



Plastic Pipe and Fittings Association

PUBLICATIONS

PEX Environmental Brochure

PEX Offers Environmentally Sound Solutions

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As the demand for housing and remodeling continues to grow in North America, home builders and homeowners are continually seeking products which provide them with increased comfort, greater energy efficiency and environmentally-responsible methods of conserving our natural resources. Cross-linked polyethylene tubing, commonly known as PEX, has demonstrated its ability to help conserve energy and water for more than two decades in the U.S. through its utilization in highly-efficient plumbing and heating systems. Members of the Plastic Pipe and Fittings Association (PPFA) have produced this brochure to help users understand how PEX is an environmentally sound product.

USES

IN HOT AND COLD-WATER PLUMBING DISTRIBUTION...

PEX tubing's high temperature ratings combined with its flexibility make it a versatile and useful material for interior hot and cold-water plumbing systems. Plumbing codes require PEX tubing and components used for plumbing to be third-party certified by nationally accredited agencies [such as NSF International, IAPMO (International Association of Plumbing and Mechanical Officials) and CSA International] to meet strict performance standards. Installation of PEX systems is clean and efficient. Corrosion resistance of the tubing is a positive attribute of PEX, prolonging the life of piping systems. Plumbing systems that utilize PEX tubing operate quieter than rigid metallic plumbing systems.



PEX tubing with check gauge in hot and cold water distribution.

IN HYDRONIC RADIANT HEATING...

PEX tubing is an ideal product for the most comfortable and energy-efficient heating system in use today,

hydronic radiant-floor heating. Hydronics is the use of water as the heat-transfer medium in heating and cooling systems. In hydronic radiant-floor heating applications, PEX tubing is installed below the flooring surface, and hot water is then circulated through the tubing allowing the entire floor to radiate heat up into the living space. PEX's durability, flexibility, and heat-transfer characteristics make it ideal for this application. Radiant-floor heating with PEX tubing can be installed with surfacing materials such as ceramic tile, stone, carpet, and hardwood. Furthermore, PEX's proven reliability promotes its use within concrete slabs, either indoors or outdoors.

Properly engineered and installed hydronic radiant

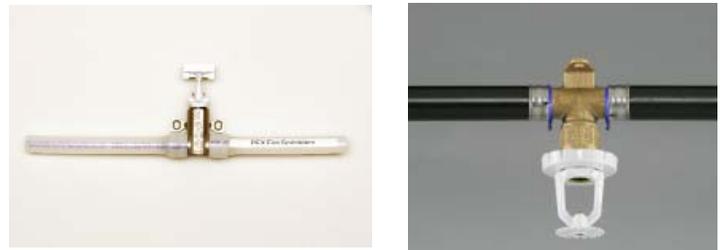


PEX radiant heating

heating systems are the most efficient heating systems available; reducing energy costs and contributing to improved IEQ (Indoor Environmental Quality).

IN RESIDENTIAL FIRE SPINKLERS...

PEX is also approved for use in residential fire sprinklers in one and two-family homes per the NFPA (National Fire Protection Association) 13D standard,



PEX residential sprinklers

thus contributing to the safety of occupants. Most often, a PEX-based fire sprinkler system is incorporated as part of the cold-water plumbing system, allowing a system in which water stagnation is not an issue. PEX-based fire sprinkler systems not only offer the protection of life, but also have the potential to reduce emissions, waste, and water usage thereby lessening the environmental impact of a structure fire, and contributing to the environmentally beneficial attributes of these systems when compared to traditional fire fighting techniques.

IN OTHER APPLICATIONS...

The uses for PEX tubing continue to grow over time. Today, it is not uncommon to see PEX installed in geothermal, solar, or radiant cooling applications. It is also approved for municipal water service and reclaimed water lines.

CHARACTERISTICS

IN MANUFACTURING AND DISTRIBUTION...

Cross-linked Polyethylene (PEX), a modification or enhancement of high-density polyethylene, is an economical and highly cost-effective piping material. Generally, as indicated by the PPFA peer reviewed life cycle inventory report, the manufacturing of plastic pipe consumes less energy than producing a similar length of metallic pipe, and PEX pipe is a fraction of the weight of metallic piping. The lighter weight of PEX makes lower transportation costs possible, contributing to even greater energy efficiency.

IN INSTALLATION...

PEX is lightweight and easy to handle and install. PEX is easier to transport to the jobsite and put into place. Because of its flexibility, PEX requires fewer fittings to install because it may be simply “bent” around corners. Fewer fittings translate to reduced pressure loss and reduction of potential installation issues. PEX utilizes mechanical fittings that do not require fuel for torches, nor solders, and flux, as are often needed for installation of copper tubing. Adhesives, glues and cements, which may be required with other piping systems, are also not used with PEX. All of these installation features of PEX add up to energy savings, both to and on the jobsite.



PEX tubing with bend support and multiple fitting connection types

VERSATILE INSTALLATION METHODS ALLOW WATER AND ENERGY SAVINGS...

PEX plumbing systems may be installed in several different configurations including central manifold (also called home run), remote manifolds (also called multi-port tees), or conventional branch-and-tee. On demand hot-water systems that partially recirculate water before use are frequently used with PEX and also save energy and water. PEX plumbing systems can even incorporate a residential fire sprinkler system as a part of the design. Selecting the best installation layout—by taking into consideration the size and floor plan of the home and the location of the water heater—can result in a PEX plumbing system that helps save both energy and water. Much of the potential energy and savings are achieved because PEX tubing contains less water per length (e.g., per foot) than other plumbing materials for the same application without significantly reducing the delivered pressure or the amount of water delivered from a modern faucet. Compared with metallic tubing, PEX systems require less water to be flushed from the plumbing system—and lost down the drain—while waiting for hot water to arrive at a fixture. Because of its durability and ease of installation, PEX is also ideally suited for use in hot-water recirculation systems to even further reduce the waiting time for hot water and contribute even greater



water and energy savings.

RECYCLABLE...

Unused scraps of PEX pipe can be ground up and blended with other polymers used to make durable products such as “plastic lumber” or used as an extender for road building materials. Therefore, even though PEX pipe cannot

be re-used to make new PEX pipe, it may indeed be recycled for incorporation into other useful products.

PROTECTS HEALTH AND SAFETY...

PEX pipe for potable water must be manufactured according to the strict standards of ASTM International (American Society for Testing & Materials), UL and CSA International in order to meet code requirements. In addition, national third-party certification agencies such as NSF International, CSA International, UL, and IAPMO test and certify PEX piping systems for performance and suitability to deliver drinking water, to be incorporated as fire sprinkler piping, or for use in radiant heating applications. PEX pipe can be specified with a factory-applied purple color to help identify alternative non-potable water lines. PEX pipe is chemically inert and therefore highly resistant to corrosion that may occur with metal pipe. PEX pipe is lightweight, flexible, and non-conductive giving it inherent worker safety advantages over the heavy, rigid metallic pipe systems. PEX pipe installs without solder, torches, fluxes or solvents that might pose safety or health concerns.

DURABLE...

Cross-linked polyethylene (PEX) pipe is designed to provide high-quality drinking water and long-lasting performance capable of withstanding the challenges of corrosive water and environments. It is also resistant to freeze damage thereby reducing leaks and need for repairs. Its flexibility, durability and ease of use characteristics make it an effective solution in a wide range of potable water, fire safety, and hydronic heating applications.

HISTORY...

A method for cross-linking polyethylene was patented in 1967 in Europe and within several years, additional methods were developed for consistent manufacturing of cross-linked polyethylene tubing. PEX tubing has established a tremendous perfor-

mance record over the past four decades. Billions of feet of PEX tubing have been installed throughout the world since 1970, with a considerable portion of that installed in North America since 1984. PEX tubing is also one of the most heavily tested piping materials in the world. Cross-linked polyethylene tubing has been under long-term pressure testing for more than 30 years in extreme temperature and pressure conditions. As the testing continues today, these are the longest continuous tests known to exist for any tubing material. PEX tubing also undergoes rigorous testing against the oxidizing effects of chlorinated water to ensure that the tubing will withstand the most aggressive drinking-water conditions.

CONCLUSION...

PEX tubing makes a major contribution to many environmentally positive systems including energy-efficient installations for drinking water and radiant heat. It is ideally suited for a variety of applications and its long-term performance has proven its durability making it the smart choice for green and sustainable building.



PEX remote manifolds

This document can be viewed online at:

www.ppfahome.org/Landing_Pages/PEX_Environmental_Brochure_2013.html

