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MATERIAL SPECIFICATION SHEET

HVAC & R

VIPERT™ RADIANT Oxy Barrier Hydronic Radiant Heating Tubing

SCOPE:

This material specification designates the requirements for VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing for general fluid transport, including hydronic radiant heating and irrigation systems. VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing includes an oxygen barrier layer that helps restrict the passage of oxygen through the wall of the tubing. All VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is copper tube size dimension (CTS), SDR-9 wall thickness and meets the requirements of cNSFus, ASTM F2623, ULC/UL S101/UL263, ULC S102.2, ASTM E84 and is an acceptable product included in CSA B214-16: Installation code for hydronic heating systems.

MATERIALS:

All VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is manufactured from a Bimodal Polyethylene with a Cell Classification of PE 223273A which is a high density polyethylene of raised temperature and does not require cross-linking to achieve the superior strength to withstand high temperatures; the Bimodal Polyethylene does this with tie chain molecules which connect the crystalline structure. The VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is a 3 layer product consisting of an Oxygen barrier layer to prevent Oxygen from defusing into the system fluid, an adhesive layer and the core layer consisting of the Bimodal Polyethylene.

MARKING & CERTIFICATION:

All VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is marked with the name CB Supplies as the manufacturer, nominal size, plastic tubing material designation code PE 2708 (indicating that the PE-RT tubing has been tested and meets the ASTM F2623 requirements for minimum chlorine resistance at the end use condition of 100% @140˚F), design pressure and temperature ratings, relevant ASTM standards, manufacturing date and production code, as well as NSF-rfh stamps (indicating third-party certification by NSF International for meeting and exceeding performance standards, as well as achieving the chlorine resistance rating). NSF conducts random onsite inspections of the manufacturing facilities and independently tests VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing for compliance with physical, performance standards. VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is also certified to meet the Uniform Mechanical Code, International Mechanical Code, NSF-rfh (ASTM F2623), ULC/UL (Underwriters Laboratory) S101/UL263 and ULC S102.2 and ASTM E84 through Warnock Hersey.

RECOMMENDED USES:

VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is intended and recommended for use in general fluid distribution, including hydronic and irrigation systems. Design temperature and pressure ratings for VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing are 160 psi @ 73˚ F and 100 psi @ 180˚ F. VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing can be used in “continuously recirculating hot water systems” at temperatures of up to 140˚F while still maintaining excellent chlorine resistance. For information on the suitability for other hot and cold water applications not listed here, consult with your CB Supplies representative.

HANDLING AND INSTALLATION:

VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is tough yet flexible. However, it is softer than metals and may be damaged by abrasion or by objects with cutting edges. Use of these materials in hot and cold fluid distribution systems must be in accordance with good mechanical practices, applicable code requirements and current installation practices available from CB Supplies. VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is manufactured to meet written national standards. Contact a CB Supplies representative or the applicable code enforcement bureau for information about approvals for specific applications.

MATERIAL PROPERTIES:

Property	Test Method	English Units	SI Units
Density	ASTM D792	–	0.9333 g/cc
Melt Index (190°C/2.16 k g)	ISO 1133	–	0.7 g/10 min
Flexural Modulus[1]	ISO 178	79,800 psi	550 MPa
Tensile Modulus (0.0787 in, Compression Molded)	ISO 527-2	84,100 psi	579.8 MPa
Coefficient of Linear Thermal Expansion (20 - 70°C)	DIN 53752A	8x102/°F	1.95×10^{-4}/°K
Hydrostatic Design Basis @ 73°F (23°C)	ASTM F2837	1250 psi	8.6 MPa
Hydrostatic Design Basis @ 180°F (82°C)	ASTM F2837	630 psi	4.3 MPa
Vicat Softening Point	ASTM D1525	252°F	124°C
Thermal Conductivity	DIN 52612	2.8 Btu-in/(hr)(ft^2)(°F)	0.39 Watts/(m^2)(°C)

1. 73°

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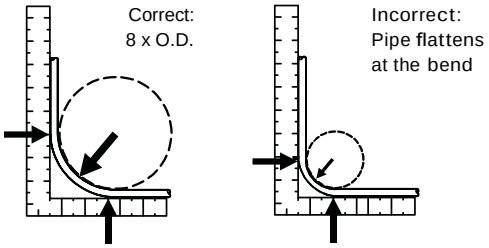
VIPERT™ Oxy Barrier Hydronic Radiant Heating Tubing

QUALITY ASSURANCE

When the product is marked with ASTM F2623 and NSF-rfh designations, it affirms that the product was manufactured, inspected, sampled and tested in accordance with these specifications and it has been found to meet the specified requirements.

CERTIFICATIONS

Indicates that the tubing has been tested and meets the ASTM F2623 requirements for minimum chlorine resistance at the end use condition of 100% 140˚F (60˚C). NSF tested according to ASTM Standard F2023, evaluating the oxidative resistance of cross-linked polyethylene (PEX) tubing and systems to hot chlorinated water greatly exceeding the minimum chlorine resistance requirements of ASTM F2623.



NOTE: Tubing may be bent to a minimum of 5 x O.D.with approved bend support.

ULC/UL S101/UL 263 Listed for Fire Resistant & Firestop Products & Systems

NSF Certified to ASTM F2623

IAPMO Listed Uniform Mechanical Code

Listed International Mechanical Code

Warnock Hersey Certified to ULC S102.2 & ASTM E84 for sizes up to 1”

MINIMUM BURST PRESSURE (PSI)

Per ASTM F2623/CTS-OD SDR-9

Size	73.4˚ (23˚C)	180˚ (82.2˚C)
1/2”	480	180
3/4”	475	180
1”	475	180
1 1/4”	475	180
1 1/2”	475	180
2”	475	180

PRESSURE DROP TABLE

Expressed as PSI/FT Pressure Drop (US Gallons / Minute and Nominal I. D. used for calculation)

	Size						
GPM	3/8”	1/2”	3/4”	1”	1-1/4”	1-1/2”	2”
1	.061	.014					
1.5	.130	.030					
2.2	.264	.062					
2.5	.334*	.078					
3	.468	.110	.021				
3.5	.623	.146	.028				
4		.187*	.036				
5		.283	.054				
6		.396	.076	.022			
7		.528	.101	.030			
8			.130	.038			
9			.161*	.048			
10			.196	.058	.022		
11			.234	.069	.026		
12			.275	.081	.031		
13			.381	.094	.035		
14				.108*	.041		
16				.138	.052	.023	
18				.172	.065	.029	
20				.209	.079	.035	
22				.249	.094*	.042	
24					.110	.049	
26					.128	.057	
28					.147	.065	
30					.167	.074*	
32					.188	.084	.023
34						.094	.025
36						.104	.028
38						.115	.031
40						.126	.034
46						.164	.044
52							.055*
80							.123

EXAMPLE: To calculate the pressure drop of a 1/2” line, 40 ft. long, with a 3 gpm flow rate, calculate .110 psi x 40 ft. = 4.4 psi pressure drop. Most plumbing codes require 8 psi residual pressure at the fixture. Refer to your local code requirements.

*Indicates 8 fps maximum velocity allowed by some plumbing codes.

NOTE: Maximum flow for each size based on 12 fps velocity. PSI x 2.307 = head loss.

SDR-9 VIPERT OXY BARRIER HYDRONIC RADIANT HEATING TUBING

ASTM F2623/CTS-OD SDR-9

Stock Code	Tubing Size	O. D.	Wall Thickness	Nom. I. D.	Weight Per Ft.	Volume (Gal/100 ft.)
PRTOB3	1/2”	0.625” ± .004”	0.070” + .010”	0.485	0.0535	0.97
PRTOB58	5/8”	0.750” ± 0.004”	0.083” + 0.010”	0.662”	0.080	1.78
PRTOB4	3/4”	0.875” ± .004”	0.097” + .010”	0.681	0.1023	1.90
PRTOB5	1”	1.125” ± .005”	0.125” + .013”	0.875	0.1689	3.13
PRTOB6	1 1/4”	1.375” ± .005”	0.153” + .015”	1.069	0.251	4.53
PRTOB7	1 1/2”	1.625” ± .006”	0.181” + .019”	1.263	0.352	6.31
PRTOB8	2”	2.125” ± .006”	0.236” + .024”	1.653	0.599	10.83

Note: Dimensions are in English units. Tolerances shown are ASTM requirements. VIPERT™ Oxy Barrier Hydronic Radiant Heating tubing is manufactured to within these specifications.

CB SUPPLIES

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