HDPE Pipes Technical Datasheet

The PE100 pipes are high-density polyethylene (HDPE) pipes, black in color with blue stripes.
They are used in the networks for the supply, distribution, and connection of potable water.

Standard for DPS HDPE Pipes: ISO 4427
Certifications for the production facility: ISO 45001:2018, ISO 9001:2015, ISO 14001:2015

ADVANTAGES OF HDPE (High-Density Polyethylene)

- PE pipe systems offer water and gas engineers numerous advantages:
- Cost savings and easy installation.
- Naturally exempt from any maintenance during their lifespan of use.
- Unlike ductile iron galvanized or steel pipes, HDPE pipes are corrosion-resistant and therefore do not require protection against corrosion during their lifespan, whereas the cement and bitumen galvanizing layers of ductile iron and steel pipes tend to flake off, making the pipe vulnerable to corrosion.
- Polyethylene pipes do not decompose, rust, or lose thickness due to chemical or electrical reactions from surrounding soils.
- HDPE pipes are flexible. In this regard, water hammer effects beyond pressure values are three times lower than those applicable to ductile iron and steel pipes. Their flexibility also allows them to withstand any ground movement that could subject the pipes to excessive stress.
- They are produced in long lengths, reducing the number of connections that can cause pressure losses and leaks. This also significantly reduces installation time and, unlike ductile iron and steel pipes, offers cost savings.

PE 100 vs. Ductile/Steel Pipes

- Compared to ductile iron and steel pipes, HDPE pipes have the lowest rigidity coefficient. The comparative figures below show that the new HDPE pipe maintains a very low friction coefficient ‘n’.

	n' New Pipes	n' Old Pipe
HDPE	0.008	0.008
Ductile Iron	0.012	0.014
Cast Iron	0.013	0.015
Steel	0.012	0.013

According to the Manning equation, frictional losses depend on n^2. The actual difference in frictional head loss for which the total pumping head must be increased is as follows:

	New Pipe	Service Pipe
HDPE	n2= 6.4 x 10-5	n2= 6.4 x 10-5
Ductile Iron	n2= 14.4 x 10-5	n2= 19.6 x 10-5
Cast Iron	n2= 16.9 x 10-5	n2= 22.5 x 10-5
Steel	n2= 14.4 x 10-5	n2=16.9 x 10-5

The above figures demonstrate that compared to ductile iron, when the same amount of water is pumped through a pipe of the same diameter, the increase in water frictional head loss for HDPE is two times lower in a new pipeline and three times lower in an old pipeline.

- HDPE pipes weigh relatively less than ductile iron pipes of the same inside diameter and pressure class. Therefore, the transportation, handling, and installation of HDPE pipes are considerably less costly and simpler than those of ductile iron and steel pipes

HDPE Pipe for Water Supply

PIPES SPECIFICATIONS: HDPE-100 ISO4427

OD		PN 6 SDR 26		PN 10 SDR 17		PN 16 SDR 11	
Min	Max.	W.THICK.	WEIGHT	W.THICK.	WEIGHT	W.THICK.	WEIGHT
16	16.30						
20	20.30					2.00	0.12
25	25.30					2.30	0.17
32	32.30			2.00	0.19	3.00	0.28
40	40.40			2.40	0.29	3.70	0.43
50	40.40	2.00	0.31	3.00	0.45	4.60	0.67
63	63.40	2.50	0.49	3.80	0.72	5.80	1.05
75	75.50	2.90	0.67	4.50	1.01	6.80	1.47
90	90.60	3.50	0.97	5.40	1.46	8.20	2.13
110	110.70	4.20	1.43	6.60	2.17	10.00	3.16
125	125.80	4.80	1.84	7.40	2.77	11.40	4.10
140	140.90	5.40	2.32	8.30	3.47	12.70	5.11
160	161.00	6.20	3.05	9.50	4.54	14.60	6.70
180	181.10	6.90	3.79	10.70	5.74	16.40	8.47
200	201.20	7.70	4.71	11.90	7.08	18.20	10.45
225	226.40	8.60	5.91	13.40	8.98	20.50	13.22
250	251.50	9.60	7.33	14.80	11.01	22.70	16.26
280	281.70	10.70	9.14	16.60	13.83	25.40	20.39
315	316.90	12.10	11.64	18.70	17.51	28.60	25.81
355	357.20	13.60	14.71	21.10	22.28	32.20	32.76
400	402.40	15.30	18.66	23.70	28.16	36.30	41.60
450	452.70	17.20	23.59	26.70	35.68	40.90	52.67
500	503.00	19.10	29.10	29.70	44.09	45.40	64.99
560	563.40	21.40	36.48	33.20	55.23	50.80	81.42
630	633.80	24.10	46.22	37.40	69.95	57.20	103.16

HDPE Pipe for Water Supply (Continued)

PIPES SPECIFICATIONS: HDPE-100 ISO4427

OD		PN 6 SDR 26		PN 10 SDR 17		PN 16 SDR 11	
Min	Max.	W.THICK.	WEIGHT	W.THICK.	WEIGHT	W.THICK.	WEIGHT
710	714.30	27.2	58.75	42.1	88.76	64.5	131.04
800	804.80	30.6	74.41	47.4	112.55	72.6	166.19
900	905.40	34.4	94.48	53.3	142.37	81.7	210.36
1000	1006.00	38.2	116.12	59.3	175.95	90.2	258.27
1200	1207.20	45.9	167.25	67.9	242.36		

PE 100 pipelines can be assembled using either electro fusion welding (electro-fusion joint) or butt fusion welding techniques. These connection methods make the network self-supporting, eliminating the need for concrete stops or special locking joints at directional changes.

- PE 100 pipelines should be laid with a sand bedding. They can tolerate surface scratches of up to 10% of the maximum thickness.
- Expansion and contraction: To limit these phenomena, it is advisable to create undulations with the pipe in the trench.

Bending Radius

The flexibility of PE 100 allows the bending of the pipe during directional changes. Please adhere to the minimum bending radii as shown in the table below.

Bending Radius		
	20˚C	40˚C
SDR 7.4	20DN	40DN
SDR 9	20DN	40DN
SDR 11	20DN	40DN
SDR 13.6	25DN	50DN
SDR 17	25DN	50DN

Typical Properties		
		PE100
Density	kg/m3	960
Tensile Strength	Mpa	19
Elongation at break	%	500
Short Term Elasticity Modulus	MPa	1700
Linear Expansion Coefficient	mm/m˚C	0.2
Thermal Conductivity	W/m˚C	0.4
Minimum Required Strength	MPa	10
Long Term Design Strength	MPa	8
Carbon Black Content		›2.0%
Operating Temperature Range		-20˚C /+40˚C
Estimated Service Life		100 years

Derating Factor

A corrective factor, less than 1, should be applied to the PN (Nominal Pressure) of a network when operating temperature conditions differ. For example, a PN 16 pipeline conveying fluid at 30 degrees Celsius will have a maximum allowable pressure (PMA) of 16 * 0.87 = 13.92 bar.

Temperature-dependent thermal expansion coefficient	
Temperature	Thermal Expansion Coefficient
20˚C	1
30˚C	0.87
40˚C	0.74

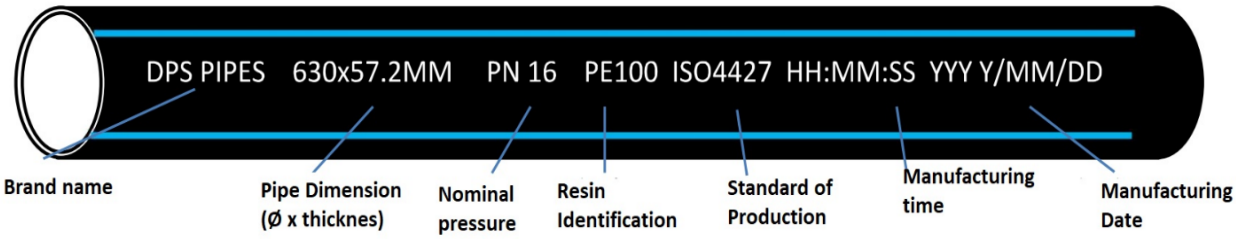
Pressure Class (bar)			
	POP (Permissible Operating Pressure):	MAP (Maximum Allowable Pressure)	PPT (Permissible Pressure Test on Site):
PN10	10	20	15
PN12.5	12.5	25	18.7
PN16	16	32	24
PN20	20	40	30
PN25	25	50	37.5

Rigidity Class

A class that defines the ring stiffness of a HDPE pipe. See the table below for details.

Rigidity Class	
	RC (kN/M2)
SDR 7.4	317
SDR 9	162
SDR 11	83
SDR 13.6	33
SDR 17	16

Marking on Pipes



Packaging

For DN (Nominal Diameter) greater than or equal to DN110: Lengths exceeding 12m available on request. The tolerance on the length of the tubes measured at 20 (+/-5) degrees Celsius is +/-1%, depending on the packaging (coil, drum, or bar).

Glossary:

- PN (Nominal Pressure): This is the constant value of pressure in bars maintained in a pipeline for over 100 years at a temperature of 20 degrees Celsius.
- DN (Nominal Diameter): This is the external diameter of the HDPE pipe. The choice of DN depends on the fluid velocity, flow rate, and pressure losses.
- SDR (Standard Dimension Ratio): The standardized dimensional ratio is a rounded number that expresses the ratio of the nominal diameter to the nominal thickness (SDR=DN/Thickness).
- MAP (Maximum Allowable Pressure): The maximum pressure, including water hammer, that the pipeline can withstand when subjected to intermittent service.
- POP (Permissible Operating Pressure): The maximum hydrostatic pressure that the pipeline can withstand continuously in service.
- PPT (Permissible Pressure Test on Site): The maximum hydrostatic pressure that the pipeline can withstand for a relatively short period to ensure its integrity and tightness.