

FLYING W PLASTICS



1/2" to 20"
**Municipal & Industrial
High-Density
Polyethylene Pipe**
PRODUCT SPECIFICATIONS



PLASTICS, INC.

www.flyingwplastics.com

487 Vanhorn Dr. - PO Box 759 - Glenville, WV 26351

800-327-4735 (sales)

For Quote Requests: sales@fwplastics.com

OVERVIEW



Flying W Plastics' high-density polyethylene municipal and industrial pipe can be manufactured to meet several industry standards including ASTM, AWWA, NSF, and other custom standards upon request. Different applications can require the pipe to be manufactured and labeled differently. Since Flying W Plastics manufactures pipes for a wide variety of applications, and since some standards may not be suitable for all applications, it is imperative that the customer review all standards prior to purchase and request quotations for pipe manufactured to meet their specific requirement.

Flying W Plastics manufactures the following products:

Spec I & Spec II - These HDPE pipes are manufactured from select PE4710 materials designed to give outstanding performance and longevity specifically for municipal water, sewer, and various industrial applications. These pipes are available in sizes 1/2"-20" and are available as black pipe or with color-coded stripes. These pipes comply with AWWA C901 (3" and smaller sizes), AWWA C906 (4" and larger sizes), and can be NSF-PW listed for potable water, if so specified. They are manufactured in compliance with the requirements of ASTM F714 (4" and larger), ASTM D3035 (3" and smaller), and meet the cell classification of PE445574C as specified in ASTM D3350.

Pioneer Industrial - These HDPE pipes are manufactured from select PE4710 resins and meet the cell classification of PE445574C as per ASTM D3350. These pipes are designed to provide excellent performance in applications such as mining, landfills (both solid and perforated pipes available), hydraulic fracturing, process fluids and a wide variety of industrial applications. They are manufactured to meet the requirements of ASTM F714 (4" and larger) and ASTM D3035 (3" and smaller), and meet the cell classification of PE445574C as specified in ASTM D3350. Available in sizes 1/2"-20".

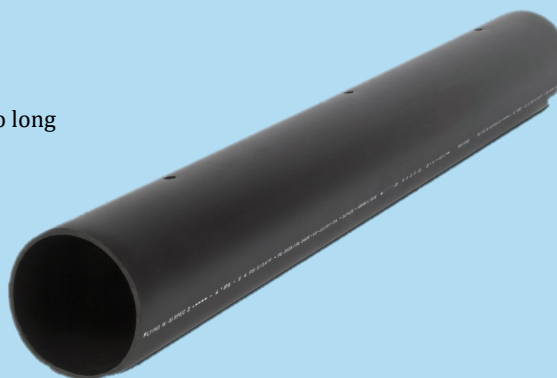
I.P.S. and D.I.P.S. pipe can be easily connected by fusion processes. Flying W Plastics recommends either butt fusion, socket fusion, or electrofusion, and can provide the recommended guidelines and procedures for connecting municipal and industrial pipe utilizing these methods.

PE 4710 Pressure Chart								
PE 4710 – 3" to 20" ASTM F714 SPEC I, SPEC LL & Pioneer Industrial								
DR 32.5	DR 26	DR 21	DR 17	DR 13.5	DR 11	DR 9	DR 7.3	DR 7
65 PSI	80 PSI	100 PSI	125 PSI	160 PSI	200 PSI	250 PSI	317 PSI	335 PSI
PE 4710 – 1/2" to 20" ASTM D3035 SPEC I, SPEC II & Pioneer Industrial								
DR 32.5	DR 26	DR 21	DR 17	DR 13.5	DR 11	DR 9	DR 7.3	DR 7
65 PSI	80 PSI	100 PSI	125 PSI	160 PSI	200 PSI	250 PSI	317 PSI	335 PSI

Custom Perforation

Flying W Plastic also offers its 4"-20" Pioneer Industrial, Sparta Gas, and Spec II piping custom perforated. We can do a wide variety of patterns and hole sizes done in line as a cost and labor saving alternative to shipping pipe to a perforation facility, making the perforations, re-bundling the pipe, and shipping onto a job site. Our inline perforation capabilities are wide ranging, but there are some limits, as follows:

- Perforations must be round holes 1/4" to 1" in diameter.
- A limit of 8 perforated rows to complete pattern.
- Spacing can be 3" to 20".
- Holes can be lined up or staggered (off-set).
- The angles between rows of holes are infinitely adjustable so long as no two rows are closer than 20 degrees apart.
- Any staggering profiles must repeat in 20" or less.



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MATERIAL PROPERTIES

Material Properties PE4710

The PE4710 materials offer higher working pressures in most applications than PE3608. Flying W certifies that its Municipal and Industrial PE4710 Pipes are manufactured from high-quality HDPE copolymers having the typical properties listed. These high-density copolymers meet the specifications set forth in ASTM D3035, ASTM F714, and ASTM D3350. These products are designed and manufactured specifically for use in municipal, industrial, mining, water transfer, slurries, irrigation, and landfill applications. For potable water applications, Flying W Plastics' Spec I & Spec II pipes have NSF-PW, AWWA C901, and AWWA C906 certifications and comply with ANSI/NSF Standard 61 health effects requirement.

Typical Properties ⁽¹⁾	English	SI Units	ASTM Method
Density Block	-	.959g/cc	D4883
Melt Index (High Load) ⁽²⁾	-	8.0g/10min	D1238
Melt Index ⁽³⁾	-	0.10g/10min	D1238
Tensile Strength			
@Yield (2in/min)	3625 psi	25.0 MPa	D638
@Break (2in/min)	5500 psi	38.0 MPa	D638
Elongation@ Break (2 in/min)	>600%	>600%	D638
Flexural Modulus ⁽⁴⁾	150,00 psi	1.035 MPa	D790
Notched Izod Impact Strength	9 ft-lbf/in	0.49 kj/m	D256
Hardness (Shore D)	66	66	D2240
Vicot Softening Point	259 ° F	126 °C	D1525
Brittleness Temperature	<-180°F	<-118 °C	D746
Hydrostatic Design Basis			
@ 23°C	1600 psi	11.0 MPa	D2837
@ 60°C	1000 psi	6.9 MPa	D2837
Minimum Required Strength	-	100 MPa	ISO 9080
Environmental Stress Crock Resistance ⁽⁵⁾	>1000 hrs	>1000 hrs	D1693
Notch Tensile (PENT)	>5000 hrs	>5000 hrs	F1473
Carbon Block Concentration	2.3%	2.3%	D1603
Cell Classification	445574C	445574C	D3350

(1) Typical Properties will vary within specification limits;

(2) 190 ° C / 21.100 kg

(3) 190 ° C / 2.16 kg

(4) 2% Secant - Method 1

(5) Condition C



PRODUCT SPECS

IRON PIPE SIZES - OUTSIDE DIAMETER / DR 7, 7.3, 9, 11, 13.5

Pipe weights are calculated in accordance with PPI TR-7. Average ID is calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual inside diameter will vary. Pipe dimensions are in accordance with applicable ASTM standards.

I.P.S. Data

- ASTM F714 Sizes 4" to 20"
- ASTM D3035 Sizes 1/2" to 3"

All pipe is manufactured from select PE4710 resins unless requested otherwise at the time of quote. While PE4710 resins are used, these resins meet or exceed the pressure ratings and physical properties of PE3608/3408 resins.

Pipe Size	Nom. OD	IPS DR - 7 335 psi			IPS DR - 7.3 317 psi			IPS DR - 9 250 psi			IPS DR - 11 200 psi			IPS DR - 13.5 160 psi		
		Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)
1/2"	0.840	0.120	0.58	0.118	0.115	0.59	0.114	0.093	0.64	0.096	0.076	0.67	0.08	0.062	0.70	0.071
3/4"	1.050	0.150	0.73	0.185	0.144	0.74	0.18	0.117	0.80	0.15	0.095	0.84	0.125	0.078	0.88	0.104
1"	1.315	0.188	0.91	0.29	0.180	0.93	0.28	0.146	1.00	0.235	0.120	1.06	0.197	0.097	1.10	0.163
1-1/4"	1.660	0.237	1.15	0.462	0.227	1.17	0.447	0.184	1.26	0.374	0.151	1.34	0.313	0.123	1.39	0.26
1-1/2"	1.900	0.271	1.32	0.606	0.260	1.34	0.585	0.211	1.45	0.49	0.173	1.53	0.411	0.141	1.60	0.341
2"	2.375	0.339	1.65	0.947	0.325	1.68	0.914	0.264	1.81	0.766	0.216	1.91	0.642	0.176	2.00	0.533
2-1/2"	2.875	0.411	2.00	1.39	0.389	2.05	1.34	0.319	2.19	1.12	0.261	2.32	0.94	0.213	2.42	0.781
3"	3.500	0.500	2.44	2.06	0.479	2.48	1.99	0.389	2.67	1.66	0.318	2.82	1.39	0.259	2.95	1.16
4"	4.500	0.643	3.13	3.40	0.616	3.19	3.28	0.500	3.44	2.75	0.409	3.63	2.30	0.333	3.79	1.91
5"	5.563	0.795	3.87	5.19	0.762	3.94	5.02	0.618	4.25	4.20	0.506	4.49	3.52	0.412	4.68	2.93
6"	6.625	0.946	4.61	7.37	0.908	4.70	7.12	0.736	5.06	5.96	0.602	5.34	4.99	0.491	5.58	4.15
8"	8.625	1.232	6.01	12.49	1.182	6.12	12.06	0.958	6.59	10.10	0.784	6.96	8.46	0.639	7.27	7.03
10"	10.750	1.536	7.49	19.40	1.473	7.62	18.74	1.194	8.21	15.68	0.977	8.67	13.14	0.796	9.06	10.92
12"	12.750	1.821	8.88	27.28	1.747	9.04	26.36	1.417	9.74	22.06	1.159	10.29	18.49	0.944	10.74	15.36
14"	14.000	2.000	9.76	32.93	1.918	9.93	31.51	1.556	10.70	26.60	1.273	11.30	22.29	1.037	11.80	18.52
16"	16.000	2.286	11.15	43.01	2.192	11.35	41.15	1.778	12.23	34.74	1.455	12.91	29.12	1.185	13.48	24.19
18"	18.000	2.571	12.54	54.43	2.466	12.77	52.08	2.000	13.76	43.97	1.636	14.53	36.85	1.333	15.17	30.62
20"	20.000	2.857	13.94	67.20	2.74	14.19	64.30	2.222	15.28	54.34	1.818	16.14	45.54	1.481	16.86	37.84

O.D. controlled water/fluids pipe.

Recommended for municipal, industrial, and government applications. Easily connects by fusing, eliminating the need for common connections.

For Quote Requests: sales@fwplastics.com or 800-327-4735



PRODUCT SPECS

IRON PIPE SIZES - OUTSIDE DIAMETER / DR 15.5, 17, 21, 26, 32.5

Pipe weights are calculated in accordance with PPI TR-7. Average ID is calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual inside diameter will vary. Pipe dimensions are in accordance with applicable ASTM standards.

I.P.S. Data

- ASTM F714 Sizes 4" to 20"
- ASTM D3035 Sizes 1/2" to 3"

All pipe is manufactured from select PE4710 resins unless requested otherwise at the time of quote. While PE4710 resins are used, these resins meet or exceed the pressure ratings and physical properties of PE3608/3408 resins.

Pipe Size	Nom. OD	IPS DR -15.5 140psi			IPS DR - 17 125 psi			IPS DR - 21 100 psi			IPS DR - 26 80 psi			IPS DR - 32.5 65psi		
		Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)	Min. Wall	Avg. ID	Weight (lbs/ft.)
1/2"	0.840															
3/4"	1.050															
1"	1.315	0.085	1.13	0.144	0.077	1.15	0.132									
1-1/4"	1.660	0.107	1.43	0.229	0.098	1.45	0.21									
1-1/2"	1.900	0.123	1.64	0.30	0.112	1.66	0.276									
2"	2.375	0.153	2.05	0.469	0.140	2.07	0.431	0.113	2.13	0.35						
2-1/2"	2.875	0.185	2.48	0.69	0.169	2.51	0.631	0.137	2.58	0.52						
3"	3.500	0.226	3.02	1.02	0.206	3.06	0.935	0.167	3.14	0.767	0.135	3.21	0.63	0.108	3.27	0.50
4"	4.500	0.290	3.88	1.69	0.265	3.93	1.55	0.214	4.04	1.27	0.173	4.13	1.03	0.138	4.20	0.835
5"	5.563	0.359	4.80	2.58	0.327	4.86	2.36	0.265	5.00	1.94	0.214	5.10	1.58	0.171	5.20	1.28
6"	6.625	0.427	5.71	3.65	0.390	5.79	3.35	0.315	5.95	2.75	0.255	6.08	2.24	0.204	6.19	1.81
8"	8.625	0.556	7.44	6.19	0.507	7.54	5.68	0.411	7.75	4.66	0.332	7.92	3.80	0.265	8.06	3.07
10"	10.750	0.694	9.27	9.62	0.632	9.40	8.83	0.512	9.66	7.23	0.413	9.87	5.90	0.331	10.04	4.76
12"	12.750	0.823	11.00	13.53	0.750	11.16	12.41	0.607	11.46	10.18	0.490	11.71	8.30	0.392	11.91	6.70
14"	14.000	0.903	12.08	16.31	0.824	12.25	14.97	0.667	12.58	12.27	0.538	12.85	10.01	0.431	13.08	8.08
16"	16.000	1.032	13.81	21.30	0.941	14.00	19.55	0.762	14.38	16.03	0.615	14.69	13.08	0.492	14.95	10.55
18"	18.000	1.161	15.53	26.96	1.059	15.75	24.74	0.857	16.18	20.28	0.692	16.53	16.55	0.554	16.82	13.35
20"	20.000	1.29	17.26	32.82	1.176	17.50	30.58	0.952	17.98	25.07	0.769	18.37	20.45	0.615	18.69	16.50

O.D. controlled water/fluids pipe.

Recommended for municipal, industrial, and government applications. Easily connects by fusing, eliminating the need for common connections.

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DUCTILE IRON PIPE SIZES

DUCTILE IRON PIPE SIZE - OUTSIDE DIAMETER / DR 7, DR 7.3, DR 9, DR 11

Pipe weights are calculated in accordance with PPI TR-7. Average ID is calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual inside diameter will vary. Pipe dimensions are in accordance with applicable ASTM standards.

D.I.P.S. Data

•ASTM F714

All pipe is manufactured from select PE4710 resins unless requested otherwise at the time of quote. While PE4710 resins are used, these resins meet or exceed the pressure ratings and physical properties of PE3608/3408 resins.

		<i>DIPS DR - 7 335 psi</i>			<i>DIPS DR - 7.3 317 psi</i>			<i>DIPS DR - 9 250 psi</i>			<i>DIPS DR - 11 200 psi</i>		
Pipe Size	Nom. OD	Min. Wall	Avg. ID	Weight (lbs/ft)	Min. Wall	Avg. ID	Weight (lbs/ft)	Min. Wall	Avg. ID	Weight (lbs/ft)	Min. Wall	Avg. ID	Weight (lbs/ft)
3"	3.96							0.44	3.02	2.13	0.36	3.19	1.78
4"	4.800	0.686	3.34	3.87	0.658	3.40	3.74	0.533	3.66	3.13	0.436	3.87	2.62
6"	6.900	0.986	4.81	7.99	0.945	4.89	7.72	0.767	5.27	6.46	0.627	5.57	5.42
8"	9.050	1.293	6.30	13.75	1.240	6.42	13.28	1.006	6.91	11.12	0.823	7.30	9.32
10"	11.100	1.586	7.738	20.70	1.521	7.876	19.81	1.233	8.48	16.72	1.009	8.96	14.01
12"	13.200	1.886	9.202	29.27	1.808	9.367	28.00	1.467	10.09	23.65	1.200	10.65	19.82
14"	15.300	2.186	10.66	39.33	2.096	10.85	37.63	1.700	11.69	31.80	1.391	12.35	26.63
16"	17.400	2.486	12.13	50.87	2.384	12.34	48.67	1.933	13.30	41.13	1.582	14.04	34.44
18"	19.500	2.786	13.59	63.89	2.671	13.83	61.12	2.167	14.90	51.66	1.773	15.74	43.29

O.D. controlled water/fluids pipe.

Recommended for municipal, industrial, and government applications. Easily connects by fusing, eliminating the need for common connections.



DUCTILE IRON PIPE SIZES

DUCTILE IRON PIPE SIZE - OUTSIDE DIAMETER / DR 13.5, DR 17, DR 21, DR 26

Pipe weights are calculated in accordance with PPI TR-7. Average ID is calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual inside diameter will vary. Pipe dimensions are in accordance with applicable ASTM standards.

D.I.P.S. Data

•ASTM F714

All pipe is manufactured from select PE4710 resins unless requested otherwise at the time of quote. While PE4710 resins are used, these resins meet or exceed the pressure ratings and physical properties of PE3608/3408 resins.

		<i>DIPS DR - 13.5</i>			<i>DIPS DR - 17</i>			<i>DIPS DR - 21</i>			<i>DIPS DR - 26</i>		
		<i>160 psi</i>			<i>125 psi</i>			<i>100 psi</i>			<i>80 psi</i>		
Pipe Size	Nom. OD	Min. Wall	Avg. ID	Weight (lbs/ft)	Min. Wall	Avg. ID	Weight (lbs/ft)	Min. Wall	Avg. ID	Weight (lbs/ft)	Min. Wall	Avg. ID	Weight (lbs/ft)
3"	3.96	0.293	3.33	1.48	0.233	3.46	1.20	0.189	3.55	0.982			
4"	4.800	0.356	4.04	2.18	0.282	4.20	1.76	0.229	4.31	1.44	0.185	4.40	1.18
6"	6.900	0.511	5.81	4.50	0.406	6.03	3.64	0.329	6.20	2.98	0.265	6.33	2.43
8"	9.050	0.670	7.62	7.74	0.532	7.92	6.25	0.431	8.13	5.13	0.348	8.31	4.18
10"	11.100	0.822	9.35	11.64	0.653	9.71	9.41	0.529	9.97	7.71	0.427	10.19	6.29
12"	13.200	0.978	11.12	16.47	0.776	11.55	13.31	0.629	11.86	10.91	0.508	12.12	8.90
14"	15.300	1.133	12.89	22.12	0.900	13.39	17.88	0.729	13.75	14.66	0.588	14.05	11.96
16"	17.400	1.289	14.66	28.61	1.024	15.23	23.12	0.829	15.64	18.95	0.669	15.98	15.46
18"	19.500	1.444	16.43	35.97	1.147	17.06	29.07	0.929	17.53	23.84	0.750	17.91	19.44

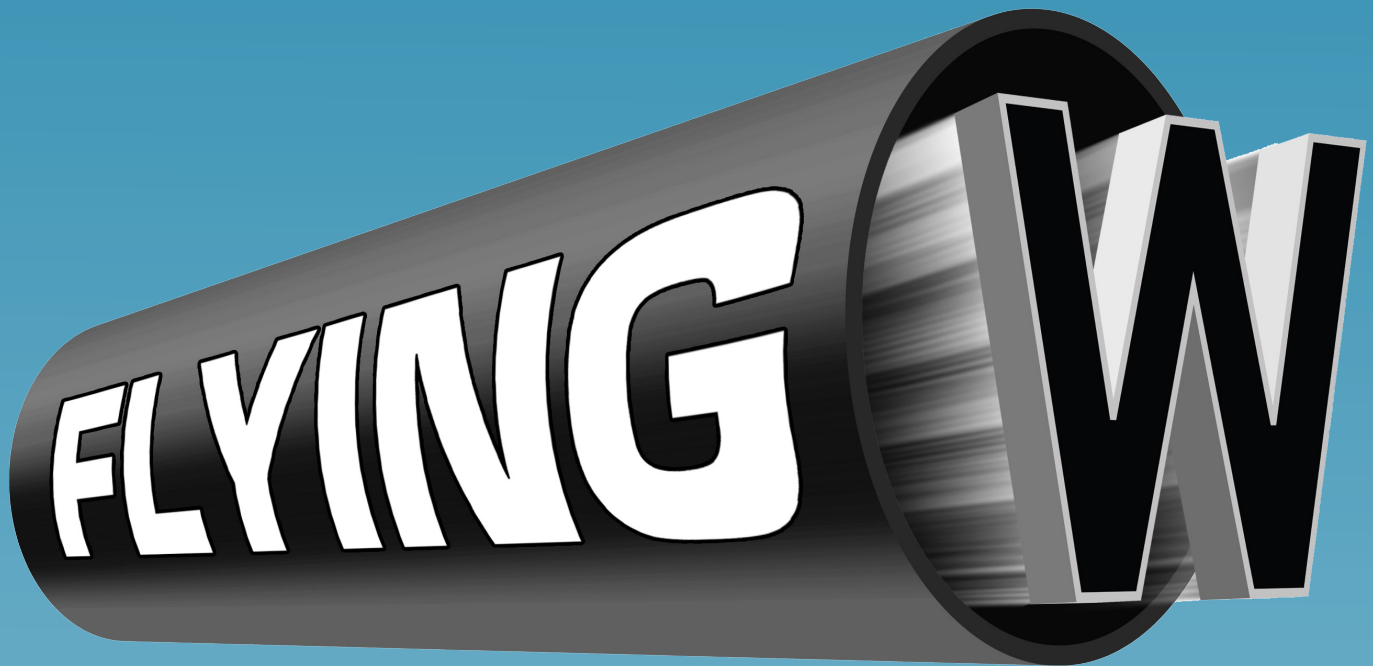
O.D. controlled water/fluids pipe.

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Flying W Plastics & PPI

Flying W Plastics, Inc. is a member in good standing with the Plastics Pipe Institute (PPI). PPI is the major trade association representing all segments of the plastics piping industry. As an association, PPI focuses collaborative efforts to accumulate data, concentrate facts, and target resources toward advancements in plastics piping application and usage. PPI promotes contemporary use of plastics piping for water and gas distribution, sewer and wastewater, oil and gas production, industrial and mining uses, power and communications, and ducting and irrigation.

PPI's vision and leadership have resulted in the establishment of uniform testing and design criteria that has become the foundation for all current applications of plastics piping. As PPI members, Flying W Plastics recommends PPI's Handbook of Polyethylene Pipe, Second Edition for testing and design criteria of all HDPE pipe manufactured by Flying W Plastics. This handbook is available for purchase online (www.plasticpipe.org). The individual chapters can be downloaded free of charge (www.plasticpipe.org/publications/pe_handbook.html). Many case studies, technical bulletins, and pipe calculations can also be found at the PPI web site.



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