

FUSIBLE PVC® PIPE SYSTEMS

Fusible C-900® pipe | Fusible C-905® pipe | FPVC® pipe



FUSIBLE PVC® PIPE SYSTEMS



Features and Benefits

- Gasketless, leak-free, fully-restrained pipe system
- Readily connects with standard waterworks fittings, eliminating the need for fusion adapters
- Transitions easily to bell-and-spigot PVC and ductile iron pipe
- Life expectancy greater than 100 years
- Greater recommended safe pulling allowance than HDPE pipe of similar ID and pressure class
- Lower installation costs due to lighter pipe weight and smaller pipe OD
- Field testing and time proven thermal butt fusion technology and PVC formulation
- Excellent abrasion and scratch-resistance
- Superior resistance to hydrocarbon permeation compared to HDPE or gasketed pipe
- Superior resistance to oxidation from common chlorine-based water disinfectants compared to HDPE pipe
- Fused joint OD consistent with OD of pipe barrel
- Smaller OD casing sizes possible for jack and bore installations

Trenchless Technology Award Winning Projects

- 2016 New Installation Project of the Year
- 2015 New Installation Project of the Year Honorable Mention
- 2014 New Installation Project of the Year Honorable Mention
- 2013 Rehabilitation Project of the Year
- 2010 New Installation Project of the Year
- 2007 New Installation Project of the Year Honorable Mention

Installations

Trenchless

- Horizontal directional drilling
- Sliplining
- Pipe bursting
- Jack and bore carrier pipe

Open-Cut

- Restrained joint
- Installation efficiencies

Applications

- Water mains (AWWA C900, ASTM D2241)
- Force mains and gravity sewer
- Water reuse and reclaim
- Raw water and irrigation
- Casings
- Storm drains
- Process water
- Power transmission conduit and casings

Experience

- Over 12,000 Fusible PVC® pipe installations
- Over 12 million feet installed
- Installations in all 50 U.S. states, U.S. territories, Canada, Mexico and New Zealand
- Directional drill continuous pull-ins of greater than 7,000 feet
- Over 35 HDD installations exceeding 3,000 feet
- Installed at over 40 U.S. military bases and federal sites



Pipe Engineering Data

DIPS						
Size	OD	DR	Min. Wall (in)	Avg. ID (in)	Wt. (lb/ft)	Safe Pulling Force (lbs)
4"	4.80"	14	.34	4.07	3.1	13,400
		18	.27	4.23	2.5	10,600
6"	6.90"	14	.49	5.85	6.4	27,700
		18	.38	6.09	5.1	21,900
8"	9.05"	25	.28	6.31	3.7	16,000
		14	.65	7.68	11.0	47,700
10"	11.10"	18	.50	7.98	8.7	37,800
		25	.36	8.28	6.4	27,600
12"	13.20"	14	.79	9.42	16.6	71,800
		18	.62	9.79	13.2	56,800
14"	15.30"	25	.44	10.16	9.6	41,600
		14	.94	11.20	23.5	101,600
16"	17.40"	18	.73	11.65	18.6	80,300
		25	.53	12.08	13.6	58,800
18"	19.50"	14	1.09	12.98	31.6	136,500
		18	.85	13.50	25.0	108,000
20"	21.60"	21	.73	13.75	21.6	93,400
		25	.61	14.00	18.3	79,000
24"	25.80"	14	1.24	14.76	41.5	176,600
		18	.97	15.35	32.4	139,700
30"	32.00"	21	.83	15.64	28.0	120,800
		25	.70	15.92	23.7	102,200
36"	38.30"	18	1.08	17.20	40.6	175,400
		21	.93	17.53	35.1	151,700
42"	42.00"	25	.78	17.85	29.8	128,400
		14	1.54	18.33	62.9	272,200
48"	48.00"	18	1.20	19.06	49.8	215,300
		21	1.03	19.42	43.1	186,100
54"	54.00"	25	.86	19.77	36.5	157,500
		18	1.43	22.76	71.1	307,100
60"	60.00"	21	1.23	23.19	61.5	265,600
		25	1.03	23.61	52.1	224,800
72"	72.00"	32.5	.79	24.12	40.5	174,600
		21	1.52	28.77	94.6	408,500
84"	84.00"	25	1.28	29.29	80.1	345,800
		32.5	.99	29.91	62.3	268,700
96"	96.00"	21	1.82	34.43	135.5	585,100
		25	1.53	35.05	114.8	495,400
108"	108.00"	32.5	1.18	35.80	89.2	384,600

IPS						
Size	OD	SDR	Min. Wall (in)	Avg. ID (in)	Wt. (lb/ft)	Safe Pulling Force (lbs)
6"	6.63"	17	.39	5.80	5.0	21,300
		21	.32	5.96	4.1	17,500
		26	.26	6.08	3.3	14,200
8"	8.63"	17	.51	7.55	8.4	36,200
		21	.41	7.76	6.9	29,600
		26	.33	7.92	5.6	24,200
10"	10.75"	17	.63	9.41	13.2	56,200
		21	.51	9.67	10.7	46,000
		26	.41	9.87	8.7	37,500
12"	12.75"	17	.75	11.16	18.6	79,100
		21	.61	11.47	15.0	64,700
		26	.49	11.71	12.3	52,800



Fusible C-900® and Fusible C-905® product lines meet:

- AWWA C900/C905 requirements
- AWWA C605
- ASTM F1674
- NSF 61, NSF 61-G
- ASTM cell class 12454, HDB = 4,000 psi, and HDS = 2,000 psi, provide a minimum safety factor of 2.0
- NSF-14 to AWWA C900

Notes:

- Safe pulling force based on axial tensile stress of 7,000 psi per ASTM D1784 with a safety factor of 2.5.
- Available in 40' and 45' lengths
- Some sizes may require special order. Schedule, sewer and other pipe sizes are available upon request. Inquire for sizes.

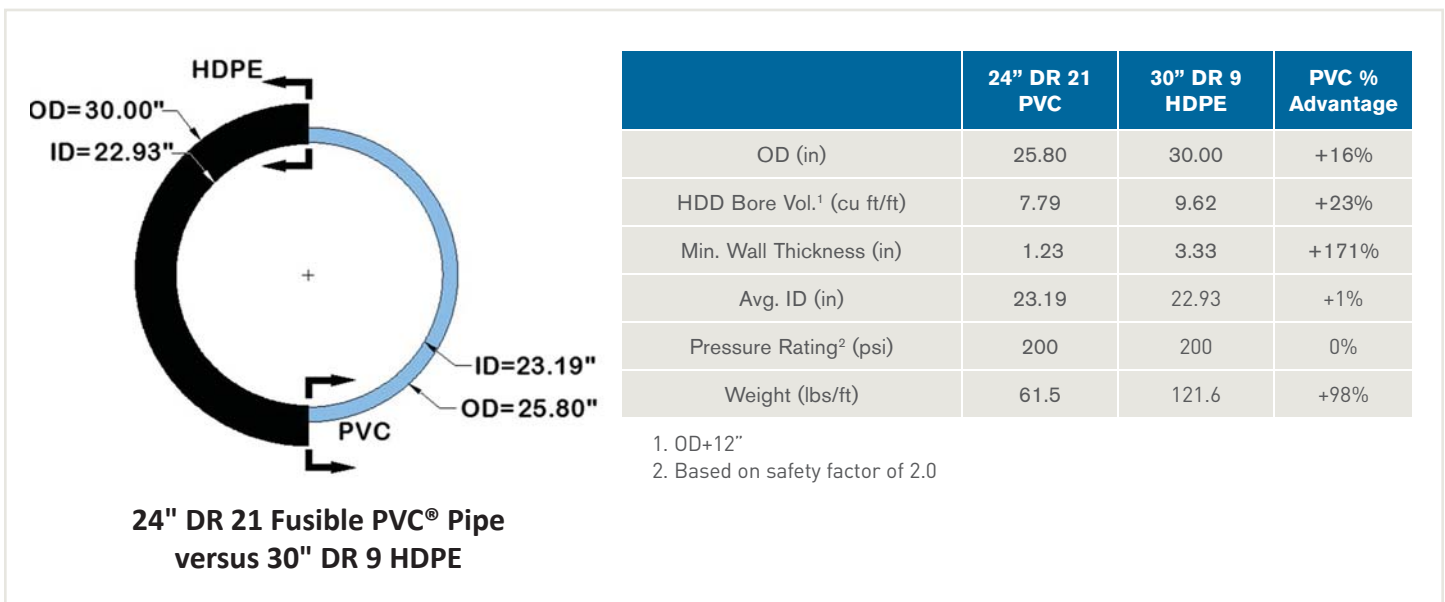
Fusible PVC® pipe is available in the following colors:

- Blue:** Potable water
- Green:** Force main and gravity sewer
- Purple:** Water reuse
- White:** Power cable and communications conduit and other applications

Material Properties

PVC vs. HDPE Material Properties					
Property	Specification	PVC	PE 3408	PE 4710	Difference
Tensile Strength (psi)	ASTM D638	7,000	3,000	3,500	≥2x
Specific Gravity	ASTM D1505	1.40	0.94	0.95	
Modulus of Elasticity for Long Term Deflection Calculations (psi)	ASTM D638	400,000 ¹	29,000 ²		>13x
Hydrostatic Design Basis at 73°F (psi)	ASTM D2837	4,000	1,600		2.5x
Coefficient of Linear Expansion (in/100 ft/10°F)	ASTM D696	0.36	1.44		0.25x
Water Disinfectant Induced Oxidation		High Resistance	Low Resistance		
Hydrocarbon Permeation		High Resistance	Low Resistance		

1. PVC Pipe Association—Handbook of PVC Pipe Design and Construction, Fifth Edition
2. PPI—Handbook of PE Pipe, Second Edition—Long Term Modulus of Elasticity = 29,000 PSI



Dimension Ratio—Pressure Class Rating

PVC		HDPE 3408/4710		HDPE 4710	
SF = 2.0		SF = 2.0		SF = 1.6*	
DR	Pressure Rating (psi)	DR	Pressure Rating (psi)	DR	Pressure Rating (psi)
DR 14	305	-	-	DR 7.3	317
DR 18	235	DR 7.3	255	DR 9	250
DR 21	200	DR 9	200	DR 11	200
DR 25	165	DR 11	160	DR 13.5	160
DR 32.5	125	DR 13.5	128	DR 17	125

Supporting references at
www.aegion.com/about/our-brands/underground-solutions

* Lower margin of safety lowers life expectancy and reliability. Not Recommended.

Pipe Engineering Data

Pressure Ratings

DIPS	
Dimension Ratio	Pressure (psi)
14	305
18	235
21	200
25	165
32.5	125

IPS	
Dimension Ratio	Pressure (psi)
17	250
21	200
26	160

Critical Buckling	
Dimension Ratio	Critical Buckling Pressure (psi)
14	426
17	228
18	190
21	117
25	68
26	60
32.5	30



Bend Radius

DIPS	
Size	Minimum Bend Radius
4"	100 ft.
6"	144 ft.
8"	189 ft.
10"	231 ft.
12"	275 ft.
14"	319 ft.
16"	363 ft.
18"	406 ft.
20"	450 ft.
24"	538 ft.
30"	667 ft.
36"	798 ft.

IPS / Schedule	
Size	Minimum Bend Radius
6"	138 ft.
8"	180 ft.
10"	224 ft.
12"	266 ft.

Bend radius based on pipe OD to allow for fittings installation, repairs and maintenance.

Fusion Process

- Fusion is performed by UGS technicians and/or licensed and trained contractors.
- Fusion times are comparable to other thermoplastic pipe materials.
- Testing performed in accordance with AWWA C900 ASTM F1674 and D638 confirms that fused joints are fully restrained.
- Fuse and pull or intermediate fusions are possible in space-limited areas.



The Most Tested PVC Pipe in the Industry

Test Categories	Vendor Qualification	Required Vendor Testing	UGS Lot Acceptance Testing	Fusion Joint QC Data Collection & Retention
AWWA C900	●	●	●	
ASTM D2241/ D1785/3034/F679	●	●	●	
Extrusion Quality	●	●	●	
Mechanical Properties	●	●	●	
Process Control Points				●
Trained and Licensed Operators				●

FUSIBLE PVC® PIPE SYSTEMS



Horizontal Directional Drill



Pipe Burst



Slipline/Jack and Bore



Open-Cut



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