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TITLE:
The New Frontier of Natural Gas Distribution: A Case Study of Bimodal PE2708 Gas Pipe Application

ABSTRACT:



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The new frontier of natural gas distribution offers improved reliability and integrity of pipeline systems. The polyethylene (PE) gas pipe industry consists of gas utilities, resin producers, pipe manufacturers, regulators and industrial organizations who are working together to deliver a safer, more durable and efficient pipeline system. This new frontier for gas utilities consists of larger diameter gas pipes and higher operating pressures. Manufacturing responds to this frontier by offering new bimodal technology that has dramatically improved the performance of PE gas piping materials in almost all categories. The DOT has increased the maximum allowable operation pressure from 100 psig to 125 psig for PE gas pipe which further embraces this new frontier. Industrial standards provide the foundation for the frontier through the inclusion of high performance PE pipe materials, such as PE 2708 and PE4710 into the PPI and ASTM standards. The application parameters at Dominion, a major gas utility, include broad range in temperatures, operation pressures and pipe diameters. Higher temperature accelerates the slow crack growth (SCG) process, the major failure mode observed in the field. Lower temperature makes PE gas pipe more vulnerable to rapid crack propagation (RCP), a rare but catastrophic fast fracture failure mode. RCP resistance also decreases with increase in pipe diameter, wall and/or operation pressure.. Good pipe begins from a good material. In order to achieve safe long term operation with the least maintenance, an excellent PE material is the premise. While you can not make a good pipe from a poor resin, you may make a poor pipe from a good resin. A higher standard in pipe quality is a must. To better serve our customers, Dominion has successfully converted to bimodal PE2708 and bimodal PE4710 gas pipe by working with a resin producer and a pipe manufacturer. This case study reports Dominion's experience in using the high performance bimodal PE gas pipe.