Material Codes

Thermoplastic Material Designation Codes

Most of us are familiar with thermoplastic material designation codes, but may not realize that codes such as PE3408 and PE2406 are not just material names, but have meaning. In fact, these codes describe the type of thermoplastic polymer, two key physical properties, and the design rating for pressure water service.

- The thermoplastic polymer is described by its abbreviation, PE for polyethylene.
- The first number is the density of the polymer as described by the ASTM D 3350 density cell classification value.
    - Medium density polyethylene is cell classification value 2.
    - High density polyethylene is cell classification value 3 or 4.
- The second number is the slow crack growth resistance of the polymer as described by the ASTM D 3350 SCG cell classification value.
    - A 4 is F_{20} >600 hours ESCR per ASTM D 1693 Condition C or >10 hours per ASTM F 1473 PENT.
    - A 6 is >100 hours per ASTM F 1473 PENT.
    - A 7 is >500 hours per ASTM F 1473 PENT.
- The third and fourth numbers are the PPI hydrostatic design stress (HDS) rating for water at 73°F in hundreds with tens and units dropped. The HDS is used to determine pipe pressure rating.
    - 06 is 630 psi HDS.
    - 08 is 800 psi HDS.
    - 10 is 1000 psi HDS.

So we can decipher PE3408 as a polyethylene, high density, >600 h ESCR or >10 h PENT, and 800 psi HDS. Likewise, PE2406 is polyethylene, medium density, >600 h ESCR or >10 h PENT, and 630 psi HDS.

Industry Changes

Over the past decade, resin manufacturers have developed new manufacturing technologies for producing polyethylene pressure pipe materials that have improved physical properties and performance. These new materials are frequently referred to as “bimodal”, which is a type of molecular weight distribution; although other molecular structure characteristics are also changed. Please see *High-Performance PE4710,* WL123, for a discussion of high-performance PE materials.

To characterize these new PE materials, ASTM D 3350 and PPI TR-3 have been revised, and industry experts are in the process of updating ASTM, AWWA, CSA and other industry

standards so that the new high performance pressure pipe materials can be properly rated and used. This standards work should be completed in 2006-2007.

Dual-Marking Codes

WL Plastics believes that a transitional period is necessary so that customers, users, code officials, engineers and specifiers can be informed about new materials and the changes taking place in the industry. Accordingly, WL Plastics is temporarily changing its pipe printline markings to a "dual-marking" that identifies both the current material designation code and the new material designation code for the resin used to make the pipe. WL Plastics uses both standard performance and high performance resins; however, until the appropriate ASTM, AWWA, and CSA pipe specifications and codes have been updated to recognize high performance materials, pressure ratings based on the current, standard performance code will apply.

The following Dual-Marking material designation codes will temporarily appear on WL Plastics polyethylene pipe:

Current Code	*Dual-Marking Code*
PE2406	PE2406/PE2606 [A] PE2406/PE2708 [B]
PE3408	PE3408/PE3608 [A] PE3408/PE4710 [B]

[A] Denotes standard-performance MDPE or HDPE material.
[B] Denotes High-Performance MDPE or HDPE material.

Additional information about material designation codes, specifications, and performance properties are available from WL Plastics Technical Service at 435-867-8908 or wltechnical@wlplastics.com.