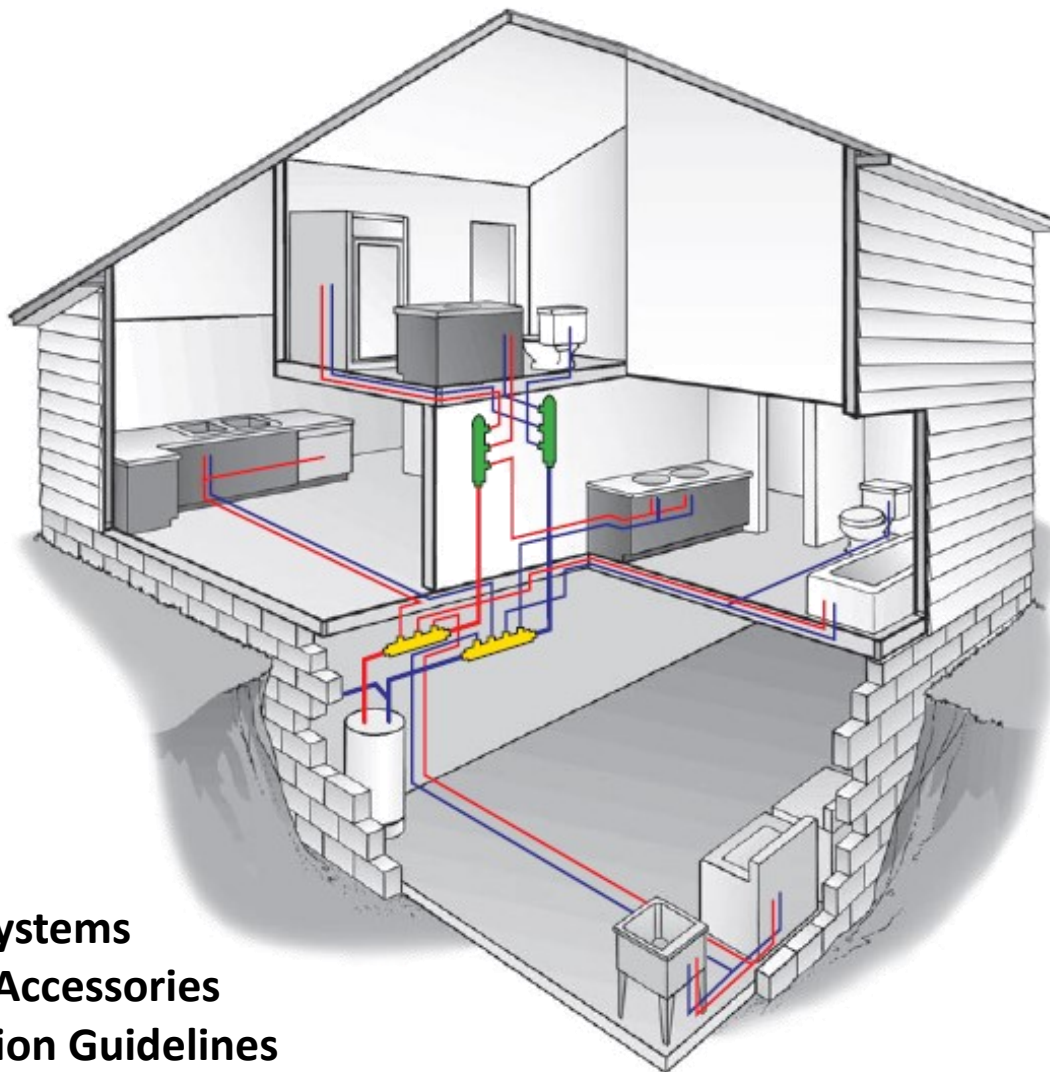


ComfortPro®

AquaSeal Pex-A & Pex-B

Installation Manual



Tubing
Fitting Systems
Tools & Accessories
Installation Guidelines
Certifications & Listings
Warranty



AquaHeat



AquaSeal



AquaMelt



Terre-Pex

24000 S PECULIAR DRIVE, PECULIAR, MO 64078

WWW.COMFORTPROSYSTEMS.COM

1-800-968-8905

ComfortPro System Solution

Plumbing, heating and cooling systems work better when they work together. That's why ComfortPro delivers a total, integrated solution that's smart, simple, and as energy-efficient as possible.

Demand a better approach

Most others offer single solutions, only ComfortPro has the range of products - and depth of experience - to provide a thorough, solutions-focused approach that maximizes heating and cooling output while minimizing time and effort.

The ComfortPro line of products

Our business is to understand the unique needs of your job and deliver the very best system for it.

A better approach, A better system.

"Your One Stop Shop for Pex"

PEX Tubing - PEX is cross-linked polyethylene. Through one of several processes, links between polyethylene molecules are formed to create bridges (thus the term "cross-linked"). This resulting material is more durable under temperature extremes, chemical attack, and better resists creep deformation, making PEX an excellent material for potable water and other applications. The physical properties of PEX tubing make it ideal for use with various mechanical connection systems.

There are three primary methods for producing PEX tubing:

PEX-A - "Engel" or Peroxide Method. Peroxide is added to the base resin. As the tubing is produced, cross-linking takes place due to pressure and high temperature.

PEX-B "Silane" Method.

Silane is grafted to the backbone of the polyethylene. The grafted compound is combined with a catalyst through the Sioplas or Monosil methods. Extruded tube is exposed to steam or hot water to complete the cross-linking reaction. The resultant link is three-dimensional in nature whereby the bunch-like bond is not unlike a trellis.

PEX-C Electron Beam Method.

Very high-energy radiation is used to initiate molecular cross-linking in specialty high-density polyethylene. Tube is extruded (generally as HDPE), routed through an E-Beam facility and rotated under a beam in the accelerator where it is dosed with a specific amount of radiation to release the hydrogen atoms and cause polymer chains to link to the open carbon sites.

The resultant link is planar in nature and a carbon to carbon bond.

PEX Tubing Applications

PEX tubing is ideally suited for potable water plumbing applications. It is flexible, making it easy to install and service. It is also able to withstand the high and low temperatures found in plumbing and heating applications and is highly resistant to chemicals found in the plumbing environment.

Common Application Types

- Water service
- Potable water plumbing—Lead Free
- Hydronic / radiant cooling
- Hydronic / radiant heating*
- Snow / ice melting systems*



Benefits & Approvals

AquaHeat and AquaSeal uses only crosslinked polyethylene tubing. Known as PEX, crosslinked polyethylene offers distinct advantages over both metal piping materials and other plastic alternatives. Our pipe is virtually maintenance free. It is corrosion resistant, flexible, and remarkably clean. Long used worldwide, PEX has an outstanding and unblemished track record of quality performance. PEX's crosslinked molecular structure offers toughness and lasting durability. Our crosslinked polyethylene piping withstands temperatures ranging from below freezing to above the boiling point. Because it is pliable, a section of 1/2" pipe can be bent into a 3" (77mm) radius at 68 F (20 C) without affecting tubing integrity. The material is highly crush resistant and can be submerged in concrete or earth without any damage.

Approvals

AquaHeat and AquaSeal PEX pipe has been manufactured to ASTM F-876/F-877/F-2023/E-84/F1960/F-2080, NSF-61, ICC & CSA B137.5 and approved by CSA, IAPMO and ICBO for use with potable water systems. AquaHeat is certified for continuous use at pressures of 100 psi and temperatures up to 180 F.

AquaSeal Pex pipe meets the requirements of ASTM F-2023 chlorine standard. AquaSeal is certified for continuous use at pressures of 100psi and temperatures up to 180 F.

The AquaHeat brass fittings are not approved for potable water use and do not meet the lead free requirements of ASTM F1807 & CSA B137.5 standards.

AquaSeal brass fittings and valves meet the lead free requirements per U.S. Senate Bill S.3874 less than 0.25% Pb. NSF 61G, of ASTM F1807 & CSA B137.5 standards. Fittings with soldering or brazing end conform to ASME B16.22 and NPT male thread , NPSM female thread conform to ANSI/ASME B1.20.1.

The AquaSeal ProPlas plastic fittings meet the requirements of ASTM F-2159 & CSA B137.5 standards.

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

AquaHeat, AquaSeal and ComfortPro® Systems are registered trademarks.



Material Benefits of PEX Tubing

Corrosion Resistant

Smooth inner walls inhibit mineral build up and scaling. Resists pitting or stress-corrosion more than other types of tube. PEX is also more resistant to the harmful effects of chemicals such as chlorine.

Quiet

Flow characteristics are increased and system noise is decreased when compared to metal tubing systems.

Freeze Resistant

While it is always recommended to follow code requirements and common practices to protect from freezing, PEX tubing can expand and contract more easily (often without damage) than copper and CPVC tubing.

Reduced Turbulence / Increased Flow

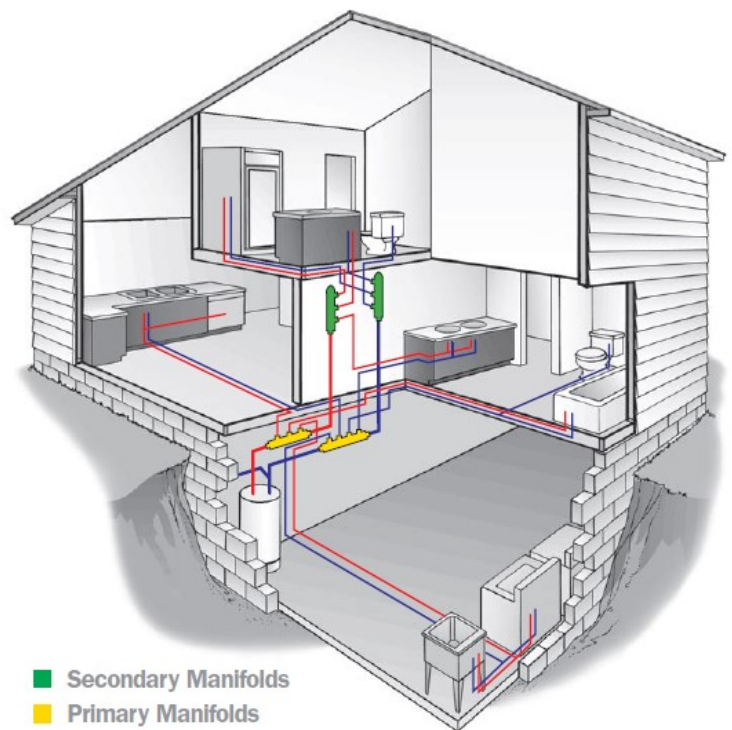
The smooth interior wall of the tube reduces turbulence during water demand thereby increasing the overall flow characteristics to the fixture being supplied.

Thermal Conductivity

Lower heat transfer compared to metal tube, saving energy and money.

Installation Flexibility

PEX tube bends easily and can be plumbed around building members or through floors/walls. Using flexible tubing means fewer fittings, fewer brackets, fewer joints behind the wall, fewer hours on the job, and fewer potential leaks.



Material Properties of PEX Tubing

Water Temperature + Water Pressure

PEX tubing shall not be used in applications where temperature and pressure ratings are not regulated or are known to evidence exposures beyond the tested and certified limit of the tube.

Tube Operating Pressure / Temperatures

TEMPERATURE	HYDROSTATIC PSI (MAX)	OPERATING PSI WATER
73.4° F / 23° C	630	160
180° F / 82.2° C	400	100
200° F / 93.3° C	315	80

Thermal Expansion & Contraction

PEX has a thermal expansion rate of 1.10" per 10°F ΔT per 100 ft. (27.94mm per 5.56°C ΔT per 30.48m).

Bending Stress on Polymer Fittings

Polymer fitting joints should be properly supported to avoid undue stress on fittings and connections. A minimum distance of 2x the tubing O.D. should be allowed before changing the direction of the tube. ComfortPro recommends *always* using a manufactured bend support.

Support + Spacing

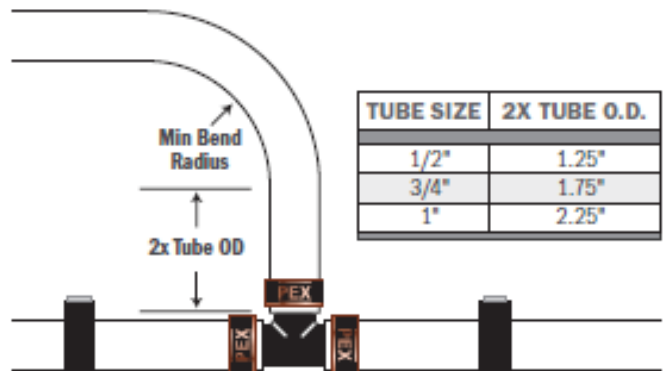
TUBE SIZE	HORIZONTAL SUPPORT SPACING	VERTICAL SUPPORT SPACING
1/2"	32"	Once per floor penetration at floor level. Once at midpoint of floor expanse or every 48"
3/4"	32"	
1"	32"	
1-1/4"	32**	
1-1/2"	32**	
2"	32**	

*See Section 5.4 for Tubing Installation Requirements & Limitations. Or, specific manufacturer's instructions for continuous pipe support systems for large diameter horizontal arterial water mains.

Minimum Bend Radius*

TUBE SIZE (CTS)	MIN. BEND RADIUS
1/2"	3.75"
3/4"	5.25"
1"	6.75"
1-1/4"	8.25"
1-1/2"	9.75"
2"	12.75"

*Without bend support. See Section 5.4 for additional information.



Flow Characteristics

GPM	1/2" PRESSURE DROP @ 60°F (PSI/100FT)	VELOCITY (FT/SEC)	3/4" PRESSURE DROP @ 60°F (PSI/) 100FT	VELOCITY (FT/SEC)	1" PRESSURE DROP @ 60°F (PSI/100FT)	VELOCITY (FT/SEC)
1	1.8	1.7	1.2	0.9	.4	0.5
2	5.9	3.5	2.4	1.8	.7	1.0
3	12.1	5.2	4.0	2.7	1.2	1.6
4	20.1	7	5.7	3.5	1.8	2.1
5			8.1	4.4	2.5	2.7
6			10.7	5.3	3.2	3.2
7			13.5	6.2	4.1	3.7
8				7.1	5.0	4.3
9					6.0	4.8

ASTM F1807 / F2159

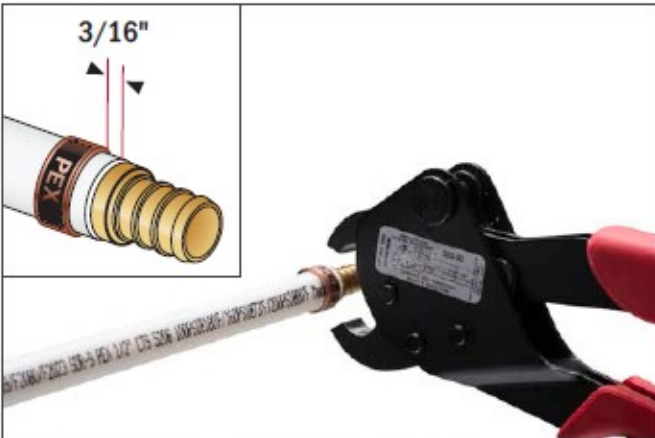
Copper Crimp Ring Installation



1. Cut tube at 90-degrees. Do not crush OD of tubing with cutters. Hint: Slightly rotate cutter during blade engagement.



2. Install PEX Crimp Ring onto OD of tubing. Install PEX fitting fully into tube end.

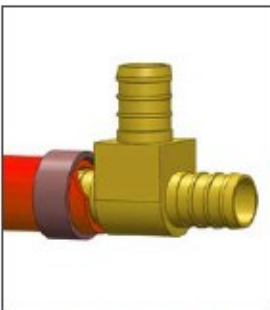


3. Position ring over sealing barbs of the fitting. The ring should be positioned 3/16" ($\pm 1/16"$) from the end of the tube.

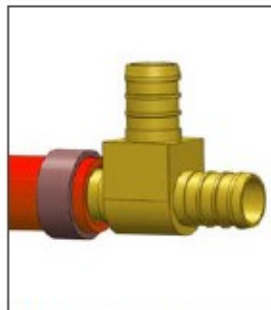


4. Compress tool perpendicular to tube. Compress only once. Remove defective connections. Use a gauge to assure a proper joint. Test all completed joints.

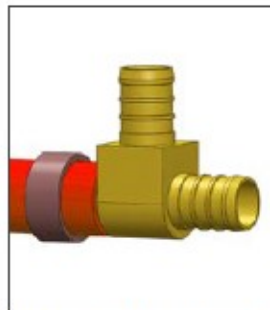
Installation Notes: Take care to avoid the below issues when making joints with copper crimp rings



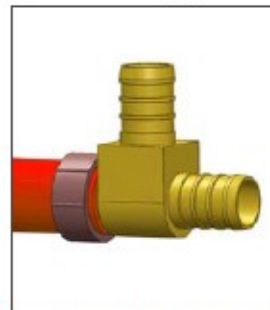
Tube not cut squarely - ring not compressing tube for a secure seal.



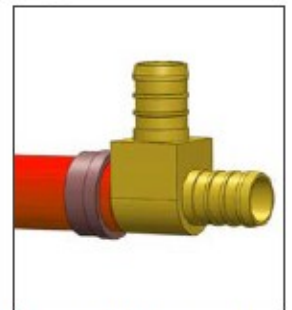
Fitting not inserted completely into tube end.



Ring placed too far forward or too far back & not positioned over sealing barbs of fitting.



Improperly calibrated tool - not enough compression. Rings compressed multiple times may develop a leak path.

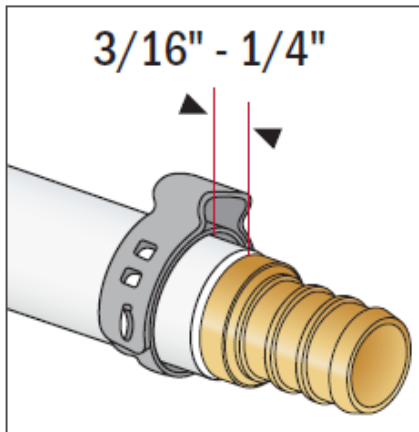
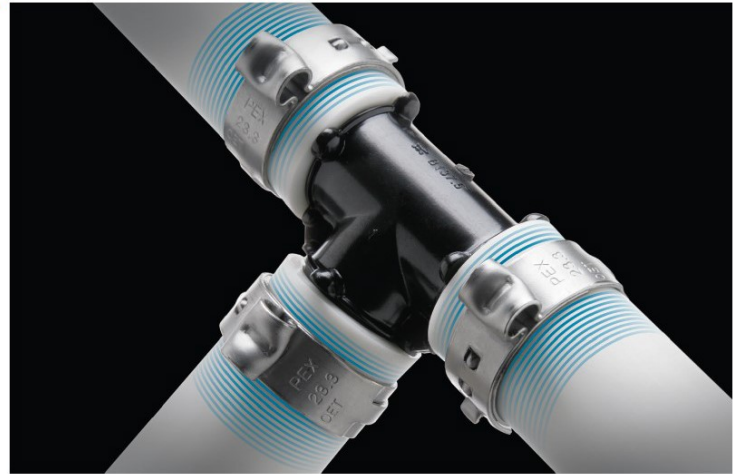


Crimp Tool did not engage the Crimp Ring over the entire surface of the ring.

PEX Connecting Solutions

Benefits

- One tool for all sizes
- 360° Stepless design
- Certified by NSF to meet NSF / ANSI 14 requirements
- Fast, simple and secure installation



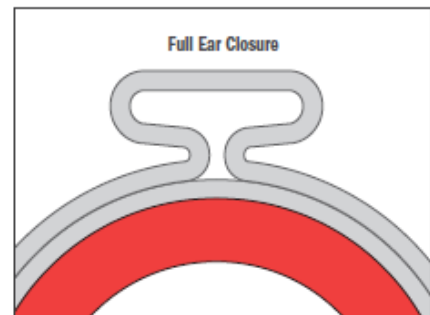
1. Cut tube at 90-degrees. Load clamp over tube end. Insert fitting fully into tubing. Position clamp between 3/16" and 1/4" from tube end to ensure coverage of both sealing bars.



2. Close clamp ear with ratchet pincer tool. Tool will not release until clamp is fully closed. Remove any defective connections. Test all completed joints.

Note:

Full ear closure is required for proper installation. Always visually inspect clamp for correct closed-ear form.



Check ratchet pincer tool calibration with a GO/NO-GO gauge daily. Refer to tool manufacturer's instructions for calibration procedures.



Installation Notes:

In high-chloride water conditions, use only plastic (ASTM F2159) fittings.
Do Not install in contact with concrete.
Avoid contact with soldering flux.

Press Sleeve Installation



Step 1: Cut PEX Pipe end squarely. Remove any burrs.



Step 2: Slide correct sized stainless steel sleeve over the end of the PEX pipe. Look at the view hole to see if it is over the pipe.



Step 3: Push the fitting into the pipe until it touches the fitting shoulder.



Step 4: Hold the tool at 90 degree to the sleeve and close the jaws completely. Crimp only one time.



Step 5: If the pipe can be seen from the view hole and a "W" shaped crimp has been formed, it's a good connection.



Step 6: Check for proper crimp with the Go/No-Go gauge.

ASTM F1960

Expansion Ring Installation



1. Cut tube at 90-degrees. Do not crush OD of tubing with cutters. Hint: Slightly rotate cutter during blade engagement.



2. Install an approved PEX expansion sleeve onto OD of tubing.



3. Using expander tool, expand sleeve fully. If using a manual tool, expand **slowly** and repeat expansions, **rotating expander 1/8-turn** between expansions. Forcing the tube onto the expansion head and/or expanding too quickly can damage the tubing and sleeve, and require rework.

Note: CPS recommends all ASTM F1960 expansion joints using AquaSeal Type-B tubing be made with a self-rotating, power expansion tool to avoid improper expansion.



4. Insert fitting into expanded tube and sleeve. Hold fitting in place until tube/sleeve constricts annularly around the fitting.



5. The installation is complete with a visibly secure connection. Remove defective connections. Test all completed joints.

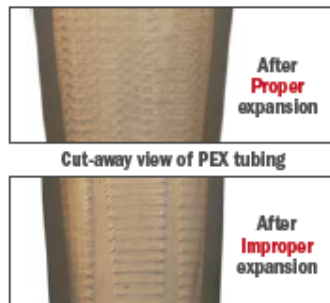
Special Considerations for Making Large-Diameter, or Low-Temperature F1960 PEX Expansion Joints:

When expanding large diameter tubing or in temperatures below 55°F, Do Not force the tubing onto the expansion head. Expand slowly and evenly at the prescribed rate of expansion. When using a manual tool, always rotate the tool. Keep tube/sleeves warm (Tip: store sleeves in pockets) to ensure uniform expansion and decrease the time needed to fully constrict around fitting. In colder temperatures, fewer expansions are needed. Use only enough tool expansions/rotations to allow full insertion of the fitting. Both lower temperatures and over-expansion of the tube/sleeve will increase the time needed to fully constrict and complete the joint. Do Not make connections in temperatures below 5°F. Do Not apply heat with a heat gun - Excessive heat may damage tube/sleeves/fittings.

Installation Problems: Take care to avoid the below issues when making joints with PEX expansion rings



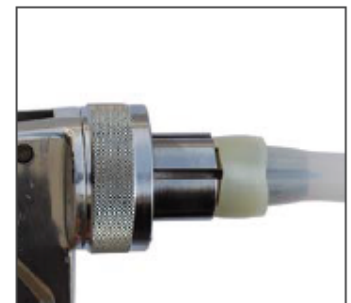
Be sure tubing is cut squarely, tube is inserted into sleeve completely and fitting is inserted fully into tube/sleeve.



No rotation between expansions, or defective expansion head leaving a groove as a potential leak path.



Damaged, cut or grooved barb on fitting.



Failure to rotate tool inside tubing may cause unequal expansion. Remove any rings with unequal expansion.

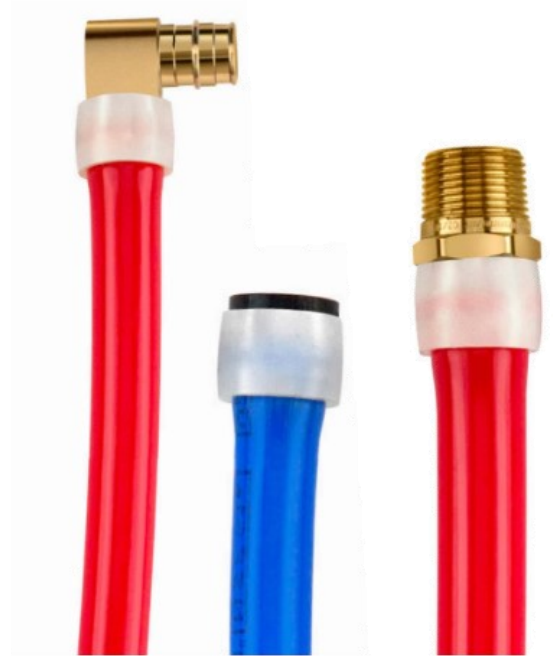
Pex Expansion

Comfort Pro Systems AquaHeat and AquaSeal Pex A and Pex B tubing is manufactured to meet or exceed ASTM 876/877/2023/E-84/1960/2080, NSF-61 CSA B137.5 standards.

AquaSeal Lead Free brass expansion fittings and PPSU Poly expansion fittings conform to ASTM 1960, NSF-61PW-G standards.

These fitting systems regardless of who manufactures them will provide excellent and permanent connections with our tubing.

Our warranty for our tubing is not affected regardless of what fitting system is used.



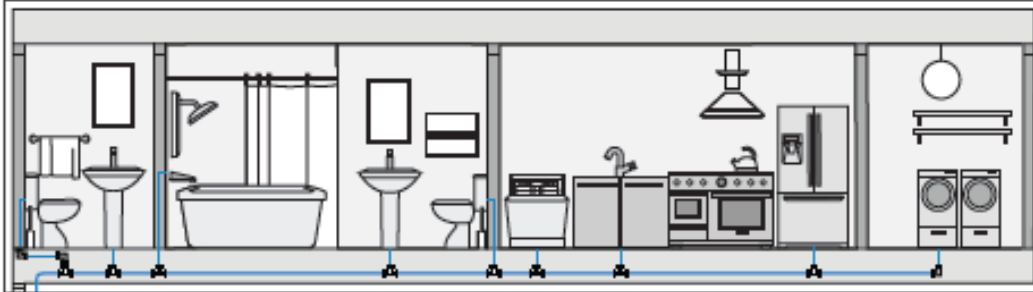
Fitting Spacing

When installing F1960 fittings, it is important to keep the minimum distance between expansions shown in the table below:

PIPE SIZE	MINIMUM DISTANCE BETWEEN EXPANSIONS
3/8"	2.00"
1/2"	2.50"
3/4"	3.50"
1"	4.50"
1-1/4"	5.50"
1-1/2"	6.50"
2"	7.50"

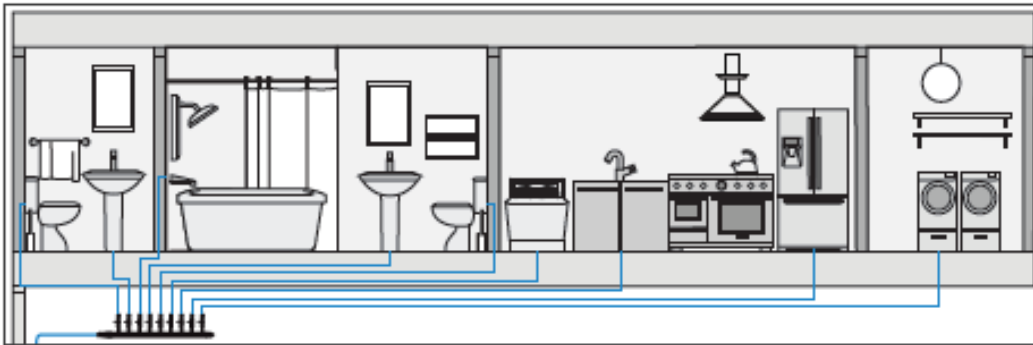


System Installation Options



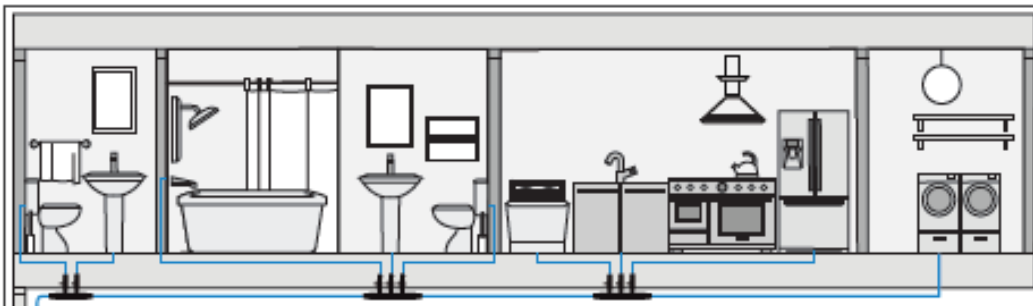
Standard Trunk & Branch

A network of supply tube and fittings service fixtures and are put together like conventional copper or CPVC systems. For every change in direction within the system, an elbow or tee is used (directionals). There is typically more volume of water within a system of this nature and stagnant water must be purged before hot water is realized.



Home Run

Fixtures are supplied from a central manifold. These manifolds are often referred to as primary manifolds, and when used in this manner, can isolate a fixture for repair or service, and ensure proper flow at the fixture by providing an individual supply line. Primary manifolds for home run plumbing typically incorporate valves for proper line segregation and service.



Hybrid/Combination

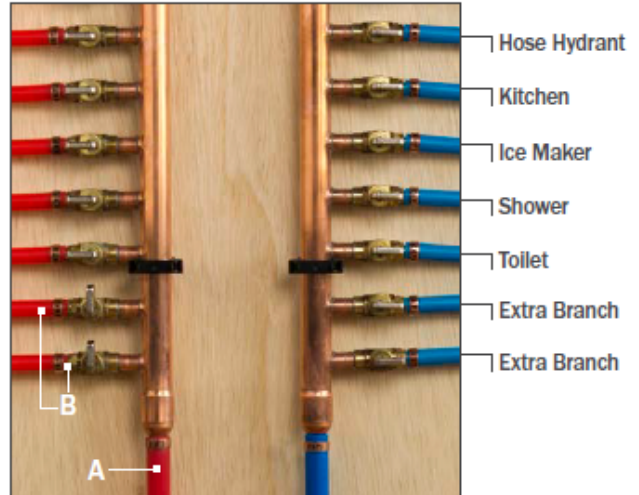
Fixtures are supplied from a manifold with a line being directly plumbed from a primary manifold or a secondary manifold. Secondary manifolds are either valved or non-valved and can be installed in-line. Valved manifolds typically require access, so non-valved manifolds are more often used as secondary manifolds and can be hidden in walls. The manifold can be marked with the fixture it supplies and a layout schematic marks the manifold location as well as the fixture it provides.

Sioux Chief recommends this plumbing system approach.

Manifold Plumbing

Sizing

Using manifolds can be accomplished with one of the previously mentioned plumbing layouts. Typically, the size of the manifold is dependent on the amount of fixtures it will be supplying. ComfortPro offers manifolds with different trunk sizes and in varying outlet connections and sizes. All outside hydrants and/or auxiliary fixtures fed from their own supply line would total the branch quantity needed. Some manifold applications purposefully oversize the manifold by 2 branches for possible future additions. These 'extra branches' are typically sealed off with a plug. If two fixtures within a bathroom or kitchen application can legally be supplied with a single supply line, the manifold would reflect one less branch.



Note

For hot water distribution, branches (B) that are closer to the incoming hot line (A) will have faster hot water supply rates to fixtures downstream.

Location / Accessibility

Typical home run applications should dictate that a manifold is located near the water conditioning equipment, utility room, or water heater. This area is chosen so that the heated water is fed as quickly as possible to the distribution point for efficient transfer of conditioned water. In any case, the location chosen should be readily accessible for service situations. Manifolds should not be located closer than 3" from a water heater hot line outlet.

The home run layout has half of the connections at the manifold itself with the other half located at the stub out and/or supply stop.

Combination systems allow the cold water distribution manifold (no valve) to be located in a convenient area within the structure (no access panels are required for manifolds without valves).



IMPORTANT



Do NOT recirculate back through the manifold branch. Doing so will void the manifold warranty.

F-1960 & F-1807 Plastic Multi-Tees



Hybrid/Combination System Installations

Continued

Combination Systems

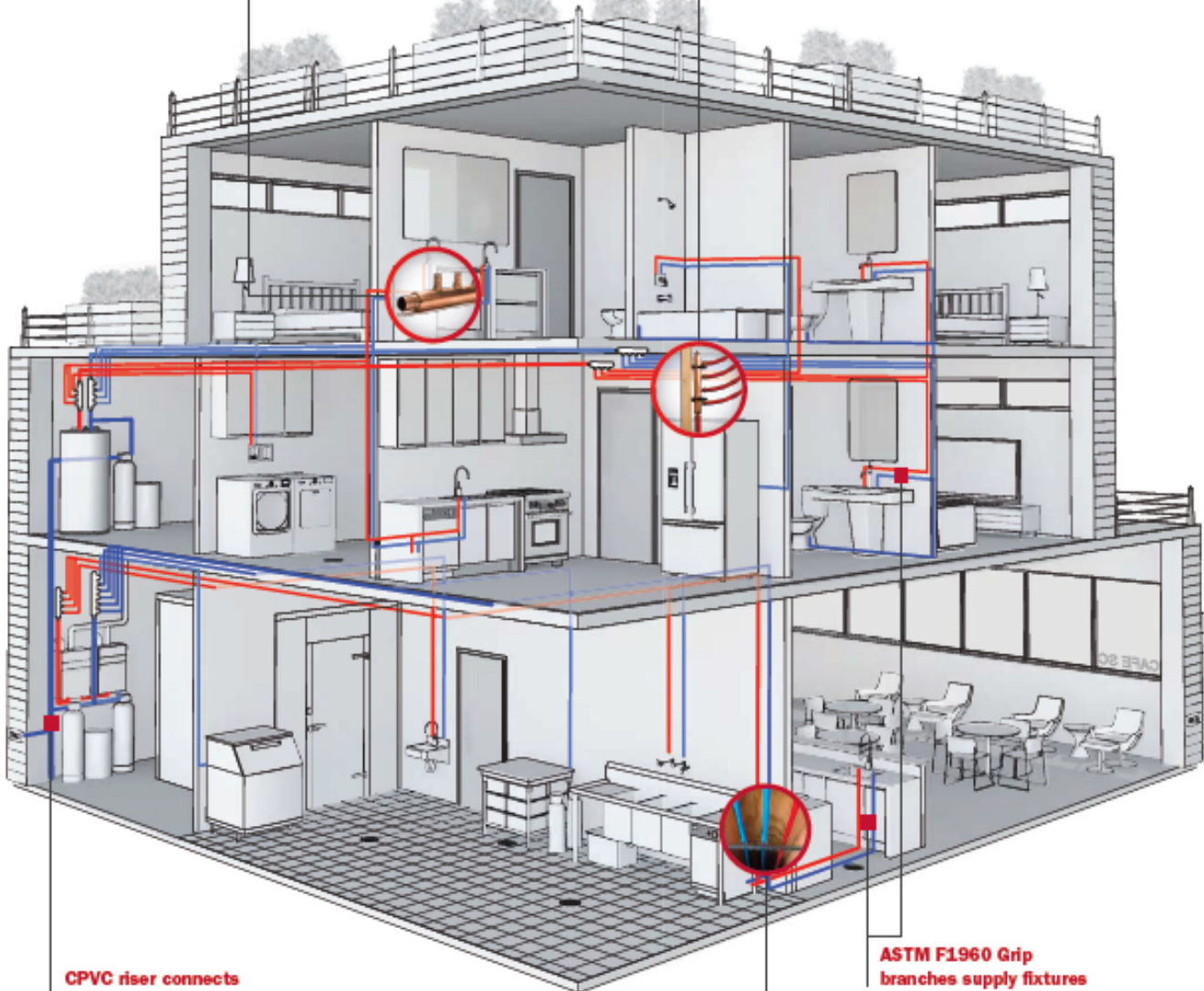
Combine the best features of a home run plumbing system with the best features of a trunk and branch plumbing system.

The Smarter Choice:

- Saves materials, especially in No Lead compliant systems.
- Requires half the installation time of traditional systems.
- Requires fewer connections, which translates to fewer leak possibilities, fewer callbacks and fewer claims.
- Exhibits increased flow characteristics, decreased hot water wait times and a decrease in system noise.

Combination: 16 fittings
Trunk & Branch: 96 fittings

Combination: 59 connections
Trunk & Branch: 165 connections



CPVC riser connects directly to manifold

ASTM F1960 Grip branches supply fixtures

Combination: 637ft of tube
Home Run: 1,515ft of tube



Tubing Installation Requirements & Limitations *

Tube Protection

Protect tube with properly regulated and certified stud guards and metal plating where tube protrudes through building members. See tubing insulation requirements below.

When undue stress will be placed on a connection joint, use an appropriate fitting with strapping means (drop ear elbow, eared stub out) and make connection to secured fitting.

Example: Shower arm installations. Hydrant installations

Tube Support

Reference mandated support length intervals through local code regulations. Typically horizontal spacing shall be every 32" and vertical spacing shall be 48" and at each floor penetration.

Tube supports should be used to support a long tubing length/run in addition to regular tube support intervals.

Supports should be used to secure any expansion loop or tubing offset.

PEX bend supports can be used when minimum bend radius requirements cannot be met and to prevent tube from kinking when installed per installation instructions.

Tube Insulators

Tube insulators must be used when a tube protrudes through wood or metal studs. Generally, insulating tube is a practice used to protect the tube from:

1. Potential harm (as in damage from metal stud edges)
2. Thermal Dissipation: Do not bundle hot and cold tubing together.
3. Noise Transmission: PEX has a lower modulus of elasticity whereby noise/acoustic transmission is less likely. Insulators further guard against this phenomenon.

PEX Design Factor

The Design Factor (DF) for PEX tubing per AWWA C904 is 0.50. Pressure ratings are based on a typical Hydrostatic Design Basis (HDB) for PEX of 1,250 psi and the Design Factor of 0.50 resulting in the Hydrostatic Design Stress (HDS) of 630 psi

This is the "06" in the PEX Material Designation Code

Thermal Expansion & Contraction.

PEX has a thermal expansion rate of 1.10" per 10°F ΔT per 100 ft. (27.94mm per 5.56°C ΔT per 30.48m).

Slab Installation

Do Not make any fitting joints under the slab. Use a tube sleeve material when penetrating a slab or concrete floor.

Spray-Foam Compatibility

Some spray-foam insulation products are approved for use with PEX tube and fittings. It is the responsibility of the installing contractor to refer to information provided by the insulation manufacturer and verify compatibility of any foam or chemical foaming agents that will come into contact with PEX tube and fittings, including PPSU or other polymer material. If insulation manufacturer recommends wrapping PEX tube joints before application, use liner-less black rubber tape.

In general, ICYNENE closed-cell, polyurethane spray foams are compatible with AquaSeal tubing. Information provided on MD-R-210, LD-C-50, and MC-C-200 has been reviewed and found that there should be no compatibility issues with AquaSeal tubing.

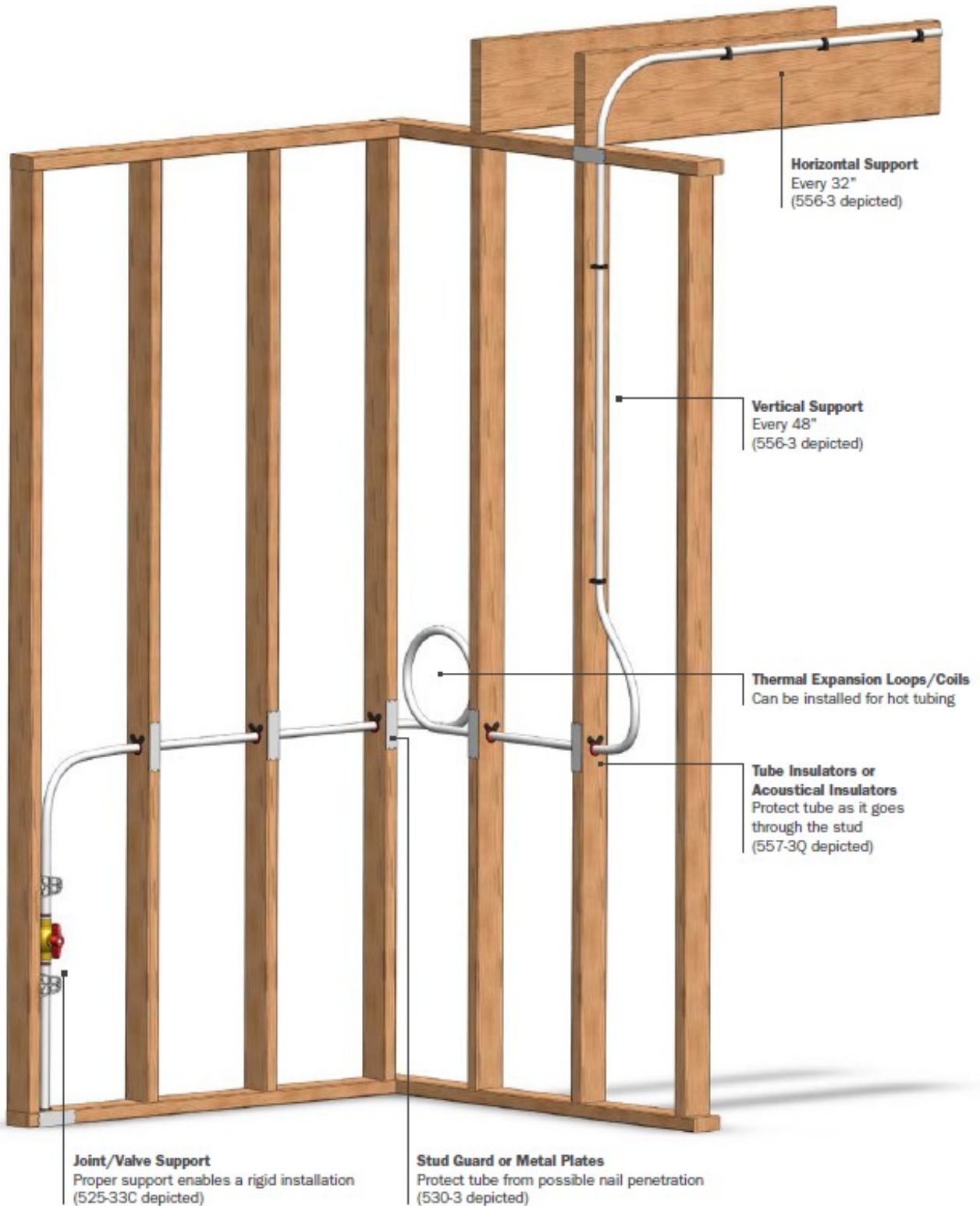
During application of spray-applied polyurethane foam insulation, all installation instructions provided by the manufacturer must be followed. During the curing process, conditions should not exceed the temperature and pressure limitations of the tube.

Fire-Suppression Materials

It is the responsibility of the installing contractor to refer to information provided by the fire-protection material manufacturer and verify compatibility of any fire-protection material that will come into contact with AquaSeal tube and fittings, including PPSU or other polymer material.

ComfortPro
A better approach. A better system.

AquaSeal





Tubing Installation Requirements & Limitations

Inspection & Pressure Test

Ensure all tube is free of defects and harm. Inspect all connections to assure they are leak-free and properly supported. Proper tube anchors and fasteners must be used. Test the system as code dictates. Where the code is absent, test to 100 psi for no less than 12 hours before covering any connection or tubing underground or behind walls. If testing with water, protect from freezing. If more than 10% pressure is lost during hydrostatic or air tests, add more and test for another 12 hours.

Sleeving Service Main

Where AquaSeal tubing enters foundation walls, rigid tubing shall be used to protect tube from shearing due to ground settlement or other earth movement. The rigid sleeve shall protrude into the earth minimally 12" and pass through to the interior of the building. Backer rod (closed-cell foam rod or mineral wool) can be used to seal the gap around the tube and capped with water based caulking as filler.

Where AquaSeal tubing enters concrete floors, follow referenced slab penetration sleeve recommendations

Expansion Joint Protection (Concrete)

When AquaSeal tubing is being run below an eventual radiant-type expansion joint, tubing shall be protected from the possibility of being cut using a metal sleeve material and/or by assuring that the tubing is suitably set below the eventual cut.

Repairs in Service Work

If damage occurs to tubing while in the service stage, it is recommended that the area be replaced (if at all possible) without the use of a fitting below grade. When a fitting must be installed below grade, use a fitting made from C69300 brass for maximum dezincification resistance and stress corrosion cracking resistance. Sleeve and insulate the entire connection for protection from possible corrosion and from any mechanical stress that may occur. Test the assembly. Assure proper slack has been left in the line and proper backfill compaction has been obtained to limit movement on the connection.

Water System Disinfection

AWWA C651-14 shall be referenced when disinfecting AquaSeal tube installations and/or practices outlined by local codes.

- Do not allow solutions to remain in tubing for more than 24 hours
- Upon disinfection completion, flush all systems with potable water.
- Cover tube ends whenever not in use, preventing debris from entering tube.
- Only use disinfecting agents appropriate for PEX water service as well as possible use of PPSU PEX fittings.

Pressure Testing Water Mains

Water service tubing should have pressure applied throughout the installation. Air should be bled off the line prior to pressurizing fully hydrostatically. Sioux Chief recommends continuous pressure throughout the installation process to evidence any leaks or damage that may cause tube/connection failure. Testing water pressures should be set higher than the expected service pressure within the system. Do not test beyond 225 PSI for extended periods of time. 150 PSI water testing pressure is recommended for service mains throughout the construction phase.

Pressure Testing Water Tubing

Water: (recommended). When using water to test distribution tubing, it is important to follow local codes. It is important not to exceed the pressure limit of the tubing. Reference the continuous use pressures and hydrostatic pressure limitations in section 2.4.

Air: When using air to test pipe, there may be a need to condition the pipe especially when testing in hotter weather. PEX-B tubing does not need to be conditioned to the extent that PEX-A tubing should due to physical characteristics of the two tubing types.

Conditioning:

Conditioning the pipe is a process used to slightly expand the tubing ID beyond what the test will effectively expand it to in an effort to maintain the desired test pressure without a 'false negative' of decreased pressure due to normal tubing expansion. Expanding the tube by using 40 psi beyond the testing pressure would



Tubing Installation Requirements & Limitations Continued

be recommended. Comfort Pro would suggest testing with air up to 80 psi.

Procedure:

- 1) Fill system with air or water.
- 2) Remove all plumbing fixtures or appurtenances that may harm a pressure test and/or should not be exposed to excessive pressures.
- 3) Increase pressure over desired testing pressure for a period of about 30 minutes while maintaining the higher PSI. EG: 100 PSI if testing pressure will be 60 PSI.
- 4) After the 30-min conditioning time, relieve pressure down to 60 PSI. The PSI may climb slightly above 60 as the pipe shrinks due to relieved pressure. After witnessing the final pressure (which may take about five minutes depending on ambient temperature and may increase to around 63-65 PSI), determine if the system is air tight over the necessary code mandated testing time.

Water Service Installation & Limitations

Getting Started. Local codes should be referenced for acceptable pressures as well as special precautions on use of PEX, system fittings, layout and installation requirements for service piping. Typical water service pressure requirements often mandate that the service is capable of withstanding 1.5x the operating pressure of the system it is supplying. See listed PEX pressure ratings. Ensure the fittings and tubing being installed are acceptable for potential pressures, stresses, and application requirements.

Preparation. Check all tubing and fittings for proper listings. Check all tubing and fittings for structural and manufacturing integrity as well as issues that may have arisen from transport or initial installation. Remove any fitting or tube section that has been subjected to cuts, gouges or other excessive installation hazards. Make sure proper analysis of soil and soil chemistry has been completed. Make sure trench is prepared according to guidelines.

Soil Analysis. Do not install PEX tube or fittings in areas where known chemical spills have occurred or where a likely chemical spill can occur. Do not install AquaSeal tubing in soils contaminated with solvents, fuels, organic solvents, pesticides or other harmful materials for

plastic tubing or its fitting systems. Local plumbing code authorities and Comfort Pro should be contacted if there is a question on the installation or area of installation.

Note 1: Do not allow backfill weight to cause tube to become out-of-round beyond 5%. Do not over compact backfill.

Note 2: Comfort Pro recommends using a sleeve material for the entire length of the buried service main.

Trench Layout Guidelines. If the soil has been graded and deemed acceptable, the next step is to gauge the type of soil so that proper installation can proceed. Installations shall be made in an acceptable soil condition or prepared soil condition that supports the tube against future settlement. ASTM D2774 and Chapter 7 of PE Pipe Handbook (see bottom of page 25) shall be additionally referenced for plastic tube used for service work.

Installation In Different Soil Types

Good Soils. Tube may be directly installed on the trench bottom. Code should be referenced for embedment practices and necessary spacing requirements of the tube in the ground. Tube should be laid into trench with slack. Trench bottom is to be clear of any pits or humps as well as sharp objects. Test tube. Compact initial backfill to prevent settlement. Test after backfill.

Rocky Soils + Solid Rock. Tube shall have an additional 6" of trench dug below desired level of service tubing. Prepared trench bottom shall have a 6" layer of pea gravel or other non-sharp substrate trench base installed (pea gravel suggested). Prevent humps or pits where tubing will be laid. Test tube. Compact initial backfill to prevent settlement. Backfill with 6" of the substrate used for the base. Test after backfill.

Unstable Soils. Tube shall have an additional 4" of trench dug below the desired level of the service tubing. Prepared trench bottom shall have a 4" layer of pea gravel or other non-sharp substrate trench base installed (pea gravel suggested). Prevent humps or pits where tubing will be laid. Test tube. Compact initial backfill to prevent settlement. Backfill with 6" of the substrate used for the base.

Tubing Installation Requirements & Limitations

Continued

External Temperature

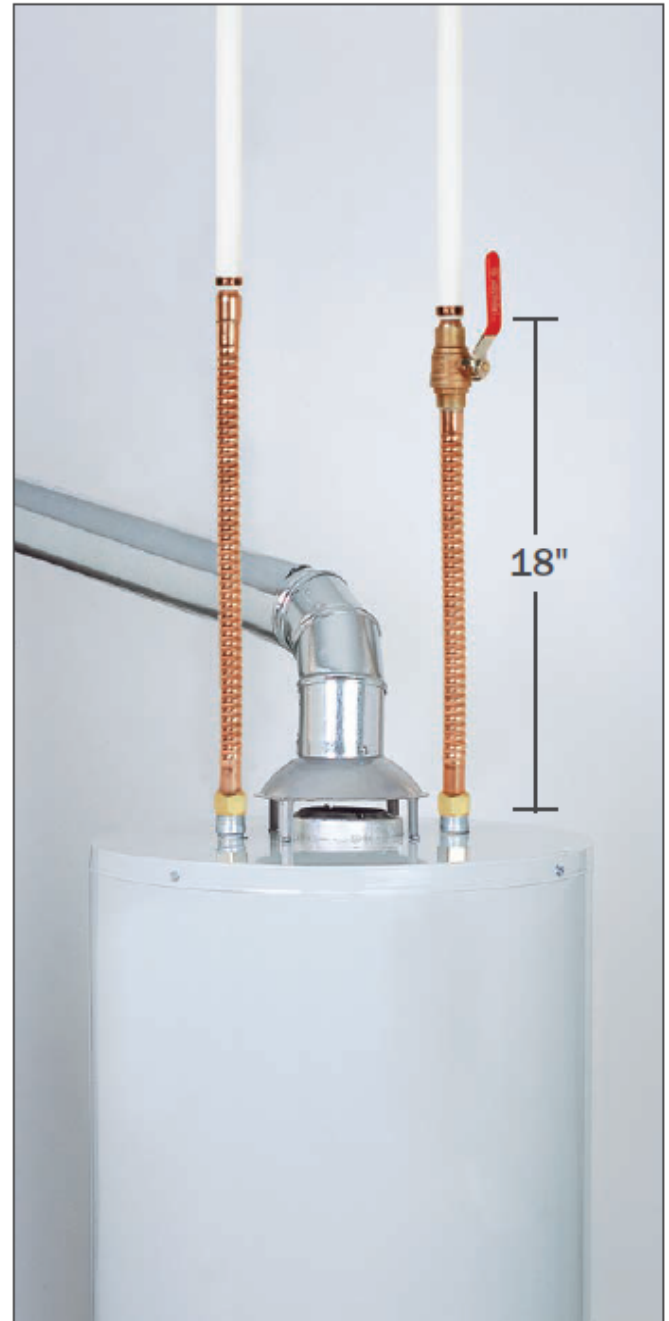
Soldering. Soldering shall be performed minimally 18" from installed PEX tubing unless a heat-trapping device is employed. Make all sweat connections and allow cooling prior to making PEX connections to PEX tubing.

Duct Work - Heating. Tubing shall be insulated from direct contact with heat transmission ductwork that has a possibility to exceed the maximum tubing working temperature of **150°F**. Tubing shall be kept 6" from gas appliance vents except those vents with a thermal protection approved for installation near plastic (PEX) tubing as explicitly called out by the manufacturer. In horizontal tube installations, keep tube 6" away from heat source.

Water Heater Connections. Connections to tubing shall be made minimally 18" from the water heater hot and cold connections on water heaters. Connections to tubing shall be made with metal transition fittings.

Heat Lamp + Lighting. Tubing shall be kept minimally 12" from heat source and proper protection shall be used to avoid overheating tubing. Keep tube protected and 12" from recessed lighting when installed in vertical alignment to heat source. If 12" distance is not available, proper insulation should be used to protect tubing where insulation maintains the necessary heating certifications for the application. PEX must be protected from any UV light-producing device.

Frozen Tubing. PEX tubing should not intentionally be frozen. The frozen section of tubing and the general area should be protected from further exposure to inadvisable installations. Heat the affected area or the blockage assuring that tubing does not overheat. Use a hand to test surface. Space heaters, warm towels, or warm water submersion are acceptable means to thaw tube.



Welding. Do not attempt to weld or fuse tubing.

Kinked Tube. Remove Kinked sections or sections of pipe that have exceeded maximum out-of-roundness.

Tubing Installation Requirements & Limitations

Continued

Vermin Protection

Protect tube from exposure to rodents or other nuisances that may damage the tubing.

Water Hammer Exposure

Water Hammer is generally defined as the damaging pressure surge and banging noise caused by the quick stoppage of the water column when a valve or faucet is turned off abruptly. PEX tubing, like all other materials, needs to be protected from water hammer by the installation of certified water hammer arresters. If left uncontrolled, the water hammer pressure surge can exceed the pressure ratings for the tube, causing damage to the system and/or system components. Both the UPC and IPC model codes require the installation of ASSE 1010 water hammer arresters, regardless of tubing material.

Bend Radius

If coiled tubing is being used and the bend direction is against the coil direction, multiply noted bend radius by a factor of 3. Warmer tubing bends more easily. Generally a bend radius of 8x tube diameter should be sufficient. To avoid undue stress on polymer fittings and connections, a minimum distance of 2x the tubing O.D. should be allowed before changing the direction of the tube. Comfort Pro recommends ALWAYS using a manufactured bend support to ensure the proper bend radius.

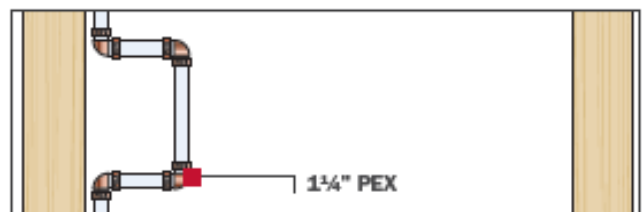
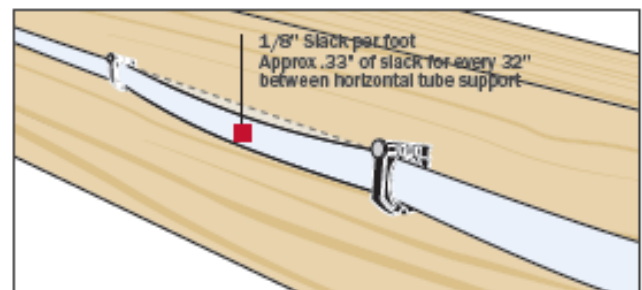
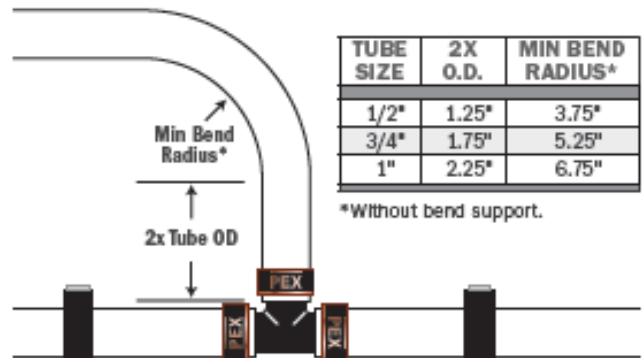
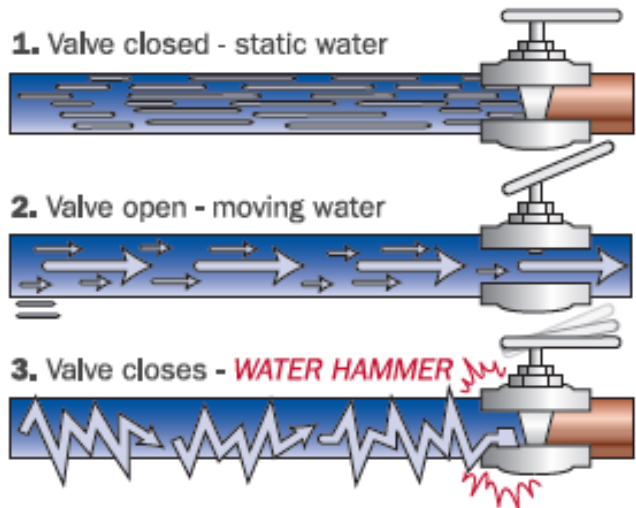
TUBE	MINIMUM BEND RADIUS	BETTER BEND RADIUS	COUNTER-COIL-SET BEND RADIUS
1/2"	3.75"	5"	11.25"
3/4"	5.25"	7"	15.75"
1"	6.75"	9"	20.25"

Thermal Expansion

Linear expansion of PowerPEX tubing is approximately 1.10" per 10°F ΔT per 100 ft.

Do not install tube supports or hangers too tightly. Allow for expansion of tube when bracketing and supporting PEX by allowing 1/8" slack for every 1 foot of linear installation.

For large tubing runs, a tube loop can be installed to allow for proper expansion and contraction.



Avoiding Common Problems

Avoid Scratching, Gouging, Cutting.
Always handle with care.



Metal tubing hangers with sharp edges and corners should be avoided. Metal, vinyl-coated tubing hangers specifically designed for uses with PEX tube are acceptable. A better option would be to use an approved plastic hanger.

Note: Acceptable Metal hangers may include PEX bend supports and straight-thru floor sleeves. Plastic PEX bend supports should be used when size and offering permit.

Tube hangers that can easily pinch the tube should not be used. Limit the 'ovaling' of the tube a hanger may cause. Tubing must not be crushed or bent beyond the materials min. bend radius and/or beyond 5% out-of-round by tubing hangers.

Chemical

PEX tubing is a durable, safe and chemical-resistant material that has exceeded the requirements of potable drinking water systems with the highest chlorine testing certifications possible. Tubing that exhibits damage caused by contact with the following should not be used: grease, tar, adhesive tapes, thinners, fuels, sealants, tube cements, fluxes, bleaches, other oxidizing agents and/or petroleum products.



- Do Not allow adhesives to continuously contact tubing. Remove any residue left by temporary or unintentional exposing tube and fittings.
 - Do Not use solvent-based paints or petroleum products on or in PEX tubing.
 - For compatibility of fire-protection materials that may contact PEX tubing, refer to fire-protection material manufacturer's instructions and recommendations. Do Not allow contact with acids or strong bases. Keep pesticides, fungicides, and other organic chemicals away from tube.
- Do Not attempt to glue or fuse to PEX tubing.

Electrical

Tube and tube/fitting system shall not be used as an electric ground.

Gas Use

Only use PEX tube in a manner consistent with the tubing identification marking and certifications. Only use PEX in applications presented within this manual and accepted through local and jurisdictional codes.

Ultraviolet (UV) Exposure

Do not store PEX tubing unprotected outdoors. Keep PEX tubing in the original packaging or under protective cover until time of installation. Ensure that exposure to sunlight during installation does not exceed the maximum recommended UV exposure time for the tube being installed.



Leak Testing Solutions

All leak-testing agents must be approved for PEX tubing. Some chemicals found in leak-detecting formulations can cause premature PEX tubing failure by developing micro-fracturing of the tube wall.

Polymer (PPSU/PSU) Fitting Limitations

Special considerations should be made when using polymer fittings in PEX systems.

Brass Fitting Limitations

Comfort Pro PEX fittings, valves and connectors/adapters are made from multiple materials. These fittings should be installed where allowed by code for hot/cold plumbing applications. For aggressive water jurisdictions prone to dezincification or for areas requiring no-lead fittings.

Do not allow PEX fitting barbs and fitting ends to be deformed or damaged. A fitting that exhibits a damaged sealing barb or sealing surface should be removed from service.



Avoiding Common Problems

Continued

Copper Fitting Limitations

Do Not install copper fittings in areas prone to copper deterioration. Do Not allow PEX fitting barbs and fitting ends to be deformed or damaged. A fitting that exhibits a damaged sealing barb or sealing surface should be removed from service.

Stainless Steel Fitting Limitations

Be sure these fittings are used as potable water fittings for the referenced applications within this manual. Stainless steel products should generally be protected from caustic environments that are known to degrade stainless materials including, but not limited to, high chlorine or bromine environments and/or other environments that produce halogens.

Buried or Concealed Joints

Comfort Pro permits AquaSeal joints (polymer and to be buried or concealed. ComfortPro recommends threaded connections never be buried or concealed as they must be accessible for periodic inspection, per building codes.

The requirement to wrap a PEX joint can depend on many factors including location and the presence of other materials that contact or can come in contact with the joint.

Concealed in Inaccessible Locations:

When PEX joints are concealed but are still in open air space (e.g. behind drywall), it is not necessary to wrap the joint. However, the installer should ensure the fittings do not come in contact with chemicals (e.g. PVC glues, solvents, cements) that could damage the fitting material. If it is determined that the joint should be protected, see below requirements for wrapping a AquaSeal joint.

Buried in a Concrete Slab or in The Sub-Base Undemeath the Slab:

ComfortPro does NOT recommend burying AquaSeal joints in concrete slabs. If joints must be buried in a concrete slab, or in the sub-base beneath the slab, they must be wrapped (see requirements below). In addition, the location of the joint should be marked and indicated on building drawings.

Buried in soil:

When burying AquaSeal joints in soil, outside of a structure, the joint must be wrapped (see requirements below).

Requirements for Wrapping a Aqua Seal joint

- Use linerless black rubber tape.
- Ensure a minimum of 50% overlap of the tape.
- Avoid wrinkles or kinks in the tape.
- Ensure the joint is completely covered, extending onto the pipe as necessary.
- Indicate the location of each joint as required on the 'as-built' drawings

Polymer Fittings Special Considerations for Use

Chemical Resistance:

Some chemicals can cause damage and should not come in contact with polymer fittings. These chemicals include (but are not limited to): Adhesives, petroleum based substances, paints, solvents, oxidizing agents, disinfectants, PVC primers/solvents/cements, leak detection liquids, oil/lubricants, pipe dopes, ethylene glycol, or other volatile compounds. It is the responsibility of the installing contractor to verify compatibility of any chemicals that come into contact with the PPSU fittings.



Polymer fittings that have been damaged by chemicals MUST be removed from service.

Spray-Foam Compatibility

Some spray-foam insulation products are approved for use with PEX tube and fittings. It is the responsibility of the installing contractor to refer to information provided by the insulation manufacturer and verify compatibility of any foam or chemical foaming agents that will come into contact with PEX tube and fittings, including polymer PEX fittings. If insulation manufacturer recommends wrapping PEX tube joints before application, see Section 5.5 for Requirements for Wrapping a PEX joint.

Heat / Flame:

Do not subject polymer fittings to open flame. Do not solder within 18" of polymer fittings. Flame or heating sources beyond material tolerances must be avoided.



U.V. / Sunlight:

Polymer fittings should be protected from UV exposure.



UV radiation can significantly decrease ductility, strength, and impact resistance. Fittings that have been exposed to harmful UV radiation should be removed from use.

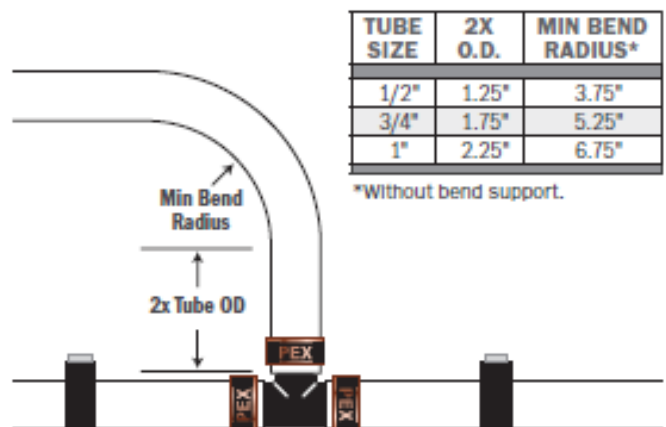
Temperature / Radiant Heating:

The maximum short-term working temperature (30 days) of fittings: 210 °F (99 °C) @ 150 PSI. Constant Working Temperature: 140 °F (60 °C) @ 55 PSI. PPSU fittings are suitable for radiant heating and cooling applications under the following conditions:

1. Use only propylene glycol - Max: 60% by volume
2. DO NOT USE ETHYLENE GLYCOL WITH PPSU FITTINGS
3. Maximum temp: 194°F (90°C) at 44 PSI
4. Recommended Corrosion Inhibitors: Metal Guard™ H50 (6% by volume), H60 (4% by volume), H80 (4% by volume)

Mechanical Stress:

Fittings should be kept free of mechanical stress. Do not subject polymer fittings to excessive impact. Do not subject fittings to torque exceeding 100 lbs. of force. Each joint should be properly supported. To avoid undue stress on polymer fittings and connections, a minimum distance of 2x the tubing O.D. should be allowed before changing the direction of the tube. ComfortPro recommends *always* using a manufactured bend support.





FACTORY WARRANTY

AquaHeat

Radiant Heating and Snowmelting Products

All AquaHeat barrier pex pipes and PEX-Al-PEX have a 30 year limited factory warranty against defects in material and workmanship. All AquaHeat manifolds, parts, and fittings also carry a 25 year limited factory warranty.

All Salus thermostats and controls have a 5 year limited factory warranty.

AquaSeal

Pex Piping & Plumbing Products

All AquaSeal pex pipes, fittings and accessories have a 25 year limited factory warranty against defects in material and workmanship. We warranty our potable products for 25 years regardless of what fitting system is used and will not alter our warranty if you use other manufacturers fittings. The warranty for AquaSeal pipe and fittings does not cover other manufactures products.

TerrePex

Pre Insulated Pex-A Piping Systems

All Terre-Pex Insulated Pipes, fittings, and accessories have a 10 year limited factory warranty against defects in material and workmanship.

All pex A pipes are manufactured in Israel and all pex B pipes are manufactured in the USA.

Within the first 10 years of above warranties, Comfort Pro Systems will cover reasonable costs in consequential damages if found to be the direct fault of Comfort Pro products and customer has taken necessary steps to stop damages to said property. Comfort Pro will not be responsible for labor or other costs associated with replacement of products.

*Please see website for more detailed warranty policies and procedures:
www.comfortprosystems.com*

Comfort Pro Systems, LLC

Distribution Center

24000 S. Peculiar Drive, Peculiar, MO 64078

Customer Service 816-425-9824

Phone (816)425-9824

Toll Free 800-968-8905

Fax (816)-479-4568

www.comfortprosystems.com

orders@comfortprosystems.com



“Your One Stop Shop for Pex”



AquaHeat



AquaSeal



AquaMelt



Terre-Pex

2400 S PECULIAR DRIVE, PECULIAR, MO 64078

WWW.COMFORTPROSYSTEMS.COM

1-800-968-8905