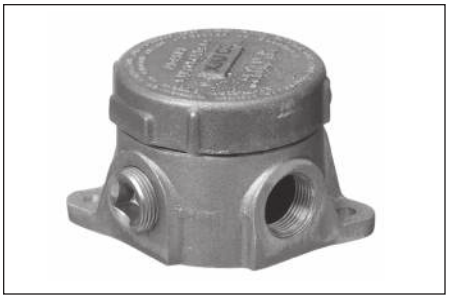
SSW-100 (392315)

Stainless Steel Tie Wire, 100ft Roll



JB-7-4 (392307)

Four Hub, NEMA 7 Cast Aluminum Junction Box, 3/4" NPT

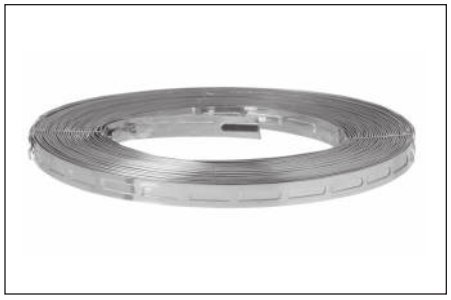


JB-7-MB (399023) Pipe Mounting Kit

Hardware & bracket to attach JB-7-4 Juntion Box to pipe, Stainless Steel. JB-7-4 sold separately

SSPS-82 (392323) Spacer Strip

Stainless Steel Spacer Strip with 1" spaced tabs for tank and snow melt applications, 50ft roll.



Ordering Information

To Order — *Complete the Model Number using the Matrix provided.*

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 (Both cold leads to be same length for "E" style cables)

Heater Set Total Wattage (W_{TOTAL})

Operating Voltage (V)

Fitting Size/Type

A	532K	150	04	2972W	120V	F12	Typical Model Number

(120V, 19.8 w/ft cable, 150 ft heated section, 4ft cold lead section)