

PE Gas Pipe

Submittal Data Sheet



Job or Customer:

Engineer:

Contractor:

Submitted by: Date

Approved by: Date

Order No: Date

Specification:

< STANDARDS >



ASTM D2513
ASTM D3350



NSF/ANSI 14

Please see our listing on agency websites for NSF compliant pipe and fittings.

www.nsf.org
www.CSAGroup.org

Polyethylene is flexible and easy to join, requiring minimal labor to install. It has strong chemical resistance and is not susceptible to rust, rot, or electrolysis.

Gas pipe can be used for natural gas distribution and LPG distribution systems.

Gas pipe is manufactured from PE 2708 (formerly PE 2406) with a cell classification of 234373E and hydrostatic design basis (HDB) of 1250 psi @ 73°F.

Gas pipe is offered in IPS, 3/4" through 4" in SDR-11, 1-1/4" in DR-10 and 1/2" in DR-9.3, as well as CTS, 1" in SDR-11.5 and 1/2" in SDR-7. Available in coil lengths ranging from 100'-500', size dependent.

Material Properties

Properties	Gas Pipe	Standards
Cell classification	234373E	ASTM D3350
Density, g/cc	0.925 - 0.940	ASTM D1505
Tensile strength at yield, psi at 73°F	2,600 - 3,000	ASTM D638
Hydrostatic Design Basis (HDB), psi @ 73°F	1,250	ASTM D2837
Flexural Modulus, psi @ 73°F	80k - 110K	ASTM D790
Coefficient of thermal expansion in./in./°F (x 10 ⁻⁵)	9.0	
Melt Index, g/10min (190°C / 2.16kg)	0.4 - 0.15	ASTM D1238
Slow Crack Growth Resistance, PENT (hours)	500	ASTM F1473
Maximum operating temperature 140°F		

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Pipe Availability

IPS SDR 11, Yellow

Nominal Size	Inside Diameter	Min. Wall Thickness	Outside Diameter	Max Working Pressure at 73°F	Wt/100'	Lengths Available						
						20'	100'	150'	200'	250'	300'	500'
3/4"	0.856	0.095	1.050	100 PSI	12			x				x
1"	1.072	0.120	1.315	100 PSI	19			x		x	x	x
1-1/4"	1.352	0.151	1.660	100 PSI	30		x	x		x		x
1-1/2"	1.547	0.173	1.900	100 PSI	40			x				x
2"	1.934	0.216	2.375	100 PSI	62	x	x	x	x	x		x
3"	2.851	0.318	3.500	100 PSI	134	x						
4"	3.666	0.409	4.500	100 PSI	222	x						

IPS SDR 10, Yellow

Nominal Size	Inside Diameter	Min. Wall Thickness	Outside Diameter	Max Working Pressure at 73°F	Wt/100'	Lengths Available				
						100'	150'	200'	300'	500'
1-1/4"	1.321	0.166	1.660	111 PSI	33		x			x

CTS SDR 11.5, Yellow

Nominal Size	Inside Diameter	Min. Wall Thickness	Outside Diameter	Max Working Pressure at 73°F	Wt/100'	Lengths Available				
						100'	150'	200'	300'	500'
1"	0.923	0.099	1.125	95 PSI	14		x			x

IPS SDR 9.3, Yellow

Nominal Size	Inside Diameter	Min. Wall Thickness	Outside Diameter	Max Working Pressure at 73°F	Wt/100'	Lengths Available				
						100'	150'	200'	300'	500'
1/2"	0.656	0.090	0.840	120 PSI	9		x			

CTS SDR 7, Yellow

Nominal Size	Inside Diameter	Min. Wall Thickness	Outside Diameter	Max Working Pressure at 73°F	Wt/100'	Lengths Available				
						100'	150'	200'	300'	500'
1/2"	0.441	0.090	0.625	120 PSI	6		x			x

Note: The Maximum Working Pressure is determined by US DOT CFR 49 Title 49 Part 192.121 at 73°F.

Handling & Installation Procedures

Installation

Both IPS and CTS pipe made to ASTM D2513 are OD-controlled products designed for use with heat & electro fusion fittings and other appropriate joining methods.

Ensure all mechanical fittings are intended for use with the applicable pipe (ASTM D2513) by the fitting manufacturer. Mechanical fittings (e.g. Stab) shall be installed per the manufacturer's instructions.

Fittings for PE gas pipe shall conform to the ASTM specifications below.

- **D2683:** Socket-Type PE Fittings for OD-Controlled PE Pipe and Tubing
- **D3261:** Butt Heat Fusion PE Plastic Fittings for PE Plastic Pipe and Tubing
- **F1055:** Electrofusion Type PE Fittings for OD Controlled PE and Crosslinked PE (PEX) Pipe and Tubing

NOTES:

Tables showing the flow rate capacity of gas pipe for various piping systems and conditions are provided in Chapter 12 of the Uniform Plumbing Code and Chapter 4 of the International Fuel Gas Code.

Both the UPC and IFGC state that plastic piping shall be installed outdoors underground only (with a few exceptions, such as when used with an anode-less riser).

Recommendations for PE piping systems for LPG and its major components, propane and butane gas is published by the Plastic Pipe Institute (PPI) Report TR-22.

Heat fusion (Butt or Socket) joints shall meet or exceed the specifications for ASTM D2513 as described by 49 CFR Part 192.283.

REFERENCES:

- ASTM F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
- Plastic Pipe Institute
 - Handbook of Polyethylene Pipe
 - TR-33 Generic Butt Fusion Joining Procedure for Polyethylene Gas Pipe
- IAPMO Uniform Plumbing Code (UPC)
- ICC, International Fuel Gas Code (IFGS)
- US Department of Transportation
 - PHMSA 49 CFR 192 - Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards

Handling & Installation Procedures

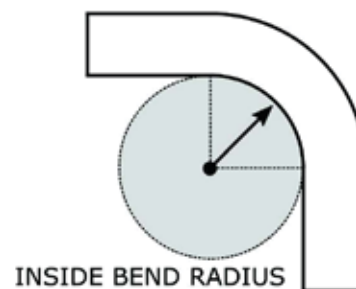
UV Protection and Outdoor Storage

Yellow gas pipe and tubing are protected against outdoor (UV exposure) through additive formulations and are defined as Code E materials in accordance with ASTM standard D3350. Cumulative outdoor storage should not exceed 3 years. Yellow gas pipe that has had outdoor exposure greater than 3 years should not be used.

Installation Considerations - Bending

When bending polyethylene gas pipe, the 2018 Uniform Plumbing Code (UPC) says that the radius along the inside of the curve shall be not less than 25 times the ID of the pipe. However, because gas pipe is OD-controlled, the table below shows the relationship between the Pipe OD and the minimum bend radius.

Dimension Ratio	Min. Bend Radius
IPS 9.3, 10	20 x Pipe OD
IPS 11	21 x Pipe OD
CTS 7	18 x Pipe OD
CTS 11.5	21 x Pipe OD



Handling & Installation Procedures

Polyethylene Gas Pipe Pressure Testing

For PE gas piping designed for natural gas and liquified petroleum gas (LPG) distribution, the test pressure and duration shall meet the requirements of the applicable local, state, and federal regulations. In the absence of this, the test procedures shall be performed as directed by the contract documents or engineer.

In general, it is common to see the following (or similar) requirements and guidelines:

- Test pressure shall be at least 150% of the maximum operating pressure of the system or 50 psi, whichever is greater. However, the maximum test pressure shall not exceed 3x the design pressure of the pipe.
- Minimum test duration of 10 or 15 minutes. This may also be determined by the internal volume of the test section and the equipment used for leak discovery.
- Maximum pipe temperature of 100°F
- Testing medium: water, air or other inert gases
- Allow sufficient time for all heat fusion joints to cool.
- It is easier to test for leaks prior to backfilling, but make sure any piping sitting in the sun does not exceed temperature limits and that piping is sufficiently restrained should a sudden failure occur.

Dimension Ratio	Pressure Rating at 73°F (psi)	Internal Volume (ft ³) per 100' of Pipe							
		1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	3"	4"
IPS SDR 9.3	120	0.24	x	0.58	0.93		1.90	4.12	6.82
IPS SDR 10	111				0.96	1.32			
IPS SDR 11	100	0.26	0.40	0.63	1.01		2.06	4.47	7.39
CTS SDR 7	125	0.11							
CTS SDR 11.5	95		0.28	0.47	0.70				

REFERENCES

- American Gas Association (AGA) "Plastic Pipe Manual for Gas Service"
- ASTM D2513: Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings
- ASME B31.8: Gas Transmission and Distribution Piping Systems
- CFR Title 49, Section 192.513
- International Fuel Gas Code, Chapter 4
- National Fire Protection Association
 - » NFPA 54: National Fuel Gas Code
 - » NFPA 58: Liquefied Petroleum Gas Code
- Plastic Pipe Institute - TR-22 "Polyethylene Piping Distribution Systems for Components of Liquid Petroleum Gases"

Specifications

Gas Pipe

Scope

This specification sheet covers the manufacturers' requirements for polyethylene Gas Pipe in IPS SDR-11, DR-10, and DR-9.3, as well as CTS SDR 11.5 and SDR-7. The pipe meets or exceeds all applicable ASTM and NSF standards and is suitable for natural gas distribution and LPG distribution systems.

Materials

Medium density polyethylene resin used in Gas pipe complies with the material requirements of ASTM D3350 and has a material designation of 2708 and a cell classification of 234373E. The Gas pipe product complies with the requirements of NSF/ANSI 14.

Dimensions

Physical dimensions and properties of Gas pipe shall meet the requirements of ASTM D2513.

Marking

Gas pipe pipe is marked as prescribed in ASTM D2513 and NSF/ANSI 14. The marking includes the following: Nominal size, Gas, Material Classification, SDR or DR size and pressure rating, applicable ASTM & NSF standards, and footage counter.

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical
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- Industrial process piping
- Municipal pressure and gravity flow
- Plumbing and DWV and water supply
- Irrigation
- Electrofusion PE for gas and water
- Industrial, plumbing and electrical cements
- PVC, CPVC, PVCO, ABS, PE, PEX, PP and PVDF pipe and fittings

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A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.