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Electrical freeze protection and process temperature maintenance for both hazardous and nonhazardous locations

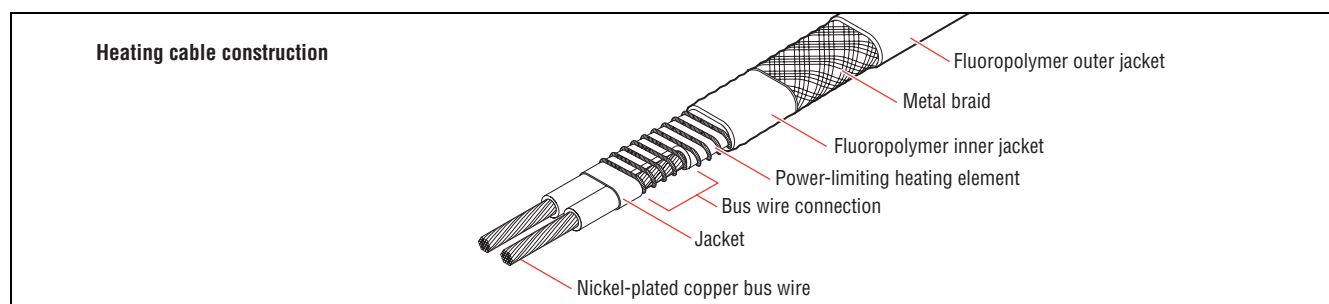
VPL is a family of power-limiting heating cables designed for pipe heat tracing in industrial applications. VPL can be used for freeze protection and process-temperature maintenance requiring high power output and/or high temperature exposure up to 455°F (235°C) and can withstand routine steam purges and temperature excursions to 500°F (260°C) with power off.

High-temperature power-limiting heating cables

Power-limiting cables are parallel heaters formed by a coiled resistor alloy heating element wrapped around two parallel bus wires. The distance between conductor contact points forms the heating zone length. This parallel construction allows the cable to be cut to length and terminated on site. The power output of VPL heating cables decreases with increasing temperature. VPL heating cables can be overlapped. The relatively flat power temperature curve of VPL ensures a low start-up current and high output at elevated temperatures.

VPL cables are approved for use in non-hazardous and hazardous locations. Approvals are listed below.

Raychem® VPL cables meet the requirements of the U.S. National Electrical Code and the Canadian Electrical Code. For additional information contact your Tyco Thermal Controls representative or call Tyco Thermal Controls at (800) 545-6258.



Application

Area classification	Nonhazardous and hazardous locations
Traced surface type	Metal
Chemical resistance	Organic and aqueous inorganic chemicals and corrosives

Temperature Rating

Maximum exposure temperature (power off)	500°F (260°C)					
Maximum maintain (power on) temperature table						
Cable	120 V	208 V	230 V	240 V	277 V	480 V
5VPL1-CT	445°F (230°C)	–	–	–	–	–
10VPL1-CT	400°F (205°C)	–	–	–	–	–
15VPL1-CT	335°F (170°C)	–	–	–	–	–
20VPL1-CT	300°F (150°C)	–	–	–	–	–
5VPL2-CT	–	455°F (235°C)	445°F (230°C)	445°F (230°C)	435°F (225°C)	–
10VPL2-CT	–	425°F (220°C)	410°F (210°C)	400°F (205°C)	390°F (200°C)	–
15VPL2-CT	–	410°F (210°C)	375°F (190°C)	335°F (170°C)	240°F (115°C)	–
20 VPL2-CT	–	300°F (150°C)	300°F (150°C)	300°F (150°C)	–	–
5VPL4-CT	–	–	–	–	–	445°F (230°C)
10VPL4-CT	–	–	–	–	–	400°F (205°C)
15VPL4-CT	–	–	–	–	–	335°F (170°C)
20VPL4-CT	–	–	–	–	–	300°F (150°C)

Temperature ID Number (T-Rating)

To be established using the principles of stabilized design. Use TraceCalc® Pro design software or contact Tyco Thermal Controls for assistance.

Approvals



IECEx BAS 06.0048X
Ex e II T* (See Schedule)
Ex ID A21 IP 66

Hazardous Locations



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



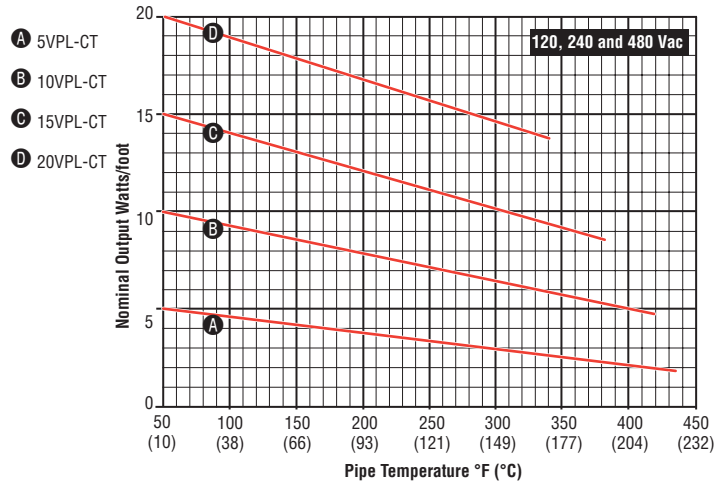
Class I, Div. 1 and 2, Groups A, B, C, D
Class II, Div. 1 and 2, Groups E, F, G
Ex e II T*
*T-class by design

Design and Installation

For proper design and installation, use TraceCalc Pro design software or the Design section of the *Industrial Product Selection and Design Guide* (H56550). Also, refer to the *Industrial Heat-Tracing Installation and Maintenance Manual* (H57274). Literature is available via the Tyco Thermal Controls Web site, www.tycothermal.com.

Nominal Power Output Rating on Metal Pipes at 120 V, 240 V and 480 V

	Adjustment factors	
	Power output	Circuit length
208 V		
5VPL2-CT	0.77	0.89
10VPL2-CT	0.78	0.90
15VPL2-CT	0.79	0.91
20VPL2-CT	0.80	0.92
277 V		
5VPL2-CT	1.30	1.13
10VPL2-CT	1.28	1.11
15VPL2-CT	1.26	1.09
20VPL2-CT	Not allowed	



Note: To choose the correct heating cable for your application, use the Design section of the *Industrial Product Selection and Design Guide* (H56550). For more detailed information, use TraceCalc Pro design software.

Maximum Circuit Lengths Based on Circuit Breaker Sizes

	Ambient temperature at start-up	Maximum circuit length (in feet) per circuit breaker														
		120 V					240 V					480 V				
		15 A	20 A	30 A	40 A	50 A	15 A	20 A	30 A	40 A	50 A	15 A	20 A	30 A	40 A	50 A
5VPL-CT	50°F(10°C)	260	350	370	370	370	525	685	740	740	740	1050	1370	1480	1480	1480
	0°F(-18°C)	240	325	370	370	370	485	645	740	740	740	970	1290	1480	1480	1480
	-20°F(-29°C)	235	315	370	370	370	470	625	740	740	740	940	1250	1480	1480	1480
	-40°F(-40°C)	225	305	370	370	370	455	610	740	740	740	910	1220	1480	1480	1480
10VPL-CT	50°F(10°C)	130	175	260	260	260	260	350	525	525	525	520	700	1050	1050	1050
	0°F(-18°C)	120	165	245	260	260	245	325	490	525	525	490	650	980	1050	1050
	-20°F(-29°C)	120	160	240	260	260	235	315	475	525	525	470	630	950	1050	1050
	-40°F(-40°C)	115	155	230	260	260	230	310	465	525	525	460	620	930	1050	1050
15VPL-CT	50°F(10°C)	85	115	175	215	215	175	230	350	430	430	350	460	700	860	860
	0°F(-18°C)	80	110	165	215	215	165	220	325	430	430	330	440	650	860	860
	-20°F(-29°C)	80	105	160	215	215	160	215	320	425	430	320	430	640	850	860
	-40°F(-40°C)	75	100	155	210	215	155	210	310	415	430	310	420	620	830	860
20VPL-CT	50°F(10°C)	65	85	130	175	185	130	175	260	350	370	260	350	520	700	740
	0°F(-18°C)	60	85	125	165	185	125	165	250	330	370	250	330	500	660	740
	-20°F(-29°C)	60	80	120	160	185	120	160	245	325	370	240	320	490	650	740
	-40°F(-40°C)	60	80	120	160	185	115	155	240	320	370	230	310	480	640	740

Ground-Fault Protection

Tyco Thermal Controls and national electrical codes require both ground-fault protection of equipment and a grounded metallic covering on all heating cables. The DigiTrace® HTPI and HTPG distribution panels meet this requirement. The following ground-fault breakers can also be used: Square D Type QOB-EPD or QO-EPD, TraceGuard 277®, Cutler Hammer Type QBGFEP.

480 V VPL must use DigiTrace 920, 200N, T2000, or NGC-30 controllers only, which provide ground-fault protection at 480 volts.

Product Characteristics

	5VPL1-CT, 10VPL1-CT 15VPL1-CT, 20VPL1-CT	5VPL2-CT, 10VPL2-CT 15VPL2-CT, 20VPL2-CT	5VPL4-CT, 10VPL4-CT 15VPL4-CT, 20VPL4-CT
Minimum bend radius	0.75 in	0.75 in	0.75 in
Supply voltage	100–120 Vac	200–277 Vac (20VPL2-CT 200–240 Vac only)	400–480 Vac
Bus wire size	12 AWG	12 AWG	12 AWG
Outer jacket color	Red	Red	Red
Weight (lb per 10 ft, nominal)	1.4	1.4	1.4
Heating cable dimensions	0.46 in x 0.3 in (11.7 mm x 7.6 mm)	0.46 in x 0.3 in (11.7 mm x 7.6 mm)	0.46 in x 0.3 in (11.7 mm x 7.6 mm)

Components

Tyco Thermal Controls offers a full range of components for power connections, splices, and end seals. These components must be used to ensure proper functioning of the product and compliance with warranty, code, and approvals requirements.