

# Domestic Hot Water Recirculation Systems

In order to ensure expected service life of the system, MrPEX Systems® requires that systems be designed at the lowest possible operating pressure and temperature, and installed as per all applicable local codes and the MrPEX Systems® installation guide.

The product standards ASTM F876 "Standard Specification for Crosslinked Polyethylene (PEX) Tubing" and CSA B137.5 "Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications" define the technical requirements for PEX tubing.

ASTM F876 Section 6.10 requires a minimum extrapolated time-to-failure of 50 years when tested in accordance with ASTM F2023 "Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Pipe, Tubing and Systems to Hot Chlorinated Water."

Domestic hot water return design parameters:

- + Max. velocity of 2 ft/s (0.6 m/s) through PEX tubing.
- + Max. operating temperature of 140°F (60°C).
- + Max. operating pressure of 80 psig (0.55 MPa).
- + Max. oxidative reduction potential (ORP) of 825 mV.
- + Sized according to the American Society of Plumbing Engineers (ASPE) method described in "Hot Water Circulation Systems" in *Plumbing Engineering Design Handbook—Volume 2*, Chapter 6—Domestic Water Heating Systems.

**Actual service conditions (e.g. surge pressures, water quality, installation methods, use patterns, localized stresses) can affect the service life of the PEX. Depending on site conditions, it may be necessary to reduce pressure, reduce temperature, condition the water, or some combination of the above to below the maximum. To ensure optimal operation and performance, it is recommended to add an adequately sized expansion tank to relieve pressure spikes in the system.**

MrPEX POTABLE PEX—a tubing has been third-party tested and achieved the highest chlorine designation code of "5" which means that it meets or exceeds the minimum end use condition of 100% of the time at 140°F (60°C) and 80 psi (0.55 Mpa).

MrPEX POTABLE PEX—a tubing is approved for continuous DHW recirculation. MrPEX Systems® recommends recirculation systems that utilize the minimum duty cycle to meet the demand requirements of the system.

MrPEX Systems® is working with PPI, PPFA, and other industry professionals to develop new test methods, and improve the overall performance of PEX. It is imperative that systems be designed at the lowest possible operating pressure and temperature, installed properly, and never exceed the maximum recirculation recommendations.

For more information, see:

- + Plastics Pipe Institute TN-53, Guide to Chlorine Resistance Ratings of PEX Pipes and Tubing for Potable Water Applications.
- + IAPMO IS 31, Installation Standard for PEX Tubing Systems for Hot- and Cold- water Distribution.
- + MrPEX Systems® Plumbing Installation Guide.

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