

PE 2708 CTS & IPS – GAS PIPE

Designed for: Natural Gas Service & Distribution Propane Gas Distribution

- Copper Tube Size & Iron Pipe Size - MDPE
- Yellow Pipe
- Material Designation - PE 2708, Previously PE 2406

Specifications:

- Resin – Chevron Phillips TR418Q
- PE 2708 Resin formulation listed in PPI TR4
- Hydrostatic Design Basis: 1250 psi @ 73°F, 800 psi @ 140°F
- Cell Classification per ASTM D3350 = 234373E or 234375E
- MRS per ISO 9080 = 1160 psi
- ASTM D 2513
- CSA B137.4 – ONLY for the following pipe sizes:
(1/2" CTS .090 wall), (1" CTS 099 wall), (3/4" SDR 11), (1" SDR 11), (1-1/4" SDR 10),
(1-1/2" SDR 11), (2" SDR 11)
- Pipe Test Category per ASTM D2513 = CDE
- Outdoor Storage = 3 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
- .40 for Canada natural gas distribution and transmission per CSA Z662-96

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")

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Pipe for a New World.

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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	1250 psi actual
100 ° F	1000 psi*
120 ° F	1000 psi*
140 ° F	800 psi actual

Design Criteria:

The design pressure for plastic pipe is calculated based on the following equation:
Design Pressure = 2 (HDB at pipeline temperature) x Design Service Factor (natural gas .32)
SDR - 1

Table # 2
Maximum Allowable U.S. Operating Pressures for PE 2406/2708 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	100 psi	80 psi	80 psi	64 psi
9.3	96 psi	77 psi	77 psi	62 psi
10	89 psi	71 psi	71 psi	57 psi
11	80 psi	64 psi	64 psi	51 psi
11.5	76 psi	61 psi	61 psi	49 psi
13.5	64 psi	51 psi	51 psi	41 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.

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Propane (LPG) Gas Service:

Charter Plastics PE 2406/2708 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 PPI TR-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 2406/2708 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 diameter. 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.

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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 the 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

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IPS PIPE SIZE	O.D. ACTUAL		IPS SDR 9.3	IPS SDR 10	IPS SDR 11	IPS SDR 11.5	IPS SDR-13.5
.50"	.840	MIN WALL	.090				
		CALC. ID.	.649	N/A	N/A	N/A	N/A
		WEIGHT PER FT	.091				
.75"	1.050	MIN WALL			.095		
		CALC. ID.	N/A	N/A	.848	N/A	N/A
		WEIGHT PER FT			.122		
1"	1.315	MIN WALL			.120		
		CALC. ID.	N/A	N/A	1.062	N/A	N/A
		WEIGHT PER FT			.193		
1.25"	1.660	MIN WALL		.166	.151		
		CALC. ID.	N/A	1.308	1.340	N/A	N/A
		WEIGHT PER FT		.334	.307		
1.5"	1.900	MIN WALL			.173		
		CALC. ID.	N/A	N/A	1.533	N/A	N/A
		WEIGHT PER FT			.403		
2"	2.375	MIN WALL			.216		
		CALC. ID.	N/A	N/A	1.917	N/A	N/A
		WEIGHT PER FT			.629		
3"	3.500	MIN WALL			.318	.304	
		CALC. ID.	N/A	N/A	2.825	2.855	N/A
		WEIGHT PER FT			1.365	1.312	
4"	4.500	MIN WALL			.409	.391	.333
		CALC. ID.	N/A	N/A	3.633	3.670	3.794
		WEIGHT PER FT			2.257	2.168	1.874

Weight calculations per PPI TR7
Pipe sizes in bold face are listed with NSF to CSA B137.4

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CTS PIPE SIZE	O.D. ACTUAL		CTS SDR 7	CTS SDR 9.7	CTS SDR 11.5	CTS SDR 12.5
.50"	.625	MIN WALL	.090			
		CALC. ID.	.436	N/A	N/A	N/A
		WEIGHT PER FT	.065			
.75"	.875	MIN WALL		.090		
		CALC. ID.	N/A	.684	N/A	N/A
		WEIGHT PER FT		.095		
1"	1.125	MIN WALL			.099	.090
		CALC. ID.	N/A	N/A	.915	.934
		WEIGHT PER FT			.137	.126

Weight calculations per PPI TR7

Pipe sizes in bold face are listed with NSF to CSA B1374

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