



WIRSBO®
Life, Safety, Comfort Systems

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AQUAPEX® Professional Plumbing Installation Guide

Hot and Cold Potable Water Systems

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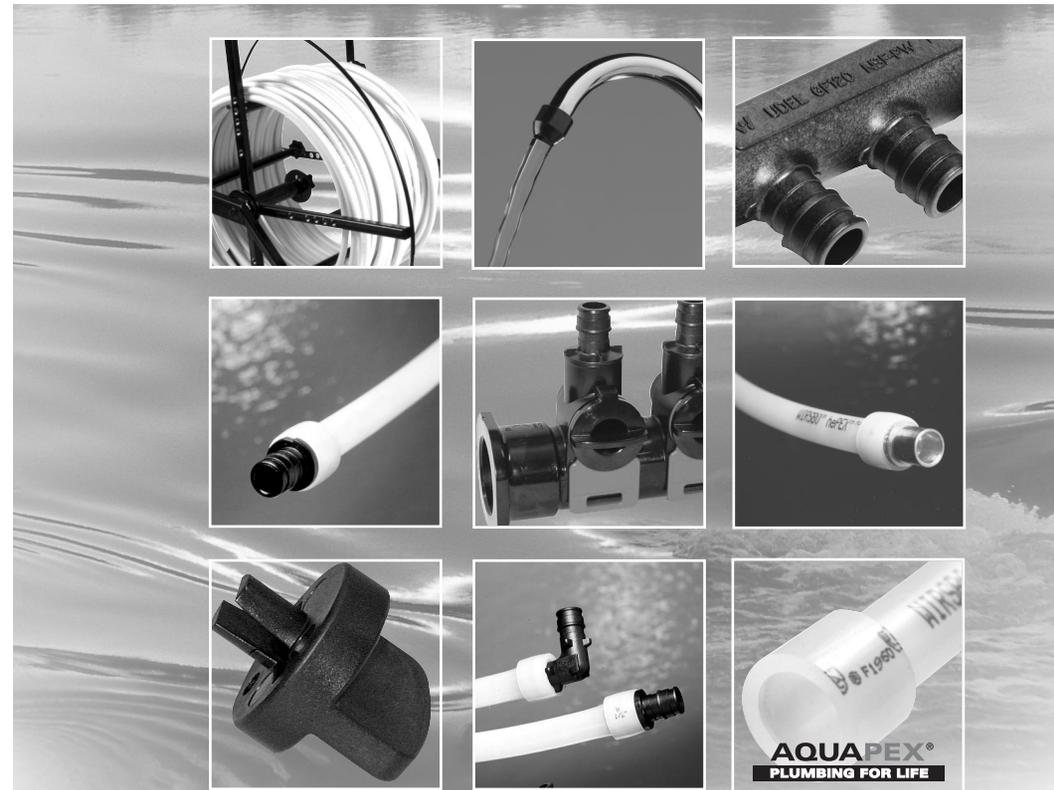
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AQUAPEX®

Installation Guide

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This installation guide is published for building officials and plumbing professionals interested in Wirsbo AQUAPEX® Professional Plumbing systems. This manual describes general installation recommendations that use Wirsbo AQUAPEX tubing products. Local code requirements should be followed.

Uponor Wirsbo has used reasonable efforts in collecting, preparing and providing quality information and material in this manual. However, system enhancements may result in modification of features or specifications without notice. For the most current technical information, go to the Wirsbo website at www.wirsbo.com.

Uponor Wirsbo is not liable for installation practices that deviate from this manual or are not acceptable practices within the mechanical trades.

Refer to the Wirsbo AQUASAFE® Installation Guide to install AQUAPEX tubing in our fire safety system.

Please direct any questions regarding the suitability of an application or a specific design to your local Uponor Wirsbo representative. For the name of your local representative, please call toll free (800) 321-4739.

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Section 1

The Wirsbo AQUAPEX® Plumbing System

The AQUAPEX plumbing system consists of AQUAPEX® tubing, ProPEX® fittings, axial press (APR) fittings, AQUACENTER™ manifolds and additional Wirsbo components.

PEX is an acronym for crosslinked polyethylene. The PE refers to the raw material used to make PEX (polyethylene), and the X refers to the crosslinking of the polyethylene across its molecular chains. The molecular chains are linked into a three-dimensional network that makes PEX remarkably durable within a wide range of temperatures and pressures.

Wirsbo manufactures PEX tubing using the Engel method, a hot crosslinking process. The actual crosslinking takes place during the extrusion process when the base polyethylene is above its crystal-melting temperatures. Classified within the industry as PEX-a tubing, Engel-method PEX is superior to other types of PEX, resulting in consistent, uniform and evenly crosslinked PEX — with no weak links within its molecular chains. Wirsbo AQUAPEX also demonstrates a great resistance to chemical-dissolving agents. The unique structure is stable and inert, and is unaffected by chemicals commonly found in plumbing and heating systems.

AQUAPEX tubing has been used in plumbing systems around the world for more than 30 years — longer than any other flexible plumbing system on the market.

Applications

Uses for AQUAPEX tubing include:

- Potable hot and cold water distribution
- Water service
- Hydronic radiant floor, radiant ceiling, baseboard and radiator connections
- Snow and ice melting systems
- Turf conditioning systems
- Fire protection systems
- Permafrost systems

Ratings, Standards, Listings and Codes

Our extensive listings and history of system testing means that Wirsbo AQUAPEX can be installed in many types of residential and commercial structures, including, but not limited to:

- Homes
- Townhomes
- Schools
- Daycare Centers
- Theatres
- Churches
- Nursing Homes
- Hotels
- Restaurants
- Gymnasiums
- Hospitals
- Apartments

Ratings

Wirsbo AQUAPEX has Standard Grade Hydrostatic Stress and Pressure Ratings in accordance with all four temperatures and pressures listed in Table 1 of ASTM F 876. AQUAPEX tubing is tested in accordance with Plastic Pipe Institute (PPI) TR-3 and listed in PPI TR-4. The Standard Grade hydrostatic ratings are:

- 200°F at 80 psi
- 180°F at 100 psi
- 73.4°F at 160 psi

The Hydrostatic Stress Board of PPI issues these pressure and temperature ratings.

AQUAPEX has an additional rating of 120°F at 130 psi in accordance with UL1821 for ½-inch tubing.

Standards

Wirsbo AQUAPEX, ProPEX advanced engineered plastic (EP), APR and brass fittings, copper manifolds and AQUACENTER are manufactured to the following standards.

- ASTM F876 “Standard Specification for Crosslinked Polyethylene (PEX) Tubing”¹
- ASTM F877 “Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems”
- ASTM F1960 “Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Crosslinked Polyethylene (PEX) Tubing”
- ASTM F2080 “Standard Specification for Cold-Expansion Fittings with Metal Compression Sleeves for Crosslinked Polyethylene (PEX) Pipe”
- ANSI/NSF Standard 14 “Plastics Piping System Components and Related Materials”

- ANSI/NSF Standard 61 “Drinking Water System Components – Health Effects”
- UL 1821 Thermoplastics Sprinkler Pipe & Fittings for Fire Protection Service (½" AQUAPEX only)
- The Canadian Standards Association Standard CAN/CSA B 137.5M, “Crosslinked Polyethylene (PEX) Tubing Systems For Pressure Applications”

¹ Compliance with ASTM F876 includes testing in accordance with ASTM 2023 “Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water”

Listings

Wirsbo AQUAPEX is listed with the following agencies.

- ANSI/NSF 14 and 61 Certified
- Council of America Building Officials (CABO) One and Two Family Dwelling Code
- ICBO Evaluation Service — ER Number 5143
- ICC ESR-1099
- UPC Listing — Files 3558, 3946, 3960
- U.S. Department of Housing and Urban Development (HUD) Material Release Number 1269

Codes

Wirsbo AQUAPEX listed to F876 and F877 is approved in the following model codes.

- International Plumbing Code (IPC)
- Uniform Plumbing Code (UPC)
- National Standard Plumbing Code (NSPC)

AQUAPEX is listed in the following model codes for water service.

- IPC
- UPC

Check with your local Wirsbo representative for code compliance in your area.

Tubing Identification

The labeling (print line) on AQUAPEX ½" tubing reads as follows:
 WIRSBO AQUAPEX® PEX 1006 ½IN SDR9/Ⓢ B137.5 POTABLE / Ⓢ UL1821/ULC-ORD C199P1(Ⓢ ASTM F876/F877/F2023)
 (ASTM F1960/F1807/F2098/F2080) / ICC ESR-1099/ ICBO ES
 ER4407/ HUD MR1269b(WHI-LISTED CAN/US FS25/SD50)/160PSI
 73.4°F/100PSI 180°F/80PSI 200°F
 WIRSBO-PEX-a TUBING UN04950127² xxxxxx³

Print Stream on Tubing	Explanation
WIRSBO AQUAPEX®	Brand Name
PEX 1006	ASTM F2023 testing I/A/W ASTM F876
½ IN	Tubing Size (example: ½ inch)
SDR9	Standard Dimensional Ratio of 9
Ⓢ B137.5 POTABLE	Potable Water Listing by CSA
Ⓢ UL1821 130PSI 120° UL 1821	Rating I/A/W UL 1821 (½" only)
ULC-ORD C199P	Canadian Rating I/A/W UL 1821 and C199P
Ⓢ ASTM F876/F877/F2023	Tubing Standards listed by NSF
ASTM F1960/F1807/F2098/F2080	Fitting Standards listed by NSF
Ⓢ	IAPMO Reports 3558, 3946, 3960
ICC ESR-1099	ICC Evaluation Services Report 1099
ICBO ES ER-4407	ICBO Evaluation Services Report ER4407
HUD MR1269b	HUD Material Release Report 1269b
WHI-LISTED CAN/US FS25/SD50	Warnock Hersey listing for 25/50 Plenum Rating
160PSI 73.4°F/100PSI 180°F/80PSI 200°F	Hydrostatic Ratings from PPI per ASTM F876
WIRSBO-PEX-a TUBING	Type of Crosslinking (PEX-a)
UN04950127	Manufacturing Code to audit material source
xxxxxx	Footage marker in increments of three feet

¹ For ½-inch tubing only

² (USA, Material Type, Extruder No., Year, Month, Day)

³ (Footage marking in increments of three)

Fire-resistant Standards

National building codes, such as the IBC and UBC, require that products used in construction meet specific standards. Wirsbo PEX has achieved the following fire-resistant construction ratings when tested in accordance with the applicable standards.

- ANSI/UL 263 (ASTM E119, NFPA No. 251) "Standard for Safety for Fire Tests of Building Construction and Materials"
 - UL Design No. L557 rating applies to ½" to 1½" AQUAPEX tubing, fittings and manifolds installed in one-hour wood frame floor and ceiling assemblies.
 - UL Design No. K913 rating applies to ½" to 1½" AQUAPEX tubing, fittings and manifolds installed in one- and two-hour concrete floor/ceiling unrestrained (and restrained) assemblies.
 - UL Design No. V444 rating applies to ½" to 1½" AQUAPEX tubing, fittings and manifolds installed in one-hour steel stud/gypsum wallboard wall assemblies.
 - UL Design No. U372 rating applies to ½" to 1½" AQUAPEX tubing, fittings and manifolds installed in one-hour wood stud/gypsum.
- ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
 - Certification of flame spread/smoke development rating of 25/50 in accordance with ASTM E84 for the following AQUAPEX sizes: ⅜", ½" and ¾"

Note: Our listing to ASTM E84 requires that tubing runs should be located at least 18 inches apart.

Firestop Listings

Numerous firestop manufacturers have tested their products with PEX tubing. These tests establish the installation procedures for installing the firestop around the PEX tubing at the penetration. These test assemblies are divided into sections based on the type of penetration (e.g., wall, floor and ceiling, etc.).

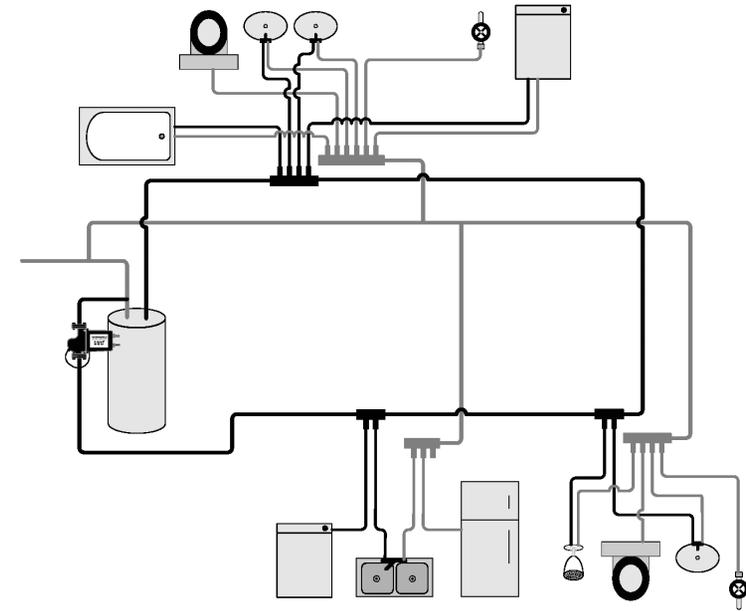
Not all caulks are approved for all penetrations. Ensure the penetration is sealed in accordance with the appropriate test assembly using that manufacturer's recommended type of firestop material. Larger penetrations may not use a caulk type of firestop, but rather a wrap or collar assembly may be required. Refer to the respective firestop manufacturer for more information pertaining to the appropriate application of their products.

Installation Options and Applications

The five installation options for AQUAPEX tubing are outlined in this section.

1. Structured Plumbing

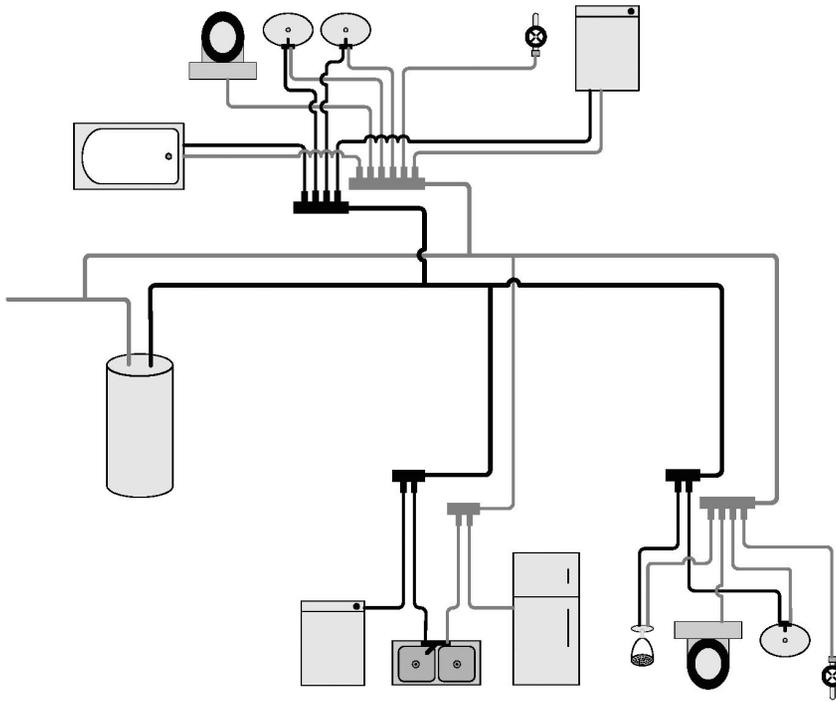
Remote Manifolds with On-demand or Timed Recirculation



Installation Considerations

- Manifolds are located near fixture groups.
- The short drop length (from supply line to fixtures) minimizes the amount of water that needs to be purged for hot water to flow from a fixture.
- An extension of the hot water supply line becomes a return line to allow recirculation of hot water.
- On-demand recirculation provides significant water and energy savings.
- This method takes advantage of the benefits derived from the flexibility of PEX tubing.
- This installation method features a significant reduction in the number of individual connections (compared to run-and-branch).

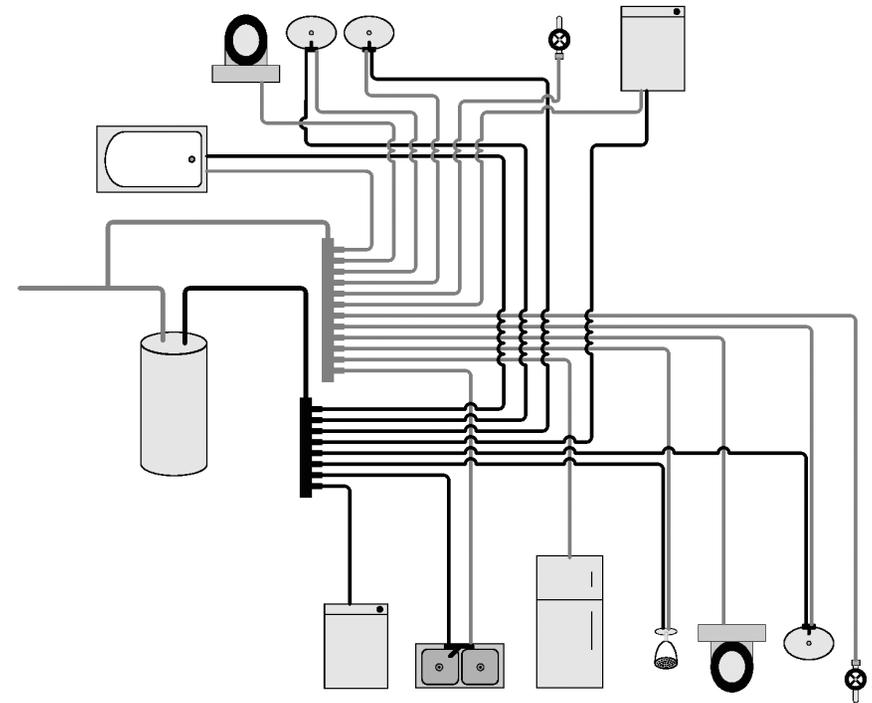
2. Remote Manifolds



Installation Considerations

- Close-end manifolds are located near fixture groupings.
- Valveless manifolds (i.e., branch manifolds) are typically used.
- This method takes advantage of the flexibility of PEX tubing.
- This installation method features a significant reduction in the number of individual connections (compared to run-and-branch)

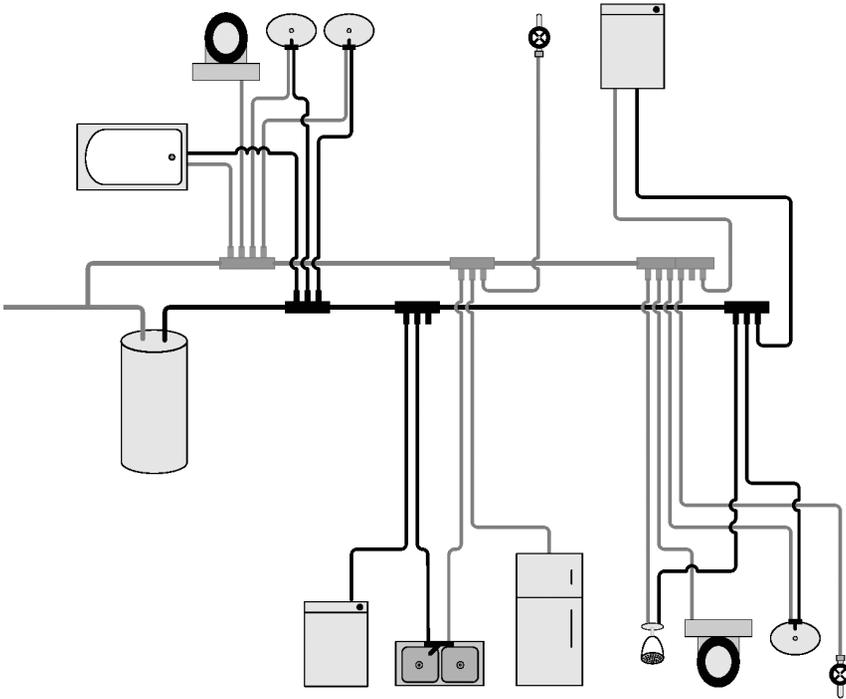
3. Home-run (Parallel Piping) Installation



Installation Considerations

- Centralized manifold(s) distribute water to points-of-use.
- Manifolds may be valved or valveless, and located near a hot water source and cold water incoming supply.
- If valved manifolds are used, supply of water to fixtures may be controlled at the manifold (check local codes).
- This installation method features dedicated supply lines from manifold to each individual fixture.
- This method minimizes the number of connection points (fittings) in overall system.
- This method may require more tubing (total length) than in other configurations.
- High tubing density at some points requires space planning.
- This method can result in reduced waiting time for hot water at fixtures if dedicated supply lines are shortened.

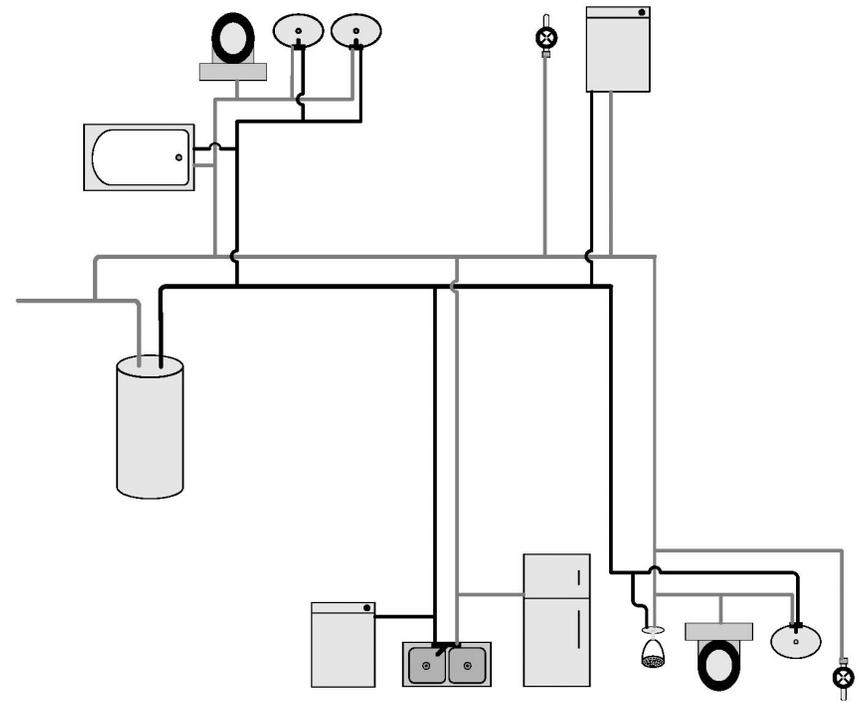
4. Modified Home-run Installation



Installation Considerations

- This method is similar to home run, but uses several flow-through sub-manifolds instead of centralized manifolds.
- Sub-manifolds may be either valved or valveless, (typically valveless so they can be installed behind a wall or in an inaccessible location).
- This method typically uses less tubing (total length) than a home-run system.
- This method features lower tubing density (at some points) than the home-run method.
- This method may provide faster hot water delivery to individual fixtures compared to some other configurations.

5. Run-and-branch Installation



Installation Considerations

- This is the same method as used for configuring rigid plumbing systems (copper or CPVC).
- A directional fitting (e.g., tee or ell) is used each time as necessary to change the direction of a tubing run.
- This method requires more fittings than most other configurations.
- The flexibility of PEX is not used to best advantage.
- Hot water delivery may be slow due to the large volume of water in the system.

Applications

Recirculation Systems

Based on our extensive history of use and testing, Wirsbo provides the following guidelines for using AQUAPEX tubing, brass and EP ProPEX fittings and APR fittings in recirculating systems.

1. Wirsbo highly recommends using an on-demand type of domestic hot water recirculation system for optimized system performance. An on-demand system delivers hot water only when called for by the end user, providing fast hot water delivery while maximizing water and energy savings. AQUAPEX is ideally suited for systems operating up to 140°F.
2. Wirsbo AQUAPEX may be used in timed recirculation systems operating at temperatures not exceeding 140°F.
3. AQUAPEX may be used in continuous recirculation systems operating at temperatures not exceeding 140°F.
Note: Wirsbo does not promote the use of continuous recirculation due to excessive energy waste.
4. The tubing is marked with the following designation as required by ASTM F876-03: PEX 1006. The first digit indicates chlorine-resistance testing. 1=Compliance with ASTM F876 chlorine-resistance testing. 0=no chlorine resistance or not tested.
5. Do not exceed the published temperature and pressure ratings of the tubing.
6. The risk of scalding may be increased by the use of recirculation systems. Thus, Wirsbo recommends limiting the delivered water temperature to 120°F in all cases.

AQUASAFE Residential Fire Safety Systems

AQUASAFE was developed by Wirsbo as a residential fire sprinkler system that is installed in combination with the cold side of the domestic potable water system in the home. Only licensed contractors trained by Wirsbo can install this system. Contact your local Wirsbo representative for more information concerning training and project support for AQUASAFE.

Combined Potable Water and Hydronic Heating Systems

Wirsbo AQUAPEX is used in combined potable water and hydronic heating systems only where allowed by code. Depending on the heating control strategy employed, these systems typically do not

exceed 140°F. Should the system water temperature exceed 140°F, the installing contractor is responsible for providing anti-scald devices to protect the inhabitants. In addition, the installer must ensure, and is responsible for, providing weekly off-season (summer) circulation through the heating portion of the system to prevent water stagnation.

Refer to your local plumbing and heating code official as to whether these combined systems are allowed in your area. If allowed within your area, ensure a proper heat loss and design is completed that considers the loss of heat energy between the two systems and the resulting impact on either system's performance.

Hydronic Heating Systems

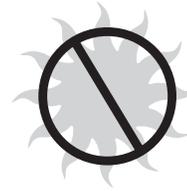
Wirsbo AQUAPEX can be used in closed-loop hydronic heating systems operating at sustained temperatures up to 180°F, provided any issues concerning oxygen diffusion are properly addressed. Corrodible or ferrous components may not be used in a system designed with Wirsbo AQUAPEX unless these components are isolated from the tubing.

Please see the Wirsbo Complete Design Assistance Manual (CDAM) for information about using AQUAPEX in hydronic radiant heating systems. Refer to the Wirsbo Snow & Ice Melting Design Manual for information about using AQUAPEX for snow-melting applications.

Working With AQUAPEX Tubing

Storing and Handling PEX

Caution:



- Do not store PEX tubing outdoors.
- Keep PEX tubing in the original packaging until time of installation.
- Ensure that exposure to sunlight during installation does not exceed the maximum recommended UV exposure time of 30 days.

Uncoiling PEX

We recommend the Wirsbo Select Uncoiler (E6062000) or Wirsbo Tube Uncoiler (E6061000) to facilitate convenient uncoiling. If one is not available, construct a suitable uncoiler.

Bending PEX

The minimum bend radius of AQUAPEX is six times the outside diameter.

Bend supports are available for $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1" AQUAPEX, and may be used to facilitate 90-degree rigid bends.

Reforming Kinked Tubing

If the tubing is kinked and hinders flow, repairs can be made easily.

1. Make sure the system is not pressurized.
2. Straighten the kinked portion of the tubing.
3. Heat the kinked area to approximately 265°F with an electric heat gun (approximately 450 watts of power). Apply the heat evenly until the tubing returns to its original size and shape. Do not use an open flame.
4. Let the repaired AQUAPEX tubing cool undisturbed to room temperature. When the tubing returns to its opaque appearance, the repair is complete.



Caution: Temperature of the tubing surface must not exceed 338°F. Do not apply direct flame to AQUAPEX.

AQUAPEX tubing repaired according to these recommendations will return to its original shape and strength. If AQUAPEX is sliced, punctured or otherwise damaged beyond the capacity of the crosslinked memory, it is necessary to install a ProPEX or APR coupling. Crosslinked polyethylene cannot be welded or repaired with adhesives.

Note: You may temporarily affix adhesive tape to PEX tubing or EP fittings during installation. However, to protect the integrity of the system, the tape should not be permanent. Remove the tape and residual adhesive after completing the installation.

Thawing Frozen Tubing

AQUAPEX tubing has the ability to withstand extreme freeze-thaw cycles better than other tubing or pipe. The crosslinking of the tubing allows it to expand and absorb much of the expansion energy from the freezing process. No tubing product is freeze-proof, but AQUAPEX is extremely resistant to freeze damage.

If freezing occurs, the contractor should advise the end user to correct the lack of insulation or heat to eliminate the problem from reoccurring.

Should the PEX tubing experience an ice blockage, use the following methods of thawing the tubing.

1. Pour hot water over the affected area of the tubing.
2. Wrap hot towels around the affected area of the tubing.
3. Place a small portable heating in the area to heat the space and thaw the ice blockage from the tubing.
4. Slowly heat the affected area of the tubing with a heat gun. Rub your hand over the area while heating the tubing to ensure the tubing does not get too hot.
5. Use a commercial system that pumps hot water to the ice blockage and returns the cooled water to be reheated.

Handling Guidelines: PEX Tubing

Although not comprehensive, the following highlights the most common guidelines when handling Wirsbo tubing.

- Install Wirsbo systems according to the manufacturer's installation instructions. Failure to follow the instructions and installation guidelines set forth in the installation guide can result in the failure of Wirsbo systems.
- Do not use Wirsbo PEX where temperatures and pressures exceed ratings.
- Do not use or store Wirsbo PEX where it will be exposed to direct sunlight for more than 30 days.
- Do not weld, glue or use adhesives or adhesive tape with Wirsbo PEX.¹
- Do not apply open flame to Wirsbo PEX.
- Do not install Wirsbo PEX within 6 inches of any gas appliance vents, with the exception of double-wall B-vents, which have a minimum clearance of 1 inch.
- Do not install Wirsbo PEX within 12 inches of any recessed light fixtures, unless the PEX line is protected with suitable insulation.
- Do not solder within 18 inches of any Wirsbo PEX tubing in the same water line. Sweat connections must be made prior to making the ProPEX connection.
- Do not use Wirsbo PEX to convey natural gas.
- Do not install Wirsbo PEX between the tub/shoulder valve and tub spout.
- Do not use Wirsbo PEX for an electrical ground.
- Do not spray on or allow organic chemicals, pesticides, strong acids or strong bases to come into contact with Wirsbo PEX.
- Do not use petroleum or solvent-based paints on Wirsbo PEX.
- Use only approved and appropriate firestop materials with Wirsbo PEX.
- Do not allow rodents, insects or other pests to come into contact with Wirsbo PEX tubing.
- Do not subject Wirsbo PEX to impact.
- During remodeling or ceiling repair, implement appropriate precautions to protect the tubing from damage.
- Wirsbo PEX and fittings are intended for use in systems outlined on **page 1**.

¹ You may temporarily affix adhesive tape to PEX tubing during installation. However, to protect the integrity of the system, the tape should not be permanent. Remove the tape and residual adhesive after completing the installation.

ProPEX Fittings

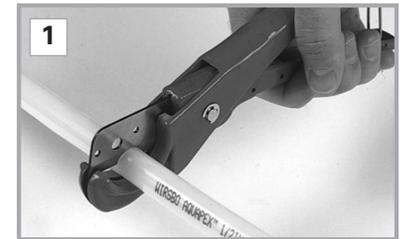
Wirsbo ProPEX fittings, manufactured to ASTM F1960, are designed for use with AQUAPEX ASTM F876 and F877 tubing. Make connections by sliding a ProPEX Ring over the PEX tubing and expanding them simultaneously. The expanded tubing and ProPEX Ring then slide over the fitting. The connection is made as the PEX tubing shrinks over the fitting because of the unique shape memory of AQUAPEX. ProPEX fittings come with a 10-year warranty when installed by a Wirsbo-trained installer.

Wirsbo offers ProPEX fittings made from engineered plastic (EP) or brass. Both are NSF-61 certified.

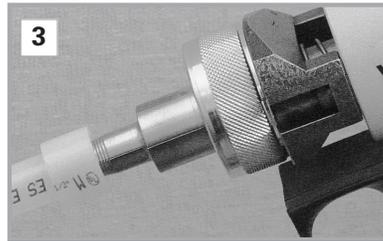
Making ProPEX Connections

Make strong, reliable connections using one of Wirsbo's expander tools (battery, air or hand). The steps are virtually the same for all three tools – with a slight variation in step 3.

1. Square cut the PEX tubing perpendicular to the length of the tubing. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the ProPEX Ring over the end of the tubing. Extend the end of the ring over the end of the tubing no more than $\frac{1}{16}$ of an inch (1mm).
3. When using the ProPEX Hand Expander Tool, brace the free handle of the tool against your hip, or place one hand on each handle. Fully separate the handles and slide the expander head into the tubing until it stops. Full expansions are necessary to make a proper connection. Bring the handles together to expand. Separate the handles, remove the head from the tubing and rotate it $\frac{1}{8}$ turn. Slide the tool head into the tubing in the newly rotated position and expand again.



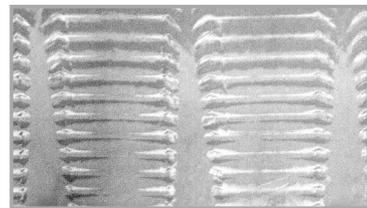
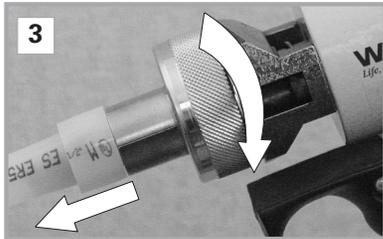
When using the ProPEX Air or Battery Expander tools, slide the expander head into the tubing until it stops. Full expansions are necessary to make a proper connection. Press the trigger to expand. Release the trigger, remove the head from the tubing and rotate it $\frac{1}{8}$ turn after each expansion. Slide the tool head into the tubing in the newly rotated position and expand again.



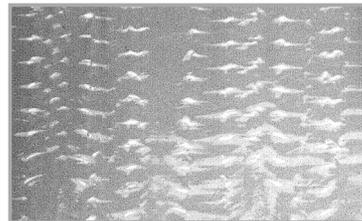
Note: For the hydraulic Battery Expander Tool, you will hear a click after each expansion.



Important: Rotate the tool one-eighth turn in either direction after **EACH** expansion to provide smooth and even expansion of the tubing. If the head is not repositioned after each expansion, the segments on the tool head may cause deep grooves in the tubing. These grooves can result in potential leak paths.



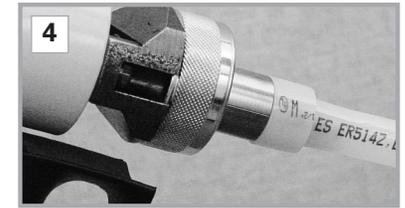
Expansion without proper rotation



Expansion with proper rotation

Note: It is not necessary to rotate the tool in only one direction. Alternating the turning direction will ease expansion in confined spaces. The photos above show enlarged views inside expanded tubing.

4. Repeat the expansion process until the tubing and ring are snug against the shoulder on the expander head. See **Chart 4-1** for the recommended number of expansions for each tubing size.



Tubing Size	Ring Marking	Head Marking			# of Expansions		
		Manual	Air Exp	Battery Exp	Manual	Air Exp	Battery Exp
$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	—	4-5	4-5	6-7
$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	—	3-4	3-4	3-4
$\frac{3}{4}$ "	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$\frac{3}{4}$ "H	7-9	7-9	6-7H
1"	1"	1"	1"	1"H	12-14	12-14	6-7H
$1\frac{1}{4}$ "	$1\frac{1}{4}$ "	—	—	$1\frac{1}{4}$ "H	—	—	6-7H
$1\frac{1}{2}$ "	$1\frac{1}{2}$ "	—	—	$1\frac{1}{2}$ "H	—	—	6-7H

Chart 4-1

Note: H referenced in the table above refers to the H-series expander heads.

5. Immediately remove the ProPEX expander tool. As you slide the tubing over the fitting, you should feel some resistance. If the tubing reaches the shoulder of the fitting without any resistance, the tubing may be over-expanded and may require additional time to fully shrink over the fitting. The tubing and ProPEX Ring should seat against the shoulder of the fitting for a proper connection.



Important Tips for a Proper ProPEX Connection

- If the fitting does not slide into the tubing all the way to the stop, immediately remove it from the tubing and expand the tubing one final time.
 - Note:** To avoid over-expanding the tubing, do not hold the tubing in the expanded position.
- The number of expansions in **Chart 4-1** is the recommended number of expansions. Experience, technique and weather conditions influence the actual number of expansions. Fewer expansions may be necessary under certain conditions. The correct number of expansions is the amount necessary for the tubing and the shoulder of the fitting to fit snugly together.

- Good connections result when the PEX ring rests snugly against the stop of the ProPEX fitting shoulder. If there is more than $\frac{1}{16}$ of an inch between the ring and the shoulder of the fitting, square cut the tubing 2 inches away from the fitting, and make another connection using a new ProPEX Ring.

Making $\frac{3}{8}$ " ProPEX Connections

The $\frac{3}{8}$ " ProPEX Ring is smaller and thicker than the ProPEX Rings used for other tubing sizes. The $\frac{3}{8}$ " ProPEX Ring must be expanded once on each side to properly fit over the tubing. Expansion of the PEX ring is only necessary for $\frac{3}{8}$ " AQUAPEX.

1. Square cut the $\frac{3}{8}$ " AQUAPEX tubing perpendicular to the length of the tubing.
2. Expand each side of $\frac{3}{8}$ " ProPEX Ring with the ProPEX Expander Tool once.
3. Slide the expanded $\frac{3}{8}$ " ring over the end of the tubing. Extend the end of the ring over the end of the tubing no more than $\frac{1}{16}$ " (1mm).

Once the $\frac{3}{8}$ " PEX ring is properly expanded and on the tubing, refer to Steps 3 to 5 on **pages 19 to 22** for further instruction.

Important Tips for a Proper $\frac{3}{8}$ " ProPEX Connection

- When the temperature is above 40°F, ProPEX connections to $\frac{3}{8}$ " AQUAPEX tubing require four to five expansions. When the temperature is below 40°F, only four expansions are necessary.
- The thicker ProPEX Ring used for $\frac{3}{8}$ " ProPEX connections shrinks over the fitting faster than other size rings.

Disconnecting a ProPEX Brass Fitting

ProPEX brass fittings are manufactured connections and can be concealed in walls, ceilings and floors.

However, when necessary, ProPEX Brass Fittings can be disconnected (APR and EP fitting cannot be reclaimed or reused). To disconnect a ProPEX brass fitting:

1. Make sure the system is not pressurized.
2. Use a heat gun to heat one side of the ProPEX Ring. When the ring is clear, use a utility knife to carefully cut through the ring. Care should be taken to cut only the ring and not the tubing. This will protect the fitting from being gouged by the knife. Remove the ProPEX Ring from the tubing with pliers or another tool to avoid touching the hot ring.

Note: Do not gouge the fitting when cutting the ProPEX Ring. Nicks and gouges in the fitting may result in leaks. If nicked, discard the fitting.

3. When the ProPEX Ring is removed, apply heat directly around the fitting and tubing connection. Gently work the tubing back and forth while pulling slightly away from the fitting until the tubing separates from the fitting.
4. When the tubing is removed from the fitting, square cut the tubing 2 inches (minimum) from the end of the tubing.
5. Use a new ProPEX Ring and follow the steps to make a new ProPEX connection. Allow the fitting to cool before attempting to make another connection.

Troubleshooting ProPEX Connections

Trouble-free ProPEX installations begin with a ProPEX Expander Tool that is maintained in proper working condition. If the tool or segment fingers are damaged, it is very difficult to make a proper connection. The following troubleshooting suggestions are designed to assist with problems in the field.

For Fittings That Will Not Seal:

- Make sure the expander head is securely screwed onto the tool (hand-tightened).
- Make sure the segment fingers are not bent. If the head does not completely close when the battery tool's drive unit is fully retracted or the handles of the manual tool are open, replace the head.
- Examine the tool for excess grease on the segment fingers. Remove excess grease prior to making ProPEX connections.
- Examine the fitting for any damage. Nicks and gouges on the fitting will cause the fitting to leak.
- Make sure the internal driver cone is not damaged or bent.
- Make sure the last expansion is not held in the expanded position before the fitting is inserted. The longer the tubing and ProPEX Ring are held in the expanded position, the greater the chance for a leak.
- Be sure to rotate the tool one-eighth turn after EACH expansion.

If Expansion is Difficult:

- Make sure the internal cone is properly greased.

If the Expansion Head Slips out of the Tubing When Making Expansions:

- Ensure the tubing and ProPEX Ring are dry.
- Make sure that grease is not getting into the tubing.
- Examine the segment fingers to make sure that none are bent.

If the ProPEX Ring Slides Down the Tubing During Expansion:

- Ensure your hands are clean while handling the tubing. Any sweat or oils on your hands can act as a lubricant. Due to the smoothness of PEX, any form of lubricant can cause the PEX ring to slide across the tubing during expansion.
- If you anticipate the ring may possibly slide down, position the ProPEX Ring slightly farther over the end of the tubing and make the first couple of expansions slowly. Once the ring and the tubing begin to expand together, you can continue with the normal number and type of expansions.
- Place your thumb against the ProPEX Ring to help support it and feel for any movement. If caught early, you can slide the ring up the tubing and expand as described in the previous bullet point.

If More Than the Recommended Number of Expansions are Needed to Make a Connection:

- Make sure that the head is hand-tightened to the expander tool.
- Examine the segment fingers to make sure that none are bent.
- Be sure to completely cycle the tool on each expansion, (e.g., close the manual tool handle or release the battery expander tool trigger).

Cold Weather Expansions

- Temperature affects the time required for the tubing and ring to shrink onto the fitting. The colder the temperature, the slower the contraction time.
- Warming ProPEX fittings and ProPEX Rings reduces contraction time. Put fittings and rings in your pockets prior to installation to keep them warm.
- ProPEX connections must be made at temperatures above 5°F (-15°C).
- Fewer expansions are necessary in temperatures below 40°F.

Proper Expander Tool and Head Maintenance

The ProPEX expander tools are sturdy, but must be handled with care to prevent possible damage to the cone and the expander heads.

- Remove and clean the segment fingers as needed.
- Remove the segments from the attachment ring by pushing the segment finger down toward the opening in the ring. Once the first segment is removed, the rest follow easily.
- Place the segments on a flat surface with the ridges facing up. The fingers should lay flat without any curve in the middle. If the segments are bent, replace the head immediately.
- To reassemble, replace the segment fingers one at a time to the attachment ring by sliding the grooved portion of the segment fingers over the spring in the attachment ring. The narrow end of the segment fingers point away from the solid side of the attachment ring. Hold these segment fingers in place with your thumb as the remaining segment fingers are inserted.
- Once the expander head is cleaned and reassembled, use a lint-free cloth to apply a light coat of lubricant to the cone prior to making any ProPEX connections.
- Apply the lubricant daily if used regularly.
- Keep all other parts of the tool free from lubricant.
- The Hand Expander Tool handles will open and close smoothly if the tool is properly lubricated.
- Failure to properly lubricate the tool may result in improper connections.



Caution: Excessive lubrication may result in improper connections. Only use a small amount of lubrication to keep the tool working properly.

- Once a month, soak the heads in degreasing agent to remove any grease from between the segments. Clean the cone using a clean, dry cloth.
- Store the tool and expander heads in the case. Store the tool with an expansion head in place to protect the cone.
- Store the tool in a dry location to prevent rust.

Handling Guidelines: EP Fittings

Although not comprehensive, the following highlights the most common guidelines.

- Do not solder within 18 inches of any EP fittings in the same water line. Sweat connections must be made prior to making the ProPEX connection.
- Do not subject EP fittings to impact.
- Do not use adhesives or adhesive tape with Wirsbo EP fittings.¹
- Do not expose EP fittings to open flame.
- Do not allow solder, flux, pipe dope, solvents or urethane foams to come in contact with EP fittings as immediate damage may result.
- Never pull or drag tubing by the installed EP fittings.
- Do not expose EP fittings to excessive bending loads (greater than 100 lbs.).
- Do not use Wirsbo EP fittings where temperatures and pressures exceed ratings.
- Do not spray on or allow organic chemicals, strong acids or strong bases to come into contact with Wirsbo EP fittings.
- Do not use petroleum or solvent-based paints on EP fittings.
- Do not allow rodents, insects or other pests to come into contact with Wirsbo EP fittings.

¹ You may temporarily affix adhesive tape to EP fittings during installation. However, to protect the integrity of the system, the tape should not be permanent. Remove the tape and residual adhesive after completing the installation.

APR Fittings

The Wirsbo APR fitting system complements our ProPEX fitting technology, and is designed to provide an optional method for connecting AQUAPEX.

APR fittings use an expander tool to expand the tubing enough to insert a brass fitting, and a ratchet tool to slide a brass sleeve over the tubing and the fitting.

Note: The APR tools and expander heads are not interchangeable with the ProPEX tools and expander heads.

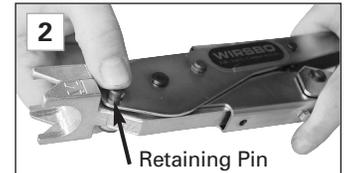
Making APR Connections

Make APR fitting connections by following these steps.

1. Prepare the APR Blunt Expander Tool.
Before placing the expander head on the tool, ensure the APR Blunt Expander Tool cone is clean. Apply a very thin film of graphite grease on the cone, if needed. Hold the tool by its swing handle and thread the expander head onto the tool.



2. Select and prepare the proper APR Ratchet Tool, red (1/2- and 3/4- inch) or black (all sizes). To change jaws on the APR Ratchet Tool, open the handles slightly to relieve pressure against the jaws. Push the retaining pin back and pull the head of the pin away from the tool.



Pull the jaw from the tool. Repeat the procedure for the other jaw. To install a new jaw set, reverse the removal sequence. Each jaw set is labeled with the respective PEX tubing size.



Make sure the jaws form a "V" when installed.



Push the release pin down on the handle to reset the tool handles for storage. The reset pin should face down when stored in the case.



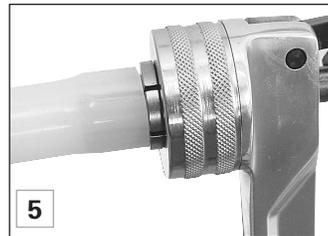
3. Cut the PEX tubing. Make a clean perpendicular cut on the tubing using only an appropriate PEX tubing cutter. Do not use knives, hacksaws or other means of cutting the tubing. Ensure the cut end of the tubing is free of burrs or jagged ends.



4. Install the appropriate size brass sleeve onto the tubing. Ensure the flush end of the sleeve with the fitting marking (e.g., size, designation, etc.) is placed onto the tubing first. The 30-degree beveled end of the sleeve must face the cut end of the tubing. Slide the sleeve far enough down the tubing so it does not interfere with the expansion.



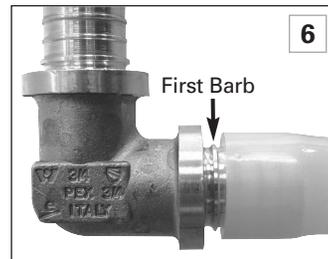
5. Expand the tubing twice. Ensure the proper expander head is installed on the tool prior to expanding. Hold the APR Blunt Expander Tool by its swing handle and insert the nose of the expander head into the PEX tubing until the tubing is against the shoulder of the expander head. While keeping slight pressure against the tubing and tool, bring the handles together for the first expansion. Next, fully open the handle and rotate either the tool or the tubing one-eighth turn and complete the second and final expansion.



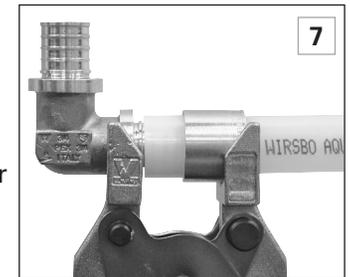
Note: Do not use the ProPEX Expander Tool for APR fittings.

6. Quickly remove the APR Blunt Expander Tool and insert the appropriate fitting into the tubing. Slide the brass sleeve toward the fitting.

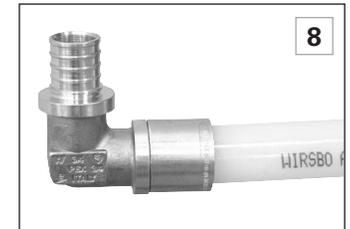
Note: The tubing should stop before the first barb located next to the fitting shoulder, but not past it.



7. Align the PEX tubing, brass sleeve and APR fitting onto the APR Ratchet Tool. Once in place, ratchet the tool to slide the brass sleeve over the tubing and fitting. Stop ratcheting the tool once the brass sleeve is snug against the shoulder of the fitting.



8. Visually inspect the fitting. Remove the APR Ratchet Tool from the fitting assembly and ensure the fitting is secure and complete. The maximum gap between the brass sleeve and the shoulder of the fitting should not exceed 1/32 of an inch.



Note: You cannot reuse or reclaim an APR fitting.

9. Close the fitting. The minimum distance between two fittings in line is 6 inches from the shoulder of one fitting to the shoulder of the other fitting. This distance will ensure room for making the second fitting without damaging the tools or experiencing difficulty with the brass sleeve.

Water Service Phase

Handling and Repairs

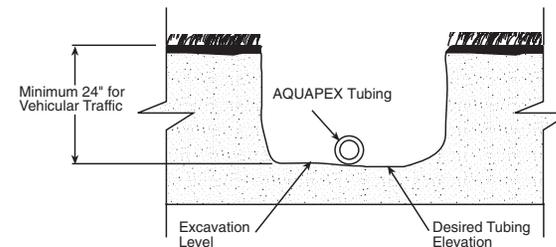
Although AQUAPEX is highly resistant to kinking and abrasion, it is important to take care while handling and installing the tubing to prevent damage and possible failure of the tubing. If damage occurs during installation, the area should be cut out and repaired before backfilling.

To reform kinked tubing, see **Section 3**. If damaged beyond the tubing's thermal memory capacity, use a ProPEX Repair Coupling. Do not reuse or reclaim APR or EP fittings.

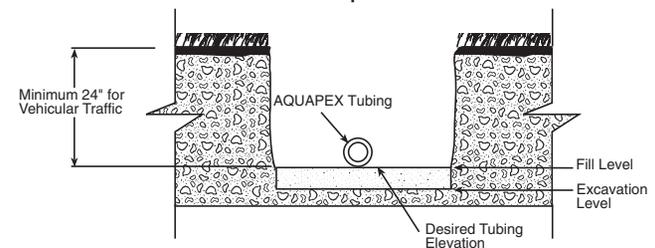
Trench Bottom Preparation

To achieve a satisfactory installation, it is essential that the supporting soil provides a stable and continuous support for the tubing.

Good Soil Conditions — If the trench is cut smoothly, install the tubing directly on the prepared bottom. The bottom must be flat with no hollows, lumps or rocks.



Poor Soil Conditions — In rocky, clay, muddy or other poor soil conditions, it may be necessary to prepare the trench bottom using granular material of such size and grading to provide a stable base. See your local code for additional requirements.



Installation

Install AQUAPEX tubing underground in a manner that ensures external loads will not subsequently cause a decrease in the vertical dimension of the cross section of the tubing that exceeds 5% of the outside diameter. Install AQUAPEX tubing in a snaking pattern with sufficient slack in the line to provide an allowance for contraction of the line due to temperature change prior to backfilling. The linear expansion rate for AQUAPEX is approximately 1.1 inch per 10°F temperature change for every 100 feet of tubing.

Note: Do not use blocking to support the tubing or change the tubing grade. Do not install potable water service tubing in, under or above cesspools, septic tanks, septic tank drainage fields or pits.



Caution: Do not install AQUAPEX tubing in soil environments contaminated with solvents, fuels, organic compounds, pesticides or other detrimental materials that may cause permeation, corrosion, degradation or structural failure of the tubing. Where such conditions are suspected, perform a chemical analysis of the soil or groundwater to ascertain the acceptability of AQUAPEX for the specific installation. Check your local codes for additional requirements.

Joining Methods and Fittings

Use ProPEX or approved compression fittings to connect tubing to itself or to the corporation and curb stops. Check with Wirsbo or the fitting manufacturer for application suitability and proper usage instructions.

For applications requiring direct burial, Wirsbo offers DZR brass ProPEX fittings for Wirsbo large dimension AQUAPEX tubing. DZR brass is a low lead material that is resistant to aggressive soil and water and meets the requirements of NSF 61.

Note: Water service fittings designed for SDR-9 tubing, such as Mueller 110 and Philmac #2 (¾-inch) and #3 (1-inch) fittings, are approved for AQUAPEX tubing in cold water service applications. Other fittings designed for SDR-9 tubing may also be used. A polyethylene stiffener is required for use with these fittings. Please contact the fitting manufacturer for temperature and pressure ratings.

Tubing Embedment

Proper soil selection, placement and compaction are essential in the area around the tubing. Backfill the tubing with sand or gravel of ¾-inch maximum particle size.

Compact the initial backfill around the tubing to provide adequate tubing support and prevent settlement. It is particularly important to adequately compact the soil around the tap connection. It is recommended to pressurize the tubing prior to backfilling to reveal any damage. In heavy vehicular traffic areas, compact backfill to 90% of maximum soil density.

Do not use highly plastic clays, silts, organic materials or sharp or large rocks as backfill in the immediate vicinity of the tubing. Compact the backfill from the subgrade to a level per local code that will cover the tubing 4 to 6 inches to provide protection around the tubing and to prevent settlement that puts stress on the fittings and the tubing.

For additional information about proper embedment practices, refer to ASTM D2774, *Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping* or AWWA report TR31, *Underground Installation of Polyolefin Piping*.

Water System Disinfection

AQUACENTER manifolds and AQUAPEX tubing should be disinfected in accordance with AWWA C651-86, Standard for Disinfecting Water Mains, or in accordance with local codes.



Important: To prevent reduced service life of system components, disinfection solutions should not stand in the system longer than 24 hours. Flush the system with potable water after disinfection.



Caution: Do not allow fluids to freeze in the AQUACENTER valved manifold system.

Ground and Top-out Stage of Installation

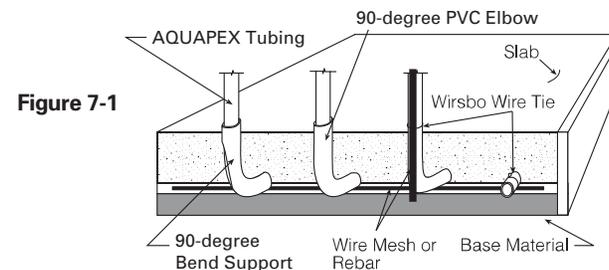
After the service water line has been installed into the building, the next area to focus on is the ground work under and in the soon-to-be-poured concrete. The level of activity during the ground work stage varies by area of the country. Areas doing primarily slab on-grade construction may put the bulk of the tubing in the slab or run it overhead in the attic. Traditional homes with basements will run the majority of tubing within the building framework.

Parts Inspection

Prior to starting a project, ensure all required material for that day is onsite to eliminate work delays. Contractors should be trained to evaluate component suitability for installation. Check for material defects, incomplete parts or shipping damage. Also check to see the correct amount and type of PEX tubing is onsite to start the project.

Installing AQUAPEX During Ground Work

- Secure tubing using Wirsbo wire ties at the intervals necessary to keep the tubing from floating up during the pour.
- It is preferred to use continuous lengths of AQUAPEX (no splices) when installing tubing within or under concrete slabs.
- When bending, entering or exiting the slab, Wirsbo 90-degree bend supports or PVC elbows are recommended to reduce the possibility of kinking the tubing during the pour or subsequent construction. Supports also ensure proper tubing placement when exiting the slab.



- When exiting a slab, a bend support is not required for abrasion protection.
- Maintain pressure on tubing installed in slab during the pour to facilitate leak detection.

- If you anticipate tubing will be exposed to sunlight for more than 30 days, sleeve it to protect against damage.
- At the entry and exit points of the slab, cover the end of the tubing with a suitable black poly sleeve to prevent dirt and debris from entering the system.
- Only EP or dezincification resistant (DZR) brass fittings are approved for direct burial in soil. EP fittings can be embedded directly into concrete. DZR brass fittings should be wrapped if embedded in concrete.
- If the tubing runs through an expansion joint, protect with a sleeve or dip below the joint. See **Figures 7-2 and 7-3**.

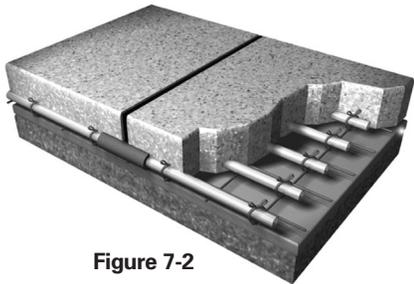


Figure 7-2

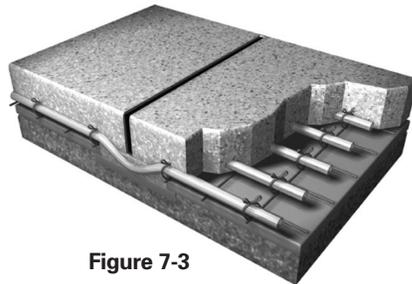


Figure 7-3



Caution: If the tubing is damaged during the pour, the preferred method is to use a ProPEX EP coupling to repair. If using a brass ProPEX or APR coupling, wrap with a protective cover and make a note of the repair location in the concrete floor.

Installing AQUAPEX in Frame Construction

Tubing Runs

- Leave extra tubing at the beginning and end of runs to simplify connection to manifolds and fittings. Immediate connection to the manifold simplifies installation.
- Ensure runs are as direct as possible between the manifold and the fixture it supplies.
- Insulate hot water tubing runs where code requires, or as necessary.
- Consult local building codes for information on where and how to drill through load-bearing construction.
- In residential or non-return plenum applications, you may bundle tubing runs together unless prohibited by local code.



Caution: When installing in attics, install tubing below the insulation to protect from excessive heat or cold.

Recessed Lighting

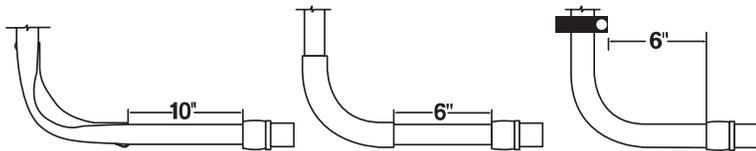
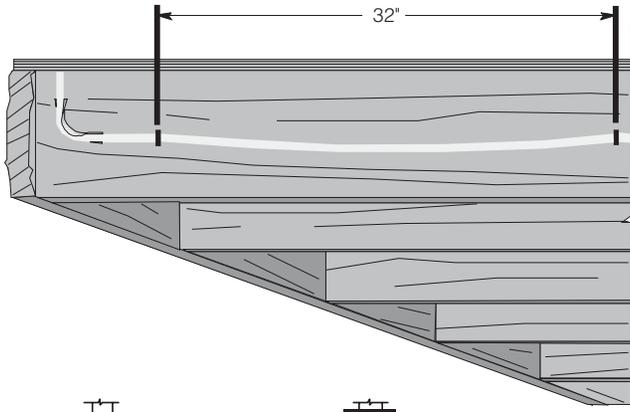
There are two types of recessed lights: Type I.C. (Insulated Ceiling) — direct contact with thermal insulation and Type Non-I.C. (Non-insulated Ceiling) — 3-inch minimal clearance with thermal insulation.

- If there is not enough room in the joist cavity to meet the 12-inch restriction stated by Wirsbo, then insulation is required.
- The insulation must be rated to withstand the temperatures generated by the fixture.
- All tubing that is within 12 inches of the recessed light must be insulated with closed-cell polyethylene, polyolefin or other suitable pipe insulation for 12 inches on either side of the light.
- Insulation is required anytime a UV light source is used; tubing must be protected for direct UV exposure.

Tubing Supports

- Plastic tubing supports are recommended. Metal tubing supports designed for use with plastic tubing may be used.
- Do not use supports that will damage the tubing. Inspect metal supports for sharp edges.
- The linear expansion rate for AQUAPEX is approximately 1.1 inch per 10°F temperature change for every 100 feet of tubing.
- When installing tubing runs, allow $\frac{1}{8}$ to $\frac{3}{16}$ -inch longitudinal clearance per foot of run to accommodate thermal expansion. Do not allow tubing to dip excessively between supports. Do not pull tubing tight during installation.
- Do not rigidly anchor AQUAPEX tubing with supports to allow tubing to expand and contract.
- Allow adequate clearance between PEX tubing and the structure (bored holes or sleeves) to allow tubing to move freely due to thermal expansion and contraction.

- Along horizontal runs, install supports every 32 inches for 3/8", 1/2", 3/4" and 1" AQUAPEX. If horizontal runs are continuously supported (truss to truss), place tubing supports at 6-foot intervals.



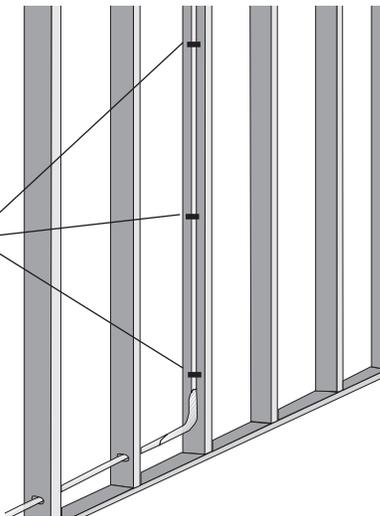
Metal Bend Support
3/4" and 1" Tubing

Plastic Bend Support and Tube Talon
3/8" and 1/2" Tubing

- Along vertical runs, install supports and a mid-story guide every 4 to 5 feet at each floor.



TUBING SUPPORTS



- Bends within 6 inches of a connection require a tube talon or bend support (for 3/8", and 1/2" AQUAPEX). For 3/4" and 1" tubing, support is required for bends within 10 inches of a ProPEX connection.

Manifold Placement

- Refer to **Section 9** for information concerning manifold placement and installation procedures.

Common Components

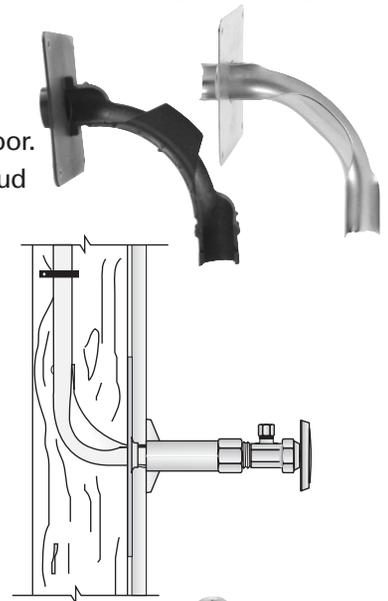
Bend Supports

- Bend Supports are used to hold the tubing in a 90-degree bend — commonly used when exiting the slab to control the tube's direction above the slab.
- Bend Supports are available in metal and plastic for 3/8", 1/2" and 3/4" PEX.
- PVC conduits are used for 3/8" to 1" PEX. The PVC conduits are used primarily when exiting the slab with only a couple feet of tubing left to install.
- The PVC conduits sleeve over the PEX tubing. The metal and plastic bend supports can snap onto the tubing anywhere along the tubing.



Drop Ear Bend Supports

- Drop Ear Bend Supports provide a rigid, connection-free, 90-degree exit from a standard 2" x 4", or larger, stud wall or floor.
- Nail the flange to the front edge of the stud for support. A horizontal brace is required to position the Drop Ear Bend Support between two studs.
- Drop Ear Bend Supports are available in metal and plastic for 3/8" and 1/2" PEX.
- Use a standard 5/8-inch O.D. stop to provide a shut-off at the fixture. ProPEX stops are also available from Wirsbo.



Note: Drawing shows use of optional chrome sleeve. The sleeve provides a protected, finished appearance.

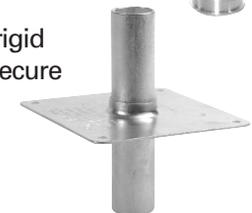
Drop Ear Elbows

Wirsbo Drop Ear Elbows provide a rigid 90-degree bend and the ability to secure 3/8" or 1/2" AQUAPEX where it exits a stud wall or connects to a showerhead.



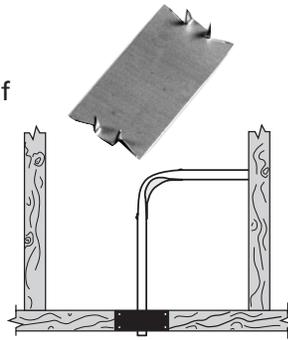
Metal Straight-through Support

- Wirsbo Straight-through Supports provide rigid straight-through support and the ability to secure AQUAPEX tubing as it exits a wood floor.



Steel-plate Protectors

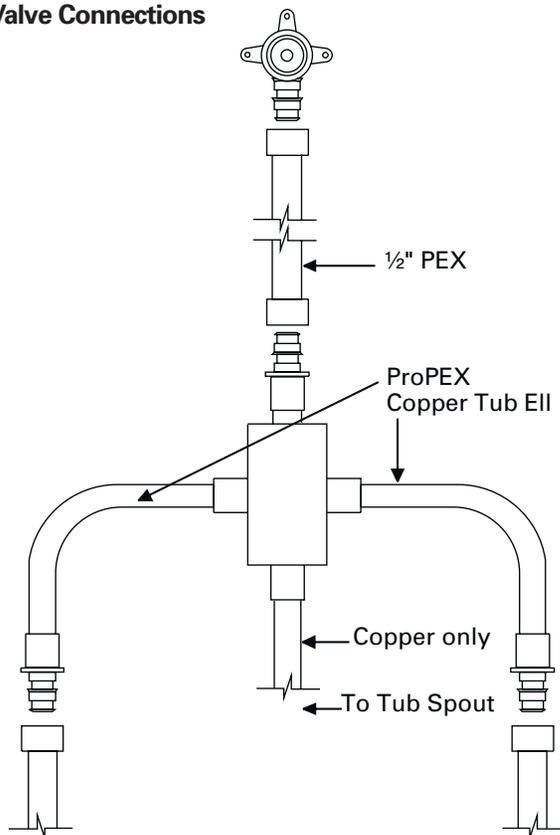
- Protect installed tubing from possible damage. If tubing is in danger of being pierced by drywall, paneling, trim screws or nails, etc. during or after construction, safeguard with suitable steel-plate protectors.
- If AQUAPEX tubing passes through hollow masonry walls or metal studs, always protect with suitable sleeves or grommets.



Water Hammer Arrestors

- AQUAPEX will withstand repeated pressure surges well beyond its rated pressure capacity.
- AQUAPEX will dampen sound eight times more than metallic pipe.
- Water hammer arrestors are only advisable if local code requires them.

Shower Valve Connections



ProPEX Copper Tub Ell

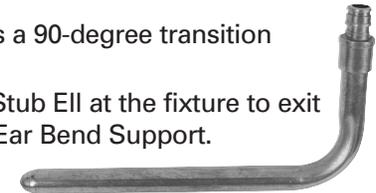
- ProPEX Copper Tub Ell provides a 90-degree transition from tub and shower valve to AQUAPEX.

⚠ Caution: Do not use AQUAPEX to connect the tub/shower valve to the tub down spout.



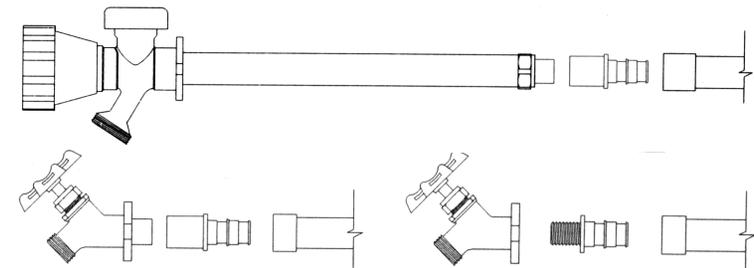
ProPEX Copper Stub Ell

- Wirsbo Copper Stub Ell provides a 90-degree transition from AQUAPEX to copper.
- You may use a ProPEX Copper Stub Ell at the fixture to exit from the wall instead of a Drop Ear Bend Support.



Hose Bib

- Connect AQUAPEX to frost-free hose bibs using a ProPEX Threaded or Sweat Adapter.
- Be sure to rigidly anchor the hose bib behind the wall to prevent it from becoming loose with heavy use.



Pressure Testing the System

- Pressure test the system to the system working pressure (40 to 60 psi) at the current ambient temperature. Pressure testing should not exceed 100 psi. Slight fluctuations of pressure are normal due to ambient temperature changes.
- The valves on the AQUACENTER Valved Manifold must be open prior to pressure testing. These valves are to remain open until the pressure test is complete.

Ice Maker Connections

- Use the Wirsbo Ice Maker Outlet Box (Q4838809) or ProPEX In-line Ice Maker Tee (Q4455050) to supply an ice maker.
- Connect AQUAPEX using a ½" ProPEX Connection.



Washing Machine Outlet Box

- Use the Wirsbo Washing Machine Outlet Box (Q4838864) to transition AQUAPEX to washing machine valves.
- Connect AQUAPEX to the valves using ½" ProPEX Connection.



Final Stage of Installation

During the final stage of installation the finishing items are installed in the structure. Lavs, tubs and water closets are set and connected. This section discusses the supporting components installed during this stage.

AQUAPEX Risers

AQUAPEX ¾" O.D. Risers must be installed with delrin rings (included with the risers) and are available in the following sizes.

- 12" Lav
- 20" Lav
- 30" Lav
- 36" Lav
- 12" Closet
- 20" Closet



Lav Risers

- AQUAPEX Lav Risers are sold with a delrin ring. Metal washers are sold separately.
- The metal washer assures that the riser is compatible with compression nuts with various hole sizes.
- If the plastic ring is used, do not use an insert. If a metal ring is substituted, a ¼-inch insert is required.
- AQUAPEX LAV Risers are listed to NSF 14 and 61.

Note: Wirsbo recommends ¼-inch AQUAPEX riser washers in hot-water applications.

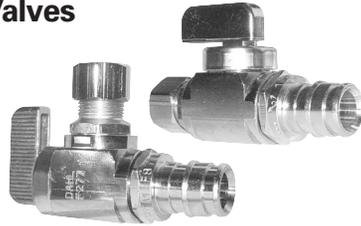
Closet Risers

- Closet Risers are compatible with off-the-shelf compression nuts.
- Closet Risers are sold with a delrin ring.
- Closet Risers are not sold with the metal washer. Do not use the metal washer to connect to closets.
- If the plastic ring is used, do not use an insert. If a metal ring is substituted, a ¼-inch insert is required.

Note: Do not heat AQUAPEX risers to remove kinks. Do not install kinked or damaged risers.

ProPEX Straight and Angle Stop Valves

ProPEX Straight and Angle Stops allow AQUAPEX to connect to the stop with a ProPEX connection. Please refer to **Section 4** to review ProPEX connections.



Compression Quarter-turn and ProPEX Stop Valves (Straight and Angle)

Because AQUAPEX tubing has the same outside diameter as standard copper tubing, you can use standard straight and angle stops with AQUAPEX tubing. An insert stiffener is required. The insert comes with Wirsbo stops, or it may be purchased separately.

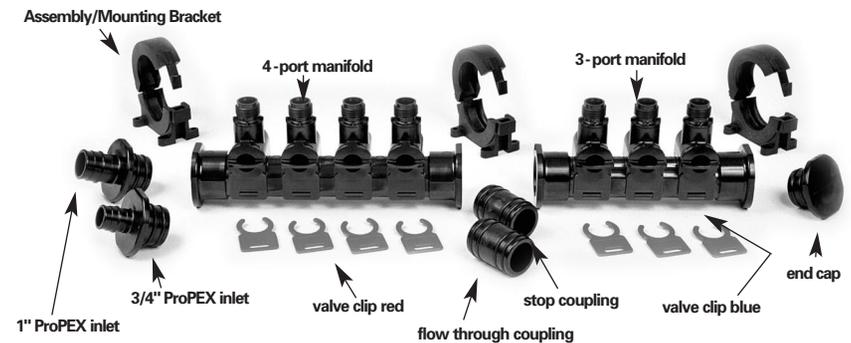
1. Square cut the tubing perpendicular to the length of the tubing.
2. Place the nut and then the compression ring over the end of the tubing.
3. Use the brass compression ring that comes with the stop.
4. Install the insert into the tubing end. Be sure the insert is completely seated against the end of the tubing.
5. Wrap threads with Teflon tape.
6. Slowly tighten the compression nut to the opposing thread.

Note: Retighten all compression fittings after initial installation. Wait 30 minutes to allow the tubing to relax, and then retighten each fitting.

Manifold Installation

Wirsbo offers a full line of manifolds for all plumbing applications. The AQUACENTER family of valved and valveless manifolds is made from advanced EP, which is suitable for hot and cold-water distribution systems. That same durable material is also used in Wirsbo's EP Branch and Flow-through Manifolds. Complementing the plastic EP manifolds are Wirsbo Copper Manifolds — branch, flow-through, valved and valveless.

This section discusses the installation of all Wirsbo manifolds used with AQUAPEX. The AQUACENTER Valved Manifolds have very detailed assembly, placement, mounting and testing instructions due to their versatility of installation.



Manifold Placement

Review the installation options shown in **Section 2** to determine the best method for the building construction. With the exception of AQUACENTER Manifolds and the ProPEX and APR Valved Manifolds, most manifolds are located near their intended use. In a smaller structure, a basic home-run method works best because the point-of-use fixtures are within 12 to 15 feet of the utility room. Larger structures are likely to incorporate the combination method with remote manifolds.

Before installing any AQUAPEX manifolds, review the following guidelines and local plumbing and building codes.

AQUACENTER Manifold Placement Guidelines

- Install the AQUACENTER Valved Manifold in a fully accessible location. The opening should be large enough to allow complete servicing of the manifold (mounting screws, distribution lines, etc.).

- When local code allows, the AQUACENTER Valved Manifold may be installed in a fire-rated wall provided that the access door meets the same rating requirements as the wall and is installed over the access opening.
- To maximize potential water and energy savings, mount the AQUACENTER Valved Manifold as close as is practical to the hot water source.
- The AQUACENTER Valved Manifold may be supplied from a recirculating hot water loop.
- When the home requires more than one unit due to the number of fixtures or size of the home, consider sub-manifolds and locating a remote AQUACENTER manifold near an outlying group of fixtures. Also consider dividing high-demand fixtures between the units.

EP and Copper Manifolds Placement Guidelines

- ProPEX EP and Copper Manifolds do not require access since the ProPEX connections are classified as manufactured instead of mechanical fittings.
- ProPEX Copper Valved Manifolds should have access in order to adjust the outlet valves.
- APR Copper Manifolds do not require access since the APR connections are classified as manufactured instead of mechanical fittings.
- APR Copper Valved Manifolds should have access in order to adjust the outlet valves.

AQUACENTER Valved Manifolds

AQUACENTER Valved Manifolds are used in home-run installation methods. Place the fixture stop valve at the manifold location instead of at the point-of-use. PEX lines run directly to each fixture from the manifold, reducing the number of required fittings.

AQUACENTER Valved Manifold Installation

Before you begin, gather appropriate tools and materials.

Tools Required

- Screw gun or electric drill
- ProPEX Expander Tool (Q6295075, Q6301000 or Q6251500)
- ProPEX Expander Tool Heads
- Tubing Cutter (E6081125)
- 3/4" and 1 1/4" wood drill bits

Materials Required

- 1" wood screws (for valved manifold mounting)
- 1/2" or 3/4" plywood – only required when mounting between studs
- AQUAPEX tubing
- AQUACENTER Valved Manifold Kit (includes valve-turning tool and hot/cold labels)
- ProPEX Swivel Adapters (1/2" or 3/8" for 1/2" NPSM-threaded outlets only)
- Tubing Uncoiler (recommended)



Assembling the AQUACENTER Valved Manifold

You may assemble the AQUACENTER Valved Manifold prior to mounting or as it is mounted.

1. Determine the total number of outlets required for both the hot and cold manifold assemblies and the appropriate inlet/end cap arrangement.
2. AQUACENTER Valved Manifolds are assembled with Flow-through Couplings (Q2121313) or Stop Couplings (Q2121251).



Flow-through Coupling

3. Insert the coupling into the end of the manifold until it stops. Attach the next manifold to the coupling and install the Assembly/Mounting Bracket (Q2120020).



Assembly/Mounting Bracket

4. Insert the 3/4" ProPEX inlet (Q2120750) or 1" ProPEX inlet (Q2121000) into the appropriate end of the manifold assembly. Install the Assembly/Mounting Bracket.
5. Insert the End Cap (Q2121250) into the other end of the manifold assembly. Install the Assembly/Mounting Bracket.
6. Ensure that all Assembly/Mounting Brackets are fully locked and the release tabs are located on the front (valve) side of the manifold.
7. For hot water distribution, install the Red Valve Clips (Q2120001), included in the kit, prior to the manifold installation. Remove the Blue Valve Clips (Q2120002) by grasping the clip and pulling up and away from the outlet. Rotating the clip away from the tab on the valve while pulling may simplify removal.



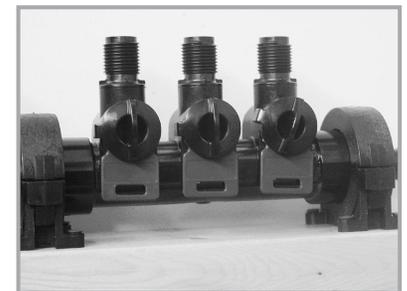
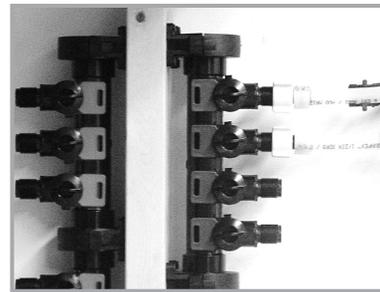
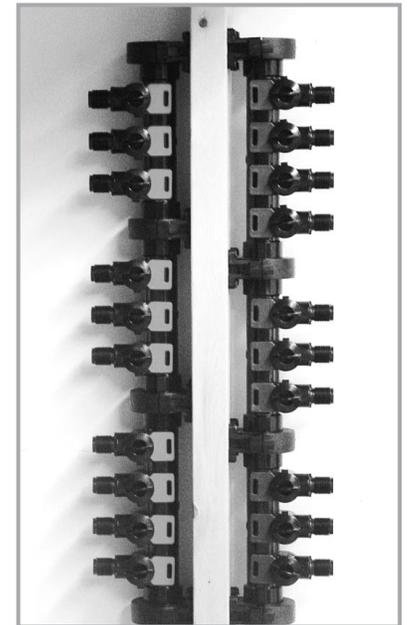
Note: If insertion of components is difficult, lubricate the o-rings with a soapy water solution.

Mounting AQUACENTER Valved Manifolds

1. Always mount manifolds in locations that are easily accessible and allow valves to face outward.
2. Always ensure that the release tab on the Assembly/Mounting Bracket is accessible.
3. Provisions must be made to support the tubing runs as they exit the AQUACENTER Valved Manifold. Any bend within 6 inches of a ProPEX connection to 3/8" and 1/2" AQUAPEX tubing requires a tube talon, bend support or stud. For 3/4" and 1" tubing, support is required for bends within 10 inches of a ProPEX connection.
4. Do not over tighten mounting screws – over tightening may cause the Assembly/Mounting Brackets to fail.
5. When mounting on a stud, center the Assembly/Mounting Bracket on the stud to allow the bracket to open sufficiently.
6. When surface mounting, manifolds must be mounted with fasteners appropriate for the wall surface. If surface mounting to sheetrock, brackets should align with as many studs as practical.
7. Extended driver bits simplify Assembly/Mounting Bracket installation, and allow mounting of the manifold in a fully assembled configuration.

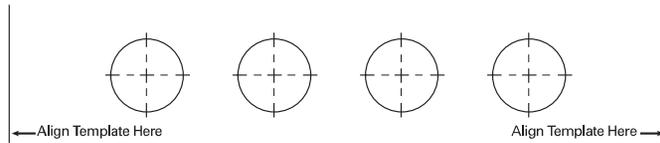
8. To run distribution lines through studs, the drill guide provided may be helpful.
9. When the AQUACENTER Valved Manifold is mounted above the water heater, install a minimum of 36 inches of connecting tubing between the water heater and the AQUACENTER Valved Manifold due to chance of heat stacking.
10. When the AQUACENTER Valved Manifold is mounted beside the water heater and is connected with tubing incorporating a horizontal flow, connect with at least 18 inches of tubing.

Caution: When the AQUACENTER Valved Manifold is installed prior to wall-finishing operations, protect the unit from paint, texture compounds and drywall dust.

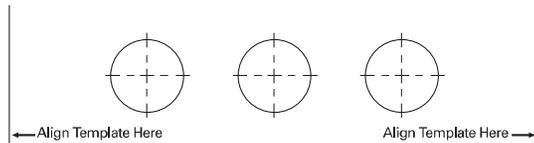


Using the Drill Guide

The drill guide, included with each AQUACENTER Valved Manifold, is used to mark locations of distribution holes that are drilled through the studs. The distribution lines may pass through these holes as they are attached to the AQUACENTER Valved Manifold ports. Use one drill guide to mark all studs.



AQUACENTER™ Valved Manifold 4-Port Outlet Pattern



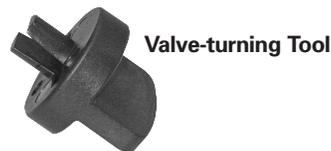
AQUACENTER™ Valved Manifold 3-Port Outlet Pattern

1. Fasten the drill guide template so that the holes are in the center of the stud.
2. Mark the appropriate number of holes on the stud by lancing a pencil through the crosshairs of the drill guide.
3. Remove the guide and drill holes.

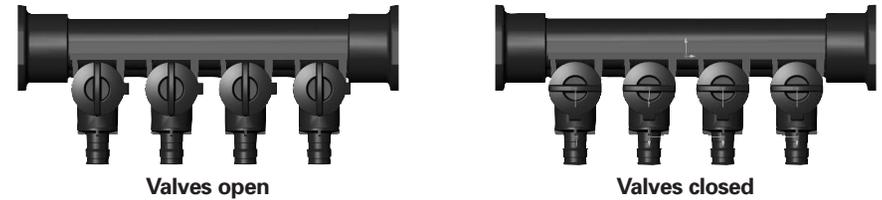
Connecting AQUAPEX to the AQUACENTER Valved Manifold

1. The manifold is available with $\frac{3}{4}$ " or 1" ProPEX supply connections and either $\frac{1}{2}$ -inch threaded outlets (to connect with a ProPEX swivel adapter) or direct ProPEX connections.
2. Please refer to **Section 4** for instructions on making a proper ProPEX connection.
3. If using the swivel adapter to thread onto the manifold, start thread and hand-tighten until snug, plus a quarter turn. Do not over tighten the swivel connections or use tools.
4. Open all valves after completing each connection.

Note: Valves are quarter turn only. Turn valves counter-clockwise to open, and clockwise to close. Do not turn past the valve stop. Use the valve-turning tool to open and close valves.



Caution: Turning the valves past the stop will cause the valve body to blow off under pressure.



5. Label each valve handle with the hot and cold fixture labels supplied with the AQUACENTER Valved Manifold.
6. Cap any unused outlet and turn it to the off position.
7. Attach the manifold supply tubing to the appropriate end using proper ProPEX connection procedures.

Caution: Do not use thread sealant (Teflon tape, pipe dope) on the connections. The carriers present in these compounds can crack the plastic port connections, resulting in leaks and water damage.

Filling and Testing the AQUACENTER Valved Manifold System

System Test

Air pressure testing of an AQUACENTER Valved Manifold is acceptable and preferred to hydrostatic testing in areas where cold temperatures could freeze the system or where water is not available. Wirsbo recommends that the installer pressurize the system with compressed air after installing and capping distribution lines.

AQUACENTER Valved Manifold valves must be in the open position prior and during the test, which should use a pressure of not less than working system pressure. Test the system for a minimum of 15 minutes. During the test, system pressure should drop no more than 8 psi in a one-hour period.

Warning! Pressures used in testing can blow unmade or incomplete connections apart with tremendous force.

This force is many times greater when air is used as the test media. To reduce the risk of personal injury, ensure that all connections are completed before testing. Use only the pressure and time required to determine that the system is leak free.

Filling the System

- Open all connected port valves before filling the system with water and pressurizing.
- Use care when opening a port valve to an empty or unpressurized line. Ensure the fixture to which the line is connected is in the off position. Open the valve slowly until water starts to flow into the line.
- Valve stems (Q2120050) are replaceable.

Note: Test the system to a minimum of working pressure.

AQUACENTER Valve Replacement



Caution: Make sure there is no pressure on the AQUACENTER Valved Manifold system prior to repair or replacement of any system components.

All AQUACENTER Valved Manifolds come complete with assembled valves and necessary o-rings. O-rings are required for proper valve operation.

1. Shut off water to manifold and bleed.
2. Remove the red or blue valve clip using a small flat-head screwdriver or by hand.
3. Push the valve down as far as it will go and turn clockwise past the indent on the manifold.
4. Use pliers to grip the handle of the valve if removal is difficult.
5. Pull the valve out of the manifold.
6. Place a small amount of soap and water solution on the o-rings on the replacement valve.
7. Locate the tab on the valve so that it clears the indent on the manifold and push the valve all the way.
8. Turn the valve past the indent and pull up until it hits the stop.
9. Slide a red or blue clip with the appropriate label between the manifold and the valve until the clip snaps into place.



Caution: Failure to install the valve clip could result in the valve being blown off when the system is pressurized.



Handling Guidelines: AQUACENTER Valved Manifolds

Although not comprehensive, the following highlights the most common guidelines.

- AQUACENTER Valved Manifold threaded outlets seal with a gasket.
- Do not use pipe dope with AQUACENTER Valved Manifolds.
- Do not over tighten connections by using tools. Tighten swivel nuts by hand until snug, plus a one-quarter to one-half turn.
- Do not subject the AQUACENTER Valved Manifold to impact.
- Distribution lines should exit the AQUACENTER Valved Manifold in straight lines perpendicular to the length of the AQUACENTER Valved Manifold.
- Supply lines should enter or exit the AQUACENTER Valved Manifold in a straight line parallel to the length of the AQUACENTER Valved Manifold.
- Do not expose the AQUACENTER Valved Manifold to open flame.
- Do not allow solder, flux, solvents or urethane foams to come in contact with the AQUACENTER Valved Manifold as immediate damage may result.
- Do not assemble or disassemble the AQUACENTER Valved Manifold while pressurized. Be sure that the water supply is turned off and that pressure has been relieved from the system.
- Do not conceal the AQUACENTER Valved Manifold behind permanent walls, floors or ceilings.
- Keep valve-turning tool in an accessible location near the AQUACENTER.
- Hang or fasten the manifold kit supplied with the AQUACENTER nearby for future reference.
- Always inform the homeowner where the AQUACENTER is located if fixture stops are omitted.
- Do not spray on or allow organic chemicals, strong acids or strong bases to come into contact with the AQUACENTER Valved Manifold.
- Do not use petroleum or solvent-based paints on AQUACENTER Valved Manifolds.
- Do not allow rodents, insects or other pests to come into contact with Wirsbo AQUACENTER Valved Manifolds.

AQUACENTER Valveless Manifold

Wirsbo's AQUACENTER Valveless Manifolds are available with 4, 6, 8, 10 or 12 outlets with a 3/4-inch inlet. The AQUACENTER Valveless Manifolds are also available in 8, 10 or 12 outlets with a 1-inch inlet. All outlets have 1/2" ProPEX connections. The AQUACENTER Valveless Manifolds require no assembly.

- Connects directly to 3/4" AQUAPEX using the 3/4" ProPEX Rings (Q4690751, Q4690752) or 1" AQUAPEX using the 1" ProPEX Rings (Q4681000)
- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets on the manifold.



AQUACENTER Flow-through Valveless Manifold

Wirsbo's AQUACENTER Flow-through Valveless Manifolds are available with 4, 6, 8, 10 or 12 outlets and 3/4-inch or 1-inch inlets.



The AQUACENTER Flow-through Valveless Manifolds are also available in 4 and 6 outlets with 1-inch inlets. All outlets have 1/2" ProPEX connections. The AQUACENTER Flow-through Valveless Manifolds require no assembly.

- Connects directly to 3/4" AQUAPEX using the 3/4" ProPEX Rings (Q4690751 and Q4690752) or 1" AQUAPEX using the 1" ProPEX Rings (Q4681000)
- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets.

ProPEX EP Manifolds

EP Branch Manifold

Fully assembled EP Branch Manifolds are available in either 3/4- or 1-inch inlets with 1/2-inch ProPEX branch outlets. The four-outlet manifold features 3/4-inch inlet with 1/2-inch ProPEX outlets. The six-outlet manifold features 1-inch inlet with 1/2-inch ProPEX outlets.



- Connects directly to 3/4" AQUAPEX using the 3/4" ProPEX Rings (Q4690751 and Q4690752) or 1" AQUAPEX using the 1" ProPEX Rings (Q4681000)

- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets.

EP Flow-through Branch Manifold

The EP Flow-through Branch Manifold features a combination of inlet configurations with 1/2-inch ProPEX branch outlets. The first configuration is a 3/4" ProPEX inlet on either end of the manifold body. The second configuration consists of 3/4- and 1-inch inlets at the manifold body ends. The last configuration is a 1-inch inlet on either end of the manifold body.



- The manifolds connect directly to 3/4" AQUAPEX using the 3/4" ProPEX Rings (Q4690751 and Q4690752) or 1" AQUAPEX using the 1" ProPEX Rings (Q4681000)
- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets.

Handling Guidelines: EP Branch Manifolds

Although not comprehensive, the following highlights the most common guidelines.

- Do not subject EP Branch Manifolds to impact.
- Do not expose EP Branch Manifolds to open flame.
- Do not allow solder, flux, pipe dope, solvents or urethane foams to come in contact with EP Branch Manifolds as immediate damage may result.
- Do not use Wirsbo EP Branch Manifolds where temperatures and pressures exceed ratings.
- Do not spray on or allow organic chemicals, strong acids or strong bases to come into contact with Wirsbo EP Branch Manifolds.
- Do not use petroleum or solvent-based paints on EP Branch Manifolds.
- Do not allow rodents, insects or other pests to come into contact with Wirsbo EP Branch Manifolds.

ProPEX Copper Manifolds

ProPEX 1" Copper Branch Manifold

Fully assembled ProPEX Copper (type L) Branch Manifolds with ½" ProPEX brass fittings are brazed to manifold body. One end of the manifold body is flared to accept 1-inch fitting adapters. The other end of the manifold is spun closed. Adequate space is available on the manifold body to cut the spun end off should the manifold require augmentation. The manifolds are available with 4, 6, 8, 10 or 12 outlets. Do not exceed acceptable flow rates for 1-inch nominal copper.



The manifold inlet transitions to AQUAPEX tubing by using a ProPEX fitting adapter.

- ¾" PEX — use ProPEX Brass Fitting Adapter, ¾" PEX x 1" Copper (Q4507510)
- 1" PEX — use ProPEX Brass Fitting Adapter, 1" PEX x 1" Copper (Q4501010)
- The manifolds connect directly to ¾" AQUAPEX using the ¾" ProPEX Rings (Q4690751 and Q4690752) or 1" AQUAPEX using the 1" ProPEX Rings (Q4681000)
- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets.

ProPEX 1" Copper Branch Manifolds with ¾" ProPEX Inlet

Fully assembled ProPEX 1" Copper (type L) Branch Manifold with ¾" ProPEX Inlet has ½" ProPEX brass fittings brazed to the manifold outlets. One ¾" ProPEX adapter fitting is brazed to one end of the manifold. The other end of the manifold is spun closed. Adequate space is available on the manifold body to cut the spun end off should the manifold require augmentation. The manifolds are available with 3, 4, 6, 8, 10 or 12 outlets. Do not exceed acceptable flow rates for 1-inch nominal copper.



- The manifolds connect directly to ¾" AQUAPEX using the ¾" ProPEX Rings (Q4690751 and Q4690752).
- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets.

ProPEX 1" Copper Flow-through Manifold

Fully assembled ProPEX 1" Copper (type L) Flow-through Manifolds with ½" ProPEX brass fittings brazed to the manifold outlets. A ¾" ProPEX adapter fitting is brazed to each end of the manifold. The manifolds are available with 4, 6, 8, 10 or 12 outlets. Do not exceed acceptable flow rates for 1-inch nominal copper.



- The manifolds connect directly to ¾" AQUAPEX using the ¾" ProPEX Rings (Q4690751 and Q4690752).
- Use a short piece of AQUAPEX (3 inches minimum) with a ProPEX Plug and PEX Ring to cap unused outlets.

ProPEX 1" Copper Valved Manifold

Fully assembled ProPEX 1" Copper (type L) Valved Manifolds feature ½" ProPEX valved outlets. Valved connections allow for isolation of individual outlets to fixtures. The manifolds are available with 4, 6, 8, 10 or 12 outlets.



Both 1-inch ends are copper pipe size, and require a copper end cap, coupling or transition fitting to make the proper connection. Sections can sweat together to extend the number of valved outlets using a standard 1-inch copper coupling. Do not exceed acceptable flow rates for 1-inch nominal copper.

APR Manifolds

APR 1" Copper Branch Manifold

Fully assembled APR Copper (type L) Branch Manifolds with ½" APR brass fittings are brazed to manifold body. One end of the manifold body is flared to accept 1-inch fitting adapters. The other end of the manifold is spun closed. Adequate space is available on the manifold body to cut the spun end off should the manifold require augmentation. The manifolds are available with 4, 6, 8, 10 or 12 outlets. Do not exceed acceptable flow rates for 1-inch nominal copper.



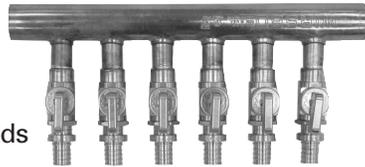
The manifold inlet transitions to AQUAPEX tubing by using an APR fitting adapter.

- ¾" PEX — use APR Brass Fitting Adapter, ¾" PEX x 1" Copper (K4507510)

- 1" PEX — use APR Brass Fitting Adapter, 1" PEX x 1" Copper (K4501010)
- The manifolds connect directly to 3/4" AQUAPEX using the 3/4" APR Brass Sleeve (K4680750) or 1" AQUAPEX using the 1" APR Brass Sleeve (K4681000)
- Use a short piece of AQUAPEX (4 inches minimum) with an APR Brass Plug and Brass Sleeve to cap unused outlets.

APR 1" Copper Valved Manifold

Fully assembled APR 1" Copper (type L) Valved Manifolds feature 1/2" APR valved outlets. Valved connections allows for isolation of individual outlets. The manifolds are available with 4, 6, 8, 10 or 12 outlets.



Both 1-inch ends are copper pipe size, and require a copper end cap, coupling or transition fitting to make the proper connection. Sections can sweat together to extend the number of valved outlets using a standard 1-inch copper coupling. Do not exceed acceptable flow rates for 1-inch nominal copper.

Blank Copper Manifold Bodies

2" Valveless Manifolds

The 2" Copper (type L) Manifolds with 3/4" copper outlets are 60 inches long. The manifold is available with 24 outlets at 3 inches on center.

Both ends of the manifold are copper pipe size, and require a copper end cap, coupling or transition fitting to make the proper connection. Sections can sweat together to extend the number of outlets using a standard 2-inch copper coupling. This manifold can accept either ProPEX or APR adapters for the inlets and outlets. Do not exceed acceptable flow rates for 2-inch nominal copper.



1 1/2" Valveless Manifolds

The 1 1/2" Copper (type L) Manifolds with 3/4" copper outlets are 60 inches long. The manifold is available with 24 outlets at 3 inches on center.

Both ends of the manifold are copper pipe size, and require a copper end cap, coupling or transition fitting to make the proper connection. Sections can sweat together to extend the number of outlets using a standard 1 1/2-inch copper coupling. This manifold can accept either

ProPEX or APR adapters for the inlets and outlets. Do not exceed acceptable flow rates for 1 1/2-inch nominal copper.

1" Copper Valveless Manifolds

1" Copper (type L) Valveless Manifolds feature either 1/2- or 3/4-inch copper outlets. The manifolds with 1/2-inch outlets are available in 2, 3 and 4 outlets. The manifolds with 3/4-inch outlets are available in 2 and 3 outlets. Both manifold types have outlet on centers of 1 1/2-inch. These manifolds can accept either ProPEX or APR adapters for the inlets and outlets.



One end of the manifold body is flared to accept 1-inch fitting adapters. The other manifold end is 1" copper pipe size and requires a copper end cap, coupling or transition fitting to make the proper connection. Do not exceed acceptable flow rates for 1-inch nominal copper.

The manifold inlet transitions to AQUAPEX tubing by using a ProPEX fitting adapter.

- 3/4" PEX — use ProPEX Brass Fitting Adapter, 3/4" PEX x 1" Copper (Q4507510)
- 1" PEX — use ProPEX Brass Fitting Adapter, 1" PEX x 1" Copper (Q4501010)

The manifold inlet transitions to AQUAPEX tubing by using an APR fitting adapter.

- 3/4" PEX — use APR Brass Fitting Adapter, 3/4" PEX x 1" Copper (K4507510)
- 1" PEX — use APR Brass Fitting Adapter, 1" PEX x 1" Copper (K4501010)

Plumbing Inspector's Checklist

This checklist is only intended to serve as a guideline to the local authority. It is not intended to include all applicable requirements. Please review the AQUAPEX Installation Guide and local code for additional guidelines and restrictions. Where any conflict exists between this checklist and local code, the local code takes precedence.

Tubing and Fittings

- AQUAPEX tubing — ASTM F876, ASTM F877, CSA B137.5, NSF-pw
- ProPEX fittings — Manufactured and listed to ASTM F1960 and CSA B137.5
- APR fittings — Manufactured and listed to ASTM F2080 and CSA B137.5

AQUACENTER Valved Manifolds

- NSF Certified to ASTM F1960, NSF-PW
- An AQUACENTER Valved Manifold system, which has valves on all the outlet ports, does not require stop valves at the fixtures. However, the code official may require stop valves at some fixtures.
- Provide access to the AQUACENTER Valved Manifold and its mounting screws, the port valves, distribution line connections and supply-line connections.
- When the AQUACENTER Valved Manifold is mounted above the water heater, install a minimum of 36 inches of connecting tubing between the water heater and the AQUACENTER Valved Manifold due to chance of heat stacking.
- When the AQUACENTER Valved Manifold is mounted beside the water heater and is connected with tubing incorporating a horizontal flow, connect with at least 18 inches of tubing.
- Individual fixture shut-off valves at the manifold should identify the fixture being supplied.

Limitations

- Do not expose AQUAPEX tubing to direct sunlight for more than 30 days.
- Do not install AQUAPEX tubing within 6 inches of any gas appliance vents, with the exception of double-wall B-vents (with a minimum clearance of 1 inch).
- Do not install AQUAPEX tubing within 12 inches of recessed light fixtures, unless the PEX line is protected with suitable insulation.

Joints and Connections

- Square cut all tubing ends and ensure they are free of burrs and debris before a connection is made.
- Ensure fittings and connections comply with the manufacturer's recommendations.
- Make transition joints with manufacturer-approved fittings.

ProPEX Fittings

- Fully seat the AQUAPEX tubing and ProPEX Ring against the shoulder of the fitting. The maximum gap should be no more than the width of a credit card.
- If an improper connection is made, cut 2 inches from the end of the tubing and use a new ProPEX Ring.

APR Fittings

- The maximum gap between the brass sleeve and the shoulder of the fitting should not exceed $\frac{1}{32}$ of an inch.
- If an improper connection is made, cut 2 inches from the end of the tubing and use a new APR sleeve and fitting.

Tubing Supports

- Use plastic tubing supports or metal supports designed for use with plastic tubing.
- Place horizontal support every 32 inches for $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{1}{4}$ " and 1" PEX tubing.
- Provide vertical support every 4 to 5 feet with a mid-story guide placed between floors.
- Bends within 6 inches of a ProPEX connection to $\frac{3}{8}$ " to $\frac{1}{2}$ " tubing and within 10 inches of a ProPEX connection to $\frac{3}{4}$ " to 1" tubing require support.

- Allow $\frac{1}{8}$ to $\frac{3}{16}$ inches of slack per foot of run on installed AQUAPEX for expansion and contraction.
- AQUAPEX should not be rigidly anchored. Anchor the tubing to allow freedom of movement for expansion and contraction.

General Recommendations

- Protect AQUAPEX tubing passing through hollow masonry walls or metal studs with sleeves or grommets.
- Protect AQUAPEX tubing from damage (e.g., nail, screw, etc.) with suitable steel-plate protectors.
- The minimum bend radius of PEX is six times the outside diameter.
- Only EP or DZR fittings are suitable for burial.

Pressure Testing

- Pressure test the system to the system working pressure (40 to 60 psi) at the current ambient temperature. Pressure testing should not exceed 100 psi. Slight fluctuations of pressure are normal due to ambient temperature changes.
- The valves on the AQUACENTER Valved Manifold must be open prior to pressure testing. These valves are to remain open until the pressure test is complete.

