DESIGN-FLOW® HDPE Pipe - General Information

Weatherability

Independent Pipe Products, Inc. black polyethylene pipe, PE3408 , is protected against degradation by a combination of stabilizers and carbon black. The pipe formulation contains in excess of 2% carbon black imparting the black color as well as effective protection from ultraviolet radiation. Carbon black is the single most effective additive to enhance weatherability in Independent Pipe Product's polyethylene pipe.

Weatherability studies indicate that carbon black imparts UV stability that makes our polyethylene pipe acceptable for normal outside storage for a period of years without a detrimental loss of physical properties. Good inventory practices should be maintained to insure optimum performance by installing the pipe in two years or less. If pipe must be stored for more than two years, it should be stored under cover, out of direct sunlight.

Joining

Industry standards recommend the butt heat fusion method for joining. The butt heat fusion joints are as strong as the pipe wall itself. Quick bursts tests have shown ductile rupture of the pipe wall before rupture of the fusion joint.

Applications

Independent Pipe Products, Inc. is well qualified to meet the demanding needs of the municipal water and wastewater markets, energy markets in applications such as oil and gas gathering systems, methane recovery from coal seams and landfills, and water supply lines for oil recovery systems.

Pipe marked with NSF-61 meets the rigorous standards of third party testing performed by the National Sanitation Foundation. This pipe is manufactured to ASTM D-3035 and F-714.

Improved Material Designations

The recent updates and additions to ASTM D3350 caused the EHMW-HDPE resins designated as PE3408 in 2006, to become PE3608 in 2007. The HDPE material did not change, but the ASTM D3350 cell classification that described the material did change, necessitating the upgrade to PE3608. Those same changes encompassed the addition of PE4710 High Performance Polyethylene (HPPE) into the arsenal of pipe grade resins. A PE4710 HPPE piping system can result in a 15% savings when compared to current costs of PE3408 piping systems. By virtue of its higher pressure rating enabling the use of the next lower DR, wall thickness becomes less, ID increases and the weight per foot of pipe is reduced.

PE3608 (prev. PE3408) Material Designation

Materials designated as PE3608 have a hydrostatic design basis of 1600 psi for water at 73º F. After applying the 0.5 Design Factor, the design working stress for 73º F is 800 psi.

PE4710 (prev. PE3408) Material Designation

Materials designated as PE4710 have a hydrostatic design basis of 1600 psi for water at 73º F. After applying the 0.63 Design Factor, the design working stress for 73º F is 1000 psi. PE4710 has higher performance as described in PPI's TN41.

Pressure Ratings

The longevity of polyethylene pipe is calculated between 50 years to 100 years when properly engineered and installed for the conditions and application. Pressure ratings for polyethylene pipe are determined by use of the ISO equation:

$$P = [(2xHDB)/(SDR-1)] \times DF \times F_T$$

Where P = Working pressure of the pipeline
HDB = Hydrostatic Design Basis of the material
1600 psi for PE 3408, PE3608 or PE4710
SDR = Standard Dimension Ratio (OD/min wall)
DF = Design Factor
F_T = Elevated temperature service factor

A design factor of 0.5 is recommended for water or dry natural gas in areas not affected by Federal regulations. The Design Factor dry natural gas in areas under the U.S. Department of Transportation (DOT) jurisdiction, according to the Code of Federal Regulations, Title 49, Part 192.123, is 0.32 with a maximum allowable operating pressure of 100 psi. The Design Factor for crude oil or wet natural gas is 0.25.

Elevated Temperature Service Factor (F_T)

Maximum Continuously Applied Service Temperature, °F (°C)	Temperature Compensation Factor, FT, for PE3408 / PE3608 / PE4710
< 80 (26)	1.00
< 90 (32)	0.90
< 100 (38)	0.78
< 110 (43)	0.75
< 120 (49)	0.63
< 130 (54)	0.60
< 140 (60)	0.50

Applicable Standards

ASTM F714, F2620, D3035, D3261, D3350; NSF 61; AWWA C901/C906; PPI TR7, TR33, TR41