

To ensure expected service life of the system, HeatLink requires that systems be designed at the lowest possible operating pressure and temperature, and installed as per all applicable local codes and the HeatLink 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.

The system should be 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*.

Domestic hot water recirculation design parameters:

- o Max. velocity of 2 ft/s (0.6 m/s) through PEX tubing.
- o Max. operating temperature of 140°F (60°C).
- o Max. operating pressure of 80 psig (550 kPa).
- o Max. oxidative reduction potential (ORP) of 825 mV.

PEX Size	Velocity ft/s (m/s)	Flow US gpm (L/min)	Friction Loss @ 120°F psi/ft (kPa/m)
½"	2 (0.6)	1.1 (4.2)	0.0195 (0.4411)
¾"	2 (0.6)	2.2 (8.3)	0.0126 (0.2850)
1"	2 (0.6)	3.6 (13.6)	0.0092 (0.2081)
1¼"	2 (0.6)	5.4 (20.4)	0.0072 (0.1629)
1½"	2 (0.6)	7.5 (28.4)	0.0059 (0.1335)
2"	2 (0.6)	12.9 (48.8)	0.0042 (0.0950)

Actual service conditions (e.g. surge pressures, water quality, installation methods, 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.

HeatLink's PureLink® Plus PEX-a tubing has been third-party tested and meets the minimum end use condition of 100% of the time at 140°F (60°C) and 80 psi (550 kPa), sometimes referred to as continuous recirculation.

HeatLink recommends recirculation systems utilize the minimum duty cycle to meet the demand requirements of the system.

HeatLink 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.

Excerpts from model plumbing codes with respect to water pressure:

International Plumbing Code

604.8 Water pressure-reducing valve or regulator.

Where water pressure within a building exceeds 80 psi (550 kPa) static, an approved water pressure-reducing valve ... shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static.

Uniform Plumbing Code

608.2 Excessive Water Pressure

Where static water pressure in the water supply piping is exceeding 80 psi (552 kPa), an approved-type pressure regulator ... shall be installed and the static pressure reduced to 80 psi (552 kPa) or less.

National Plumbing Code of Canada

2.6.3.3. Static Pressure

1) Where the static pressure at any *fixture* may exceed 550 kPa, a pressure-reducing valve shall be installed to limit the maximum static pressure at the *fixture* to 550 kPa.

For more information, see:

- o Plastics Pipe Institute TN-53, *Guide to Chlorine Resistance Ratings of PEX Pipes and Tubing for Potable Water Applications*.
- o IAPMO IS 31, *Installation Standard for PEX Tubing Systems for Hot- and Cold-water Distribution*.
- o *International Plumbing Code*
- o *International Energy Conservation Code*
- o *Uniform Plumbing Code*
- o *National Plumbing Code of Canada*
- o *National Energy Code of Canada for Buildings*
- o HeatLink L3235, *PEX-a Potable Water Press System Installation Guide*.
- o HeatLink L3240, *F1960 PEX-a Potable Water Expansion System Installation Guide*.