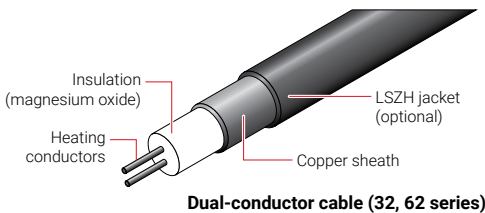
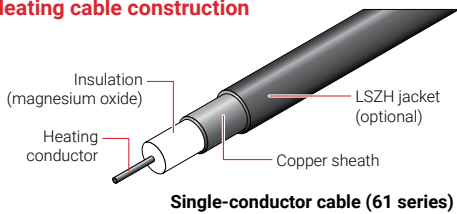


## COPPER AND LSZH JACKETED COPPER SHEATHED MI CABLE FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS

### Heating cable construction



### PRODUCT OVERVIEW

The copper sheath provides an ideal ground path and allows for a rugged yet flexible heating cable that is easy to install. Each heating cable includes a heated section that is joined to a preterminated nonheating cold lead which is ready to connect into a junction box. For corrosive or embedded applications, such as concrete or asphalt snow melting, a cable with a Low Smoke Zero Halogen (LSZH) jacket is required. For embedded applications the red LSZH jacket enhances cable visibility during concrete or asphalt placement. Refer to the tables below for the complete list of approved applications.

For additional information or applications requiring stainless steel sheathed heating cables, contact your nVent representative or call (800) 545-6258.



### APPROVED APPLICATIONS AND POWER OUTPUT FOR NONHAZARDOUS AREAS

Bare copper-sheathed heating cable	c-CSA-us	FM	UL	Max. power output W/ft (W/m)
Snow melting on metal roofs	Yes	No	No	15 (49)
De-icing of metal gutters and downspouts	Yes	No	No	15 (49)
De-icing of nonmetallic gutters and downspouts	Yes	No	No	5 (16)
Freeze protection of metal pipes and vessels <sup>2</sup>	Yes	Yes	No	18 (59)
Process temperature maintenance (pipes and vessels) <sup>2</sup>	Yes	Yes	No	18 (59)
<b>LSZH jacketed copper-sheathed heating cable</b>				
Snow melting in concrete and mastic asphalt slab	Yes	No	Yes	30 (99)
Snow melting in road-grade asphalt slab	Yes	No	Yes	25 (82)
Snow melting in sand/limestone screenings (pavers)	No <sup>1</sup>	No	No	20 (66)
Snow melting on nonmetal roof	Yes	No	No	8 (26)
Pool and Spa Decks	Yes <sup>3</sup>	No	No	35 (115)
De-icing of metal gutters and downspouts	Yes	No	No	8 (26)
De-icing of nonmetallic gutters and downspouts	Yes	No	No	5 (16)
Floor heating in concrete slab	Yes	No	No	10 (33)
Frost heave protection - embedded in concrete	Yes	No	No	7 (23)
Freeze protection of metal pipes and vessels – internal	Yes	No	No	8 (26)
Freeze protection of metal pipes and vessels – external	Yes	No	No	8 (26)
Freeze protection of nonmetallic pipes and vessels – internal	Yes	No	No	4 (13)
Freeze protection of nonmetallic pipes and vessels – external	Yes	No	No	4 (13)

<sup>1</sup> Special permission for paver snow melting is required from the Authority Having Jurisdiction.

<sup>2</sup> When designing heating cables for pipe and vessel tracing, the "Max. power output (W/ft)" values may have to be decreased to ensure that the sheath temperature does not exceed the maximum exposure temperature of the cable (see page 2).

<sup>3</sup> Pool and spa deck approval - Canada only.

## APPROVED APPLICATIONS AND POWER OUTPUT FOR HAZARDOUS AREAS

Bare copper-sheathed heating cable	c-CSA-us	FM	UL	Max. power output W/ft (W/m)
Process temperature maintenance (pipes and vessels) <sup>3</sup>	Yes	Yes	No	18 (59)
Freeze protection of metal pipes and vessels <sup>3</sup>	Yes	Yes	No	18 (59)
De-icing of metal gutters and downspouts <sup>3</sup>	Yes	No	No	15 (49)
De-icing of nonmetallic gutters and downspouts	Yes	No	No	5 (16)
<b>LSZH jacketed copper-sheathed heating cable</b>				
Snow melting in concrete and mastic asphalt slab	Yes	No	No	30 (99)
Snow melting in road-grade asphalt slab	Yes	No	No	25 (82)
De-icing of metal gutters and downspouts	Yes	No	No	8 (26)
De-icing of nonmetallic gutters and downspouts	Yes	No	No	5 (16)
Freeze protection of metal pipes and vessels – external	Yes	No	No	8 (26)
Freeze protection of nonmetallic pipes and vessels – external	Yes	No <td No	4 (13)	

<sup>2</sup> When designing heating cables for pipe and vessel tracing, and de-icing of metal gutters and downspouts, the "Max. power output (W/ft)" values may have to be decreased to ensure that the sheath temperature does not exceed the maximum exposure temperature of the cable (see below) or the autoignition temperature of gases and vapors present in the hazardous area. For assistance designing heating cables for hazardous areas, contact nVent Technical Support at (800) 545-6258.

## TEMPERATURE RATINGS

### Maximum exposure temperature

392°F (200°C) Bare copper-sheathed heating cable  
 194°F (90°C) LSZH-jacketed heating cable\*

\* LSZH-jacketed cables may be exposed to higher temperatures during installation in asphalt.

### Minimum installation temperature

-76°F (-60°C) Bare copper-sheathed heating cable  
 -4°F (-20°C) for UL, -22°F (-30°C) for CSA LSZH-jacketed heating cable

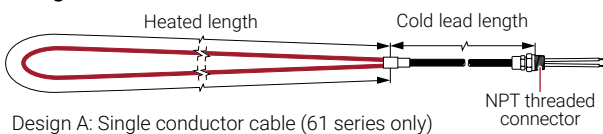
## TEMPERATURE ID NUMBER (T-RATING)

To be established by calculating the maximum sheath temperature. Contact nVent for assistance.

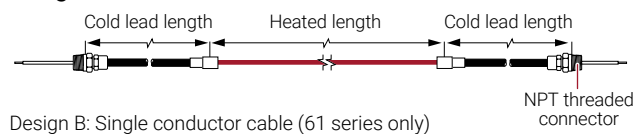
## BASIC HEATING CABLE DESIGN CONFIGURATIONS

Heating cables are supplied as complete factory-fabricated assemblies consisting of the heated section joined to a length of nonheating cold lead section, preterminated with an NPT-threaded connector and ready to connect into a junction box.

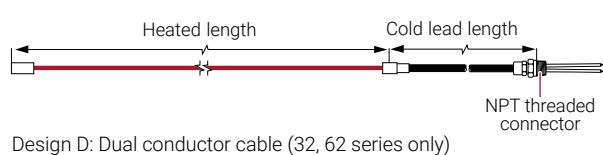
### Design A



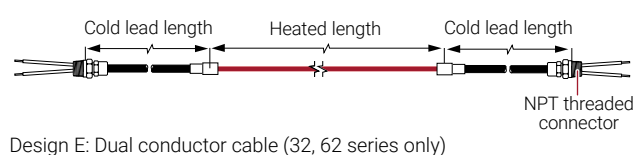
### Design B



### Design D

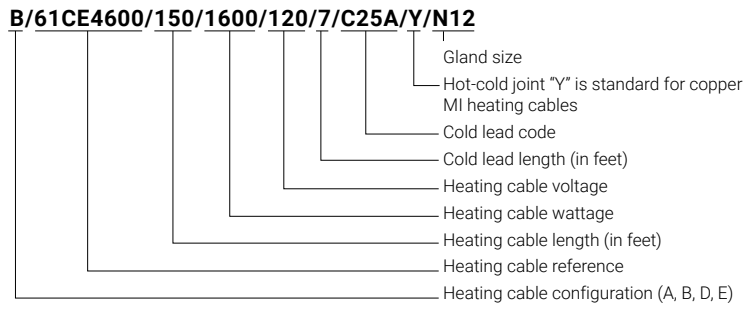


### Design E



## HEATING CABLE CATALOG NUMBER

To order an nVent RAYCHEM MI heating cable, it is important to understand the format of our catalog number.



In the above heating cable catalog number, the length of the heated section and the cold lead are in feet. For metric lengths, the heating cable catalog number would include a suffix "M" after the length, as shown below. A LSZH jacket on the heated section and a LSZH jacket on the cold lead have also been included in the following:

**B/61RE4600-RD/45.7M/1600/120/2.1M/R25A/Y/N12**

### Options

Add suffix "/PE" at the end of the catalog number for pulling eye (Design D cables only).

Add suffix "/RG1" at the end of the catalog number for 1" reverse gland (used to make a watertight seal) for Designs A and D cables. Design D cables also available with 1/2" or 3/4" reverse gland ("/RG34" for 3/4" or "/RG12" for 1/2").

### Examples

#### Snow melting for area 1200 sq ft (spacing 7")

6 cables **B/61RE3150-RD/343/7000/600/15/R25A/Y/N12**

- Heating cable configuration is Design B
- 600 V rated single conductor LSZH jacketed cable, resistance at 20°C is 0.150 Ω/ft (0.492 Ω/m)
- Each heating cable length is 343 ft (104.5 m)
- Each heating cable wattage is 7000 W at 600 V
- Cold lead is 15 ft (4.5 m) with LSZH jacket
- Cold lead code is R25A
- 1/2-in NPT gland connector

#### Pipe tracing for 2 in x 50 ft pipe

1 cable **D/32CD3800/52/340/120/3/C22A/Y/N12**

- Heating cable configuration is Design D
- 300 V rated two conductor cable, resistance at 20°C is 0.80 Ω/ft (2.625 Ω/m)
- Heating cable length is 52 ft (15.9 m)
- Heating cable wattage is 340 W at 120 V
- Cold lead is 3 ft (0.9 m)
- Cold lead code is C22A
- 1/2-in NPT gland connector

## HEATING CABLE REFERENCE DECODING

	Digit number	Description	
<b>6 1 C D 3 6 1 0</b> Digit 1 2 3 4 5 6 7 8	1	Maximum voltage rating	3 = 300 V, 6 = 600 V
	2	Number of conductors	1 or 2
	3	Sheath material	C = Copper, R = LSZH jacket
<b>6 1 R D 3 6 1 0-RD</b> Digit 1 2 3 4 5 6 7 8 9	4	Conductor material	C, D, or E
	5	Move decimal point to left indicated number of places	1, 2, 3, 4, 5, or 6 places
	6 to 8	Cable resistance ( Ω/ft) to 3 whole numbers (use with digit 5)	3610 = 0.610 Ω/cable foot at 20°C
	9	Jacket color - use only with LSZH jacketed cables	-RD = red color LSZH jacket

## COLD LEADS FOR COPPER-SHEATHED HEATING CABLES

Cold leads for copper MI heating cables are available in bare copper or for superior mechanical and corrosion resistance LSZH jacketed copper. Use LSZH jacketed copper for all embedded heating cable applications, such as snow melting and floor heating.

Bare copper cold lead code	LSZH jacketed cold lead code	Maximum voltage (V)	Maximum current (A)	Gland size (NPT)	Gland size reference for catalog number	Tail size (AWG)
<b>Design A, D, E</b>						
C22A	R22A	600	22	1/2"	N12	14
C29A	R29A	600	29	1/2"	N12	12
C38A	R38A	600	38	3/4"	N34	10
C50A	R50A	600	50	3/4"	N34	8
C67A	R67A	600	67	3/4"	N34	6
C90A	R90A	600	90	1"	N1	4
<b>Design B</b>						
C25A	R25A	600	25	1/2"	N12	14
C30A	R30A	600	30	1/2"	N12	12
C40A	R40A	600	40	1/2"	N12	10
C60A	R60A	600	60	1/2"	N12	8
C80A	R80A	600	80	1/2"	N12	6
C105A	R105A	600	105	3/4"	N34	4

## SERIES 61 MI HEATING CABLE SPECIFICATIONS (600 V, SINGLE CONDUCTOR)

Heating cable reference	Nom. cable resistance at 20°C		Nominal cable diameter		Max. unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
61CD3610	0.610	2.00	0.120	3.0	11712	3571	35	52.1
61CD3390	0.390	1.28	0.132	3.4	9689	2954	45	67.0
61CD3300	0.300	0.984	0.160	4.1	6595	2011	45	67.0
61CD3200	0.200	0.656	0.168	4.3	5987	1825	56	83.3
61CE3150	0.150	0.492	0.148	3.8	7718	2353	49	72.9
61CE3105	0.105	0.344	0.174	4.4	5230	1594	52	77.4
61CE4800	0.0800	0.262	0.182	4.6	4948	1508	54	80.4
61CE4600	0.0600	0.197	0.194	4.9	4269	1301	56	83.3
61CE4400	0.0400	0.131	0.185	4.7	4686	1429	58	86.2
61CE4300	0.0300	0.0980	0.192	4.9	4340	1323	65	96.6
61CE4200	0.0200	0.0660	0.205	5.2	3564	1086	74	110.2
61CC4100	0.0100	0.0328	0.198	5.0	4624	1409	58	86.3
61CC5651	0.00651	0.0214	0.194	4.9	4187	1277	67	99.7
61CC5409	0.00409	0.0134	0.223	5.7	3394	1034	84	125.2
61CC5258	0.00258	0.00846	0.230	5.8	3076	938	98	146.1
61CC5162	0.00162	0.00531	0.246	6.2	2693	821	117	174.2
61CC5102	0.00102	0.00335	0.277	7.0	2056	627	154	229.1
61CC6641	0.000641	0.00210	0.298	7.6	1688	515	179	266.3
61CC6403	0.000403	0.00132	0.340	8.6	1331	406	236	351.1

**Notes:** 1) To specify an LSZH jacket on the heating cable, replace the "C" (first letter in cable reference) with "R" and add a "-RD" suffix (red jacket colour) after the cable reference number.

Example: 61CD3610 becomes 61RD3610-RD for red jacketed version.

2) Tolerance on cable resistance is ± 10%.

**SERIES 32 MI HEATING CABLE SPECIFICATIONS (300 V, DUAL CONDUCTOR)**

Heating cable reference	Nom. cable resistance at 20°C		Nominal cable diameter		Max. unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
32CD3800	0.800	2.62	0.165	4.2	5800	1768	46	68.5
32CD3600	0.600	1.97	0.175	4.4	5676	1730	59	87.8
32CD3400	0.400	1.31	0.183	4.6	4686	1428	60	89.4
32CD3300	0.300	0.984	0.190	4.8	4158	1267	62	92.1
32CE3200	0.200	0.656	0.185	4.7	4686	1428	60	89.4
32CE3125	0.125	0.410	0.195	5.0	4026	1227	65	96.6
32CE3100	0.100	0.328	0.208	5.3	3564	1086	65	96.6
32CE4700	0.0700	0.230	0.230	5.8	3300	1006	110	163.7
32CE4440	0.0440	0.144	0.260	6.6	2244	684	140	208.2
32CE4280	0.0280	0.092	0.300	7.6	1782	543	182	270.8

**Notes:** 1) To specify a LSZH jacket on the heating cable, replace the "C" (first letter in cable reference) with "R" and add a "-RD" suffix (red jacket colour) after the cable reference number.  
 Example: 32CD3800 becomes 32RD3800-RD for red jacketed version.  
 2) Tolerance on cable resistance is ± 10%.

**SERIES 62 MI HEATING CABLE SPECIFICATIONS (600 V, DUAL CONDUCTOR)**

Heating cable reference	Nom. cable resistance at 20°C		Nominal cable diameter		Max. unjointed cable length		Nominal weight	
	Ω/ft	Ω/m	in	mm	ft	m	lb/1000 ft	kg/1000 m
62CE4950	0.0950	0.312	0.283	7.2	1890	576	129	192
62CE4700	0.0700	0.230	0.309	7.9	1400	427	150	223.2
62CE4440	0.0440	0.144	0.340	8.6	1170	357	181	269.4
62CE4280	0.0280	0.0920	0.371	9.4	965	294	224	333.8
62CC4200	0.0200	0.0656	0.252	6.4	2500	762	109	242.0
62CC4130	0.0130	0.0427	0.309	7.9	1647	502	150	223.2
62CC5818	0.00818	0.0268	0.340	8.6	1217	371	189	281.2
62CC5516	0.00516	0.0169	0.371	9.4	1062	324	236	351.1
62CC5324	0.00324	0.0106	0.402	10.2	876	267	275	409.1
62CC5204	0.00204	0.00669	0.449	11.4	706	215	353	525.3

**Notes:** 1) To specify a LSZH jacket on the heating cable, replace the "C" (first letter in cable reference) with "R" and add a "-RD" suffix (red jacket colour) after the cable reference number.  
 Example: 62CE4950 becomes 62RE4950-RD for red jacketed version.  
 2) Tolerance on cable resistance is ± 10%.

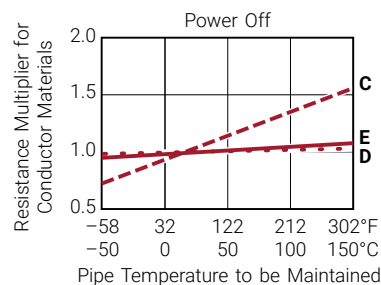
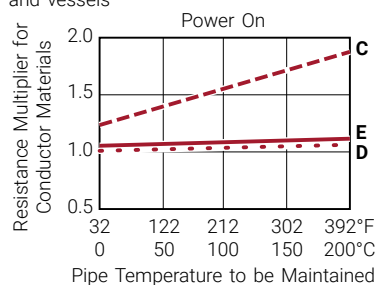
**RESISTANCE CORRECTION FACTOR**

Various conductor materials behave differently. Based on the application, use the table or graphs below for approximate adjustment of power and resistance as a function of temperature. For detailed design, contact nVent for further assistance.

**Applications:** Snow melting, floor warming, roof and gutter de-icing, frost-heave prevention

Conductor material	Correction factor
C	1.15
D	1.0
E	1.0

**Applications:** Freeze protection for pipes and vessels, process temperature maintenance for pipes and vessels



## APPROVALS

Also refer to application tables on previous pages



### Nonhazardous Locations

#### \*Hazardous Locations

Class I, Div 1 & 2, Groups A, B, C, D  
Class II, Div 1 & 2, Groups E, F, G  
Class III

\* Polymer jacketed MI Heating Cables are not FM approved.



### Nonhazardous Locations



### Nonhazardous Locations

#### \*Hazardous Locations

Class I, Div 1\* & 2, Groups A, B, C, D  
Class II, Div 1 & 2, Groups E, F, G  
Class III

\* Polymer jacketed MI Heating Cables are not approved for CID1 locations

Zone:

US: Class I Zone 1 AEx e IIC T\*

Canada: Ex e IIC T\*

## GROUND-FAULT PROTECTION

To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with the requirements of nVent, agency certifications, and national electrical codes, ground-fault equipment protection must be used on each heating cable branch circuit. Arcing may not be stopped by conventional circuit protection. Many nVent RAYCHEM control and monitoring systems meet the ground-fault protection requirement.

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