

### VIPERT™ RADIANT Oxy Barrier Hydronic Radiant Heating Tubing

#### SCOPE:

This material specification designates the requirements for VIPERT™ Radiant Oxy Barrier Hydronic Radiant Heating tubing for general fluid transport, including hydronic radiant heating and irrigation systems. VIPERT™ Radiant 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™ Radiant 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™ Radiant 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 (PE-RT) 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™ Radiant 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™ Radiant 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 the VIEPRT™ Radiant Oxy Barrier 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™ Radiant Oxy Barrier Hydronic Radiant Heating tubing for compliance with physical, performance standards. VIPERT™ Radiant 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/UL 263 and ULC S102.2 and ASTM E84 through Warnock Hersey.

#### RECOMMENDED USES:

VIPERT™ Radiant 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™ Radiant Oxy Barrier Hydronic Radiant Heating tubing are 160 psi @ 73° F and 100 psi @ 180° F. VIPERT™ Radiant 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™ Radiant 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™ Radiant 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 kg)	ISO 1133	–	0.7 g/10 min
Flexural Modulus <sup>1</sup>	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)	DIN53752A	8x10 <sup>2</sup> /° F	1.95 x10 <sup>-4</sup> /°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. <sup>2</sup> )(°F)	0.39 Watts/(m <sup>2</sup> )(°C)

1. 73° F

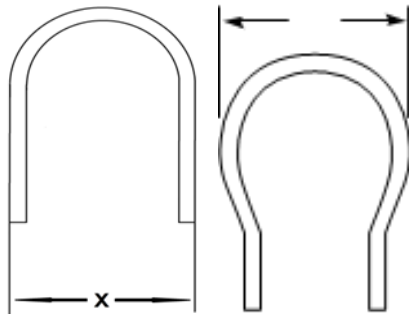


## VIPERT™ Radiant Oxy Barrier Hydronic Radiant Heating Tubing

### 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.

When the VIPERT™ Radiant Oxy Barrier tube space is less than the minimum recommended bending dimension, the loop ends should be swept out to at least the dimension shown below.



When spacing for the tube is less than minimum bend dimension.

Dimension X	
Tubing Size	Minimum Bend Diameter
1/2	10"
5/8	12"
3/4	14"
1	18"

Otherwise, if the spacing for the tube is equal or greater than "X", a standard loop may be used.

VIPERT™ Radiant Oxy Barrier Oxygen Permeation: All sizes have less than 0.1 grams/m<sup>3</sup>/day.

NOTE: VIPERT™ Radiant OXY Barrier Tubing meets DIN 4726 requirements for oxygen tight pipes.

Certified to ULC

### PRESSURE DROP TABLE

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

GPM	Size				
	3/8"	1/2"	5/8"	3/4"	1"
.5	.025	.006	.001	.001	.000
.75	.049	.012	.005	.001	.000
1	.080	.019	.008	.004	.000
1.5	.163	.038	.016	.007	.002
2.0	.269	.063	.026	.012	.004
2.5	.399*	.093	.038	.018	.006
3	.551	.128	.052	.025	.008
3.5	.724	.169	.068	.033	.010
4		.213*	.087	.041	.013
5		.317	.128	.061	.019
6		.439	.178*	.084	.026
7			.234	.111	.033
8			.297	.140*	.042
9			.366	.173	.052
10				.209	.063
11				.248	.075
12				.291	.087
13				.336	.101
14					.115*
16					.147
18					.181
20					.219
21					.240

EXAMPLE: To calculate the pressure drop of a 1/2" line, 40 ft. long, with a 3 gpm flowrate, 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 = headloss.



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 S102.2 & ASTM E84

### SDR-9 VIPERT™ RADIANT OXY BARRIER HYDRONIC RADIANT HEATING TUBING

ASTM F2623 CTS-OD SDR-9

Stock Code	Tubing Size	O. D. (in.)	Wall Thickness (in.)	Nom. I. D. (in.)	Weight Per Ft. (lbs.)	Volume (Gal/100 ft.)
PRT0B2	3/8	0.500" ± .003"	0.070" + .010"	0.360"	.04	0.50
PRT0B3	1/2	0.625" ± .004"	0.070" + .010"	0.485"	0.0535	0.97
PRT0B58	5/8	0.750" ± 0.004"	0.083" + 0.010"	0.584"	0.080	1.78
PRT0B4	3/4	0.875" ± .004"	0.097" + .010"	0.681"	0.1023	1.90
PRT0B5	1	1.125" ± .005"	0.125" + .013"	0.875"	0.1689	3.13

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



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