Chromalox®
PRECISION HEAT AND CONTROL

The Right Products and Solutions for Your Applications



HEAT TRACE & CONTROLS

KOREA EHT
www.koreaeht.com

Chromalox Highest Manufacturing Standards

ISO9001:2000 Certified (UL)

Controls Plant, Cable Plant and Warehouse - Semi Annual Audits

Current Heating Cable Certifications:

Factory Mutual - IEEE 515 Standard - Quarterly Inspection

UnderWriter's Laboratory - Quarterly Inspection

Canadian Standards Association - Semi Annual Inspection

LCIE (France)

GOST (Russia)

VDE (Germany)

ATEX (Europe)

CE (Europe)

Heat Tracing Products

Overview

Industrial Cable Applications

- **Self Regulating**
- **Constant Wattage**
- **Mineral Insulated**

Commercial Cable Applications

- **Self Regulating Freeze Protection**
- **Self Regulating Roof & Gutter De-Icing**



Heat tracing is used to counteract the heat lost from process equipment and piping through its insulation. A heat tracing system is a group of process equipment and piping which is heat traced and controlled in a logical and economical manner.

There are many reasons for making up the heat loss of a system. With any heat loss, there is a corresponding drop in temperature. In many cases, a drop in temperature brings about unacceptable consequences. These consequences could be freezing of water in cooling water lines, steam or condensate return lines, compressed air lines, fire protection lines, storage tanks, valves, etc. A drop in temperature of process fluids could result in solution precipitation, unacceptable viscosity increase or solidification of the product in the lines.

Heat Tracing Products

Applications

Electric Heat Tracing Products

Chromalox heating cable line includes cables suitable for most process maintenance, pipe and vessel freeze protection and roof and gutter de-icing applications.

Industrial Heating Cables are ideal for process maintenance applications. Maintenance temperatures up to 900°F can be achieved in a variety of hazardous and corrosive environments. Industrial Cables include:

SRL — Self-Regulating, Low Temperature

SRM/E — Self-Regulating, Medium Temperature Enhanced

CWM — Constant Wattage, Medium Temperature

MI — Mineral Insulation, High Temperature.

Commercial Application Cables are designed to meet specific needs of winterizing applications such as water line freeze protection and preventing ice damage to building structures. Commercial Cables include:

SRF — Self-Regulating Freeze Protection

SRF-RG — Self-Regulating Roof and Gutter Freeze Protection.

Industrial Process Maintenance Applications

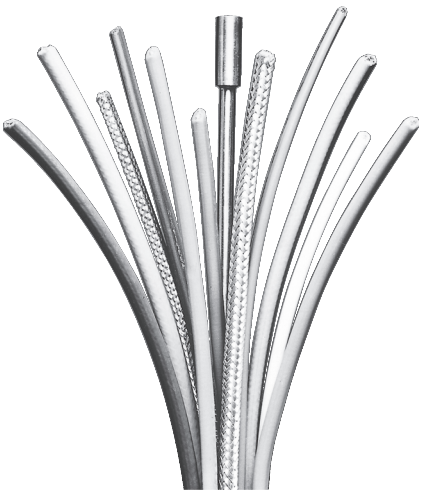
When industrial process piping and vessels must be maintained above the ambient air temperature, Chromalox has the heating cable to fit the application. Cables range in the maximum maintenance temperature from 150°F for SRL to 900°F for MI cables.

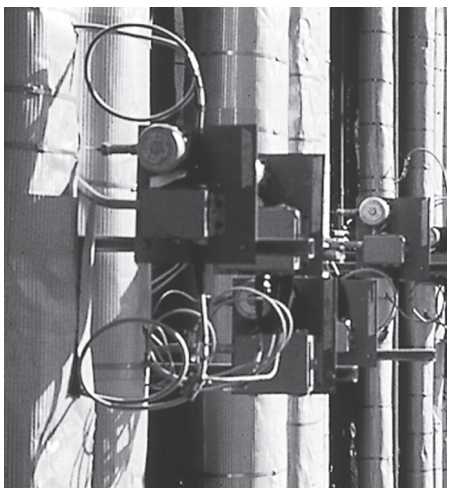
- Petroleum Refineries — Maintain petroleum and by-products at process temperature
- Waste Water Treatment Facilities — Prevent the precipitation of NaOH from solutions
- Food Processing Plants — Maintain viscosity of products in processes such as chocolate, oils and tallow
- Instrument Lines
- Storage Tanks
- Div. 1 and Div. 2 Hazardous Location Applications (Contact your Local Chromalox Sales office for Div. 1 applications)
- Freeze Protection of Steam Cleaned Lines
- Power Generating Plants — Trace steam condensate lines and other chemical additive lines
- Asphalt Lines.

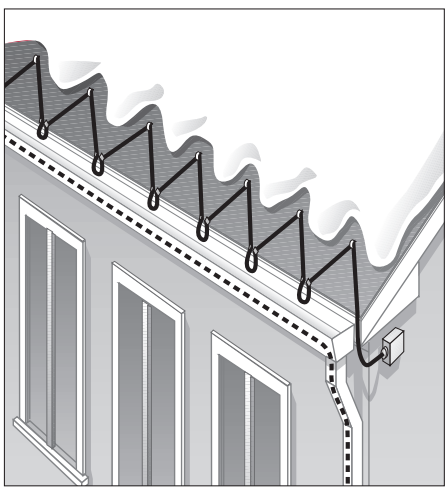
Commercial Applications

In a large number of regions in the world, buildings are susceptible to damage caused by water freezing. Primarily, this damage involves either the bursting of pipes or structural damage due to the weight of ice and snow building up on the roof. Chromalox Commercial Application Cables are intended to prevent this damage.

- Cooling Tower Pipes
- Parking Garage Drain Lines
- Chiller Water Lines
- Exposed Pipe Traps
- Exposed Storm Water Pipes
- Sump Discharge Pipes and Equipment
- Wet Sprinkler Fire Systems, where approved by Local Codes
- Outdoor Sports Facilities and Stadiums
- Roof and Gutter De-icing.







Heat Tracing Products

Industrial & Commercial Grade Cables

Heat Tracing Products — Section Outline

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Industrial Cable Applications

Self-Regulating

Chromalox SRL and SRM/E Self Regulating Heating Cables provide the most versatility in heat trace designs and applications. Constructed of a semiconductive heater matrix extruded between parallel buss wires, a self-regulating cable adjusts its output to independently respond to temperatures all along its length. As temperatures increase, the heater's resistance increases which lowers the output wattage. Conversely, as the temperature decreases, the resistance decreases and the cable produces more heat. The result — an energy efficient heating cable.

Self-regulating cables are flexible, can be cut-to-length in the field and can be single overlapped without fear of burnout in areas where complex piping and equipment require additional heat trace cable.

Chromalox manufactures low (SRL) and medium (SRM/E) temperature self-regulating heating cable for use on 120 and 208 to 277V. Equipped with a ground braid and optional TPR or FEP jacket, Chromalox self-regulating cables are third party tested and approved for use in harsh corrosive and hazardous applications.

Constant Wattage

Chromalox CWM Constant Wattage Heating Cables are ideally suited for applications where a particular watt density is required at all times. The heater element consists of a nichrome wire wrapped around parallel, insulated buss wires. At specific intervals, a short section of insulation is removed from alternating buss wires to create connection nodes for the nichrome wire. The result is a network of parallel resistors along the entire length of constant wattage cable.

Constant wattage cables are flexible, can be cut-to-length in the field, and are manufactured for use on voltages from 120 to 480V. Although not suited for overlapping, its constant output makes it an ideal choice for higher temperature applications where higher watt densities are required. Equipped with a ground braid and optional FEP jacket, Chromalox constant wattage cables are third party tested and approved for use in harsh, corrosive and hazardous areas. Contact your Local Chromalox Sales office for hazardous area designs.

Mineral Insulated

Chromalox MI Mineral Insulated Heating Cables are the most rugged heating cable in Chromalox's product line. Constructed of a solid series resistor element embedded in highly compacted mineral insulation, MI cables are built to handle high temperature, high wattage applications. The series resistor and mineral insulation are encased in a metallic jacket of Alloy 825 for high temperature or corrosive applications.

Mineral insulated cables are factory assembled and tested, ensuring the highest quality product. Since the units consist of a series resistor, virtually any wattage/voltage/length cable configuration can be produced within the cable's physical operating limits. Chromalox mineral insulated cables are available for use up to 600V and are tested and approved for use in corrosive and hazardous areas. Optional accessories include pulling eyes and reverse glands. Other special features are also available.

Commercial Cable Applications

Self-Regulating Freeze Protection

Chromalox SRF Self Regulating Freeze Protection Heating Cable is a self-regulating cable designed for the freeze protection of water lines. The self-regulating matrix allows for overlapping and easy field installation. SRF also lowers its output and energy consumption as the temperature increases thus lowering energy costs. The 16 AWG buss wires provide for long circuits which reduce the number of accessories required.

A braided and braided with overjacket construction is available. Braided cable should be used on dry pipes and dry locations. The overjacket construction is suitable for wet locations where occasional exposure to moisture is expected.

SRF heating cable is not for use in hazardous locations. Consult the Industrial Cable Products in this section for cables suitable for hazardous locations.

Self-Regulating Roof & Gutter De-Icing

SRF-RG Heating Cable is specifically designed for roof and gutter de-icing applications. SRF-RG features a self-regulating matrix that reduces output as snow melt requirements decrease or when warm weather is present.

The braided and overjacketed construction provides reliable moisture protection. The 16 AWG buss wires allow ample circuit lengths and rugged design. Accessories are available for mounting to roofs and gutters.

Heat Tracing Products

Application & Selection Guidelines

General Product Summary

This section is designed to assist you in determining the appropriate cable for use in your application.

Step 1 — Collect Required Application Data and Determine Heat Loss

Step 2 — Choose the cable that best meets your specific application parameters based on the summary. Consideration of application temperature, exposure temperature, application requirements and environmental ratings should be made.

Step 3 — Select Heating Cable Wattage Rating

Step 4 — Determine Total Cable Required

Step 5 — Determine Circuits and Circuit Protection

Step 6 — Select Appropriate Accessories

Step 1 — Collect Required Application Data & Determine Heat Loss

Application data required can be split into two categories. The first is the heat loss data. This includes:

- Maintenance Temperature
- Minimum Ambient Temperature
- Pipe Size
- Insulation Type (or K factor)
- Insulation Thickness
- Indoor/Outdoor Installation
- Maximum Expected Wind Speed
- Required Safety Factor.

Refer to the Technical section of this catalog, "Determining Heat Energy Requirements — Pipe & Tank Tracing" for details on performing heat loss calculations. For Commercial Freeze Protection, please see Cable Selection Tables in this section.

The second category of data required is the application and environmental conditions. This includes:

- Maximum Exposure Temperature (Power Off Condition)
- Circuit Length Considerations
- Available Voltage
- Hazardous Area Requirements
- Type of Pipe (Plastic or Metal)
- Chemical Exposure
- Fire Resistance.

Step 2 — Select the Cable

Choose the cable that best fits your specific application parameters and wattage requirements.

Heat Tracing Product Features

Features	Industrial				Commercial	
	SRL	SRM/E	CWM	Alloy 825 MI	SRF	SRF-RG
Max. Maintenance Temp. (°F)	150	302	320	900	100	50
Max. Exposure Temp. (°F) Power Off	185	420	400	1,472	185	185
Max. W/Ft.	10	20	12	64	8	12
Max. Circuit Length (Ft.)	95 - 660	150 - 600	225 - 900	330 - 1,000+	180 - 660	135-540
Buss Wire Size	16	14	12	N/A	16	16
Voltages	120, 208-277	120, 208-277	120, 208-277, 480	Up to 600	120, 208-277	120, 208-277
Hazardous Ratings	Yes	Yes	Yes	Yes	No	No
Usable on Plastic Pipe	Yes	No	No	No	Yes	Yes
Cut-to-Length in Field	Yes	Yes	Yes	No	Yes	Yes
Field Splicable	Yes	Yes	Yes	No	Yes	Yes
Can be Overlapped	Yes	Yes	No	No	Yes	Yes
Output Varies with Temp.	Yes	Yes	No	No	Yes	Yes
Varies Output Along Length	Yes	Yes	No	No	Yes	Yes
Design of System	Simple	Simple	Simple	Involved	Simple	Simple
Installation of System	Easiest	Easiest	Simple	Involved	Easiest	Easiest
Fire Resistance	Fair	Fair	Fair	Excellent	Fair	Fair
Chemical Resistance	See Corrosion Guide, next page					
Size (Max. In.)	0.435 x 0.185	0.5 x 0.2	0.435 x 0.235	0.4	0.435 x 0.185	0.435 x 0.185
Accessories	DL/EL	DL	DL/EL		DL/EL	RG Accessories
Monitor Wire Available	Yes	Contact Factory	Contact Factory	No	No	No
Applications	FL,PL	FL,FH,PL,PH	FL,FH,PL,PH	FL,FH,PL,PH	FL	RG
	FL = Freeze Protection FH = Freeze Protection, High Exposure Temperature PL = Process Maintenance, Low Temperature PH = Process Maintenance, High Temperature RG = Roof and Gutter De-icing					

Heat Tracing Products

Application & Selection Guidelines *(cont'd.)*

Agency Approvals

Cable	UL				CSA				FM			
	Ordinary Area	Class I Div. 2 Groups B, C, D	Class II Div. 2 Groups F, G	Class III Div. 2	Ordinary Area	Class I Div. 2 Groups A, B, C, D	Class II Div. 2 Groups F, G	Class III Div. 2	Ordinary Area	Class I Div. 2 Groups B, C, D	Class II Div. 2 Groups F, G	Class III Div. 2
SRL-C SRL-CT SRL-CR	✓ ✓ ✓				✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓		✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
SRM/E-C SRM/E-CT	✓ ✓				✓ ✓	✓ ✓	✓ ✓		✓ ✓	✓ ✓	✓ ✓	✓ ✓
CWM-C CWM-CT	✓ ✓				✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓			
MI*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SRF-C SRF-CR SRF-RG	✓ ✓ ✓				✓ ✓ ✓				✓ ✓ ✓			
	For T ratings, refer to individual product pages. For more specific information, refer to individual product pages. CF=Contact Factory *Class I, Division I, Groups B,C & D - UL, CSA, FM - Contact your Local Chromalox Sales office for design assistance.											

Corrosion Guide to Select Proper Cable Construction

Exposure To	Industrial				Commercial	
	SRL	SRM/E	CWM	Alloy 825 MI	SRF	SRF-RG
Moisture	C, CR, CT	C, CT	C, CT	Yes	C, CR	Yes
Aqueous Solutions of Inorganic Compounds	CR, CT	CT	CT	No	No	No
Liquids Organic Chemicals	CT	CT	CT	Yes	No	No
Acids or Bases	CT	CT	CT	No	No	No
Note — This is a recommendation guide. Chromalox cannot warrant any Electric Heat Trace against failure by sheath degradation if such failure is the result of operating conditions beyond the control of the heater manufacturer. It is the responsibility of the purchaser to make the ultimate choice of sheath material based on knowledge of the chemical composition of the corrosive solution, character of materials entering the solution, and controls which maintains the process.						

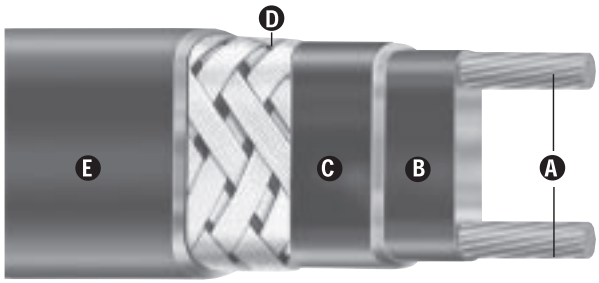
Required Jacket Material

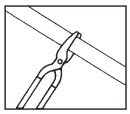
Select the appropriate jacket configuration for the desired level of mechanical and corrosive chemical protection. The CR over-jacket option can be used when additional mechanical protection is desired. The CR over-jacket option is required when the cable can be exposed to aqueous inorganic chemicals. The CT over-jacket option is required when the cable can be exposed to organic chemicals or strong corrosives. Use Corrosion Guide above to determine the correct jacket material option for the cable type selected.

SRL

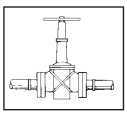
Self-Regulating Low Temperature

- **Self-Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 660 Feet**
- **Process Temperature Maintenance to 150°F (65°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 185°F (85°C)**
- **Industrial Freeze Protection Applications**
- **Field Splicing Without Disrupting Heat Output**
- **3, 5, 8 and 10 W/Ft.**
- **120 and 208 - 277 Volt From Stock**
- **Approximate Size 3/8 x 1/8"**
- **Min. Bend Radius 1-1/8"**

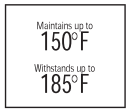




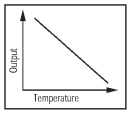
Cut to Length in Field



Can be Single Overlapped



Low Temperature



Self Regulating Output

Description

Chromalox SRL self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and optional overjacketing, SRL ensures operating integrity in Div. 2 hazardous environments as well as certain corrosive industrial environments. SRL heating cable has a maximum maintenance temperature rating of 150°F (65°C).

Features

- Energy efficient, self-regulating SRL uses less energy when less heat is required.
- Easy to install, SRL can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- SRL features lower installed cost than steam tracing, less maintenance expense and less downtime.
- SRL can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRL is self-regulating, over-temperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

Construction

A **Twin 16 AWG Copper Buss Wires —** Provide reliable electrical current capability.

B **Semiconductive Polymer Core Matrix —** "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C **Polyolefin Jacket —** Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.

D **Tinned Copper Braid —** Provides additional mechanical protection in any environment and a positive ground path.

E **High Temperature Fluoropolymer or TPR Overjacket (optional) —** Corrosion resistant, flame retardant overjacket is highly effective in many environments. TPR coatings protect against certain inorganic chemical solutions. Fluoropolymer coatings are used for exposure to organic or corrosive solutions. These coatings also protect against abrasion and impact damage.

Approvals

Factory Mutual (FM) Approved for ordinary areas. UL Listed, CSA Certified for ordinary areas. FM Approved for hazardous (classified) areas when used with DL or EL accessories:

- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and fillings)
- 3 Watt Rated T6 Temperature Class
- 5 and 8 Watt Rated T5 Temperature Class
- 10 Watt Rated T4A Temperature Class.

CSA Certified for hazardous areas when used with DL or EL accessories:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G.

SRL

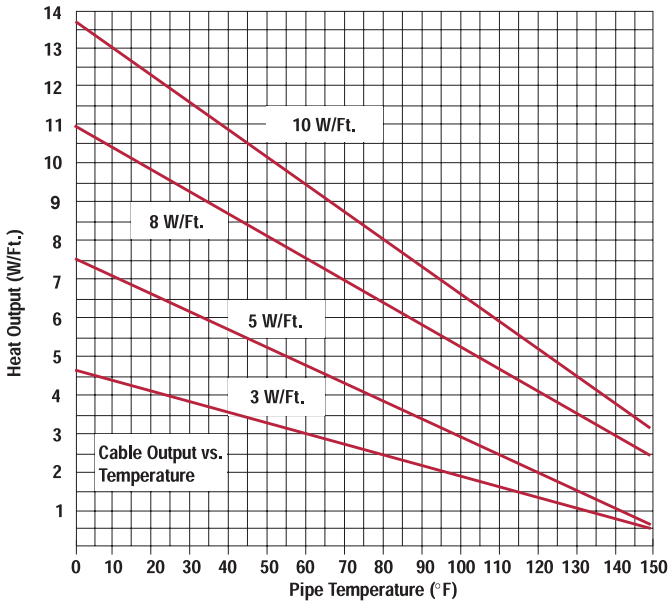
Self-Regulating Low Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided. Contact your Local Chromalox Sales office for monitor wire option.

Model	Self-Regulating Low Temperature			
SRL	Self-Regulating, Low Temperatue Heating Cable			
	Code	**Output (W/Ft.)**		
	3	Three		
	5	Five		
	8	Eight		
	10	Ten		
		Code	**Voltage**	
		1	120	
		2	208 - 277	
			Code	**Braid and Overcoat Options**
			C	Plated-copper metallic braid for additional protection and ground path
			CT	Fluoropolymer corrosion resistant overjacket over braid for hostile/corrosive environments
			CR	TPR overjacket over braid for protection against certain inorganic chemical solutions
SRL	**5**	**1**	**C**	Typical Model Number

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Accessories		Model
Power Connection	Heat trace to electrical service connection	KRT-PC
Splice & Tee		KRT-STK
End Seal	For terminating cable	KRT-RES
Thermostat	Ambient air sensing thermostat	KRT-AST
	Line sensing thermostat	KRT-LST

To Order — General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the General Application Accessories page at the end of this section.

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
SRL 3	2.4	-20	2.6	-13	3.4	+15
SRL 5	4.1	-18	4.5	-10	5.6	+13
SRL 8	6.88	-14	7.28	-9	8.96	+12
SRL 10	8.7	-13	9.2	-8	11.1	+10

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

Cable Rating	50°F Start-Up (Ft.)						0°F Start-Up (Ft.)						-20°F Start-Up (Ft.)					
	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A
SRL3-1C	205	305	360	NR	NR	NR	135	200	270	330	360	NR	120	185	245	300	360	NR
SRL3-2C	400	600	660	NR	NR	NR	275	415	555	660	NR	NR	245	370	495	600	660	NR
SRL5-1C	125	185	250	270	NR	NR	90	135	180	225	270	NR	80	120	160	205	245	270
SRL5-2C	250	375	505	540	NR	NR	180	270	360	450	540	NR	160	245	325	405	490	540
SRL8-1C	100	150	200	215	NR	NR	70	110	145	180	215	NR	65	100	130	165	200	210
SRL8-2C	185	285	375	420	NR	NR	135	200	265	335	395	420	120	175	235	300	350	420
SRL10-1C	60	95	130	160	180	NR	50	80	105	130	155	180	45	70	95	120	140	180
SRL10-2C	100	160	210	260	315	360	80	125	170	210	255	340	75	120	160	195	240	320

NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

Note — Thermal magnetic circuit breakers are recommended since magnetic circuit breakers could "nuisance trip" at low temperature.

SRL/S

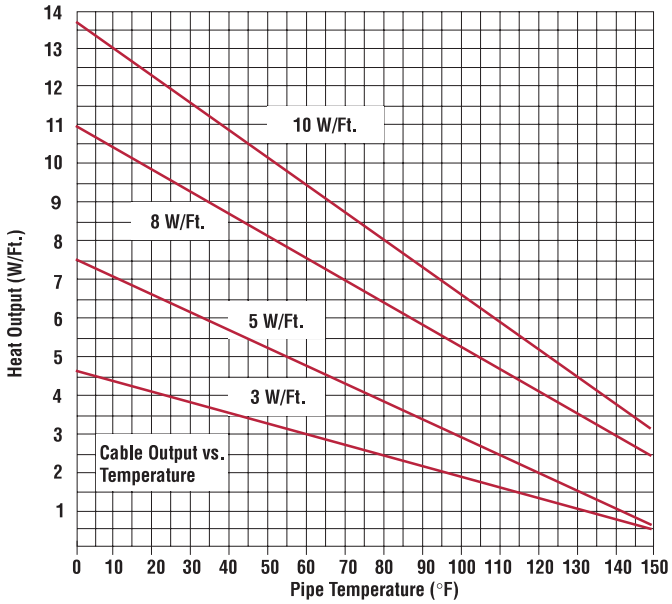
Self-Regulating Low Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided. Contact your Local Chromalox Sales office for monitor wire option.

Model	Self-Regulating Low Temperature			
SRL/S	Self-Regulating, Low Temperatue Heating Cable			
	Code	**Output (W/Ft.)**		
	3	Three		
	5	Five		
	8	Eight		
	10	Ten		
		Code	**Voltage**	
		1	120	
		2	208 - 277	
			Code	**Braid and Overcoat Options**
			C	Plated-copper metallic braid for additional protection and ground path
			CT	Fluoropolymer corrosion resistant overjacket over braid for hostile/corrosive environments
			CR	TPR overjacket over braid for protection against certain inorganic chemical solutions
SRL/S	**5**	**1**	**C**	**Typical Model Number**

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Accessories		Model
Power Connection	Heat trace to electrical service connection	KRT-PC
Splice & Tee		KRT-STK
End Seal	For terminating cable	KRT-RES
Thermostat	Ambient air sensing thermostat	KRT-AST
	Line sensing thermostat	KRT-LST

To Order — General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the General Application Accessories page at the end of this section.

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
SRL/S 3	2.4	-20	2.6	-13	3.4	+15
SRL/S 5	4.1	-18	4.5	-10	5.6	+13
SRL/S 8	6.88	-14	7.28	-9	8.96	+12
SRL/S 10	8.7	-13	9.2	-8	11.1	+10

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

Cable Rating	50°F Start-Up (Ft.)						0°F Start-Up (Ft.)						-20°F Start-Up (Ft.)					
	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A
SRL/S 3-1C	205	305	360	NR	NR	NR	135	200	270	330	360	NR	120	185	245	300	360	NR
SRL/S 3-2C	400	600	660	NR	NR	NR	275	415	555	660	NR	NR	245	370	495	600	660	NR
SRL/S 5-1C	125	185	250	270	NR	NR	90	135	180	225	270	NR	80	120	160	205	245	270
SRL/S 5-2C	250	375	505	540	NR	NR	180	270	360	450	540	NR	160	245	325	405	490	540
SRL/S 8-1C	100	150	200	215	NR	NR	70	110	145	180	215	NR	65	100	130	165	200	210
SRL/S 8-2C	185	285	375	420	NR	NR	135	200	265	335	395	420	120	175	235	300	350	420
SRL/S 10-1C	60	95	130	160	180	NR	50	80	105	130	155	180	45	70	95	120	140	180
SRL/S 10-2C	100	160	210	260	315	360	80	125	170	210	255	340	75	120	160	195	240	320

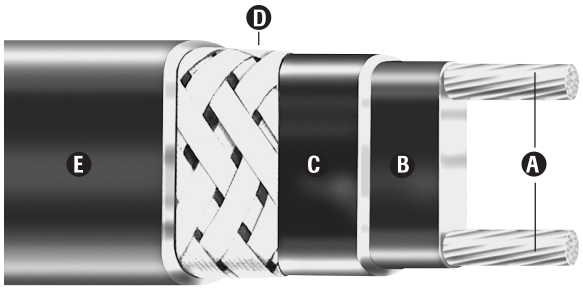
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

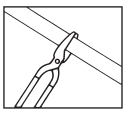
Note — Thermal magnetic circuit breakers are recommended since magnetic circuit breakers could "nuisance trip" at low temperature.

SRM/E

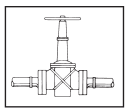
Self-Regulating Medium Temperature

- **Self-Regulating, Energy Efficient**
- **14 AWG Buss Wire**
- **Circuit Lengths to 780 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Industrial Process Maintenance Applications**
- **Industrial Freeze Protection Applications**
- **Steam Cleanable on Process Equipment Up to 300 PSIG**
- **3, 5, 8, 10, 15 and 20 W/Ft.**
- **120 and 208 - 277 Volt From Stock**





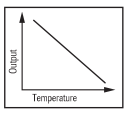
Cut to Length in Field



Can be Overlapped



Medium Temperature



Self Regulating Output

Description

Chromalox SRM/E self-regulating heating cable provides safe, reliable heat tracing for process temperature maintenance and freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 14 AWG buss wire with metal braid and optional overjacketing, SRM/E ensures operating integrity in most hostile industrial environments. The 420°F (215°C) maximum exposure temperature rating allows steam cleaning of process equipment with up to 300 psig steam.

Enhanced Features

- Industrial Grade, 14 gauge buss wire has higher current capacity, allowing longer circuit lengths up to 780 feet.
- Superior matrix to buss wire bonding ensures overall operating integrity and performance.
- High output, 20 W/Ft. heating cable.
- All ratings are available from stock.

Features

- Energy efficient, self-regulating SRM/E uses less energy when less heat is required.
- Easy to install, SRM/E can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- With lower installed cost than steam tracing, SRM/E features less maintenance expense and downtime.
- SRM/E can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRM/E is self-regulating, overtemperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

Construction

A **Twin 14 AWG Copper Buss Wires —** Provide reliable electrical current capability.

B **Semiconductive Polymer Core Matrix —** "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C **High Temperature Fluoropolymer Jacket —** Flame retardant, electrically insulates the matrix and provides corrosion resistance.

D **Metallic Braid —** Provides additional mechanical protection in any environment and a positive ground path.

E **High Temperature Fluoropolymer Overjacket (optional) —** Corrosion resistant, flame retardant overjacket is highly effective in hostile, aqueous and chemically active environments. It also protects against abrasion and impact damage.

Approvals

Factory Mutual (FM) Approved for ordinary areas. UL Listed, CSA Certified for ordinary areas. FM Approved for hazardous (classified) areas when used with DL accessories:

- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and filings)
- 3, 5 and 8 Watt Rated T3 Temperature Class
- 8, 10, 15 and 20 Watt Rated T2D Temperature Class

CSA Certified for hazardous (classified) areas when used with DL accessories:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G
- Rated T3[1] Temperature Class.

Note 1 Exception — Cable Surface Temperature shall not exceed 190°C in Class II, Div. 2, Group F; 165°C in Class II, Div. 2, Group G.

SRM/E

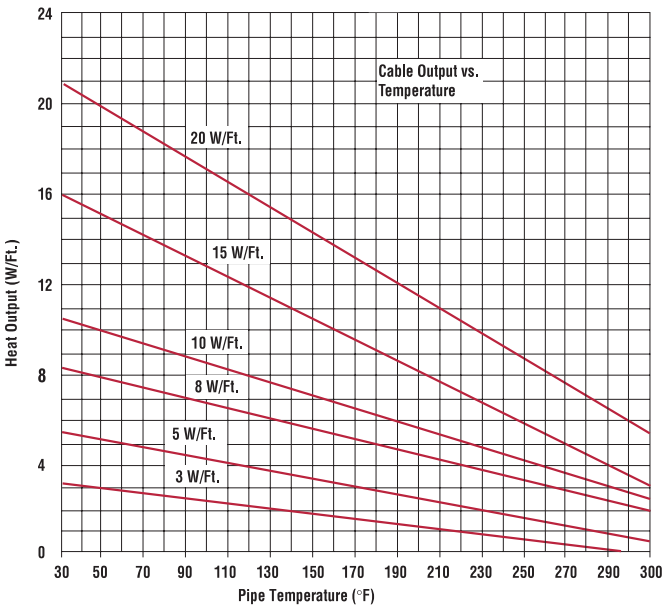
Self-Regulating Medium Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model	Self-Regulating Medium Temperature			
SRM/E	Self-Regulating, Medium Temperatue Enhanced Heating Cable			
	Code	Output (W/Ft.)		
	3	Three		
	5	Five		
	8	Eight		
	10	Ten		
	15	Fifteen		
	20	Twenty		
		Code	Voltage	
		1	120	
		2	208 - 277	
			Code	Braid and Overcoat Options
			C	Plated-copper metallic braid for additional protection and ground path
			CT	Fluoropolymer corrosion resistant overjacket over braid for hostile/ corrosive environments
SRM/E	8	8	CT	Typical Model Number

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Accessories		Model
Power Connection	Heat Trace to electrical service connection	KRT-PC
Splice & Tee		KRT-STK
End Seal	For terminating cable	KRT-RES
Thermostat	Ambient air sensing thermostat	KRT-AST
	Line sensing thermostat	KRT-LST

To Order — General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the General Application Accessories page at the end of this section.

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
SRM/E 3	2.31	-23	2.55	-15	3.90	+23
SRM/E 5	3.85	-23	4.25	-15	6.45	+23
SRM/E 8	6.4	-20	6.88	-14	10.24	+22
SRM/E 10	8.3	-17	8.80	-12	12.50	+20
SRM/E 15	12.75	-15	13.50	-10	18.45	+19
SRM/E 20	17.6	-12	18.40	-8	24.40	+19

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

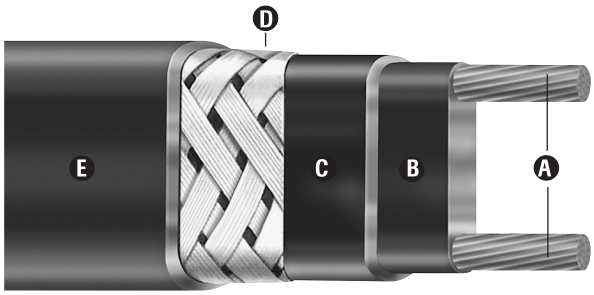
Cable Rating	50°F Start-Up (Ft.)					0°F Start-Up (Ft.)					-20°F Start-Up (Ft.)				
	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A
SRM/E 3-1	285	385	NR	NR	NR	275	375	385	NR	NR	265	365	385	NR	NR
SRM/E 3-2	575	770	780	NR	NR	540	750	780	NR	NR	525	740	780	NR	NR
SRM/E 5-1	180	240	360	375	NR	165	220	330	375	NR	155	210	310	375	NR
SRM/E 5-2	360	480	720	750	NR	325	430	645	750	NR	310	415	620	750	NR
SRM/E 8-1	145	190	285	325	NR	135	175	265	325	NR	130	165	250	325	NR
SRM/E 8-2	285	380	575	650	NR	255	345	520	650	NR	245	335	490	650	NR
SRM/E 10-1	95	125	190	250	NR	90	110	175	250	NR	85	100	170	245	250
SRM/E 10-2	190	255	385	490	NR	165	225	345	490	NR	155	215	330	470	490
SRM/E 15-1	70	95	145	190	210	65	85	125	165	210	60	80	120	150	210
SRM/E 15-2	145	190	290	385	420	120	175	270	360	420	115	165	260	340	420
SRM/E 20-1	60	75	115	155	160	50	65	105	140	160	45	65	100	135	160
SRM/E 20-2	115	155	230	305	350	100	135	200	270	350	90	130	195	255	335

NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

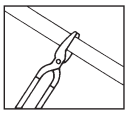
SRM/ES

Self-Regulating Medium Temperature

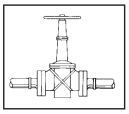
- **Self-Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 740 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Industrial Process Maintenance Applications**
- **Industrial Freeze Protection Applications**
- **Steam Cleanable on Process Equipment Up to 300 PSIG**
- **3, 5, 8, 10, 15 and 20 W/Ft.**
- **120 and 208 - 277 Volts**



FM



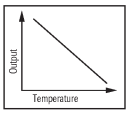
Cut to Length in Field



Can be Overlapped



Medium Temperature



Self Regulating Output

Description

Chromalox SRM/ES self-regulating heating cable provides safe, reliable heat tracing for process temperature maintenance and freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with metal braid and optional overjacketing, SRM/ES ensures operating integrity in most hostile industrial environments. The 420°F (215°C) maximum exposure temperature rating allows steam cleaning of process equipment with up to 300 psig steam.

Enhanced Features

- 16 gauge buss wire has high current capacity, allowing circuit lengths up to 740 feet.
- Superior matrix to buss wire bonding ensures overall operating integrity and performance.
- High output, 20 W/Ft. heating cable.

Features

- Energy efficient, self-regulating SRM/ES uses less energy when less heat is required.
- Easy to install, SRM/ES can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- With lower installed cost than steam tracing, SRM/ES features less maintenance expense and downtime.
- SRM/ES can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRM/ES is self-regulating, overtemperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

Construction

A **Twin 16 AWG Copper Buss Wires —** Provide reliable electrical current capability.

B **Semiconductive Polymer Core Matrix —** "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C **High Temperature Fluoropolymer Jacket —** Flame retardant, electrically insulates the matrix and provides corrosion resistance.

D **Metallic Braid —** Provides additional mechanical protection in any environment and a positive ground path.

E **High Temperature Fluoropolymer Overjacket (optional) —** Corrosion resistant, flame retardant overjacket is highly effective in hostile, aqueous and chemically active environments. It also protects against abrasion and impact damage.

Approvals

Factory Mutual (FM) Approved for ordinary areas. UL Listed, CSA Certified for ordinary areas. FM Approved for hazardous (classified) areas when used with DL accessories:

- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and filings)
- 3, 5 and 8 Watt Rated T3 Temperature Class
- 8, 10, 15 and 20 Watt Rated T2D Temperature Class

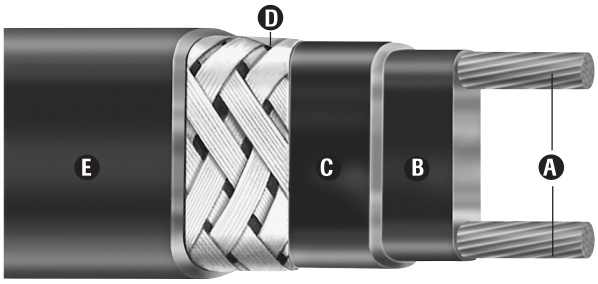
SRL/S

Self-Regulating Low Temperature

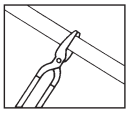
- **Self-Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 660 Feet**
- **Process Temperature Maintenance to 150°F (65°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 185°F (85°C)**
- **Industrial Freeze Protection Applications**
- **Field Splicing Without Disrupting Heat Output**
- **3, 5, 8 and 10 W/Ft.**
- **120 and 208 - 277 Volt From Stock**
- **Approximate Size 3/8 x 1/8"**
- **Min. Bend Radius 1-1/8"**

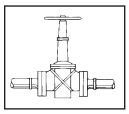
Description

Chromalox SRL/S self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and optional overjacketing, SRL/S ensures operating integrity in Div. 2 hazardous environments as well as certain corrosive industrial environments. SRL/S heating cable has a maximum maintenance temperature rating of 150°F (65°C).



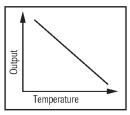
FM


Cut to Length in Field


Can be Single Overlapped



Low Temperature



Self Regulating Output

Features

- Energy efficient, self-regulating SRL/S uses less energy when less heat is required.
- Easy to install, SRL/S can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- SRL/S features lower installed cost than steam tracing, less maintenance expense and less downtime.
- SRL/S can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRL/S is self-regulating, over-temperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

Construction

A **Twin 16 AWG Copper Buss Wires —** Provide reliable electrical current capability.

B **Semiconductive Polymer Core Matrix —** "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C **Polyolefin Jacket —** Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.

D **Tinned Copper Braid —** Provides additional mechanical protection in any environment and a positive ground path.

E **High Temperature Fluoropolymer or TPR Overjacket (optional) —** Corrosion resistant, flame retardant overjacket is highly effective in many environments. TPR coatings protect against certain inorganic chemical solutions. Fluoropolymer coatings are used for exposure to organic or corrosive solutions. These coatings also protect against abrasion and impact damage.

Approvals

Factory Mutual (FM) Approved for ordinary areas. UL Listed, CSA Certified for ordinary areas. FM Approved for hazardous (classified) areas when used with DL or EL accessories:

- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and fillings)
- 3 Watt Rated T6 Temperature Class
- 5 and 8 Watt Rated T5 Temperature Class
- 10 Watt Rated T4A Temperature Class.

CSA Certified for hazardous areas when used with DL or EL accessories:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G.

SRM/ES

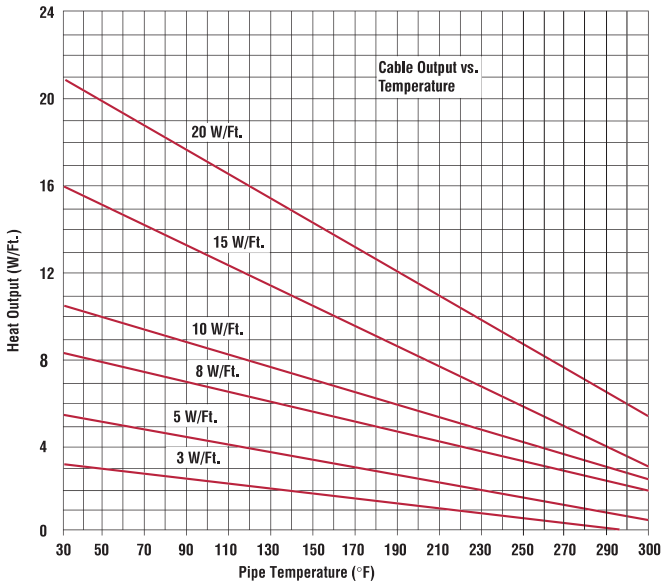
Self-Regulating Medium Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model	Self-Regulating Medium Temperature			
SRM/ES	Self-Regulating, Medium Temperature Enhanced Heating Cable			
	Code	**Output (W/Ft.)**		
	3	Three		
	5	Five		
	8	Eight		
	10	Ten		
	15	Fifteen		
	20	Twenty		
	Code	**Voltage**		
	1	120		
	2	208 - 277		
		Code	**Braid and Overcoat Options**	
		C	Plated-copper metallic braid for additional protection and ground path	
		CT	Fluoropolymer corrosion resistant overjacket over braid for hostile/ corrosive environments	
SRM/ES	**8**	**1**	**CT**	**Typical Model Number**

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Accessories		Model
Power Connection	Heat Trace to electrical service connection	KRT-PC
Splice & Tee	Connects two or three cables together	KRT-STK
End Seal	For terminating cable	KRT-RES
Thermostat	Ambient air sensing thermostat	KRT-AST
	Line sensing thermostat	KRT-LST

To Order — General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the General Application Accessories page at the end of this section.

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
SRM/ES 3	2.31	-23	2.55	-15	3.90	+23
SRM/ES 5	3.85	-23	4.25	-15	6.45	+23
SRM/ES 8	6.4	-20	6.88	-14	10.24	+22
SRM/ES 10	8.3	-17	8.80	-12	12.50	+20
SRM/ES 15	12.75	-15	13.50	-10	18.45	+19
SRM/ES 20	17.6	-12	18.40	-8	24.40	+19

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

Cable Rating	50°F Start-Up (Ft.)					0°F Start-Up (Ft.)					-20°F Start-Up (Ft.)				
	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A
SRM/ES 3-1	285	365	NR	NR	NR	275	365	NR	NR	NR	265	365	NR	NR	NR
SRM/ES 3-2	575	740	NR	NR	NR	540	740	NR	NR	NR	525	740	NR	NR	NR
SRM/ES 5-1	180	240	355	NR	NR	165	220	330	355	NR	155	210	310	355	NR
SRM/ES 5-2	360	480	710	NR	NR	325	430	645	710	NR	310	415	620	710	NR
SRM/ES 8-1	145	190	285	305	NR	135	175	265	305	NR	130	165	250	305	NR
SRM/ES 8-2	285	380	570	NR	NR	255	345	520	570	NR	245	335	490	570	NR
SRM/ES 10-1	95	125	190	235	NR	90	110	175	235	NR	85	100	170	235	NR
SRM/ES 10-2	190	255	385	465	NR	165	225	345	465	NR	155	215	330	465	NR
SRM/ES 15-1	70	95	145	190	195	65	85	125	165	195	60	80	120	150	195
SRM/ES 15-2	145	190	290	385	395	120	175	270	360	395	115	165	260	340	395
SRM/ES 20-1	60	75	115	150	NR	50	65	105	140	150	45	65	100	135	150
SRM/ES 20-2	115	155	230	305	330	100	135	200	270	330	90	130	195	255	330

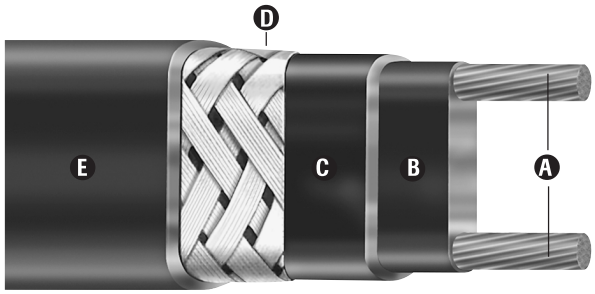
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

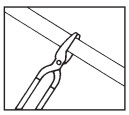
Note — Thermal magnetic circuit breakers are recommended since magnetic circuit breakers could "nuisance trip" at low temperature.

SRS

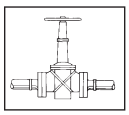
Self-Regulating Medium Temperature Small Profile

FM





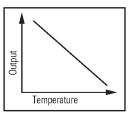
Cut to Length in Field



Can be Overlapped



Medium Temperature



Self Regulating Output

- **Self-Regulating, Energy Efficient**
- **20 AWG Buss Wire**
- **Circuit Lengths to 360 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Industrial Process Maintenance Applications**
- **Min. Bend Radius of 1/4"**
- **Steam Cleanable on Process Equipment Up to 300 PSIG**
- **5, 10, 15 and 20 W/Ft.**
- **120 and 208 - 277 Volts**

Description

Chromalox SRS self-regulating heating cable provides safe, reliable heat tracing for process temperature maintenance and small diameter (<1") tubing, valves and similar applications. Constructed of industrial grade 20 AWG buss wire with metal braid and optional overjacketing, SRS ensures operating integrity in most hostile industrial environments. The 420°F (215°C) maximum exposure temperature rating allows a wide variety of medium temperature applications.

Enhanced Features

- Industrial Grade, 20 gauge buss wire has higher flexibility, allowing the cable to be used on tight bending radius.
- Superior matrix to buss wire bonding ensures overall operating integrity and performance.
- High output, 20 watts per foot heating cable.

Features

- Energy efficient, self-regulating SRS uses less energy when less heat is required.
- Easy to install, SRS can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- SRS can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRS is self-regulating, overtemperature conditions are virtually impossible.
- Chromalox termination end seal assemblies reduce installation time.

Construction

A Twin 20 AWG Copper Buss Wires — Provide reliable electrical current capability.

B Semiconductive Polymer Core Matrix — "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C High Temperature Fluoropolymer Jacket — Flame retardant, electrically insulates the matrix and provides corrosion resistance.

D Metallic Braid — Provides additional mechanical protection in any environment and a positive ground path.

E High Temperature Fluoropolymer Overjacket (optional) — Corrosion resistant, flame retardant overjacket is highly effective in hostile, aqueous and chemically active environments. It also protects against abrasion and impact damage.

Approvals

Factory Mutual (FM) Approved for ordinary areas. FM Approved for hazardous (classified) areas when used with DL accessories:

- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and filings)
- 5 Watt Rated T3 Temperature Class
- 10, 15 and 20 Watt Rated T2D Temperature Class

SRS

Self-Regulating Medium Temperature Small Profile *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model	Self-Regulating Medium Temperature Small Profile
SRS	Self-Regulating Medium Temperature Small Profile Heating Cable

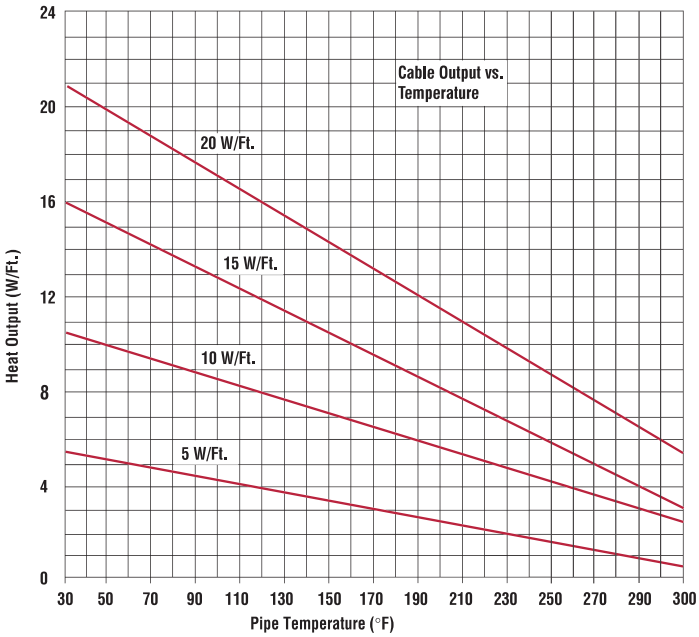
Code	Output (W/Ft.)
5	Five
10	Ten
15	Fifteen
20	Twenty

Code	Voltage
1	120
2	208 - 277

Code	Braid and Overcoat Options
C	Plated-copper metallic braid for additional protection and ground path
CT	Fluoropolymer corrosion resistant overjacket over braid for hostile/ corrosive environments

SRS	5	1	CT	Typical Model Number

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Accessories		Model
Power Connection	Heat Trace to electrical service connection	KRT-PC
Splice & Tee	Connects two or three cables together	KRT-STK
End Seal	For terminating cable	KRT-RES
Thermostat	Ambient air sensing thermostat	KRT-AST
	Line sensing thermostat	KRT-LST

To Order — General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the General Application Accessories page at the end of this section.

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
SRS 5	3.85	-23	4.25	-15	6.45	+23
SRS 10	8.30	-17	8.80	-12	12.50	+20
SRS 15	12.75	-15	13.50	-10	18.45	+19
SRS 20	17.60	-12	18.40	-8	24.40	+19

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

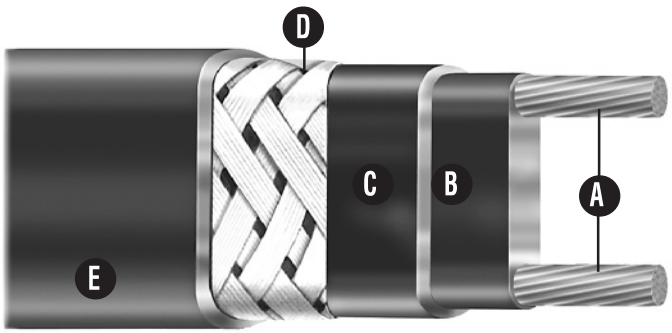
	40°F Start-Up (Ft.)			0°F Start-Up (Ft.)			-20°F Start-Up (Ft.)			-40°F Start-Up (Ft.)		
Cable Rating	5A	10A	15A	5A	10A	15A	5A	10A	15A	5A	10A	15A
SRS 5-1	60	120	180	55	110	165	50	100	155	45	90	135
SRS 5-2	120	240	360	110	220	330	100	200	300	90	180	270
SRS 10-1	30	65	95	25	55	85	25	55	80	20	45	70
SRS 10-2	65	130	195	55	110	170	55	110	165	45	90	140
SRS 15-1	25	50	75	20	40	65	20	40	60	18	35	55
SRS 15-2	50	100	150	40	85	130	40	80	120	35	70	110
SRS 20-1	20	40	60	18	35	55	17	35	50	15	30	45
SRS 20-2	40	80	120	35	70	105	35	70	105	30	60	90

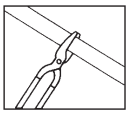
Note – Thermal Magnetic circuit breakers are recommemded since magnetic breakers could "nuisance trip" at low temperature.

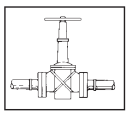
HSRL

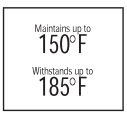
Self-Regulating Low Temperature

- **Self- Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 660 Feet**
- **Process Temperature Maintenance to 150°F (65°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 185°F (85°C)**
- **Freeze Protection of Fire Protection System Piping**
- **Available in 3, 5, 8, and 10 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**
- **Approximate Size 3/8"W x 1/8"H**
- **Minimum Bend Radius 1-1/8"**
- **For Use on Metal & Plastic Pipes**

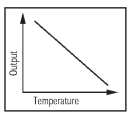



Cut to Length in Field


Can be Single Overlapped



Low Temperature



Self Regulating Output

Description

Chromalox HSRL self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and fluoropolymer overjacket, HSRL ensures operating integrity in Div. 1 hazardous environments. HSRL heating cable has a maximum maintenance temperature rating of 150°F (65°F) and a maximum exposure temperature of 185°F (85°C)

Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Features

- Energy efficient, self-regulating HSRL uses less energy when less heat is required.
- Easy to install, HSRL can be cut to any length (up to max circuit length) in the field.
- HSRL features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRL can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.

Construction

A **Twin 16 AWG Copper Buss Wires—** Provide reliable electric current capability.

B **Semiconductive Polymer Core Matrix—** "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C **Polyolefin Jacket—** Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.

D **Tinned Copper Braid—** Provides additional mechanical protection in any environment and a positive ground path.

E **High Temperature Fluoropolymer Overjacket—** Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

Approvals

FM Approved
- UL Listed for freeze protection of fire system piping
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 3 Watt rated T6 temperature class
- 5 and 8 Watt rated T5 temperature class
- 10 Watt rated T4A temperature class

CSA Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- 3 Watt rated T6 temperature class
- 5 and 8 Watt rated T5 temperature class
- 10 Watt rated T4A temperature class

HSRL

Self-Regulating Low Temperature *(cont'd.)*

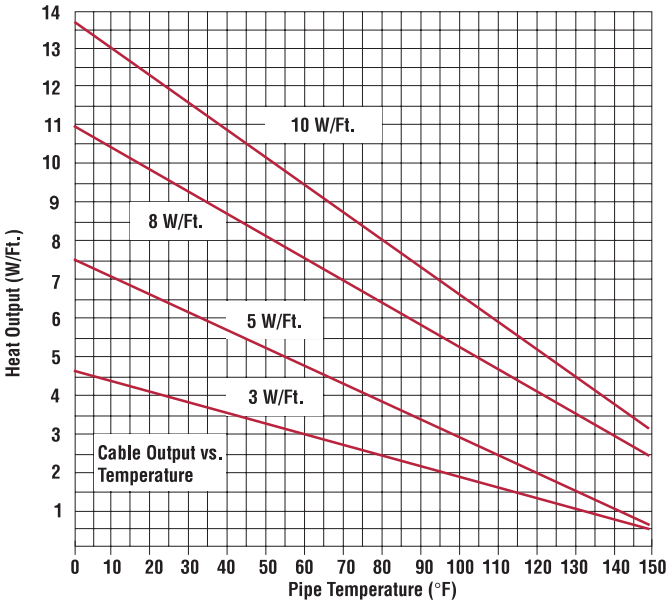
Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model	Hazardous Location Self-Regulating Low Temperature			
HSRL	Self-Regulating, Low Temperature Heating Cable			
	Code	**Output (W/Ft.)**		
	3	Three		
	5	Five		
	8	Eight		
	10	Ten		
		Code	**Voltage**	
		1	120	
		2	240	
			Code	**Standard Braid & Overjacket**
			CT	Tinned copper metallic braid for ground path fluoropolymer corrosion resistant overjacket. Specifically tested for Division I environments.
HSRL	**3**	**1**	**CT**	**Typical Model Number**

Note 1 — Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 *— Thermal output is determined per IEEE 515-1997 Standard for testing, design, installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.*

Accessories

Description		Model
Power Connection	Heat trace to electrical service connection	HL-PC/ELPK-E-012
T- Splice	Electrical connection for 3 cables	HL-T
In-Line Splice	Electrical connection for 2 cables	HL-S
End Seal	For terminating cable	HL-ES/KRT-TES
Thermostat	Ambient air sensing thermostat	B-121
	Line sensing thermostat	E-121
		E-122
		E-122P

To Order — Please refer to HL Connection Accessories

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
HSRL 3	2.4	-20	2.6	-13	3.4	+15
HSRL 5	4.1	-18	4.5	-10	5.6	+13
HSRL 8	6.88	-14	7.28	-9	8.96	+12
HSRL 10	8.7	-13	9.2	-8	11.1	+10

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

Cable Rating	50°F Start-Up (Ft.)						0°F Start-Up (Ft.)						-20°F Start-Up (Ft.)					
	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A
HSRL3-1CT	205	305	360	NR	NR	NR	135	200	270	330	360	NR	120	185	245	300	360	NR
HSRL3-2CT	400	600	660	NR	NR	NR	275	415	555	660	NR	NR	245	370	495	600	660	NR
HSRL5-1CT	125	185	250	270	NR	NR	90	135	180	225	270	NR	80	120	160	205	245	270
HSRL5-2CT	250	375	505	540	NR	NR	180	270	360	450	540	NR	160	245	325	405	490	540
HSRL8-1CT	100	150	200	215	NR	NR	70	110	145	180	215	NR	65	100	130	165	200	210
HSRL8-2CT	185	285	375	420	NR	NR	135	200	265	335	395	420	120	175	235	300	350	420
HSRL10-1CT	60	95	130	160	180	NR	50	80	105	130	155	180	45	70	95	120	140	180
HSRL10-2CT	100	160	210	260	315	360	80	125	170	210	255	340	75	120	160	195	240	320

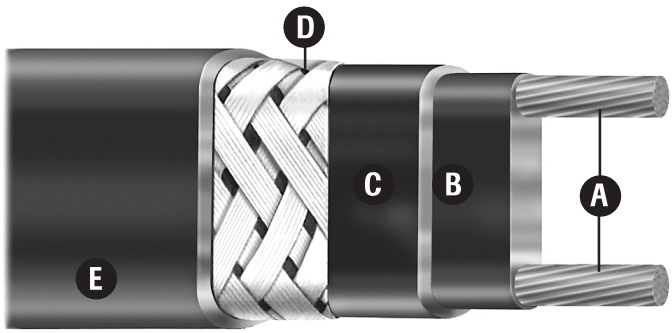
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

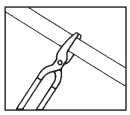
HSRL/S

Self-Regulating Low Temperature

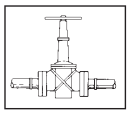
FM

- **Self- Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 660 Feet**
- **Process Temperature Maintenance to 150°F (65°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 185°F (85°C)**
- **Available in 3, 5, 8, and 10 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**

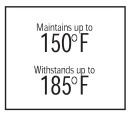




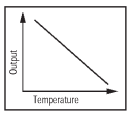
Cut to Length in Field



Can be Single Overlapped



Low Temperature



Self Regulating Output

Description

Chromalox HSRL/S self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and optional overjacketing, HSRL/S ensures operating integrity in Div. 1 hazardous environments. HSRL/S heating cable has a maximum maintenance temperature rating of 150°F (65°F).

Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Features

- Energy efficient, self-regulating HSRL/S uses less energy when less heat is required.
- Easy to install, HSRL/S can be cut to any length (up to max circuit length) in the field.
- HSRL/S features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRL/S can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.

Construction

A **Twin 16 AWG Copper Buss Wires—** Provide reliable electric current capability.

B **Semiconductive Polymer Core Matrix—** "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C **Polyolefin Jacket—** Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.

D **Tinned Copper Braid—** Provides additional mechanical protection in any environment and a positive ground path.

E **High Temperature Fluoropolymer Overjacket—** Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

Approvals

- FM Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 3 Watt rated T6 temperature class
- 5 and 8 Watt rated T5 temperature class
- 10 Watt rated T4A temperature class

HSRL/S

Self-Regulating Low Temperature *(cont'd.)*

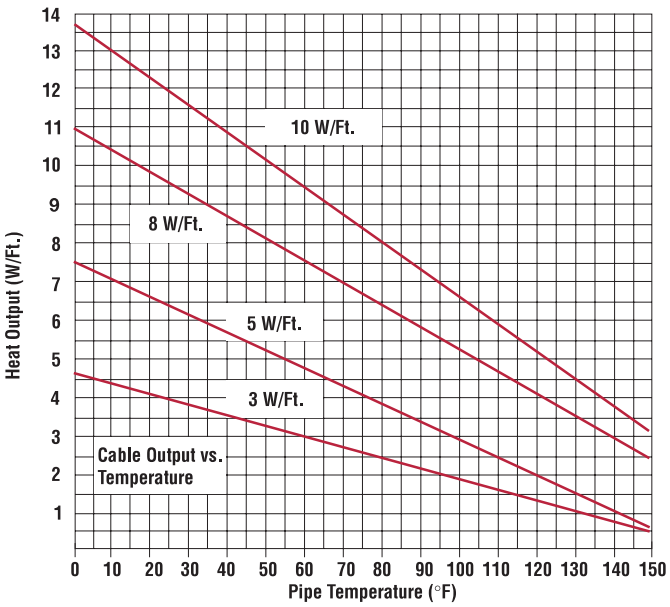
Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model	Hazardous Location Self-Regulating Low Temperature			
HSRL/S	Self-Regulating, Low Temperature Heating Cable			
	Code	**Output (W/Ft.)**		
	3	Three		
	5	Five		
	8	Eight		
	10	Ten		
	Code	**Voltage**		
	1	120		
	2	240		
		Code	**Standard Braid & Overjacket**	
		CT		
HSRL/S	**3**	**1**	**CT**	**Typical Model Number**

Note 1 — Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design, installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Description		Model
Power Connection	Heat trace to electrical service connection	HL-PC/ELPK-E-012
T- Splice	Electrical connection for 3 cables	HL-T
In-Line Splice	Electrical connection for 2 cables	HL-S
End Seal	For terminating cable	HL-ES/KRT-TES
Thermostat	Ambient air sensing thermostat	B-121
	Line sensing thermostat	E-121
		E-122
		E-122P

To Order — Please refer to HL Connection Accessories

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
HSRL/S 3	2.4	-20	2.6	-13	3.4	+15
HSRL/S 5	4.1	-18	4.5	-10	5.6	+13
HSRL/S 8	6.88	-14	7.28	-9	8.96	+12
HSRL/S 10	8.7	-13	9.2	-8	11.1	+10

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

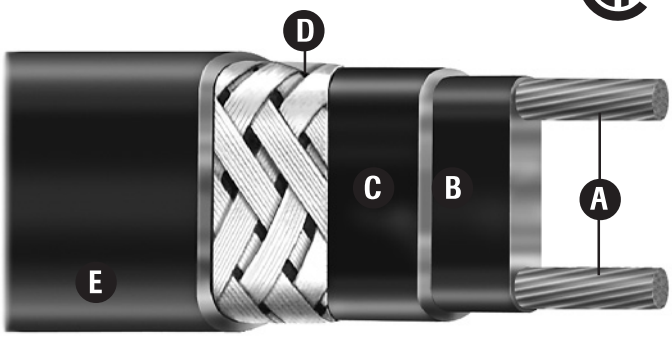
Cable Rating	50°F Start-Up (Ft.)						0°F Start-Up (Ft.)						-20°F Start-Up (Ft.)					
	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A	10A	15A	20A	25A	30A	40A
HSRL/S 3-1CT	205	305	360	NR	NR	NR	135	200	270	330	360	NR	120	185	245	300	360	NR
HSRL/S 3-2CT	400	600	660	NR	NR	NR	275	415	555	660	NR	NR	245	370	495	600	660	NR
HSRL/S5-1CT	125	185	250	270	NR	NR	90	135	180	225	270	NR	80	120	160	205	245	270
HSRL/S5-2CT	250	375	505	540	NR	NR	180	270	360	450	540	NR	160	245	325	405	490	540
HSRL/S8-1CT	100	150	200	215	NR	NR	70	110	145	180	215	NR	65	100	130	165	200	210
HSRL/S8-2CT	185	285	375	420	NR	NR	135	200	265	335	395	420	120	175	235	300	350	420
HSRL/S10-1CT	60	95	130	160	180	NR	50	80	105	130	155	180	45	70	95	120	140	180
HSRL/S10-2CT	100	160	210	260	315	360	80	125	170	210	255	340	75	120	160	195	240	320

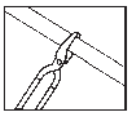
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

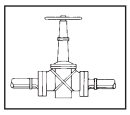
HSRM

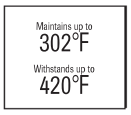
Self-Regulating Medium Temperature

- **Self- Regulating, Energy Efficient**
- **14 AWG Buss Wire**
- **Circuit Lengths to 780 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Freeze Protection of Fire Protection System Piping**
- **Available in 5, 8, 10, 15 and 20 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**
- **Approximate Size 1/2"W x 1/4"H**
- **Minimum Bend Radius 1-1/2"**
- **For Use on Metallic Pipes Only**

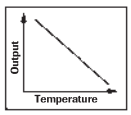



Cut to Length in Field


Can be Overlapped



Medium Temperature



Self Regulating Output

Description

Chromalox HSRM self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 14 AWG buss wire with a tinned copper braid and fluoropolymer overjacket, HSRM ensures operating integrity in Div. 1 hazardous environments. HSRM heating cable has a maximum maintenance temperature rating of 302°F (150°C) and a maximum exposure temperature of 420˚F (215˚C).

Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Features

- Energy efficient, self-regulating HSRM uses less energy when less heat is required.
- Easy to install, HSRM can be cut to any length (up to max circuit length) in the field.
- HSRM features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRM can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.

Construction

A Twin 14 AWG Copper Buss Wires—Provide reliable electric current capability.

B Semiconductive Polymer Core Matrix— "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C Fluoropolymer Jacket— Flame retardant electrically insulates the matrix and provides corrosion resistance.

D Tinned Copper Braid— Provides additional mechanical protection in any environment and a positive ground path.

E High Temperature Fluoropolymer Overjacket— Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

Approvals

FM Approved
- UL Listed for freeze protection of fire system piping
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 5 and 8 Watt rated T3C Temperature Class
- 10 Watt rated T3A Temperature Class
- 15 and 20 Watt rated T2C Temperature Class

CSA Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- 5 and 8 Watt rated T3C Temperature Class
- 10 Watt rated T3A Temperature Class
- 15 and 20 Watt rated T2C Temperature Class

HSRM

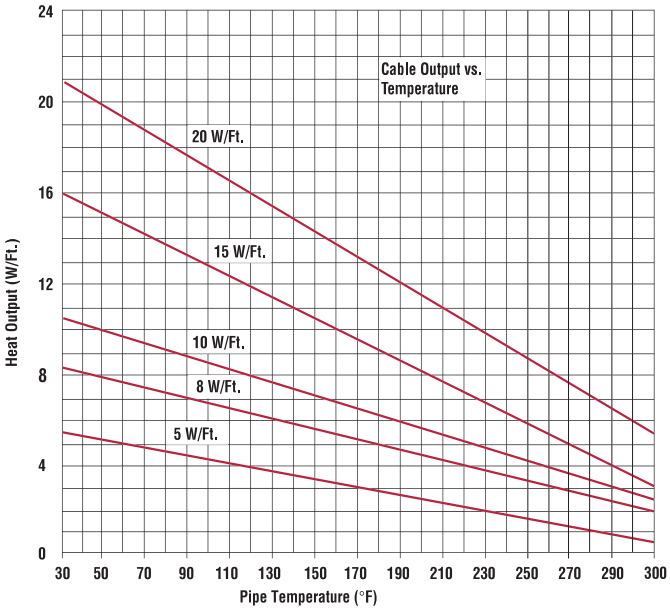
Self-Regulating Medium Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.
Note — Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Model	Hazardous Location Self-Regulating Medium Temperature			
HSRM	Self-Regulating, Medium Temperature Heating Cable			
	Code	Output (W/Ft.)		
	5	Five		
	8	Eight		
	10	Ten		
	15	Fifteen		
	20	Twenty		
		Code	Voltage	
		1	120	
		2	240	
			Code	Standard Braid & Overcoat Option s
			CT	Tinned copper braid for ground path fluoropolymer overjacket specifically tested for Division I environments
HSRM	8	1	CT	Typical Model Number

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design, installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Description		Model
Power Connection	Heat trace to electrical service connection	HL-PC/ELPK-E-012
T- Splice	Electrical connection for 3 circuits	HL-T
In-Line Splice	Electrical connection for 2 circuits	HL-S
End Seal	For terminating cable	HL-ES/KRT-TES
Thermostat	Ambient air sensing thermostat	B-121
	Line sensing thermostat	E-121
		E-122
		E-122P

To Order — Please refer to HL Connection Accessories

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
HSRM 5	3.85	-23	4.25	-15	6.45	+23
HSRM 8	6.4	-20	6.88	-14	10.24	+22
HSRM 10	8.3	-17	8.80	-12	12.50	+20
HSRM 15	12.75	-15	13.50	-10	18.45	+19
HSRM 20	17.6	-12	18.40	-8	24.40	+19

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

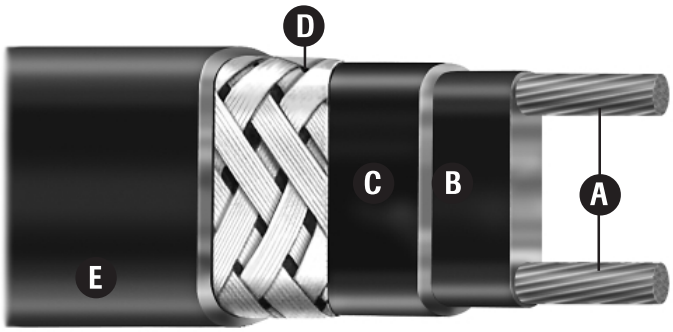
Cable Rating	50°F Start-Up (Ft.)					0°F Start-Up (Ft.)					-20°F Start-Up (Ft.)				
	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A
HSRM 5-1	180	240	360	375	NA	165	220	330	375	NA	155	210	310	375	NA
HSRM 5-2	360	480	720	750	NA	325	430	645	750	NA	310	415	620	750	NA
HSRM 8-1	145	190	285	325	NA	135	175	265	325	NA	130	165	250	325	NA
HSRM 8-2	285	380	575	650	NA	255	345	520	650	NA	245	335	490	650	NA
HSRM 10-1	95	125	190	250	NA	90	110	175	250	NA	85	100	170	245	250
HSRM 10-2	190	255	385	490	NA	165	225	345	490	NA	155	215	330	470	490
HSRM 15-1	70	95	145	190	210	65	85	125	165	210	60	80	120	150	210
HSRM 15-2	145	190	290	385	420	120	175	270	360	420	115	165	260	340	420
HSRM 20-1	60	75	115	155	160	50	65	105	140	160	45	65	100	135	160
HSRM 20-1	115	155	230	305	350	100	135	200	270	350	90	130	195	255	335

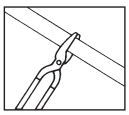
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

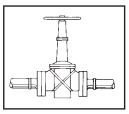
HSRM/S

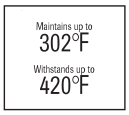
Self-Regulating Medium Temperature

◀FM▶

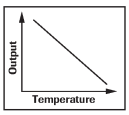



Cut to Length in Field


Can be Overlapped



Medium Temperature



Self Regulating Output

- **Self- Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 710 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Available in 5, 8, 10, 15 and 20 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**

Description

Chromalox HSRM/S self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and optional overjacketing, HSRM/S ensures operating integrity in Div. 1 hazardous environments. HSRM/S heating cable has a maximum maintenance temperature rating of 420°F (215°C).

Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Features

- Energy efficient, self-regulating HSRM/S uses less energy when less heat is required.
- Easy to install, HSRM/S can be cut to any length (up to max circuit length) in the field.
- HSRM/S features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRM/S can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.

Construction

Ⓐ **Twin 16 AWG Copper Buss Wires—** Provide reliable electric current capability.

Ⓑ **Semiconductive Polymer Core Matrix—** "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

Ⓒ **Fluoropolymer Jacket—** Flame retardant electrically insulates the matrix and provides corrosion resistance.

Ⓓ **Tinned Copper Braid—** Provides additional mechanical protection in any environment and a positive ground path.

Ⓔ **High Temperature Fluoropolymer Overjacket—** Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

Approvals

FM Approved

- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 5 and 8 Watt rated T3C Temperature Class
- 10 Watt rated T3A Temperature Class
- 15 and 20 Watt rated T2C Temperature Class

HSRM/S

Self-Regulating Medium Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.
Note — Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Model	Hazardous Location Self-Regulating Medium Temperature
HSRM/S	Self-Regulating, Low Temperatue Heating Cable

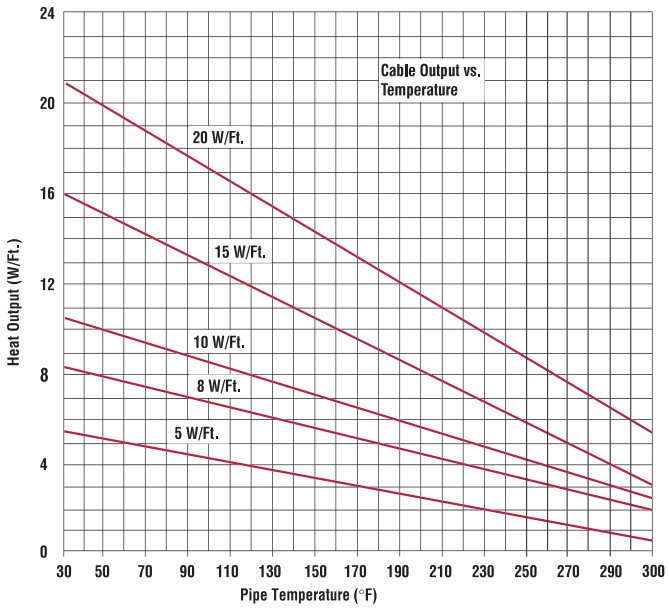
Code	Output (W/Ft.)
5	Five
8	Eight
10	Ten
15	Fifteen
20	Twenty

Code	Voltage
1	120
2	240

Code	Standard Braid & Overcoat Options
CT	

HSRM/S	8	1	CT	Typical Model Number

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design, installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Description		Model
Power Connection	Heat trace to electrical service connection	HL-PC/ELPK-E-012
T- Splice	Electrical connection for 3 circuits	HL-T
In-Line Splice	Electrical connection for 2 circuits	HL-S
End Seal	For terminating cable	HL-ES/KRT-TES
Thermostat	Ambient air sensing thermostat	B-121
	Line sensing thermostat	E-121
		E-122
		E-122P

To Order — Please refer to HL Connection Accessories

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
HSRM/S 5	3.85	-23	4.25	-15	6.45	+23
HSRM/S 8	6.4	-20	6.88	-14	10.24	+22
HSRM/S 10	8.3	-17	8.80	-12	12.50	+20
HSRM/S 15	12.75	-15	13.50	-10	18.45	+19
HSRM/S 20	17.6	-12	18.40	-8	24.40	+19

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

	50°F Start-Up (Ft.)					0°F Start-Up (Ft.)					-20°F Start-Up (Ft.)				
Cable Rating	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A	15A	20A	30A	40A	50A
HSRM/S 5-1	180	240	355	NR	NR	165	220	330	355	NR	155	210	310	355	NR
HSRM/S 5-2	360	480	710	NR	NR	325	430	645	710	NR	310	415	620	710	NR
HSRM/S 8-1	145	190	285	305	NR	135	175	265	305	NR	130	165	250	305	NR
HSRM/S 8-2	285	380	570	NR	NR	255	345	520	570	NR	245	335	490	570	NR
HSRM/S 10-1	95	125	190	235	NR	90	110	175	235	NR	85	100	170	235	NR
HSRM/S 10-2	190	255	385	465	NR	165	225	345	465	NR	155	215	330	465	NR
HSRM/S 15-1	70	95	145	190	195	65	85	125	165	195	60	80	120	150	195
HSRM/S 15-2	145	190	290	385	395	120	175	270	360	395	115	165	260	340	395
HSRM/S 20-1	60	75	115	150	NR	50	65	105	140	150	45	65	100	135	150
HSRM/S 20-1	115	155	230	305	330	100	135	200	270	330	90	130	195	255	330

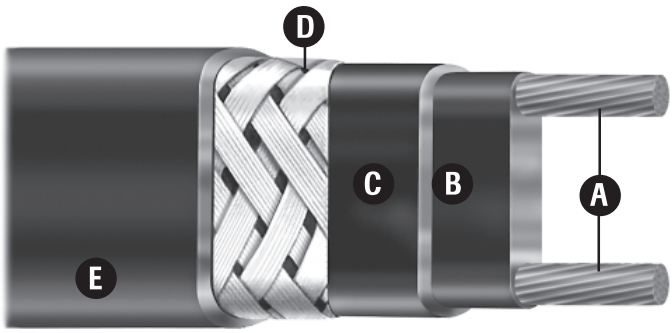
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

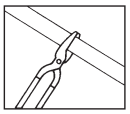
HSRS

Self-Regulating Medium Temperature

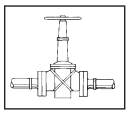
◀FM▶

- **Self- Regulating, Energy Efficient**
- **20 AWG Buss Wire**
- **Circuit Lengths to 360 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Available in 5, 8, 10, 15 and 20 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**





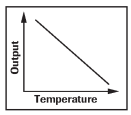
Cut to Length in Field



Can be Overlapped



Medium Temperature



Self Regulating Output

Description

Chromalox HSRS self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 20 AWG buss wire with a tinned copper braid and optional overjacketing, HSRS ensures operating integrity in Div. 1 hazardous environments. HSRS heating cable has a maximum maintenance temperature rating of 420°F (215°C).

Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Features

- Energy efficient, self-regulating HSRS uses less energy when less heat is required.
- Easy to install, HSRS can be cut to any length (up to max circuit length) in the field.
- HSRS features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRS can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.
- Industrial Grade, 20 gauge buss wire has higher flexibility, allowing the cable to be used on tight bending radius.

Construction

A Twin 20 AWG Copper Buss Wires—Provide reliable electric current capability.

B Semiconductive Polymer Core Matrix— "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

C Fluoropolymer Jacket— Flame retardant electrically insulates the matrix and provides corrosion resistance.

D Tinned Copper Braid— Provides additional mechanical protection in any environment and a positive ground path.

E High Temperature Fluoropolymer Overjacket— Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

Approvals

FM Approved

- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 5 and 8 Watt rated T3C Temperature Class
- 10 Watt rated T3A Temperature Class
- 15 and 20 Watt rated T2C Temperature Class

HSRS

Self-Regulating Medium Temperature *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.
Note — Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

Model	Hazardous Location Self-Regulating Medium Temperature
HSRS	Self-Regulating, Low Temperature Heating Cable

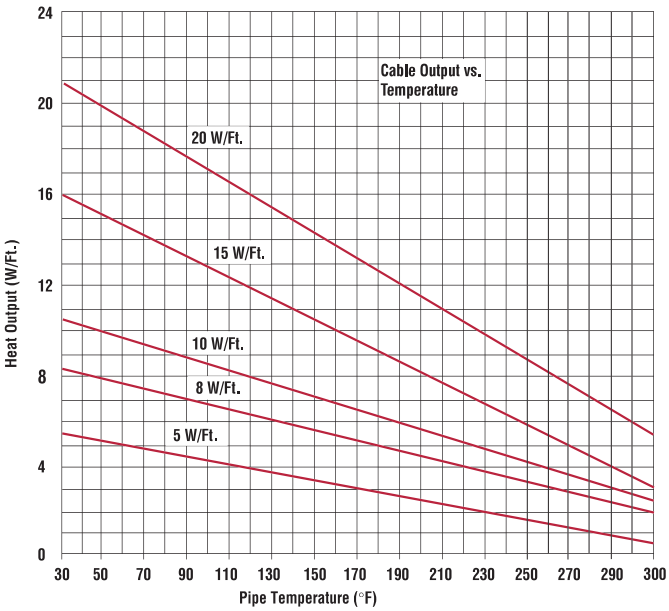
Code	Output (W/Ft.)
5	Five
8	Eight
10	Ten
15	Fifteen
20	Twenty

Code	Voltage
1	120
2	240

Code	Standard Braid & Overcoat Options
CT	

HSRS	8	1	CT	Typical Model Number

Thermal Output Ratings on Insulated Metal Pipe[1]



Note 1 — Thermal output is determined per IEEE 515-1997 Standard for testing, design, installation,and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

Accessories

Description		Model
Power Connection	Heat trace to electrical service connection	HL-PC/ELPK-E-012
T- Splice	Electrical connection for 3 circuits	HL-T
In-Line Splice	Electrical connection for 2 circuits	HL-S
End Seal	For terminating cable	HL-ES/KRT-TES
Thermostat	Ambient air sensing thermostat	B-121
	Line sensing mechanical thermostat	E-121
		E-122
		E-122P

To Order — Please refer to HL Connection Accessories

Output Wattage at Alternate Voltages (W/Ft.)

Model	208V	% Change In Output	220V	% Change In Output	277V	% Change In Output
HSRS 5	3.85	-23	4.25	-15	6.45	+23
HSRS 8	6.4	-20	6.88	-14	10.24	+22
HSRS 10	8.3	-17	8.80	-12	12.50	+20
HSRS 15	12.75	-15	13.50	-10	18.45	+19
HSRS 20	17.6	-12	18.40	-8	24.40	+19

Circuit Breaker Selection (Max. Circuit Lengths in Ft.)

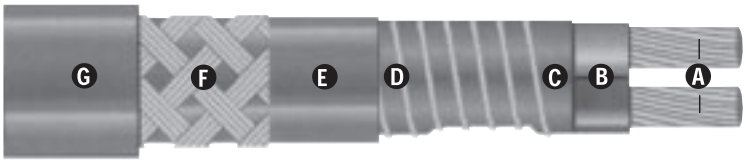
	40°F Start-Up (Ft.)			0°F Start-Up (Ft.)			-20°F Start-Up (Ft.)			-40°F Start-Up (Ft.)		
Cable Rating	5A	10A	15A	5A	10A	15A	5A	10A	15A	5A	10A	15A
HSRS 5-1	60	120	180	55	110	165	50	100	155	45	90	135
HSRS 5-2	120	240	360	110	220	330	100	200	300	90	180	270
HSRS 10-1	30	65	95	25	55	85	25	55	80	20	45	70
HSRS 10-2	65	130	195	55	110	170	55	110	165	45	90	140
HSRS 15-1	25	50	75	20	40	65	20	40	60	18	35	55
HSRS 15-2	50	100	150	40	85	130	40	80	120	35	70	110
HSRS 20-1	20	40	60	18	35	55	17	35	50	15	30	45
HSRS 20-2	40	80	120	35	70	105	35	70	105	30	60	90

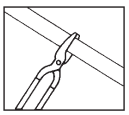
NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

CWM

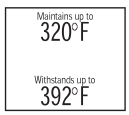
Constant Wattage Medium Temperature

- **Uniform Thermal Output**
- **Accurate, Easy to Control and Monitor**
- **Low Energy Cost**
- **No Inrush at Any Ambient**
- **Industrial/Process and Commercial/Construction Applications**
- **Flexible to Most Any Configuration**
- **Fluoropolymer Jacket**
- **Maximum Exposure Temperature, Power Off, 392°F (200°C)**
- **Steam Cleanable on Process Equipment Up to 190 PSIG (Power Off)**
- **4, 8 and 12 W/Ft.**
- **120, 208 - 277 and 480 Volt From Stock**

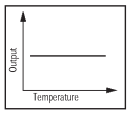




Cut to Length in Field



Medium Temperature



Constant Wattage Output

Description

Chromalox CWM constant wattage heating cable is a proven, reliable solution for industrial process temperature maintenance and freeze protection. CWM features a parallel heating core that produces uniform thermal output over its entire length. Using a single power point, you can easily configure and install a heat tracing system as short as several feet or as long as 780 feet right in the field. System design only requires that you match the CWM cable thermal output to the heat loss of your piping system.

CWM is flexible at most ambient temperatures and can be wrapped around piping and complex fittings. It is rugged, easy to monitor and maintain temperature, and has zero inrush at start-up. With 392°F (200°C) fluoropolymer electrical insulation overjacketing, CWM has outstanding electrical and thermal properties, and is well suited for most chemically hostile environments. An extensive range of wattages and voltages are available immediately from Chromalox stock.

Features

- Durable, non-aging fluoropolymer jacket ensures long service life and can be used in some hostile environments.
- Flexible, easy to install on most equipment and delivers long-term reliable performance.
- Eliminates the need for oversized wiring or switchgear.
- Accurate temperature, reliable electric heat that can be consistently controlled and easily monitored.
- Safe and rugged.
- Parallel circuitry allows cut-to-length.
- High performance, rated to withstand up to 392°F saturated steam (190 psig) temperature (power off).
- Low profile, uses standard size thermal insulation on piping and process equipment.

Construction

A **Twin 12 AWG Copper Buss Wires —** Provide reliable, consistent electrical current.

B **FEP Insulation Jacket —** Electrically insulates buss wires.

C **Pairing Jacket —** Secures two buss wires together and provides wrapping surface for Nichrome wire.

D **Nickel Chromium Wire —** Heating component of the cable.

E **FEP Insulation —** Rugged outer sheath protects heating cable, assures longer service life, and provides protection against environmental application hazards.

F **Tinned Copper Braid —** Plated copper braid increases robust construction, provides ground path and provides additional protection in any location. Suffix "C" in model number.

G **FEP Overjacket (optional) —** Fluoropolymer overjacket, over the braid, provides protection from most aqueous and chemically corrosive solutions. Suffix "T" in model number.

Approvals[1]

UL Listed for ordinary areas.

CSA Certified for ordinary and:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G. Rated T3 Temperature Class[2].

Notes —

1. Depends on specific model.
2. Exception: Cable surface temperature shall not exceed 190°C in Class II, Div. 2, Group F; 165°C in Class II, Div. 2, Group G.

CWM

Constant Wattage Medium Temperature *(cont'd.)*



Specifications

Model	Output (W/Ft.)	Nominal Voltage (Vac)	Circuit Load (Amps/Ft.)	Max. Circuit Length (Ft.)
CWM 4-1CT	4	120	0.033	350
CWM 8-1CT	8	120	0.067	240
CWM 12-1CT	12	120	0.100	200
CWM 4-2CT	4	240	0.017	700
CWM 8-2CT	8	240	0.033	480
CWM 12-2CT	12	240	0.050	400
CWM 12-4CT	12	480	0.025	780

Output Wattage at Various Operating Voltages (Ft.)

Model	120V	208V	220V	240V	277V	480V
CWM 12-1	12	—	—	—	—	—
CWM 8-1	8	—	—	—	—	—
CWM 4-1	4	—	—	—	—	—
CWM 12-2	3	9	10.1	12	—	—
CWM 8-2	2	6	6.7	8	—	—
CWM 4-2	—	3	3.4	4	—	—
CWM 12-4	—	2.3	2.5	3	4	12

Maximum Maintenance Temperatures

Output (W/Ft.)	Temperatures (°F)								
	3	4	6	6.7	8	9	10.1	10.6	12
w/o AT-1 Tape	340	325	293	282	262	246	229	222	200
w/ AT-1 Tape	350	344	332	328	320	314	307	304	296

Accessories

Accessories		Model
Power Connection	Heat trace to electrical service connection	KRT-PC
Splice & Tee		KRT-STK
End Seal	For terminating cable	KRT-RES
Thermostat	Ambient air sensing thermostat	KRT-AST
	Line sensing thermostat	KRT-LST

To Order — General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the General Application Accessories page at the end of this section.

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

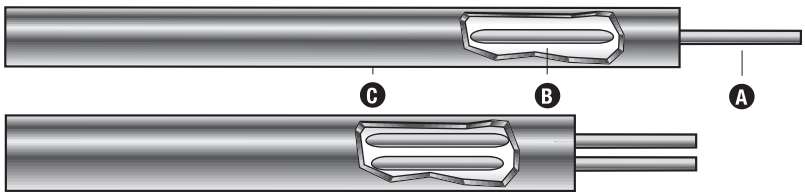
Model	Constant Wattage Medium Temperature		
CWM	Constant Wattage, Medium Temperature Heating Cable		
	Code	Output (W/Ft.)	
	4	Four	
	8	Eight	
	12	Twelve	
	Code	Nominal Voltage (Vac)	
	1	120	
	2	240	
	4	480	
		Code	Braid and Overcoat Options
		C	Standard tinned-copper metallic braid for additional protection and ground path
		CT	Fluoropolymer corrosion resistant overjacket over braid for hostile/ corrosive environments
CWM	5	1	C

Typical Model Number

MI

Mineral Insulated High Temperature

- **Constant Output**
- **Impact Resistant, Heavy Duty Alloy 825 Sheath**
- **Exposure Temperature to 1472°F (800°C)**
- **Any Design Voltage Up to 600 Volt**
- **High Watt Densities Available**
- **Industrial Freeze Protection**
- **Suitable for Hazardous Areas, Div. 1 and Div. 2**
- **Single and Two Conductor Cables Available**



Description

MI mineral insulated heating cable is ideal for rugged industrial pipe tracing applications. Its tough outer sheath of Alloy 825 resists damage during installation and provides a reliable electrical ground for safe operation. MI cable will not burn or support combustion. All materials are inorganic and will not deteriorate with age.

MI cable is made with either one or two conductors, insulated with compacted magnesium oxide for high dielectric strength. Cable assemblies are custom made at the factory to meet your specific needs.

Applications

- Tank Heating
- High Temperature Process Maintenance
- Long, Single Circuit Runs
- Cryogenic Applications
- Freeze Protection

Features

- Mechanically Rugged Design
- Fire Resistant
- Alloy Features High Corrosion Resistance
- Long Circuit Lengths
- Built to Customer Design Specifications
- Series Wiring for Long Lengths
- Includes 10" Pigtails for Wiring Connections.

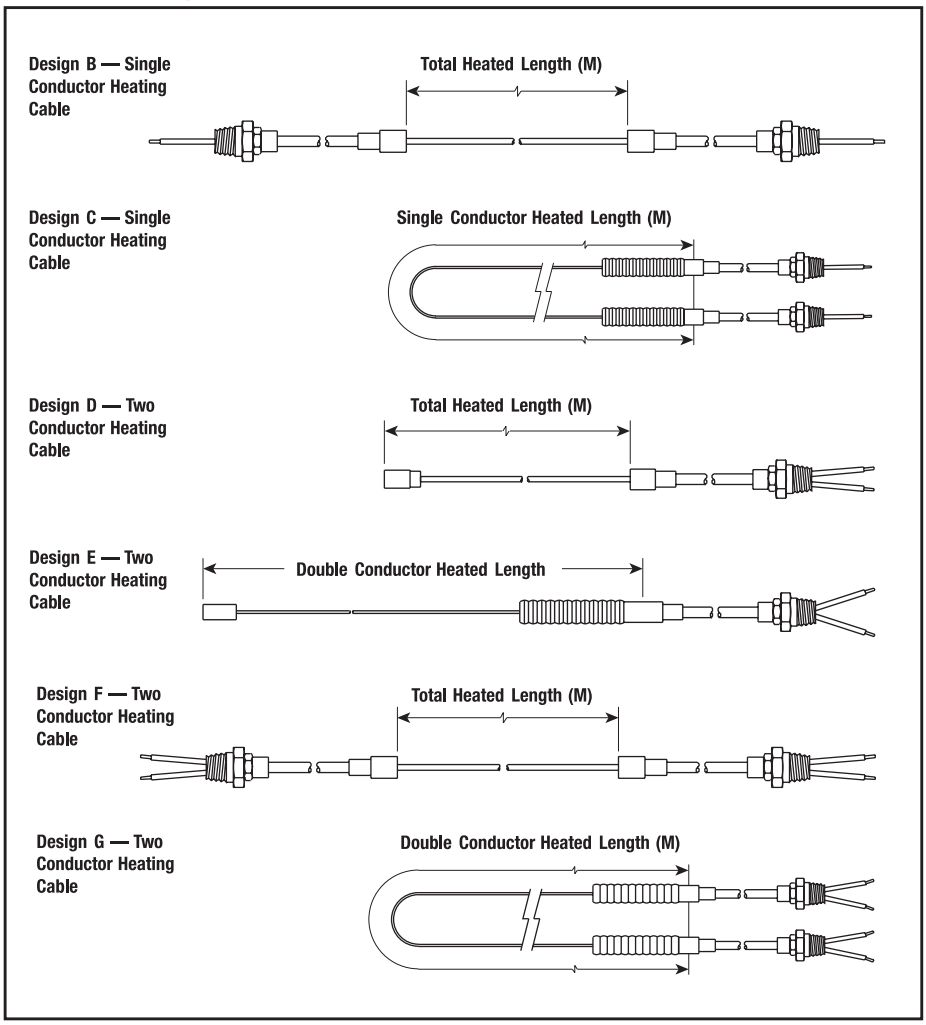
Construction

Ⓐ **Resistance Wire** — One or two resistance wires.

Ⓑ **Insulation** — High grade densely compacted mineral insulation.

Ⓒ **Sheath** — Heavy Duty Alloy 825 Metallic Sheath.

Cable Set Configurations



Note — Standard cable sets include 1.0 Meter non-heating cable with 10" pigtails, brazed to customer specified length of MI heating cable. Gland fittings are PF 1/2", PF 3/4" (metric also available).

MI

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

High Temperature

For applications with maintenance or exposure temperatures of 800°C or above, cable set configuration C, E or G should be used. These configurations include a 12" transition fitting to reduce the temperature at the hot-to-cold joint. The transition fitting should be positioned outside the thermal insulation to provide long and reliable service life. Contact the Chromalox surface heating group for assistance with the design of high temperature applications.

Cable Design for Pipes

Step 1 — Heater Design
Determine heater design to use. Design D is usually the most convenient design using two conductor cable.

Step 2 — Heat Loss (W/M) Use the value calculated from Technical section - Heat Loss Calculations, Pipe & Tank Tracing.

Step 3 — Cable Length (L)
Use the length calculated from Application & Selections Guidelines in this section.

Step 4 — Supply Voltage Available (V)
Determine what voltage is available. When different voltages are available, it provides multiple cable choices which may result in a more accurate design.

Step 5 — Calculate Resistance per Meter (R/M)

$$R/M = \frac{V^2}{W/M \times L^2}$$

Step 6 — Select the Meter (R/M) Rating
Choose a cable having equal or the next lower resistance per Meter value from Ordering Information Table, next page.

Step 7 — Calculate Actual W/M. and total wattage (W)

$$W/M = \frac{V^2}{R/M \times L^2}$$

$$W = W/M \times L$$

Step 8 — Determine Current Draw (I)

$$I = \frac{W}{V}$$

Step 9 — Select Heater Single or Double Conductor Cold Lead Length
The cold lead length is determined by the customer or by using a nominal 1.0 Meter. All cold leads are 6.0~8.0mm WG with 40 Amp maximum current capacity.

Step 10 — Convert Design to a Model Number

Ordering Information

To Order —
Complete the Model Number using the Matrix provided.

If applicable, specify hazardous location classifications.

Model	Mineral Insulated High Temperature
B	MI Heater Set Design
Code	
1H01247SA	MI Heater Cable Catalog Reference
Code	
110 M	Heater Set Length in Meter (±1%)
Code	
1052W	Heater Set Wattage
Code	
380V	Operating Voltage
Code	
1M	Cold Lead Length
Code	
4.0	Pigtail Sqmm

B	1H01247SA	110M	1052W	380V	1M	4.0	Typical Model Number

MI

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

600V Single Conductor Stainless Steel Sheathed Heating Cable

Cable Reference	Resistance (ohm/m@20°C)	Diameter (mm)	Max. Unjointed Length (m)	Weight (kg/km)
600V Single Conductor				
1H06562SA	6.562	3.5	541	68
1H05249SA	5.249	4.0	450	83
1H04265SA	4.265	4.0	450	83
1H03281SA	3.281	4.0	450	83
1H02789SA	2.789	4.0	396	83
1H02297SA	2.297	4.0	450	83
1H01640SA	1.640	4.0	354	107
1H01247SA	1.247	4.0	354	107
1H00984SA	0.984	4.0	354	107
1H00820SB	0.820	4.0	366	107
1H00656SB	0.656	4.0	354	107
1H00558SB	0.558	4.0	354	107
1H00492SB	0.492	4.0	354	109
1H00328SB	0.328	4.0	299	131
1H00262SB	0.262	4.0	250	158
1H00230SB	0.230	4.0	299	135
1H00197SB	0.197	4.0	250	162
1H00131SB	0.131	4.0	192	214
1H00118SB	0.118	4.0	183	79
1H00098SB	0.098	5.0	192	223
1H00066SQ	0.066	5.0	299	131
1H00052SC	0.052	5.0	183	79
1H00043SC	0.043	5.0	183	79
1H00033SL	0.033	4.0	328	115
1H00021SL	0.021358	4.0	296	129
1H00013SL	0.013418	5.0	259	151
1H00008SL	0.008464	6.0	204	195
1H00005SL	0.005315	6.0	183	226
1H00003SL	0.003346	7.0	143	298
1H00002SL	0.00210	8.0	114	388

(EX) 1 (a) H (b) 01247 (c) S (d) A (e)

	Marking	Description
a)	1 or 2	number of conductors
b)	H or L	maximum voltage rating H=600V, L=300V
C)	5 dightnumber	resistance (01247=1.247 Ohm / m@20°C)
d)	S or C	sheath material
	S825=Alloy 825 S600=Alloy 600 S310=AISI 310 S446=AISI 446 S316=AISI 316L S321=AISI 321 S304=AISI 304 CN=Cupronickel C=Copper CH=Copper with HDPE jacket	
e)	A,D,C,T,F,E,Q,B,L,R,P	Conductor material
	A=Nichrome A, D=Everdur 655, C=Copper, T=Alloy 180, F=Nichrome P=Alloy30 E=Everdur 651, Q=Alloy60, B=Constantan, L=Ni-Clad Cu, R=Alloy90	

Note – 1) Tolerance on conductor resistance is ± 5% for all 600 volt 1/C cables.
2) The maximum recommended loading is 210 watts per meter for all 600 volt 1/C cables.
3) For pipe tracing, the maximum recommended watts per meter of cable may be reduced to the pipe maintain or process temperature.
4) Minimum bend radius is 5 times nominal cable diameter.

MI

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

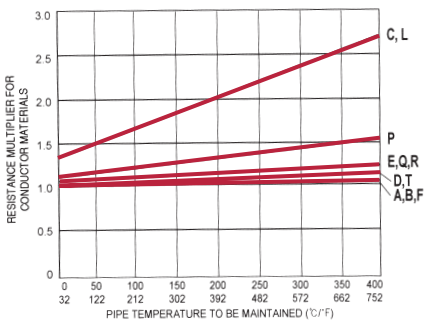
300V Double Conductor Stainless Steel Sheathed Heating Cable

Cable Reference	Resistance (ohm/m@20°C)	Diameter (mm)	Max. Unjointed Length (m)	Weight (kg/km)
300V Double Conductor				
2L36089SF	36.089	2.4	671	57
2L29527SF	29.527	2.4	610	58
2L24606SA	24.606	2.4	610	58
2L19685SA	19.685	2.6	622	60
2L16404SA	16.404	2.6	564	64
2L13123SA	13.123	2.6	541	70
2L09022SA	9.022	3.0	541	70
2L08202SA	8.202	3.0	549	70
2L06562SA	6.562	4.0	354	107
2L05577SA	5.577	4.0	450	85
2L04593SA	4.593	4.0	396	98
2L03281SA	3.281	4.5	299	131
2L02297SB	2.297	4.5	450	86
2L01968ST	1.968	4.8	183	79
2L01640SB	1.640	4.8	299	129
2L01312SR	1.312	4.8	183	79
2L00984SB	0.984	5.0	250	158
2L00820SQ	0.820	5.0	183	79
2L00656SQ	0.656	4.0	541	71
2L00492SQ	0.492	4.0	450	86
2L00410SP	0.410	4.5	183	79
2L00328SQ	0.328	4.5	354	110
2L00279SP	0.279	5.0	183	79
2L00230SQ	0.230	5.0	299	133
2L00164SQ	0.164	5.0	250	161
2L00131SC	0.131	5.0	183	79
2L00115SC	0.115	5.0	183	79
2L00098SC	0.098	5.0	183	79

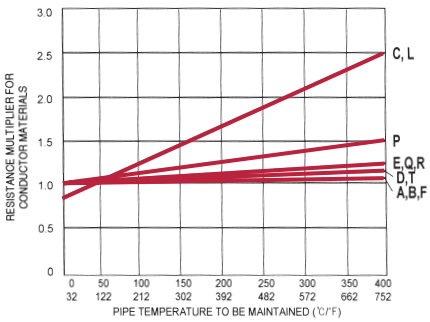
Note – 1) Tolerance on conductor resistance is ± 5% for all 300 volt 2/C cables.
2) The maximum recommended loading is 197 watts per meter for all 300 volt 2/C cables.
3) For pipe tracing, the maximum recommended watts per meter of cable may be reduced to the pipe maintain or process temperature.
4) Minimum bend radius is 5 times nominal cable diameter.

Resistance Correction Factor

POWER ON



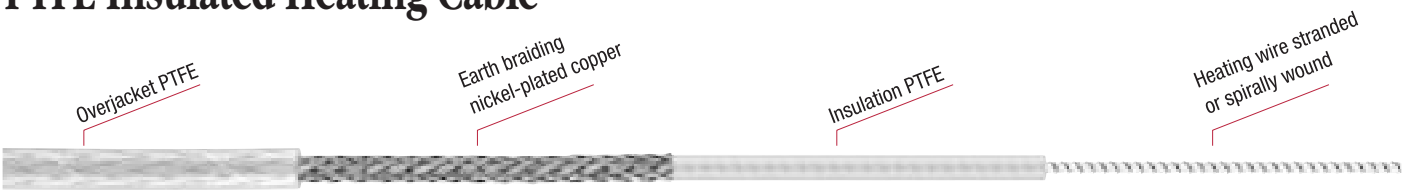
POWER OFF



PTFE

up to 250°C

PTFE Insulated Heating Cable



Description of heating cable

- **High chemical resistance**
- **For all types of applications**
- **Durable**
- **High operating temperature**
- **May be used in liquids**

Applications:

For use on appliances, containers, pipes, valves and many others, in highly corrosive atmosphere. Except for the power connections, the cable may be installed in liquids.
This product is also available for hazardous areas.

Technical Data

Insulation . . . . . PTFE
Earth braiding . . . . . nickel-plated copper
Overjacket . . . . . PTFE
Nominal temperature . . . . . 220°C
Nominal voltage 500V
Max. loading. . . . . 30W/m★
Max. operating temperature★
Min. bending radius. 20mm
Min. installation
temperature. . . . . –50°C
Moisture protected . . . . . yes

Standards

Manufactured according toDIN VDE 0253
El. code NH5YI1Q5YI1 220
VDE-No. 40001594
Classification . . . . . Ⓔx II 2G EEx e II T3, T4, T5
Cer tificate . . . . . LCIE 01 ATEX 6048 X

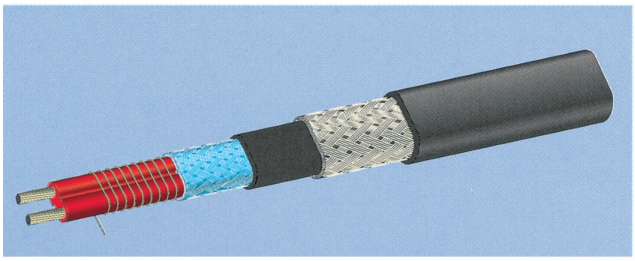
★ Note: Lower loading allows a higher operating temperature. Higher loading is possible, depending on the heat transfer. Is the cable to be operated close to the nominal temperature? Ask us!

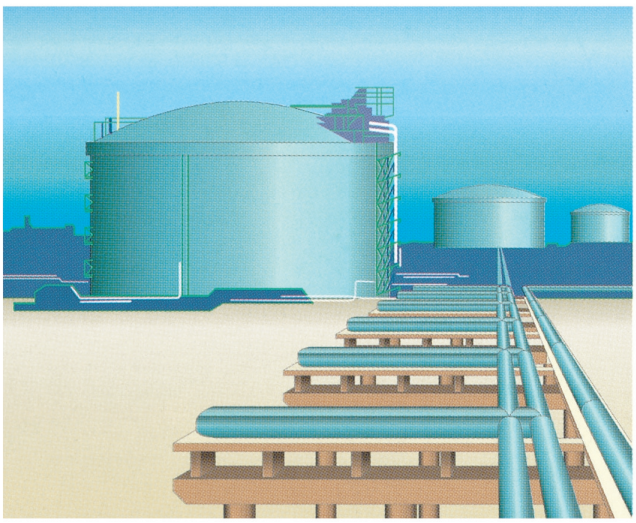
★★ 2.5 mm^2 as coldend usable
★★★ 1.5 mm^2 as coldend usable

Resistance [Ω/km]	OD [mm]	Heating wire	Temperature coefficient [1/100K]
0.0117	5.1	stranded	1.43
0.0263	4.7	stranded	1.43
0.034	4.6	stranded	1.43
0.05	4.9	stranded	1.3
0.08	4.6	stranded	1.3
0.1	5.1	stranded	1.04
0.14	4.9	stranded	1.04
0.16	4.8	stranded	1.04
0.2	4.8	stranded	1.04
0.26	4.6	stranded	1.04
0.34	4.4	stranded	1.04
0.43	4.6	stranded	1.0018
0.51	4.5	stranded	1.0018
0.53	4.5	stranded	1.0018
0.68	4.4	stranded	1.0018
1.0	4.5	stranded	1
1.25	4.4	stranded	1
1.44	4.3	stranded	1
1.75	4.3	stranded	1
2.06	4.5	stranded	1.029
2.5	4.4	stranded	1.029
3.1	4.8	spirally	1.04
3.4	4.8	wound	1.04
4.0	4.8	spirally	1.018
4.4	5.3	stranded	1.43
4.7	4.8	wound	1.018
5.7	4.8	spirally	1.018
7	4.8	wound	1.018
7.1	4.7	stranded	1.43
9	4.8	spirally	1.018
11	4.8	wound	1.018
13	4.8	spirally	1
15	4.8	wound	1
20	4.8	spirally	1
25	4.8	wound	1
30	4.8	spirally	1
40	4.8	wound	1
50	4.8	spirally	1
60	4.8	wound	1
80	4.8	spirally	1
100	4.8	wound	1.006
117	4.8	spirally	1.029
160	4.8	wound	1.029
200	4.8	spirally	1.006
300	4.8	wound	1.006
450	4.8	spirally	1.006
600	4.8	wound	1.006
1500	4.8	spirally	1.002

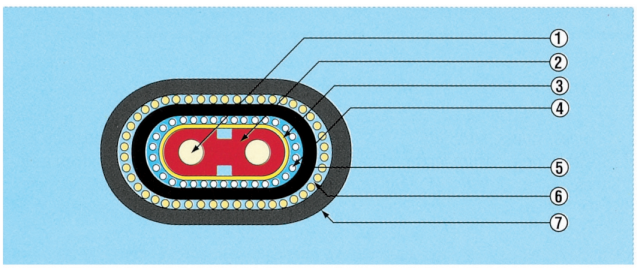
CWLNG

Conatant wattage cable for LNG tanks





- *Constant wattage cables for base heating and frost heave prevention. Specifically designed for LNG / LPG / and Anonia tanks located* ***in Hazardous Areas***
- *The cable is threaded through parallel galvanised steel tubes, spaced 1m apart and set in concret.*
- *The reinforced design allows easy installation especially whilst drawing the cable through the steel tubes and high resistance to high moisture, chemical atmospheres and hydrocarbor corrosion*
- *Parallel construction allows the cable to be cut to length, terminated, and spliced on site by the fitter, or can be supplied as finished complete with non heating sections (i.e. cold lead and links between tubes)*
- *Nominal voltage 230 or 415 Volts (Insulation test 4000 V)*
- *Available 20 W/m, 25 W/m or 30 W/m output*
- *Control panels are designed to suite each project / application and can be installed within the hazardous location (Pressurised* ***EX "p"*** *design) or located out of the zoned area.*



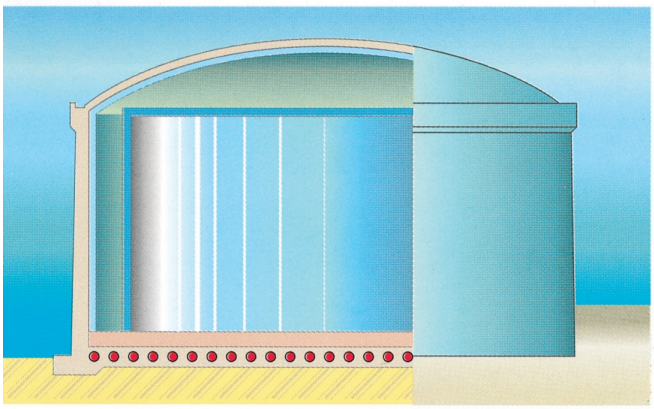
1 – Internal supply wires (4 sq.mm)

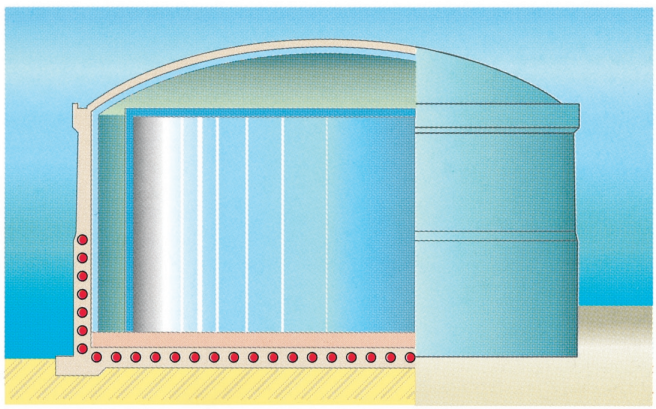
2 – Silicone rubber first insulation

3 – Chromium-nickel heating wire
4 – Coated glass braid
5 – FEP fluoropolymer jacket
6 – Tinned copper braid
7 – FEP fluoropolymer overjacket

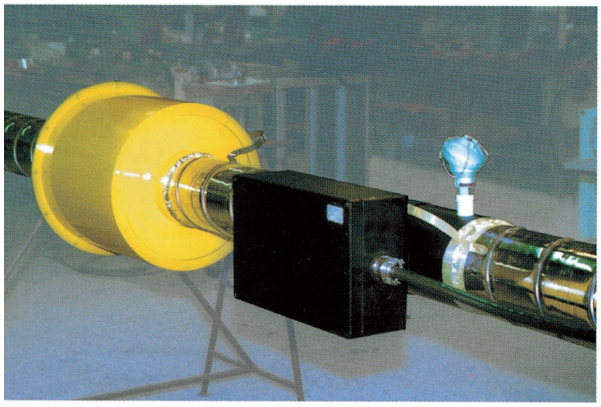
Maximum exposure temperature (power off) : 205° C (peaks up to 230° C)

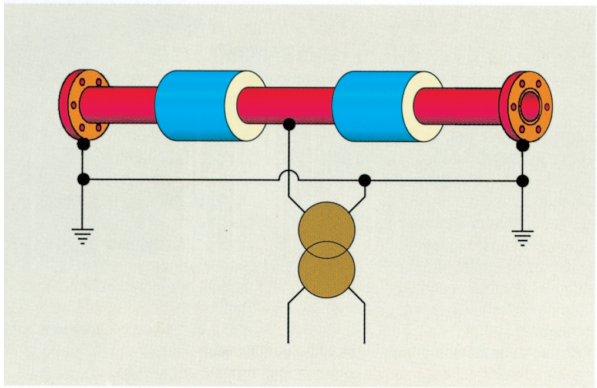
Output	Nominal voltage	Reference	Heating modules length	Max length of heating cables
20 W/m	230 V	**CWLNG20 - 2CT**	1 m	160 m
	415 V	**CWLNG20 - 4CT**	1,5 m	230 m
25 W/m	230 V	**CWLNG25 - 2CT**	1 m	150 m
	415 V	**CWLNG25 - 4CT**	1,5 m	220 m
30 W/m	230 V	**CWLNG30 - 2CT**	1 m	135 m
	415 V	**CWLNG30 - 4CT**	1,5 m	210 m





TTPC
Impedance trace heating





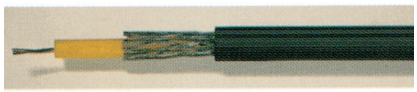
- Homogenous temperature, precision control and low temperature differential between fluid and pipe.
- Large wall surface area for heat exchange and capability of high wattages for rapid temperature rise.
- Suitable for fluids which must be decongealed when restarting
- Simplicity, robustness, low maintenance
- Low operating cost

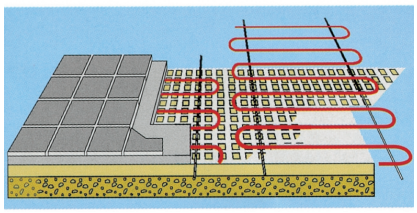
- possible **ATEX - ExII3G/T3,T4,T5,ouT6** certified variation for using up to 200 °C in hazardous areas

- The heating is obtained by Joule Effect on pipes which are supplied at each end by a very low voltage.
- The ohmic value of each length then produces the suitable thermal dissipation.
- This one pass on to the fluid though the whole area of the internal wall, with a low watt density and with a reduced $\Delta t°$, even if the total output is important.
- These pipes have to be electrically insulated from their supports, and only the pre insulated pipes proposed by CHROMALOX will be allowed in hazardous area.

- This technology can be also used as a circulation heater for fluids which have thermal sensitivity, viscosity, pressure, or outlet temperature hardly compatible with a conventional technology using sheathed imersion heaters in additional vessels.

SPS-T
Frame work heating cable for ground





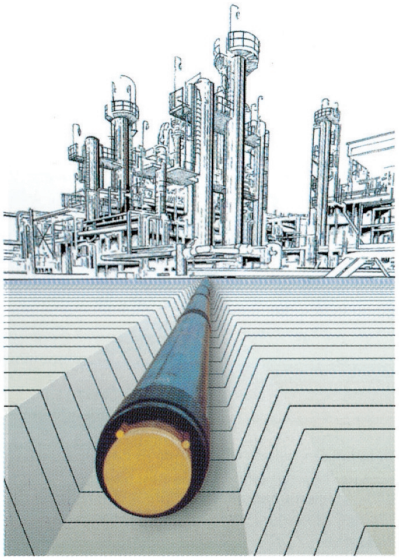
- Heating cables with PRC insulation / metalic braid / and HDP overjacket distributed on framework for setting in concrete, in accordance with NFC 32 230
- Applications :
  - Freeze protection of ground in cold rooms
  - De-icing of external access ways
  - Floor heating in small industrial premises

See our SPS range on page 048 for the choice for the used cables

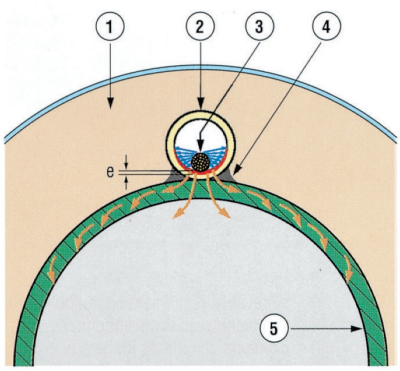
MI long line heat tracing cable

Cable Reference Bare Cable : CC LSF Covered : CCX	Conductor		Cable Diameter(mm)		max. conductor resistance @20°C ohm/km	approximate longest coil length (m)
	No.	Size (mm)	Bare	LSF		
1HH4	1	4	5.1	6.6	4.61	923
1HH6	1	6	6.4	7.7	3.08	719
1HH10	1	10	7.3	8.8	1.83	574
1HH16	1	16	8.3	9.8	1.16	446
1HH25	1	25	9.6	11.1	0.727	333
1HH35	1	35	10.7	12.2	0.524	273
1HH50	1	50	12.1	13.6	0.387	218
1HH70	1	70	13.7	15.2	0.268	174
1HH95	1	95	15.4	17.4	0.193	132
2HH1.5	2	1.5	7.9	9.4	12.1	511
2HH2.5	2	2.5	8.7	10.2	7.41	379
2HH4	2	4	9.8	11.3	4.61	326
2HH6	2	6	10.9	12.4	3.08	255
2HH10	2	10	12.7	14.2	1.83	197
2HH16	2	16	14.7	16.2	1.15	149
2HH25	2	25	17.1	19.1	0.727	107

TTEP
Skin effect trace heating



- For temperature maintenance up to 150 °C
- For very long pipes (up to 25 km) with only 1 supply connection
- Technology applicable to elevated, buried, or immersed pipes
- Voltage up 2500 VAC
- High robustness (polyfluored insulation jacket is heat, corrosion, rending, corona effect resistant / cables protected by steel tube)
- No maintenance and possible exchange of cable without removing of insulation
- No residual voltage on external face of tube and pipe / Earth connected / No effect on cathodic protective device
- Low temperature gap betwen cable, tube, and pipe



1. Insulation
2. Heating steel tube (DN20)
3. Special "skin effect" cable
4. Thermal junction — Electric current focusing
5. Traced pipe — Heating transfer

- The pipe being maintained at temperature is fitted with one or several small steel tubes set on pipe generants by welding or by rings
- A non heating cable, set inside the tube, conduct the voltage up to the end of the pipe
- The return of current goes by the small tube, but only through an internal thickness defined by the laws of Kelvin and Maxwell
- The internal face, and so, the pipe itself, remains without residual voltage and can be earth connected
- The heating of the small tube is generated by Joules effect in its thin internal thickness concerned, and transfers it to the pipe by conduction (welding / rings / thermal cement)

Kelvin and Maxwell law

e = *active internal thickness of the steel tube (= skin thickness)*

$$e = \sqrt{\frac{2\rho}{\mu o \times \mu a \times 2\pi \times f}}$$

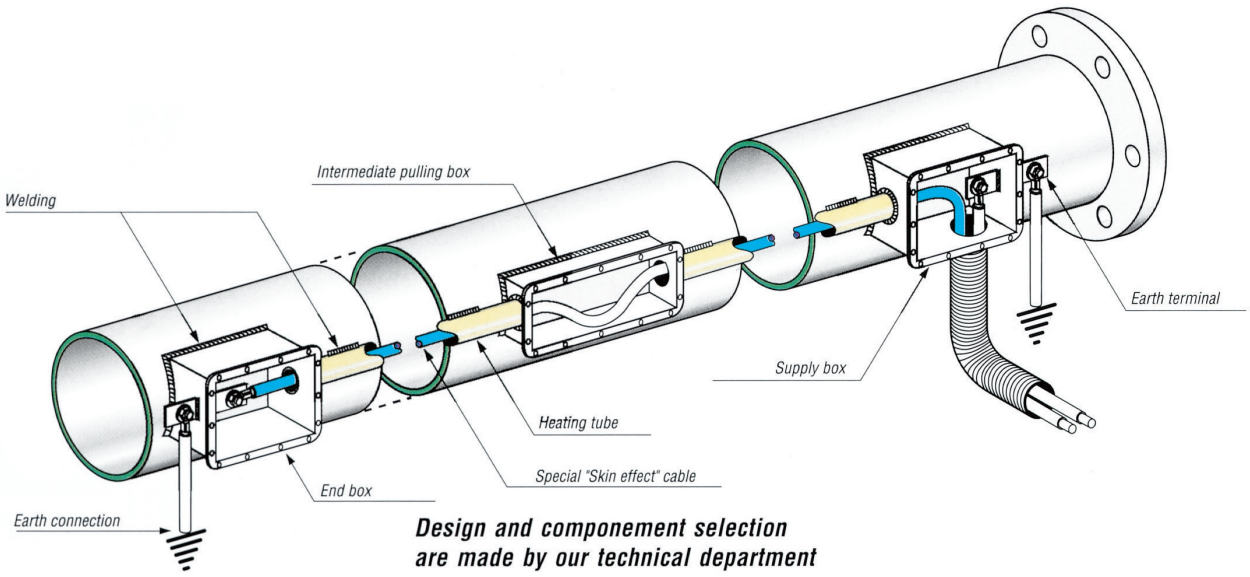
ρ = *material resistivity in* Ωm (= 20×10^{-8})

μo = *vacuum magnetic permeability* (= $4\pi \times 10^{-7}$)

μa = *steel E36 magnetic permeability* (= 1800)

f = *voltage frequency in Hz* (50)

=> $\boxed{e = 0{,}75mm}$



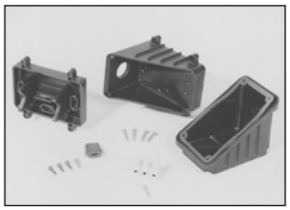
Design and componement selection are made by our technical department

Standard Connection Accessories

- **Junction Box Connection Kits for SRL, SRM/E, CWM and MI Applications**
- **Cold Lead Connection Kits for CSA Certified Installations**
- **Splice & Tee Kits for SRL, SRM/E, CWM and MI Applications**
- **End Seal Kits for SRL, SRM/E and CWM Applications**



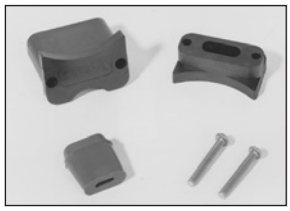
RTPC



RTST



RTES



Description

Each model the Installation Accessories for Chromalox Rapid Trace Heating Cable products is designed to satisfy the demands of a particular operation. These high-quality models combine a variety of functions in a convenient, easy to use and economical package.

Applications

Connection of selected rapid trace heating cables to customer supplied power wiring in any of the following applications:

- Freeze Protection
- Hydrocarbon and Chemical Product Piping
- Process Temperature Maintenance
- Fluid Flow and Viscosity Maintenance.

Approvals

UL Listed for ordinary areas

CSA Certified for ordinary areas

FM Approved for ordinary areas and:

- Class I, Div. 2, Groups B, C, D
- Class II, Div. 2, Groups F, G
- Class III, Div. 2 Areas.

Ordering Information

DL Accessories	
Model	**Used With**
Power Connection Kit	
RTPC RTPC-SL ELPK-E-012 KRT-PC KRT-APC	SRL-C SRL-CR, CT CWM-C CWM-CT SRM/E-C SRM/E-CT, MI
Splice & Tee Kit	
RTST RTST-SL KRT-STK KRT-SK	SRL-C SRL-CR, CT CWM-C CWM-CT SRM/E-C SRM/E-CT, MI
End Seal Kit	
RTES KRT-TES KRT-RES	SRL-C SRL-CR, CT CWM-C CWM-CT SRM/E-C SRM/E-CT
To Order — Refer to the General Application Accessories in this section.	

Attachment Accessories

Model	Description
FT-3	Fiberglass® tape to affix cable to pipe
AT-1	Aluminum tape to improve heat transfer to pipe
PS-1	Pipe strap to mount power connection box to pipe, 1/2 - 3/4" pipes
PS-3	Pipe strap to mount power connection box to pipe, 1 - 3-1/2" pipes
PS-10	Pipe strap to mount power connection box to pipe, 2-1/2 - 9" pipes
CL-1	Caution labels, apply every 10 feet to insulation to alert personnel
To Order — Refer to the General Application Accessories in this section.	

Standard Connection Accessories

KRT-RES (383574)



End Seal Kit (for Self-Regulating cable, Constant Wattage Cable)

- 57X16mm Diameter heat silicone caps

KRT-TES (383582)



Explosion-Proof End Seal Kit (for Self-Regulating cable, Constant Wattage Cable)

- 55.5 X 28.2mm Diameter
- Glass Fiber Reinforced Polyamide
- Inside Silicone Rubber Packing
- Class : Exd II C T6 / IP 67

KRT-PC (383296)



Power Connection Kit

- ABS (UV Protection Type)
- Cable Entry Up to 3 Cables
- PF 3/4", 3-Way, 1",1-Way Hub opening
- With 30A, 3P Terminal Block

ELPK-E-012 (383320)



Explosion-Proof Power Connection Kit

- Explosion-proof
- Copper Free Aluminum
- Cable Entry Up to 3 Cables
- PF 3/4", 3-Way, 1", 1-Way Hub Opening
- With 30A, 3P Terminal Block
- Class :Exd II C T6

KRT-SLK (383515)



Signal Light Termination Kit (400V)

- Cover-Polycarbonate
- Body - Glass Fiber Reinforced Polyamide
- Free Voltage 3 (Three) LED Lamp

KRT-APC



Power Connection Kit

- Copper Free Aluminum
- Cable Entry Up to 2 cables
- PF 3/4", 3-way, Hub opening
- With 30A, 3P Terminal Block

KRT-STK (386003)



Splice & Tee Kit

- 230mm X 60mm Diameter
- Glass Fiber Reinforced Polyamide MAX. 400V, 24A MAX. Temp 250°C
- Connect in line or in branching heating cable or supply cable and heating cables.
- Class : IP - 67

HDTK (383339)



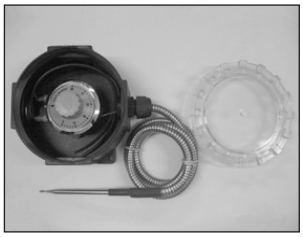
Splice & Termination Kit

- 100 X 38mm Diameter
- Glass Fiber Reinforced Polyamide. MAX. 400V, 24A MAX. Temp 250°C
- Connect in line or branching heating cable or supply cable
- Class : IP - 67

Standard Temperature Control Accessories

KRT-LST

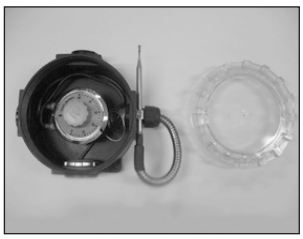
Line Sensing Thermostats



- Cover - Polycabonate
- Body - Glass Fiber Reinforced Polyamide
- Switching diffrence : ±3°C
- Switching capacity : 16 Amp / 400V
- Adjustment Range : 0°C to 50°C / 10°C to 110°C / 50°C to 320°C / 200°C to 600°C
- Length of Capillary Tube : 500mm
- Diameter of Sensor : 6.5 X 142mm
- Material of Sensor : Stainless Steel
- Proteetion Class : IP 66

KRT-AST

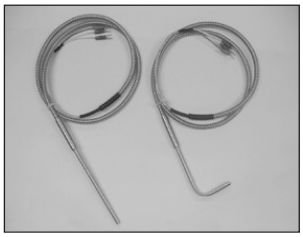
Ambient Sensing Thermostats



- Cover - Polycabonate
- Body - Glass Fiber Reinforced Polyamide
- Switching diffrence : ±3°C
- Switching capacity : 16 Amp / 400V
- Adjustment Range : 0°C to 50°C / 10°C to 110°C
- Length of Capillary Tube : 60mm
- Diameter of Sensor : 6.5 X 142mm
- Material of Sensor : Stainless Steel
- Proteetion Class : IP - 66

KRT-PTC

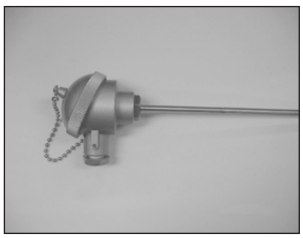
PT 100 Sensor



- Heat Trace or Pipe Sensing Applications
- Stainless Steel Capillary Tube or PVC Lead
- ø 6.0mm / 100mm Long
- PT100 ohm RTD
- ±0.12% Accuracy
- 3 wire connection
- Protection Calss : IP 54

KRT-PTS

Sheathed PT100 Sensor with IP54 Terminal Box



- Heat Trace or Pipe Sensing Applications
- Stainless Steel Sheath
- Moisture Resistant Heads
- 3/4" or 1/2" PT Theaded
- PT100 ohm RTD
- ±0.12% Accuracy
- 3 wire connection
- Protection Calss : IP 54

General Application Accessories

Accessories

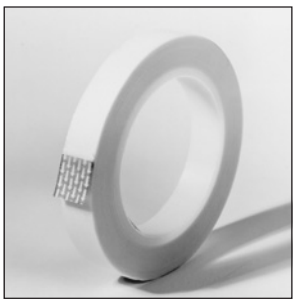
CCH-2 (385650)



Conduit Hub Cable Attachments

Corrosion resistant for 3/4" conduit. Fits opening in RTPC. Includes a ground connector.

FT-3 (389941)



Fiberglass Tape Cable Attachments

30m roll glass cloth tape with pressure-sensitive thermosetting silicone adhesive12mm wide. 310°F (155°C) rating. Strap at one foot intervals at minimum application temperatures of 40°F (5°C).

AT-1 (383355)



Aluminum Tape Cable Attachments

30m roll aluminum foil installation tape with pressure-sensitive acrylic adhesive. 50mm wide. 200°F (93°C) rating. Minimum application temperatures 40°F (5°C).

PS-1, 3 and 10



Metal Pipe Strap Kit Attachments

PS-1 **(382352)**
1/2 to 3/4" pipes

PS-3 **(382360)**
1 to 3-1/2" pipes

PS-10 **(382379)**
2-1/2 to 9" pipes

Interlock Straps for larger diameter pipes

CL-1 (382424)



Caution Labels

Electric heat tracing caution labels, weather resistant.

KRT-YS



"Y" Power Supply kit

126X16mm Diameter
2-way Heat silicone caps

Ordering Information — Cable Attachments

Description	Model	PCN	Stock	Wt. (Lbs.)
Conduit Hub	**CCH-2**	**385650**	**S**	1
Fiberglas® Tape	**FT-3**	**389941**	**S**	1
Aluminum Tape	**AT-1**	**383355**	**S**	2
Metal Pipe Strap Kit	**PS-1**	**382352**	**S**	1
	PS-3	**382360**	**S**	1
	PS-10	**382379**	**S**	1
Caution Labels	**CL-1**	**382424**	**S**	1

To Order — Specify model, PCN and quantity.

Pipe Heat Loss Calculation

1. Basic Heat Loss: After determining the difference between the ambient and desired pipe maintenance temperature, T_m, use Table 1 to figure the basic heat loss for the pipe size and insulation thickness.

2. Insulation Adjustment: Using Table 2, find the type of insulation being used and its insulation factor.

Table 1 Pipe Heat Loss W/m Based on Temperature Differential and Insulation Thickness

Heat losses from pipes (W/m)

Insulation thickness	ΔT °C	Pipe dimensions - Nominal dia: inches. Ext dia: mm															
		1/4 14mm	1/2 21mm	3/4 27mm	1 34mm	1 1/4 42mm	1 1/2 48mm	2 60mm	2 1/2 76mm	3 89mm	4 114mm	6 168mm	8 219mm	10 273mm	12 324mm	14 356mm	16 406mm
9	10	3.2	3.7	4.6	5.4	6.4	8.0	9.1	11.1	–	–	–	–	–	–	–	–
	20	6.5	7.6	9.3	10.9	13.1	16.3	18.5	22.7	–	–	–	–	–	–	–	–
	30	9.9	11.6	14.2	16.7	20.0	24.9	28.2	34.6	–	–	–	–	–	–	–	–
	40	13.4	15.8	19.2	22.6	27.1	33.8	38.2	47.0	–	–	–	–	–	–	–	–
	50	17.1	20.1	24.4	28.8	34.5	43.0	43.0	59.7	–	–	–	–	–	–	–	–
13	10	2.5	2.9	3.5	4.0	4.8	5.9	6.6	8.1	–	–	–	–	–	–	–	–
	20	5.1	5.9	7.0	8.2	9.7	12.0	13.5	16.5	–	–	–	–	–	–	–	–
	30	7.7	9.0	10.8	12.5	14.9	18.3	20.6	25.1	–	–	–	–	–	–	–	–
	40	10.5	12.2	14.6	17.0	20.2	24.9	27.9	34.1	–	–	–	–	–	–	–	–
	50	13.4	16.0	18.6	21.6	25.5	31.6	35.5	43.3	–	–	–	–	–	–	–	–
20	10	1.8	2.3	2.7	3.1	3.6	3.9	4.7	5.7	–	–	–	–	–	–	–	–
	20	3.6	4.6	5.4	6.3	7.3	8.0	9.5	11.5	13.1	16.1	22.4	28.5	34.7	40.5	44.1	49.7
	30	5.5	7.0	8.2	9.6	11.1	13.3	14.6	17.5	20.0	24.5	34.3	43.5	53.0	61.9	67.4	75.8
	40	7.5	9.5	11.1	13.0	15.1	16.7	19.7	23.8	27.1	33.3	46.5	59.0	71.9	83.9	91.3	102.8
	50	9.6	12.1	14.2	16.5	19.2	21.2	25.1	30.3	34.4	42.3	59.1	75.0	91.4	106.6	116.0	130.6
	60	11.7	14.8	17.3	20.2	23.5	25.9	30.6	36.9	42.0	51.6	72.0	91.5	111.5	130.0	141.5	159.2
25	20	3.2	4.0	4.7	5.4	76.2	6.8	8.0	9.6	10.9	13.3	18.5	23.4	28.4	33.1	36.0	40.6
	30	4.9	6.1	7.1	8.3	9.5	10.4	12.3	14.7	16.6	20.3	28.3	35.7	43.4	50.6	55.0	61.9
	40	6.7	8.3	9.7	11.2	12.9	14.2	16.7	19.9	22.6	27.6	38.4	48.4	58.8	68.5	74.6	82.9
	50	8.5	10.6	11.4	14.2	16.4	18.0	21.2	25.4	28.7	35.1	48.8	61.5	74.8	87.1	94.8	106.7
	60	10.4	12.9	15.0	17.4	20.0	22.0	25.9	30.9	35.0	42.8	59.5	75.0	91.2	106.3	115.6	130.1
	80	14.3	17.8	20.7	23.9	27.6	30.3	35.6	42.6	48.3	59.0	82.0	103.3	125.6	146.3	159.2	179.1
	100	18.4	23.0	26.6	30.9	35.6	39.1	46.0	55.0	62.3	76.1	105.8	133.3	161.9	188.6	205.2	230.8
30	20	2.9	3.6	4.2	4.8	5.5	6.0	7.0	8.4	9.4	11.5	15.8	19.9	24.1	28.1	30.6	34.4
	30	4.5	5.5	6.4	7.3	8.4	9.2	10.7	12.8	14.4	17.5	21.2	30.4	36.9	42.9	46.7	52.5
	40	6.1	7.5	8.7	10.0	11.4	12.5	14.6	17.3	19.6	23.8	32.8	41.2	50.0	58.2	63.3	71.2
	50	7.7	9.6	11.0	12.7	14.5	15.9	18.5	22.0	24.9	30.2	41.7	52.4	63.6	74.0	80.4	90.5
	60	9.5	11.7	13.4	15.5	17.7	19.4	22.6	26.9	30.3	36.9	50.9	63.9	77.5	90.2	98.1	110.4
	80	13.0	16.1	18.5	21.3	24.4	26.7	31.2	37.1	41.8	50.8	70.1	88.1	106.8	124.2	135.1	151.9
	100	16.8	20.7	23.9	27.5	31.5	34.4	40.2	47.8	53.9	65.5	90.5	113.6	137.7	160.2	174.2	195.8
	120	20.8	25.7	29.6	34.0	39.0	42.6	49.8	59.2	66.7	81.1	112.0	140.5	170.3	198.1	215.2	242.1
	140	25.0	30.8	35.6	40.9	46.8	51.2	59.8	71.1	80.2	97.4	134.5	168.8	204.6	237.9	258.6	290.7
	160	29.4	36.3	48.8	48.1	55.1	60.2	70.4	83.7	94.4	114.6	158.2	198.5	240.5	279.7	304.0	341.6
	180	34.1	42.0	48.4	55.7	68.3	69.7	81.4	96.8	109.2	132.6	183.0	229.6	278.2	323.4	351.5	394.9
40	20	2.6	3.1	3.6	4.0	4.6	5.0	5.8	6.8	7.6	9.1	12.5	15.5	18.8	21.8	23.7	26.6
	30	3.9	4.8	5.4	6.2	7.0	7.6	8.8	10.4	11.6	14.0	19.0	23.7	28.6	33.2	36.1	40.5
	40	5.3	6.5	7.4	8.4	9.5	10.3	11.9	14.0	15.7	18.9	25.8	32.2	38.8	45.1	49.0	55.0
	50	6.3	8.2	9.4	10.7	12.1	13.1	15.2	17.9	20.0	24.1	32.8	40.9	49.4	57.3	62.2	69.9
	60	8.3	10.0	11.4	13.0	14.7	16.0	18.5	21.8	24.4	29.4	40.1	49.9	60.3	69.9	75.9	85.3
	80	11.4	13.8	15.7	17.9	20.3	22.1	25.5	30.0	33.6	40.5	55.2	68.8	83.0	96.3	104.6	117.4
	90	13.0	15.8	18.0	20.5	23.2	25.2	29.2	34.3	38.5	46.3	63.1	78.6	94.9	110.0	119.5	134.2
	100	14.7	17.8	20.3	23.1	26.2	28.5	32.9	38.8	43.4	52.2	71.2	88.7	107.0	124.2	134.9	151.4
	120	18.2	22.1	25.1	28.6	32.4	35.2	40.8	48.8	53.7	64.6	88.1	109.7	132.4	153.6	166.8	187.2
	140	21.9	26.5	30.2	34.4	39.0	42.4	49.0	57.6	64.6	77.7	105.8	131.9	159.1	184.5	200.4	224.9
	160	25.8	31.2	35.6	40.5	45.9	49.8	57.6	67.8	76.0	91.4	124.5	155.1	187.1	217.0	235.6	264.4
	180	29.8	36.1	41.2	46.8	53.1	57.7	66.7	78.5	87.9	105.7	144.0	179.4	216.4	250.9	272.4	305.7

Table 2 Insulation Adjustment Factors

Pipe Insulation Type	Insulation Factor
Glass fiber (ASTM C547)	1.00
Calcium silicate (ASTM C533)	1.48
Cellular glass (ASTM C552)	1.48
Rigid cellular urethane (ASTM C591)	0.64

Pipe Insulation Type	Insulation Factor
Foamed elastomer (ASTM C534)	1.16
Mineral fiber blanket (ASTM C553)	1.16
Expanded perlite (ASTM C610)	1.90

Pipe Heat Loss Calculation

3. Calculate Q_F: Multiply the basic heat loss figure from Table 1 by the adjustment factor from Table 2 to calculate the estimated heat loss, Q_F, in watts per foot of pipe length.

4. Correct for Indoor Location/ Wind Speed: If location is indoors, multiply Q_F by 0.9. Table 1 is based on 10% safety factor and 20 mph wind speed; add 5% margin for each 5 mph over 20 mph wind speed.

Table 1 Continued

Pipe Heat Loss W/m Based on Temperature Differential and Insulation Thickness

Heat losses from pipes (W/m)

Insulation thickness	ΔT °C	Pipe dimensions - Nominal dia: inches. Ext dia: mm															
		1/4 14mm	1/2 21mm	3/4 27mm	1 34mm	1 1/4 42mm	1 1/2 48mm	2 60mm	2 1/2 76mm	3 89mm	4 114mm	6 168mm	8 219mm	10 273mm	12 324mm	14 356mm	16 406mm
50	20	2.3	2.8	3.2	3.6	4.0	4.3	5.0	5.8	6.5	7.7	10.4	12.9	15.5	17.9	19.4	21.8
	30	3.6	4.3	4.8	5.6	6.1	6.6	7.6	8.9	9.9	11.8	15.9	19.4	23.7	27.4	29.7	33.3
	40	4.8	5.8	6.5	7.4	8.3	9.0	10.3	12.0	13.4	16.0	21.6	26.7	32.1	37.1	40.3	54.1
	50	6.2	7.4	8.3	9.4	10.6	11.4	13.1	15.3	17.1	20.4	27.4	32.0	40.8	47.2	51.2	57.4
	60	7.5	9.0	10.2	11.5	12.9	14.0	16.0	18.7	20.8	24.8	33.5	41.4	49.8	57.6	62.5	70.0
	80	10.3	12.4	14.0	18.8	17.8	19.2	22.1	25.7	28.7	34.2	46.1	57.1	68.6	79.3	86.0	96.4
	100	13.4	16.0	18.1	20.4	22.9	28.4	28.5	33.2	37.0	44.2	59.5	73.6	88.4	102.3	110.9	124.3
	120	16.5	19.8	22.4	25.2	28.4	30.7	35.2	41.1	45.8	56.4	73.6	91.1	109.4	126.5	137.2	153.8
	140	19.9	23.8	26.8	30.3	34.1	36.9	42.4	49.4	55.0	65.7	88.5	109.5	131.5	152.0	164.9	184.7
	160	23.4	28.0	31.6	35.7	40.2	43.4	49.8	58.1	64.7	77.3	104.0	128.8	154.6	178.8	193.9	217.2
	180	27.1	32.4	36.6	41.3	46.5	50.3	57.7	67.3	74.9	89.4	120.4	149.0	178.9	206.8	224.2	251.2
60	20	2.2	2.6	2.9	3.2	3.6	3.9	4.4	5.2	5.7	6.8	9.0	11.1	13.3	15.3	16.6	18.6
	30	3.3	3.9	4.4	4.9	5.5	6.0	6.8	7.9	8.7	10.4	13.8	17.0	20.3	23.4	25.6	28.4
	40	4.5	5.3	6.0	6.7	7.5	8.1	9.2	10.7	11.8	14.1	18.7	23.0	27.5	31.8	34.4	38.5
	50	5.7	6.8	7.6	8.5	9.5	10.3	11.7	13.6	15.1	17.9	23.8	29.3	35.0	40.4	43.7	49.0
	60	7.0	8.3	9.3	10.4	11.6	12.5	14.3	16.6	18.4	21.8	29.0	35.7	42.7	49.3	53.4	59.7
	80	9.6	11.4	12.8	14.4	16.1	17.3	19.7	22.8	25.3	30.1	40.0	49.2	58.9	67.9	73.5	82.3
	100	12.4	14.7	16.5	18.5	20.7	22.3	25.4	29.5	32.7	38.8	51.6	63.5	75.9	87.6	94.8	106.1
	120	15.3	18.2	20.4	22.9	25.6	27.6	31.5	36.5	40.4	48.0	63.9	78.6	94.0	108.3	117.3	131.2
	140	18.5	21.9	24.6	27.6	30.8	33.2	37.8	43.8	48.6	57.7	76.7	94.4	112.9	130.2	141.0	157.7
	160	21.7	25.7	28.9	32.4	36.3	39.1	44.5	51.6	57.2	67.9	90.3	111.1	132.8	153.1	165.8	185.4
	180	25.1	29.8	33.5	37.5	42.0	45.2	51.5	59.7	66.1	78.5	104.5	128.5	153.6	172.1	191.7	214.5
80	20	1.9	2.3	2.5	2.8	3.1	3.3	3.8	4.3	4.8	5.6	7.3	8.9	10.5	12.1	13.0	14.6
	30	3.0	3.5	3.9	4.3	4.8	5.1	5.7	6.6	7.3	8.5	11.1	13.5	16.1	18.4	19.9	22.2
	40	4.0	4.7	5.2	5.8	6.5	6.9	7.8	8.9	9.8	11.5	15.1	18.4	21.8	25.0	27.0	30.1
	60	6.3	7.3	8.1	9.0	10.0	10.7	12.1	13.9	15.3	17.9	23.4	28.5	33.8	38.8	41.9	46.8
	80	8.6	10.1	11.2	12.5	13.8	14.8	16.7	19.1	21.0	24.7	32.3	39.3	46.6	53.5	57.8	64.4
	100	11.1	13.0	14.5	16.1	17.8	19.1	21.5	24.7	27.2	31.8	41.6	50.7	60.2	69.0	74.5	93.1
	120	13.8	16.1	17.9	19.9	22.0	23.6	26.6	30.5	33.6	39.4	51.5	62.7	74.4	85.4	92.2	102.8
	140	16.5	19.3	21.5	23.9	26.5	28.4	32.0	36.7	40.4	47.4	61.9	75.4	89.5	102.6	110.8	123.5
	160	19.5	22.8	25.3	28.1	31.2	33.4	37.2	43.2	47.5	55.7	72.9	88.7	105.2	120.7	130.3	145.2
	180	22.5	26.3	29.3	32.6	36.1	38.6	43.6	50.0	55.0	64.5	84.3	102.6	121.7	139.6	150.7	160.0
100	20	1.9	2.2	2.4	2.7	3.0	3.2	3.5	4.0	4.4	5.1	6.6	7.9	9.4	10.7	11.5	12.8
	30	2.9	3.4	3.7	4.1	4.5	4.8	5.4	6.1	6.7	7.8	10.0	12.1	14.3	16.3	17.6	19.5
	40	3.9	4.6	5.0	5.6	6.1	6.5	7.3	8.3	9.1	10.6	13.6	16.5	19.4	22.1	23.8	26.5
	60	6.1	7.1	7.8	8.6	9.5	10.1	11.3	12.9	14.1	16.4	21.2	25.5	30.1	34.3	37.0	41.1
	80	8.4	9.8	10.8	11.9	13.1	14.0	15.6	17.8	19.5	22.6	29.1	35.2	41.5	47.3	51.0	56.6
	100	10.9	12.6	13.9	15.4	16.9	18.0	20.2	22.9	25.1	29.2	37.6	45.4	53.5	61.0	65.8	73.1
	120	13.4	15.6	17.2	19.0	20.9	22.3	25.0	28.4	31.1	36.1	46.5	56.2	66.2	75.5	81.4	90.4
	140	16.2	18.7	20.7	22.2	25.2	26.8	30.0	34.1	37.3	43.4	55.9	67.5	79.5	90.8	97.8	108.6
	160	19.0	22.0	24.4	26.9	29.6	31.6	35.3	40.1	43.9	51.0	65.8	79.4	93.6	106.8	115.0	127.8
	180	22.0	25.5	28.2	31.1	34.3	36.5	40.9	46.5	50.8	59.1	70.2	91.9	108.3	123.5	133.1	147.8

Chromalox Cable Selection

1. Select Heating Cable Family: Based on the maximum maintenance temperature rating, maximum exposure temperature rating, and area classification, select the heating cable family from Table 3. (See Chromalox Heat Trace Cable Product Information Sheets for cable construction options, voltage ratings, and wattage outputs available.)

2. Select Thermal Output Rating:

(a) For Metal Pipes – Use Figures 1 or 2

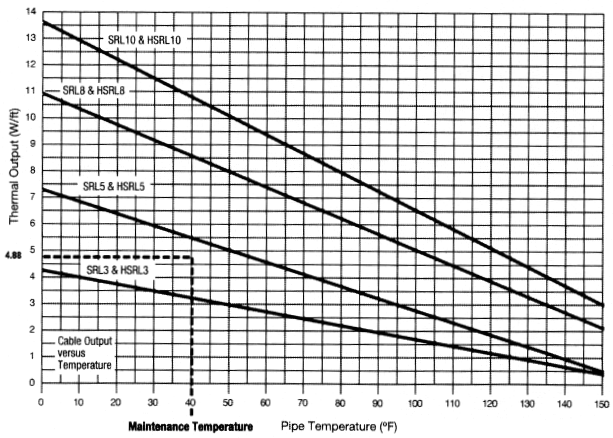
(b) For Plastic Pipes – Use Figure 3 by finding the intersection of the calculated heat loss, Q_F, and pipe maintenance temperature, T_m. Select the cable with a thermal output that equals or exceeds Q_F at T_m.

Table 3 Heating Cable Families

Heating Cable Family	Area Classification	Pipe Material	Maximum Maintenance Temperature, °F	Maximum Exposure Temperature (Power Off), °F	Approvals	
					U.S.	Other
SRL (Self-Regulating Low Temperature)	Ordinary	Plastic/Metal	150°F	185°F	UL, CSA, FM	GOST, Cenelec,CE, ATEX
	Class I, Div.2, Gr. B, C, D				CSA, FM, (Gr. A, CSA Only)	GOST, Cenelec, CE, ATEX
	Class II, Div.2, Gr. E, F, G				CSA, FM, (Gr. E, CSA Only)	GOST, Cenelec, CE
	Class III, Div. 2				FM Only	GOST, Cenelec, CE, ATEX
SRM/E (Self-Regulating Medium Temperature)	Ordinary	Metal Only	302°F	420°F	UL, CSA, FM	GOST, Cenelec, CE, ATEX
	Class I Div.2, Gr. A, B, C, D				CSA, FM' (Gr. A, CSA Only)	GOST, Cenelec, CE, ATEX
	Class II, Div.2, Gr. F, G				CSA Only	GOST, Cenelec, CE, ATEX
HSRL (H-Self Regulating Low Temperature)	Class I, Div.1, Gr. B, C, D	Plastic/Metal	150°F	185°F	CSA, FM	
	Class II, Div.1, Gr. E, F, G				CSA, FM	
	Class III, Div.1				CSA, FM	
HSRM (H-Self-Regulating Medium Temperature)	Class I, Div.1, Gr. B, C, D	Metal Only	302°F	420°F	CSA, FM	
	Class II, Div.1, Gr. E, F, G				CSA, FM	
	Class III, Div. 1				CSA, FM	
CWM (Constant Wattage)	Ordinary	Metal Only	Consult Factory	392°F	UL, CSA	
	Hazardous Area, Consult Factory					
MI (Mineral Insulated)	Ordinary	Metal Only	Consult Factory	1,472°F	Consult Factory	Consult Factory
	Hazardous Area, Consult Factory					

NOTE: It is the responsibility of the facility manager or engineer to determine the classification of an area where heat trace will be installed. The factory can help determine a suitable cable based on the information provided.

Figure 1 SRL & HSRL – Thermal Output Ratings on Insulated Metal Pipe



Chromalox Cable Selection

3. Determine Total Cable Length: In addition to pipe length, in-line components such as valves, flanges, and pipe supports require additional heat tracing to maintain T_m. See Table 4. Calculate the total cable length required by combining the pipe length with the additional lengths needed for all the other components.

Table 4 Additional Cable Lengths Required for In-line Components Based on Pipe IPS (Iron Pipe Size)

Piping Size	Gate Valve	Globe Valve	Ball Valve	Butterfly Valve	Shoe Support	Hanger Support	Sleeper Support	Flange Pair
	ft							
½ in.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.30
¾ in.	1.50	1.00	1.00	1.00	1.50	1.00	1.00	0.30
1 in.	2.00	1.00	1.00	1.00	1.50	1.00	1.00	0.30
1½ in.	2.50	1.50	1.50	1.50	2.00	2.00	2.00	0.30
2 in.	2.50	2.00	2.00	2.00	2.00	2.00	2.00	0.30
2½ in.	2.50	2.00	2.00	2.00	2.00	2.00	2.00	0.30
3 in.	3.00	2.50	2.50	2.50	2.00	2.00	2.00	0.50
4 in.	4.00	3.00	3.00	3.00	2.50	2.50	2.50	0.50
6 in.	5.00	3.50	3.50	3.50	2.50	2.50	2.50	0.80
8 in.	7.00	4.00	4.00	4.00	2.50	2.50	2.50	0.80
10 in.	8.00	4.50	4.50	4.50	3.00	3.00	3.00	0.80
12 in.	9.00	5.00	5.00	5.00	3.00	3.00	3.00	0.80
14 in.	10.00	5.50	5.50	5.50	3.00	3.00	3.00	1.00
16 in.	11.00	6.00	6.00	6.00	3.50	3.50	3.50	1.00
18 in.	12.00	7.00	7.00	7.00	3.50	3.50	3.50	1.00
20 in.	13.00	7.50	7.50	7.50	3.50	3.50	3.50	1.00
22 in.	13.00	7.50	7.50	7.50	3.50	3.50	3.50	1.00
24 in.	15.00	8.00	8.00	8.00	4.00	4.00	4.00	1.00

Figure 2 SRM/E & HSRM – Thermal Output Ratings on Insulated Metal Pipe

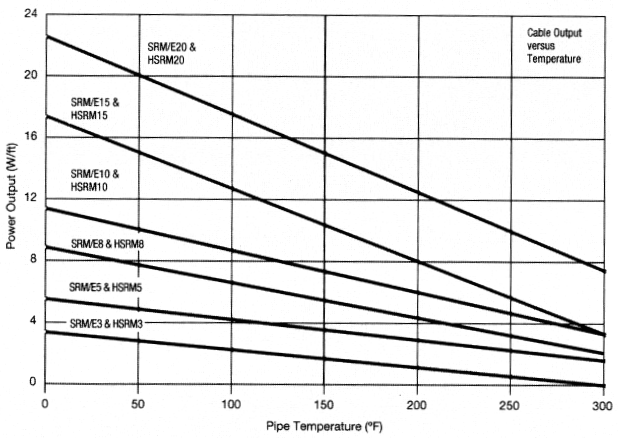
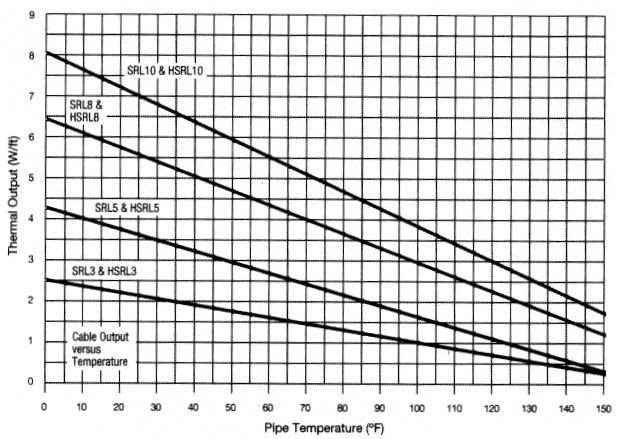
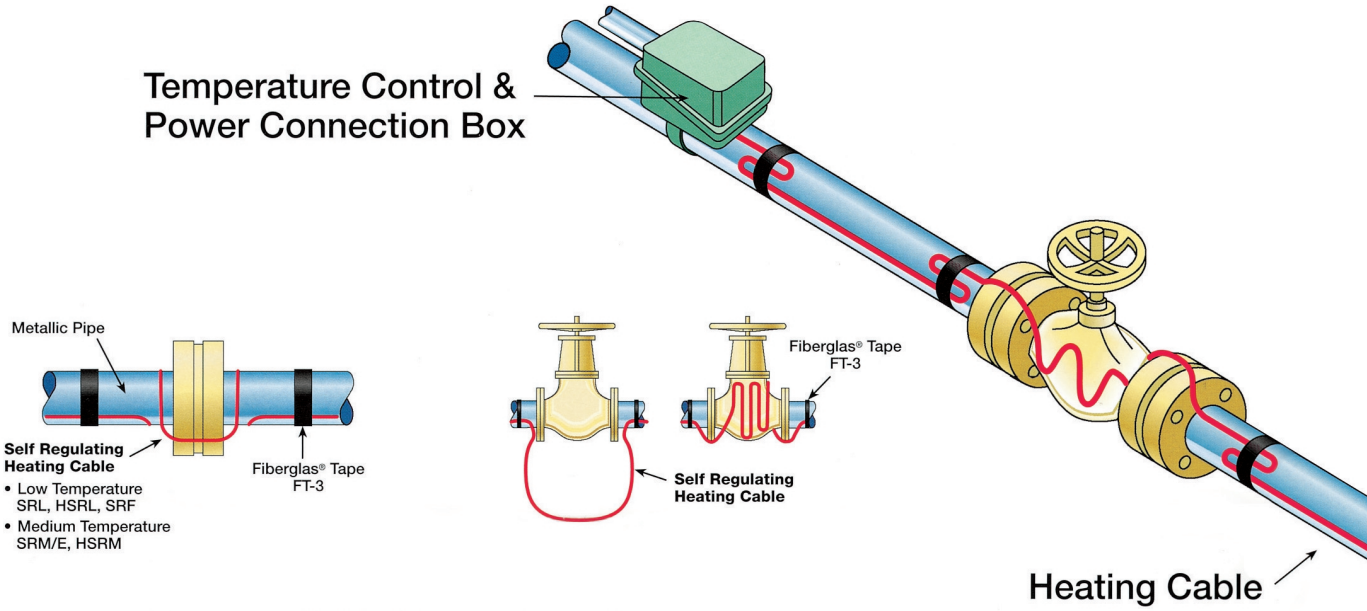


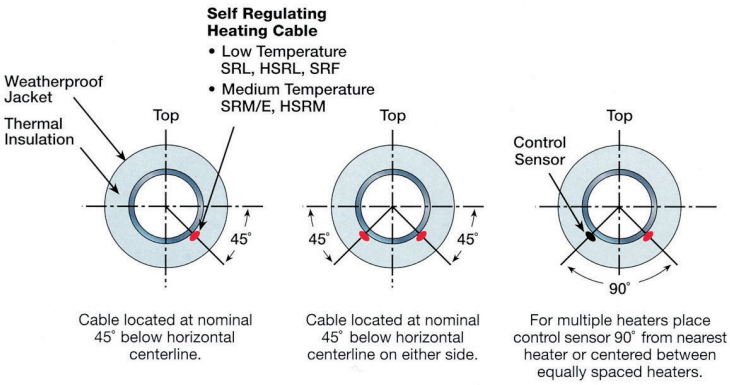
Figure 3 SRL & HSRL – Thermal Output Ratings on Plastic Pipe with Aluminum Tape



Heating Cable



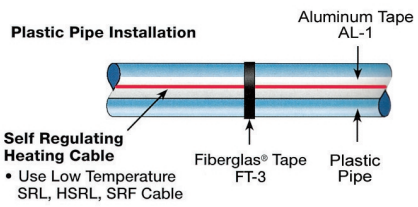
Heating Cable/Sensor Location



Cable located at nominal 45° below horizontal centerline.

Cable located at nominal 45° below horizontal centerline on either side.

For multiple heaters place control sensor 90° from nearest heater or centered between equally spaced heaters.



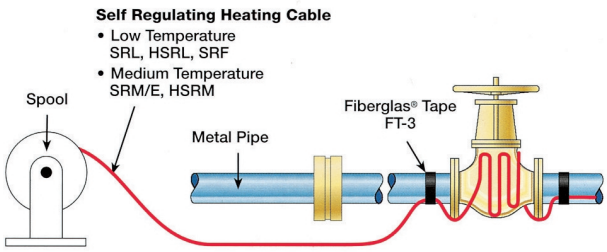
Note: Aluminum tape must be used under or over heating cable to spread heat transfer.

Installation Tips

- *Temporarily position cable on pipe and equipment to ensure proper distribution.*
- *Leave a loop of cable at heat sinks such as valves, pipe supports and flange sets. Use FT-3 Fiberglas® to secure cable to pipe at 18 in.(nom) intervals using recommended method.*
- *Always observe minimum bend radius.*

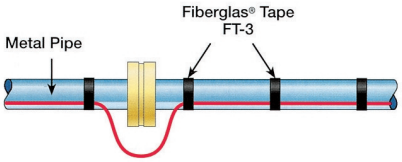
Step 1

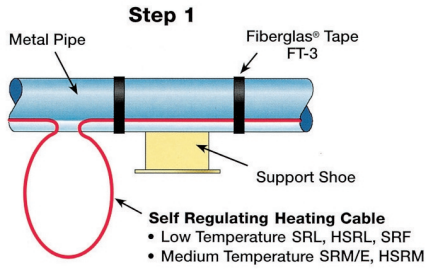
Start tracing at the end of the pipe and work your way back to spool.

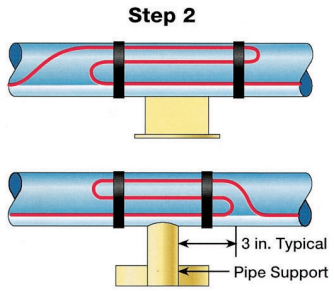


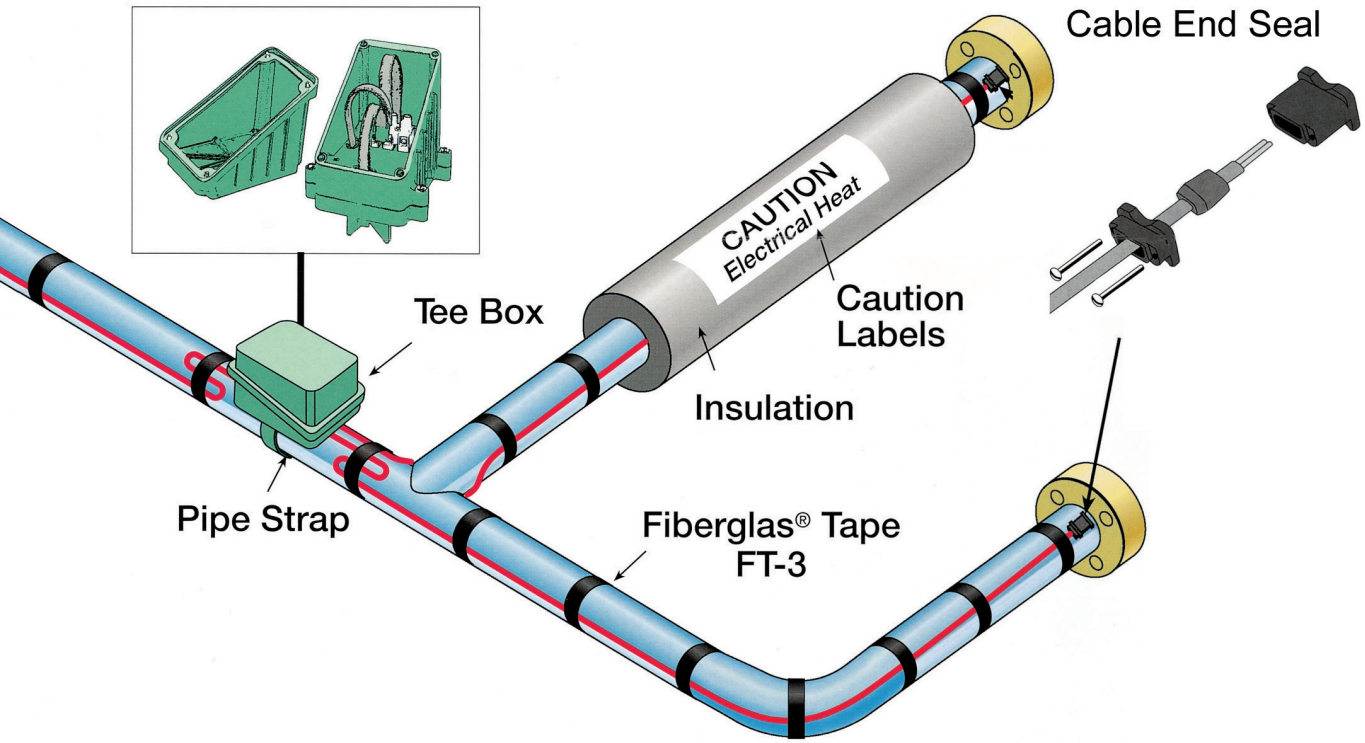
Step 2

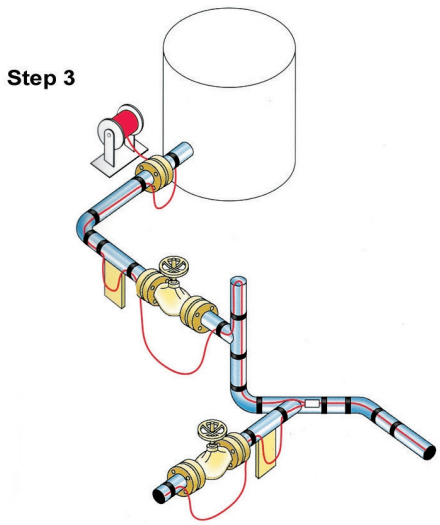
Leave a loop of cable at heat sinks such as valves, pipe supports and flange set. Use FT-3 Fiberglas® tape to secure cable to pipe at 18 in. intervals.

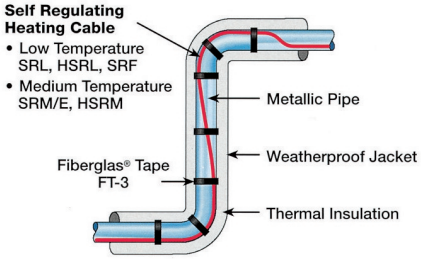








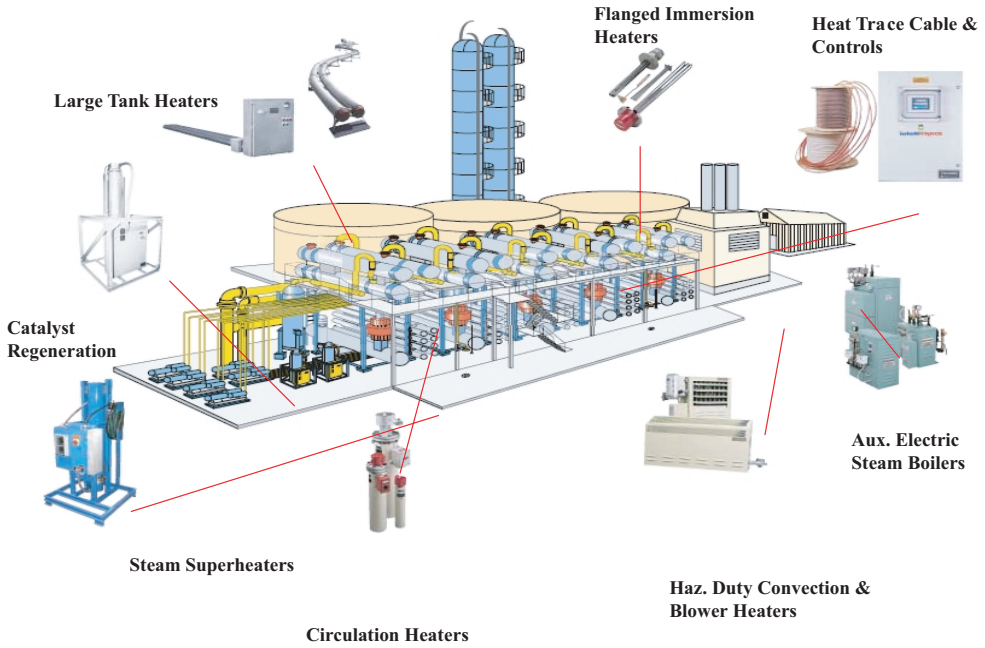




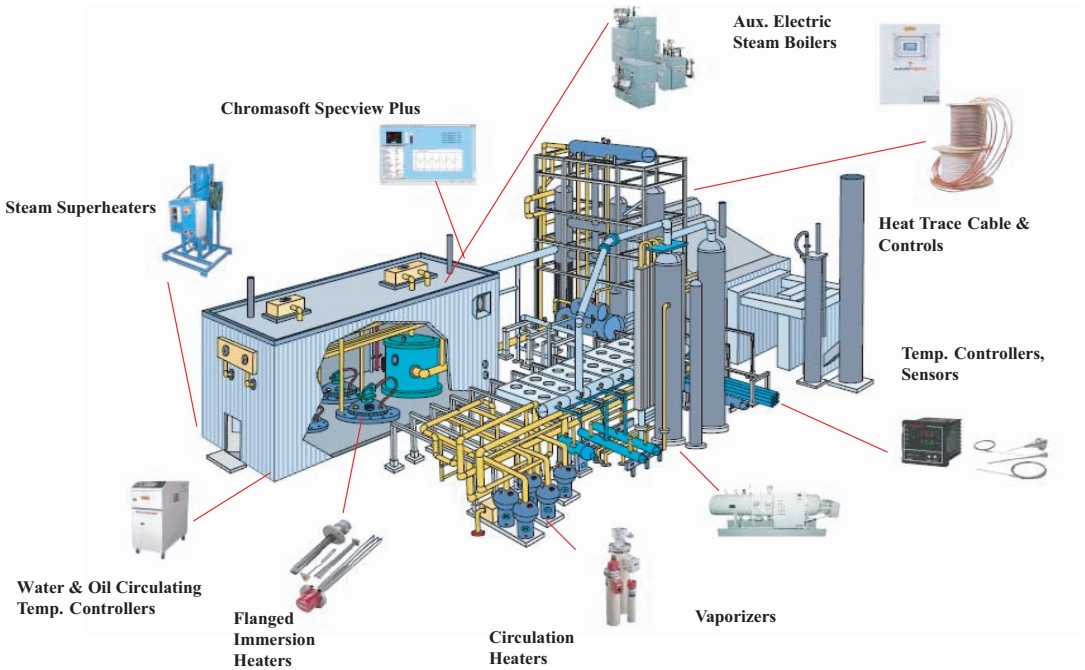
Ask about Chromalox Class 1 Div. 1 Cables & Accessories as well as a ful line of High Temperature Cables.

Applications

Petrochemical Process

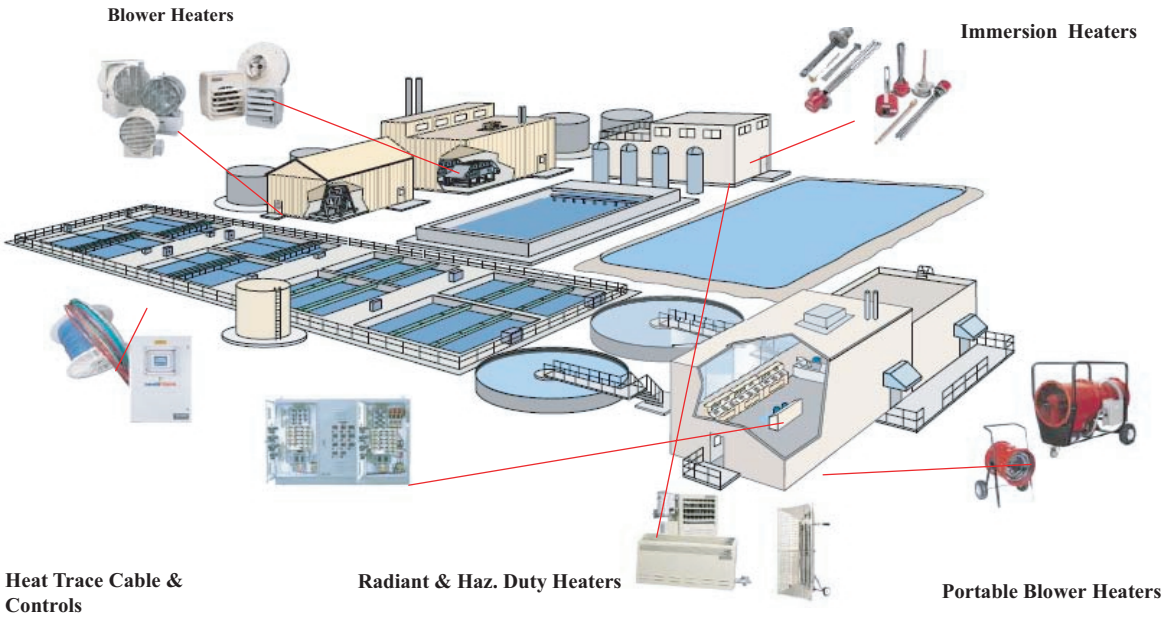


Biopharmaceutical Process

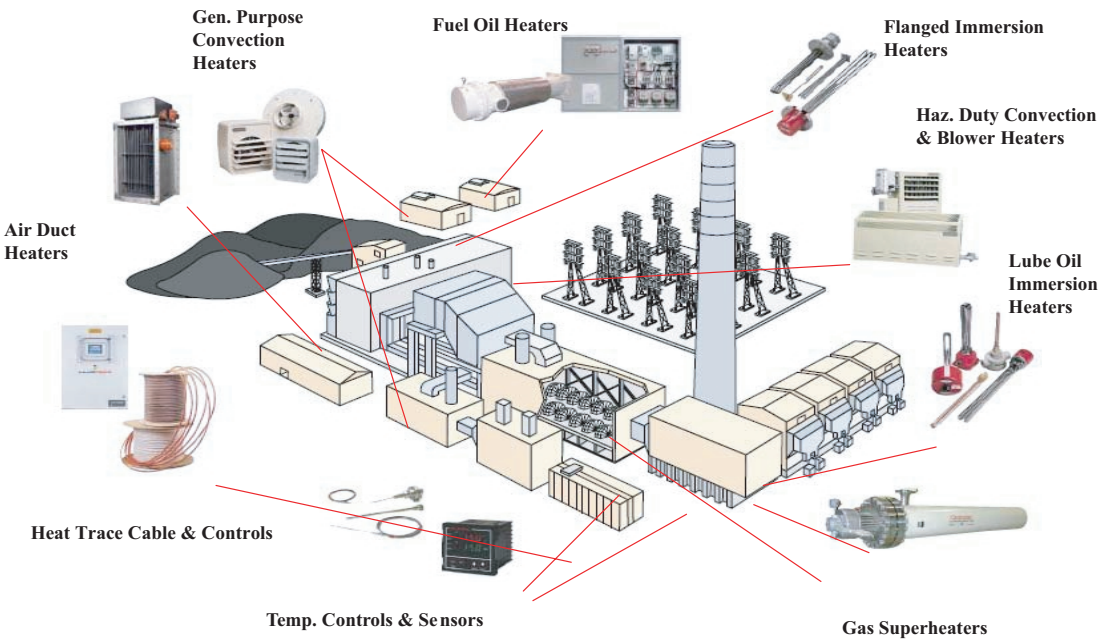


Applications

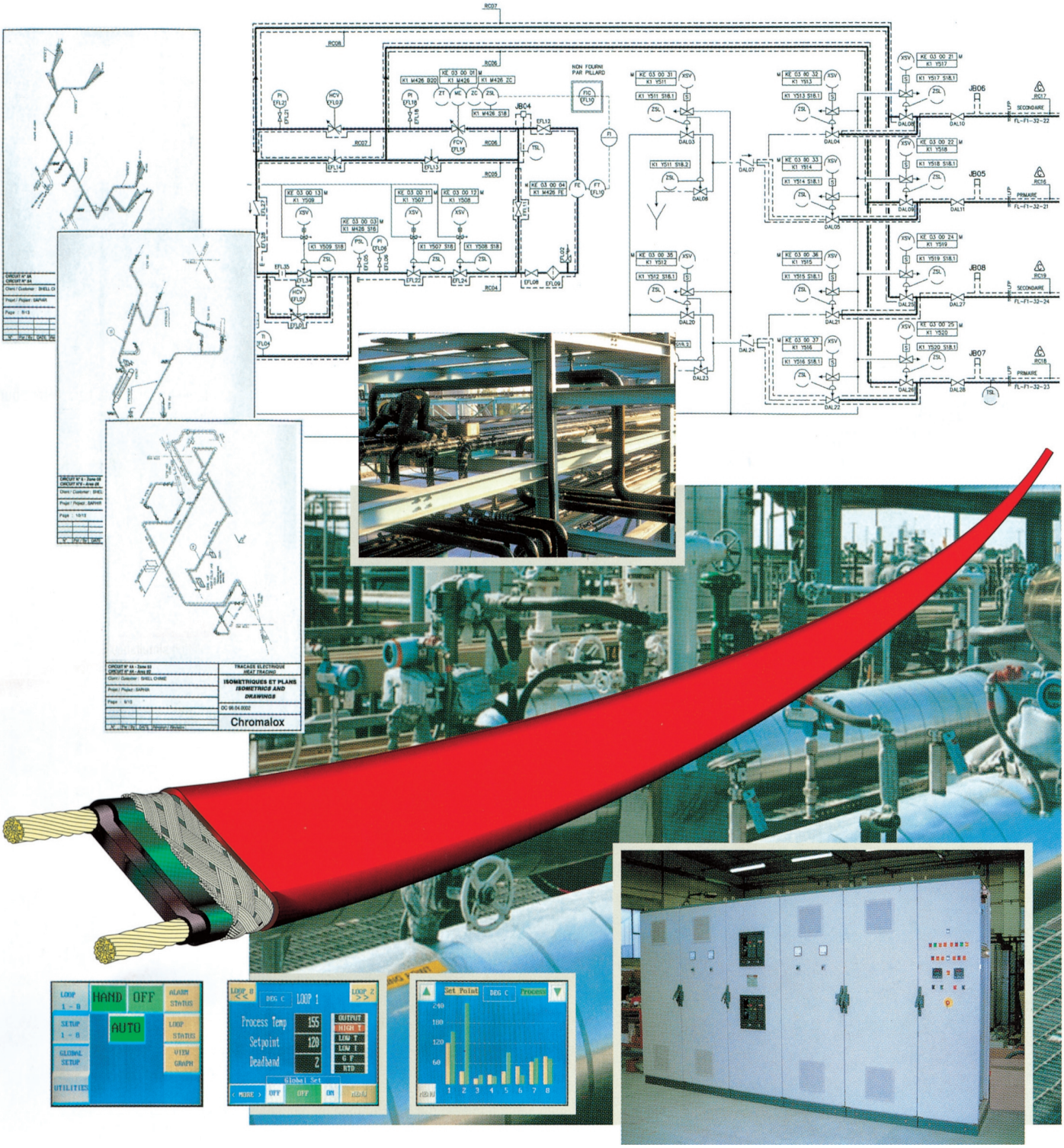
Wastewater Treatment



Power Generation



Heat Tracing Engineering

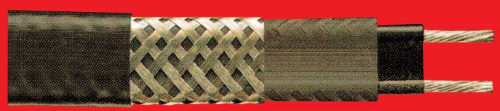


CHROMALOX WORLD WIDE



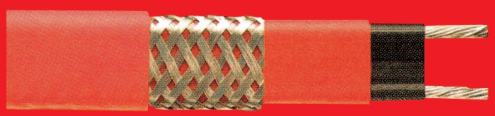
Installation Tips

- Do not twist buss wires together at end of circuit
- Insulate all conductive parts
- Seal all electrical connections against moisture
- Seal ends of exposed cable during installation
- Do not expose cables to temperatures above their maximum ratings
- Install cable with aluminum tape for use on plastic pipes
- Locate ambient temperature sensors in coldest expected area
- Locate pipe temperature sensors at lowest expected line temperature
- Use sufficient cable to trace additional heat sinks
- Install cable so that valves can be removed without removing cable



SRL Cable

- 150°F Maximum Maintenance
- 185°F Maximum Exposure
- 3-10 W/ft
- 16 AWG with optional TPE or Fluoropolymer Jacket



SRM Cable

- 302°F
- 420°F Maximum Exposure
- 5-20 W/ft
- 14 AWG with Optional Fluoropolymer Jacket

Important Safeguards

Mechanical Inspection

- Inspect all insulation and weatherproofing
- Inspect all junction box, connection box and sensor connections
- Verify all circuits have been properly grounded
- Verify all circuits are connected in proper panel locations
- Verify proper circuit breakers are in place (always use 30mA trip GFI type breakers)
- Verify all circuit lengths are within manufacturers specified limits
- Verify all proper safety warnings are in place
- Verify all end seal, splice/tee locations are marked on lagging

Electrical Tests

- Insulation Resistance (Megger)
  - Before tracing pipes
  - After installing terminations
  - Before insulating pipes
  - After insulating pipes
  - Before energizing system
- Circuit Voltage
- Initial Current
  - Note ambient temp and pipe temp
- Stabilized Current (15 minutes of operation)
  - Note ambient temp and pipe temp
- Always use ground fault circuit breakers (30mA trip level)

Tools Needed

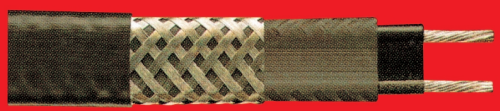
- Wire Cutters/Strippers
- Megger
- Phillips Head Screwdriver
- Standard Screwdriver
- Voltmeter
- Utility Knife
- Hammer

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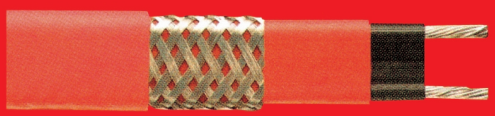
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- Standard Screwdriver
- Voltmeter
- Utility Knife
- Hammer

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