



NEWS RELEASE

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ADVANTAGES OF

PEX PLUMBING SYSTEMS DETAILED

IN NEW TECHNICAL DOCUMENT

PEX: State-of-the-Art for Potable Water;
Historical Overview of Discontinued
PB Piping Materials Also Examined

IRVING, Texas - March 7, 2024 - A new technical document that addresses the critical differences between crosslinked polyethylene (PEX) tubing systems with polybutylene (PB) systems has been published by the Plastics Pipe Institute, Inc. (PPI). The initiative was deemed necessary to eliminate any confusion between the two products because of problems associated with polybutylene, which was discontinued.

Prepared by PPI's Building & Construction Division, *PPI TN-31 Differences Between Crosslinked Polyethylene (PEX) and Polybutylene (PB) Piping Systems for Potable Water Plumbing Applications* discusses the advantages of modern PEX tubing and fittings as compared with PB tubing and fittings, which were last sold in the U.S. during the late 1990s.

"In short, PEX is not polybutylene," explained Lance MacNevin, P. Eng., director of engineering for PPI's Building & Construction Division, "but we have found that some misunderstanding still persists in the industry.

"Polybutylene tubing systems were introduced into North America in the 1970s, but by the 1980s some PB systems experienced premature failures in potable water distribution systems. Many failures were attributed to the polyacetal material, also called polyoxymethylene or POM, used to mold the plastic

fittings used in those systems. Some failures of the PB tubing material itself were attributed to insufficient resistance to hot chlorinated water or inadequate resistance to slow crack growth.”

By the late 1990s, the primary PB pipe grade resin manufacturer chose to stop supplying it in North America. The PB tubing standard ASTM D3309 was withdrawn in 2010 and the material has since been removed from plumbing and mechanical codes in USA and Canada.

Fortunately, crosslinked polyethylene piping systems had already been developed in Europe, with the first PEX radiant heating systems installed in 1972. The American standard for PEX tubing, ASTM F876, was published in 1984 and PEX was adopted into plumbing codes in 1997. Today, the North American PEX industry is thriving in both residential and commercial construction.

MacNevin continued, “Just as various types of metals, such as steel and copper, have different properties, various types of plastics also have different properties. Not all metal pipes perform the same, and not all plastic pipe and fitting materials perform the same either. Thanks to modern polymer technology, PEX piping systems perform in ways that provide superior reliability and safety when compared to polybutylene piping systems.”

PEX systems have several key differences and advantages over the discontinued polybutylene pipe components that were sold in North America until the 1990s:

- PEX is a crosslinked material, adding greater long-term stability against internal pressure at high temperatures, improved toughness, and reduced creep (material flow) under compressive loads at fitting connections, whereas PB material is not crosslinked.
- PEX tubing has thicker walls than PB tubing. All PEX tubing has a standard dimension ratio (SDR) of 9, vs. SDR 11 for PB. The thicker wall of PEX gives better mechanical strength and resistance to damage.
- PEX tubing is required to demonstrate chlorine resistance. Mandatory chlorine resistance testing according to ASTM Test Method F2023 requires that all PEX tubing used for potable

water applications shall be tested to meet a minimum extrapolated lifetime of at least 50 years. Such testing was not in place for polybutylene tubing.

- PEX systems do not use polyacetal insert fittings. PEX systems for potable-water plumbing use fittings made from lead-free brass or bronze, copper, stainless steel, or polymers such as polysulfone (PSU) and polyphenylsufone (PPSU), both of which have demonstrated very high levels of chlorine resistance.

According to product standards from ASTM, AWWA, CSA, and NSF, the testing requirements for today's PEX systems are far more stringent than for PB systems of the past. Third-party certification agencies also require strenuous quality control testing for PEX systems, including frequent unannounced inspections of plants and annual monitoring and re-testing.

PPI TN-31 contains the list of historical standards for PB piping systems plus a comparison of PB and PEX crimp ring fitting dimensions. Access the full content of PPI TN-31 at www.plasticpipe.org/buildingconstruction and go to the 'publications' tab, then click on BCD Technical Literature.



or by scanning:

Additional information and data about pressure pipe materials used for plumbing and mechanical systems are available from the PPI Building & Construction Division at www.plasticpipe.org/buildingconstruction

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Photo Follows...



The advantages of PEX tubing for potable hot and cold water systems are detailed in PPI's new TN-31 document.

About PPI:

The Plastics Pipe Institute, Inc. (PPI) is the major North American trade association representing the plastic pipe industry and is dedicated to promoting plastic as the materials of choice for pipe and conduit applications. PPI is the premier technical, engineering and industry knowledge resource publishing data for use in the development and design of plastic pipe and conduit systems. Additionally, PPI collaborates with industry organizations that set standards for manufacturing practices and installation methods.