PIPELINE PLASTICS

Water Pipe PE4710







Corporate Headquarters
1301 Solana Blvd., Bldg. 1 Suite 1440, Westlake, TX 76262
O: 817-693-4100 **F:** 817-693-4101

Applications

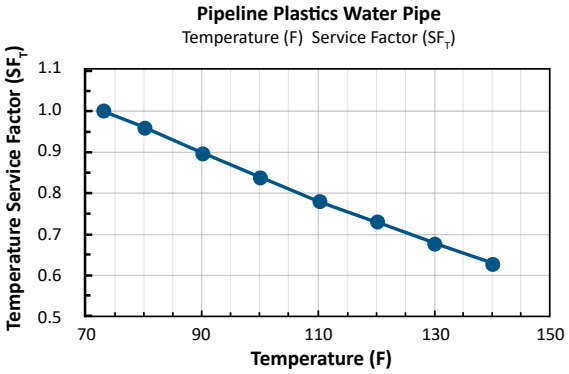
Pipeline Plastics PE4710 Water Pipe is a high performance bimodal, high density polyethylene (HDPE) pipe designed for raw water transmission, potable and municipal water applications, as well as gravity and force sewer mains. Our PE4710 Water Pipe's heat fused joints provide a leak free, NSF certified, quality water system which is corrosion and seismic resistant to ensure a lifetime of safe and clean water.

Features and Benefits of HDPE Water Pipe

- Heat fused leak-free joints
- Small minimum bending radius
- Impact Resistant
- Resistant to fatigue from repetitive surge events
- Immune to corrosion
- Resistant to rapid crack propagation
- Highly resistant to scale build up that can reduce flow capacities
- Installed by open cut or trenchless method
- High fluid flow coefficient C= 150 over the life of the piping systems

Pressure Design

Pipeline Plastics Water Pipe is manufactured using a high performance PE4710 compound meeting the demanding requirements and rigors of water transmission, distribution and sanitary sewer. Design operation temperatures range up to 140°F. Maximum operating pressures follow the PPI Handbook of Polyethylene Pipe, second edition, Chapter 3 and 6 for determination of maximum operating pressures. For design temperatures other than 73°F a temperature service factor must also be used (see Chapter 3, Table A.2). For the transportation of fluids other than water see PPI publication TR-9 for additional service factor guidance.



$$PC = \frac{2 * HDS}{(DR - 1)} * SF_E * SF_T$$

Where:

PC = pressure class, psi
HDS = hydrostatic design stress
= 1000 psi for PLP Water Pipe at 73°F
DR = dimension ratio (actual average OD/min wall thickness, t)
SF_E = environmental service factor
= 1.0 for water and most sanitary sewer
(see PPI TR-9 for additional information)
SF_T = temperature service factor
= 1.0 at 73°F (see chart)

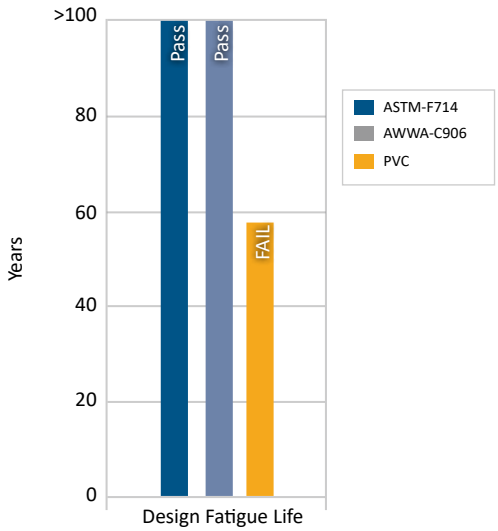
Working Pressure, Surge and Fatigue

Pipeline Plastics Water Pipe can withstand surge events associated with frequent pump on/off cycles, fast value closures or catastrophic system shutdown. Pressures and surge events generating up to 2X PC for occasional surge, and 1.5X PC for repeated surge is allowed for up to 10 million cycles (see PPI Technical Report, "Fatigue of Plastic Water Pipe: A Technical Review with Recommendations for PE4710 Pipe Design Fatigue.").

Pressure Class (PC)	DR	Working Pressure WP (psi)	* WP + Recurring Surge (psi)	* WP + Occasional Surge (psi)
200	11	200	300	400
160	13.5	160	240	320
125	17	125	188	250
100	21	100	150	200

* Note: Working Pressure rating for PE4710 at 73°F

Total Pressure = Working Pressure + Surge Pressure Allowance



Example installation for a 100 yr. design life:

PE4710 10" DIPS DR 14.3 vs. PVC 10" CIOD DR 18

- Working Pressure 70 psi
- Recurring flow velocity 4 fps
- Occasional flow velocity 8 fps
- Surge events per day 55
- **HDPE design fatigue life >100 yrs.**
- PVC design fatigue life 58 yrs.

Source – PPI PACE software, beta ver. 1.0, ©eTrenchless Group, Inc.

Joining

Pipeline Plastics Water Pipe can be joined by heat fusion using industry accepted ASTM F2620 procedure for butt-fusion and saddle fusion. Electro-fusion as well as many types of mechanical couplings or flange adaptors designed for use on HDPE pipe can also be used. Always follow the fitting manufacturer installation procedure.

Design, Installation and Leak Testing

Pipeline Plastics recommends following the practices and guidance of the Plastics Pipe Institute Handbook of Polyethylene Pipe, second edition available on the PPI website www.plasticpipe.org. Additional guidance is available with the PPI Calculator http://plasticpipe.org/publications/software-ppi-calculator.html.

Leak testing should be performed according to ASTM F2164, "Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure." Appropriate safety considerations should always be followed.

Conformance

- ASTM F714, "Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter."
- ANSI/AWWA C906, "Polyethylene (PE) Pressure Pipe and Fittings, 4" to 65" (100mm to 1650mm), for Waterworks."
- Cell Classification PE445574C per ASTM D3350
- NSF/ANSI Standard 14 Certified for Potable Water Contact
- Plastics Pipe Institute (PPI) TR-4 Listing as PE4710 / PE3408
- Hydrostatic Design Basis 1,600 psi @ 73°F (23°C) and 1,000 psi @ 140°F (60°C) per ASTM D2837
- Color & UV Stabilizer: (C) Black with 2% min Carbon Black per ASTM D3350
- Heat Fusion Joining as per ASTM F2620 and PPI TR-33/TR-41.
- Installation as per AWWA M55 and PPI PE Pipe Handbook, 2nd ed.

Physical Properties	Nominal Value*	Test Method	Physical Properties	Nominal Value*	Test Method
Density	0.960 g/cm^3	ASTM D1505	Elongation @ Break	>500 %	ASTM D638
Melt Index (MI) 190°C/2.16kg	0.07 g/10 min	ASTM D1238	Flexural Modulus	150,000 psi	ASTM D790
High Load Melt Index (190°C/21.6kg)	7 - 16 g/10 min	ASTM D1238	Brittleness Temperature	<-103 °F	ASTM D746
PENT	>500 hours	ASTM F1473	Hardness	62 Shore D	ASTM D2240
Tensile Stress @ Yield	3,500 psi	ASTM D638	Vicat Softening Temperature	256 °F	ASTM D1525
Tensile Stress @ Break	5,000 psi	ASTM D638	Thermal Expansion	1.0 x 10^{-4} in/in/°F	ASTM D696

* Nominal values are typical results and are not guaranteed or intended to be used as a product specification.

IPS		PR[A] / PC[B]	200	160	150	125	100
Size	OD (in)	DR	11	13.5	14.3	17	21
4"	4.5	Min Wall (in)	0.409	0.333	0.315	0.265	0.214
		ID[C] (in)	3.633	3.793	3.833	3.939	4.046
		Lb / Ft[D]	2.307	1.914	1.819	1.550	1.268
6"	6.625	Min Wall (in)	0.602	0.491	0.463	0.390	0.315
		ID[C] (in)	5.348	5.585	5.643	5.799	5.956
		Lb / Ft[D]	4.994	4.151	3.938	3.354	2.747
8"	8.625	Min Wall (in)	0.784	0.639	0.603	0.507	0.411
		ID[C] (in)	6.96	7.27	7.35	7.55	7.75
		Lb / Ft[D]	8.468	7.035	6.672	5.689	4.658
10"	10.75	Min Wall (in)	0.977	0.796	0.752	0.632	0.512
		ID[C] (in)	8.68	9.06	9.16	9.41	9.66
		Lb / Ft[D]	13.16	10.93	10.37	8.830	7.247
12"	12.75	Min Wall (in)	1.159	0.944	0.892	0.750	0.607
		ID[C] (in)	10.29	10.75	10.86	11.16	11.46
		Lb / Ft[D]	18.51	15.38	14.59	12.43	10.19
14"	14	Min Wall (in)	1.273	1.037	0.979	0.824	0.667
		ID[C] (in)	11.30	11.80	11.92	12.25	12.59
		Lb / Ft[D]	22.31	18.54	17.59	14.98	12.29
16"	16	Min Wall (in)	1.455	1.185	1.119	0.941	0.762
		ID[C] (in)	12.92	13.49	13.63	14.00	14.38
		Lb / Ft[D]	29.15	24.21	22.97	19.58	16.05
18"	18	Min Wall (in)	1.636	1.333	1.259	1.059	0.857
		ID[C] (in)	14.53	15.17	15.33	15.76	16.18
		Lb / Ft[D]	36.90	30.64	29.07	24.76	20.31
20"	20	Min Wall (in)	1.818	1.481	1.399	1.176	0.952
		ID[C] (in)	16.15	16.86	17.03	17.51	17.98
		Lb / Ft[D]	45.54	37.83	35.90	30.58	25.08
22"	22	Min Wall (in)	2.000	1.630	1.538	1.294	1.048
		ID[C] (in)	17.76	18.55	18.74	19.26	19.78
		Lb / Ft[D]	55.10	45.78	43.44	37.00	30.32
24"	24	Min Wall (in)	2.182	1.778	1.678	1.412	1.143
		ID[C] (in)	19.37	20.23	20.44	21.01	21.58
		Lb / Ft[D]	65.59	54.48	51.69	44.02	36.08
26"	26	Min Wall (in)	2.364	1.926	1.818	1.529	1.238
		ID[C] (in)	20.99	21.92	22.15	22.76	23.38
		Lb / Ft[D]	76.95	63.94	60.65	51.67	42.35
28"	28	Min Wall (in)	2.545	2.074	1.958	1.647	1.333
		ID[C] (in)	22.60	23.60	23.85	24.51	25.17
		Lb / Ft[D]	89.25	74.18	70.37	59.93	49.12
30"	30	Min Wall (in)	2.727	2.222	2.098	1.765	1.429
		ID[C] (in)	24.22	25.29	25.55	26.26	26.97
		Lb / Ft[D]	102.47	85.16	80.77	68.81	56.39
32"	32	Min Wall (in)	2.909	2.370	2.238	1.882	1.524
		ID[C] (in)	25.83	26.97	27.26	28.01	28.77
		Lb / Ft[D]	116.60	96.89	91.89	78.27	64.16
34"	34	Min Wall (in)	3.091	2.519	2.378	2.000	1.619
		ID[C] (in)	27.45	28.66	28.96	29.76	30.57
		Lb / Ft[D]	131.60	109.37	103.72	88.37	72.43
36"	36	Min Wall (in)	3.273	2.667	2.517	2.118	1.714
		ID[C] (in)	29.06	30.35	30.66	31.51	32.37
		Lb / Ft[D]	147.55	122.62	116.31	99.08	81.21
42"	42	Min Wall (in)	3.818	3.111	2.937	2.471	2.000
		ID[C] (in)	33.91	35.40	35.77	36.76	37.76
		Lb / Ft[D]	200.82	166.89	158.28	134.85	110.54
48"	48	Min Wall (in)		3.556	3.357	2.824	2.286
		ID[C] (in)		40.46	40.88	42.01	43.15
		Lb / Ft[D]		217.97	206.75	176.13	144.39
54"	54	Min Wall (in)			3.776	3.176	2.571
		ID[C] (in)			45.99	47.27	48.55
		Lb / Ft[D]			261.68	222.90	182.75
63"	63	Min Wall (in)				3.706	3.000
		ID[C] (in)				55.14	56.64
		Lb / Ft[D]				303.38	248.72
65"	65	Min Wall (in)				3.824	3.095
		ID[C] (in)				56.89	58.44
		Lb / Ft[D]				322.97	264.77

DIPS - DIOD		PR[A] / PC[B]	200	160	150	125	100
Size	OD (in)	DR	11	13.5	14.3	17	21
4"	4.80	Min Wall (in)	0.436	0.356	0.336	0.282	0.229
		ID[C] (in)	3.875	4.046	4.088	4.201	4.315
		Lb / Ft[D]	2.625	2.180	2.069	1.760	1.442
6"	6.90	Min Wall (in)	0.627	0.511	0.483	0.406	0.329
		ID[C] (in)	5.570	5.816	5.877	6.040	6.203
		Lb / Ft[D]	5.421	4.506	4.269	3.638	2.981
8"	9.05	Min Wall (in)	0.823	0.670	0.633	0.532	0.431
		ID[C] (in)	7.306	7.629	7.708	7.921	8.136
		Lb / Ft[D]	9.32	7.75	7.351	6.258	5.134
10"	11.10	Min Wall (in)	1.009	0.822	0.776	0.653	0.529
		ID[C] (in)	8.961	9.357	9.454	9.716	9.979
		Lb / Ft[D]	14.03	11.66	11.06	9.42	7.717
12"	13.20	Min Wall (in)	1.200	0.978	0.923	0.776	0.629
		ID[C] (in)	10.66	11.13	11.24	11.55	11.87
		Lb / Ft[D]	19.84	16.48	15.63	13.32	10.91
14"	15.30	Min Wall (in)	1.391	1.133	1.070	0.900	0.729
		ID[C] (in)	12.35	12.90	13.03	13.39	13.76
		Lb / Ft[D]	26.65	22.14	21.00	17.89	14.66
16"	17.40	Min Wall (in)	1.582	1.289	1.217	1.024	0.829
		ID[C] (in)	14.05	14.67	14.82	15.23	15.64
		Lb / Ft[D]	34.47	28.64	27.17	23.14	18.97
18"	19.50	Min Wall (in)	1.773	1.444	1.364	1.147	0.929
		ID[C] (in)	15.74	16.44	16.61	17.07	17.53
		Lb / Ft[D]	43.29	35.97	34.11	29.07	23.82
20"	21.60	Min Wall (in)	1.964	1.600	1.510	1.271	1.029
		ID[C] (in)	17.44	18.21	18.40	18.91	19.42
		Lb / Ft[D]	53.11	44.14	41.86	35.67	29.23
24"	25.80	Min Wall (in)	2.345	1.911	1.804	1.518	1.229
		ID[C] (in)	20.83	21.75	21.98	22.58	23.20
		Lb / Ft[D]	75.78	62.98	59.72	50.89	41.70
30"	32.00	Min Wall (in)	2.909	2.370	2.238	1.882	1.524
		ID[C] (in)	25.83	26.97	27.26	28.01	28.77
		Lb / Ft[D]	116.60	96.89	91.89	78.27	64.16
36"	38.30	Min Wall (in)	3.482	2.837	2.678	2.253	1.824
		ID[C] (in)	30.92	32.29	32.62	33.52	34.43
		Lb / Ft[D]	167.02	138.76	131.63	112.13	91.91
42"	44.50	Min Wall (in)		3.296	3.112	2.618	2.119
		ID[C] (in)		37.51	37.90	38.95	40.01
		Lb / Ft[D]		187.33	177.72	151.39	124.08
48"	50.80	Min Wall (in)		3.763	3.552	2.988	2.419
		ID[C] (in)		42.82	43.27	44.46	45.67
		Lb / Ft[D]		244.14	231.59	197.30	161.71
54"	57.56	Min Wall (in)				3.386	2.741
		ID[C] (in)				50.38	51.75
		Lb / Ft[D]				253.26	207.59
60"	61.61	Min Wall (in)				3.624	2.934
		ID[C] (in)				53.93	55.39
		Lb / Ft[D]				290.19	237.88

Note - These tables represent standard sizes. Other DRs and PCs available upon request.

A. PR: Pressure Rating in pounds/sq. in. (psi) for ASTM F714 Water up to 80°F.

B. PC: Pressure Class in pounds/sq. in. (psi) for ANSI / AWWA C906 Water up to 80°F.

C. ID: Inside Diameter may vary due to manufacturing tolorances.

D. Wt / Ft: Weight per foot in pounds may vary due to manufacturing tolorances.

PIPELINE PLASTICS

Corporate Headquarters
1301 Solana Blvd., Bldg. 1, Suite 1440, Westlake, TX 76262
O: 817-693-4100 **F:** 817-693-4101