PVC PIPE GASKETED JOINTS — PART 1: HISTORY

In the early days of the PVC pipe industry, pipes and fittings were connected by solvent-cemented joints. The first ASTM standards for this joining system were published in the mid-1960s. As pipe sizes increased, however, solvent-cementing became a less attractive option.

Over the next decade, push-on gasketed joints were widely adopted as an alternative to cementing. Several ASTM standards for gasketed joints were published by the mid-1970s:

- ASTM D3139 for pressure pipe (1973)
- ASTM D3212 for non-pressure pipe (1973)
- ASTM F477 for gaskets (1976)

These standards are still in effect today, but are not the same as they were forty years ago. ASTM reviews all standards on a regular schedule, either reaffirming without change or revising as necessary.

For PVC pipe, the popularity of bell-and-spigot gasketed joints can be attributed to the following:

- Leak-free piping systems
- Ease of installation
- Dependability
- Long service-life
- Ability to accommodate both positive and negative (vacuum) internal pressures
- Ability to accommodate ground movements caused by seasonal changes and seismic events
- Ability to resist chemical attacks
- Ability to prevent axial stresses by allowing longitudinal movement

IMPROVEMENTS IN GASKETS

The first gasketed-joint PVC pipes were sealed by a rubber o-ring that was manually inserted into a pipe or a fitting. Over time, this simple ring was modified and improved many times. Newer designs incorporate multiple sealing methods including self-restraint systems, locked in place, integrated gaskets, and dual durometers.

The impetus for the improvements included:

- To reduce insertion forces during pipe assembly, resulting in increased worker productivity at relatively low cost
- To lessen the chance of a gasket being dislodged during pipe assembly, reducing jobsite problems
- To better accommodate variations in joint geometry, permitting proper sealing over a wide range of conditions
- To better accommodate extreme conditions like ground movement and joint deflection, allowing the pipe system to function in adverse situations

THE BOTTOM LINE: LEAK-FREE WATER AND SEWER PIPELINES

Elastomeric gaskets have been used for sealing PVC bell-and-spigot push-on joints for about fifty years. During that time, more than two million miles of leak-free water and sewer pipelines have been installed across North America.

References: ASTM D3139 "Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals"; ASTM D3212 "Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals"; ASTM F477 "Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe"; Rahman, S. "Sealing Our Buried Lifelines" AWWA Opflow, (April 2007).