

Thermoplastic Material Designation Codes for Polyethylene

Most of us are familiar with thermoplastic material designation codes, but may not realize that codes for polyethylene pressure piping compounds such as PE3608 and PE4710 are not just names, but actually describe properties for the material. Codes for polyethylene compounds describe the type of thermoplastic, two key physical properties, and the design stress rating for pressure water service.

- The thermoplastic material is described by its abbreviation, PE for polyethylene.
- The first two numbers are requirements for physical properties, density and slow crack growth (SCG) resistance.
- The first number is the ASTM D3350 cell classification value for density
 - Conventional high density polyethylene is cell classification value 3
 - High-performance, high density polyethylene is cell classification 4.
- The second number is the ASTM D3350 cell classification value for SCG resistance
 - 4 is at least 10 hours per ASTM F1473 PENT.
 - 6 is at least 100 hours per ASTM F1473 PENT.
 - 7 is at least 500 hours per ASTM F1473 PENT.
- The third and fourth numbers are the PPI hydrostatic design stress (HDS) rating for water at 73°F (23°C) in hundreds of psi with tens and units dropped. The HDS is used to determine standard pressure ratings for water pipe.
 - 08 is 800 psi HDS.
 - 10 is 1000 psi HDS.
- PE3408 is polyethylene, >10 h PENT, and 800 psi HDS for water at 73°F
- PE3608 is polyethylene, >100 h PENT, and 800 psi HDS for water at 73°F
- PE4710 is polyethylene, >500 h PENT, and 1000 psi HDS for water at 73°F

Industry Changes

Over the past decade, resin manufacturers have improved physical properties and performance by developing improved manufacturing technologies for producing polyethylene pressure pipe materials. The improved polyethylenes from these improved technologies have different molecular structure and improved performance properties for pressure piping. Please see WL123 *High-Performance PE4710*, for a discussion of high-performance PE4710 materials.

To characterize improved PE materials, ASTM D 3350 and PPI TR-3 have been revised, and the industry is updating ASTM, AWWA, CSA and other industry standards

and regulatory codes so that high performance pressure pipe materials can be properly rated and applied.

Material Designation Code Markings on WL Plastics Pipe

In the interim, WL Plastics dual-marks pipe with older and newer material designation codes where standards or regulations have not been updated for newer material designations. Currently, the remaining work involves US regulations for gas piping, AWWA C906, ASTM D2239 and ASTM D2737. The US Department of Transportation has been petitioned to update 49 CFR Part 192, but as of this writing, updates are pending. AWWA C906, ASTM D2737 and D2239 are undergoing update through AWWA and ASTM respectively with completion expected in 2011.

WL Plastics uses PE3608 compound for the manufacture of PE3408 pipe where regulations or standards specify PE3408, and marks these piping products with PE3608 and PE3408 designations. See WL106A for PE3608/PE3408 compound information. PE4710 materials are used only for pipe manufactured to standards that have been updated for PE4710 compounds. See WL106B for PE4710 compound information.

This publication is intended for use as a piping system guide. It should not be used in place of a professional engineer's judgment or advice and it is not intended as installation instructions. The information in this publication does not constitute a guarantee or warranty for piping installations and cannot be guaranteed because the conditions of use are beyond our control. The user of this information assumes all risk associated with its use. WL Plastics Corporation has made every reasonable effort to ensure accuracy, but the information in this publication may not be complete, especially for special or unusual applications. Changes to this publication may occur from time to time without notice. Contact WL Plastics Corporation to determine if you have the most current edition.



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