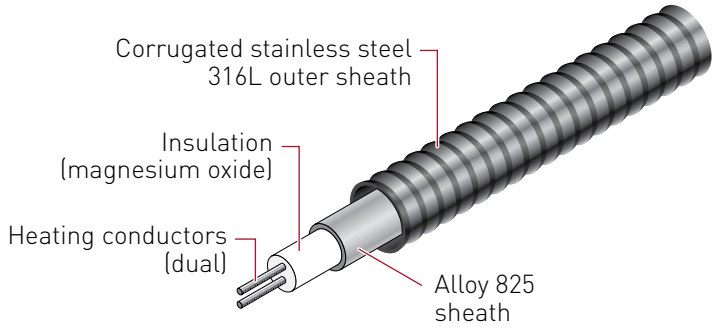
PENTAIR

Raychem XMI-L

STAINLESS STEEL, LOW TEMPERATURE SHEATH CONSTANT WATTAGE MINERAL INSULATED HEATING CABLES

10 YEAR Product warranty

Heating cable construction



PRODUCT OVERVIEW

Raychem XMI-L heating cables provide solutions for industrial freeze protection and process-temperature maintenance applications up to 752°F (400°C) and maximum continuous exposure temperatures up to 1022°F / 550°C.

They are available as 300 V and 600 V rated heating cables and are approved for applications up to 50 watts per foot (164 watts per meter) of power output and are ideally suited for heating applications where high power output, high exposure temperatures, or extreme resistance to environmental corrosives is needed.

XMI-L heating cables are constructed using Alloy 825 sheathed MI heating cables inside a small or large corrugated 316L stainless steel sheath, providing a lower sheath temperature for optimized, reduced pass designs and improved constructability in hazardous area applications. The heating units are available in lengths up to 150 feet (45.7 meters).

For additional information, contact your Pentair Industrial Heat Tracing Solutions representative or call (800) 545-6258.

TEMPERATURE RATING

Standard environmental conditions		
Typical outdoor, wet location conditions. Corrosives may be present; acidic pH levels; high chloride	Maximum continuous exposure temperature	842°F / 450°C
	Maximum intermittent exposure temperature (1000 hours, power off)	1022°F / 550°C
Protected environmental conditions		
Corrosives not present; controlled pH and chloride levels	Maximum continuous exposure temperature	1022°F / 550°C

TEMPERATURE ID NUMBER (T-RATING)

To be established by calculating the maximum sheath temperature.
Use TraceCalc Pro design software or contact Pentair Industrial Heat Tracing Solutions for assistance.

APPROVALS

XMI-L
(Low temperature sheath)
Hazardous Locations

Class I, Div 2 (Zone 2), Groups A, B, C and D; Class II, Div 2, Groups E, F and G; Class III, Div 1 and Div 2; T**
Ex e IIC T** (for use in Zone 1 and Zone 2 locations)
Class I, Zone 1, AEx e IIC T**

SPECIFICATIONS

Product Family	Sheath Material	Product Code	Voltage Rating	Number of Conductors	Approximate Cable Diameter*	Maximum Length	Max. Power Output**
XMI-L	316L stainless steel	XMI-L32-CS	300 V	2	0.49 in; 12.4 mm (-CS)	150 ft; 45.7 m	50 W/ft; 164 W/m
XMI-L	316L stainless steel	XMI-L32-CL	300 V	2	0.57 in; 14.5 mm (-CL)	150 ft; 45.7 m	50 W/ft; 164 W/m
XMI-L	316L stainless steel	XMI-L62-CL	600 V	2	0.57 in; 14.5 mm (-CL)	150 ft; 45.7 m	50 W/ft; 164 W/m

* Large corrugated sheath (-CL) provides maximum reduction of sheath temperature. Small corrugated sheath (-CS) is recommended for smaller diameter pipes to allow greater contact around flanges, valves and other heat sink areas.

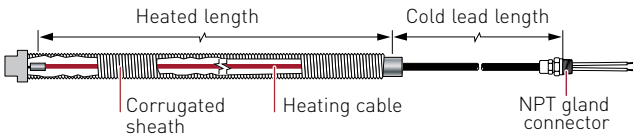
** Actual power output values are application specific and may be lower, particularly for designs in hazardous locations. Use TraceCalc Pro design software or contact Pentair Industrial Heat Tracing Solutions for design assistance.

BASIC HEATING CABLE DESIGN CONFIGURATIONS

XMI-L heating cables are designed as engineered heating units according to your specific application. An engineered heating unit consists of a length of heating cable (Heated length) joined to a length of non-heating cold lead (Cold lead length). Engineered heating units are designed using our TraceCalc Pro software. This section describes the available XMI-L engineered heating unit design configurations.

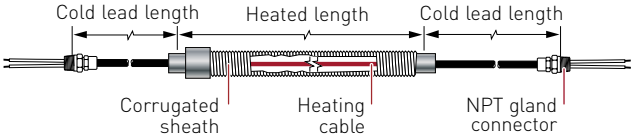
Various quick connector options are available for the XMI-L cold lead (Canada only). Refer to data sheet H59126 for further details.

Design D



Dual conductor cable (XMI-L32 or XMI-L62 series)

Design E



Dual conductor cable (XMI-L32 or XMI-L62 series)

HEATING CABLE CATALOG NUMBER

A Raychem XMI-L engineered heating unit is ordered by compiling the catalog number based on the design of the specific engineered heating unit required for your application. Typically, an engineered heating unit is designed using our TraceCalc Pro design software which provides the catalog number as part of the design output. An explanation of the catalog number follows:

Example: Engineered Heating Unit (Part No.: EHU)
EHU: D/32SA2200-CL/40/538/208/7/S25A/C/N12/S

Position: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10

D / 32SA2200-CL / 40 / 538 / 208 / 7 / S25A / C / N12 / S

Position	Characteristic	Code Options	Description
1	Design configuration	D or E	Designates the basic heating cable design configuration of the XMI-L engineered heating unit.
2	Heating cable reference	See Table 3, 4 and 5	Indicates the XMI-L heating cable reference used in the design.
3	Heated length	Length of the heating cable in feet or meters	Default value is in feet; if in meters add "M" after the length.
4	Power	Power output of the heating cable unit	Power output at maintain temperature, in Watts, for the total heated length of the engineered heating unit.
5	Voltage	Effective voltage applied to a heating unit	This is the designed effective voltage that will be applied to the engineered heating unit (in the case of series connected heating units, it is the voltage across a single unit).
6	MI cold lead length	(length) or (length)–(length) Length of the MI cold lead in feet or meters	Default value is in feet; if in meters add "M" after the length. Standard lengths for XMI-L engineered heating units are 4 feet (1.2 m) or 7 feet (2.1 m), however custom lengths can be designated here. For E configurations, which have cold leads on each end, a single value (such as "7") indicates that both MI cold leads are to be 7 feet long. A hyphenated value (such as "5-7") indicates that the cold lead on one end is 5 feet long and the cold lead on the other end is 7 feet long.
7	MI cold lead code	Select the cold lead code from Table 2	Table 2 is used to select the appropriate MI cold lead based on the current and voltage rating required by the design.
8	Hot-cold joint type	C	"C" type joint is used with all XMI-L engineered heating units.
9	Gland size reference	Refer to Table 2	Gland size depends on the cold lead code selected from Table 2.
10	Special feature	S	Indicates a special non-standard feature has been added to the heating cable.

Examples

D/32SQ3100-CL/100/1360/120/4/LS23A/C/N12

- Configuration is Design D
- XMI-L32-CL heating cable (300 V rated, dual conductor, low temperature large corrugated sheath cable), resistance at 20°C is 0.100 Ohm/ft (0.328 Ohm/m)
- Heating cable length is 100 ft (30 m)
- Heating cable wattage is 1360 W at 120 V
- MI cold length is 4 ft (1.2 m)
- MI cold lead code is LS23A (23 Amps)
- Hot-cold joint type is "C" for use with XMI-L low temperature sheath cables
- Gland connector is 1/2 in NPT

E/32SQ3200-CS/82/870/120/5-2/LS23A/C/N12

- Configuration is Design E
- XMI-L32-CS heating cable (300 V rated, dual conductor, low temperature small corrugated sheath cable), resistance at 20°C is 0.200 Ohm/ft (0.656 Ohm/m)
- Heating cable length is 82 ft (25 m)
- Heating cable wattage is 870 W at 120 V
- MI cold lead length is 5 ft (1.5 m) on one end and 2 ft (0.6 m) on the other end
- MI cold lead code is LS23A (23 Amps)
- Hot-cold joint type is "C" for use with XMI-L low temperature sheath cables
- Gland connector is 1/2 in NPT

TABLE 1 HEATING CABLE REFERENCE DECODING

	6	2	S	A	2	2	0	0	-	C	L
Position	1	2	3	4	5	6	7	8		9	10

Position	Description	
1	Maximum voltage rating	3 = 300 V, 6 = 600 V
2	Number of conductors	1 or 2
3	Sheath material	S = Alloy 825*
4	Conductor material	A, B, F, P, Q, or T
5	Move decimal point to left indicated number of places	1, 2, 3 or 4 places
6 to 8	Cable resistance to 3 whole numbers (use with digit 5)	2200 = 2.00 Ω/cable foot at 20°C
9 to 10	Extensions for low temperature sheath heating cable	"CL" indicates large corrugated 316L stainless steel sheath "CS" indicates small corrugated 316L stainless steel sheath

* Basic heating cable sheath is Alloy 825, however XMI-L (low temperature sheath) has an additional 316L stainless steel corrugated sheath covering the Alloy 825 heating cable.

TABLE 2 ALLOY 825 SHEATHED COLD LEADS

This cold lead is supplied from the factory with a standard stainless steel National Pipe Thread (NPT) gland connector ready for assembly into the junction box or panel using the flexible wire tails extending from the MI cold lead. The cold lead is selected based on the voltage and current requirements of the XMI-L engineered heating unit. The standard tail length is 12 in (30 cm) unless otherwise specified, and the gauge size (AWG) for the tails is shown in the table below.

Cold lead code for catalog number	Maximum voltage (V)	Maximum current (A)	Cold lead diameter		Gland size (NPT)	Gland size reference for catalog no.	Tail size (AWG)
			in	mm			
Design D, E							
S25A	600	25	0.355	9.0	1/2 in	N12	14
LS23A	300	23	0.319	8.1	1/2 in	N12	14
S34A	600	34	0.402	10.2	3/4 in	N34	10
S49A	600	49	0.496	12.6	3/4 in	N34	8
S65A	600	65	0.543	13.8	3/4 in	N34	6

Note: MI cold lead minimum bending radius is 6 times the cable diameter.

TABLE 3 XMI-L32-CS SERIES MI HEATING CABLE SPECIFICATIONS (300 V, DUAL CONDUCTOR, LOW TEMPERATURE SHEATH, SMALL CORRUGATED CONDUIT)

Heating cable reference	Nominal cable resistance at 20°C		Nominal weight		Minimum bending radius	
	Ω/ft	Ω/m	lb/1000 ft	kg/1000 m	in	mm
32SF1180-CS	18.0	59.0	99	147	1.0	25
32SF1110-CS	11.0	36.1	90	134	0.9	23
32SF2900-CS	9.00	29.5	92	137	1.0	25
32SF2750-CS	7.50	24.6	91	136	0.9	23
32SA2600-CS	6.00	19.7	92	137	1.0	25
32SA2400-CS	4.00	13.1	86	128	0.9	23
32SA2318-CS	3.18	10.4	100	148	1.0	25
32SA2275-CS	2.75	9.02	90	134	0.9	23
32SA2200-CS	2.00	6.56	99	148	1.0	25
32SA2170-CS	1.70	5.58	98	146	1.0	25
32SB2114-CS	1.14	3.74	101	151	1.0	25
32SB3914-CS	0.914	3.00	95	141	1.0	25
32SB3700-CS	0.700	2.30	100	149	1.0	25
32SQ3472-CS	0.472	1.55	102	152	1.1	28
32SQ3374-CS	0.374	1.23	105	157	1.1	28
32SQ3293-CS	0.293	0.961	103	154	1.1	28
32SQ3200-CS	0.200	0.656	94	140	1.0	25
32SQ3150-CS	0.150	0.492	99	148	1.0	25
32SQ3100-CS	0.100	0.328	110	164	1.1	28
32SP4734-CS	0.0734	0.241	102	152	1.0	25
32SP4583-CS	0.0583	0.191	105	157	1.1	28
32SP4458-CS	0.0458	0.150	112	167	1.1	28

TABLE 4 XMI-L32-CL SERIES MI HEATING CABLE SPECIFICATIONS (300 V, DUAL CONDUCTOR, LOW TEMPERATURE SHEATH, LARGE CORRUGATED CONDUIT)

Heating cable reference	Nominal cable resistance at 20°C		Nominal weight		Minimum bending radius	
	Ω/ft	Ω/m	lb/1000 ft	kg/1000 m	in	mm
32SF1180-CL	18.0	59.0	131	197	1.0	25
32SF1110-CL	11.0	36.1	122	184	0.9	23
32SF2900-CL	9.00	29.5	124	187	1.0	25
32SF2750-CL	7.50	24.6	123	185	0.9	23
32SA2600-CL	6.00	19.7	124	187	1.0	25
32SA2400-CL	4.00	13.1	118	176	0.9	23
32SA2318-CL	3.18	10.4	132	198	1.0	25
32SA2275-CL	2.75	9.02	122	182	0.9	23
32SA2200-CL	2.00	6.56	131	195	1.0	25
32SA2170-CL	1.70	5.58	130	194	1.0	25
32SB2114-CL	1.14	3.74	133	198	1.0	25
32SB3914-CL	0.914	3.00	127	191	1.0	25
32SB3700-CL	0.700	2.30	132	197	1.0	25
32SQ3472-CL	0.472	1.55	134	200	1.1	28
32SQ3374-CL	0.374	1.23	137	204	1.1	28
32SQ3293-CL	0.293	0.961	135	201	1.1	28

TABLE 4 XMI-L32-CL SERIES MI HEATING CABLE SPECIFICATIONS (300 V, DUAL CONDUCTOR, LOW TEMPERATURE SHEATH, LARGE CORRUGATED CONDUIT)

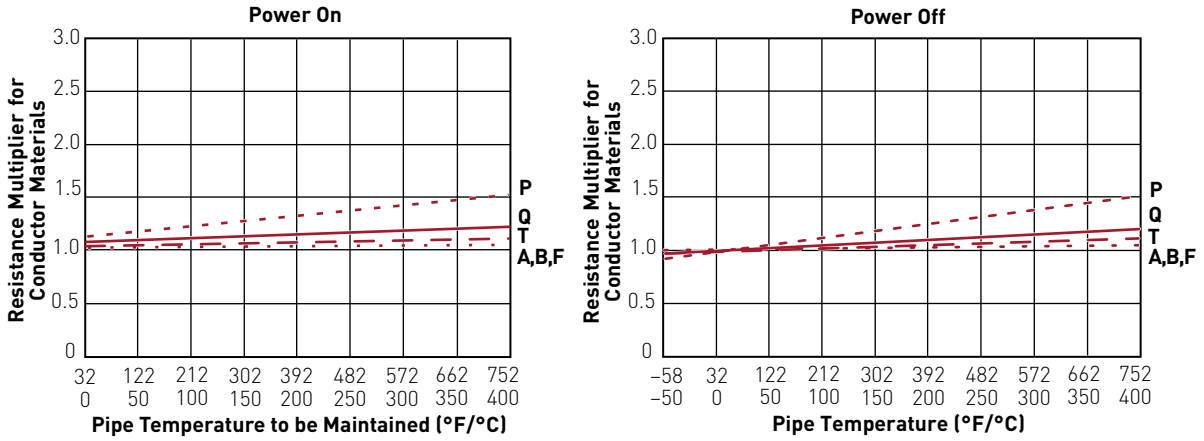
Heating cable reference	Nominal cable resistance at 20°C		Nominal weight		Minimum bending radius	
	Ω/ft	Ω/m	lb/1000 ft	kg/1000 m	in	mm
32SQ3200-CL	0.200	0.656	126	188	1.0	25
32SQ3150-CL	0.150	0.492	131	195	1.0	25
32SQ3100-CL	0.100	0.328	142	212	1.1	28
32SP4734-CL	0.0734	0.241	134	200	1.0	25
32SP4583-CL	0.0583	0.191	137	204	1.1	28
32SP4458-CL	0.0458	0.150	144	215	1.1	28

TABLE 5 XMI-L62-CL SERIES MI HEATING CABLE SPECIFICATIONS (600 V, DUAL CONDUCTOR, LOW TEMPERATURE SHEATH, LARGE CORRUGATED CONDUIT)

Heating cable reference	Nominal cable resistance at 20°C		Nominal weight		Minimum bending radius	
	Ω/ft	Ω/m	lb/1000 ft	kg/1000 m	in	mm
62SF1110-CL	11.0	36.1	143	213	1.2	30
62SF2900-CL	9.00	29.5	143	213	1.2	30
62SF2750-CL	7.50	24.6	151	227	1.2	30
62SF2600-CL	6.00	19.7	168	252	1.4	36
62SA2414-CL	4.14	13.6	176	264	1.4	36
62SA2275-CL	2.75	9.02	166	249	1.4	36
62SF2200-CL	2.00	6.56	182	271	1.5	38
62SA2170-CL	1.70	5.58	178	267	1.4	36
62ST2115-CL	1.15	3.77	158	236	1.3	33
62SB3914-CL	0.914	3.00	171	256	1.4	36
62SB3700-CL	0.700	2.30	199	298	1.6	40
62ST3505-CL	0.505	1.66	159	237	1.3	33
62SQ3374-CL	0.374	1.23	158	237	1.3	33
62SQ3286-CL	0.286	0.938	163	243	1.3	33
62SQ3200-CL	0.200	0.656	168	250	1.4	36
62SQ3150-CL	0.150	0.492	168	250	1.4	36
62SQ3100-CL	0.100	0.328	193	288	1.5	38
62SP4775-CL	0.0775	0.254	186	277	1.5	38
62SP4561-CL	0.0561	0.184	198	295	1.6	41
62SP4402-CL	0.0402	0.1320	212	316	1.7	43
62SP4281-CL	0.0281	0.0922	229	341	1.8	46

RESISTANCE CORRECTION FACTOR

Various conductor materials behave differently. Use the graphs below for approximate adjustment of power and resistance as a function of temperature. For detailed design, use TraceCalc Pro design software or contact Pentair Industrial Heat Tracing Solutions.



316L STAINLESS STEEL QUICK REFERENCE GUIDE

		Nominal chemical composition, % (major elements)				Thermal conductivity Btu-in/ft²-hr-°F (W/m-C)	High temperature resistance +1000°F (+540°C)		Corrosion resistance G-E = Good to excellent G = Good NR = Not recommended A = Acceptable X = Check for specific data										
Alloy	**Description**	**Nickel (+Cobalt)**	**Iron**	**Chromium**	**Other**	**70°F (20°C)**	**Oxidation**	**Carburization**	**Sulfuric acid**	**Hydrochloric acid**	**Hydrofluoric acid**	**Phosphoric acid**	**Nitric acid**	**Organic acid**	**Alkalis**	**Salts**	**Seawater**	**Chloride cracking**
316L	Molybdenum-bearing austenitic stainless steel that is more resistant to general corrosion and pitting/crevice corrosion than conventional chromium nickel austenitic stainless steels such as 304.	12	69	16.5	Mo 2.1	101 (14.6)	G-E	NR	A	NR	—	A	G	G	G	G-E	G	A

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 Pentair Industrial Heat Tracing Solutions, 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 Raychem control and monitoring systems meet the ground-fault protection requirement.

WWW.PENTAIRTHERMAL.COM

NORTH AMERICA

Tel: +1.800.545.6258
Fax: +1.800.527.5703
Tel: +1.650.216.1526
Fax: +1.650.474.7711
thermal.info@pentair.com

EUROPE, MIDDLE EAST, AFRICA

Tel: +32.16.213.511
Fax: +32.16.213.603
thermal.info@pentair.com

ASIA PACIFIC

Tel: +86.21.2412.1688
Fax: +86.21.5426.2937
cn.thermal.info@pentair.com

LATIN AMERICA

Tel: +1.713.868.4800
Fax: +1.713.868.2333
thermal.info@pentair.com