City of Tacoma

Questions and Answers

Asphalt Plant Chip Seal Oil Tanks
RFB Specification No. **PW23-0152F**

All interested parties had the opportunity to submit questions in writing by email to Brandon Snow, Senior Buyer by date questions were due. The answers to the questions received are provided below and posted to the City's website at www.TacomaPurchasing.org: Navigate to *Current Contracting Opportunities* / *Public Works and Improvements Solicitations*, and then click *Questions and Answers* for this Specification. This information IS NOT considered an addendum. Respondents should consider this information when submitting their proposals.

Question 1: Specification Section 40 05 00 – General Equipment, 1.03.B states contractor design responsibility excludes the foundation system and electrical system improvement from service panel to Asphalt Storage Handling system and lighting. However, section 43 41 13, Welded Steel Tanks, 1.04 Quality Assurance, A.4, appears to indicate the contractor is responsible to verify adequacy of tank foundation. Please confirm that owner and/or designer of record is responsible for verifying adequacy of tank foundation based on loads provided by tank system designer.

Answer 1: The designer of record for the concrete foundation will confirm that the foundation is adequate for the tank system based on tank system designer furnished loads.

Question 2: E2, construction notes indicate providing an Oldcastle A 233-LA electrical vault. However, the location is not provided on the E2 site plan. Please verify if vault is required for project as it is not shown on E3 one line diagram either.

Answer 2: No vault is required for the project.

Question 3: Due to amount of cross-referencing in specifications and lack of schedule of coatings, there is confusion with the coatings and finishes requirements for the steel and the equipment, to include structural steel, tanks, and enclosures. Please see below specification references and please provide a schedule of items that require either coatings or galvanizing with respective coatings systems. Specifications are not clear on what features are painted or galvanized and what coatings systems shall be used for features. Below is a guess of what could be intended.

Tank System:
- Interior Tank - 2-coats of primer
- Exterior Tank – unclear but possibly 1 – coat primer as exterior is covered with insulation
- Pumps/Drives/Motors/Enclosures: Factory finish – no epoxy paint or field coatings
- Electrical:

Underground conduit: no coatings
Above ground conduit – rigid galvanized
Platform/Ladder/Handrail: Galvanized finish but would recommend safety yellow polyurethane for handrails, ladder, and toe kick
Piping: unclear as piping will have 4" of insulation. Assumed as unpainted and will have pipe identification on insulation

Coatings Systems for features:
Please provide a schedule of coatings systems in section 09 90 00, 2.02 with which features or items to receive coatings. Unclear which steel or items to receive which coating system.

05 12 00 - Steel

3.01.D – Shop Prime: All structural steel items which are not galvanized or epoxy coated,
including connection angles, shall be given a shop coat by the fabricator, using material which is standard for the fabricator.
Finish paint coats shall be furnished and applied as specified in Section 09 90 00 – Protective Coatings.

05 50 00 – Steel Fabrication

2.02 GALVANIZING
A. Hot-dip galvanize all exterior ferrous metal work and all interior ferrous metal work so noted.
B. Hot-dip galvanize all sheet steel, plain, or shaped in accordance with ASTM A525, G-90 Commercial Grade.
C. Hot-dip galvanize all products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strip 1/8-inch thick or heavier, in accordance with ASTM A123.

2.04 SHOP PRIMING
A. Refer to Section 09 90 00 – Protective Coatings for surface preparation, pretreatment, primers, and application techniques.
B. Apply one shop coat of rust inhibiting primer in accordance with Section 09 90 00 - Protective Coatings to all steel fabrications not scheduled to be galvanized.
1. Apply two coats of primer to surfaces not in contact but inaccessible after assembly.

2.06 FABRICATIONS
A. Steel Guardrails and Handrails:
1. Fabricate from 1 1/2-inch inside-diameter Schedule 40 steel pipe. Maximum post spacing 8-feet.
2. Hot-dip galvanize, after fabrication, guardrails and handrails exposed to the exterior and where noted to be galvanized.

C. Ladders, Steel

2. Rungs: 1-inch diameter solid bar inserted into holes drilled in rails and welded on the outside. Space rungs equal distance apart. Coat rungs with an epoxy base paint containing aluminum oxide grit by Wooster "Safe-Stride" Anti-slip paint; or equal.4. Hot-dip galvanize after fabrication

D. Grating Support Frames:

1. Material: Galvanized steel

09 90 00 - Coatings

1.01 SUMMARY

A. Section Includes:

1. Coat or paint all facilities and equipment which are part of this Contract, except:

a. Metal completely embedded in concrete.

b. Piping buried in ground or encased in concrete.

c. Galvanized grating, galvanized bolts, and galvanized grating frames.

d. Nameplates and grease fittings.

1.03 DEFINITIONS

A. Dry Film Thickness (DFT) – The prime coat and the sum of all fully cured applied coats for the paint system.

B. Exterior Surface – surface that is not inside a building or structure and is exposed to the weather. A surface with epoxy coating(s) that may be affected by ultraviolet rays from the sun shall be considered an exterior surface if the sun can shine on that surface.

1.09 COLORS AND SAMPLES

A. Coat all exposed metals white. If different shades of this color are available, give the Owner a color chart from which to select the color.

2.02 PRODUCTS

A. Aboveground Pipe and Equipment. Use one of the following systems:

1. Carboline System.

a. Surface preparation. Remove oil and grease from surface to be coated with Carboline Thinner #2 or Carboline Surface Cleaner #3 in accordance with SSPC SP 1. Abrasive blast to a commercial finish in accordance with SSPC SP 6. Obtain a 1 to 2 mil blast profile.

b. Coating system. Apply one coat of Carbomastic 15 L/O High
Solids High Builds Aluminum Flake Filled Epoxy Mastic at 5 to 8 mils. DFT. Apply two coats of the Carboline 133 HB High Build
Satin Finish Polyurethane Topcoat at 3 to 5 mils. per coat.

2. Tnemec System.
a. Surface preparation. Abrasive blast to a commercial finish in accordance with SSPC Sp 6. Obtain a 1 to 2 mil. blast profile.
b. Coating system.
1) Prime coat. Tnemec Series 90-97 Tnemec zinc at 2.5 to 3.5 mils.
2) Intermediate coat. Tnemec Series 161 Fast Cure Epoxy at 4 to 6 mils.
3) Finish coat. Tnemec Series 73 Endura-Shield at 3 to 5 miles.

3. Sherwin-Williams System.
a. Surface preparation. Abrasive blast to a commercial finish in accordance with SSPC SP 6. Obtain a 2 mil. Blast profile.
b. Coating System.
1) Prime coat: Recoatable epoxy intermediate B67H5/B67V5 at 4.0 to 6.0 mils. DFT.
2) Second coat: Hi-Solids Polyurethane B85-300/B60V30 at 3.0 to 5.0 mils. DFT.
3) Total DFT: 7 – 11 mils.

26 00 00

3.04 RACEWAYS UNDERGROUND

A. Galvanized rigid steel conduit - painted with two coats of bitumastic paint - or galvanized rigid steel conduit with 15 mil. polyvinyl chloride (PVC) jacket (repair abrasions with PVC base paint or PVC).

40 05 00 – General Tank Requirements

2.03 Welded Steel Tanks

E. Fabrication

1. API 650 and also

d. Shop prime all steel items which are not galvanized or epoxy-coated,

with material that is compatible with the finish coat.

3.03 Installation Welded Tanks

C. PAINTING

1. Perform interior and exterior cleaning, preparation, and painting in
accordance with API 650 and Section 09 90 00 – Protective Coatings.
3.05 Installation - Gear Pumps
B. Field Painting
1. Pumps, motors, and appurtenances shall receive a final color coat in the
field in accordance with Section 09 90 00 – Protective Coatings.

40 22 00 – Pipe and Pipe Fittings
2.04 Pipe Supports
B. Materials: Galvanize or paint (in accordance wit 09800) all support systems.

40 05 93 – Electric Motor Drives
2.03 Enclosure Type by Location
B. When specifically called for in the Specifications for the driven equipment or
required by Code, provide the following enclosure types:
1. API 650 and also
d. Shop prime all steel items which are not galvanized or epoxy-coated,
with material that is compatible with the finish coat.
2. Severe duty: Motors shall have the following features:
m. Epoxy coating on all external surfaces.
2.05 Fabrication
A. API 650 and also
4. Shop prime all steel items which are not galvanized or epoxy-coated,
with material that is compatible with the finish coat.

Answer 3: Coating Requirements:

Tank System:

- No interior coatings
- Exterior coating per Section 43 41 13 Welded Steel Tanks, 2.05 (A) 4; Shop prime all steel items which are not galvanized or epoxy coated, with material that is compatible with finish coat. Finish coat per Section 09 90 00 – Protective Coatings 2.02, color white per Section 09 90 00 – Protective Coatings 1.09.

Pumps/Drives/Motors/Enclosures

- Factory applied protective paint system per Section 40 05 00 – General Equipment and Mechanical Requirements.

Electrical

- Conduit per Section 26 05 33 – Raceway

Stairs/landing/ladder/handrail/pipe supports:

- Hot-dipped galvanized per Section 05 12 00 – Structural Steel and Section 05 50 00 – Metal Fabrications unless otherwise required by the IBC, OSHA, or ADA.
- Stair nosings per Section 05 50 00 – Metal Fabrications.
- Safety yellow polyurethane as directed by the City of Tacoma.

Question 4: 26 00 00 – Electrical: 2.03.D Suppliers can provide individual equipment components that are U.L. Listed but a skid with all the equipment on it would not be U.L. listed. Please confirm spec section is only pertaining to components and not assembled skid with panels, drive(s), and pump(s) attached

Answer 4: Each equipment component shall be UL or ETL listed as indicated in the Specifications. This does not pertain to assembled skids using all UL or ETL listed equipment components.

Question 5: 26 00 00 – Electrical: "MI" electrical mineral filled heat cable does not come from manufacturer as U.L. listed. Please confirm heat trace cable is not required to be U.L. listed.

Answer 5: It is our understanding that MI cable can be obtained from manufacturers with UL or FM. As an example, review of supplier web page www.valinonline.com indicates MI cable can be obtained with proper listing. Please see attached data sheet for Chromalox® MI* cable downloaded from the Valin website.

**This product is referenced only as an example and should not be inferred as the required/requested material and/or part.*

Question 6: 40 05 00 – General Equipment and Mechanical: 2.09 Electrical Heat Tracing – A.6 states the heat tracing is required to be warranted for a period of 10-years. Manufacturers will not provide a warranty for a 10-year period. Please confirm 10-years is accurate. If warranty of 10-year is required, for purposes of warranty the cost to remove and reinstall insulation will need to be addressed.

Answer 6: It is our understanding that MI cable can be obtained from manufacturers with UL or FM. As an example, review of supplier web page www.valinonline.com indicates MI cable can be obtained with proper listing. Please see attached data sheet for Chromalox® MI** cable downloaded from the Valin website. The Valin website indicates that their heat trace comes with a 10-year warranty.

Per City of Tacoma General Provisions Section 2.09 – Guarantee, the materials and workmanship for the work under this Contract is to be guaranteed for a period of 1-year.

As noted in your question, due to the magnitude of effort required to replace the heat trace wire, the 10-year warranty on the trace wire has been chosen in an effort to reduce the possibility of a premature failure.

***This product is referenced only as an example and should not be inferred as the required/requested material and/or part.*

Question 7: 40 05 00 – General Equipment and Mechanical: 2.09 Electrical Heat Tracing – A.7 states heat trace equipment and material shall be FM approved or U.L. "MI" electrical mineral filled heat cable does not come from manufacturer as FM approved or U.L. listed. Please confirm heat trace cable is not required to be FM approved or U.L. listed.

Answer 7: It is our understanding that MI cable can be obtained from manufacturers with UL or FM. As an example, review of supplier web page www.valinonline.com indicates MI cable can be obtained with proper listing. Please see attached data sheet for Chromalox® MI*** cable downloaded from the Valin website.

****This product is referenced only as an example and should not be inferred as the required/requested material and/or part.*

Question 8: Regarding soil management:

01 35 43.19, 1.02 indicates soils excavated cannot be re-used as part of the project.

31 00 00, Section 3.01.B.1 states surplus excavated material and unsuitable excavated material shall be disposed in the pit area of the facility.

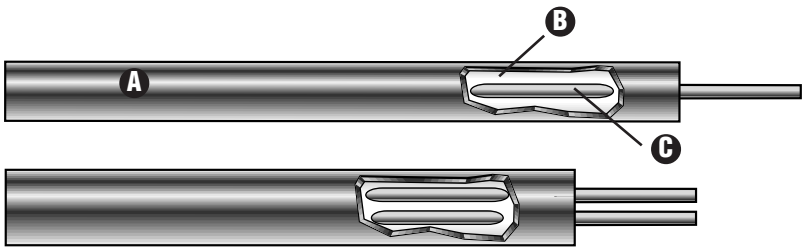
31 00 00, Section 3.01.B.2 states material stockpiled for reuse must be protected.

Please review specifications and clarify if native material for trenching can be reused or if it is required to be treated as contaminated material and disposed of off-site. Thank you.

Answer 8: The City has determined that all excavated soil shall be considered contaminated and shall be handled and disposed of per Specification Section 01 35 43.19 - Export Soil Management.

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.

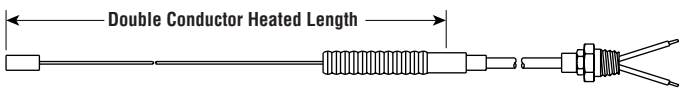
D Cold-Lead (Shown Below): Non-heating Alloy 825 sheathed MI cable extends the leads away from the high temperature equipment. 7 ft. long is standard.

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

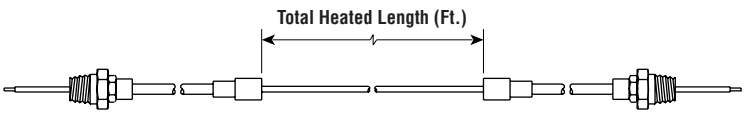
Form "A" (one cold section w/ 14 AWG - 12 in. pigtails and termination w/ end cap, 0.50" brass pressure fittings)

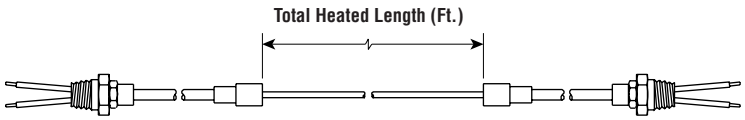
Available in two conductor only



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.

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

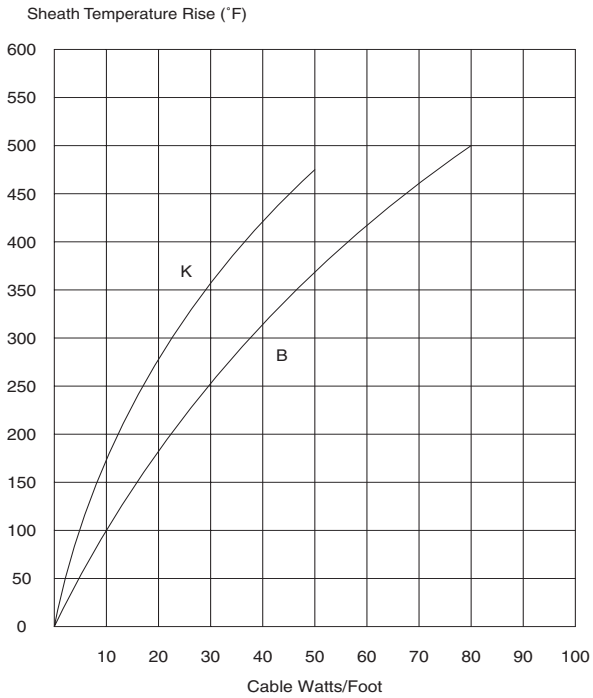
Cable Number	Ohms/ft	Maximum Exposure Temperature Rating ˚F	Resistance Curve
145K	0.0046	600	1
189K	0.0090		2
216K	0.0165		3
239K	0.069	1100	N/A
250K	0.050		
279K	0.079		
310K	0.095		
316K	0.157		
326K	0.260		
333K	0.330		
346K	0.457		
372K	0.730		
412K	1.17		
415K	1.48		
423K	2.36		
430K	2.80		
447K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

MI

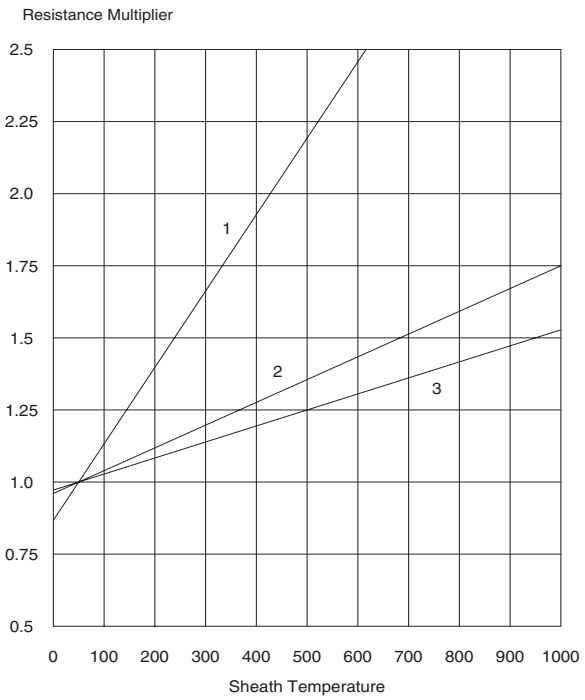
Mineral Insulated High Temperature *(cont'd.)*

Specification / Application Information

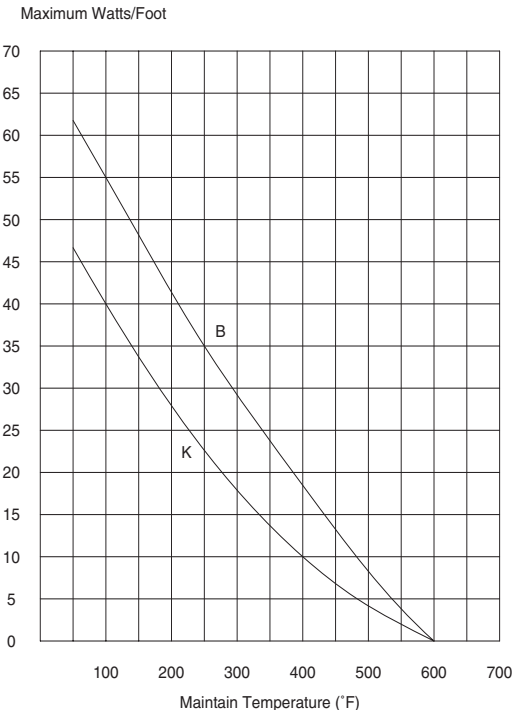
Graph-1
Cable Sheath Temperature Rise



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