

Custom Fabricated

Description:

Mineral insulated cable is a metal sheathed cable that uses a metallic conductor as the heating element. The conductor is electrically insulated from the metal sheath with magnesium oxide (MgO). Mineral insulated cable is a series resistance heater that generates heat by passing current through the electrical conductor. Power output per unit length of the cable therefore varies with the applied voltage and the resistance of the conductor.

Mineral Insulated Cables are available with either one or two conductors. The one conductor cable is available in the E Form where a cold splice is provided at both cable ends for electrical connection. The two-conductor cable is available in two forms. The A Form provides an out-and-back circuit with a single cold splice connection at one end. The E Form provides cold splices at both ends of the cable.

Outer sheath construction is Alloy 825, a high temperature corrosion resistant alloy with superior flexibility. Two cable diameters are available. The K cable diameter is 0.1875" (4.76mm) and the B cable diameter is 0.3125" (7.94mm). A unique manufacturing process provides for a thin wall construction which improves flexibility and ease of installation. This process also allows the use of high performance alloy conductors for high temperature applications.

Principle of Operation:

The series conductor generates heat when voltage is applied as a result of current passing through the conductor. Power output per unit length varies with the applied voltage and circuit resistance. The circuit resistance, in turn, varies with cable length. MI cables are available with a wide selection of conductor resistances. Based on voltage and desired cable length, a specific conductor is selected with a cable resistance that provides the desired power output.

Application:

Nelson MI Cable is a high performance, industrial grade heat tracing cable used for applications requiring:

- High Temperature Exposure
- High Maintain Temperature
- High Power Output
- Rugged Cable Construction
- Extended Heater Life
- Immunity to Stress Corrosion
- Undertank Heating (Cryogenic Tanks)
- Constant Power Output Over Entire Heater Length

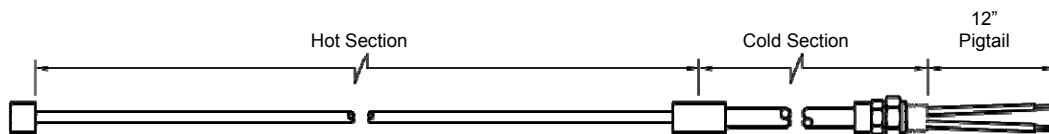
MI Cable is custom designed and fabricated for specific applications.

Cable Ratings:

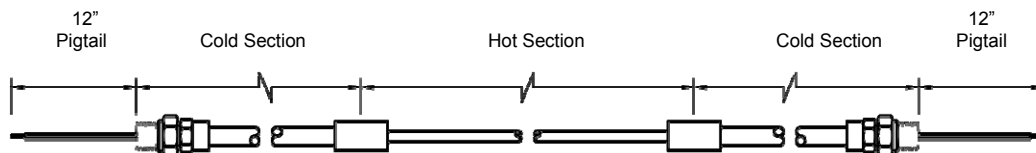
MI Cable

| CABLE TYPE | K1 | K2 | B2 |
|----------------------|----------------------------|----------------------------|----------------------------|
| SHEATH MATERIAL | ALLOY 825 | | |
| CABLE DIAMETER | 0.1875" (4.76mm) | 0.1875" (4.76mm) | 0.3125" (7.94mm) |
| NUMBER OF CONDUCTORS | 1 | 2 | 2 |
| MAXIMUM VOLTAGE | 600VAC | 300VAC | 600VAC |
| MAXIMUM EXPOSURE | 1100°F (593°C) | | |
| MAXIMUM POWER | 62 w/ft (204 w/m) | 62 w/ft (204 w/m) | 88 w/ft (289 w/m) |
| WEIGHT | 0.07 lbs/ft (0.104 kg/m) | 0.07 lbs/ft (0.104 kg/m) | 0.22 lbs/ft (0.327 kg/m) |
| FORMS | E | A and E | A and E |
| STANDARD COLD LEAD | 7.0 Feet (2.1 Meters) | | |

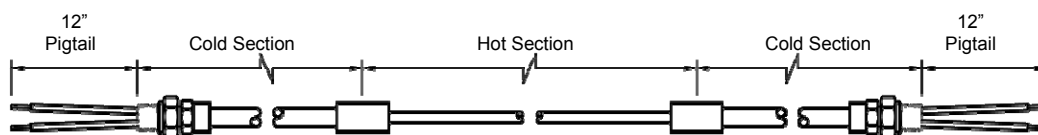
Form A (2 Conductor)



Form E (1 Conductor)



Form E (2 Conductor)



Catalog Ordering System:

Custom Cables

Catalog Number (*) A 670 B 150 07 (*)

| (*) | A | 670 | 150 | 07 | (*) |
|------------------------------|--------------|--------------------------------|----------------------------------|--------------------------------------|------------------------------|
| Optional Construction Prefix | Form A or E* | Conductor selection from table | Hot Section Length order in feet | Cold section Length(s) order in feet | Optional Construction Suffix |

*When E Form cold sections are specified, both cold section lengths must be provided for proper cable construction.
Example: E 279K 500 0707 for 7 foot (2.1 meter) cold sections on both cable ends.

Accessories:

QHT-3 HIGH TEMPERATURE ADAPTER is used to heat sink the hot section transition 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 (316°C) and cable Wattage exceeds 20 w/ft (66 w/m).

SV2 VOLTAGE ADJUSTER provides solid-state voltage adjustment when required voltage is below 120 volts. It is primarily used for cable lengths less than 20 feet (6 meters).

Optional Constructions:

| Prefix | Suffix | Description |
|--------|--------|--|
| P | | Pulling Eye for A Form only |
| X | | Oversize cold sections or special feature requirement |
| EM | | Mounting of hot-cold junction outside thermal insulation (freeze protection of lines over 600°F (316°C)) |
| QT | | Factory mounting of QHT-3 Adapter (sheath temperature over 600°F (316°C) and cable wattage above 20 w/ft (66 w/m)) |
| UG | | UL Listing tag ** |
| UH | | UL Hazardous Area Listing tag ** |
| UM | | UL Snow Melting Listing tag ** |
| FH | | FM Hazardous Area Listing tag ** |
| CH | | CSA Hazardous Area Listing tag ** |
| EEX | | ATEX Certified Listing tag ** |
| | | **Requires volts, amps, watts and calculated sheath temperature with each cable order |

Custom Cable

Resistance Characteristics:

| 2-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, 300 VOLTS | | | | |
|---|---------------------------------------|-------------------|--|-------------------------|
| Cable | Cable Resistance @ 68°F (20°C) | | Maximum Exposure Temperature Rating | Resistance Curve |
| Number | Ohms/Foot | Ohms/Meter | | |
| 556K | .0430 | .1411 | 600°F (316°C) | 1 |
| 658K | .0581 | .1906 | | 1 |
| 674K | .0742 | .2434 | | 1 |
| 693K | .0926 | .3038 | | 1 |
| 712K | .1170 | .3839 | | 1 |
| 715K | .1470 | .4823 | | 1 |
| 721K | .2130 | .6988 | | 3 |
| 732K | .3190 | 1.0466 | 1100°F (593°C) | N/A |
| 742K | .4160 | 1.3648 | | |
| 752K | .5200 | 1.7060 | | |
| 766K | .6600 | 2.1654 | | |
| 774K | .7400 | 2.4278 | | |
| 810K | 1.0000 | 3.2808 | | |
| 813K | 1.3000 | 4.2651 | | |
| 818K | 1.8000 | 5.9055 | | |
| 824K | 2.3400 | 7.6772 | | |
| 830K | 2.9600 | 9.7113 | | |
| 838K | 3.7000 | 12.1391 | | |
| 846K | 4.7200 | 15.4856 | | |
| 860K | 5.6000 | 18.3727 | | |
| 866K | 6.6000 | 21.6535 | | |
| 894K | 9.0000 | 29.5276 | | |
| 919K | 18.0000 | 59.0551 | | |

| 2-CONDUCTOR CABLE, 0.3125" DIAMETER ALLOY 825, 600 VOLTS | | | | |
|---|---------------------------------------|-------------------|--|-------------------------|
| Cable | Cable Resistance @ 68°F (20°C) | | Maximum Exposure Temperature Rating | Resistance Curve |
| Number | Ohms/Foot | Ohms/Meter | | |
| 588B | .0071 | .0233 | 600°F (316°C) | 1 |
| 614B | .0149 | .0489 | | 1 |
| 627B | .0270 | .0886 | | 2 |
| 640B | .0400 | .1312 | | 3 |
| 670B | .0650 | .2133 | 1100°F (593°C) | N/A |
| 710B | .1040 | .3412 | | |
| 715B | .1620 | .5315 | | |
| 720B | .2050 | .6726 | | |
| 732B | .3250 | 1.0663 | | |
| 750B | .5000 | 1.6404 | | |
| 774B | .7350 | 2.4114 | | |
| 810B | 1.1620 | 3.8123 | | |
| 819B | 1.8700 | 6.1352 | | |
| 830B | 2.9700 | 9.7441 | | |
| 840B | 4.3000 | 14.1076 | | |
| 859B | 5.9800 | 19.6194 | | |

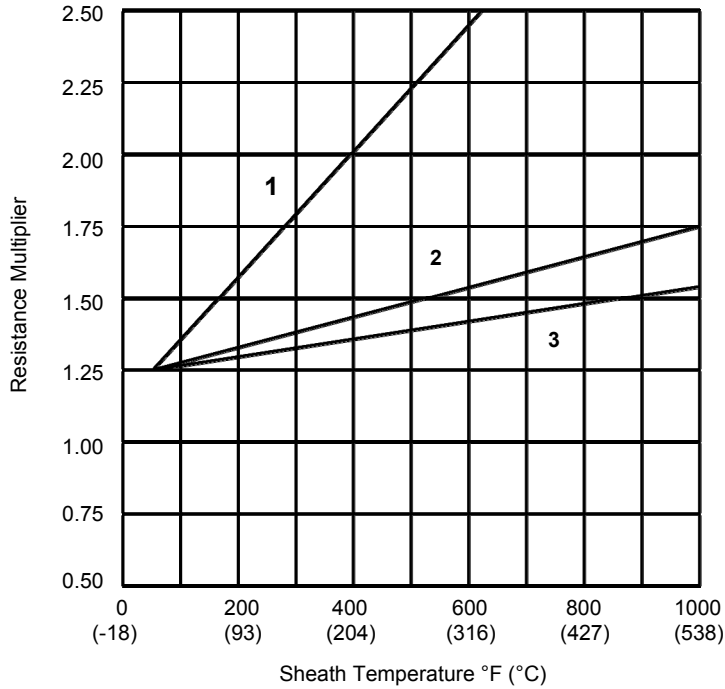
**Custom Cable
Resistance Characteristics:**

| 1-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, 600 VOLTS | | | | |
|---|---------------------------------------|-------------------|--|-------------------------|
| Cable | Cable Resistance @ 68°F (20°C) | | Maximum Exposure Temperature Rating | Resistance Curve |
| Number | Ohms/Foot | Ohms/Meter | | |
| 145K | .0046 | .0151 | 600°F (316°C) | 1 |
| 189K | .0090 | .0295 | | 1 |
| 216K | .0165 | .0541 | | 2 |
| 239K | .0390 | .1280 | 1100°F (593°C) | N/A |
| 250K | .0500 | .1640 | | |
| 279K | .0790 | .2592 | | |
| 310K | .0950 | .3117 | | |
| 316K | .1570 | .5151 | | |
| 326K | .2600 | .8530 | | |
| 333K | .3300 | 1.0827 | | |
| 346K | .4570 | 1.4993 | | |
| 372K | .7300 | 2.3950 | | |
| 412K | 1.1700 | 3.8386 | | |
| 415K | 1.4800 | 4.8556 | | |
| 423K | 2.3600 | 7.7428 | | |
| 430K | 2.8000 | 9.1864 | | |
| 447K | 4.5000 | 14.7638 | | |

Note: Factory design required for the following applications:
1. Exposure temperature greater than 1100°F (593°C).
2. Maintain temperature greater than 400°F (204°C).

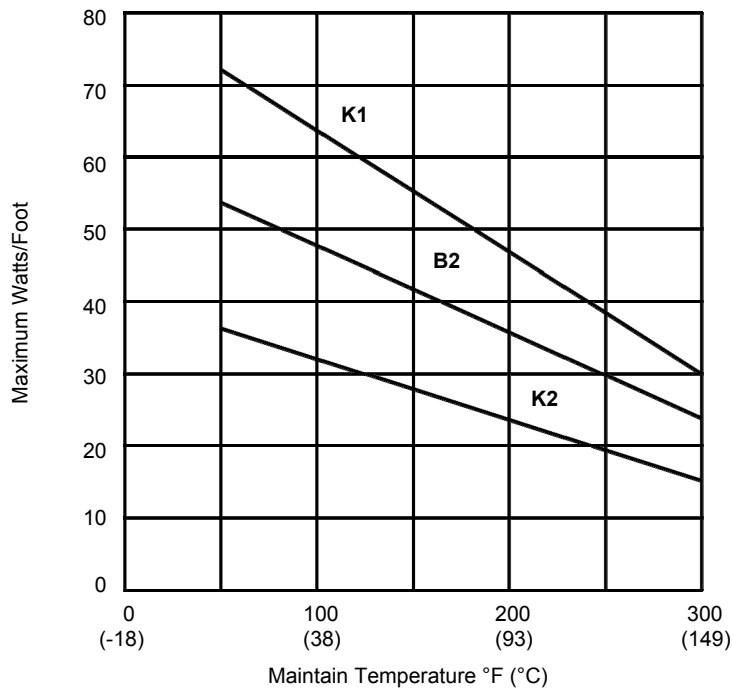
GRAPH-1

CABLE RESISTANCE VS TEMPERATURE MULTIPLIER



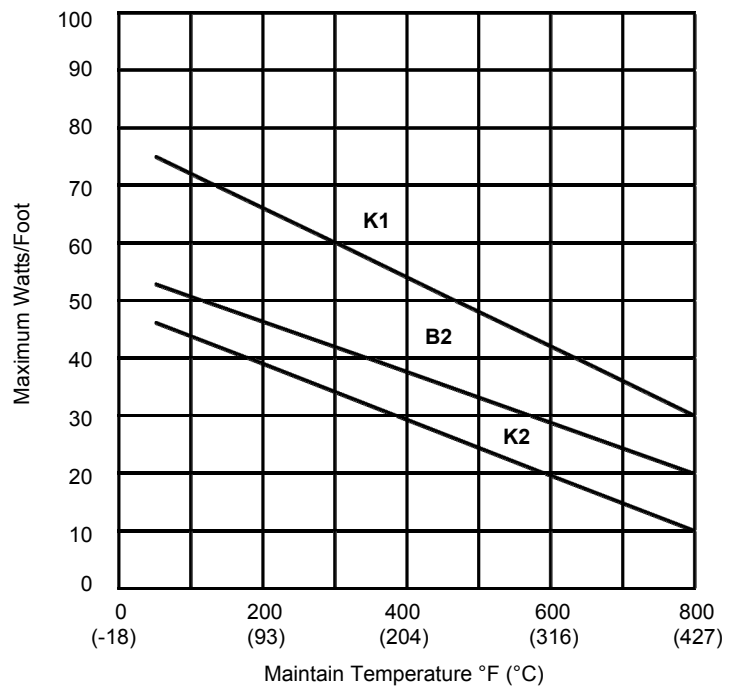
GRAPH-2






MAXIMUM WATTAGES – ALL CABLES
WITH HOT / COLD JUNCTION UNDER THERMAL INSULATION



GRAPH-3

MAXIMUM WATTAGES – ALL CABLES
WITH HOT / COLD JUNCTION OUTSIDE THERMAL INSULATION



| | | | |
|---|--|--|---|
| <p>Approvals:</p> <p>Note: Cable voltage, amps and watts must be provided for approval tags. Calculated sheath temperature must also be provided for hazardous (classified) approval tags.</p> | <p>FM</p> <p>Ordinary Locations Hazardous (Classified) Locations (FH Suffix) Class I, Division 1 and 2 Groups A, B, C, D Class II, Divisions 1 and 2 Groups E, F, G Class III, Divisions 1 and 2</p>  | <p>UL</p> <p>Ordinary Locations Hazardous (Classified) Locations (UH Suffix) Class I, Division 1 and 2 Groups B, C, D Class II, Divisions 1 and 2 Groups E, F, G Class I, Zone 1 and 2 Group IIB + H2</p>  | <p>CSA</p> <p>Ordinary Locations Hazardous (Classified) Locations (CH Suffix) Class I, Division 1 and 2 Groups B, C, D Class II, Divisions 1 and 2 Groups E, F, G Class III, Divisions 1 and 2 Class I, Zone 1 and 2 Group IIB + H2 Zone 1, Ex de IIB + H2 T1-T6</p>  |
| | <p>KEMA</p> <p>Hazardous (Classified) Locations (EEX Suffix)  II 2 G EEx de IIB + H2 T1-T6 KEMA04ATEX2049X</p> | |  |

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