Polyethylene (PE) or Polyvinyl Chloride (PVC) Water Main Are these the best options for your System?

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Polyethylene (PE) pipe is a relative newcomer on the potable water pipe scene, but it is quickly gaining acceptance. Behind polyvinyl chloride (PVC) pipe, PE is the second most used plastic pipe material for water and wastewater applications because of its toughness, corrosion resistance, and flexibility.

Some of the benefits are:

- The PE pipe industry estimates a conservative service life for PE pipe to be 50-100 years. This relates to savings in replacement costs for generations to come. PE pipe's interior is exceptionally smooth, with a Hazen Williams C Factor of 150, even after years of use. The pipe does not corrode or tuberculate, and it maintains its flow capacity over time with no corrosion by-products. PE does not serve as a nutrient, which makes it resistant to biological degradation from bacteria and other microorganisms. Further, PE provides the lowest biofilm formation potential of all the common water pipe materials in use today.
- PE pipe can be bent to a radius 25 times the nominal pipe diameter (for example, 12-in. PE can be cold formed in the field to a 25-ft radius). This can eliminate many fittings required for directional changes in a piping system where fittings and thrust blocks or restraints are required with alternate materials. The flexibility of PE pressure pipe makes it well suited for dynamic soils, including earthquake-prone areas. PE pressure pipe can accept repetitive pressure surges that significantly exceed a pipe's static pressure rating.
- PE's ability to withstand longitudinal bending also gives it a significant advantage in buried applications. The use of this flexible no-joint material enhances a pipe's ability to yield to external pressure such as ground movement, uneven settlement of pipe bedding, or seasonal variations in soil conditions.

Fusion is the primary way to join PE pipe, meaning there are no joints. PE pipe can be heat fused to form a leak-free joint as strong as, or stronger than, the pipe itself to eliminate potential leak points every 10-20 ft, which can arise in other piping systems.

The fused joints are self-restraining, removing the need for costly thrust restraints or thrust blocks. If a mechanical joint is needed, basic industry standard couplings may be used. An integral part of any pipe system is the method used to join the system components. Proper engineering design of a system considers the type and effectiveness of the techniques used to join the piping components and appurtenances, as well as, the durability of the resulting joints. Joining and connection methods vary depending on requirements for internal pressure and restraint against longitudinal movement (thrust load capacity - taken from American Water Works Association's Opflow Online website.)

As I travel around the State, I find more utilities starting to switch to these materials for new construction and for distribution repairs. The guys that work with these types of pipe seem to be happy with the way the installation goes. One system that I visit has even purchased the Fusion machine and has switched completely over to this type of pipe for any future installations. In another system, I got to see where a river crossing, using the directional boring method, had been done that was over 500 feet long.

Ok, with all these positive things about PE & PVC having been said, you might want to ask about the title of this article. The reason I ask this question is because of some of my other visits to Systems around the State. I don't want this to sound like I am against using these types of materials, but feel compelled to share a couple of these visits with you.

As you may recall from my last article, one of the situations I am referring to was in a system that had a 10" plastic main on their main street. I was called there to help find a leak. After three months of searching, the leak was found on a service line that was only about 10 feet from a Hydrant. This leak could just barely be heard on the hydrant. On another occasion, I had been called to a small System to find a leak in a Town Water District that had been constructed with plastic on both the mains and the service lines. The two leaks I found on that visit were after conducting a house-to-house search, having had to listen on both the shut-off valves and on outside hose connections. Both leaks could only be heard at one point or the other. I have also had Systems call when they were unable to find distribution lines.

I know that if proper installation procedures were followed, a lot of these problems would not exist. I also know that when other types of materials are used these kinds of problems are greatly reduced. In the future, I hope better ways of eliminating these problems are developed so that the industry can continue to use these products to everyone's advantage.

I would like to get some feedback on this topic from those of you that are using these products. Send me an E-Mail at: Winters@nyruralwater.org .