

ARCTIC TRACE®

SPECIFICATION



Submersible Heat Trace Freeze Protection System

du **Alaska** Incorporated

ARCTIC TRACE SPECIFICATION FOR HEATING CABLE PROTECTION SYSTEM

The heating cable shall be Arctic Trace model Z120512CBTL temperature limiting heat cable rated at 5 Watts per foot at 32° F when energized with 120 Volts AC or equal.

The heating element of this cable shall be a metallic alloy, which increases its resistance in proportion to the increase in temperature generated by it.

The heater bus wire shall be copper 12 AWG copper conductors insulated with FEP (Teflon) inner jacket and the heating element shall be welded to the heater bus wire.

The heaters outer jacket shall be Tefzel (a fluorocarbon as manufactured by duPont) and covered with a stainless steel braid.

All components of the cable shall be non-combustible and not subject to deterioration by aging.

The cable and end seal shall be made of the same material and shall be attached by heat fusion making the cable and end seal assembly impervious to water allowing no water infiltration up to 200 psig.

The cable and its components shall be listed by CSA/US for use inside or outside metal or plastic pipe and shall be UL recognized as heating cable to be used in an appropriate freeze protection system.

Cable shall be acceptable by the EPA and listed by CSA/US for use in contact with potable water.

The cable shall be rated for a maximum maintenance temperature of 300° F, and a maximum continuous exposure temperature of 500° F with a minimum installation temperature of - 40° F and Earth Leakage of no more than 1.5 mA per 100 ft. @ 120 VAC or 31 mA @ 240 VAC.

Manufacturer of heating cable shall have a minimum of 10 years experience producing heating cable used the freeze protection of water wells, pipeline and vessels, water and wastewater, snow and ice melting, drain waste and vent in permafrost and wet locations under arctic conditions.

The heating cable shall have a minimum of 10 years limited warranty against manufactures defect.



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ARCTIC TRACE[®]

Type TL series Temperature Limiting

PRODUCT SPECIFICATION SUBMERSIBLE FREEZE PROTECTION SYSTEM

APPLICATION:

ARCTIC TRACE TL series Temperature Limiting Heating Cable are designed for a wide range of heating application using parallel resistance heating element. Suitable for water freeze protection and process viscosity maintenance. The product is specially designed to be in contact with the process (submersible) or on the outside of the pipe in a conventional heating fashion.

CONSTRUCTION:

1. Copper bus wire (12 awg)
2. Temperature limiting metal resistance wire
3. Welded heater-bus connection
4. Tefzel jacket (Tefzel is a trademark of E.I. DuPont)
5. (CB) Nickel plated copper braid *

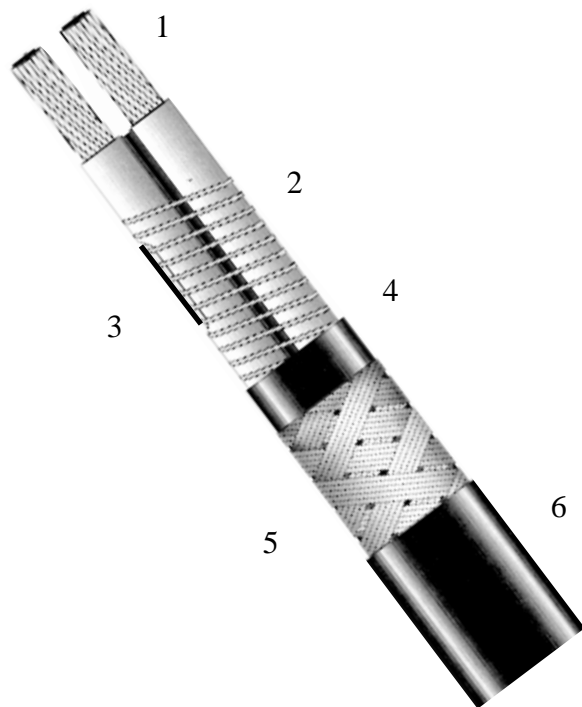
OPTIONS:

6. (TEZ) Tefzel over-jacket provides sanitary cover for food application in addition to mechanical and corrosion protection for metal braid

* (SS) 316 SS Braid # 5

PRODUCT FEATURES:

TL heating cable incorporates a special metal heating element that reduces its resistance as temperature rises giving the cable a temperature limiting quality thus saving energy, protecting plastic pipes, limiting process temperature and allowing the cable to be overlapped during installation. Lowering the cable surface temperature extends cable life. The cable is specifically designed to be submerged in the water or process and is approved for use in contact with potable water.



RATINGS

Maximum maintenance temperature:	300° F (149° C)
Maximum continuous exposure temperature: (de-energized)	500° F (260° C)
Minimum installation temperature:	-60° F (-51° C)
Earth leakage:	1.5 mA per 100 ft. (31mA) @ 240 VAC
Voltage:	120/240 VAC nominal *

* Higher maintenance temperatures and operating voltages up to 480Vac may be possible. Contact du Alaska for design assistance.

ARCTIC TRACE®

Type TL series Temperature Limiting

PRODUCT SPECIFICATION SUBMERSIBLE FREEZE PROTECTION SYSTEM

CATALOG NUMBER	Rating W/FT W/M	CIRCUIT LOAD AMP DRAW @ -40			CIRCUIT LENGTH @		CIRCUIT LENGTH WITH END TO END WATT REDUCTION			
		W/M 50F	AMPS FT	AMPS M	FULL LOAD *		15%		20%	
@ 120 VAC										
Z120312CBTL	3	10	.03	.10	450'	120M	500'	150M	590'	177M
Z120512CBTL	5	16	.04	.164	310'	95M	350'	106M	410'	125M
Z120712CBTL	7	23	.06	.33	220'	66M	250'	75M	300'	90M
Z121012CBTL	10	33	.08							
@ 240 VAC										
Z120324CBTL	3	10	.012	.04	480'	121M	600'	181M	875'	266M
Z120524CBTL	5	16	.020	.066	390'	119M	500'	153M	600'	183M
Z120724CBTL	7	23	.029	.095	380'	78M	330'	100M	390'	118M
Z121024CBTL	10	33	.041	.012	370'					

The power output shown apply to standard cable installed on insulated metallic pipe with the service voltage stated.




ALTERNET VOLTAGES
Should Arctic Trace be connected to a less or greater voltage watt per foot output will be reduced or increased

$$\text{ACTUAL WATT PER FOOT} = \text{OUTPUT} = \left(\frac{\text{CONNECTED VOLTS}}{\text{RATED VOLTS}} \right)^2 \bullet \text{ARCTIC TRACE W/ft}$$

Circuit Breaker should be sized per article 427-4 of the NEC and the use of Ground Fault Equipment is required as stated in N.E.C. Article 427-22.

AMP per FT/M rating is based on -40°F start up temperature. Increase direct breaker for all cable temperatures > -40° F by 20% to allow for in rush current.

Approval Listings:

 <p>Underwriters Laboratory Our freeze protection cable has been submitted to and tested by UL and has been recognized by that testing laboratory as a component heating cable to be used in an appropriate freeze protection system.</p>	 <p>Commercial & Industrial Ordinary and Hazardous Locations- 75C wet, 150C Dry Classified Class I, Groups C & D - Division 1 & 2 Class II, Groups E, F, & G - Division 1 & 2 On metal and nonmetallic pipe and vessels - 3A, 3B, 3C In metal and nonmetallic pipe and vessels - 4A, 4B, 5A, 5B wet location industrial</p>
<p>United States Environmental Protection Agency Acceptable for surfaces which contact potable water.</p>	 <p>Commercial & Industrial UL 515 Type A & D Ordinary Locations - 75C wet, 150C Dry On metal and nonmetallic pipe and vessels - 3A, 3B, 3C In metal and nonmetallic pipe and vessels - 4A, 4B, 5A, 5B wet location industrial</p>

* Full loads are based on 10% power drop when cable is energized on service voltage listed.

CSA/US 4B designation or installation type D limited to power outputs of 3W/FT and 5W/FT

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ARCTIC TRACE[®]

Type CW series Constant Wattage

PRODUCT SPECIFICATION SUBMERSIBLE FREEZE PROTECTION SYSTEM

APPLICATION:

ARCTIC TRACE CW series Constant Wattage Heating Cable is designed for a wide range of heating applications using parallel resistance heating element. Suitable for water freeze protection and process viscosity maintenance. The product is specially designed to be in contact with the process (submersible) or on the outside of the pipe in a conventional heating fashion.

CONSTRUCTION:

1. Copper bus wire (12 AWG)
2. High quality nickel chrome alloy heating wire
3. Welded heater-bus connection
4. Tefzel jacket (Tefzel is a trademark of E.I. DuPont)
5. (CB) Nickel plated copper braid *

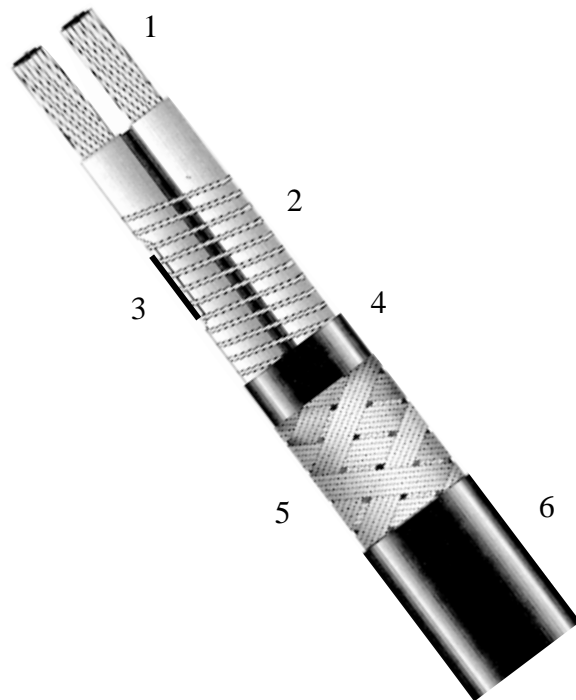
OPTIONS:

6. (TEZ) Tefzel over-jacket provides sanitary cover for food application in addition to mechanical and corrosion protection for metal braid

* (SS) 316 SS Braid # 5

PRODUCT FEATURES:

CW heating cable incorporates a constant wattage metal heating element that provides a cost effective submersible freeze protection system for metal pipes, low wattage plastic pipe applications, commercial drain, and waste sewer out-fall. Featuring zero inrush at start-up, low energy cost, most rugged and flexible, field cut to length the cable is specifically designed to be installed outside the pipe or submerged in the water or process and is approved for use in contact with potable water.



RATINGS




Maximum maintenance temperature:	300° F (149° C)
Maximum contains exposure temperature: (de-energized)	500° F (260° C)
Minimum installation temperature:	-60° F (-51° C)
Earth Leakage:	1.5 mA per 100 ft. (31 mA) @ 240 VAC
Voltage:	120/240/440 (others) VAC nominal

* Higher maintenance temperatures and operating voltages up to 480Vac may be possible. Contact du Alaska for design assistance.

ARCTIC TRACE[®]

Type CW series Constant Wattage

PRODUCT SPECIFICATION SUBMERGIBLE FREEZE PROTECTION SYSTEM

CATALOG NUMBER	Rating W/FT W/M	CIRCUIT LOAD AMP DRAW @ -40			CIRCUIT LENGTH @		CIRCUIT LENGTH WITH END TO END WATT REDUCTION				
		W/M 50F 10C	AMPS FT	AMPS M	FULL LOAD *		15%		20%		
@ 120 VAC	W/FT 50F 10C	W/M 50F 10C	AMPS FT	AMPS M	FULL LOAD *		15%		20%		
Z120312CBCW	3	10	.03	.10	450'	120M	500'	150M	590'	177M	
Z120512CBCW	5	16	.04	.164	310'	95M	350'	106M	410'	125M	
Z120712CBCW	7	23	.06	.33	220'	66M	250'	75M	300'	90M	
Z121012CBCW	10	33	.08								
@ 240 VAC											
Z120324CBCW	3	10	.012	.04	480'	121M	600'	181M	875'	266M	
Z120524CBCW	5	16	.020	.066	390'	119M	500'	153M	600'	183M	
Z120724CBCW	7	23	.029	.095	380'	78M	330'	100M	390'	118M	
Z121024CBCW	10	33	.041	.012	370'						
The power output shown apply to standard cable installed on insulated metallic pipe with the service voltage stated.											
ALTERNET VOLTAGES Should Arctic Trace be connected to a less or greater voltage watt per foot output will be reduced or increased		ACTUAL WATT PER FOOT = OUTPUT			$\left[\frac{\text{CONNECTED VOLTS}}{\text{RATED VOLTS}} \right]^2$			ARCTIC TRACE W/ft			
AMP per FT/M rating is based on -40° F start up temperature. Increase direct breaker for all cable temperatures > -40° F by 20% to allow for in rush current.											
Circuit Breaker should be sized per article 427-4 of the NEC and the use of Ground Fault Equipment is required as stated in N.E.C. Article 427-22.											
Approval Listing:											
 Underwriters Laboratory Our freeze protection cable has been submitted to and tested by UL and has been recognized by that testing laboratory as a component heating cable to be used in an appropriate freeze protection system.		 Commercial & Industrial Ordinary and Hazardous Locations – 75C wet, 150C Dry Classified Class I, Groups C & D – Division 1 & 2 Class II, Groups E, F, & G – Division 1 & 2 On metal and nonmetallic pipe and vessels – 3A, 3B, 3C In metal and nonmetallic pipe and vessels – 4A, 4B, 5A, 5B wet location industrial									
United States Environmental Protection Agency Acceptable for surfaces which contact potable water.		 Commercial & Industrial UL 515 Type A & D Ordinary Locations – 75C wet, 150C Dry On metal and nonmetallic pipe and vessels – 3A, 3B, 3C In metal and nonmetallic pipe and vessels – 4A, 4B, 5A, 5B wet location industrial									
* Full loads are based on 10% power drop when cable is energized on service voltage listed.											
CSA/US 4B designation or installation type D limited to power outputs of 3W/FT and 5W/FT											

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ARCTIC TRACE[®]

Type E series Temperature Limiting

PRODUCT SPECIFICATION FREEZE PROTECTION SYSTEM

APPLICATION:

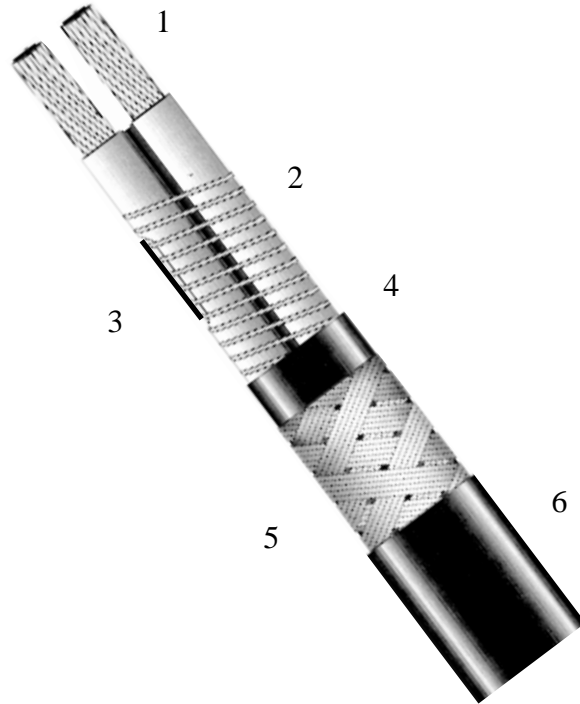
ARCTIC TRACE E series Temperature Limiting Heating Cable are designed for a wide range of heating application using parallel resistance heating element. Suitable for water freeze protection and process viscosity maintenance. The product is specially designed to be used for roof and gutter deicing, soil heating, pipe and vessel tracing in a conventional heating fashion.

PRODUCT FEATURES:

E heating cable incorporates a special metal heating element that reduces its resistance as temperature rises giving the cable a temperature limiting quality thus saving energy, protecting plastic pipes, limiting process temperature and allowing the cable to be overlapped during installation. Lowering the cable surface temperature extends cable life. The cable is specifically designed for wet or dry locations.

CONSTRUCTION:

1. Copper bus wire (16 awg)
2. Temperature limiting metal resistance wire
3. Welded heater-bus connection
4. Thermoplastic Elastomer Jacket
5. (CB) Nickel plated copper braid
6. (TEZ) Tefzel over-jacket provides sanitary cover for food application in addition to mechanical and corrosion protection for metal braid
7. Optional bus wire size (14-12 awg)





RATINGS

Maximum maintenance temperature:	100° F (39° C)
Maximum continuous exposure temperature: (de-energized)	250° F (122° C)
Minimum installation temperature:	-10° F (-23° C)
Earth leakage:	1.5 mA per 100 ft. (31 m) @ 240 VAC
Voltage:	120/208/240 VAC nominal

ARCTIC TRACE[®]

Type E series Temperature Limiting

PRODUCT SPECIFICATION FREEZE PROTECTION SYSTEM

CATALOG NUMBER	Rating W/FT	CIRCUIT LOAD AMP DRAW @ -40 F			CIRCUIT LENGTH @ 20% WATT REDUCTION FT/M	
		W/M 50F	AMPS FT	AMPS M		
@ 120 VAC	W/FT @50°F					
E160312CBTEZ	3	10	.025	.86	325FT	100M
E160512CBTEZ	5	16	.041	.14	300FT	91M
E160712CBTEZ	7	23	.058	.20	275FT	84M
E161012CBTEZ	10	33	.083	.28	235FT	72M
@ 240 VAC						
E160324CBTEZ	3	10	.012	.04	625FT	190M
E160524CBTEZ	5	16	.020	.07	600FT	183M
E160724CBTEZ	7	23	.029	.09	475FT	145M
E161024CBTEZ	10	33	.041	.14	450FT	138M
The power output shown apply to standard cable installed on insulated metallic pipe with the service voltage stated.						
ALTERNET VOLTAGES Should Arctic Trace be connected to a less or greater voltage watt per foot output will be reduced or increased		ACTUAL WATT PER FOOT = OUTPUT		$\left[\frac{\text{CONNECTED VOLTS}}{\text{RATED VOLTS}} \right]^2$		ARCTIC TRACE W/ft
Circuit Breaker should be sized per article 427-4 of the NEC and the use of Ground Fault Equipment is required as stated in N.E.C. Article 427-22.						
AMP per FT/M rating is based on -40°F start up temperature. Increase direct breaker for all cable temperatures > -40° F by 20% to allow for in rush current.						
Approval Listings:						
 Underwriters Laboratory Ordinary Locations- Heating Cable Component Listed UL Style Recognition		 Canadian Standards Association NRTL/C Ordinary Locations – 75C wet, 150C Dry Roof de-icing soil heating and pipe and vessel tracing (designations 2a,2e,3a,3b,3c in Canada and installation types A, B and C in the U.S.A.				
* Full loads are based on 10% power drop when cable is energized on service voltage listed.						
Other voltage and watt rating may be available > contact: du Alaska Incorporated phone (907) 522-3004						

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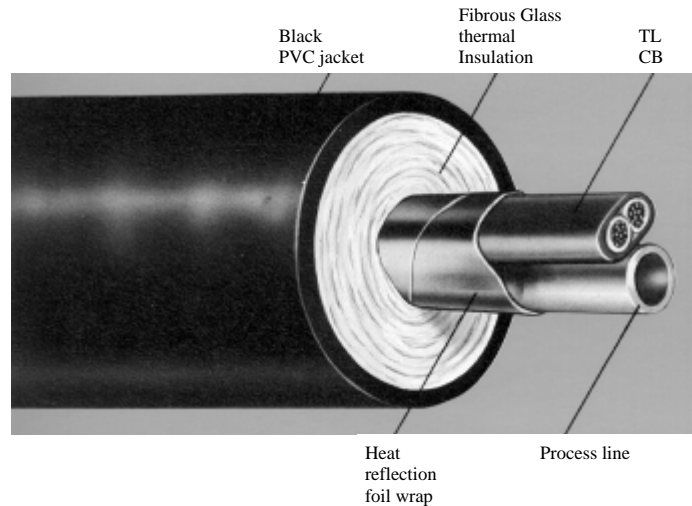
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ARCTIC TRACE[®]

Heated Tubing Bundles and Process Sample Lines

Principle of Operation:

Arctic Trace electric trace tubing system is comprised of a nickel plated copper braided Temperature Limiting heating element, single or dual process tube(s), hydrophobic inorganic fibrous glass thermal insulation, a heat reflection foil wrap and a 105°C black PVC jacket. The unique Temperature Limiting heating element allows for a wide range of temperature maintenance applications. The standard product is available for minimum temperature maintenance (240°F@80°F ambient) with 11.4 2.6 watt/foot @ 120 VAC heating element. The Temperature Limiting heating element is approved by CSA for pipe and vessel tracing applications under designations 3A, 3B, 3C, 4A, and 4B, in the Class 1, Groups A, B – Division 1 & 2 – Class II, Groups E, F, & G – Division 1 & 2. Hazardous locations. Underwriters Laboratory Ordinary Locations. Heating Cable component listed UL style recognition.



Features

- TL (Temperature Limiting) Heating element
- Pre-insulated and prefabricated for fast, easy installation
- Consistent and predictable thermal characteristics
- Maintenance free
- Class 1, Division 2 design

Applications

- Stack gas sampling lines
- Analyzer and instrument lines
- Small diameter process lines
- Impulse lines

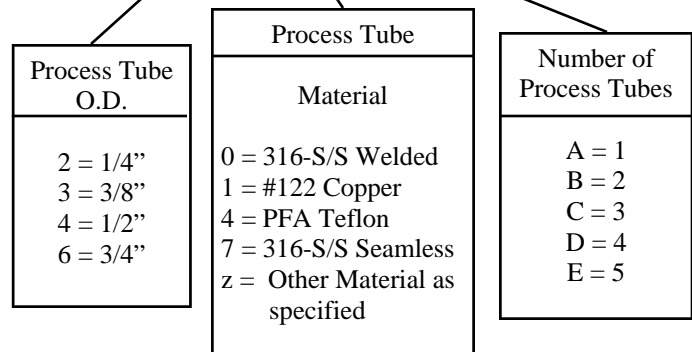
How to specify

Example: Z12xxxxCBTL
 du Alaska Incorporated TL electric trace tubing: (1) 1/4" O.D. x .035" wall 316-S/S welded tube; 11.4 watt/foot @ 120 VAC CPD nickel plated copper braided heating element; hydrophobic inorganic fibrous glass thermal insulation; 150°C black PVC jacket; MTR* = 400°F.

*Maximum Temperature Rating is the design condition for which this product is manufactured. Temperature in excess of this rating may result in deterioration of the components or changes in the operational characteristics.

How to Order

Z12	X	X	A	14	Single Process Line
MZ12	X	X	X	14	Multiple Process Line



Lists above show most common product configurations. Alternate tube sizes, wall thickness and material as well as alternate jacket material are available upon request.

TECHNICAL INFORMATION
ELECTRIC TRACE TUBING – TL

Electrical Specifications

Heater Type	TL (Temperature Limiting)
Insulation	PFA Teflon 600 V Rated
Circuit Length	260 feet
Power Output	11.4 Watt/foot @ 120VAC
	11.5 Watt/foot @ 208VAC
	10.2 Watt/foot @ 240VAC
	13.8 Watt/foot @ 277VAC
Rating Per N.E.C.	500 T2C

Product specifications

Jacket	105°C Black PVC
Insulation	Hydrophobic Inorganic Fibrous Glass Chloride Content less than 30 parts per million
Product Rating	400°F (204°C)

Nominal Bundle OD	Process Tube O.D.	Bundle O.D.
	1/4"	1.12"
	3/8"	1.44"
	1/2"	1.50"
(2)	1/4"	1.38"
(2)	3/8"	1.63"
(2)	1/2"	1.88"

Nominal Weight (I.B/FT)	Process Tube O.D.	Bundle Weight
	1/4"	.4
	3/8"	.5
	1/2"	.6
(2)	1/4"	.6
(2)	3/8"	.7
(2)	1/2"	.9

Installation Recommendations

Maximum Support Centers	Horizontal - 6 Feet Vertical – 15 Feet
Min Bending Radius	Process Tube O.D. Minimum Radius
	1/4" 6"
	3/8" 8"
	1/2" 10"
(2)	1/4" 8"
(2)	3/8" 10"
(2)	1/2" 12"

Minimum Installation Temperature

for PVC +15°F(-9.4°C)

Alternate flame retardant jacket materials include:

- Low Temperature Polyvinyl Chloride
- Polyethylene
- Thermoplastic Elastomer

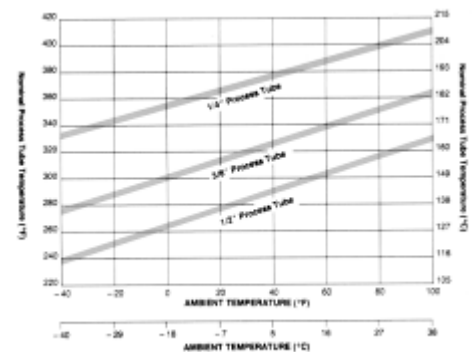
Tubing Specifications					
Tube O.D.	Wall Thickness	Material†	ASTM	Working Pressure @400°F	Maximum Coil Lengths
1/4"	.035"	316 – S/S	A-269	5170 psi**	500'*
3/8"	.035"	316 – S/S	A-269	3310 psi**	400'*
1/2"	.035"	316 – S/S	A-269	2430 psi**	300'*
1/4"	.030"	PFA Teflon	-	30 psi	500'*
3/8"	.062"	PFA Teflon	-	40 psi	500'*
1/2"	.062"	PFA Teflon	-	30 psi	500'*

** Values given are for welded. Seamless is slightly higher.

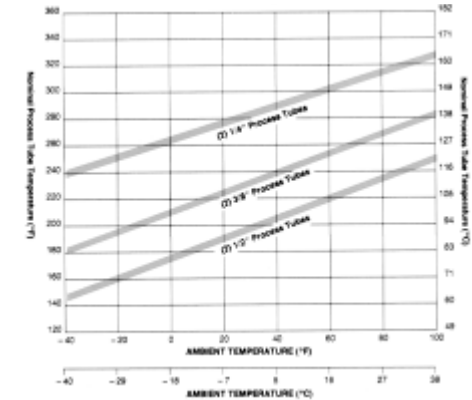
* Longer coil lengths available on request.

Performance Specifications

Temperature Limiting Tubing



Temperature Limiting Tubing



MAXIMUM CIRCUIT LENGTH		
OPERATING VOLTAGE	CIRCUIT LENGTH	WATTAGE
120	260 ft.	11.4
208	450 ft.	11.5
240	580 ft.	10.2
277	500 ft.	13.8

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