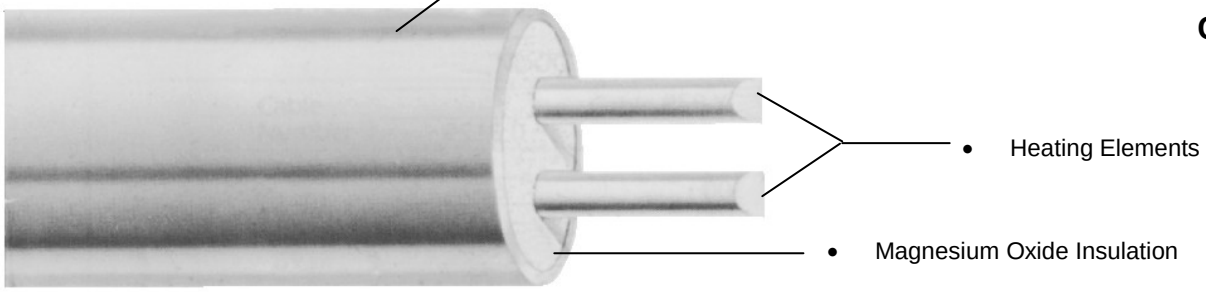
NELSON™

MINERAL INSULATED CABLE

SPECIFICATION / APPLICATION INFORMATION



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

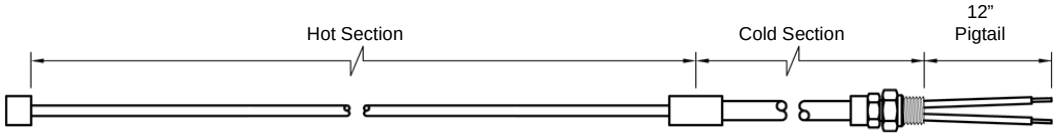
MI Cable is custom designed and fabricated for specific applications.

Cable Ratings:

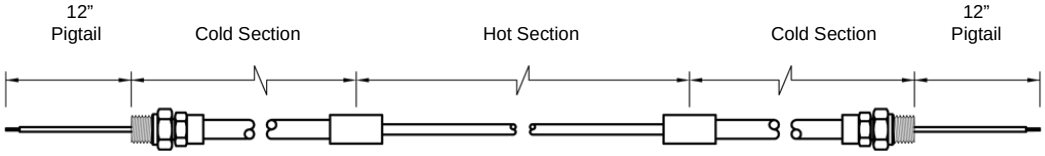
MI Cable

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)		

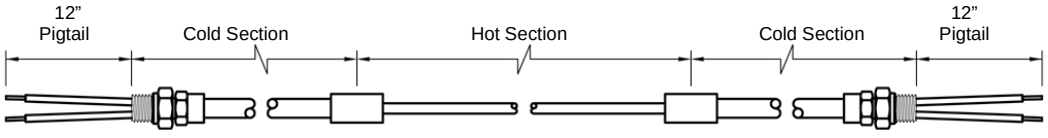
Form A (2 Conductor)



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 @ 68ºF (20ºC)		Maximum Exposure	
Number	Ohms/Foot	Ohms/Meter	Temperature Rating	Resistance Curve
556K	.0430	.1411		1
658K	.0581	.1906		1
674K	.0742	.2434		1
693K	.0926	.3038		1
712K	.1170	.3839	600°F (316°C)	1
715K	.1470	.4823		1
721K	.2130	.6988		3
722K	.2130	.6988		1
732K	.3190	1.0466		
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	1100°F (593°C)	N/A
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		

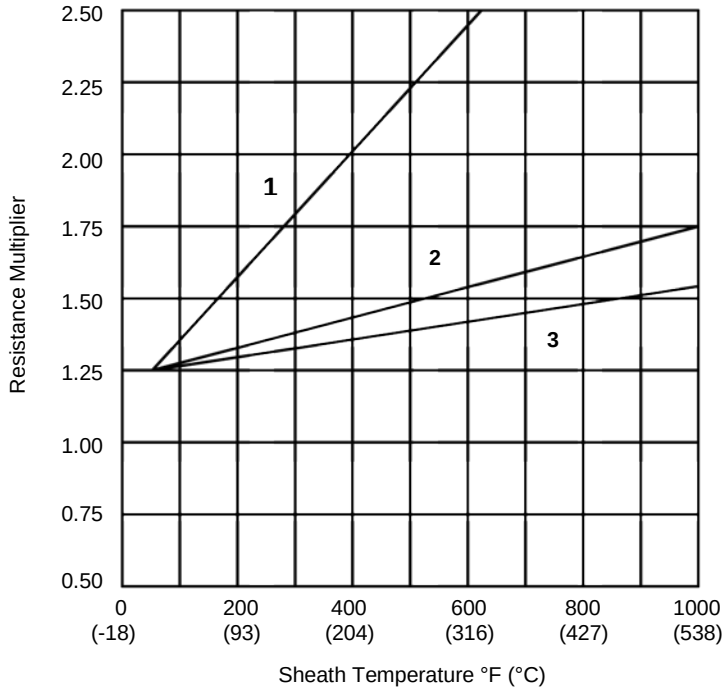
2-CONDUCTOR CABLE, 0.3125" DIAMETER ALLOY 825, 600 VOLTS				
Cable	Cable Resistance @ 68ºF (20ºC)		Maximum Exposure	
Number	Ohms/Foot	Ohms/Meter	Temperature Rating	Resistance Curve
588B	.0071	.0233		1
614B	.0149	.0489		1
627B	.0270	.0886	600°F (316°C)	2
640B	.0400	.1312		3
670B	.0650	.2133		
710B	.1040	.3412		
715B	.1620	.5315		
720B	.2050	.6726		
732B	.3250	1.0663		
750B	.5000	1.6404	1100°F (593°C)	N/A
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:

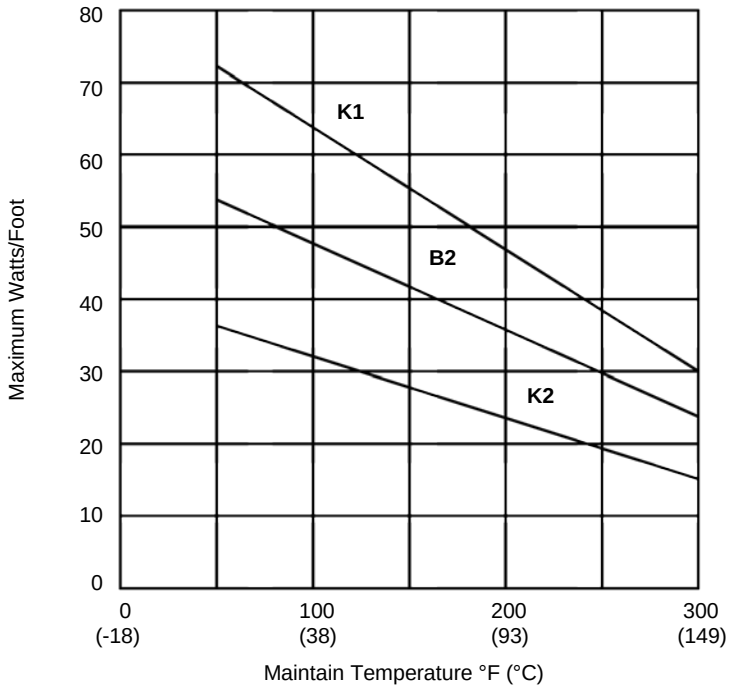
1-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, 600 VOLTS				
Cable	Cable Resistance @ 68ºF (20ºC)		Maximum Exposure	Resistance Curve
Number	Ohms/Foot	Ohms/Meter	Temperature Rating	
145K	.0046	.0151		1
189K	.0090	.0295	600°F (316°C)	1
216K	.0165	.0541		2
239K	.0390	.1280		
250K	.0500	.1640		
279K	.0790	.2592		
310K	.0950	.3117		
316K	.1570	.5151		
326K	.2600	.8530		
333K	.3300	1.0827	1100°F (593°C)	N/A
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).

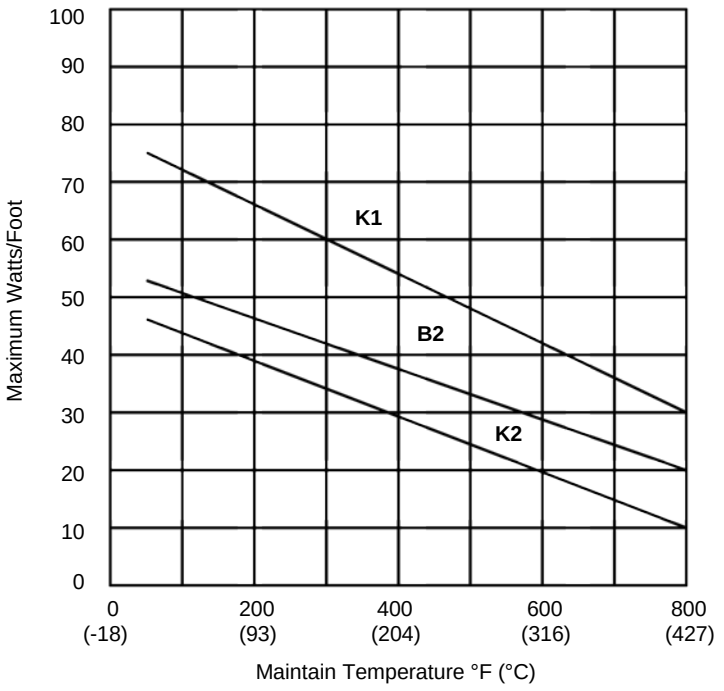
GRAPH-1
CABLE RESISTANCE VS TEMPERATURE MULTIPLIER



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



Approvals:

Note: Cable voltage, amps and watts must be provided for approval tags. Calculated sheath temperature must also be provided for hazardous (classified) approval tags.

FM

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

FM APPROVED

UL

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

UL LISTED

CSA

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

KEMA

Hazardous (Classified) Locations

(EEX Suffix)
II 2 G EEx de IIB + H2 T1-T6
KEMA04ATEX2049X

CE

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