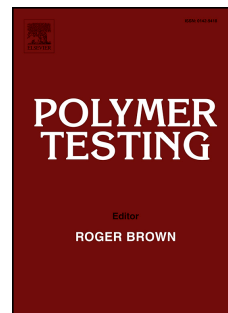


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## Correlation of Molecular Parameters, Strain Hardening Modulus and Cyclic Fatigue Test Performances of Polyethylene Materials for Pressure Pipe Applications

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### ABSTRACT

Currently, several testing methods are under development to understand the resistance of polyethylene pipe materials to slow crack growth over comparably short time periods without using aggressive chemicals to accelerate the time to brittle failure. Strain hardening and crack round bar tests have recently been developed and published as ISO testing methods. However, a better understanding of these testing methods is still required with respect to the molecular parameters of the materials. Comparative studies with existing slow crack growth testing methods such as the notched pipe test are of significant interest to the industry. This study discusses correlations of molecular weight, molecular weight distribution, short chain branching and rheological properties of different polyethylene materials with their slow crack growth resistances obtained from the strain hardening and crack round bar tests and their correlations with notched pipe tests.

**KEYWORDS:** Polyethylene pipes; slow crack growth; notched pipe test; cracked round bar; strain hardening modulus

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