

- Optional Overjacket
- Standard Metal Braid

- | | |
|---------|----------|
| LT3-CB | LT23-CB |
| LT5-CB | LT25-CB |
| LT8-CB | LT28-CB |
| LT10-CB | LT210-CB |

- Stranded Plated Copper Conductors

Performance and Rating Data:

- Self-Regulating Conductive
- Bonded Inner Thermoplastic Jacket
- Outer Thermoplastic Elastomer Jacket

Description:

Nelson Type LT self-regulating heater cable is a parallel circuit electric heater strip. An irradiation cross-linked conductive polymer core material is extruded over the multi-stranded, tinplated, 16-gauge copper bus wires. The conductive core material increases or decreases its heat output in response to temperature changes. Two jackets provide extra dielectric strength, moisture resistance, and protection from impact and abrasion damage. The inner thermoplastic jacket is extruded over and bonded to the core material. A thermoplastic elastomer outer jacket is then extruded over the inner jacket. A stranded tinned copper metal braid is supplied on all heaters. An optional overjacket (fluoropolymer or modified polyolefin) can be specified when the heater cable is to be installed in wet or corrosive environments.

Principle of Operation:

The parallel bus wires apply voltage along the entire length of the heater cable. The conductive core provides an infinite number of parallel conductive paths permitting the cable to be cut to any length in the field with no dead or cold zones developing. The heater cable derives its self-regulating characteristic from the inherent properties of the conductive core material. As the core material temperature increases, the number of conductive paths in the core material decrease, automatically decreasing the heat output. As the temperature decreases, the number of conductive paths increase, causing the heat output to increase. This occurs at every point along the length of the cable, adjusting the power output to the varying conditions along the pipe. The self-regulating effect allows the cable to be overlapped without creating hot spots or burnout. As the cable self-regulates its heat output, it provides for the efficient use of electric power, producing heat only when and where it is needed, and also limiting the maximum sheath temperature.

Application:

Nelson's Type LT self-regulating heater cable is ideal for use in maintaining fluid flow under low ambient conditions. Freeze protection and low watt density process temperature systems such as product pipelines, fire protection, process water, dust suppression systems, lube oil, condensate return, hot water and structure anti-icing are typical applications for this product. The base product is supplied with a tinned copper metal braid that may be used in both general applications and in dry, non-corrosive hazardous (classified) areas. It is also used to provide a conductive ground path when cable is installed on non-conductive surfaces, such as plastic or painted pipe.

Options: (Delete -CB and add)

-JT A tinned copper metal braid with a modified polyolefin overjacket is available for use when the heater cable is exposed to aqueous solutions of inorganic chemicals (phosphate, dilute acids, chlorides, bases and carbonites). It is also recommended where mechanical abuse is a problem.

-J A tinned copper metal braid with a fluoropolymer overjacket is available for use when the heater is available for use when the heater cable is exposed to excessive moisture, organic chemicals, solvents, etc. in hazardous (classified) areas and ordinary areas.

D1 Approved for use in Class I, Division 1, Groups B, C, and D, Class II, Division 1, Groups E, F and G, Class III hazardous areas. D1 heating cable requires the use of HASK series connection kits.

Catalog Number	Service Voltage	Maximum Length	Maximum Maintenance Temperature	Maximum Intermittent Exposure	T-Rating*
LT3	120	325	150°F (65°C)	185°F (85°C)	T6
LT23	240	650	150°F (65°C)	185°F (85°C)	T6
LT5	120	270	150°F (65°C)	185°F (85°C)	T6
LT25	240	540	150°F (65°C)	185°F (85°C)	T6
LT8	120	210	150°F (65°C)	185°F (85°C)	T5
LT28	240	420	150°F (65°C)	185°F (85°C)	T5
LT10	120	180	150°F (65°C)	185°F (85°C)	T5
LT210	240	360	150°F (65°C)	185°F (85°C)	T5

*Electrical equipment T-rating codes define the maximum surface temperature that equipment will reach. It is used in hazardous (classified) area applications.

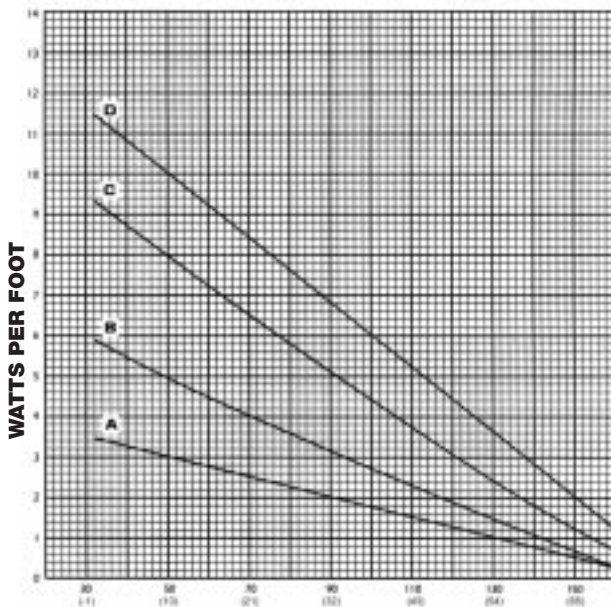
Circuit Breaker Selection :

Watts/ Ft.	Start-Up Temp.	Maximum Length (feet) Vs Circuit Breaker Size							
		120VAC				240VAC			
		15A	20A	30A	40A	15A	20A	30A	40A
3	50°F (10°C)	325				650			
	0°F (-18°C)	230	305	325		460	620	650	
	-20°F (-29°C)	205	275	325		410	550	650	
5	50°F (10°C)	225 270				460 540			
	0°F (-18°C)	155	205	270		310	415	540	
	-20°F (-29°C)	135	180	270		275	370	540	
8	50°F (10°C)	145	195	210		295	390	420	
	0°F (-18°C)	100	130	195	210	200	265	395	420
	-20°F (-29°C)	90	115	175	210	175	235	350	420
10	50°F (10°C)	115	150	180		230	305	360	
	0°F (-18°C)	85	110	155	180	165	220	325	360
	-20°F (-29°C)	75	100	145	180	150	192	290	360

NOTES:

1. Circuit breakers are sized per national electrical codes.
2. When using 240 volt product at 208, 220 or 277 volts, use the circuit adjustment factors shown in the Voltage Adjustment Table.
3. When using 2 or more heater cables of different wattage ratings in parallel on a single circuit breaker, use the 15A column amperage of 15 amps, divide it by the maximum footage to arrive at an amps/foot figure for each cable. You can then calculate circuit breaker sizes for these combination loads. These amps/foot factors include the 125% sizing factor.
4. National electrical codes require ground-fault equipment protection for each branch circuit supplying electric heating equipment. Exceptions to this requirement can be found in the 2002 N.E.C.
5. Heater cables with D1 optional construction require the use of ground fault interrupter/ground leakage device with a trip setting no greater than 30mA.

Power Output Rating:



TEMPERATURE DEGREES F (C)
A LT3 B LT5 C LT8 D LT10
LT23 LT25 LT28 LT210

WATTS PER FOOT x 3.28 = WATTS PER METER
 PIPE TEMPERATURE °F CONVERSION TO °C = 5/9 (°F - 32)

Catalog Numbers:

BASIC CATALOG NUMBERS				
Voltage	Watts Per Foot			
	3	5	8	10
120 VAC	LT3	LT5	LT8	LT10
240 VAC	LT23	LT25	LT28	LT210

Standard Feature Suffix:

-CB Tinned Copper Braid

Optional Features Suffix:

-J Tinned Copper Braid and Fluoropolymer Overjacket
 -JT Tinned Copper Braid and Modified Polyolefin Overjacket
 D1- Division 1 approved

Voltage Adjustment:

Use of Self-Regulating heater products at other than rated voltages require minor adjustments in power and maximum circuit lengths.

ADJUSTMENT MULTIPLIER							
	208 VAC		220 VAC		277 VAC		Absolute
Product	Power	Length	Power	Length	Power	Length	Max Length
LT23	.76	.93	.85	.96	1.27	1.07	650 ft.
LT25	.79	.93	.87	.96	1.24	1.07	540 ft.
LT28	.84	.93	.90	.96	1.19	1.08	420 ft.
LT210	.86	.93	.92	.96	1.16	1.09	360 ft.

Approvals:

FM

Ordinary Locations -
 (-CB, -J or -JT options)
Hazardous (Classified)
Locations
 (-CB, -J or -JT options)
 Class I, Division 2;
 Groups B, C, D
 Class II, Division 2
 Groups G
 Class III, Division 2
 (-J option)
 Class I, Zone 1
 Group IIC
 (D1 option)
 Class I, Division 1
 Groups B, C, D



CSA

Ordinary Locations -
 (-CB, -J or -JT options)
Hazardous (Classified)
Locations
 (-CB, -J or -JT options)
 Class I, Division 2
 Groups B, C, D
 Class II, Division 2
 Groups E, F, G
 Class III, Division 2
 (-J option)
 Class I, Division 1
 Groups B, C, D
 Class II, Division 1
 Groups E, F, G
 Class I, Zone 1
 Group IIB + H2
 Zone 1, Ex e II T6 (T5)



UL

Ordinary Locations -
 (-CB, -J or -JT options)
Hazardous (Classified)
Locations
 (-CB, -J or -JT options)
 Class I, Division 2;
 Groups A, B, C, D
 Class II, Division 2
 Groups F, G
 Class III, Division 2
 (-J option)
 Class I, Zone 1 and 2
 Group IIC
 (D1 option)
 Class I, Division 1
 Groups B, C, D
 Class II, Division 1
 Groups E, F, G
 Class III

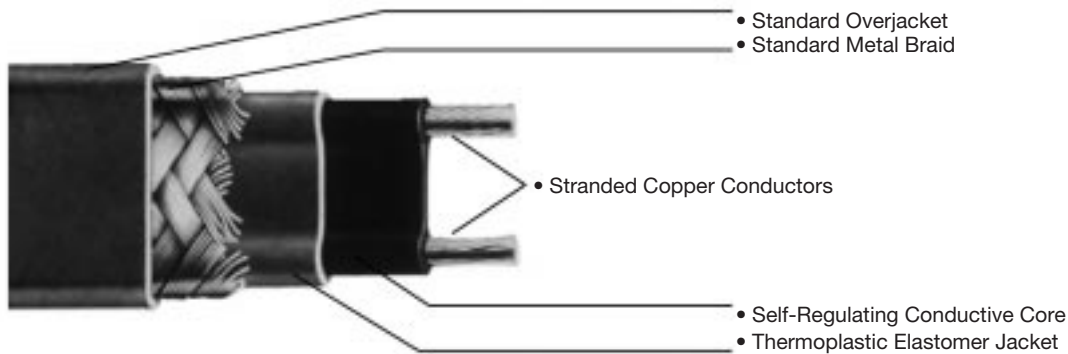


Accessories:

- Connection Kits for Power Connection, Tee Splice, Splices and End Seals (Nelson PLT and ALT Series)
- Thermostatic Controls (Nelson TA, TH, TE and HC Series)
- Junction Boxes, Tapes and Warning Signs
- Custom Control, Monitoring and Power Panels
- Division 1 Connection Kits for Power Connection, Tee Splice, Splice and End Connection (Nelson HASK Series)
- Zone 1 Connection Kits for Power Connection, Tee Splice, Splice and End Connection (Nelson Z1-PLT and Z1-ALT Series)

Nelson Heat Tracing Systems products are supplied with a limited warranty. Complete Terms and Conditions may be found on Nelson's website at

TYPE CLT



Description:

Nelson Type CLT self-regulating heater cable is a parallel circuit electric heater strip. An irradiation cross-linked conductive polymer core material is extruded over the multi-stranded, tin-plated, 18-gauge copper bus wires. The conductive core material increases or decreases its heat output in response to temperature changes. A thermoplastic elastomer dielectric jacket is then extruded over the conductive core. A copper braid is installed over this jacket providing a continuous ground path. A UV stabilized thermoplastic elastomer overjacket is provided to cover the braid for wet applications and exposure to the sun.

Nelson Type CLT self-regulating heater cable is a parallel circuit electric heater strip. An irradiation cross-linked conductive polymer core material is extruded over the multi-stranded, tin-plated, 18-gauge copper bus wires. The conductive core material increases or decreases its heat output in response to temperature changes. A thermoplastic elastomer dielectric jacket is then extruded over the conductive core. A copper braid is installed over this jacket providing a continuous ground path. A UV stabilized thermoplastic elastomer overjacket is provided to cover the braid for wet applications and exposure to the sun.

Principle of Operation:

The parallel bus wires apply voltage along the entire length of the heater cable. The conductive core provides an infinite number of parallel conductive paths permitting the cable to be cut to any length in the field with no dead or cold zones developing. The heater cable derives its self-regulating characteristic from the inherent properties of the conductive core material. As the core material temperature increases, the number of conductive paths in the core material decreases, automatically decreasing the heat output. As the temperature decreases, the number of conductive paths increases, causing the heat output to increase. This occurs at every point along the length of the cable, adjusting the power output to the varying conditions along the pipe. The self-regulating effect allows the cable to be overlapped without creating hot spots or burnout. As the cable self-regulates its heat output, it provides for the efficient use of electric power, producing heat only when and where it is needed, and also limiting the maximum surface temperature.

Application:

Nelson's Type CLT self-regulating heater cable is ideal for use in maintaining fluid flow under low ambient conditions. Freeze protection and low watt density process temperature systems such as pipelines, fire protection, process water, dust suppression systems, hot water and structure anti-icing are typical applications for this product. For other than metal pipe heating, see appropriate application guide. The base product is supplied with a copper metal braid with a thermoplastic elastomer overjacket for wet applications, exposure to the sun, and where mechanical abuse is a problem.

Piping Freeze Protection - TYPE CLT

Cable Selection @ 0°F Minimum Ambient Temperature

Application Design Conditions	
Maintain Temperature	40°F
Insulation Type	Fiberglass
Wind Speed	20 MPH
Safety Factor	10%
Heater Attachment	GT-6 Fiberglass Tape

The information in the tables below represents the wattage of cable necessary to meet the Design Conditions. CLT3 = 3, CLT5 = 5, CLT8 = 8. If a single pass of cable does not satisfy the heat loss requirement, then multiple passes are shown.
Example : 5(2) (two passes of 5 watt product).

Metallic Pipe Applications* include Carbon Steel, Stainless Steel and Copper pipe.

Non-Metallic Pipe Applications* include FRP, PVC CPVC, HDPE, ABS and Polypropylene

Metallic Pipe Applications*										
208 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	3	5	5	5	8	8	8	8(2)	8(2)
1.0"	3	3	3	3	5	5	5	5	8	8
1.5"	3	3	3	3	3	3	5	5	5	8
2.0"	3	3	3	3	3	3	3	5	5	5
120/240 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	3	3	5	5	5	8	8	5(2)	8(2)
1.0"	3	3	3	3	3	3	5	5	8	8
1.5"	3	3	3	3	3	3	3	3	5	5
2.0"	3	3	3	3	3	3	3	3	5	5
277 VAC @										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	3	3	3	3	5	5	8	5(2)	8(2)
1.0"	3	3	3	3	3	3	3	3	5	5
1.5"	3	3	3	3	3	3	3	3	3	5
2.0"	3	3	3	3	3	3	3	3	3	3

Non-Metallic Pipe Applications*

208 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	5	5	8	8	5(2)	8(2)	8(2)		
1.0"	3	3	5	5	5	8	8	8	8(2)	8(2)
1.5"	3	3	3	5	5	5	5	8	8	8(2)
2.0"	3	3	3	3	5	5	5	5	8	8(2)
120/240 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	5	5	8	8	8	5(2)	8(2)		
1.0"	3	3	3	5	5	5	8	8	5(2)	8(2)
1.5"	3	3	3	3	3	5	5	5	8	5(2)
2.0"	3	3	3	3	3	3	3	5	8	8
277 VAC @										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	3	3	5	8	8	5(2)	5(2)	8(2)	
1.0"	3	3	3	3	3	5	5	8	5(2)	5(2)
1.5"	3	3	3	3	3	3	3	5	8	8
2.0"	3	3	3	3	3	3	3	3	5	8

Piping Freeze Protection - TYPE CLT

Cable Selection @ -20°F Minimum Ambient Temperature

Application Design Conditions	
Maintain Temperature	40°F
Wind Speed	20 MPH
Heater Attachment	GT-6 Fiberglass Tape

Metallic Pipe Applications* include Carbon Steel, Stainless Steel and Copper pipe.

Non-Metallic Pipe Applications* include FRP PVC, CPVC, HDPE, ABS and Polypropylene.

The information in the tables below represents the wattage of cable necessary to meet the Design Conditions. CLT3 = 3, CLT5 = 5, CLT8 = 8. If a single pass of cable does not satisfy the heat loss requirement, then multiple passes are shown.

Example : 5(2) (two passes of 5 watt product).

Metallic Pipe Applications*

208 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	5	5	8	8	8				
1.0"	3	3	5	5	5	5	8	8	5(2)	8(2)
1.5"	3	3	3	5	5	5	5	8	8	5(2)
2.0"	3	3	3	3	3	5	5	5	8	8
120/240 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	5	5	5	8	8				
1.0"	3	3	3	3	5	5	5	8	8	5(2)
1.5"	3	3	3	3	3	3	5	5	8	8
2.0"	3	3	3	3	3	3	3	5	5	8
277 VAC @										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	3	3	5	5	8	8	5(2)	8(2)	
1.0"	3	3	3	3	3	3	5	5	8	5(2)
1.5"	3	3	3	3	3	3	3	5	5	8
2.0"			3	3	3	3	3	3	5	5

Non-Metallic Pipe Applications*

208 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	8	8	8	5(2)	8(2)	8(2)				
1.0"	5	5	5	8	8	8	5(2)	8(2)		
1.5"	3	5	5	5	8	8	8	5(2)	8(2)	8(2)
2.0"	3	3	5	5	5	5	8	8	5(2)	8(2)
120/240 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	5	8	5(2)	5(2)	8(2)	8(2)			
1.0"	3	5	5	5	8	8	8	5(2)	8(2)	
1.5"	3	3	3	5	5	5	8	8	5(2)	8(2)
2.0"	3	3	3	3	5	5	5	8	8	5(2)
277 VAC @										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	5	5	8	5(2)	5(2)	8(2)	8(2)		
1.0"	3	3	3	5	5	8	8	5(2)	8(2)	
1.5"	3	3	3	3	5	5	5	8	5(2)	8(2)
2.0"	3	3	3	3	3	3	5	5	8	5(2)

Piping Freeze Protection - TYPE CLT

Cable Selection @ - 40°F Minimum Ambient Temperature

Application Design Conditions	
Maintain Temperature	40°F
Insulation Type	Fiberglass
Wind Speed	20 MPH
Safety Factor	10%
Heater Attachment	GT-6 Fiberglass Tape

Metallic Pipe Applications* include Carbon Steel, Stainless Steel and Copper pipe.

Non-Metallic Pipe Applications* include FRP PVC, CPVC, HDPE, ABS and Polypropylene.

The information in the tables below represents the wattage of cable necessary to meet the Design Conditions. CLT3 = 3, CLT5 = 5, CLT8 = 8. If a single pass of cable does not satisfy the heat loss requirement, then multiple passes are shown.

Example : 5(2) (two passes of 5 watt product).

Metallic Pipe Applications*

208 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	8	8	8	5(2)	8(2)	8(2)			
1.0"	5	5	5	5	8	8	8	5(2)	8(2)	8(2)
1.5"	3	3	5	5	5	5	8	8	5(2)	8(2)
2.0"	3	3	3	5	5	5	5	8	8	5(2)

120/240 VAC										
Insulation Thickness	Pipe Size (in inches)									
	.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	5	5	8	8	5(2)	8(2)	8(2)		
1.0"	3	3	3	5	5	8	8	8	8(2)	8(2)
1.5"	3	3	3	3	5	5	5	8	8	5(2)
2.0"	3	3	3	3	3	5	5	5	8	8

277 VAC @										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	3	5	5	8	8	5(2)	5(2)	8(2)		
1.0"	3	3	3	3	5	5	5	8	5(2)	8(2)
1.5"	3	3	3	3	3	3	5	5	8	5(2)
2.0"			3	3	3	3	3	5	5	8

Non-Metallic Pipe Applications*

208 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	8	8	8	5(2)	8(2)	8(2)			
1.0"	5	8	8	8	8	5(2)	8(2)			

120/240 VAC										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	8	8	8	8(2)	8(2)	8(2)				
1.0"	5	5	5	8	8	5(2)	5(2)	8(2)		
1.5"	3	5	5	5	8	8	8	5(2)	8(2)	
2.0"	3	3	5	5	5	8	8	8	5(2)	8(2)

277 VAC @										
Insulation Thickness	Pipe Size (in inches)									
	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
0.5"	5	8	8	5(2)	8(2)	8(2)				
1.0"	3	3	5	8	8	5(2)	5(2)	8(2)		
1.5"	3	3	3	5	5	8	8	5(2)	8(2)	8(2)
2.0"	3	3	3	3	5	5	5	8	5(2)	8(2)

Piping Freeze Protection - TYPE CLT

Performance and Rating Data :

Catalog No.	CLT3	CLT5	CLT8	CLT23	CLT25	CLT28
Voltage (VAC)	120	120	120	240	240	240
Power Output @ 40°F (W/ft.)	3.2	5.4	8.6	3.2	5.4	8.6
Maximum Segment Length (ft.)	221	178	1142	533	458	347
Minimum Installation Temp (°F)	-35°F	-35°F	-35°F	-35°F	-35°F	-35°F
Current Load (amp/foot):						
At 0°F Start-up	.072	.100	.143	.036	.050	.071
At -20°F Start-up	.080	.111	.158	.040	.056	.079
At -40°F Start-up	.088	.122	.174	.044	.061	.087

Note : Amp/Foot values include 20% breaker derating per National Electrical Code.

Circuit Breaker Selection :

Watts/Ft.	Start-Up Temp.	Maximum Length (feet) Vs Circuit Breaker Size						
		120VAC			240VAC			
		15A	20A	30A	15A	20A	30A	40A
3	40°F	268	358	537	537	716	1074	1432
	0°F	208	277	416	416	555	832	1110
	-20°F	187	249	374	374	499	748	998
	-40°F	170	226	340	340	453	679	906
5	40°F	192	256	384	384	511	767	1023
	0°F	150	199	299	299	399	598	798
	-20°F	135	180	269	269	359	539	718
	-40°F	123	163	245	245	327	490	654
8	40°F	134	179	269	269	358	537	716
	0°F	105	140	210	210	280	421	561
	-20°F	95	127	190	190	253	380	506
	-40°F	86	115	173	173	231	346	461

Notes:

- Maximum segment length is the maximum continuous heater run with minimal voltage drop. For breaker loading, multiple heater segments can be installed in parallel providing no individual length is longer than the maximum published segment length. For voltages other than 240VAC, multiply the amps/foot value in the table above by the power adjustment value below, then divide full breaker amperage rating by the adjusted value to determine maximum total footage allowed.
- Circuit breakers are sized per Article 427-4 of the 1999 National Electrical Code.
- Article 427-22 of the National Electrical Code requires ground-fault equipment protection for each branch circuit supplying electric heating equipment. Electrical connections should be made by a licensed electrician.
- Cable Selection Tables are designed for product selection over a wide range of piping materials. For specific applications utilizing heat transfer aids, such as AT-50 aluminum foil tape, consult your Nelson products representative.

Voltage Adjustment:

Use of Type CLT products at other than nominal voltages requires minor adjustments in power and maximum segment lengths.

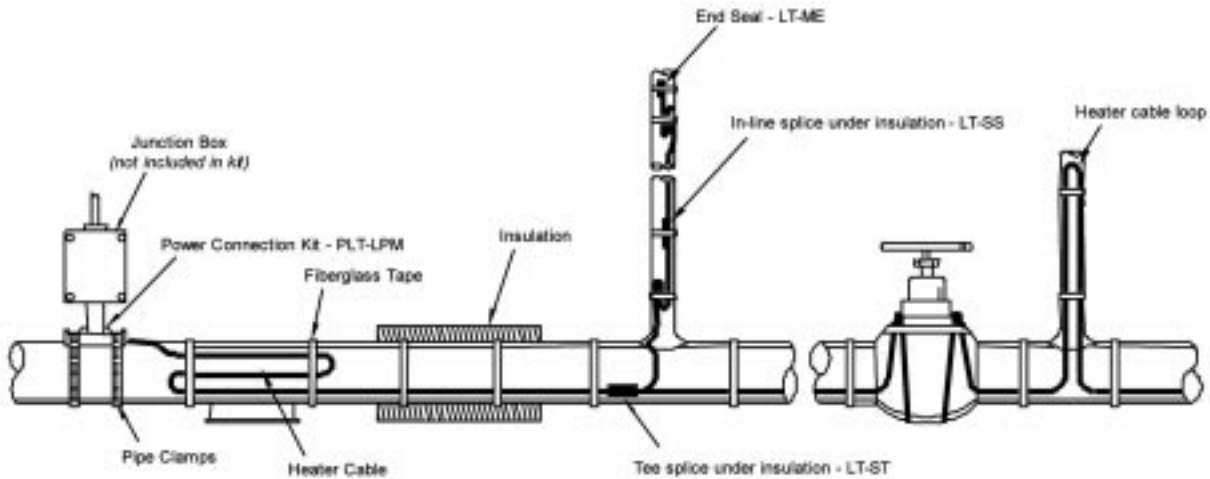
Product	Adjustment Multiplier			
	208VAC		277 VAC	
	Power	Length	Power	Length
CLT23	.71	1.04	1.34	98
CLT25	.80	1.01	1.22	1.02
CLT28	.87	1.00	1.12	1.03

Catalog Numbers:

Overjacketed			
Voltage	3	5	8
120VAC	CLT3-JT	CLT5-JT	CLT8-JT
240VAC	CLT23-JT	CLT25-JT	CLT28-JT

Piping Freeze Protection - TYPE CLT

Additional Footage of Heater for Various Heat sinks						
Pipe Size	Standard Flange	Blind Flange	Pipe Support	Screwed Welded Valve	Flanged Valve	Butterfly Valve
0.50	.3	.5	1.0	1.0	1.0	1.0
0.75	.3	.5	1.5	1.0	1.5	1.0
1.00	.3	.5	1.5	1.0	2.0	1.0
1.50	.3	.5	1.5	1.5	2.5	1.5
2.00	.3	.5	2.0	2.0	2.5	2.0
3.00	.5	.75	2.0	2.5	3.0	2.5
4.00	.5	.75	2.5	3.0	4.0	3.0
6.00	.75	1.0	2.5	3.5	5.0	3.5
8.00	.75	1.0	2.5	4.0	7.0	4.0



Note: Heater cable power connections and end seals are included in Power Connection Kit (PLT-LPM). Additional heater cable end seals, tees and thermostats are used as needed.

Components and Accessories

Catalog No	Units	Description
PLT-LPM	Ea.	Power Connection Kit with Cable Seals
LT-SS	5 Ea.	Splice Kit - Heat Shrink
LT-ST	5 Ea.	Tee Splice Kit - Heat Shrink
LT-ME	5 Ea.	End Termination Cable Seals
PC03	Ea.	Pipe Clamp, .50-3.00" Pipe
PC12	Ea.	Pipe Clamp, 3.50-12.00" Pipe
GT-6	Ea.	Glass Fiber Tape, 60 Feet/Roll
AT-50	Ea.	Aluminum Foil Tape, 50 Yards/Roll
WS-100	Ea.	Warning Sign
JB-552	Ea.	Junction Box, 5" x 5" x 2", NEMA 4X
TF4X40	Ea.	Thermostat, 40°F Fixed Setpoint, NEMA 4X Enclosure
TH4X325	Ea.	Thermostat, 25-325°F, NEMA 4X Enclosure
TA4X140	Ea.	Ambient Thermostat, 15-140°F, NEMA 4X Enclosure

Roof and Gutter Deicer - TYPE CLT

Total Cable Requirements:

The total cable length for deicing is determined by including all elements of the roof system that need protection. Use the following tables to determine the total length of cable required.

Item	Feet of cable/ Ft. Item	Comments
Gutter	1'	1 Trace/6" gutter width
Downspout	2'	Unless downspout is on end of circuit, the cable is looped down and back
Roof Valley	6'	Per Valley
Dormer	1'	1 t. cable/foot of dormer perimeter

Cable Footage Required for Roof Overhangs (Feet of Cable per Fot of Roof)			
Eave Overhang	Feet of cable Loop Height	Shingle Roof	Metal Roof
12"	18"	1'-10"	2'-6"
24"	30"	2'-8"	3'-6"
36"	42"	3'-8"	4'-6"
48"	54"	4'-8"	5'-6"

Performance and Rating Data:

Catalog No.	CLT5-JT	CLT25-JT		
Voltage (VAC)	120	208	240	277
Power Output in Ice (W/ft.)	9.2	8.1	9.2	10.2
Maximum Segment Length (ft.)	141	370	377	381
Minimum Installation Temp (°F)	-35°F	-35°F	-35°F	-35°F
Current Load (amp/foot):				
At 20°F Start-up	.125	.055	.063	.071
At 0°F Start-up	.140	.062	.070	.078
At -20°F Start-up	.156	.069	.078	.087
At -40°F Start-up	.171	.076	.086	.095

Note : Amp/Foot values include 20% breaker derating per National Electrical Code.

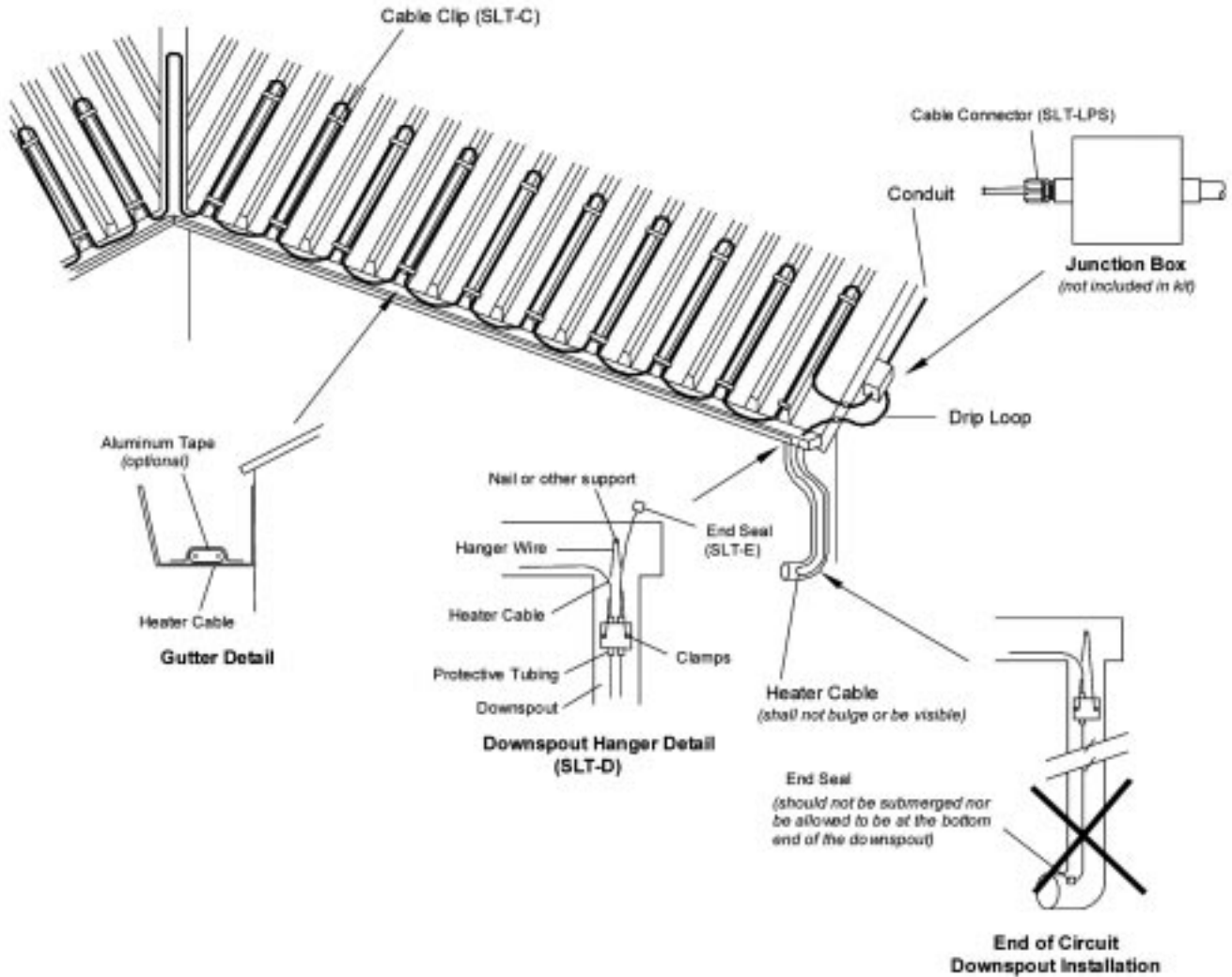
Circuit Breaker Selection:

Start-Up Temp.	Maximum Length (feet) Vs Circuit Breaker Size							
	CLT5-JT@120VAC			CLT25-JT@240VAC				
	15A	20A	30A	15A	20A	30A	40A	
20°F	120	160	240	240	320	480	640	
0°F	107	142	2214	214	286	429	571	
-20°F	96	128	192	194	258	387	516	
-40°F	88	117	175	174	232	348	464	

Notes:

1. Maximum segment length is the maximum continuous heater run with minimal voltage drop. For breaker loading, multiple heater segments can be installed in parallel providing no individual length is longer than the maximum published segment length. For voltages other than 240VAC, divide full breaker amperage rating by amps/foot @ start-up temperature to determine maximum total footage allowed.
2. Circuit breakers are sized per Article 426-4 of the 1999 National Electrical Code.
3. Article 426-28 of the National Electrical Code requires ground-fault equipment protection for fixed outdoor electrical deicing equipment. Electrical connections should be made by a licensed electrician.

Roof and Gutter Deicer - TYPE CLT



Components and Accessories

Catalog No	Units	Description
SLT-LPS	Ea.	Power Connection Kit with Cable Seals
SLT-RC	25 Ea.	Roof Clips
SLT-C	25 Ea.	Roof Clips (Universal)
SLT-D	5 Ea.	Downspout Hangers
SLT-S	5 Ea.	Splice Kit - Heat Shrink
SLT-E	5 Ea.	End Termination Cable Seals - Heat Shrink
AT-50	Ea.	Aluminum Foil Tape, 50 Yards/Roll
TF4X40	Ea.	Thermostat, 40°F Fixed Setpoint, NEMA 4X Enclosure
TA4X140	Ea.	Ambient Thermostat, 15-140°F, NEMA 4X Enclosure

Approvals:

UL
Ordinary Location:

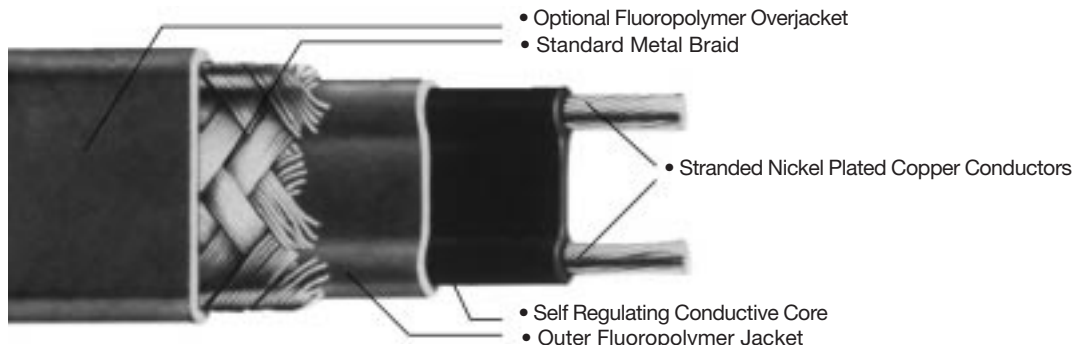


CSA
Ordinary Locations-



Type HLT Self-Regulating Heater Cable

Performance and Rating Data



- HLT3-CB
- HLT5-CB
- HLT8-CB
- HLT10-CB
- HLT12-CB
- HLT15-CB
- HLT18-CB
- HLT20-CB
- HLT23-CB
- HLT25-CB
- HLT28-CB
- HLT210-CB
- HLT212-CB
- HLT215-CB
- HLT218-CB
- HLT220-CB

Description:

Nelson's Type HLT self-regulating heater cable is a parallel circuit electric heater strip. A conductive fluoropolymer core material is extruded over the multistranded, nickel-plated, 16-gauge copper bus wires. A fluoropolymer jacket provides excellent dielectric strength, moisture resistance, protection from impact and abrasion damage, and a wide range of chemical resistance. A stranded tinned copper metal braid is supplied on all heaters.

An optional fluoropolymer overjacket can be specified when the heater cable is to be installed in wet or corrosive environments.

Operating Principle:

The parallel bus wires apply voltage along the entire length of the heater cable. The conductive core provides a continuous parallel heating element permitting the cable to be cut to any length in the field with no dead or cold zones developing. The heater cable derives its self-regulating characteristic from the inherent properties of the conductive core material. As the core material temperature increases, the number of conductive paths in the core material decreases, automatically decreasing the heat output. As the temperature decreases, the number of conductive paths increases, causing the heat output to increase. This occurs at every point along the length of the cable, adjusting the power output to the varying conditions along the pipe.

The self-regulating effect allows the cable to be overlapped without creating hot spots or burnout. As the cable selfregulates its heat output, it limits the maximum sheath temperature, while also providing useful power for process temperature maintenance

Application :

Nelson's Type HLT self-regulating heater cable is ideal for maintaining fluid flow over a wide range of operating temperatures. The product is used for freeze protection of periodically steam (200 psig) cleaned pipes and temperature maintenance for 250°F (121°C) or lower processes. Typical applications include hydrocarbon and chemical product piping. The base product is supplied with a tinned copper metal braid that may be used in both general applications and in dry, non-corrosive hazardous (classified) areas. It is also used to provide a conductive ground path when cable is installed on non-conductive surfaces, such as plastic or painted pipe.

Options: (Delete -CB and add)

J A tinned copper metal braid with a fluoropolymer overjacket is available for use when the heater cable is exposed to excessive moisture, organic chemicals, solvents, etc. in hazardous (classified) areas and ordinary areas.

D1- Approved for use in Class I, Division 1, Groups B, C and D hazardous areas. Standard construction utilizes a tinned copper metal braid with a fluoropolymer overjacket. D1- heating cable requires the use of HASK series connection kits and Ground Fault Protection Devices must be used on each heater circuit. All Division 1 designs must be reviewed by Nelson before being installed.

Catalog Number	Service Voltage	Maximum Length	Maximum Maintenance Temperature	Maximum Intermittent Exposure	T-Rating*
HLT3	120	395	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT23	240	785	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT5	120	310	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT25	240	620	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT8	120	225	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT28	240	460	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT10	120	190	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT210	240	375	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT12	120	170	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT212	240	335	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT15	120	135	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT215	240	270	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT18	120	125	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT218	240	245	250°F (121°C)	375°F (191°C)	T3 (T3)
HLT20	120	105	250°F (121°C)	375°F (191°C)	T3 (T2D)
HLT220	240	210	250°F (121°C)	375°F (191°C)	T3 (T2D)

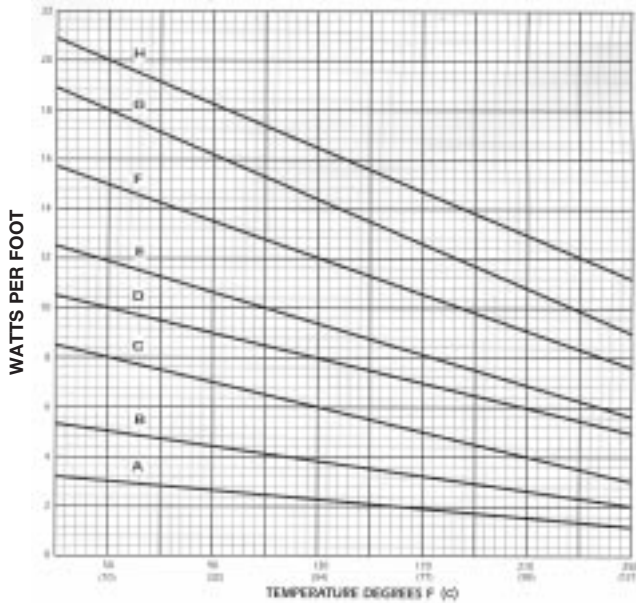
* Electrical equipment T-rating codes define the maximum surface temperature that equipment will reach. It is used in hazardous (classified) area applications. Parenthesized T-ratings are determined at a 20% over voltage required for Class I, Division 1 applications.

Watts/Ft.	Max. Length (Feet) Vs. Circuit Breaker Size					
	120 Volt			240 Volt		
	15A	20A	30A	15A	20A	30A
3	295	395		585	785	
5	185	245	310	385	500	620
8	145	195	225	290	390	460
10	115	150	190	225	300	375
12	98	130	170	195	260	335
15	80	110	135	160	215	270
18	70	95	125	140	185	245
20	65	85	105	125	170	210

NOTES:

1. Circuit breakers are sized per national electrical codes and are based on start-up temperatures between -20°F (-29°C) and 50°F (10°C).
2. When using 240 volt product at 208, 220 or 277 volts, use the circuit adjustment factors shown in the Voltage Adjustment Table.
3. When using 2 or more heater cables of different wattage ratings in parallel on a single circuit breaker, use the 15A column amperage of 15 amps, divide it by the maximum footage to arrive at an amps/foot figure for each cable. You can then calculate circuit breaker sizes for these combination loads. These amps/foot factors include the 125% sizing factor.
4. National electrical codes require ground-fault equipment protection for each branch circuit supplying electric heating equipment. Exceptions to this requirement can be found in the 2002 N.E.C.
5. Heater cables with D1 -optional construction require the use of a ground fault interrupter/ground leakage device with a trip setting no greater than 30mA.

Power Output Rating :



Catalog Numbers:

BASIC CATALOG NUMBERS								
Watts Per Foot								
Voltage	3	5	8	10	12	15	18	20
120 VAC	HLT3	HLT5	HLT8	HLT10	HLT12	HLT15	HLT18	HLT20
240 VAC	HLT23	HLT25	HLT28	HLT210	HLT212	HLT215	HLT218	HLT220

Standard Feature Suffix:

- CB Tinned Copper Braid

Optional Features Suffix:

- J Tinned Copper Braid and Fluoropolymer Overjacket
- D1- Class I, Division I, Groups B, C and D approved

A HLT3 B HLT5 C HLT8 D HLT10 E HLT12 F HLT15 G HLT18 H HLT20
 HLT23 HLT25 HLT28 HLT210 HLT212 HLT215 HLT218 HLT220

Voltage Adjustment:

Use of self-regulating products at other than rated voltages require minor adjustments in power and maximum circuit lengths.

ADJUSTMENT MULTIPLIER							
208 VAC		220 VAC		277 VAC		Absolute	
Product	Power	Length	Power	Length	Power	Length	Max. Length
HLT23	.74	.93	.84	.96	1.30	1.07	785 ft.
HLT25	.76	.93	.85	.96	1.29	1.07	620 ft.
HLT28	.78	.93	.86	.96	1.25	1.07	460 ft.
HLT210	.80	.93	.88	.96	1.23	1.07	375 ft.
HLT212	.81	.93	.88	.96	1.21	1.07	335 ft.
HLT215	.83	.93	.89	.96	1.19	1.02	270 ft.
HLT218	.85	1.01	.91	1.00	1.18	1.00	245 ft.
HLT220	.88	1.00	.93	1.00	1.15	1.00	210 ft.

Approvals:

FM

Ordinary Locations -
 (-CB, -J or -JT options)
Hazardous (Classified) Locations
 (-CB, -J or -JT options)
 Class I, Division 2;
 Groups B, C, D
 Class II and III, Division 2
 Groups G
 Class III, Division 2
 (-J option)
 Class I, Zone 1
 Group IIC
 (D1 option)
 Class I, Division 1
 Groups B, C, D
 Class I, Zone 1
 Group IIB



CSA

Ordinary Locations -
 (-CBor -J options)
Hazardous (Classified) Locations
 (-CB or J options)
 Class I, Division 2
 Groups B, C, D
 Class II, Division 2
 Groups E, F, G
 Class III, Division 2
 (-J option)
 Class 1, Division 1
 Groups B, C, D
 Class II, Division 1
 Groups E, F, G
 Class I, Zone 1
 Group IIB + H2
 Zone 1, Ex e II T6 (T5)



UL

Ordinary Locations -
 (-CB or -J options)
Hazardous (Classified) Locations
 (-CB or -J options)
 Class I, Division 2;
 Groups A, B, C, D
 Class II, Division 2
 Groups F, G
 Class III, Division 2
 (-J option)
 Class I, Zone 1 and 2
 Group IIC
 (D1 option)
 Class I, Division 1
 Groups B, C, D
 Class II, Division 1
 Groups E, F, G
 Class III

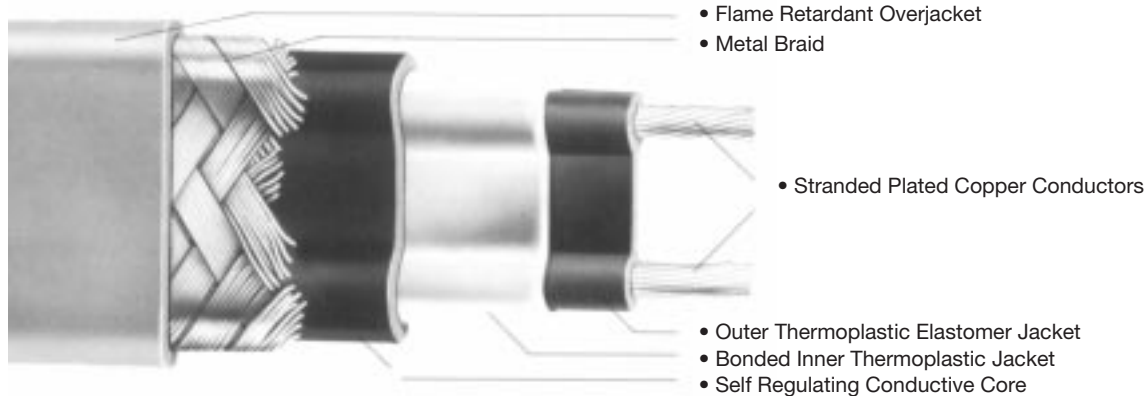


Accessories:

- Connection Kits for Power Connection, Tee Splice, Splices and End Seals (Nelson PLT and ALT Series)
- Thermostatic Controls (Nelson TA, TH, TE and HC Series)
- Junction Boxes, Tapes and Warning Signs
- Custom Control, Monitoring and Power Panels
- Division 1 Connection Kits for Power Connection, Tee Splice, Splice and End Connection (Nelson HASK Series)
- Zone 1 Connection Kits for Power Connection, Tee Splice, Splice and End Connection (Nelson Z1-PLT & Z1-ALT Series)

Type SLT Roof & Gutter Deicer

SLT-1
SLT-2



Description:

Nelson Type SLT heating cable is a parallel circuit, self-regulating electric heater. An irradiated crosslinked conductive polymer core is extruded over two multi-stranded, tin-plated, 16-gauge copper buswires. The conductive core material increases or decreases its heat output in response thermoplastic elastomer outer jacket is then extruded over the inner jacket for dielectric protection and additional moisture resistance. A tinned copper braid is installed over the second jacket providing a continuous ground path. A flame retardant, UV stabilized polyolefin overjacket is then extruded over the braid. to temperature changes. Three jackets provide extra dielectric strength, moisture resistance, protection from impact or abrasion damage, and flame retardancy. The inner thermoplastic jacket is extruded over and bonded to the core material to prevent moisture penetration and wicking along the core. A waterproof

Application:

Nelson's SLT heating cable provides a solution for ice dams that can build up and damage building roofs, gutters and downspouts. During winter months, snow and ice accumulation on roofs can prevent proper drainage of water when normal melting occurs. Water stands on the roof and can be refrozen during cold nights resulting in expansion and potential roof damage. Nelson's SLT ice melting heaters are designed for installation on roofs and gutters to melt a pathway for the drainage of water. The heating cable's self-regulating feature provides additional benefits as well.

• **Lower Energy Consumption**

The heater automatically reduces its power output as drainage tunnels are formed in the ice and snow.

• **High Temperature Protection**

Because the heater self regulates its power output as a function of temperature, it cannot overheat and melt or damage temperature sensitive roof coatings.

Performance And Rating Data:

The total cable length for deicing is determined by including all elements of the roof system that need protection. Use the following tables to determine the total length of cable required.

Total Cable Requirements:

The total cable length for deicing is determined by including all elements of the roof system that need protection. Use the following tables to determine the total length of cable required.

Item	Feet of Cable/Ft. Item	Comments
Gutter	1'	1 Trace/6" gutter width
Downspout	2'	Unless downspout is on end of circuit, the cable is looped down and back
Roof Valley	6'	Per valley
Dormer	1'	1 ft. of cable/foot of dormer perimeter

Performance And Rating Data:

Catalog No.	SLT	1 SLT 2		
		20L	240	277
Voltage (VAC)	120	20L	240	277
Power Output in Ice (W/ft.)	11.1	9.L	11.1	12.3
Maximum Segment Length (ft.)	13	40L	416	420
Minimum Installation Temp (°F)	-35°F	-35°F	-35°F	-35°F
Minimum Installation Temp (°C)	-37°C	-37°C	-37°C	-37°C
Current Load (A/ft.):				
At 20°F (-7°C) Start-up	.145	.064	.073	.0L1
At 0°F (-1L°C) Start-up	.164	.072	.0L2	.091
At -20°F (-29°C) Start-up	.1L1	.0L0	.091	.101
At -40°F (-40°C) Start-up	.200	.0LL	.100	.111

Maximum Heater Length/Circuit Breaker Size:

Start-Up Temp.	SLT-1 @ 120VAC			SLT-2 @ 240VAC			
	15A	20A	30A	15A	20A	30A	40A
20°F (-7°C)	103	138	207	205	274	411	548
0°F (-1L°C)	91	122	183	183	244	366	488
-20°F (-29°C)	83	110	166	165	220	330	440
-40°F (-40°C)	75	100	150	150	200	300	400

Notes:

1. Maximum segment length is the maximum continuous heater run with minimal voltage drop. For breaker loading, multiple heater segments can be installed in parallel providing no individual length is longer than the maximum published segment length. For voltages other than 240VAC, divide full breaker amperage rating by amps/foot @ start-up temperature to determine maximum total footage allowed.
2. Circuit breakers are sized per national electrical code.
3. National Electrical Codes require ground-fault equipment protection for fixed outdoor electrical deicing equipment. Electrical connections should be made by a licensed electrician.

Cable Footage Required for Roof Overhangs:

(Feet of Cable per Foot of Roof)

Eave Overhang	Feet of Cable		
	Loop Height	Shingle Roof	Metal Roof
12"	18"	1' -10"	2'-6"
24"	30"	2' -8"	3'-6"
36"	42"	3' -8"	4'-6"
48"	54"	4' -8"	5'-6"

COMPONENTS

SLT-LPS Power Connection Kit- includes moisture seals for both ends of the heater cable as well as a watertight entry seal into a junction box (not included in this kit). It is recommended that a NEMA 3R, 4 or 4X box be used and mounted under an eave or other protected area. Each kit will terminate one heater cable.

SLT-ES Entry Seal Kit- provides a watertight entry seal into a junction box (not included in this kit). It is recommended that a NEMA 3R, 4 or 4X box be used and mounted under an eave or other protected area. One entry per kit.

SLT-C Universal Roof Mounting Clips- are used for all types of installations. Clips come 25 to a box; order one box per eight feet of eave or one box for every 100 feet of cable installed on flat roofs.

SLT-D Downspout Hangars are used to support the heater cable where it enters or exits a downspout. Hangars come in kits of 5; one is required for each downspout. If downspout is in the middle of a circuit, the cable is looped down to the bottom of drain and back up, clamping it into downspout hanger to prevent the cable from being pulled tight against drain/gutter edge. Each kit contains 5 hangars.

SLT-S Splice Kit- is used to splice two pieces of cable together. This could occur when additional cable is needed or a damaged spot must be cut out and repaired. Each kit contains 5 splices.

SLT-E End Seal Kit- provides a moisture seal at the end of each heater cable circuit. Each kit contains 5 seals.

SLT-P Power End Seal Kit- provides a moisture seal at the power connection end of the heating cable to prevent electrical arcing if condensation occurs in the connection box. Each kit contains 5 seals.

AT-50 Aluminum Foil Tape- may be used to secure the heater cable to the bottom of the gutter. Each roll of tape will accommodate 46M (150') of gutter. Gutter must be clean for foil tape to adhere properly. As an alternate, the cable may be laid loose in the bottom of the gutter without being secured with foil tape.

Ordering Information:

Catalog No.	Description	U/M
SLT-1	Heater, 120 Volts	Ft.
SLT-2	Heater, 240 Volts	Ft.
SLT-LPS	Connection Kit with End Seals	Ea.
SLT-ES	Power Entry Seal	Ea.
SLT-P	Power End Termination	5/Box
SLT-E	End Seal Kit	5/Box
SLT-S	Splice Kit	5/Box
SLT-C	Installation Cup	25/Box
SLT-D	Downspout Hanger	5/Box

Approvals:

UL
Ordinary Location:



CSA
Ordinary Locations-



Pre-insulated Tubing Bundle



Description:

Nelson pre-insulated tubing bundles consist of single or dual 316 stainless steel process tubes traced with self-regulating heater cable, non-hygroscopic fiberglass insulation and an outer jacket of PVC or Urethane Elastomer. This system is designed to provide temperature maintenance or steam cleaning up to 250°F (121°C) at low ambient temperatures to -40°F (40°C).

Applications:

Impulse lines; flow transmitters, pressure transmitters, level transmitters and pressure switches, Sample lines; analyzers, Process lines; steam supply, condensate return, chemical feed and air lines. Designs are approved for use in Class I, Division 1 and 2, hazardous, classified locations. Designs for Zone 1 hazardous areas are also available

Process Tube O.D.	Nominal Wt. LB/FT (KG/M)	Bundle O.D. IN (CM)	Nominal Dimensions IN (CM)
(1) - .250 IN	0.4 (0.60)	1.25 (3.2)	1.1(2.8) x 1.0(2.5)
(1) - .375 IN	0.5 (0.74)	1.40 (3.6)	1.3(3.3) x 1.0(2.5)
(1) - .500 IN	0.6 (0.89)	1.50 (3.8)	1.4(3.6) x 1.1(2.8)
(2) - .250 IN	0.5 (0.74)	1.50 (3.8)	1.3(3.3) x 1.1(2.8)
(2) - .375 IN	0.7 (1.04)	2.00 (5.1)	1.5(3.8) x 1.2(3.0)
(2) - .500 IN	1.0 (1.49)	2.30 (5.8)	1.7(4.3) x 1.4(3.6)

* For other process tubes or cable, consult factory.

Heater Cable Performance and Ratings:

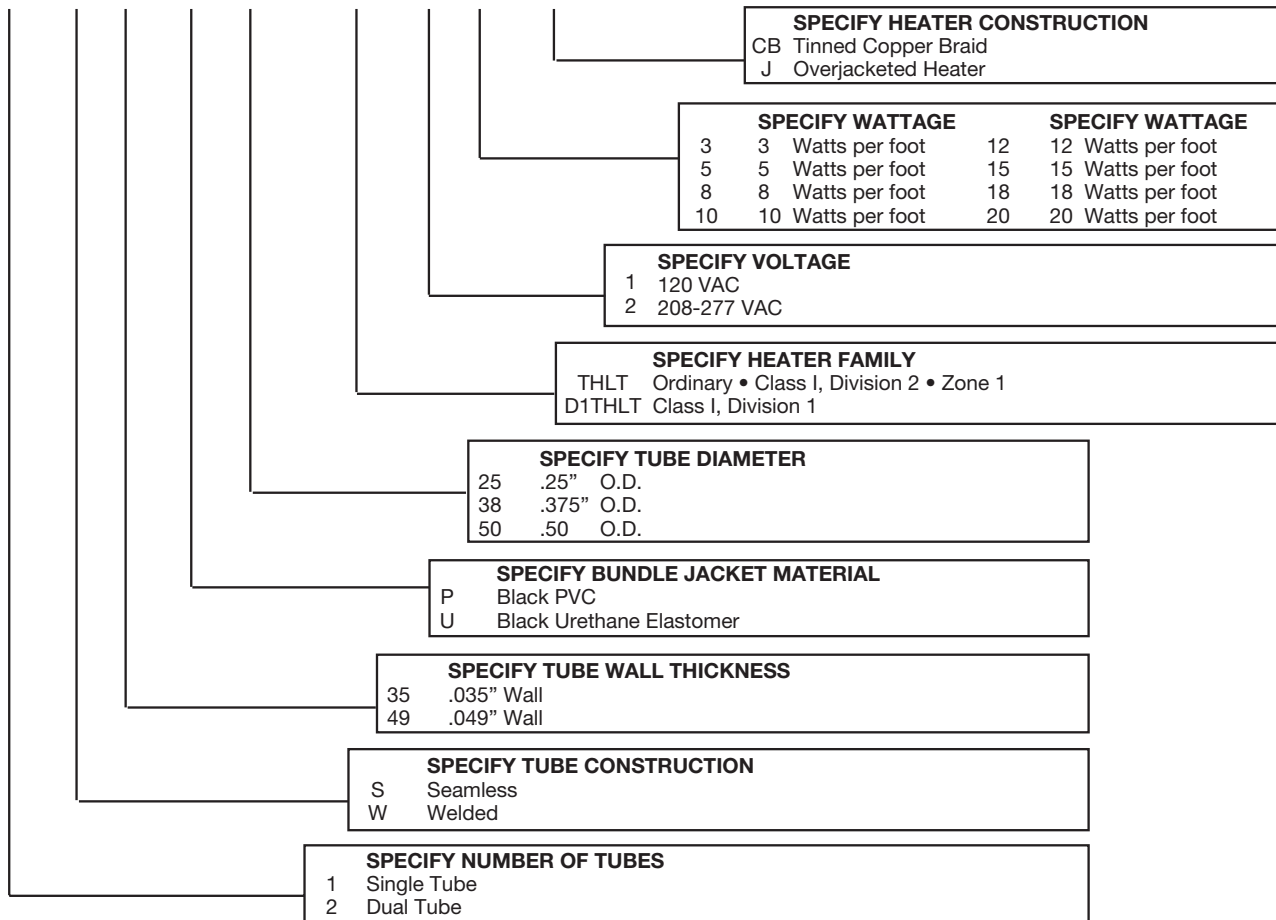
Catalog Number	Service Voltage	Maximum Length	Maximum Maintenance Temperature	Maximum Intermittent Exposure	T-Rating*
HLT3	120	395	250°F	375°F	T3 (T3)
HLT23	208-277	785	250°F	375°F	T3 (T3)
HLT5	120	310	250°F	375°F	T3 (T3)
HLT25	208-277	620	250°F	375°F	T3 (T3)
HLT8	120	225	250°F	375°F	T3 (T3)
HLT28	208-277	460	250°F	375°F	T3 (T3)
HLT10	120	190	250°F	375°F	T3 (T3)
HLT210	208-277	375	250°F	375°F	T3 (T3)
HLT12	120	170	250°F	375°F	T3 (T3)
HLT212	208-277	335	250°F	375°F	T3 (T3)
HLT15	120	135	250°F	375°F	T3 (T3)
HLT215	208-277	270	250°F	375°F	T3 (T3)
HLT18	120	125	250°F	375°F	T3 (T3)
HLT218	208-277	245	250°F	375°F	T3 (T3)
HLT20	120	105	250°F	375°F	T3 (T2D)
HLT220	208-277	210	250°F	375°F	T3 (T2D)

* Electrical equipment T-rating codes define the maximum surface temperature that equipment will reach. It is used in hazardous (classified) area applications. Parenthesized T-ratings are determined at a 20% over voltage required for Class I, Division 1 applications.

1 S 35 P 38 - THLT 1 8 CB

SELECTION TABLE

The selection table below allows for the proper specifying of Electric Trace Tubing



ACCESSORIES

- Division 2 Connection Kits for Power Connection and End Seals (Nelson PLT Series)
- Division 1 Connection Kits for Power Connection and End Connection (Nelson HASK Series)
- Zone 1 Connection Kits for Power Connection and End Connection (Nelson Z1 Series)
- Thermostatic Controls (Nelson TA, TH, TE and HC Series)
- Junction Boxes, End Boots, Entry Seals, Sealants, Patch Kits and Warning Signs
- Custom Control, Monitoring and Power Panels

HEAT TRACING

Self Regulating Trace for Low Temperature Maintenance



Pre-insulated Tubing Bundle



Description:

Nelson pre-insulated tubing bundles consist of single or dual 316 stainless steel process tubes traced with selfregulating heater cable, non-hygroscopic fiberglass insulation and an outer jacket of PVC or Urethane Elastomer. This system is designed to provide freeze protection and temperature maintenance of 40°F (4.4°C) to 150°F (65°C) at low ambient temperatures to -40°F 40°C).

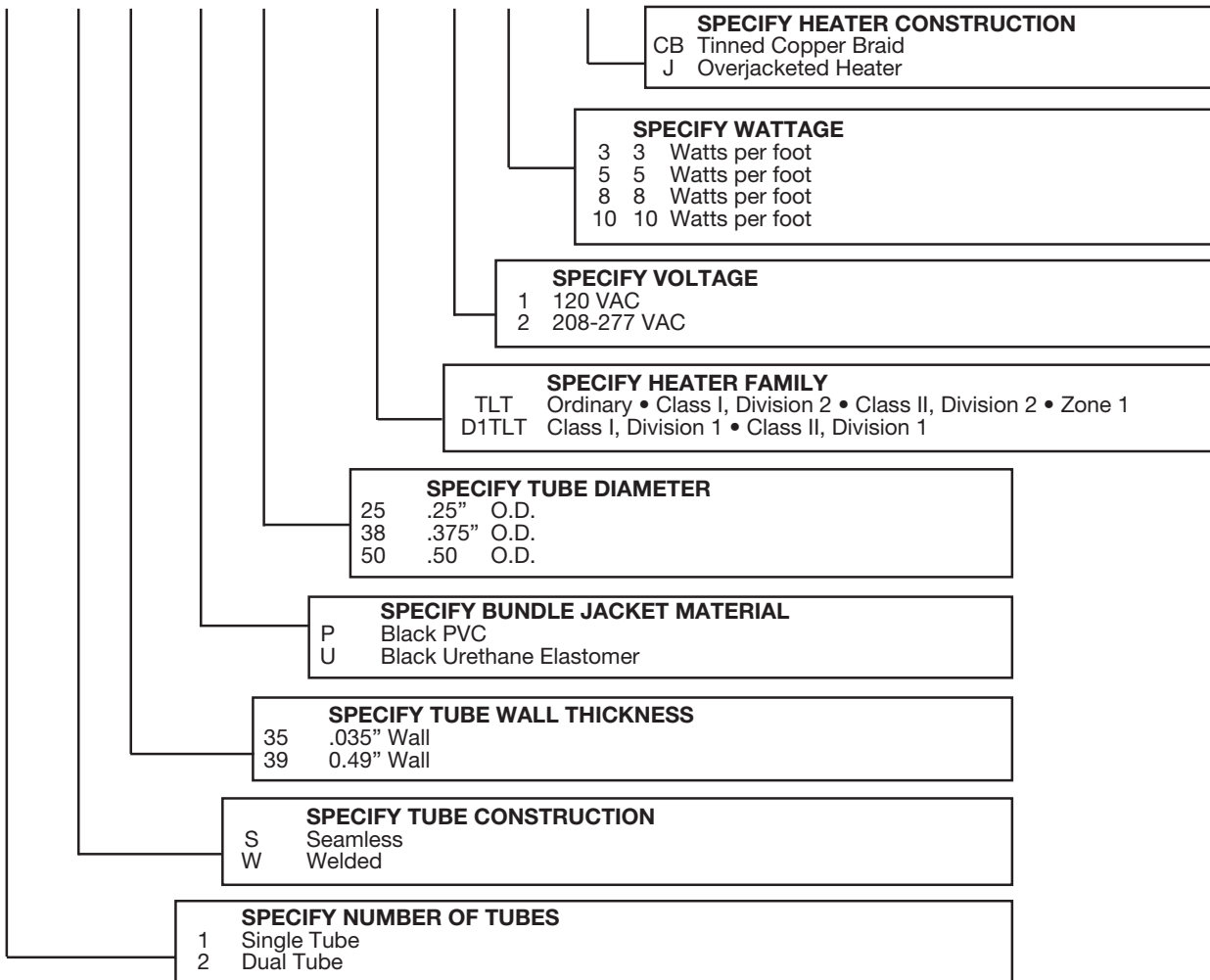
Applications:

Impulse lines; flow transmitters, pressure transmitters, level transmitters and pressure switches, Sample lines; analyzers, Process lines; steam supply, condensate return, chemical feed and air lines. Designs are approved for use in Class I, Division 1 and 2, and Class II, Division 1 and 2, hazardous, classified locations. Designs for Zone 1 hazardous areas are also available.

SELECTION TABLE

The selection table below allows for the proper specifying of Electric Trace Tubing

1 S 35 P 38 - TLT 1 8 CB



Heater Cable Performance and Ratings:

Catalog Number	Service Voltage	Maximum Length	Maximum Maintenance Temperature	Maximum Intermittent Exposure	T-Rating*
LT3	120	325	150°F	185°F	T6
LT23	208-277	650	150°F	185°F	T6
LT5	120	270	150°F	185°F	T6
LT25	208-277	540	150°F	185°F	T6
LT8	120	210	150°F	185°F	T5
LT28	208-277	420	150°F	185°F	T5
LT10	120	180	150°F	185°F	T5
LT210	208-277	360	150°F	185°F	T5

* Electrical equipment T-rating codes define the maximum surface temperature that equipment will reach. It is used in hazardous (classified) area applications.

Tube Bundle Specifications:

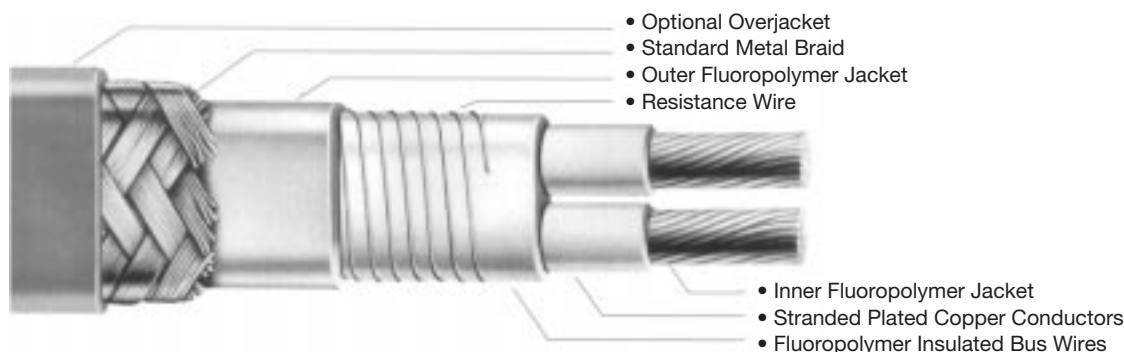
Process Tube O.D.	Nominal Wt. LB/FT (KG/M)	Bundle O.D. IN (CM)
(1) - .250 IN	0.4 (0.60)	1.25 (3.2)
(1) - .375 IN	0.5 (0.74)	1.40 (3.6)
(1) - .500 IN	0.6 (0.89)	1.50 (3.8)
(2) - .250 IN	0.5 (0.74)	1.50 (3.8)
(2) - .375 IN	0.7 (1.04)	2.00 (5.1)
(2) - .500 IN	1.0 (1.49)	2.30 (5.8)

* For other process tubes or cable, consult factory.

ACCESSORIES

- Division 2 Connection Kits for Power Connection and End Seals (Nelson PLT Series)
- Division 1 Connection Kits for Power Connection and End Connection (Nelson HASK Series)
- Zone 1 Connection Kits for Power Connection and End Connection (Nelson Z1 Series)
- Thermostatic Controls (Nelson TA, TH, TE and HC Series)
- Junction Boxes, End Boots, Entry Seals, Sealants, Patch Kits and Warning Signs
- Custom Control, Monitoring and Power Panels





NC4-CB
NC8-CB
NC26-CB
NC210-CB
NC212-CB

Description:

Nelson Type NC constant wattage heater cable is a parallel resistance electric heater strip. A fluoropolymer sheath material is extruded over the two multi-stranded, nickel-plated, 12-gauge copper bus wires. The nichrome heating element is spirally applied around parallel construction and in contact with the bus wires at specific intervals known as zones. A fluoropolymer outer jacket is then extruded over the construction to provide dielectric strength, moisture resistance, and for protection from impact and abrasion damage. A stranded tinned copper metal braid is supplied on all heaters. An optional stainless steel braid is available for mechanical abuse situations. An optional fluoropolymer overjacket can be specified when the heater cable is to be installed in wet or corrosive environments.

Principle of Operation:

The parallel bus wires supply voltage along the entire length of the heater cable. A resistance wire heating element is spirally wrapped around bus wires contacting alternate bus wires at specific intervals forming heating zones. This series of parallel heating zones provides a constant power output for each zone, irrespective of where the cable is cut along the length of the bus wires. Each cable construction has the heating zone resistance sized to provide multiple power ratings when used on different voltages. This variation is accomplished by the use of different spiral wrap spacings and heater zone lengths. There is no change of power output as the temperature changes, giving a steady power output anywhere in its recommended operating range.

Application:

Nelson's Type NC constant wattage heater cable is ideal for use in maintaining fluid flow under low ambient conditions. Freeze protection and process temperature maintenance systems such as product pipelines, fire protection, process water, dust suppression systems, lube oil, condensate return, hot water and structure de-icing are typical applications for this product. The base product is supplied with a tinned copper metal braid that maybe used in both general applications and indry, non-corrosive hazardous (classified) areas. It is also used to provide a conductive ground path when cable is installed on non conductive surfaces, suchas plastic or painted pipe.

Performance and Rating Data:

Catalog Number	Service Voltage	Maximum Watts/Ft.	Maximum Maintenance Length	Maximum Temperature	Exposure	T-Rating
NC4	120	4.0	405	300°F	400°F	T3
	208	12.0	405	150°F	400°F	T3
NC8	120	8.0	285	210°F	400°F	T3
	120	1.5	665	300°F	400°F	T3
NC26	208	4.5	665	285°F	400°F	T3
	220	5.0	665	270°F	400°F	T3
	240	6.0	665	245°F	400°F	T3
	277	8.0	665	210°F	400°F	T3
NC210	120	2.5	515	300°F	400°F	T3
	208	7.5	515	215°F	400°F	T3
	220	8.5	515	200°F	400°F	T3
NC212	240	10.0	515	175°F	400°F	T3
	120	3.0	470	300°F	400°F	T3
	208	9.0	470	190°F	400°F	T3
NC212	220	10.0	470	175°F	400°F	T3
	240	12.0	470	150°F	400°F	T3

NOTES:

1. Circuit breakers are sized per article 427-4 of N.E.C.
2. When using 2 or more heater cables of different wattage ratings in parallel on a single circuit breaker, use the 15A column amperage of 15 amps, divide it by the maximum footage to arrive at an amps/foot figure for each cable. You can then calculate circuit breaker sizes for these combination loads. These amps/foot factors include the N.E.C. sizing factor in Article 427-4.
3. Heater cables with CB optional constructions contain a metal ground shield as required by Article 427-23 of the NEC.
4. Article 427-22 of the NEC requires ground-fault equipment protection for each branch circuit supplying electric heating equipment. Exceptions to this requirement can be found in the 1996 NEC.

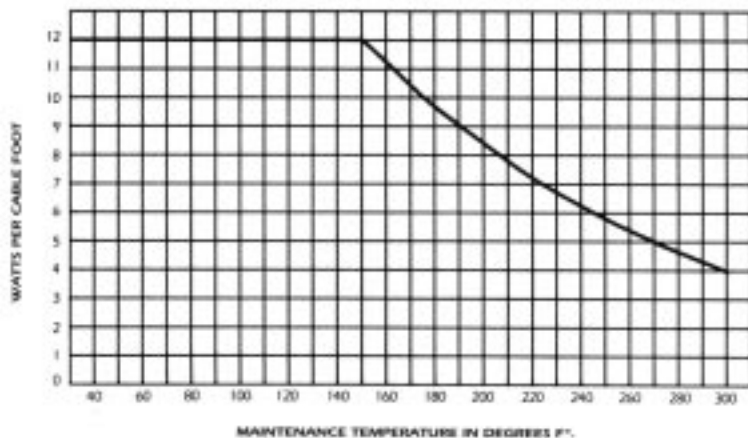
Circuit Breaker Selections:

Catalog Number	Volts	Watts/Ft.	MAXIMUM CIRCUIT LENGTH (FEET) BY CIRCUIT BREAKER SIZE								
			115/120 VAC			208/220 VAC			240/277 VAC		
			15A	20A	30A	15A	20A	30A	15A	20A	30A
NC4	120	4.0	385	405	-	-	-	-	-	-	-
	208	12.0	-	-	-	210	285	405	-	-	-
NC8	120	8.0	185	255	285	-	-	-	-	-	-
	120	1.5	665	-	-	-	-	-	-	-	-
NC26	208	4.5	-	-	-	590	665	-	-	-	-
	220	5.0	-	-	-	555	665	-	-	-	-
	240	6.0	-	-	-	-	-	-	500	665	-
	277	8.0	-	-	-	-	-	-	430	590	665
NC210	120	2.5	515	-	-	-	-	-	-	-	-
	208	7.5	-	-	-	340	470	515	-	-	-
	220	8.5	-	-	-	320	445	515	-	-	-
NC212	240	10.0	-	-	-	-	-	-	295	400	515
	120	3.0	470	-	-	-	-	-	-	-	-
	208	9.0	-	-	-	285	390	470	-	-	-
NC212	220	10.0	-	-	-	265	365	470	-	-	-
	240	12.0	-	-	-	-	-	-	245	330	470

Power Ratings by System Voltages

240/120 VAC			220/115 VAC			208/120 VAC		
W/Ft.	Voltage	Cat. No.	W/Ft.	Voltage	Cat. No.	W/Ft.	Voltage	Cat. No.
12.0	240	NC212	10.0	220	NC212	12.0	208	NC4
10.0	240	NC210	8.5	220	NC210	9.0	208	NC212
8.0	120	NC8	7.3	115	NC8	8.0	120	NC8
6.0	240	NC26	5.0	220	NC26	7.5	208	NC210
4.0	120	NC4	3.7	115	NC4	4.5	208	NC26
3.0	120	NC212	2.7	115	NC212	4.0	120	NC4
2.5	120	NC210	2.3	115	NC210	3.0	120	NC212
1.5	120	NC26	1.4	115	NC26	2.5	120	NC210
						1.5	120	NC26

Maximum Allowable Wattage Based on Maintenance Temperature:



WATTS PER FOOT x 3.28 = WATTS PER METER
 PIPE TEMPERATURE °F CONVERSION TO °C = 5/9(°F-32)

Catalog Numbers:

Voltage	RATED WATTS PER FOOT				
	Basic Catalog Numbers				
	NC4	NC8	NC26	NC210	NC212
120VAC	4.0	8.0	1.5	2.5	3.0
208VAC	12.0	-	4.5	7.5	9.0
220VAC	-	-	5.0	8.5	10.0
240VAC	-	-	6.0	10.0	12.0
277VAC	-	-	8.0	-	-

Standard Feature Suffix:

-CB Tinned Copper Braid

Approvals: FM



Ordinary Locations
 Hazardous /Classified/ Locations (-CB)
 Class I; Division 2; Groups B, C, D
 Class II; Division 2; Groups F, G
 Class III; Division 2

Accessories:

- Connection Kits for Power Connection, Tee Splice, Splices and End Seals (Nelson LT, PLT and ALT Series)
- Thermostatic Controls (Nelson TA, TH, TE and HC Series)
- Junction Boxes, Tapes and Warning Signs
- Custom Control, Monitoring and Power Panels



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.

Nelex 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 0.187" and the "B" cable diameter is 0.312". 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. Nelex 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
- Extended Heater Life
- High Maintain Temperature
- Immunity to Stress Corrosion
- High Power Output
- Snow Melt Systems
- Rugged Cable Construction
- Floor Warming Systems
- Constant Power Output Over Entire Heater Length
- Undertank Heating (Cryogenic Tanks)

Nelex MI Cable is custom designed and fabricated for specific applications.

Nelex 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 temperature over 600°F, and cable wattage above 20 w/ft.
- SV-2** VOLTAGE ADJUSTOR provides solid state voltage adjustment when desired voltage is below 120 volts. It is primarily used when cable length is below 20 feet.

Cable Ratings: Nelex MI Cable

CABLE TYPE	K	K	B
SHEATH MATERIAL	ALLOY 825		
CABLE DIAMETER (INCHES)		0.1875	0.3125
NUMBER OF CONDUCTORS	1	2	2
MAXIMUM VOLTS	600	300	600
MAXIMUM EXPOSURE °F	1100		
MAXIMUM POWER W/FT	62	62	88
WEIGHT LB/FT	.07		
FORMS	E	A,E	A,E
STD COLD LEAD FT	7.0		

Form A



Form E (1 Conductor)



Form E (2 Conductor)



Catalog Ordering System:

Nelex Custom Cables Catalog Number (*) A 670 B 150 07 (*)

(*)	A	670	B	150	07
Optional Construction	Form A or E	Conductor selection from table	Cable diameter K=.1875" B=.3125"	Hot section length in feet	Cold section length in feet

Optional Construction

Prefix	Suffix	Description
P		Pulling Eye for "A" form only
X		Oversized cold section or special feature
	EM	Mounting of hot-cold junction outside thermal insulation (freeze protection of lines over 600°F)
	QT	Factory mounting of QHT-3 Adapter (High wattage and/or maintain temperature)
	UG	UL listing tag**
	UH	UL hazardous area listing tag**
	FH	FM hazardous listing tag**
	CH	CSA Hazardous listing tag**
	CHB	CSA Group B hazardous listing tag**
	UM	UL snow melting listing tag**

** Requires volts, amps and watts with each cable order. Nelex Accessories:

Nelex Custom Cable Resistance Characteristics:

2-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, 300 VOLTS			
Cable Number	Cable Res Ohms/Ft	Maximum Exposure Temperature Rating (F°)	Resistance Curve
556K	.043	600	1
658K	.0581		
674K	.0742		
693K	.0926		
712K	.1170		
715K	.1470		
721K	.213		
732K	.319	1100	N/A
742K	.416		
752K	.520		
766K	.660		
774K	.740		
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		

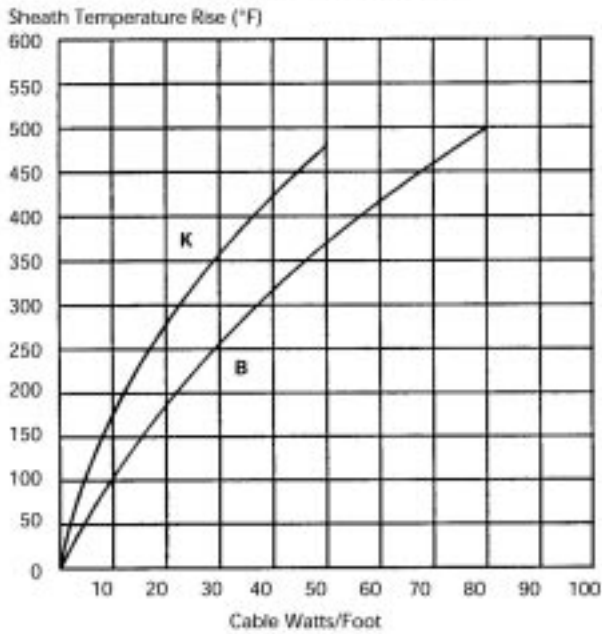
Nelex Custom Cable Resistance Characteristics:

1-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, 600 VOLTS			
Cable Number	Cable Res Ohms/Ft	Maximum Exposure Temperature Rating (F°)	Resistance Curve
145K	.0046	600	1
189K	.0090		1
216K	.0165		2
239K	.039	1100	N/A
250K	.050		
279K	.079		
310K	.095		
316K	.157		
326K	.260		
333K	.330		
346K	.457		
372K	.730		
412K	1.17		
415K	1.48		
423K	2.36		
430K	2.80		
447K	4.50		

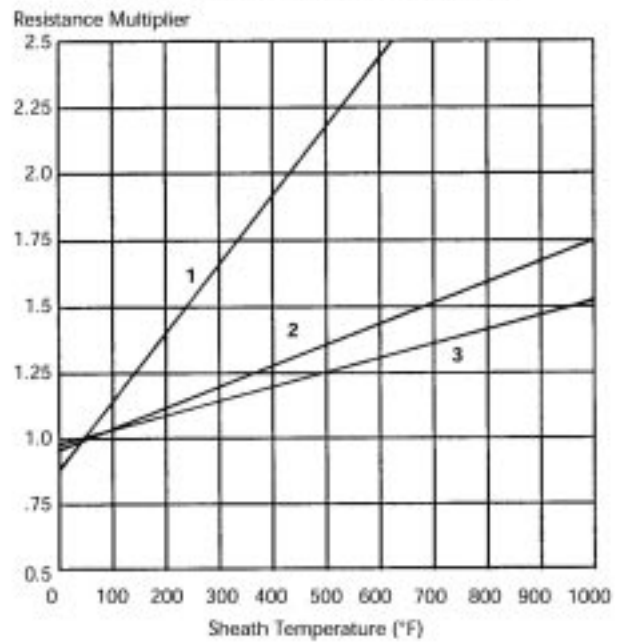
2-CONDUCTOR CABLE, 0.325" DIAMETER ALLOY 825, 600 VOLTS			
Cable Number	Cable Res Ohms/Ft	Maximum Exposure Temperature Rating (F°)	Resistance Curve
588B	.0071	600	1
614B	.0149		1
627B	.027		2
640B	.040		3
670B	.065	1100	N/A
710B	.104		
715B	.162		
720B	.205		
732B	.325		
750B	.500		
774B	.735		
810B	1.162		
819B	1.87		
830B	2.97		
840B	4.30		
859B	5.98		

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

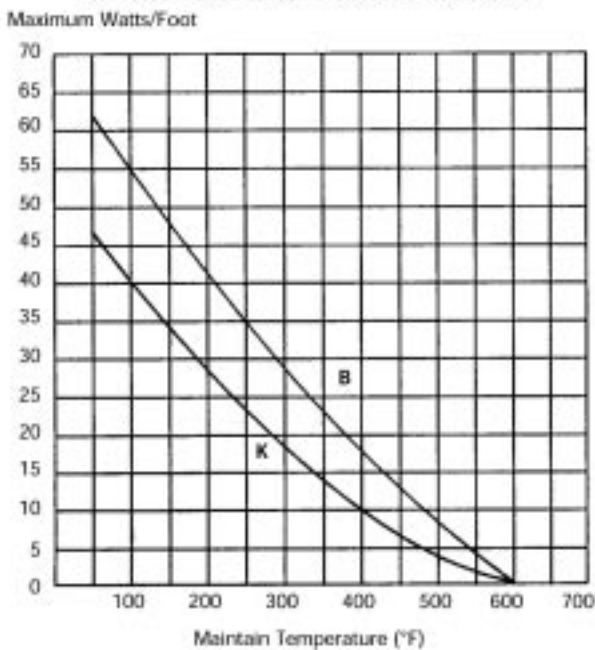
GRAPH-1
CABLE SHEATH TEMPERATURE RISE



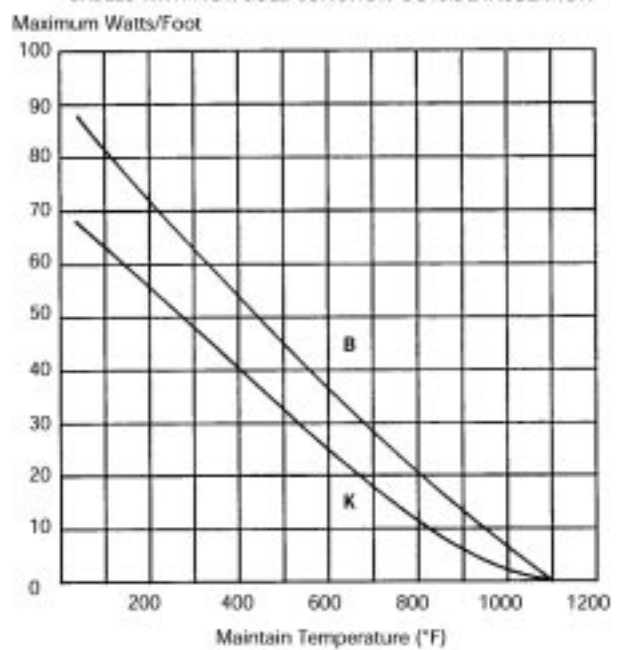
GRAPH-2
CABLE RESISTANCE TEMPERATURE MULTIPLIER



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 OUTSIDE INSULATION



Heater Design:

Nelson Mineral Insulated Cables

Step 1: Determine the pipe heat loss at minimum ambient temperature. This represents the minimum heater power output you require.

Step 2: Determine the heater length in feet by adding the required heater footage for heat sinks to the pipe length.

Step 3: Determine system voltage. Nelson cables are rated for either 300 or 600 volts maximum.

Step 4: Select the heater cable construction based on system requirements.
Voltage (below 300 volts or above) Number of conductors desired (one or two)
Cable size (.1875" or .312" diameter) Maximum watts/foot required
Maximum exposure temperature

Generally, you will want to use the smallest diameter, two conductor "A" form cable that meets your requirements. Two conductor cable provides an out-and-back circuit that simplifies electrical wiring. Smaller diameter cables are easier to install. As maintain temperatures, watt requirements, voltage, and heater length increase, you may require the larger diameter cable.

Step 5: Select the correct heater cable. This is done by calculating the optimum resistance needed and then selecting the closest actual resistance available from one of the resistance tables. The optimum resistance is calculated as follows:

$$R = V^2 / (W \times L^2)$$

Where R = Required Cable resistance (ohms/foot)
V = Voltage
W = Desired cable power output (watts/foot)
L = Required heater cable length (feet)

Note: Cable resistance (R) from the equation is based on the operating temperature. Low resistance conductors have a significant increase in resistance as operating temperature increases. The cable resistance given in the resistance tables must be modified for these cables by the following procedure.

- Based on the desired power output (W) in watts/foot, use the GRAPH-1 to determine the SHEATH TEMPERATURE RISE for the particular cable diameter you select.
- Add the sheath temperature rise to the desired maintain temperature to determine the SHEATH TEMPERATURE.
- 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.

Heater Design:

Step 6: Determine electrical and thermal conditions. Once the cable resistance has been selected, you will want to verify performance of the cable you have selected from GRAPHS 3 and 4.

Actual Power Output: $W = V^2 / (R \times L^2)$

Current draw in amps: $I = V / (R \times L)$

Note: To comply with Canadian and National Electrical Codes, the circuit breaker must be oversized by a minimum of 125% of heater amperage.



Approvals:

Note: Cable voltage, amps and watts must be provided for approval tags.

FM (FH Suffix)
Ordinary Locations
Hazardous (Classified)
Locations
Class I; Divisions 1&2;
Groups B, C, D
Class I; Zone 1&2;
Group IIC
Class II; Divisions 1&2;
Groups E, F, G

CSA (CH Suffix)
Ordinary Locations
Hazardous (Classified)
Locations
Class I; Division 2;
Groups B, C, D
Class II; Division 2;
Groups E, F, G
(CHB Suffix) Hazardous (Classified) Locations
Class I; Division 1;
Group B
(Consult Factory)

UL
Ordinary Locations (UG Suffix)
Hazardous (Classified) Locations (UH Suffix)
Class I; Division 2;
Group D
Snow Melting (UM Suffix)