

## ViegaPEX™ Ultra Multi-layer Cross-linked Polyethylene (PEX)

### Scope

This material specification designates the requirements for ViegaPEX Ultra multi-layered hot and cold water distribution tubing. All ViegaPEX tubing is copper tube size dimension (CTS), SDR-9 wall thickness and meets the requirements of ASTM F876 and F877.

### Materials

ViegaPEX Ultra tubing is manufactured from a cross-linkable, high-density polyethylene produced by grafting organo-silanes onto a polyethylene base. A catalyst (accelerator) added to the cross-linkable polyethylene during extrusion initiates the cross-linking process. Cross-linking is completed with hot water or steam (sauna). The multi-layered construction assures the customer that if the pipe is exposed to UV light, its physical properties as well as its long-term Chlorine/ORP resistance will be retained at the highest level in the industry today. The exterior layer, also with superior Chlorine/ORP resistance, is provided in the colors black, red, white and blue for easy identification of hot and cold lines.

### Marking and Certification

All ViegaPEX Ultra tubing is marked with the name Viega as the manufacturer, nominal size, plastic tubing material designation code PEX 5006, Chlorine resistance rating NSF-pw (CL5), design pressure and temperature ratings, relevant ASTM standards, manufacturing date and production code, as well as the NSF-pw stamps indicating third-party certification by NSF International for meeting and exceeding performance and toxicological standards, as well as achieving the highest chlorine resistance rating in the PEX industry. NSF conducts random on-site inspections of Viega manufacturing facilities and independently tests ViegaPEX Ultra tubing for compliance with physical, performance and toxicological standards. ViegaPEX Ultra PEX is also certified to meet the Uniform Plumbing Code, NSF U.P. Code, UL (Underwriters Laboratories) UL 1821 (cULus)<sup>1</sup>, CSA (Canadian Standards Association) B137.5 (cNSF<sub>U.S.</sub>) the ICC (International Code Council) Evaluation Service, and HUD (Housing and Urban Development).

### Recommended Uses

ViegaPEX Ultra tubing is intended and recommended for use in hot and cold potable water distribution systems and multipurpose residential fire sprinkler systems per NFPA 13D with ViegaPEX Ultra Black tubing in 3/4" to 2" sizes meeting the requirements of ASTM F876 and UL 1821 (130 psi @ 120°F). Design temperature and pressure ratings for ViegaPEX Ultra are 160 psi @ 73°F and 100 psi @ 180°F. ViegaPEX Ultra tubing can also be used in "continuously recirculating" plumbing 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 Viega representative.

### Handling and Installation

ViegaPEX Ultra cross-linked polyethylene 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 water distribution systems must be in accordance with good plumbing practices, applicable code requirements, and current installation practices available from Viega. ViegaPEX Ultra is manufactured to meet written national standards. Contact a Viega representative or the applicable code enforcement bureau for information about approvals for specific applications.

Property	ASTM Test Method	Typical Values	
		English Units	SI Units
Density	D 792	–	0.946 g/cc
Melt Index <sup>2</sup> (190°C/2.16 kg)	D 1238	–	0.7g/10 min
Flexural Modulus <sup>3</sup>	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	9.2 x 10 <sup>-5</sup> /°F	15x10 <sup>-5</sup> /°C
Hydrostatic Design Basis @ 73°F (23°C)	D 2837	1,250 psi	8.6 MPa
Hydrostatic Design Basis @ 180°F (82°C)	D 2837	800 psi	5.5 MPa
Vicat Softening Point	D 696	255°F	124°C
Thermal Conductivity	D 177	2.4 Btu-in (hr)(ft <sup>2</sup> )(°F/in)	3.5x10 <sup>-3</sup> Watts/(cm <sup>2</sup> )(°C/cm)

1. Black Ultra PEX sized 3/4" through 2" only
2. Before Cross-linking
3. 73°F

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## 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 the specified requirements.

## Certifications

**NSF-pw** - Tested for health effects to ANSI/NSF standard 61 and performance to ANSI/NSF standard 14.

**PEX 5006** - Tested and listed to the NSF-pw (CL5) Chlorine resistance rating for an end use condition of 100% @ 140°F per ASTM F876, which is the highest Chlorine resistance rating available through ASTM. When the product is marked with the PEX 5006 NSF-pw (CL5) designation, it affirms the product is approved for use in continuous domestic hot water circulation systems with up to 140°F water temperatures.

**NSF Certified to NSF-U.P. Code** – approved for Uniform Plumbing Code, listed to ASTM F876/F877.



- **ICC ES-PMG™ 1038**  
plumbing applications



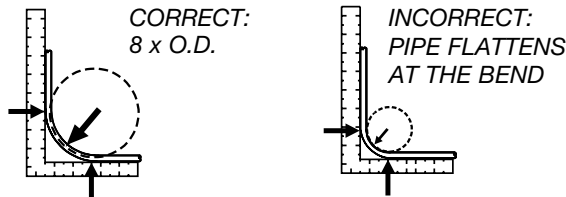
- **NSF certified to CSA B137.5**  
(Canadian Standards Association)



- **UL certified to UL 1821 listing** (130psi @ 120°F)  
for use in multipurpose residential fire sprinkler systems per NFPA 13D<sup>1</sup>

**HUD** (Housing and Urban Development) – MR 1276.

## Minimum Bend Radius



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

## Minimum Burst Pressure (PSI) Per ASTM F876/F877

SIZE	73°F (23°C)	180°F (82°C)
3/8"	620	275
1/2"	480	215
3/4"	475	210
1"	475	210
1-1/4"	475	210
1-1/2"	475	210
2"	475	210

1. Black ViegaPEX Ultra sized 3/4" through 2" only

## SDR-9 PEX Tubing ASTM F876/F877/CTS-OD SDR-9

Stock Code	Tubing Size	O.D.	Wall Thickness	Nom. I.D.	Weight Per Ft	Vol. (gal.) Per 100 Ft
33700	3/8"	0.500±.003	0.070+.010	0.350	.0413	0.50
33720	1/2"	0.625±.004	0.070+.010	0.475	.0535	0.92
34745	3/4"	0.875±.004	0.097+.010	0.671	.1023	1.82
34761	1"	1.125±.005	0.125+.013	0.862	.1689	3.04
34771	1-1/4"	1.375±.005	0.153+.015	1.054	.2523	4.52
34781	1-1/2"	1.625±.006	0.181+.019	1.244	.3536	6.30
32791	2"	2.125±.006	0.236+.024	1.629	.6026	10.83

NOTE: Dimensions are in English units. Tolerances shown are ASTM requirements. ViegaPEX Ultra is manufactured within these specifications.

## Pressure Drop Table Expressed as PSI/ft. Pressure Drop SIZE

GPM	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
1	.070	.016					
1.5	.149	.034					
2.2	.303	.069					
2.5	.385*	.087					
3	.539	.122	.023				
3.5	.717	.162	.030				
4		.208*	.039				
5		.314	.059				
6		.440	.082	.024			
7		.586	.109	.032			
8			.140	.041			
9			.174*	.051			
10			.211	.062	.024		
11			.252	.074	.028		
12			.296	.087	.033		
13			.343	.101	.038		
14				.116	.044		
16				.148*	.056	.025	
18				.184	.070	.031	
20				.224	.085	.038	
22				.267	.102	.045	
24					.119*	.053	
26					.138	.062	
28					.159	.071	
30					.180	.080*	
32					.203	.091	.024
34						.101	.027
36						.113	.030
38						.125	.033
40						.137	.037
45							.046
50							.056*
55							.066
60							.078
65							.090
70							.104
75							.118

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

NOTE: Maximum flow for each size based on 12 FPS velocity.

PSI x 2.307 = head loss.

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