

PE 4710/PE 100 CTS & IPS – GAS PIPE

Designed for: Natural Gas Service & Distribution Propane Gas Distribution

- Copper Tube Size & Iron Pipe Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes



Specifications:

- Resin – Equistar L4904
- PE 4710/PE100 Resin formulation listed in PPI TR4
- Hydrostatic Design Basis: 1600 psi @ 73°F, 1000 psi @ 140°F
- Cell Classification per ASTM D3350 = 445574C or 445576C
- MRS per ISO 9080 = 10 MPa
- ASTM D 2513
- Pipe Test Category per ASTM D2513 = CEE
- Outdoor Storage = 10 years per ASTM D2513
- Charter Plastics gas pipe complies with DIMP (Distribution Integrity Management Program) requirements per ASTM F2897.
- Charter Plastics Gas Pipe is marked NR for no regrind.

Codes, Standards and Regulations:

Design Service Factor:

- .32 for U.S. natural gas distribution and transmission per CFR 49, Part 192, 192.121
- .25 for U.S. Vapor Liquid Propane - Gas piping system

Temperature and Hydrostatic Design Basis (HDB)

Temperature factors must be considered in the design of a gas pipeline.

As per CFR 49 192.123:

"The design pressure may not exceed a gauge pressure of 689 Kpa (100 psig) for plastic pipe used in:

1. Distribution Systems
2. Classes 3 and 4 locations

Plastic pipe may not be used where operating temperatures of the pipe will be:

1. Below minus 29° C (-20°F)
2. In the case of thermoplastic pipe, above the temperature LTHS used in the design formula
3. The wall thickness for thermoplastic pipe may not be less than 1.57 mm (.062")



Pipe for a New World.

PE 4710/PE 100 CTS & IPS – GAS PIPE

Designed for: Natural Gas Service & Distribution Propane Gas Distribution

- Copper Tube Size & Iron Pipe Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes

Table # 1
Interpolates the effect of temperature on HDB in accordance with PPITR 3
HDB Ratings are established at 73°F and at 140°F
Temperature Interpolation is noted with *

TEMPERATURE	HDB-LONG TERM HYDROSTATIC STRENGTH
73 ° F	1600 psi actual
100 ° F	1250 psi*
120 ° F	1000 psi*
140 ° F	1000 psi actual

Design Criteria:

The design pressure for plastic pipe is calculated based on the following equation:

$$\text{Design Pressure} = 2 (\text{HDB at pipeline temperature}) \times \text{Design Service Factor (natural gas .32)} \\ \text{SDR} - 1$$

Table # 2
Maximum Allowable U.S. Operating Pressures for PE 4710/PE100 Natural Gas systems per CFR 49, Part 192, (192.121)

SDR	MAOP @ 73.4 °F	MAOP @ 100 °F	MAOP @ 120°F	MAOP @ 140°F
9	125 psi	100 psi	80 psi	80 psi
9.3	123 psi	96 psi	77 psi	77 psi
10	114 psi	89 psi	71 psi	71 psi
11	102 psi	80 psi	64 psi	64 psi
11.5	97 psi	76 psi	61 psi	61 psi
13.5	82 psi	64 psi	51 psi	51 psi

Design Pressure Rating is based on the formula listed above using a design factor of .32 for natural gas.

† If used in areas where pressures over 100 psi are allowed, Federal Regulations limit the MAOP to < 125 psi on < 12" pipe, unless a waiver is granted. Please see CFR 49 192.123 to review complete design criteria.

PE 4710/PE 100 CTS & IPS – GAS PIPE

Designed for: Natural Gas Service & Distribution Propane Gas Distribution

- Copper Tube Size & Iron Pipe Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes

Propane (LPG) Gas Service:

Charter Plastics PE 4710/PE100 Gas pipe may be used for transporting liquefied petroleum gas (Vapor LP Gas).

NFPA 58 limits the maximum operating pressure to **30 PSI @ 73.4°F**

For Propane gas service, a Hydrostatic Design Basis of 1000 psi @ 73° F should be used to design the system and a design service factor of .25 should be utilized.

NFPA limits the size of PE pipe to 2" Nominal Pipe size with an OD of 2.375"

Polyethylene pipe should only be used in underground distribution systems of Vapor LP Gas in applications where the sizes, pressures and temperatures will not support condensation.

Refer to PPITR-22 "Polyethylene Piping Distribution systems for Components of Liquid Petroleum Gases," for guidelines in using polyethylene pipe to transport propane gas.

Application:

Charter Plastics PE 4710/PE100 Gas Pipe is designed for transporting natural gas or propane. This product is designed for direct burial.

***It is not designed to be used inside the building.** Transition from polyethylene pipe to an appropriate product before entering the building or basement.

To safely handle and store polyethylene, refer to PPI's Material Handling Guide.

Joining:

Charter Plastics Gas Pipe is based on outside diameters. Heat fusion is the preferred method for joining this pipe. Type of heat fusion include Butt, Socket, Saddle Fusion or Electrofusion.

All persons making fusions should be certified by the gas system operator and should follow the gas systems written fusion procedures. In addition, all DOT procedures should be followed when making joints to ensure safety and the integrity of the system.

As per D.O.T. Regulations:

- Each joint in a gas piping system must be made in accordance with written procedures that have been proved by test or experience to produce strong gas tight joints (49 CFR. Part 192, 192.27(b))
- Written procedures for butt fusion, saddle fusion, and socket fusion joining of polyethylene gas piping must be qualified before use by subjecting specimen joints to required test procedures (CFR. 49, Part 192, 192.283(a))
- All persons who make joints in polyethylene gas piping must be qualified under the operator's written procedures (CFR 49, Part 192, 192.285(a))
- The gas system operator must ensure that all persons who make or inspect joints are qualified (CFR 49, Part 192 192.285(d) and 192.287)

Polyethylene pipe may also be joined with Stab or OD Mechanical fittings designed for pipe made to D 2513 Standards. A stiffener should be inserted when using OD Compression type fittings. The stiffener should be sized specifically for the pipe being installed and it should be long enough to equal the insertion depth of the pipe. Check with the local gas utility for their guidelines and recommendations relative to using mechanical connections.

Never use any lubricant on the pipe. Do not expose the pipe to direct flame.

PE 4710/PE 100 CTS & IPS – GAS PIPE

Designed for: Natural Gas Service & Distribution Propane Gas Distribution

- Copper Tube Size & Iron Pipe Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes

Installing:

Charter Plastics Gas pipe shall be installed in accordance with C.F.R.49 PART 192, Subpart G (mains) or Subpart H (service lines) and all applicable federal, state and local codes and regulations.

Mains shall be installed with a minimum of 24" of cover unless local or state codes prevail.

Service lines must be installed with at least 12" on private property and a minimum of 18" of cover under streets and roads.

Buried pipe must be fully supported by proper embedment material. Refer to C.F.R. 49 Part 192, Subpart H and to PPI's "Handbook of Polyethylene Pipe" and follow as local, state or federal guidelines.

Charter Plastics Gas pipe can be direct buried. Casing may be required based on installation as well as State and local codes. It can be installed by horizontally directionally drilled. Buried pipe must be supported by proper embedment material like sand or gravel. Refer to PPI's "Handbook of Polyethylene Pipe" and follow as local, state or federal guidelines.

***This pipe is not designed to be used inside the building.**

Squeeze Off:

Squeeze Off is a procedure that is used with HDPE and MDPE pipes to reduce or shut off flow. The pipe is squeezed between two parallel bars. When doing a squeeze off, follow ASTM F 1041 procedures and only use equipment approved by the pipe manufacturer and the gas utility, **Never squeeze off more than once at the same point on the pipe.**

Testing:

Hydrostatic testing is preferred method for identifying leaks over Pneumatic testing. The safety concern being that if catastrophic failure occurs during pneumatic testing with a compressed gas, the energy of both the compressed gas as well as the pipeline stress energy are released. With Hydrostatic testing, only the stress energy of the pipeline is released. **Consult the protocols set forth by the local gas companies as well as any local, state and federal codes before attempting leak testing.** Utilize all safety precautions.

References:

Code of Federal Regulations (CFR), U.S. Department of Transportation Pipeline Safety Regulations Title 49, Part 192 – "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards"

ASME B31.8 and Addenda – "Gas Transmission and Distribution Piping Systems."

American Gas Association (AGA) – "Plastic Pipe Manual for Gas Service."

NFPA 58 Liquefied Petroleum Gas Code – 2017 Edition

National Fuel Gas Code

API Specification 15LE, (R2013) – Specification for Polyethylene Line Pipe (PE)

Plastics Pipe Institute TR22-2013, "Polyethylene Piping Distribution Systems for Components of Liquid Petroleum Gases"



This product can expose you to chemicals, including Lead Chromate, which is known to the State of California to cause cancer or birth defects or reproductive harm. For more information, go to: www.P65Warnings.ca.gov

PE 4710/PE 100 IPS – GAS PIPE

Designed for: Natural Gas Service & Distribution
Propane Gas Distribution

- Iron Pipe Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes

PIPE SIZE	O.D. ACTUAL		DR 7.3	DR 9	DR 11	DR 13.5	DR-15.5	DR-17
.75"	1.050	MIN WALL	.144	.117	.095			
		CALC. ID.	.742	.796	.840	N/A	N/A	N/A
		WEIGHT PER FT	.180	.153	.130			
1"	1.315	MIN WALL	.180	.146	.120			
		CALC. ID.	.932	1.003	1.055	N/A	N/A	N/A
		WEIGHT PER FT	.281	.236	.201			
1.25"	1.660	MIN WALL	.227	.184	.151			
		CALC. ID.	1.177	1.270	1.338	N/A	N/A	N/A
		WEIGHT PER FT	.448	.374	.316			
1.5"	1.900	MIN WALL	.260	.211	.173			
		CALC. ID.	1.346	1.453	1.533	N/A	N/A	N/A
		WEIGHT PER FT	.587	.490	.412			
2"	2.375	MIN WALL	.325	.264	.216	.176	.153	.140
		CALC. ID.	1.683	1.815	1.917	2.002	2.049	2.075
		WEIGHT PER FT	.918	.767	.643	.534	.471	.436
3"	3.500	MIN WALL	.479	.389	.318	.259	.226	.206
		CALC. ID.	2.484	2.675	2.826	2.951	3.021	3.063
		WEIGHT PER FT	1.988	1.665	1.394	1.158	1.021	.937
4"	4.500	MIN WALL	.616	.500	.409	.333	.290	.265
		CALC. ID.	3.193	3.440	3.633	3.794	3.885	3.938
		WEIGHT PER FT	3.286	2.751	2.305	1.914	1.685	1.550
6"	6.625	MIN WALL	.908	.736	.602	.491	.427	.390
		CALC. ID.	4.701	5.065	5.349	5.584	5.720	5.798
		WEIGHT PER FT	7.123	5.962	4.995	4.154	3.653	3.357
8"	8.625	MIN WALL	1.182	.958	.784	.639	.556	.507
		CALC. ID.	6.120	6.594	6.963	7.270	7.446	7.550
		WEIGHT PER FT	12.073	10.103	8.469	7.039	6.192	5.683

Weight calculations per PPI TR7

PE 4710/PE 100 IPS – GAS PIPE (CONTINUED)

Designed for: **Natural Gas Service & Distribution**
Propane Gas Distribution

- Iron Pipe Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes

PIPE SIZE	O.D. ACTUAL		DR 7.3	DR 9	DR 11	DR 13.5	DR-15.5	DR-17
10"	10.750	MIN WALL	1.473	1.194	.977	.796	.694	.632
		CALC. ID.	7.628	8.219	8.679	9.062	9.279	9.410
		WEIGHT PER FT	18.754	15.695	13.154	10.929	9.632	8.829
12"	12.750	MIN WALL	1.747	1.417	1.159	.944	.823	.750
		CALC. ID.	9.047	9.746	10.293	10.749	11.005	11.160
		WEIGHT PER FT	26.382	22.089	18.507	15.372	13.548	12.427
14"	14.00	MIN WALL		1.556	1.273	1.037	.903	.824
		CALC. ID.	N/A	10.701	11.301	11.802	12.086	12.253
		WEIGHT PER FT		26.634	22.319	18.541	16.323	14.991
16"	16.00	MIN WALL		1.778	1.455	1.185	1.032	.941
		CALC. ID.	N/A	12.231	12.915	13.488	13.812	14.005
		WEIGHT PER FT		34.783	29.154	24.214	21.320	19.566
18"	18.00	MIN WALL		2.000	1.636	1.333	1.161	1.059
		CALC. ID.	N/A	13.760	14.532	15.174	15.539	15.755
		WEIGHT PER FT		44.017	36.881	30.644	26.983	24.771
20"	20.00	MIN WALL		2.222	1.818	1.481	1.290	1.176
		CALC. ID.	N/A	15.289	16.146	16.860	17.265	17.507
		WEIGHT PER FT		54.337	45.537	37.829	33.312	30.565
22"	22.00	MIN WALL		2.444	2.00	1.630	1.419	1.294
		CALC. ID.	N/A	16.819	17.760	18.544	18.992	19.257
		WEIGHT PER FT		65.744	55.105	45.796	40.308	36.995
24"	24.00	MIN WALL		2.667	2.182	1.778	1.548	1.412
		CALC. ID.	N/A	18.346	19.374	20.231	20.718	21.007
		WEIGHT PER FT		78.261	65.584	54.496	47.970	44.037

Weight calculations per PPI TR7

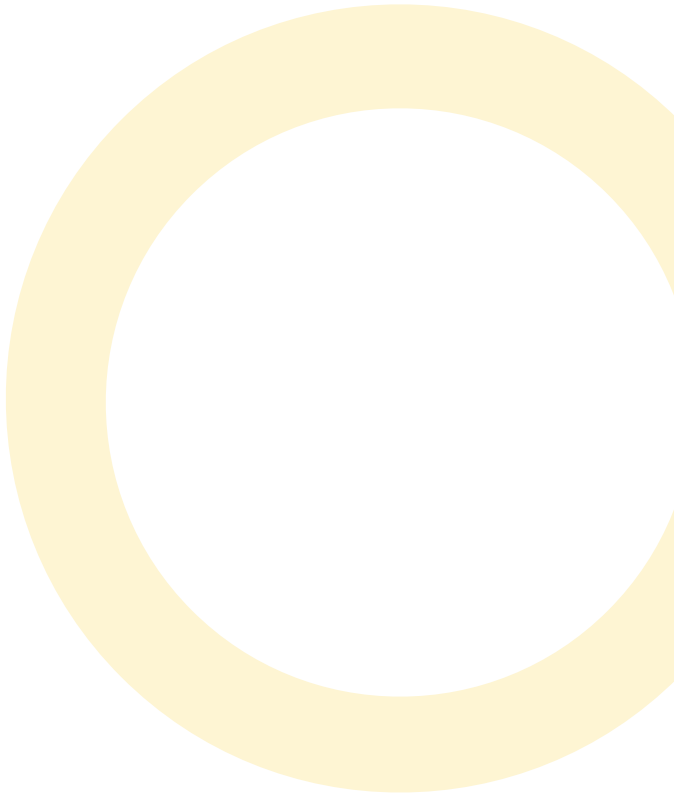
PE 4710/PE 100 CTS – GAS PIPE

Designed for: **Natural Gas Service & Distribution**
Propane Gas Distribution

- Copper Tube Size - HDPE
- Black Pipe with 3 evenly spaced Yellow stripes

CTS PIPE SIZE	O.D. ACTUAL		CTS SDR 7	CTS SDR 9.3	CTS SDR 9.7	CTS SDR 10	CTS SDR 11	CTS SDR 11.5	CTS SDR 12.5	CTS SDR 15.3
.50"	.625	MIN WALL	.090			.062				
		CALC. ID.	.434	N/A	N/A	.494	N/A	N/A	N/A	N/A
		WEIGHT PER FT	.066			.048				
.75"	.875	MIN WALL			.090					
		CALC. ID.	N/A	N/A	.684	N/A	N/A	N/A	N/A	N/A
		WEIGHT PER FT			.097					
1"	1.125	MIN WALL		.121			.101	.099	.090	
		CALC. ID.	N/A	.868	N/A	N/A	.911	.915	.934	N/A
		WEIGHT PER FT		.167			.142	.140	.130	
1.25"	1.375	MIN WALL								.090
		CALC. ID.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.184
		WEIGHT PER FT								

Weight calculations per PPI TR7



Charter Plastics, Inc.
221 S. Perry Street
P.O. Box 770
Titusville PA 16354 USA
T 800 486 7473 • 814 827 9665
F 814 827 1614

www.charterplastics.com

