Heat Link®

by MOSACK GROUP

SureLink™ Fire Safety System Installation Guide

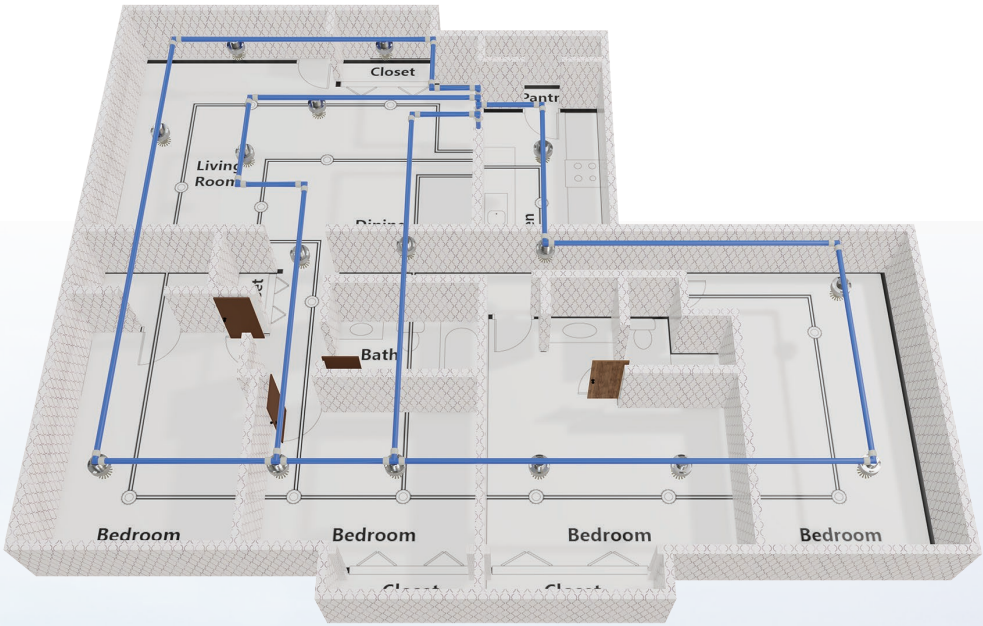


Table of Contents

About Us 3
- About Our Parent Company 3

Introduction 4
- HeatLink® F1960 PEX-a Expansion System Advantages 4

PEX Tubing Ratings 5
- Plastic Pipe Institute (PPI) PEX Tubing Ratings 5

Product Listings 6

Limitations 7
- Limitations on PureLink® PEX Tubing 7
- Limitations on HPP Fittings & Multiport Tees 7
- Limitations on NL Brass Fittings 7
- Important Notice! 7

General Repair and Testing 8
- Kinked Tubing Repair 8
- Pressure Testing 8
- Damaged Tubing Repair 8
- Thawing Frozen Tubing 8

UL 1821 Approved Tubing and Fittings 9
- Equivalent Tubing Lengths 10

SureLink™ Fire Safety System by HeatLink Overview 12

Handling and Storage of HeatLink PEX-a Tubing and Components 12

Installation in Extreme Temperatures 12

Sprinkler Installation 13

Fittings and Adapters for Sprinkler Heads 14

Sprinklers 14
- Minimum Distances from Heat Sources for Residential Sprinklers 15

System Planning 15

PureLink® Installation Guidelines 20
- General Practices 20
- Expansion and Contraction 21
- PEX Tubing Support Requirements 22
- Horizontal Support Requirements 22
- Vertical Support Requirements 25
- Other Support Requirements 25

Expansion Connection Instructions 26
- Fitting Spacing 27
- Cold Weather Connections 28
- Replacing Fittings 28
- Recovering Brass Fittings for Reuse 28

Common Installation Issues 29

PEX Tubing Pressure Drop Graph 30

PEX Tubing Water Volume 30

Testing 31
- Pressure Testing 31
- Flow Testing 31

Troubleshooting 33

Additional Literature 34

About Us

HeatLink is a multi-system supplier of potable water, radiant hydronic heating/cooling and snow melt, and residential fire safety systems that began as a family-owned business servicing a number of industries, including HVAC.

The company grew to meet the needs of builders, contractors, and architects, and began designing and installing radiant heating systems in 1985. Since then HeatLink has grown into an industry leading manufacturer of radiant heating, cooling, and potable water systems for residential and commercial applications throughout the world.

HeatLink's radiant heating systems create a comfortable and energy efficient environment for living, while our snow melt systems create safer public and private spaces that reduce liability for property owners, reduce maintenance, and ensure accessibility. Our well engineered plumbing systems provide peace of mind for property owners through extensive warranty protection, and enable quick and efficient installations for builders and contractors.

HeatLink has developed and manufactured many industry firsts, such as the "TwistSeal" tool-less manifold in 1996. The company began manufacturing PEX-a tubing in 1998, and now supplies the highest quality PEX-a systems to customers throughout North America, and parts of Europe and Asia.

HeatLink works with a network of experienced and successful partner agencies to meet the design, system installation, and training needs of the construction industry, designers, and architects.

HeatLink was built on a strong family work ethic and value system that remains the foundation for our continuing growth and industry leadership role.

About Our Parent Company

On April 24, 1928, American Lubricator and Brass Co. and Sterling & Skinner Manufacturing Co., two established Detroit-based manufacturers of brass valves and fittings, merged and adopted a new name, Consolidated Brass Company.

The company relocated to Charlotte, NC in 1955. It expanded to Pageland, SC in 1968 and to Conway, SC in 1982. The name of the company was changed to Consolidated Valve Industries in 1975 and Conbraco Industries, Inc. on July 28, 1977.

In June 2010, Aalberts Industries, a Dutch global technology company, purchased Conbraco. Over the next 10 years the Mosacks and Aalberts worked together to expand and strengthen the Apollo Valves name.

In 2018, Glenn Mosack broke out on his own and started The Mosack Group, Inc. by acquiring the retail division of Conbraco Industries, Inc. In 2020, The Mosack Group Inc. completed construction on a 126,000 sq. ft. corporate headquarters and warehouse in Mint Hill, NC. The headquarters expanded in 2022 by adding an additional 106,000 sq. ft. of warehouse and manufacturing space. Today, The Mosack Group, Inc. is continually striving to be the premier solution for plumbing system connections.

Introduction

This installation guide is intended to assist plumbing contractors and building officials with the installation of HeatLink® tubing and fittings as it pertains to the SureLink™ Fire Safety System, and includes general guidelines as reference only for the installation and design of a residential sprinkler system.

This installation guide is not a complete listing of standards as required by the NFPA, and the information contained within is superceded by NFPA 13D or other applicable standards, local building and plumbing codes, and third party (sprinkler) manufacturer guidelines.

Please check our website (heatlink.com) to ensure you have the latest version of this guide.

The HeatLink® F1960 PEX-a Potable Water Expansion System features PureLink® Plus PEX-a tubing, high performance polymer (HPP) fittings and multiport tees, no lead fittings, and PEX-a expansion rings. The unique HeatLink® PEX-a process is based on a method developed during the 1970's and uses organic peroxide to chemically cross-link the polyethylene during the manufacturing process. The PEX-a process produces a higher degree and greater uniformity in crosslinking, resulting in product with significantly improved material properties with respect to temperature, pressure, strength and chemical resistance.

PEX expansion technology has been used for decades worldwide in plumbing applications.

HeatLink's superior potable water system carries all necessary approvals for North American installations, and offers significant advantages and benefits when compared to copper, CPVC, and other PEX plumbing systems in use today.

HeatLink® F1960 PEX-a Expansion System Advantages

- Clean and non-toxic
- Flexible - easy installations
- Resists scaling and corrosion
- Fewer fittings
- Quiet - no water hammer noise
- Equalized pressure drops, minimize hot or cold surges
- Can easily be repaired if tubing is kinked
- Durable/long life
- Fast installations
- Labor costs are significantly reduced
- Light weight
- Discreet red/blue identification
- Chlorine resistance
- Freeze and chemical resistance
- Low friction losses
- Domestic Hot Water continuous recirculation approved (see INFO 37)
- Connections can be checked visually
- Can't be dry fit

PEX Tubing Ratings

Plastic Pipe Institute (PPI) PEX Tubing Ratings

PPI TR-3 presents the policies and procedures used to develop recommendations of long-term strength ratings for commercial thermoplastic piping materials or pipe.

The term hydrostatic design basis (HDB) refers to the categorized long-term hydrostatic strength in the circumferential or hoop direction, for a given set of end use conditions, as established by ASTM Test Method D 2837, "*Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials*."

The hydrostatic design stress (HDS) is derived from the HDB and is the recommended maximum hoop stress that can be applied continuously with a high degree of certainty that failure of the pipe will not occur.

Pressure ratings (PR) are calculated from the dimension ratio of the pipe (DR), the material's hydrostatic design basis (HDB), and the overall design factor (DF).

An HDB/HDS recommended rating has been shown, through both scientific procedures and historical experience, to be a useful indicator of the relative long-term strength of a thermoplastic material.

HDB and HDS recommended ratings issued by PPI are for conditions equivalent to those under which the test data were obtained, e.g., constant pressure, temperature and specific test environment.

Under some conditions, such as pressure cycling, higher temperature, more aggressive environment, or handling and installation quality, all of which may significantly reduce pipe durability, a more conservative design factor or design coefficient should be chosen.

PureLink® Plus PEX-a tubing is listed with a standard grade rating in PPI TR-4 as tested in accordance with PPI TR-3. PureLink Plus tubing carries the temperature and pressure ratings shown in the table below.

Temperature	PPI - Hydrostatic Design Basis	PPI - Hydrostatic Design Stress	Pressure Rating
73.4°F / 23°C	1,250 psi / 8620 kPa	630 psi / 4340 kPa	160 psi / 1100 kPa
120ºF / 48.9ºC	1030 psi / 7100 kPa	515 psi / 3550 kPa	130 psi / 890 kPa
180°F / 82.2°C	800 psi/ 5520 kPa	400 psi / 2760 kPa	100 psi / 690 kPa
200°F / 93.3°C	630 psi / 4340 kPa	315 psi / 2170 kPa	80 psi / 550 kPa

The use of PEX tubing in a potable hot-water plumbing system with an operating temperature above 140°F (60°C) or system pressure above 80 psig (550 kPaG) or highly aggressive water quality or any combination thereof can significantly reduce the service life of the tubing.

HeatLink requires following the guidelines described in Plastics Pipe Institute TN-53, *Guide to Chlorine Resistance Ratings of PEX Pipes and Tubing for Potable Water Applications* and HeatLink INFO 37, *Domestic Hot Water Recirculation Systems*.

Systems that do not have a fire department connection are designed to have a working pressure of 130 psi (8.9 bar) at a temperature of 120ºF (49ºC).

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.

Product Listings

It is the sole responsibility of the installer to verify that the product and installation meets local standards.

PureLink® Plus PEX-a tubing is approved for use with fittings that are compliant with ASTM F1807/F1960/F2080/F2098/F2159 standards. When using HeatLink tubing with fittings from other manufacturers, ensure to follow all applicable installation requirements and instructions, as well as local building codes to ensure proper connections are made.

Refer to individual product submittals for the latest information.

Product Line	Standards		Listings
PureLink® Plus PEX-a tubing	ANSI/UL 263 ASTM F876 ASTM F877 ASTM F1807 ASTM F1960 ASTM F2023 ASTM F2080 ASTM F2098 ASTM F2159	ASTM F2657 ASTM E84 CAN/ULC S101 CAN/ULC S102.2 CSA B137.5 NSF/ANSI-14 NSF/ANSI-61 and Annex G NSF/ANSI-372 ANSI/CAN/UL 1821†	cNSFus-pw-G ICC-ES PMG 1087 IAPMO UPC PPI TR-4 CSA B137.5 Potable NSF-fs (½" & ¾") cQAlus P371 UL/ULC
HeatLink® expansion rings	ASTM E84 ASTM F1960 ASTM F877 CSA B137.5 NSF/ANSI 14 ULC S102.2 ANSI/CAN/UL 1821		ICC-ES PMG 1087 NSF-pw cQAlus P371
HeatLink® F1960 no lead brass fittings	ASTM E84 ASTM F877 ASTM F1960 CSA B137.5 NSF/ANSI 14 NSF/ANSI 61 and Annex G NSF/ANSI 372 ULC S102.2 ANSI/CAN/UL 1821*		ICC-ES PMG 1087 cNSFus-pw cQAlus P371 U.P. Code
HeatLink® F1960 high performance polymer (HPP) fittings	ASTM E84 ASTM F1960 ASTM F877 CSA B137.5 NSF/ANSI 14 NSF/ANSI 61 and Annex G NSF/ANSI 372 ULC S102.2 ANSI/CAN/UL 1821*		ICC-ES PMG 1087 cNSFus-pw cQAlus P371 U.P. Code
HeatLink® F1960 HPP Multiport Tees	ASTM E84 ASTM F1960 ASTM F877 CSA B137.5 NSF/ANSI 14 NSF/ANSI 61 and Annex G NSF/ANSI 372 ULC S102.2 ANSI/CAN/UL 1821*		ICC-ES PMG 1087 cNSFus-pw cQAlus P371 U.P. Code

†*Excluding ½" tubing*
**Not applicable to all fittings. See page 9 for UL1821 approved fittings list.*

Limitations

Limitations on PureLink® PEX Tubing

- **Do Not** expose to open flame.
- **Do Not** permanently expose to UV light.
- **Do Not** use glue, or any material that affects the basic properties of crosslinked polyethylene.
- **Do Not** use above ratings.
- **Do Not** install within 6" (15 cm) of any gas appliance vent piping, or within 12" (30 cm) of any recessed light fixtures. See exceptions on page 20.
- **Do Not** solder pipe connections within 16" (40 cm) of any PureLink® tubing in the same water line.
- **Do Not** allow to come into contact with spray foam. (Ensure PEX is sleeved, or use Pipe-in-Pipe tubing, and fittings are wrapped.)
- **Do Not** allow contact with low molecular weight petroleum products such as fuels or solvents or oil based paints.
- **Cannot Be** used for LP or Natural Gas.
- **Cannot Be** used for an electrical ground.
- **Do Not** allow contact with termiticides or pesticides.
- **Do Not** install below fluorescent lights, unless protected.
- **Do Not** install in contaminated soil.
- **Do Not** allow pests, insects, or rodents to come in contact with PEX tubing.
- **Do Not** install in contaminated environments.

Limitations on HPP Fittings & Multiport Tees

- **Do Not** expose to open flame.
- **Do Not** use above ratings.
- **Do Not** reuse fittings.
- **Do Not** expose to excessive stress due to PEX expansion/contraction or bending force.
- **Do not** solder pipe connections within 16" (40 cm) of any HPP fitting or multiport tee in the same water line.
- **Do Not** allow contact with solder flux, pipe dope, PVC glue, strong acids, strong bases, oil based paints, solvents, or spray foams. See also INFO 24 - Material Properties of Polysulfone (L2324). Use only Teflon Tape for threaded fittings.
- **Do Not** allow contact with termiticides or pesticides.
- **Do Not** install in contaminated environments.

Limitations on NL Brass Fittings

- **Do Not** install in corrosive environments (for more information consult the Copper Development Association).

Important Notice!

HeatLink products are intended for installation by a licensed plumbing contractor. It is the sole responsibility of the installer to verify that the product meets local codes and standards.

Like most plastic material, crosslinked polyethylene is subject to ultraviolet (UV) deterioration and must not be continuously exposed to direct or indirect sunlight, or fluorescent lights, beyond the stated limits. Storage outside is not recommended.

To ensure system integrity and warranty remain intact do not expose PEX or fittings to unknown/untested chemicals.

General Repair and Testing

Kinked Tubing Repair

One of the most important features of PureLink® PEX-a crosslinked tubing is its shape memory. As such, a kinked area can be repaired using the following procedure:

- Release system pressure.
- Straighten portion of tubing being repaired (do not squeeze with pliers).
- Using a heat gun, heat area to approximately 260°F (125°C), or until tubing appears clear. (**Do Not Use an Open Flame**.)
- Let the tubing cool undisturbed at room temperature.
- Repair is now complete.

Pressure Testing

- Once the plumbing rough-in is complete, it must be pressure tested. HeatLink® ½", ¾", 1", 1¼", 1½", and 2" plugs are available.
- An appropriate test kit must be connected to the system including a pressure gauge for monitoring.
- Test requirements specified in your local building and plumbing codes must always be followed.
- Cold water or air may be used for testing. (If allowed by local codes)
  Note: Be aware of how temperature can affect air tests. Rising air temperature increases pressure, falling air temperature decreases pressure.
- Test to at least 50 psi above operating pressure, up to 120 psi.
- HeatLink recommends a test duration of 24 hours.
- When using leak detection solutions, ensure they are approved for use with PEX and HPP fittings.

Damaged Tubing Repair

If the PEX tubing is notched or cut, the damaged section must be replaced using the following procedure:

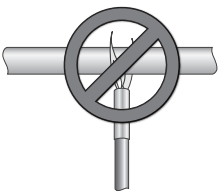
- Release system pressure.
- Cut out the damaged section, ensuring the cuts are square.
- Use an appropriate sized coupling assembly to reconnect the ends.
- Repairs in concrete require the fitting assembly to be wrapped with heat or cold shrink tube to protect assembly from concrete; HPP couplings are recommended for concrete repairs.
- HeatLink NL brass fittings, HPP fittings, and PEX-a expansion rings are suitable for direct, unprotected burial in clean, non corrosive environments (e.g. soil).
- Repair is now complete.

Thawing Frozen Tubing

PureLink® PEX-a tubing can withstand freeze-thaw cycles better than most other products available for plumbing today. While not freeze proof, PureLink® tubing is resistant to freeze damage.

Should tubing become blocked due to freezing, HeatLink recommends thawing by using hot water, hot towels or gently heating with a heat gun.

Do Not Use an Open Flame!



UL 1821 Approved Tubing and Fittings

Tubing

Part #	Description
20000 series	¾" - 2" PEX-a Tubing, natural color w/blue printing
20000BW series	¾" - 2" PEX-a Tubing, blue wall
21000 series	¾" - 2" PEX-a Tubing, natural color w/red printing
21000RW series	¾" - 2" PEX-a Tubing, red wall

Adapters

Part #	Description
EX27125NL	¾" PEX F1960 × ½" M/Sweat No Lead Brass Adapter
EX27225NL	¾" PEX F1960 × ½" F/Sweat No Lead Brass Adapter
EX27525NL	¾" PEX F1960 × ½" MNPT No Lead Brass Adapter

Expansion Rings

Part #	Description
EX24205	½" PEX F1960 Expansion Ring
EX24222	¾" PEX F1960 Expansion Ring
EX24228	1" PEX F1960 Expansion Ring
EX24235	1¼" PEX F1960 Expansion Ring
EX24241	1½" PEX F1960 Expansion Ring
EX24250	2" PEX F1960 Expansion Ring

Plugs

Part #	Description
EX15022	¾" PEX F1960 HPP Plug
EX15028	1" PEX F1960 HPP Plug
EX15035	1¼" PEX F1960 HPP Plug
EX15041	1½" PEX F1960 HPP Plug
EX15054	2" PEX F1960 HPP Plug

Couplings

Part #	Description
EX19225	¾" × ½" PEX F1960 HPP Coupling

Tees

Part #	Description
EX16225	¾" × ¾" × ½" PEX F1960 HPP Tee
EX16252	¾" × ½" × ¾" PEX F1960 HPP Tee
EX16255	¾" × ½" × ½" PEX F1960 HPP Tee
EX16335	1¼" × 1¼" × ½" PEX F1960 HPP Tee
EX16445	1½" × 1½" × ½" PEX F1960 HPP Tee
EX16552	½" × ½" × ¾" PEX F1960 HPP Tee
EX16665	2" × 2" × ½" PEX F1960 HPP Tee
EX16885	1" × 1" × ½" PEX F1960 HPP Tee

Equivalent Tubing Lengths

Elbows

Part #	Description	Equivalent Length (ft)
EX18022	¾" × ¾" PEX F1960 HPP Elbow	6.75
EX18028	1" × 1" PEX F1960 HPP Elbow	7.86
EX18035	1¼" × 1¼" PEX F1960 HPP Elbow	9.16
EX18041	1½" × 1½" PEX F1960 HPP Elbow	11.87
EX18054	2" × 2" PEX F1960 HPP Elbow	11.98

Tees

Part #	Description	Equivalent Length (ft)	
		Through	Branch
EX16222	¾" × ¾" × ¾" PEX F1960 HPP Tee	1.80	6.60
EX16332	1¼" × 1¼" × ¾" PEX F1960 HPP Tee	2.72	3.38
EX16333	1¼" × 1¼" × 1¼" PEX F1960 HPP Tee	2.67	8.69
EX16338	1¼" × 1¼" × 1" PEX F1960 HPP Tee	3.02	7.21
EX16382	1¼" × 1" × ¾" PEX F1960 HPP Tee	4.98	3.35
EX16388	1¼" × 1" × 1" PEX F1960 HPP Tee	1.17	8.24
EX16432	1½" × 1¼" × ¾" PEX F1960 HPP Tee	4.87	7.76
EX16433	1½" × 1¼" × 1¼" PEX F1960 HPP Tee	6.25	11.50
EX16438	1½" × 1¼" × 1" PEX F1960 HPP Tee	6.18	9.20
EX16442	1½" × 1½" × ¾" PEX F1960 HPP Tee	2.18	8.59
EX16443	1½" × 1½" × 1¼" PEX F1960 HPP Tee	1.81	9.29
EX16444	1½" × 1½" × 1½" PEX F1960 HPP Tee	2.38	11.76
EX16448	1½" × 1½" × 1" PEX F1960 HPP Tee	2.77	7.50
EX16488	1½" × 1" × 1" PEX F1960 HPP Tee	4.87	7.78
EX16642	2" × 1½" × ¾" PEX F1960 HPP Tee	8.46	7.57
EX16643	2" × 1½" × 1¼" PEX F1960 HPP Tee	5.81	10.33
EX16644	2" × 1½" × 1½" PEX F1960 HPP Tee	6.03	10.59
EX16648	2" × 1½" × 1" PEX F1960 HPP Tee	5.44	6.52
EX16662	2" × 2" × ¾" PEX F1960 HPP Tee	1.17	7.58
EX16663	2" × 2" × 1¼" PEX F1960 HPP Tee	1.75	10.42
EX16664	2" × 2" × 1½" PEX F1960 HPP Tee	1.84	10.60
EX16666	2" × 2" × 2" PEX F1960 HPP Tee	2.99	12.44
EX16668	2" × 2" × 1" PEX F1960 HPP Tee	2.71	8.02
EX16828	1" × ¾" × 1" PEX F1960 HPP Tee	3.77	7.69
EX16822	1" × ¾" × ¾" PEX F1960 HPP Tee	3.77	6.80
EX16882	1" × 1" × ¾" PEX F1960 HPP Tee	1.27	6.71
EX16888	1" × 1" × 1" PEX F1960 HPP Tee	3.57	7.86

Couplings

Part #	Description	Equivalent Length (ft)
EX19022	¾" × ¾" PEX F1960 HPP Coupling	1.75
EX19028	1" × 1" PEX F1960 HPP Coupling	3.61
EX19035	1¼" × 1¼" PEX F1960 HPP Coupling	2.60
EX19041	1½" × 1½" PEX F1960 HPP Coupling	3.10
EX19054	2" × 2" PEX F1960 HPP Coupling	1.19
EX19238	1¼" × 1" PEX F1960 HPP Coupling	3.21
EX19243	1½" × 1¼" PEX F1960 HPP Coupling	5.61
EX19248	1½" × 1" PEX F1960 HPP Coupling	5.00
EX19264	2" × 1½" PEX F1960 HPP Coupling	5.38
EX19282	1" × ¾" PEX F1960 HPP Coupling	3.45

Adapters

Part #	Description	Equivalent Length (ft)
EX27122NL	¾" PEX F1960 × ¾" M/Sweat No Lead Brass Adapter	5.02
EX27128NL	1" PEX F1960 × 1" M/Sweat No Lead Brass Adapter	3.43
EX27135NL	1¼" PEX F1960 × 1¼" M/Sweat No Lead Brass Adapter	4.40
EX27141NL	1½" PEX F1960 × 1½" M/Sweat No Lead Brass Adapter	4.29
EX27154NL	2" PEX F1960 × 2" M/Sweat No Lead Brass Adapter	4.78
EX27222NL	¾" PEX F1960 × ¾" F/Sweat No Lead Brass Adapter	4.98
EX27228NL	1" PEX F1960 × 1" F/Sweat No Lead Brass Adapter	3.04
EX27235NL	1¼" PEX F1960 × 1¼" F/Sweat No Lead Brass Adapter	4.44
EX27241NL	1½" PEX F1960 × 1½" F/Sweat No Lead Brass Adapter	4.11
EX27254NL	2" PEX F1960 × 2" F/Sweat No Lead Brass Adapter	5.34
EX27522NL	¾" PEX F1960 × ¾" MNPT No Lead Brass Adapter	5.03
EX27528NL	1" PEX F1960 × 1" MNPT No Lead Brass Adapter	3.65
EX27535NL	1¼" PEX F1960 × 1¼" MNPT No Lead Brass Adapter	7.53
EX27541NL	1½" PEX F1960 × 1½" MNPT No Lead Brass Adapter	6.74
EX27554NL	2" PEX F1960 × 2" MNPT No Lead Brass Adapter	1.17
EX27622NL	¾" PEX F1960 × ¾" FNPT No Lead Brass Adapter	3.77
EX27628NL	1" PEX F1960 × 1" FNPT No Lead Brass Adapter	3.57
EX27635NL	1¼" PEX F1960 × 1¼" FNPT No Lead Brass Adapter	7.63
EX27641NL	1½" PEX F1960 × 1½" FNPT No Lead Brass Adapter	6.63

SureLink™ Fire Safety System by HeatLink Overview

The SureLink™ Fire Safety System is a means to save lives, and when properly installed according to an approved design, provides time for occupants to exit the area affected by the fire.

It utilizes PureLink PEX-a tubing and F1960 expansion connections, and can be installed in combination with the HeatLink Potable system to provide reliable and cost efficient residential fire protection. Multiple system layouts are available. See "Piping Configurations" on page 18 for details.

Installation of the SureLink Fire Safety System must meet or exceed the following requirements:

- NFPA 13D standard for the installation of Sprinkler Systems in One and Two-Family Dwellings and Manufactured Homes
- Installed sprinklers must be UL1821 approved
- National Building Code of Canada (as applicable)
- Other recognized or adopted installation requirements as per the Authority Having Jurisdiction

Handling and Storage of HeatLink PEX-a Tubing and Components

To ensure the reliable operation and listing requirements of the SureLink™ Fire Protection System, potable water system, and all HeatLink components, the following storage and handling rules should be followed:

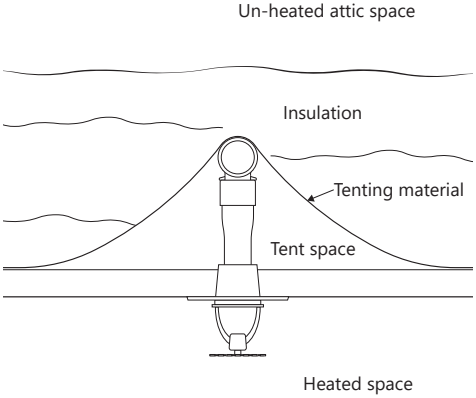
- Adhere to all manufacturer installation instructions as laid out in this or any appopriate guide. (see INFO 5 for PEX-a and fitting storage guidelines).
- Do not store sprinklers or cover plates in areas that may exceed 100°F (37.8°C).
- Do not use PEX-a tubing in applications that exceed the ratings as stated on page 5 of this guide.

Installation in Extreme Temperatures

HeatLink PEX-a tubing is able to be installed in cold and hot weather conditons, but precautions should be taken to ensure the tubing does not freeze during installation, as this may impact the installation process.

Follow the below minimum guidelines to protect the tubing:

- Install inside the insulation envelope of the structure, especially in areas that are prone to freezing weather.
- When installing in attics, tenting should be installed to keep insulation above tubing.
- Additional layers of insulation



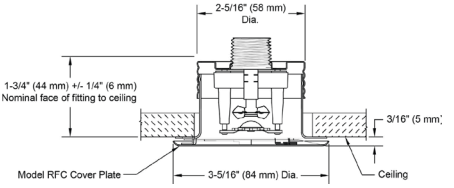
Sprinkler Installation

Sprinklers must be installed in compliance with NFPA 13D standards as well as any requirements of the local authority having jurisdiction. Always refer to the manufacturer's documentation for precise instructions on installation, maintenance, and care of sprinklers and sprinkler heads.

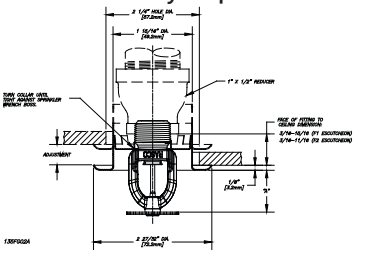
Installation examples - Dimensions shown are for typical wall and ceiling construction, and may not apply. Consult sprinkler system plans, construction drawings, and design documents.
See sprinkler manufacturer documents for detailed installation instructions.

1. Use a PTFE based thread sealant on sprinkler head threads.
   Note: Leak-stop additives are not approved for use in fire sprinkler systems.
2. Leave protective caps on all sprinklers until construction is completed. If protective covers are required to be temporarily removed during installation ensure they are replaced after installation is complete and for the remainder of construction.
3. Install concealed cover plates only after construction is completed.

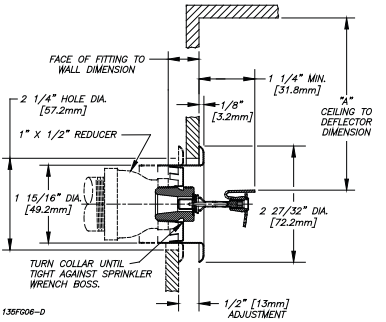
Flat Concealed Pendant-style Sprinkler Head



Recessed Pendant-style Sprinkler Head



Horizontal Sidewall-style Sprinkler Head



Fittings and Adapters for Sprinkler Heads

The SureLink Fire Safety System uses third-party ½" sprinkler adapter fittings, or approved F1960 sprinkler heads.

Sprinklers

Automatic sprinklers are heat-activated fire suppression devices that are triggered by being exposed to the thermal rating or above, allowing water to be discharged by the sprinkler head over the coverage area. Residential fire sprinklers are designed as a means to save lives by providing time for occupants to exit the area affected by the fire.

HeatLink requires using only listed residential fire sprinklers with either an ordinary or intermediate temperature rating.

Max Ceiling Temperature		Temperature Rating		Temperature Classification	Color Code	Glass Bulb Colors
°F	°C	°F	°C			
100	38	135-170	57-77	Ordinary	Uncolored or Black	Red or Orange
150	66	175-225	79-107	Intermediate	White	Yellow or Green

Installation of the sprinklers and cover plates must follow the manufacturer instructions and guidelines.

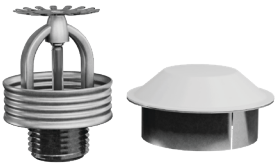
NOTE: Nothing in this manual supersedes local or national code requirements, or the manufacturer recommendations regarding their components.

There are four types of recommended residential sprinkler heads:

- **Flush Concealed** – These sprinkler heads have a cover plate that sits flush with the ceiling. The cover will detach and fall away once it reaches the operating temperature during a fire.



- **Domed concealed/Concealed recessed** – These sprinkler heads have a cover that protrudes below the ceiling. The cover will detach and fall away once it reaches the operating temperature during a fire.



- **Recessed –** These sprinklers have no cover plate and remain visible after installation.



- **Horizontal Sidewall** – These sprinklers have no cover and remain visible after installation in the wall.
- **Concealed Sidewall** – These sprinklers have a cover that sits flush with the wall. he cover will detach and fall away once it reaches the operating temperature during a fire



** Artist renderings for reference only.*

See the sprinkler head manufacturer literature for temperature ratings, installation instructions, and additional technical information.

Minimum Distances from Heat Sources for Residential Sprinklers

Heat Source	From Edge of Source to Ordinary Temperature Sprinkler in. (mm)	From Edge of Source to Intermediate Temperature Sprinkler in. (mm)
Side of open or recessed fireplace	36 (900)	12 (300)
Front of recessed fireplace	60 (1500)	36 (900)
Coal or wood-burning stove	42 (1050)	12 (300)
Kitchen range	18 (450)	9 (225)
Wall oven	18 (450)	9 (225)
Hot air flues	18 (450)	9 (225)
Uninsulated heating ducts	18 (450)	9 (225)
Uninsulated hot water pipes	12 (300)	6 (150)
Side of ceiling or wall-mounted hot air diffusers	24 (600)	12 (300)
Front of wall-mounted diffusers	36 (900)	18 (450)
Hot water heater or furnace	6 (150)	3 (75)
Light Fixtures:		
0 W - 250 W	6 (150)	3 (75)
250 W - 499 W	12 (300)	6 (150)

System Planning

The overall system layout and calculations, including the sprinkler locations, piping layout, and hydraulic flow/pressure demand, must be submitted to and approved by the authority having jurisdiction (AHJ), and must conform to NFPA 13D/IRC P2904/UL 1821/ASTM F876 standards. Any deviation from the approved sprinkler plan requires permission from local authorities.

The fire safety system must be appropriately sized, using the minimum acceptable PEX tubing size of ¾" for all system flow and pressure requirements.

Use the following steps to help plan the critical points of your SureLink Fire Safety System design:

Identify Local Jurisdiction Requirements

The first step when starting a sprinkler system design is to determine the local requirements as set forth by the AHJ, including the sprinkler installation standards, plumbing codes, and licensing for sprinkler system installers.

Fire sprinkler plans for residential systems are reviewed by the local AHJ and therefore must be designed and installed by qualified persons familiar with local requirements.

Obtain Residence Characteristics

Next, identify the residence characteristics to ensure it can be protected by a residential sprinkler system under the NFPA 13D standards. Typically this includes one and two-family dwellings, manufactured homes, and townhouses. Additional local building codes may apply.

The individual construction characteristics of the dwelling must be identified. This includes the full layout of the home, room sizes, ceiling heights (type, pitch, and/or slope), architectural ceiling elements (soffit, vault, cove, etc.), crawl spaces and basements, garages, attics, and individual levels.

Identify the Water Supply Source

The NFPA 13D standard requires every piping system to have at least one automatic water supply. **Qualifying sources are identified in NFPA 13D, chapter 6.**

Once the type of water supply has been identified, the available flow in GPM and supply pressure in psi must be determined. This information can be obtained by contacting the local waterworks authority, or can be measured at a nearby hydrant. When determining the system supply pressure, minimum pressure conditions must be considered for periods of heavy use. Accurate assessment of the available flow and pressure is critical for proper design and layout of the sprinkler system as hydraulic calculations are required to determine the exact requirements for each system.

Water Supply Layout

Determine the layout of the water service supply to the residence, and sizing according to standard practices as per local code. This should include the typical pressure losses during maximum flow demand of both the plumbing and fire safety systems.

Standard sizing practices includes pressure drop caused by any elevation differences, and shall include the following considerations affecting pressure.

Shut-off Valves

As per the NFPA a single control valve in the main service line is required to shut off both the sprinkler and plumbing systems. Separate valves may be used so long as the sprinkler valve is locked in the open position, or is observed by a monitoring system.

An affixed sign must be adjacent to the main shut off valve, stating the following:

WARNING

The water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut-off the eater to the fire sprinkler system, such as water softeners, filtration systems and automatic shutoff valves shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist.

DO NOT REMOVE THIS SIGN

Water Meters

Pressure and flow limitations through the water meter must be taken into consideration during design and installation, as excluding them could result in poor or improper system operation.

The designer/installer is responsible for verifying that the pressure loss and flow rate are within acceptable limits, and that the maximum flow rate as recommended by the water meter manufacturer is not exceeded.

Pressure Reducing Valves

For systems with a supply pressure exceeding 80psi (6 bar) a pressure reducing valve (PRV) is required to limit the pressure to a maximum of 80psi (6 bar). When using a PRV it is the responsibility of the designer/installer to account for any pressure losses through the PRV.

If a PRV is used on a stand-alone sprinkler system, and automatic pressure relief valve should also be installed on the sprinkler side.

Backflow Requirements

Backflow prevention devices are not typically required for multipurpose and other non-stagnant fire and potable systems. Check local code for any backflow requirements that may be applicable in your area. Backflow prevention may be required in standalone systems. If required, pressure loss through the device must be included in the system calculations.

Water Softeners and Flow Restricting Devices

The installer is responsible for determining if the presence of a water softener, filtration system, automatic shut-off valves, or other flow restricting devices will affect the pressure loss or restrict flow in the water supply, and to ensure that these changes are reflected in the system design. NFPA 13D 6.5.3

Smoke Detectors and Water Flow Alarms

Under the NFPA 13D standard a waterflow alarm is not required when the dwelling has smoke detectors througout the unit. The smoke detectors must be installed in accordance with NFPA 72 National Fire Alarm and Signaling Code.

Sprinkler Requirements

HeatLink does not currently offer sprinklers, so installers may source any brand which meets code requirements according to preference.

Performance requirements for sprinkler heads define water flow, operating pressure, and coverage area, which typically ranges from 12 x 12 ft (3.7m x 3.7m) to 20 x 20 ft (6m x 6m), at 13 to 15 gpm with a 7 to 9 psi operating pressure.

The NFPA 13D standard, local code, and the listing of the sprinkler manufacturer will define proper spacing for the sprinklers. The minimum distance between sprinklers prevents spray from one head hitting the other, and interfering with the proper operation of the sprinkler heads. Do not exceed the maximum spacing.

Ensure proper clearance of sprinkler heads from ceiling fans, lights, duct work, registers, fireplaces, etc.

Design Piping System Layout

The SureLink Fire Safety System by HeatLink is approved only for wet pipe system layouts, including:

- **Multipurpose –** intended to serve both domestic water needs and fire safety system needs from one common piping system throughout the residence. See page 19 for configuration types and diagrams.
- **Passive purge** – Serves a single toilet in addition to the fire safety system.
- **Stand alone** – The above ground piping serves only the fire safety system.

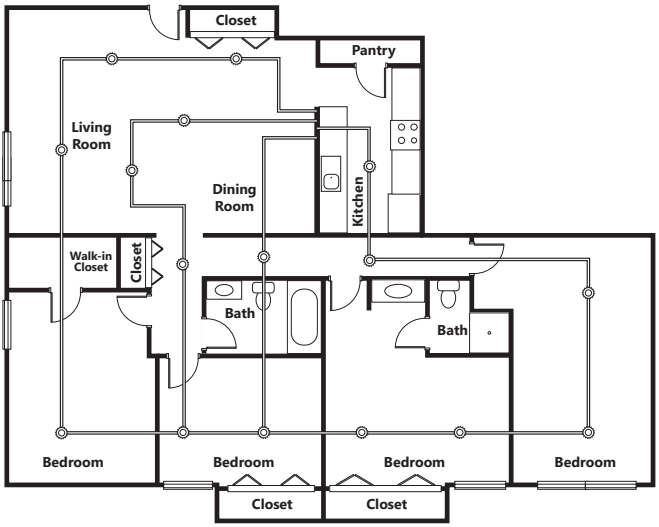
Consult with the local authority having jurisdiction for system layout acceptability and restrictions when using PEX tubing.

Piping Configurations

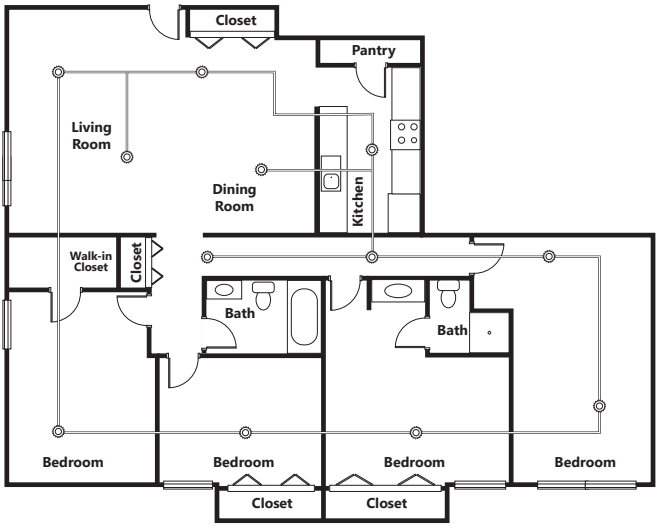
The NFPA 13D standard allows for three types of multipurpose fire safety system configurations to be used in residential applications:

Examples only. Drawings are only to show the general layout types, and should not be used as official designs, or for installation purposes. Consult a certified fire safety system designer.

Gridded – This system features multiple branch lines, with an activated sprinkler receiving water from both sides, while other branch lines help to transfer the water. The complex design precludes it from being used often.



Looped – Multiple cross mains are connected, but the branch lines are not. This method improves the hydraulic characteristics of the system as it provides additional water paths through the main piping.



Straight Run – Also referred to as a tree-type system, each sprinkler head is served by only one water flow path. This method is most commonly used for stand alone systems, though due to its inefficiency it can require larger supply lines.



Domestic Cold Water Plumbing System Connections

HeatLink F1960 Expansion Connections can be installed in the main sprinkler tubing lines for multipurpose piping systems as defined by NFPA 13D.

Hydraulic Calculation Requirements

Hydraulic calculations must be performed to veryify the system is sized accurately to ensure proper sprinkler head operation. NFPA 13D establishes the required design criteria. Local codes and standards as per the AHJ must be followed in addition to the NFPA standards. The system design, calculations, and installation of the system must be carried out by appropriately trained persons.

Modifications to the piping system may be made if adequate flow and pressure are not shown to be available as per the calculations. Consult with the AHJ for available modifications and solutions.

AHJ Approval

After the sprinkler system design and calculations are complete final approval from the local Authority Having Jurisdiction must be obtained before installation of the system.

PureLink® Installation Guidelines

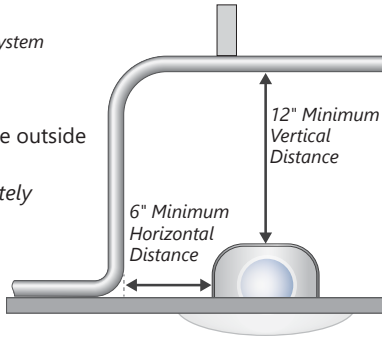
For full guidelines see L3240 PEX-a Potable Water Press System Installation Guide

General Practices

- The minimum bend radius for PEX is 6 times the outside diameter.

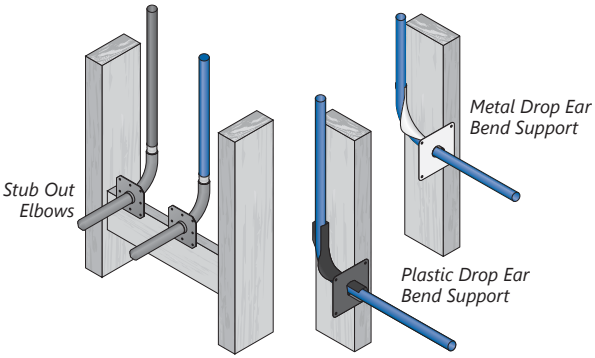
  For example: 0.625 in. x 6 = 3.75 in. (approximately 95mm) bend radius for ½" PEX

- Install PureLink® PEX at least 12" vertically, or 6" horizontally away from heat sources such as recessed light fixtures, or gas appliance vent piping.

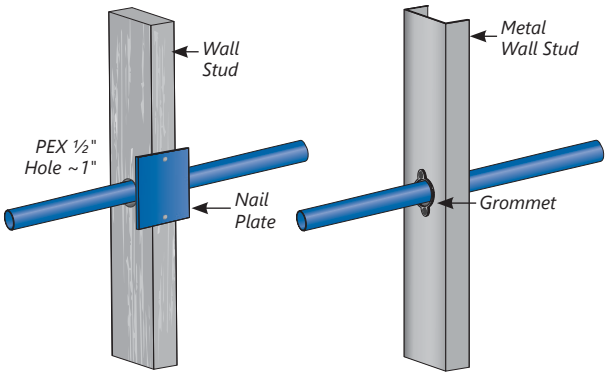


- For UL1598 approved Type IC thermally protected luminaires, clearance can be reduced to 1". Ensure the luminaire is fully enclosed so that no UV emissions reach the PEX.

- When installing HPP threaded fittings use only Teflon tape - Do Not use other sealants. Do Not Overtighten!
- Use bend supports for 90° turns. Use drop ear bend supports or copper stub-outs for 90° turns when exiting walls.



- When installing PEX tubing through wall studs and floor joists be sure drill holes at least ½" (13 mm) larger than the PEX to ensure free movement of the tubing.
- Use protective sleeves or grommets when penetrating a hollow masonry wall or metal studs.
- Protect the tubing with a nail plate if it is within 2" (5 cm) of the edges of a stud, plate, or nailing surface.



- Tubing bundles must be protected by heavy gauge protective sheathing at the area of abrasion.
- If PureLink® PEX is notched or cut, the damaged section must be cut out.
- HeatLink approves the burial of PureLink® Plus PEX-a tubing in concrete. Use of Pipe-in-Pipe (pre-sleeved tubing) is strongly recommended.
- HeatLink recommends continuous length tubing (no fittings) when installing PureLink® PEX tubing in or under a slab. Use of Pipe-in-Pipe (pre-sleeved tubing) is strongly recommended.
- When entering or exiting a concrete slab the PEX tubing should always be protected by a conduit elbow (86000 series) or a tubing sleeve.
- HeatLink NL fittings are suitable for direct, unprotected burial in clean, non corrosive environments.
- The use of hard binding wires or tape for tying PEX tubing to rebar or wire mesh is not allowable, only soft breakable wire ties or plastic tie-straps should be used.

Expansion and Contraction

(For further details see L3240)

- The design and installation of every piping system shall include means to accommodate its expansion and contraction caused by temperature changes, movement of the soil, building shrinkage or structural settlement.
- Small dimension expansion can generally be accommodated with slack and expansion loops.

PEX Tubing Support Requirements

HeatLink PEX-a tubing can be supported using the same methods as metallic pipe. HeatLink recommends using copper tube size (CTS) hangers and supports designed for use with plastic pipe, e.g., plastic, coated, rubber, or foam lined, etc. Supports shall not compress, cut or abrade the tubing. Guides should be installed to allow the free movement of the tubing.

Firestop systems generally require tubing to be rigidly supported on both sides of floor or wall assembly. Refer to the applicable firestop design.

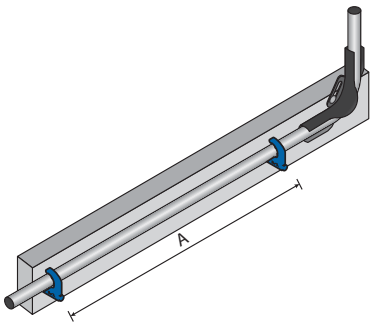
Pipe support manufacturers include, but are not limited to:

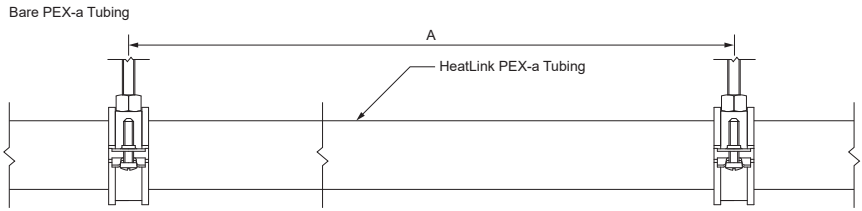
- Eaton B-Line
- HoldRite, Inc.
- Hydra-Zorb Corp.
- Pentair (Erico) CADDY
- Walraven, Inc.

Horizontal Support Requirements

Nominal PEX-a Size	Max. Support Spacing (A)			Max. Support Spacing with PEX Supports (B)
	International Plumbing Code	Uniform Plumbing Code	National Plumbing Code of Canada	
½"	32" (0.8 m)	32" (0.8 m)	0.8 m (32")	5 ft (1.5 m)
¾"	32" (0.8 m)	32" (0.8 m)	0.8 m (32")	5 ft (1.5 m)
1"	32" (0.8 m)	32" (0.8 m)	0.8 m (32")	6 ft (1.8 m)
1¼"	48" (1.2 m)	48" (1.2 m)	0.8 m (32")	7 ft (2.1 m)
1½"	48" (1.2 m)	48" (1.2 m)	0.8 m (32")	8 ft (2.4 m)
2"	48" (1.2 m)	48" (1.2 m)	0.8 m (32")	8 ft (2.4 m)

- Horizontal runs should be supported by guides as per the table above.

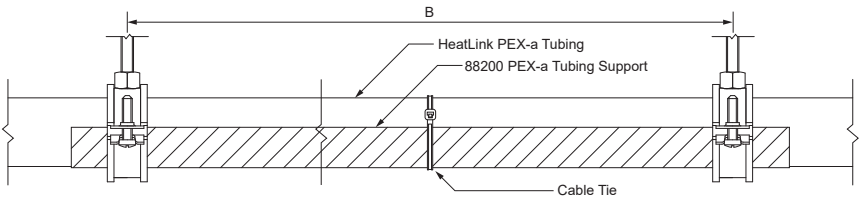




88200 Series PEX-a Tubing Support Requirements

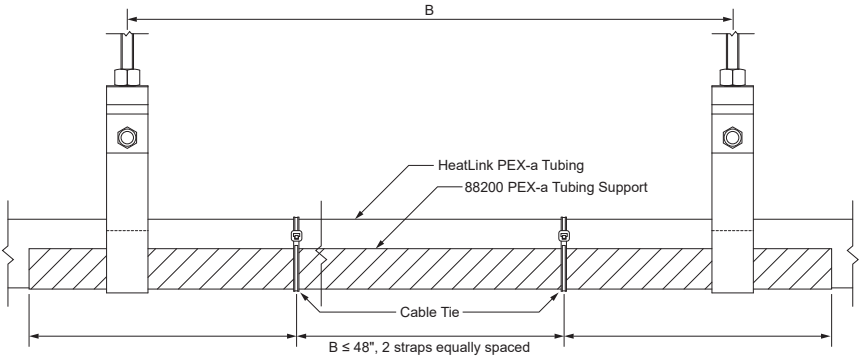
HeatLink® 88200 PEX-a tubing supports are self-gripping galvanized steel, and are ideal for all commercial potable and hydronic installations, maintaining alignment of tubing in *suspended applications*. The supports control the direction of expansion and prevent snaking, while allowing for more space between hanger placements.

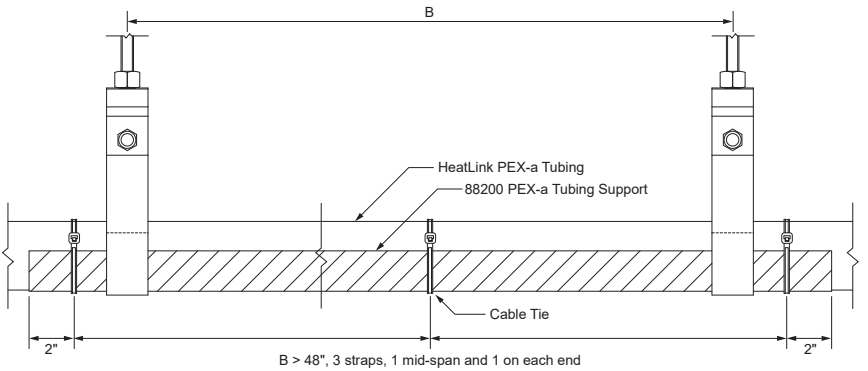
PEX Support with Clamps



If the distance between clamps (B) is greater than 48" inches, the PEX Support must be strapped mid-span to the PEX-a tubing with a cable tie or other strap suitable for use with PEX.

PEX Support with Hangers - Clevis or Loop style

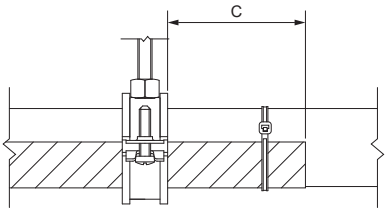




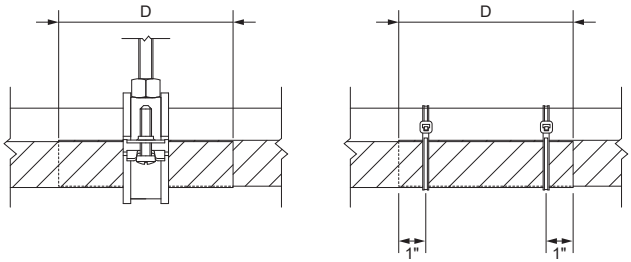
Overlap, cantilever, and minimum distance guidelines for hanger placement and tie straps on HeatLink® 88200 PEX-a tubing supports.

Nominal PEX-a Size	Max. Cantilever (C)	Min. Overlap (D)	Min. Overhang (E)	Min. Distance to Fitting (F)
½"	18" (0.5 m)	6" (0.15 m)	1" (25 mm)	1 ¼" (30 mm)
¾"	18" (0.5 m)	6" (0.15 m)	1" (25 mm)	1 ¾" (45 mm)
1"	18" (0.5 m)	6" (0.15 m)	1" (25 mm)	2 ¼" (60 mm)
1 ¼"	18" (0.5 m)	6" (0.15 m)	1" (25 mm)	2 ¾" (70 mm)
1 ½"	18" (0.5 m)	6" (0.15 m)	1" (25 mm)	3" (75 mm)
2"	18" (0.5 m)	6" (0.15 m)	1" (25 mm)	4" (100 mm)

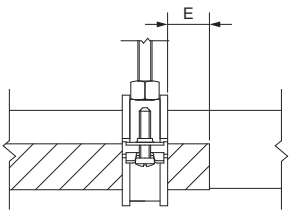
Max. Cantilever



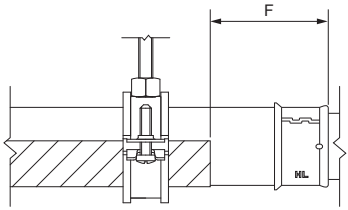
Min. Overlap



Min. Overhang

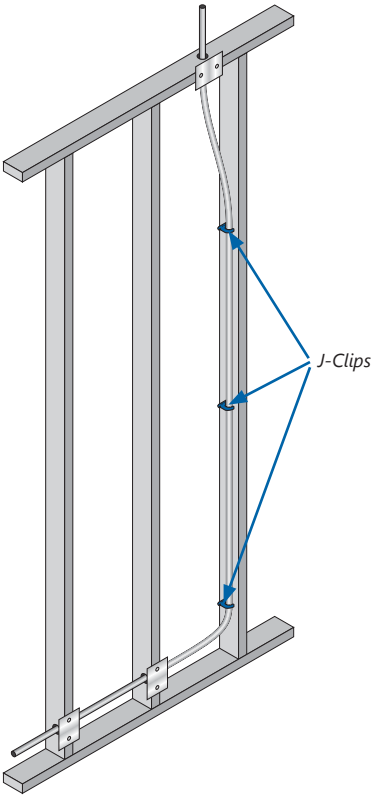


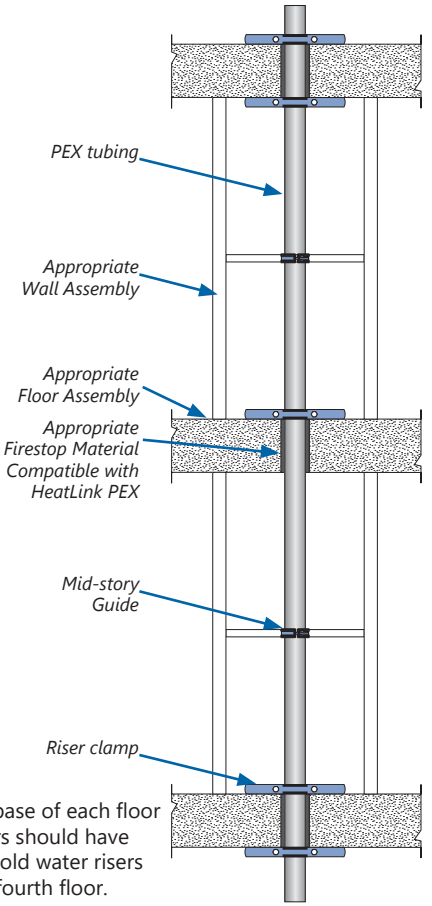
Min. Distance to Fitting



Vertical Support Requirements

- Vertical runs should be supported by guides at every floor level and midpoint between.

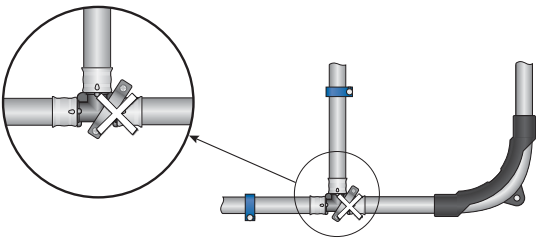




- Vertical risers should be supported at the base of each floor and have mid-story guides. Hot water risers should have a support at the top of every other floor. Cold water risers should have a support at the top of every fourth floor.

Other Support Requirements

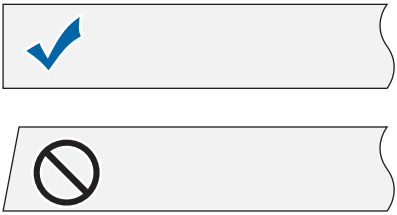
- To minimize stress on fittings, manifolds, and multiport tees, PEX should be supported as shown in the diagrams below.
- Manifolds and multiport tees should be installed at least 24" (60 cm) above the floor.



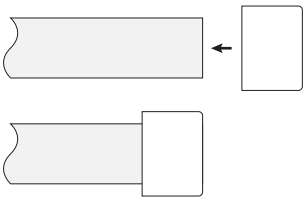
Expansion Connection Instructions

1. Inspect all components for debris, obstructions, and/or damage prior to installation. Ensure the expansion tool and head is in proper working order.

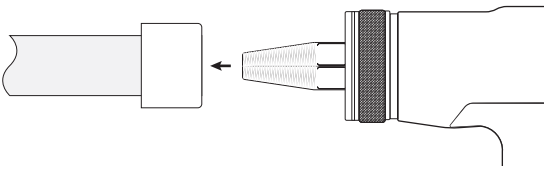
2. Cut the PEX tubing to length, ensuring a square cut - an irregular cut may result in a failed connection. *For larger diameter PEX an ABS cutter is recommended.*



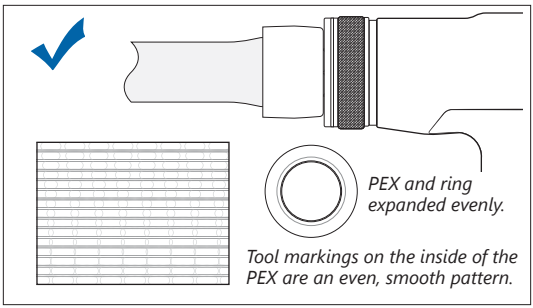
3. Slide the expansion ring over the tubing until it is properly seated.

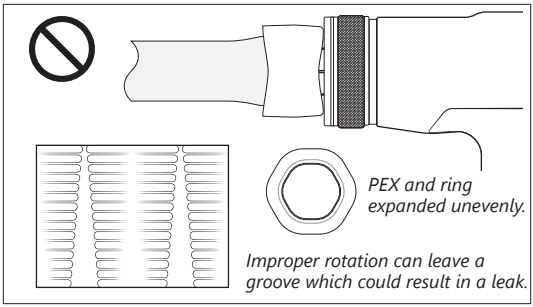


4. Using a recommended F1960 expansion tool with appropriate size expansion head, expand the PEX and ring. Follow the tool manufacturer's instructions.



- ○ Ensure the tool is rotated ⅛ turn between expansions.
- ○ Hold the ring and PEX so they don't rotate with the head.
- ○ To avoid over expansion, only expand the PEX enough to insert the fitting with some resistance and don't hold the PEX in the expanded position.
- ○ **If there is any indication of uneven expansion or improper rotation, do not complete the connection.** Cut back the tubing 2" for ½" to 1" PEX or 3" for 1¼" to 2" PEX, and replace the ring before restarting the process.





Recommended F1960 Expansion Tools

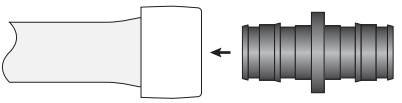
HeatLink recommends the use of power tools for consistency in expansion.

- ○ DeWalt DCE400
- ○ Milwaukee M12 (2432)
- ○ Milwaukee M18 (2632)
- ○ Milwaukee M18 (2633)
- ○ Milwaukee M18 (2932)

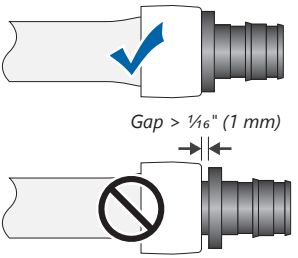
PEX Size	Number of Expansions with Ring*				
	DeWalt DCE400	Milwaukee M12 (2432)	Milwaukee M18 (2632)	Milwaukee M18 (2633)	Milwaukee M18 (2932)
½"	7-8	7-8	9	–	7-9
¾"	11-12	11-12	10	–	9-11
1"	17-18	17-18	19	–	12-13 or 7-8 (H)
1 ¼"	–	–	9	–	9-10
1 ½"	–	–	10	–	8-9
2"	–	–	–	5	9-10

* The number of expansions recommended by the tool manufacturer is to be used as a guide. This number may vary with installation temperature and operator technique.

5. Remove the PEX when the expansion cone segments are retracted and release the trigger.
6. Quickly wipe any grease from inside the PEX tubing.
7. Insert the fitting into the expanded PEX so that the fitting shoulder or stop is flush with the ring.
   If the PEX doesn't reach the shoulder or stop, quickly remove the fitting and expand the PEX one more time.



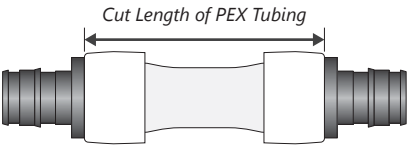
8. Hold the fitting in place until the PEX contracts around the fitting.
   If there is a gap between the fitting shoulder and ring greater than 1/16" (1 mm), the fitting must be cut out and replaced.



Fitting Spacing

HeatLink requires a minimum spacing distance between F1960 fittings, as measured by the cut length of PEX tubing. This distance ensures the expansion head can be fully inserted and expanded without damaging the fitting.

PEX Size	Minimum Cut Length of PEX Tubing
½"	2" (5 cm)
¾"	3" (7.5 cm)
1"	3 ½" (9 cm)
1 ¼"	4 ½" (11.5 cm)
1 ½"	4 ½" (11.5 cm)
2"	6" (15 cm)



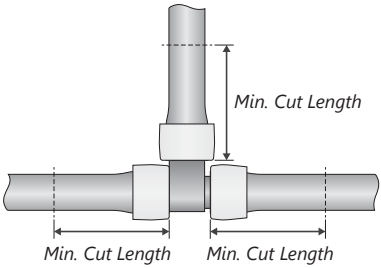
Cold Weather Connections

- Temperatures below 40°F (4°C) increase the amount of time for the PEX and ring to contract onto the fitting.
- Do not make expansion connections in temperatures below 5°F (-15°C).
- Keep rings and fittings at 55°F (13°C) or warmer to reduce contraction time and ensure even expansion.
- Slowly expand the PEX and ring only enough to insert the fitting. Fewer expansions are required.
- Do not use a heat gun on HPP fittings or multiport tees to speed up contraction.

Replacing Fittings

- Make sure that the system is not under pressure.
- When cutting out the old fitting, the PEX tubing must be square cut back a minimum length before a new fitting is installed.

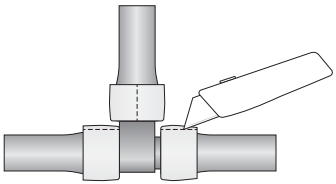
PEX Size	Minimum Cut Length
½" – 1"	2" (5 cm)
1 ¼" – 2"	3" (7.5 cm)



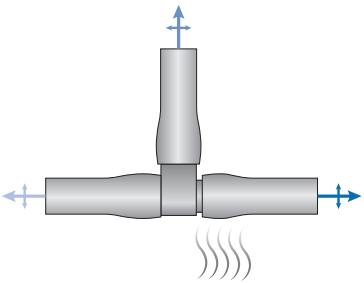
- **Do not** reuse expansion rings.
- **Do not** reuse HPP fittings or multiport tees.
- No Lead Brass fittings may be reused if the barbs are not damaged.

Recovering Brass Fittings for Reuse

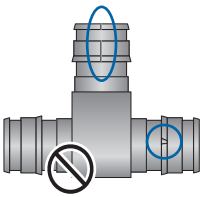
1. Cut off the expansion rings with a utility knife. Avoid damaging the fitting.



2. For each connection, slowly heat the PEX tubing around it with a heat gun.
   Do not use an open flame.
   Work the tubing back and forth while pulling away from the fitting until it is removed.
   Protect the fitting barbs from damage if gripping tools are used.



3. Allow the fitting to cool.
4. Inspect the fitting for damage before reuse. If any barbs are damaged, the fitting can not be reused.



Common Installation Issues

Issue	Resolution
Connections	
Tubing not seated all the way onto fitting	Cut out fitting, and replace with new rings and fitting.
Tubing not cut straight	Cut out fitting, and replace with new rings and fitting.
Connection not sealing	Allow enough time for the PEX to contract onto the fitting. If it doesn't seal, cut out fitting. Replace with new rings and fitting after checking the following: • Ensure the expander cone is not bent or damaged, and is properly lubricated. • Ensure the expander head segments are not bent or misaligned, and are clean and properly lubricated. • Ensure the expander head is screwed on tightly. • Inspect the fitting for damage. • Make sure the tool is rotating between expansions. The tool leaves expansion markings on the inside of the PEX tubing. The markings should be an even, smooth pattern. If not, the tool may not have rotated properly or the tubing rotated with the head. Improper rotation can leave a groove which could result in a leak.  • Avoid removing the PEX tubing from the tool while the expansion tool is in the expanded position.
Fittings	
Cracked	Cut out fitting, and replace with new rings and fitting.
Fitting Barbs are Damaged	Cut out fitting, and replace with new rings and fitting.
PEX Tubing	
Notched or Cut	Cut out section of tubing and use appropriately sized coupling. Repairs in concrete must be wrapped. HPP fittings are recommended for concrete repairs.
Kinked	Kinked tubing can be repaired using a heat gun. **See page 8 for details.**
Frozen	Can be thawed using hot water, hot towels, or gently heating with a heat gun. **Do Not Use Open Flame!**

PEX Tubing Pressure Drop Graph

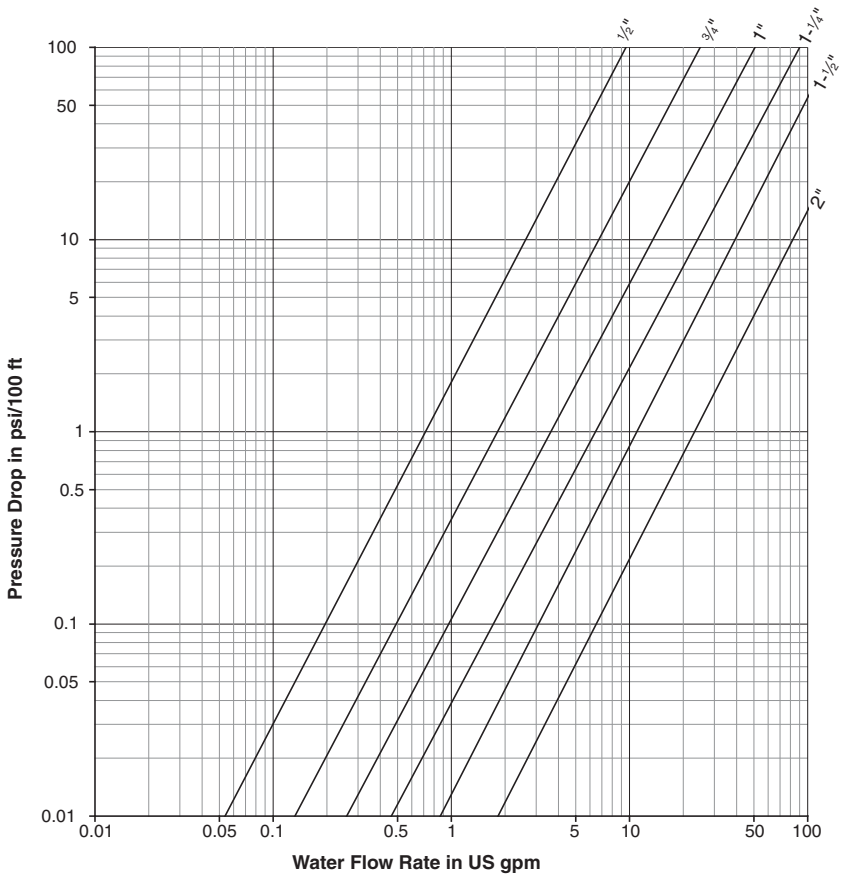


Chart settings at 120°F

PEX Tubing Water Volume

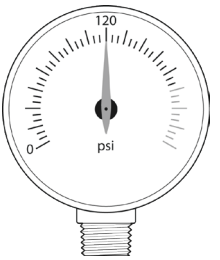
Dimension and Volume		
Size	**Volume (US gallons/ft)**	**Volume (L/m)**
½"	0.0092	0.114
¾"	0.0184	0.228
1"	0.0303	0.376
1¼"	0.0453	0.563
1½"	0.0631	0.785
2"	0.1083	1.344

Testing

In order for installation to be considered complete, the system must be tested to confirm the proper design and installation of the system. Both pressure testing and flow testing must be performed and recorded. The local authority having jursidiction may need to be present for system testing, and it is recommended that the local inspector is notified prior to testing.

Pressure Testing

The NFPA 13D standard requires systems to be tested at normal operating pressure. Local codes may require further testing, and should be followed.



Flow Testing

HeatLink requires flow testing of the system prior to being put into operation to ensure the proper operation and installation of the fire safety system. Confirm any additional testing requirements with the local AHJ.

- ○ Contact the local water and sewer department to confirm the water pressure.
- ○ Ensure the available water pressure matches the system design pressure.

In order to enure a proper flow test, the following are necessary:

1. Pressure gauge installed immediately downstream of the main shut off valve in order to record the residual pressure during the flow test. The guage must have a maximum pressure reading that is slightly higher than the normal static pressure.

   Note: A gauge with a maximum pressure reading too high above the static pressure will not measure the lower residual pressures accurately.

2. 30 gallon bucket, accurately marked in one gallon increments.
3. A long piece of rigid pipe (2" or greater) to direct the flow of water into the bucket.
4. A **flow test assembly,** including required components:
   - ½" threaded nipple, 4" max. (to connect to sprinkler adapter fitting)
   - 1" full port ball valve
   - appropriately sized sprinkler orifice. The orifice size must match the size of the sprinkler head being used for testing.
5. Optional: pressure gauge assembly made up of ½" galvanized threaded tee, ½" x ¼" galvanized threaded bushing, and 30psi or 60psi pressure gauge.

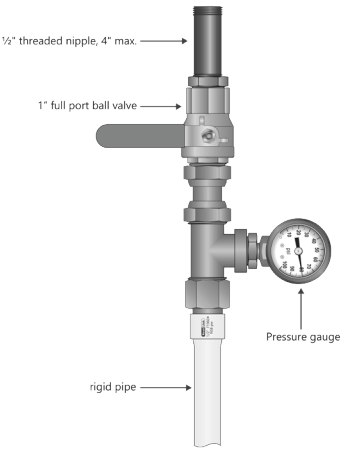
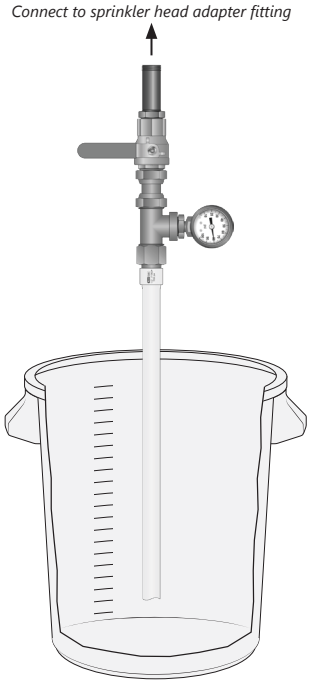


illustration for reference only

Performing the Test

1. Locate the most hydraulically demanding sprinkler. This will be marked on the sprinkler plan provided by the system designer.
2. Ensure the system is turned off and fully drained, then remove the sprinkler from the sprinkler head adapter fitting.
3. Attach the flow test assembly.
4. Charge and fill the system.
5. Open the ball valve on the test assembly and allow the water to flow (into a drain or bucket) until air is completely purged from the system. Entrained air will negatively affect the flow test.
6. Once all of the air is purged, close the ball valve and prepare the empty test bucket.
7. Open the ball valve fully and perform a timed flow for one minute.
8. The test is successful if the amount of water in the bucket meets or exceeds the calculated flow as per the plan.
9. If the test fails (ie. the amount of water in the bucket is below the calculated flow), review the troubleshooting section and perform the test again.
10. After a successful test, record the results and submit them to the AHJ as required.



Troubleshooting

Flow test failures are often caused by either:

- **Flow test procedure/equipment issues**
  - Test was not performed for required length (60 seconds).
  - Test bucket improperly marked
  - Wrong sized test orifice was used
  - Water was directed through flexible tubing (such as a garden hose), resulting in high friction loss
  - Test assembly nipples are too long, resulting in high friction loss
  - Defective test ball valve
  - Test ball valve is not full port
  - Teflon tape (or other) causing obstruction

Record the residual (flowing) pressure from the installed gauge to determine if any flow issues are in the supply (upstream) or system, or flow assembly (downstream).

- **System supply issues**
  - Underground piping size does not match sprinkler plan
  - Pipe distances do not match those shown on the sprinkler plan
  - Different meter size (verify both inlet and outlet)
  - Additional fittings and/or valves installed
  - Pressure reducing valve (PRV) is not fully open (if installed).
  - PRV (if installed) is different make or model from that shown on the sprinkler plan
  - Elevations are different from those shown on the sprinkler plan
  - Supply pump/booster pump does not match sprinkler plan
- **System piping issues**
  - Trapped air
  - Kinked or damaged tubing
  - Missing connections or tubing
  - Tubing sizes do not match those specified on the sprinkler plan
  - Tee orientations do not match those specified on the sprinkler plan
  - Pressure reducing valve (PRV) is not fully open (if installed).
  - PRV (if installed) is different make or model from that shown on the sprinkler plan
  - Layout has been altered from approved sprinkler plan. All changes must be included in the sprinkler plan and approved by the AHJ.

Additional Literature

Additional literature can be found on our website, heatlink.com

INFO 5 - PEX Tubing Technical Information

INFO 37 - Domestic Hot Water Recirculation Systems

L3240 - HeatLink F1960 Potable Water Expansion System Installation Guide

Notes

Please check our website to ensure you have the latest version of this guide.

www.heatlink.com

HeatLink, SureLink, and PureLink are either registered trademarks or trademarks of HeatLink Group Inc.

L3245 Printed in Canada, August 2025

© HeatLink Group Inc.

45444