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## Material Specification Sheet

### O2 Barrier EVOH Tubing (PEX)

#### **SCOPE:**

This specification designates the requirements for Allied O2 Barrier EVOH cross-linked polyethylene (PEX) tubing for use in hydronic radiant heating systems. Allied PEX is available in standard non-barrier (same as our plumbing tubing). All Allied PEX tubing is manufactured and tested to the requirements of ASTM F 876 and F 877 and is CTS-OD (copper tube size OD controlled) with an SDR (standard dimension ratio) 9 wall thickness.

#### **MATERIAL:**

Allied O2 Barrier EVOH is produced from cross-linkable, high density polyethylene resin. This cross-linkable resin is produced by grafting organo-silane molecules onto a base polyethylene chain. A catalyst that initiates the cross-linking process is blended with the resin before extrusion. Cross-linking is completed after extrusion by exposing the tubing to heat and moisture.

O2 Barrier EVOH PEX includes a thin layer of ethylene vinyl alcohol (EVOH) applied to the outside of the tubing during the extrusion process. EVOH is highly resistant to the passage of oxygen.

#### **MARKING AND CERTIFICATION:**

Tubing is marked with Allied O2 Barrier EVOH, the production code and date, nominal size, design pressure/temperature ratings, ASTM specifications numbers, NSF-pw and ICBO ER evaluation report number 5287. Tubing is third party tested to the requirements of the stated ASTM standards. Tubing includes incremental footage markings to assist with loop layout. Both, Allied non-barrier and O2 Barrier EVOH PEX are certified to NSF 61 for use as part of, or connected to a potable water system.

#### **RECOMMENDED USES:**

Allied O2 Barrier EVOH tubing is recommended for hydronic radiant panel heating systems utilizing water or an \*antifreeze solution as the heat transfer media. Tubing may be installed in concrete, gypsum based lightweight concrete, sand and in or under wood flooring or behind wallboard or plaster. O2 Barrier EVOH PEX may also be used as transfer lines for baseboard heating systems with a maximum operating temperature of 180° F (82° C).

#### **HANDLING AND INSTALLATION:**

Install Allied PEX in accordance with guidelines published by the \*\*Radiant Panel Association, applicable code requirements and accepted industry practices. Hydro-static testing is recommended and is to be conducted in accordance with local code requirements. For information on the suitability for other applications, contact your Vanguard representative.

**MATERIAL PROPERTIES:**

Property	ASTM	Typical Values	
		English Units	SI Units
Density	D 792	-	0.946 g/cc
Melt Index 1 (190° C/2.16kg)	D 1238	-	0.7 g/10min
Flexural Modulus 2	D 790	120,000 psi	830 MPa
Tensile Strength @ Yield (2 in/min)	D 638	2,900 psi	20 MPa
Coefficient of Linear Thermal Expansion @ 68° F	D 696	8 x 10 <sup>-5</sup> /°F	15 x 10 <sup>-5</sup> /°C
Hydrostatic Design Basis @ 73° F (23° C) @ 180° F (82° C)	D 2837	1250 PSI	8.6 MPa
	D 2837	800 PSI	5.5 MPa
Vicat Softening Point	D 1525	255° F	124° C
Thermal Conductivity	C 177	2.4 BTU/(hr)(ft <sup>2</sup> )(°F/in)	3.5 x 10 <sup>-3</sup> Watts/(cm <sup>2</sup> )(°C/cm)

1.) Condition 195/5.0 2.) 68° F

\* Antifreeze solutions include: propylene glycol; ethylene glycol; methanol; glycerin; potassium acetate.

\*\* Radiant Panel Association, 1399 S. Garfield Ave. Loveland, CO 80537 1/800 660-7187 or 1/970 613-0100

**SDR9 PEX TUBING**

ASTM F876/F877/CTS-OD SDR9

NOTE: Dimensions are in English units. Tolerances are ASTM requirements.

Part Number	Tubing Size	O.D	Wall Thickness	Nom. I.D.	Weight Per Foot
	3/8"	0.500 ± .003	0.070 ± .010	0.350	.0413
	1/2"	0.625 ± .004	0.070 ± .010	0.485	.0535
	5/8"	0.750 ± .004	0.083 ± .010	0.584	.0810
	3/4"	0.875 ± .004	0.097 ± .010	0.671	.1023
	1"	1.125 ± .005	0.132 ± .010	0.863	.1689

**PRESSURE DROP TABLE**

Expressed per/foot

	3/8"	3/8"	1/2"	1/2"	5/8"	5/8"	3/4"	3/4"	1"	1"
	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss
.1	.001	.002								
.2	.004	.008	.001	.002						
.3	.008	.017	.002	.004	.001	.002				
.4	.013	.030	.003	.007	.001	.002				
.5	.020	.045	.004	.010	.002	.004				
.6	.027	.063	.006	.014	.003	.006	.001	.003		
.7	.036	.084	.008	.019	.003	.008	.002	.004		
.8	.047	.108	.011	.024	.004	.010	.002	.005		
.9	.058	.134	.013	.030	.005	.012	.002	.006		
1	.070	.1626	.016	.037	.007	.015	.003	.007	.001	.002
1.5			.034	.078	.014	.032	.006	.015	.002	.004
2			.058	.133	.024	.055	.011	.025	.003	.007
2.5			.087	.201	.036	.083	.016	.037	.005	.011
3					.050	.116	.023	.052	.007	.015
3.5					.067	.154	.030	.070	.009	.021
4					.085	.197	.039	.089	.011	.026
5					.129	.298	.059	.135	.017	.040
6					.181	.417	.082	.189	.024	.056
7							.109	.252	.032	.075
8							.140	.322	.041	.095
9							.174	.401	.051	.118
10							.211	.487	.062	.143
11							.252	.581	.074	.171
12							.296	.683	.087	.201
13							.343	.792	.101	.233

\* Indicates 8fps maximum velocity required by some plumbing codes.

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

EXAMPLE: To calculate the pressure drop of a 1/2" line, 40 ft long, with a 3 gpm flow rate, calculate 122 psi x 40 ft = 4.9 psi pressure drop. Most plumbing codes require 8 psi residual pressure at the fixture. Refer to your local code requirements.

**QUALITY ASSURANCE:**

When the product is marked with the ASTM F876/F877 designation, it affirms that the product was manufactured, inspected, sampled and tested in accordance with these specifications and has been found to meet specified requirements.

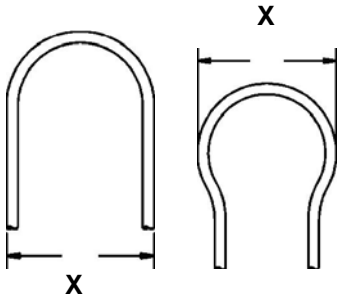
**MINIMUM BURST PRESSURE (PSI)**

Per ASTM F876/F877

Size	74 degree F (23 C)	180 degree F (82 C)
1/4"	870	390
3/8"	620	275
1/2"	480	215
5/8"	475	210
3/4"	475	210
1"	475	210
1 1/4"	475	210
1 1/2"	475	210
2"	475	210

Volume / 100 FT		Thermal Heat Transfer Coefficient BTU/FT/HR/DELTA T
Tubing Size	Gallons	
3/8"	.50	3/8"
1/2"	.92	1/2"
5/8"	1.33	5/8"
3/4"	1.84	3/4"
1"	3.04	1"

**MINIMUM BEND DIMENSIONS:**



When the tube spacing is less than the minimum recommended bending dimension, the loop ends should be swept out to at least the dimension shown. Otherwise, if tube spacing is equal or greater than "X", a standard loop may be used.

Dimension X	
Tubing Size	With the Coil
3/8"	8"
1/2"	10"
5/8"	12"
3/4"	14"
1"	18"

**ALLIED O2 BARRIER EVOH:**

Allied sizes have than 0.1 grams/m3/day

Note: Allied O2 Barrier EVOH PEX meets DIN 4726 requirement for oxygen tight pipes.

Allied reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Allied products previously or subsequently sold.

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