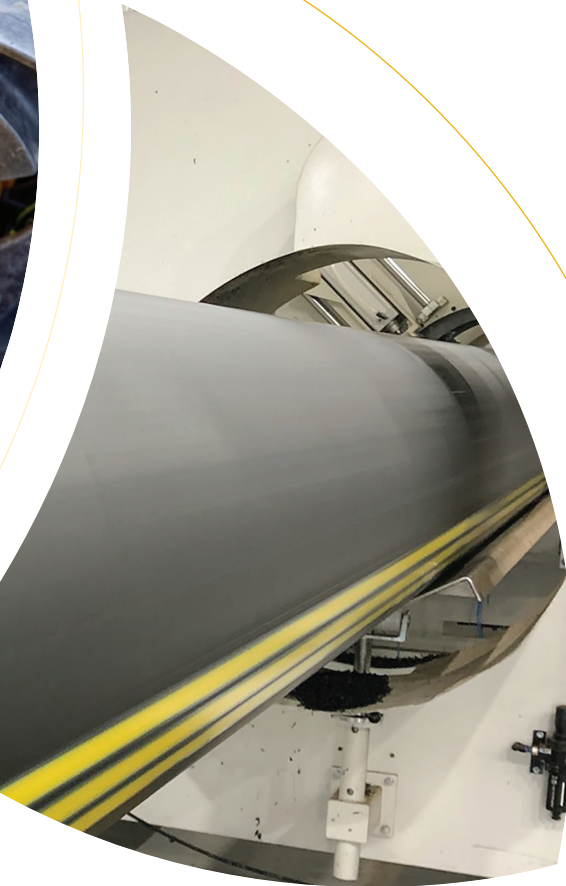




Stream-Line Product Suite

Energy Market Products



UNITED
POLY SYSTEMS



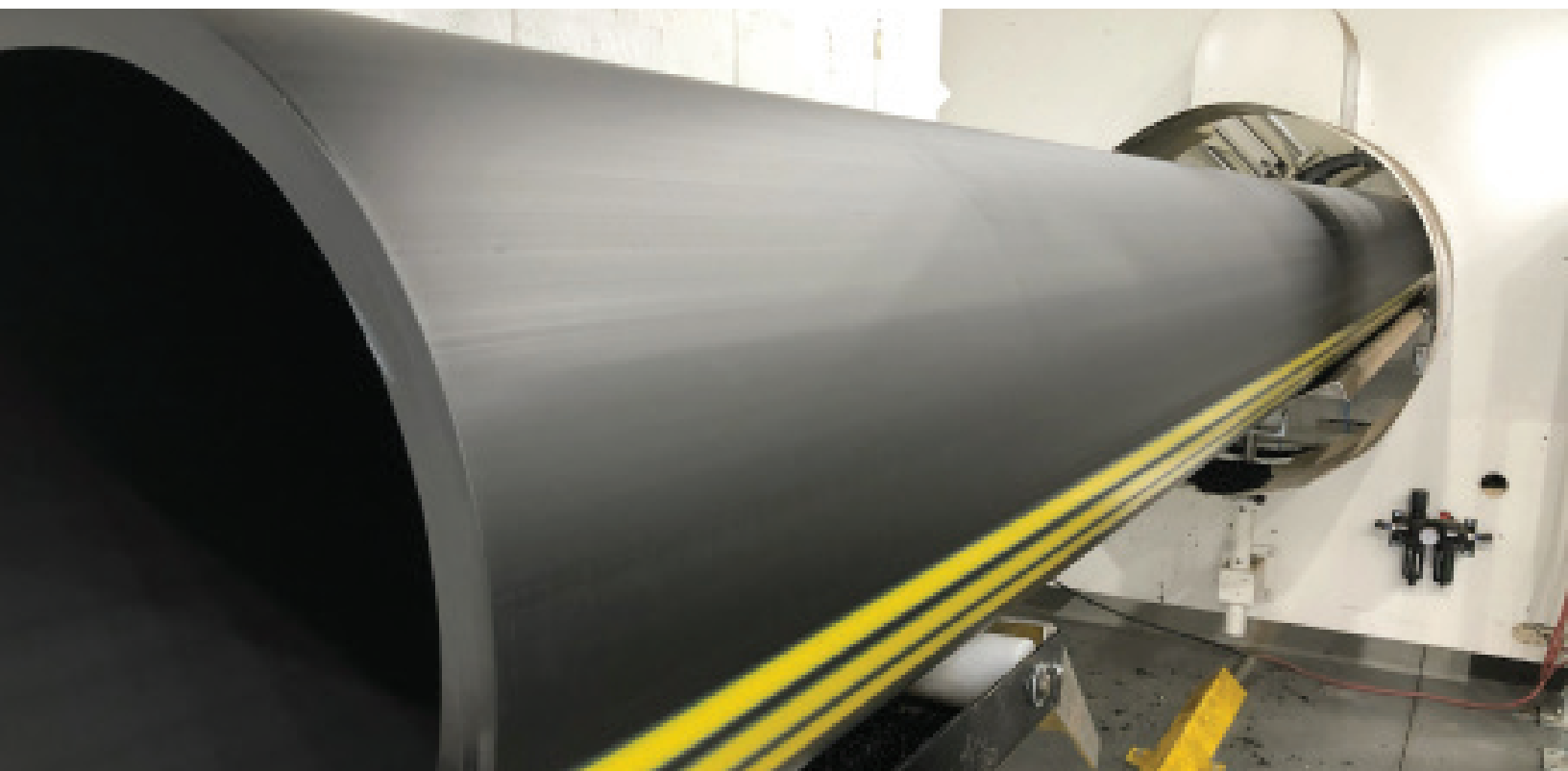
D2513 for Gas Transmission

United Poly System D2513 HDPE pipe is used for pressure applications in the oil and gas industry. It is manufactured in IPS and DIPS (4 in. and up) sizes and meets or exceeds ASTM Standard D3350 requirements for polyethylene pressure pipe. The product is manufactured with a yellow print line for identification.

- Flexible
- Low cost
- Extremely durable
- Manufactured in long runs for point-to-point installation

D2513 is part of United Poly System's Stream-Line suite for applications in the oil and gas industry. The flexibility and light weight of HDPE make it easy to deliver, install and customize at the wellsite and allow oil and gas lines to be deployed where necessary. The fusion-joint properties of HDPE mean that the joint is stronger than the pipe itself.

HDPE enjoys more than 95% market share of the natural gas market. The light weight, flexibility and easy installation make it ideal for natural gas transmission for cities and municipalities, well site applications and cross-country transmission lines.





United Poly Systems offers HDPE coil and reel options in multiple lengths to easily facilitate shipping and installation of long lengths of pipe. This is ideal for oil and gas installations and handling of materials on site.

PE4710 Typical Physical Properties

Property	Typical Value	Units	Test Method
Density with minimum 2% carbon black	0.960	g/cc	ASTM D 792 or 1505
High Load Melt Index	8.5	g/10 minutes	ASTM D 1238
Melt Index	0.08	g/10 minutes	ASTM D 1238
Flexural Modulus	110,000<160,000	psi	ASTM D 790
Tensile Strength @ yield (2 in./min)	3600	psi	ASTM D 638
Tensile Elongation @ Break	740%	%	ASTM D 638
Thermal expansion	1.0 x 10 ⁻⁴	in. /in. / °F	ASTM D 696
HDB 73.4°F (23°C)	1600	psi	ASTM D 2837
HDB 140°F (60°C)	1000	psi	ASTM D 2837
PENT	> 500	hr	ASTM F1473
Brittleness Temperature	<-103°F (-75°C)	°F	ASTM D 746
Cell Classification	445574C (black only)		ASTM D 3350

These are nominal values and used as guidelines only.

This is not a product specification and does not indicate minimum or maximum operating values.



F2619 for Oil Transmission

F2619 is United Poly Systems premium HDPE pipe for oil gathering and transmission. F2619 is manufactured in IPS and DIPS (4 in. and up) sizes and meets or exceeds ASTM Standard D3350 requirements for polyethylene pressure pipe. The product is manufactured with a yellow print line for identification.

- Flexible
- Extremely durable
- Low cost
- Manufactured in long runs for point-to-point installation

F2619 is part of United Poly System's Stream-Line suite for applications in the oil and gas industry, for onsite use at oil wells and for oil transmission. The flexibility and light weight of HDPE make it easy to deliver, install and customize at the wellsite and allow oil and gas lines to be deployed where necessary. The fusion-joint properties of HDPE mean that the joint is stronger than the pipe itself.

United Poly Systems offers HDPE coil and reel options in multiple lengths to easily facilitate shipping and installation of long lengths of pipe. This is ideal for oil and gas installations and handling of materials on site.





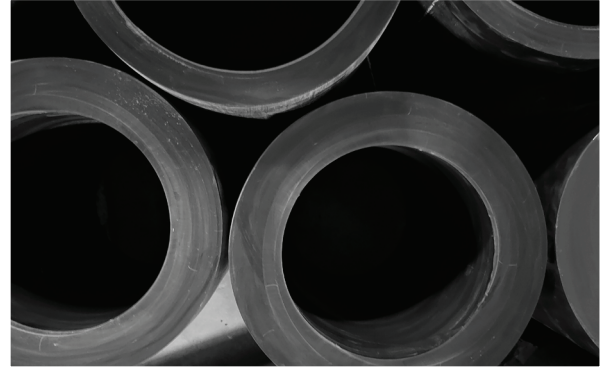
PE4710 Typical Physical Properties

PROPERTY	TYPICAL VALUE	UNITS	TEST METHOD
Density with minimum 2% carbon black	0.960	g/cc	ASTM D 792 or 1505
High Load Melt Index	8.5	g/10 minutes	ASTM D 1238
Melt Index	0.08	g/10 minutes	ASTM D 1238
Flexural Modulus	110,000 < 160,000	psi	ASTM D 79D
Tensile Strength @ yield (2 in./min)	3,600	psi	ASTM D 638
Tensile Elongation @ Break	740%	%	ASTM D 638
Thermal expansion	1.0 x 10 ⁻⁴	in /in / °F	ASTM D 696
HOB 73.4°F (23°C)	1600	psi	ASTM D 2837
HOB 140°F (60°C)	1000	psi	ASTM D 2837
PENT	>500	hr	ASTM F1473
Brittleness Temperature	<-103°F (-75°C)	°F	ASTM D 746
Cell Classification	445574C (black only)		ASTM D 3350

*These are nominal values and used as guidelines only.
This is not a product specification and does not indicate minimum or maximum operating values.*

Hard-Line™

Hard-Line is United Poly Systems HPDE pipe for high pressure, high corrosive and heavy wall applications. Hard-Line is rated for higher operating pressure and has a thicker wall than standard pipes. It is available in IPS (Iron Pipe Size) size from 1¼- to 10-in. diameter. Typical product lines include SDR5, SDR6 and SDR7. Specific products can be de-rated for certain applications. Hard-Line can be striped to indicate different applications.



Applications

- Railroad crossings
- Bore installations under waterway (lake, river, etc.)
- Nuclear sites
- Oil and gas sites
- Mines
- Any application where high pressure and/or high corrosive use is necessary

PE4710 Typical Physical Properties

PROPERTY	TYPICAL VALUE	UNITS	TEST METHOD
Density with minimum 2% carbon black	0.960	g/cc	ASTM D 792 or 1505
High Load Melt Index	8.5	g /10 minutes	ASTM D 1238
Melt Index	0.08	g/10 minutes	ASTM D 1238
Flexural Modulus	110,000 <160,000	psi	ASTM D 790
Tensile Strength @ yield (2 in./min)	3600	psi	ASTM D 638
Tensile Elongation @ Break	740%		ASTM D 638
Thermal expansion	1.0 x 10 ⁻⁴	in/ in / 0	ASTM D 696
HDB 73.4°F (23°C)	1600	psi	ASTM D 2837
HDB 140°F (60°C)	1000	psi	ASTM D 2837
PENT	> 500	hr	ASTM F1473
Brittleness Temperature	< -103°F (-75°C)	°F	ASTM D 746
Cell Classification	445574C (black only)		ASTM D 3350

These are nominal values and used as guidelines only.

This is not a product specification and does not indicate minimum or maximum operating values.

The material requirements for Hard-Line pressure pipe meets or exceeds ASTM Standard D3350 “Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.” ASTM D3350 defines important physical properties of HDPE materials into ranges, or cell classes, so that each property can be defined within a range that is appropriate for the application.

IPS Sizes

IPS SIZE	AVG. OD	SDR PSI	5 500	6 400	7 335
1¼ in.	1.66	Min Wall Avg ID Weight p/ft	0.332 0.956 0.600	0.277 1.073 0.520	0.237 1.157 0.459
1½ in.	1.90	Min Wall Avg ID Weight p/ft	0.380 1.094 0.785	0.317 1.229 0.682	0.271 1.325 0.600
2 in.	2.375	Min Wall Avg ID Weight p/ft	0.475 1.368 1.227	0.396 1.536 1.065	0.339 1.656 0.939
3 in.	3.50	Min Wall Avg ID Weight p/ft	0.700 2.016 2.665	0.583 2.263 2.314	0.500 2.440 2.040
4 in.	4.50	Min Wall Avg ID Weight p/ft		0.750 2.910 3.824	0.643 3.137 3.372
6 in.	6.625	Min Wall Avg ID Weight p/ft		1.104 4.284 8.289	0.262 2.351 0.930
8 in.	8.625	Min Wall Avg ID Weight p/ft		1.438 5.578 14.049	0.946 4.619 7.330
10 in.	10.75	Min Wall Avg ID Weight p/ft		1.792 6.952 21.825	1.536 7.494 19.245

These are nominal values and used as guidelines only.

This is not a product specification and does not indicate minimum or maximum operating values.



MDPE for Gas Transmission

MDPE medium density polyethylene pipe is primarily used for medium-pressure gas and propane transmission. United Poly System's MDPE is flexible, durable and can be manufactured in long runs for point-to-point installation. MDPE is certified for underground use, but for exterior use only. United Poly System manufacturers MDPE in sizes from ¾ to 6 inches in SDR 11 and SDR 13.5. It is shipped in 40- or 50-ft sticks and is also available in coils.

- Flexible
- Extremely durable
- Low cost
- Manufactured in long runs for point-to-point installation
- Acceptable for all external, underground gas and propane use
- Same manufacturing process and equipment as standard HDPE pipe/conduit
- Resistant to slow crack growth (SCG) and rapid crack propagation (RCP)



Applications include:

- **Utility** Gas transfer from gas main to building or house meter
- **Residential Plumbing** Gas transfer from meter to other external uses (gas grill, pool heating, fire pit, external building, lighting, etc.). Not for indoor use.
- **Propane** Transmission for heating and other applications

Product Information:

- BARCODE to be included in print line per ASTM F2897
- Manufactured in accordance with ASTM D2513
- Meets ASTM D3350 material grade PE2708



MDPE D2513 Properties

Property	Nominal Value
Density, Natural	0.939 gm/cc
Density, Yellow	0.943 gm/cc
Melt Index (190°C/2.16 kg)	0.20 gm/10 min
Flow Rate (190°C/21.6 kg)	20 gm/10 min
Tensile Strength @ Yield	2,800 psi
Ultimate Elongation	>800%
Flexural Modulus, 2% Secant	100,000 psi
PENT	>1000 hr
Brittleness Temperature	<-180°F
Vicat Softening Temperature	248°F
Izod Impact Strength (Notched)	10 ft – lbf/in.
Thermal Expansion Coefficient	1.0 x 10 ⁻⁴ in./in./°F

These are nominal values and used as guidelines only.

This is not a product specification and does not indicate minimum or maximum operating values.

Design pressure rating for natural gas, psig at 73 F:

- 80 psi for SDR 13.5
- 100 psi for SDR 11

Ratings are in accordance with DOT CFR 49, Part 192, § 192.121 and § 192.123.

Maximum design pressure was amended to 125 psig (reference § 192.123a) when designed in accordance with 192.121 for nominal pipe sizes up through 12 in. IPS (§ 192.123e.3).



MDPE D2513 Available Sizes

IPS SIZE	AVG. OD	Min. Wall	Weight (lb/ft)
¾ in. SDR 11	1.050	0.095	0.123
1 in. SDR 11	1.315	0.120	0.193
1¼ in. SDR 11	1.660	0.151	0.308
1½ in. SDR 11	1.900	0.173	0.404
2 in. SDR 11	2.375	0.216	0.631
3 in. SDR 11	3.500	0.318	1.370
4 in. SDR 11	4.500	0.409	2.265
6 in. SDR 11	6.625	0.602	4.909
4 in. SDR 13.5	4.500	0.333	1.882
6 in. SDR 13.5	6.625	0.491	4.079
½ in. CTS - 125 psig	0.625	0.090	0.065
1 in. CTS - 87 psig	1.125	0.900	0.126
1 in. CTS - 97 psig	1.125	0.099	0.139

*These are nominal values and used as guidelines only.
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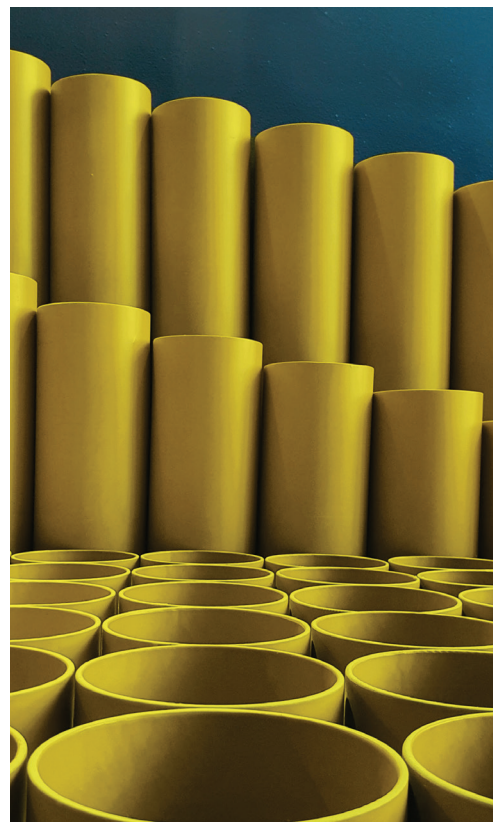


PA-12 Gas Pipe

UPS's polyamide 12 (PA-12) gas pipe is made from Evonik Vestamid polyamide material that meets or exceeds regulatory, performance and cell classification standards for gas applications up to 250 psi. It is compliant with PHMSA requirements for regulated gas distribution operations and is compliant with all standard joining techniques designed for use with polyamide.

PA-12 is part of United Poly System's Stream-Line suite for applications in the oil and gas industry. The flexibility and light weight of HDPE make it easy to deliver, install and customize at the wellsite and allow gas lines to be deployed where necessary. The fusion-joint properties of HDPE mean that the joint is stronger than the pipe itself. UPS manufactures PA-12 in ¾- to 6-in. diameter sizes in SDR 11 and SDR 13.5. PA-12 is shipped in 40- or 50-ft sticks and is also available on reels and coils.

HDPE enjoys more than 95% market share of the natural gas market. The light weight, flexibility and easy installation make it ideal for natural gas transmission for cities and municipalities, well site applications and cross-country transmission lines.



ASTM Driven Quality Assurance

PA 12 meets or exceeds the applicable test standards listed in ASTM F2785-18a. These standards include:

Initial Validation

- Resistance to Crack Propagation
- Short- and Long-Term Properties; D6779 and D2837
- Slow Crack Growth; F1473
- Outdoor Storage Stability; F2785-18a
- Chemical Resistance; D543
- Elevated Temperature Service; D2837

Semi-Annual Testing

- Sustained Pressure; D1598

Production Testing

- Dimensional Requirements; D2122
- Minimum Hydrostatic Burst Pressure; D1599



Innovative Polyamide 12 Material Compared to Alternatives

PA to PE

- Higher operating pressures, up to 250 psig
- No chemical deration
- Higher temperature performance
- Lower gas permeation
- Squeeze-off compatible
- Works with electrofusion and butt fusion
- More scratch and abrasion resistant for rocky soil

PA to Steel

- Much faster install rate, no welding
- No need for 100% inspection of joints
- Spoolable up to 4-in.
- Can be hot-tapped
- Can be plowed and installed by Horizontal Directional Drilling (HDD)
- No reaction to sour or wet gas
- No cathodic protection required

Available Sizes

IPS SIZE	AVG. OD	Min. Wall	Weight (lb/ft)
¾ in. SDR 11	1.050	0.095	0.087
1 in. SDR 11	1.315	0.120	0.154
1¼ in. SDR 11	1.660	0.151	0.240
1½ in. SDR 11	1.900	0.173	0.346
2 in. SDR 11	2.375	0.216	0.616
3 in. SDR 11	3.500	0.318	1.385
4 in. SDR 11	4.500	0.409	2.462
6 in. SDR 11	6.625	0.602	5.539
¾ in. SDR 13.5	1.050	0.078	0.072
1 in. SDR 13.5	1.315	0.097	0.128
1¼ in. SDR 13.5	1.660	0.123	0.199
1½ in. SDR 13.5	1.900	0.141	0.287
2 in. SDR 13.5	2.375	0.176	0.511
3 in. SDR 13.5	3.500	0.259	1.149
4 in. SDR 13.5	4.500	0.333	2.043
6 in. SDR 13.5	6.625	0.491	4.597

These are nominal values and used as guidelines only.

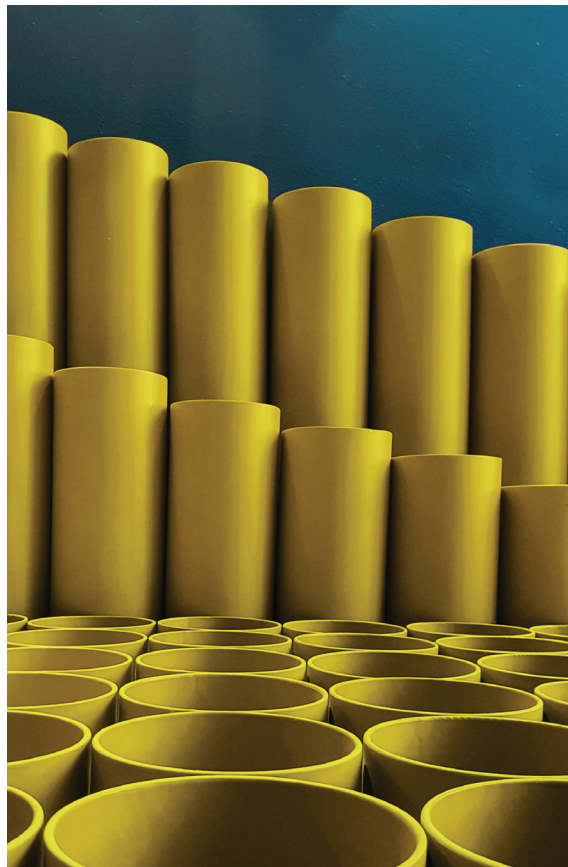
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Sleeve-It!™

Sleeve-It! is United Poly System's HDPE product for gas line protection. Although many companies use traditional PVC for gas line protection, disruptions in the PVC supply chain and the superior product benefits of Sleeve-It make it a better choice for gas line protection.

Similar to Pro-Line, a coupler can be attached during manufacturing, making Sleeve-It ready for installation once delivered to the project site. Sleeve-It! is not pressure rated and is color identified as yellow or black with a yellow stripe. It is available in ¾ in. through 6 in. diameter and is available on reels, coils and in 20-, 40- and 50-ft sticks.

The material requirements for Sleeve-It! meet or exceed ASTM Standard D3350 "Standard Specification for Polyethylene Plastic Pipe and Fittings Materials." ASTM D3350 defines important physical properties of HDPE materials into ranges, or cell classes, so that each property can be defined within a range that is appropriate for the application. Sleeve-It! is manufactured per product specification SDR SCH 40 with conduit materials per ASTM F2160.



Print Line Information

Sleeve-It! is sequentially marked and identified along its outer length in contrasting color.

The print interval is every 2 ft and includes the following:

MANUFACTURER'S NAME: United Poly Systems PRODUCT SIZE/SDR

PRODUCTION CODE Date, Location, Period SPECIFICATION

"GAS SLEEVE ONLY"

LENGTH OF CONDUIT (in feet)

Optional custom print lines are available and may include customer name, project name, and application.

HDPE Conduit Material Definition According to ASTM F2160

PROPERTY	RANGE OR MINIMUM REQUIREMENT	UNITS	CELL CLASS	TEST METHOD
Density	0.941 - 0.955	g/cc	3	ASTM D 792 or 1505
Melt Index	< 0.25 - 0.40	g/10 minutes	3 or 4	ASTM D 1238
Flexural Modulus	110,000 - 160,000	psi	4 or 5	ASTM D 790
Tensile Strength	3000 - 4000	psi	4 or 5	ASTM D 638
Environmental Stress Crack Resistance	F20 > 192	Hours (condition C)	3 or 4	ASTM D 1693
HDB	Not Defined		0, 1, 2, 3 or 4	ASTM D 2837

Available Sizes

IPS Size	AVG OD		SCH 40
¾ in.	1.05	Min Wall Avg. ID Weight p/ft	0.113 0.804 0.215
1 in.	1.31	Min Wall Avg. ID Weight p/ft	0.133 0.804 0.145
1 ¼ in.	0.66	Min Wall Avg. ID Weight p/ft	0.140 1.360 0.291
1 ½ in.	1.90	Min Wall Avg. ID Weight p/ft	0.145 1.59 0.349
2 in.	2.375	Min Wall Avg. ID Weight p/ft	0.154 2.047 0.469
2 ½ in.	2.87	Min Wall Avg. ID Weight p/ft	0.203 2.445 0.744
3 in.	3.50	Min Wall Avg. ID Weight p/ft	0.216 3.042 0.973
4 in.	4.50	Min Wall Avg. ID Weight p/ft	0.237 3.998 1.387
5 in.	5.563	Min Wall Avg. ID Weight p/ft	0.258 5.016 1.882
6 in.	6.62	Min Wall Avg. ID Weight p/ft	0.280 6.031 2.443

These are nominal values and used as guidelines only.

This is not a product specification and does not indicate minimum or maximum operating values.



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