

HDPE Pipe

Specifications for HDPE Pipe

The properties of high-density polyethylene pipe are described using ASTM D 3350-02, "Standard Specification for Polyethylene Plastic Pipe and Fittings Materials". This ASTM Standard provides cell classifications that define the physical properties of the resin used to make the HDPE pipe.

Most HDPE pipe is made with a cell classification of PE 345464C. The meaning of this cell classification is provided in the table below:

ISCO Standard HDPE Resin Specifications

PROPERTY VALUE		SPECIFICATION	UNIT	NOMINAL
Material Designation		PPI / ASTM		PE3408
Material Classification		ASTM D 1248		III C 5 P34
Cell Classification		ASTM D 3350-02		345464C
Density	(3)	ASTM D 1505	g/cm ³	.955 to .957
Melt Index	(4)	ASTM D 1238	gm/ 10 min	.10 to .15
Flexural Modulus	(5)	ASTM D 790	psi	110 to 140,000
Tensile Strength	(4)	ASTM D 638	psi	3,200 min.
Slow Crack Growth				
ESCR		ASTM D 1693	hours in 100% igepal	>5,000
PENT	(6)	ASTM F 1473	hours	>100
HDB @ 73 deg F	(4)	ASTM D 1693	psi	1,600
UV Stabilizer	C	ASTM D 1603	%C	2 to 2.5%

Types of Polyethylene Pipe

All polyethylene pipe is not the same. The Plastic Pipe Institute's "Engineering Properties of Polyethylene" shows that polyethylene with a density of greater than 0.941 (with no additives) is high-density. Materials with a density of 0.926 to .94 are medium density and those with a density of between .90 and .925 are low density.

Density influences key properties in polyethylene materials. As the density increases, the tensile strength increases. Also the chemical resistance increases.

Traditionally, medium density polyethylene resin has been used to make pipe for gas distribution. When medium density was selected for gas pipe, it had better stress crack resistance than other resins.

As new resins and manufacturing processes have been developed, high and medium density polyethylene resins have improved in their ability to handle stress and stress cracking agents.

The current test to determine stress crack resistance is the PENT test. The PENT Test is run in accordance with ASTM F 1473-97, "Standard Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins". This test requires that slow crack growth test be run on samples of extruded pipe.

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