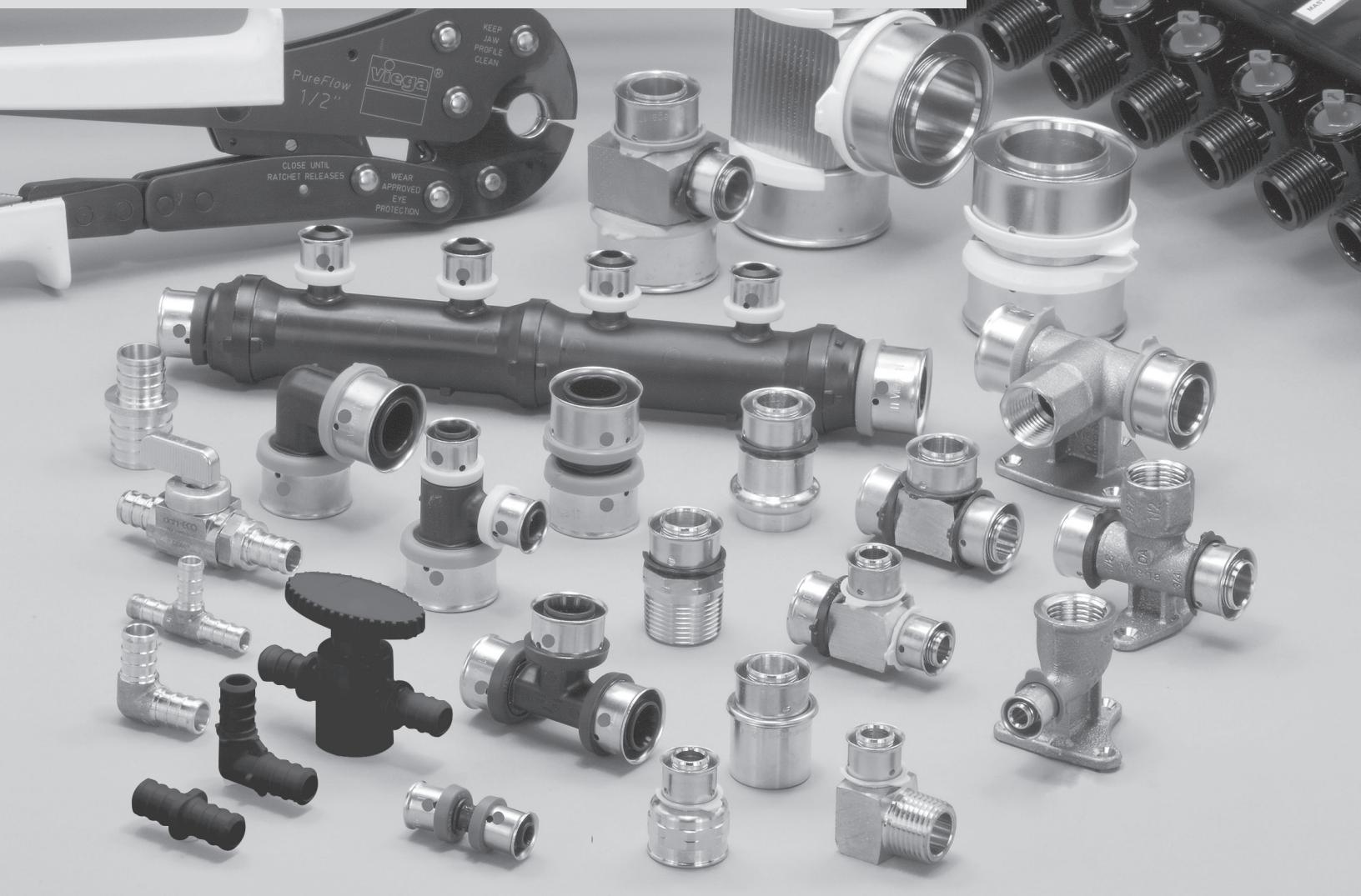


# Viega PEX Water Systems

## Installation Manual

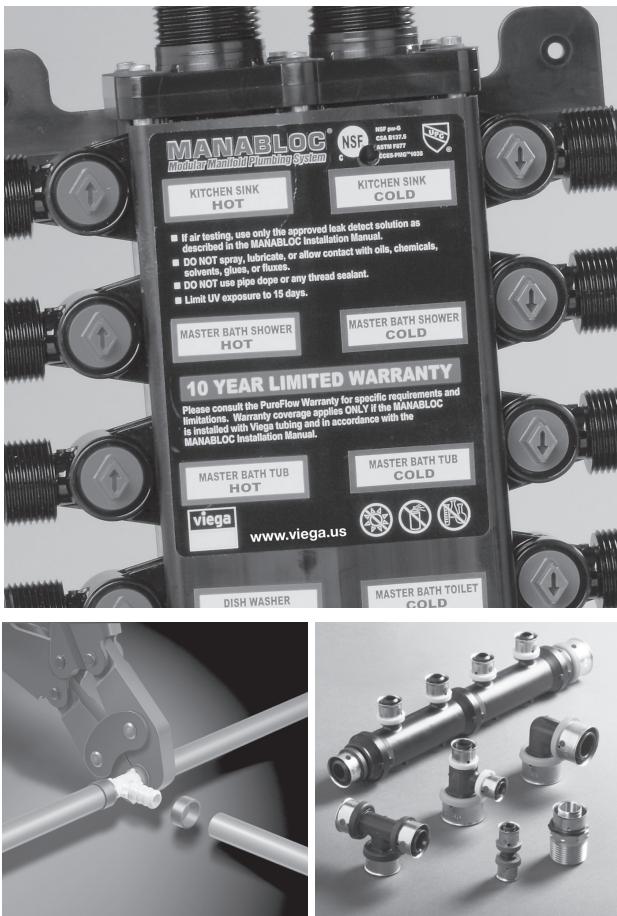


The global leader  
in plumbing, heating  
and pipe joining systems



## Viega, heritage of quality, vision for the future

Viega's heritage of superiority demands nothing but the best for our customers. Engineered to be efficient, Viega products perform at the highest possible level of quality, providing confidence and peace of mind. Viega is the only manufacturer to offer press systems in multiple pipe joining materials, including polymer. More than one million Viega press fittings are installed every day around the world and, with a Supply Chain that can process orders in 48 hours or less, Viega is positioned to provide customers the best, most versatile support in the industry.



### **⚠ MANUAL CONTENT AND USE**

**It is the responsibility of the contractor, specifying engineer or installer to appropriately design the PEX system, determine that the selection of components in the system are the proper ones for the intended application in the locale in which they will operate and that employees working on the job site observe the proper installation practices.**

### **Important notice**

This installation guide is intended for traditional (branch and tee) plumbing systems and combination plumbing systems using termination manifolds, ManaBloc and MiniBloc parallel / manifold plumbing system.

**NOTE:** References to ViegaPEX Ultra tubing made throughout this publication include the entire line of Viega cross-linked polyethylene products.

**NOTE:** Zero Lead identifies Viega® products meeting the lead-free requirements of NSF 61-G through testing under NSF/ANSI 372 (0.25% or less maximum weighted average lead content).

**In the event of conflict or inconsistency between these installation guidelines and local building or plumbing codes, local codes should take precedence.**

**NOTE:** Failure to follow the installation instructions will void the Viega PEX Limited Warranty. Nothing in this publication is intended to create any warranty beyond Viega's applicable limited warranty. For additional information, contact Viega at 800-976-9819.

### **IMPORTANT NOTE:**

**A GREEN DOT ON A VIEGA PEX PRESS POLYMER FITTING INDICATES THE SMART CONNECT FEATURE. FOR A CURRENT LIST OF APPLICATIONS, PLEASE VISIT [WWW.VIEGA.US/APPLICATIONS](http://WWW.VIEGA.US/APPLICATIONS).**

Viega products are designed to be installed by licensed and trained plumbing and mechanical professionals who are familiar with Viega products and their installation. ***Installation by non-professionals may void Viega LLC's warranty.***

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### Important warning symbols



Important, read and understand the warnings accompanying this symbol to ensure your Viega product is installed correctly and safely. Ignoring these warnings could result in product failure and/or void your warranty.



Limit direct UV exposure (sunlight) to products that have this warning symbol present. Maximum UV exposure durations may vary based on the type of product being installed. Review the warning and/or limitation listed with the product being installed.



Do not expose products with these warnings to any foreign substances that include VOC (volatile organic chemical) compounds, paints, solvents, glues, cleaners and disinfectants. Products that are exposed to these types of substances are at risk of having failures (leaks).



Hand-tighten only. Damage may result if over-tightened.



Contact Viega Technical Services for questions concerning chemical compatibility.

## 1.1 Viega PEX solutions

Viega PEX systems are the most complete potable water solutions available on the North American market. With tubing, fittings and distribution manifolds, Viega provides everything you need for a total plumbing system that is not only easy to install but also helps reduce energy costs and water waste. Viega provides the highest-quality PEX tubing with the best UV and chlorine ratings in the industry. Viega PEX Press fittings allow installers to make secure press connections in less than seven seconds. With Viega press technology, pressure testing can be completed immediately after connections are made without waiting for glues or solvents to dry or for expansions to contract. Viega PEX Press fittings are approved for potable water and hydronic heating applications and are available in sizes ranging from  $\frac{3}{8}$ " through 2" in both Zero Lead and high-grade polymer materials. With a comprehensive 10-year transferable limited warranty and unmatched quality in the industry, Viega offers a complete system solution for all your plumbing needs.

### Do more with Viega

Viega press technology is consistent and reliable, providing the same quality pipe connections every time. Viega PEX Press polymer fittings incorporate the Viega Smart Connect feature, which helps installers identify unpressed connections easily. ViegaPEX Ultra tubing and Viega PEX Press polymer fittings are manufactured in the United States and provide secure, reliable connections for residential and light commercial projects, ranging from potable water to snow melting applications.

A true innovator since 1899, Viega is at the forefront of pipe joining technology. With personalized support, efficient delivery processes and trustworthy quality, no other manufacturer can provide the same level of service. The global leader in plumbing, heating and pipe joining systems, Viega is the name you can trust.



## 1.2 Viega PEX system concepts

Viega PEX is a high-quality, flexible PEX system for hot and cold potable water distribution.

The Viega PEX plumbing system offers maximum security thanks to press and full-circle crimp fitting techniques. These fittings ensure the plumber quick installation, suitability for use in all types of applications at the construction site and vast reductions in the required number of fittings and necessary installation time.

The systems incorporate:

- ViegaPEX Ultra tubing: red, white, blue and black cross-linked polyethylene tubing designed with superior chlorine and UV resistance
- Black ViegaPEX Ultra tubing ( $\frac{3}{4}$ " - 2"): UL 1821 listed for use in multipurpose one- and two-family fire sprinkler systems per NFPA 13D
- Viega FostaPEX tubing: cross-linked polyethylene with additional aluminum and polyethylene layers to provide rigidity and form stability, available in red or silver to differentiate hot water lines
- A range of Zero Lead bronze, Eco Brass or polymer fittings for PEX Press and PEX Crimp fitting systems
- Viega ManaBloc distribution system for use with ViegaPEX tubing
- A range of inline, manifold and stop valves for Viega PEX fitting systems
- Viega press tools and jaws for the PEX Press fitting systems
- Viega crimp tools for the PEX Crimp fitting systems

## 2 Codes, Standards and Certifications

### 2.1 Codes

The Viega PEX system is accepted by the following model codes for use in potable hot and cold water distribution systems.

ICC – International Code Council  
 IPC – International Plumbing Code  
 IMC – International Mechanical Code  
 IRC – International Residential Code  
 UPC – Uniform Plumbing Code  
 UMC – Uniform Mechanical Code  
 NSPC – National Standard Plumbing Code  
 HUD – Housing for Urban Development  
 NPCC – National Plumbing Code of Canada  
 NBCC – National Building Code of Canada

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

### 2.2 Standards

#### ASTM – American Society for Testing and Materials

**ASTM F876/F2023: Standard Specification for Cross-linked Polyethylene (PEX) Tubing** — This standard contains finite dimensional requirements for SDR9 PEX tubing in addition to burst, sustained pressure, chlorine resistance and other relevant performance tests at different water temperatures.

**ASTM F877: Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems** — This standard contains performance requirements for SDR9 PEX tubing and fitting systems. The standard contains finite dimensional requirements for tubing, in addition to burst, sustained pressure and other relevant performance tests at different water temperatures.

**ASTM E84** — Standard Test Method for Surface Burning Characteristics of Building Materials

**ASTM E119** — Standard Test Method for Fire Testing of Building Construction and Materials

**ASTM E814** — Standard Test Method for Fire Test of Through-Penetration Firestop Systems

#### NSF International

**ANSI/NSF 14: Plastics Piping System Components and Related Materials** — This standard establishes minimum physical and performance requirements for plastic piping components and related materials. These criteria were established for the protection of public health and the environment.

**ANSI/NSF 61: Drinking Water System Components – Health Effects** — This standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components and materials used in drinking water systems. This standard does not establish performance or taste and odor requirements for drinking water system products, components or materials.

#### American Water Works Association (AWWA)

**AWWA C904** — Cross-linked Polyethylene (PEX) Pressure Pipe,  $\frac{1}{2}$ " through 2" for Water Service

#### ISO – International Standards Organization

**ISO 9001** — This standard is intended to establish, document and maintain a system for ensuring production output quality. ISO 9001 certification is a tangible expression of a firm's commitment to quality that is internationally understood and accepted. All PureFlow PEX Press fittings are manufactured in ISO 9001 certified facilities.

### 2.3 Certifications

#### PPI – Plastic Pipe Institute

#### TR 4 Listed Materials

Listing of Hydrostatic Design Bases (HDB), Strength Design Bases (SDB), Pressure Design Bases (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe.

Pressure/Temperature Ratings:

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

#### NSF International

**NSF-pw certification mark** — Product meets all applicable performance standards for pressure-rated potable water applications required in ANSI/NSF Standard 14 and complies with ANSI/NSF Standard 61 for health effects.

**cNSF®us pw-G** — Product meets Zero Lead listing meeting California AB 1953 and Vermont Act 193

**CSA B137.5** — This standard specifies requirements for thermoplastic pressure piping. It includes reference publications, definitions, abbreviations, general requirements for materials and manufactured pipe and fittings, relevant test methods, and marking requirements.

**NSF U.P. Code** — Product meets requirements of the Uniform Plumbing Code™.

**PEX 5306** — Tested and certified to the NSF-pw 5306 chlorine resistance rating for an end-use condition of 100% @ 140°F per ASTM F876, which is the highest chlorine resistance rating available through ASTM. When the product is marked with the PEX 5306 designation it affirms the product is approved for use in continuous domestic hot-water circulation systems with up to 140°F water temperatures and has a maximum UV rating of six months.

#### **Underwriters Laboratories Inc. (UL)**

**UL1821** — Standard for Safety for Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service (NFPA 13D systems only)

**ANSI/UL 263** — Standard for Safety for Fire Tests for Building Construction and Materials

#### **Underwriters Laboratories of Canada Inc. (cUL)**

**CAN/ULC — S101** — Standard Methods of Fire Endurance Tests of Building Construction and Materials

**CAN/ULC — S102.2** — Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies

**CAN/ULC — S115** — Standard Method of Fire Tests of Firestop Systems

**CAN/ULC/ORD/-C199P** — Combustible Piping for Sprinkler Systems

**IAPMO R&T — International Association of Plumbing and Mechanical Officials Research and Testing**

**Certificate of Listing** — Product meets the requirements of the Uniform Plumbing Code™

**ICC — ES — International Code Council — Evaluation Services**

**ICC ES-PMG™** — Product complies with International Plumbing Code

**Note:** Certifications available at:

[www.nsf.org](http://www.nsf.org)

[www.spec-direct.com](http://www.spec-direct.com) (Intertek)

[www.ul.com](http://www.ul.com)

[www.canada.ul.com](http://www.canada.ul.com)

## **2.4 Specifying Viega PEX Systems**

Viega offers many tools to assist the specifying engineer, engineer, contractor and installer to ensure Viega PEX systems are properly designed and installed. This can be done by referring to one of the resources listed below:

- Engineering Specifications are available at [www.viega.us](http://www.viega.us)
- Viega guide specifications in Master Spec format are available upon request at 1(800) 976-9819.
- Contact your local Viega field sales representative.

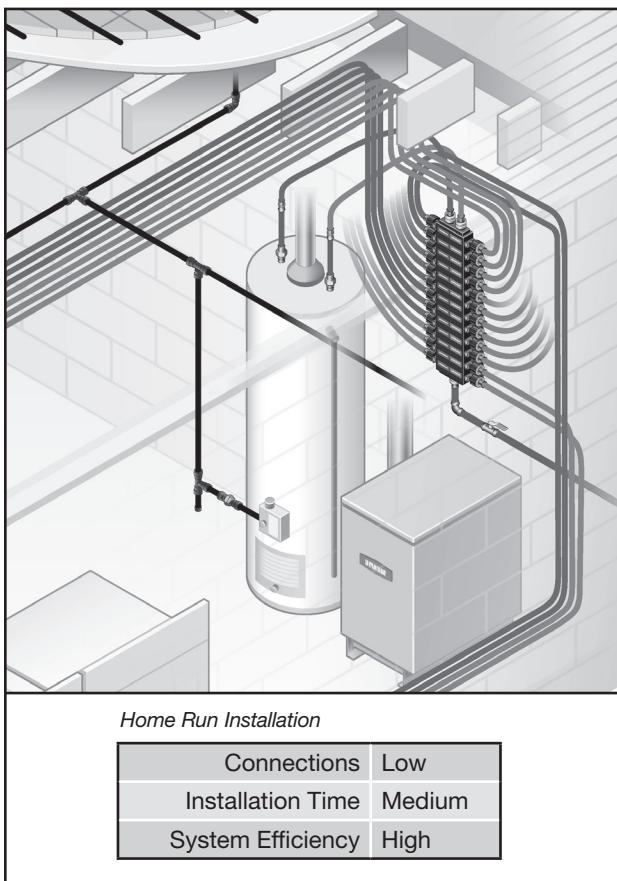
Check with your local Viega representative for further information or copies of above-mentioned listings and certifications.

## 3 VIEGA PEX Installation Methods

There are three installation methods that VIEGA recommends to help enhance your water distribution systems performance by reducing water waste and hot water delivery times. These methods consist of the home run, combination and branch and tee systems. The following sections provide information to help select the best system based on the application.

### 3.1 Home run systems

The VIEGA ManaBloc manifold system, also known as a parallel or home run system, is a unique method of plumbing that provides homeowners water and energy savings and can reduce water waste by up to 40% compared to traditional systems.



Features that the VIEGA ManaBloc system offers its customers over branch and tee plumbing systems include:

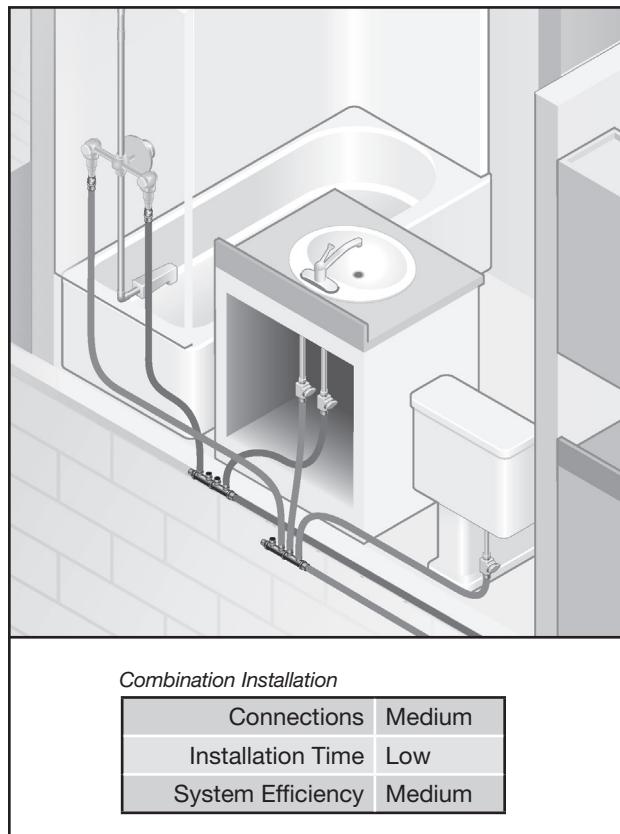
- Faster Hot Water Delivery – properly sized lines deliver hot water up to four times faster
- Dedicated lines to each fixture use fewer fitting connections behind walls
- Balanced Water Delivery – multiple fixtures can be used simultaneously without noticeable pressure or temperature changes

- Better Control of the Plumbing System – individual 1/4-turn shutoff valves provide a simple way of servicing a fixture or adding on to the system

### 3.2 Combination systems

A combination system uses multiple manifolds combined with a branch-and-tee supply system. These systems use small manifolds located throughout a structure placed near each main fixture group and are supplied by the main hot and cold supply lines similar to the branch-and-tee system. The manifolds branch multiple lines from a common location in lieu of multiple tee fittings spread throughout. This takes advantage of benefits from both types of systems and helps keep hidden fittings to a minimum.

- Ideal for areas with multiple fixtures grouped together
- Uses fewer connections behind walls compared to branch and tee

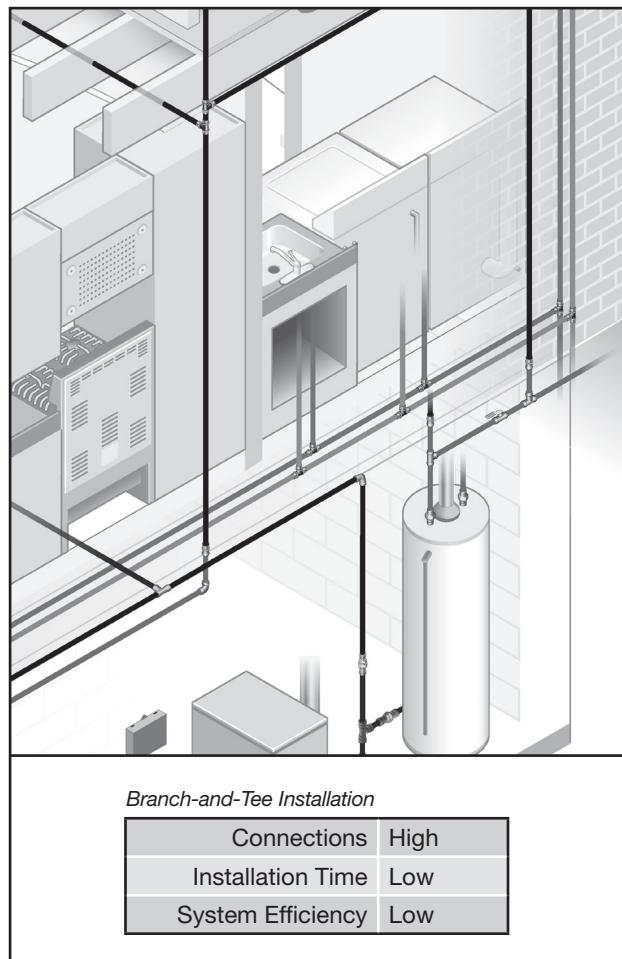


### 3.3 Branch and tee

This method of plumbing is commonly referred to as a conventional plumbing system or branch-and-main systems.

This system uses a large-diameter “main” supply line for both hot and cold water supplies that runs throughout a structure to or near each fixture group, with smaller “branch” lines teeing off the main to supply each fixture.

- Ideal for condensed floor plans
- Less installation time



## 4 Viega Manifolds

Viega offers several different manifolds to meet a variety of applications, whether it is a parallel water distribution system or combination installation.

### 4.1 Viega manifold markings

Each Viega manifold is marked where space permits with the following information:

Manufacturer	VIEGA
ASTM Standard	ASTM F877 / F1807 / F2159
Temperature Rating	180°F
Certifications	UPC®, cNSF®us pw-G, CSA B137.5, ICC-ES PMG™ 1038

**NOTE:** All manifolds may not be listed with each organization shown.



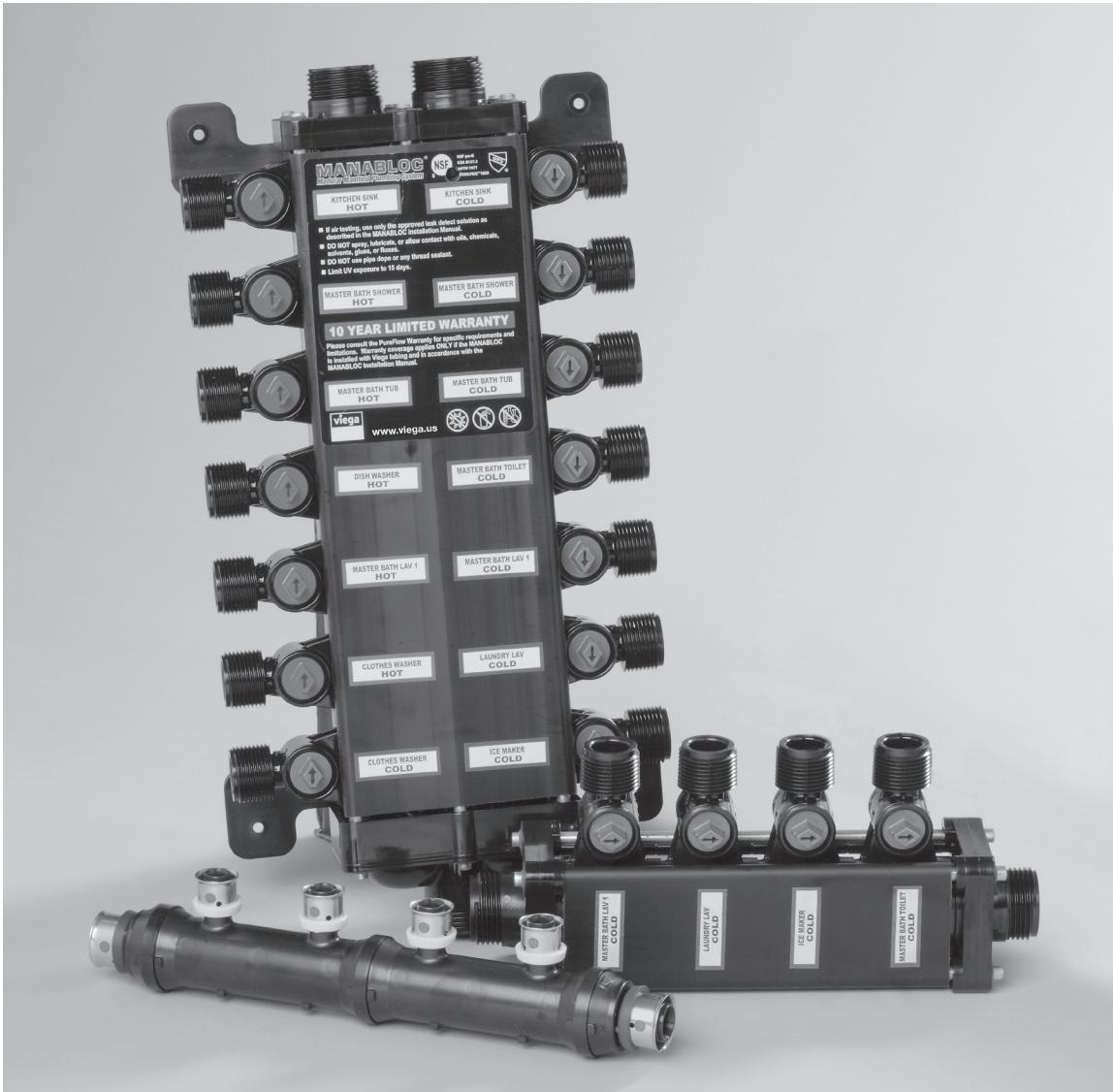
To maintain your warranty and be code compliant, use only Viega-approved fittings to connect ViegaPEX Ultra tubing to the ManaBloc.



Viega polymer manifolds must be protected from UV exposure, which can damage them. In the event of incidental UV exposure during storage, installation and handling, combined exposure of Viega polymer manifolds shall not exceed 15 days.



Do not expose Viega products to any foreign substance that includes but is not limited to VOC (volatile organic chemical) compounds, paints, solvents, glues, cleaners and disinfectants. Viega products that are exposed to these types of substances are at risk of having failures (leaks).



Viega PEX Press fittings are available in Zero Lead Bronze and polymer and include a factory-assembled, stainless steel sleeve with three viewing holes and a tool locator ring to ensure a proper press connection. The following design criteria make Viega PEX Press fittings ideal for use in potable water applications:

- High corrosion resistance
- Excellent strength properties
- Resistant to stress corrosion
- Superior wear properties
- Compatible with all materials

All Viega PEX tubing, fittings and manifolds are NSF certified for use in potable water systems.

## 5.1 Viega PEX Press bronze

Viega PEX Press bronze fittings are manufactured from a high-quality Zero Lead material specifically designed for press technology meeting or exceeding all manufacturing requirements.

## 5.2 Viega PEX Press polymer

Viega PEX Press polymer fittings are manufactured from Radel R® and incorporate the Viega Smart Connect feature.

### 5.2.1 Viega Smart Connect feature

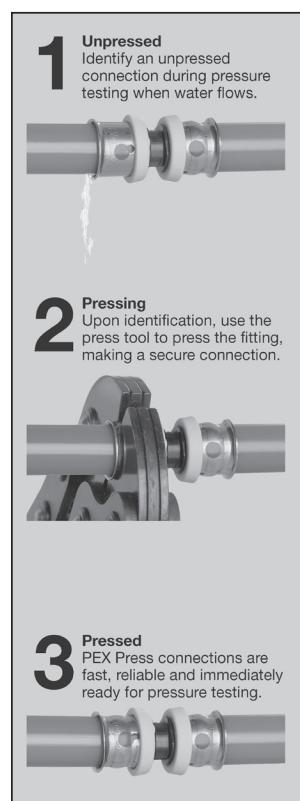


Figure 5.1 Smart Connect Feature

## 5.3 Viega PEX Press fitting markings

Each Viega PEX Press fitting is marked where space permits with the following information:

Manufacturer	VIEGA
ASTM Standard	ASTM F877
Temperature Rating	180°F (potable) 200°F (hydronic heating)
Certifications	cNSF®us pw-G, CSA B137.5 UPC® or UP Code, cULus® ICC-ES PMG™ 1038 / 1015

**NOTE:** All fittings may not be listed with each organization shown.



**Use only Viega stainless steel attached PEX Press sleeves and press tools with Viega PEX Press fittings.**



**Viega PEX Press polymer fittings must be protected from UV exposure, which can damage them. In the event of incidental UV exposure during storage, installation and handling, combined exposure of PEX Press fittings shall not exceed 15 days.**



**Do not expose Viega products to any foreign substance that includes but is not limited to VOC (volatile organic chemical) compounds, paints, solvents, glues, cleaners and disinfectants. Viega products that are exposed to these types of substances are at risk of having failures (leaks).**

## 5.4 PEX Press tools

### 5.4.1 PEX Press hand tools

The Viega PEX Press connection must always be carried out with the aid of a Viega PEX Press tool. The hand tool incorporates a forced compression mechanism to complete a secure connection each time. A ratchet inside the tool prevents the tool from being opened until the proper force has been applied to the press sleeve. A safety release screw allows the tool to be opened at any time, but any connection made without full tool compression must be repressed. The tool handles are color coded to match the PEX Press tool locator rings.

The reduced grip feature permits one-handed operation, making the Viega PEX Press system ideal for tight spaces and awkward locations. The compression of the tool also allows press connections to be made in temperatures as low as -4°F.



### 5.4.2 PEX Press power tools

The Viega PEX Press connection may also be carried out with a Viega power tool. These RIDGID tools are designed to make the same consistent press as the Viega PEX Press hand tools. The compression of the tool also allows press connections to be made in temperatures as low as 23°F.



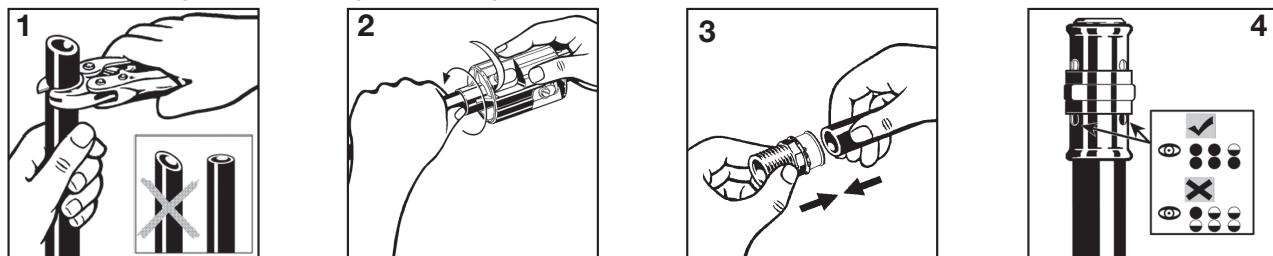
*Compact Power Tool*



*RP-200-B Kit*

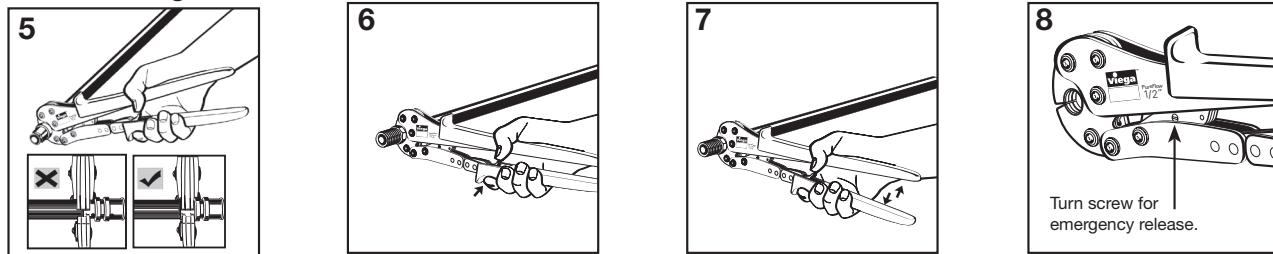
## 5.5 Making a Viega PEX Press connection with hand tool

### 5.5.1 Trimming and inserting the tubing



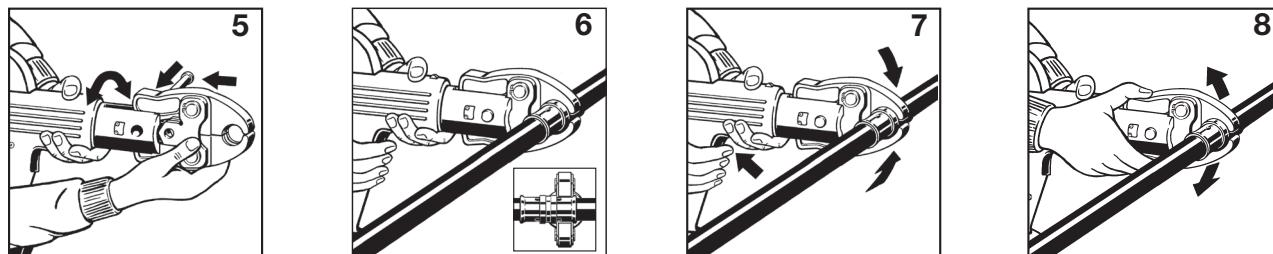
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.
2. If using FostaPEX tubing, insert into prep tool, push and turn until no resistance is felt. If using ViegaPEX Ultra, continue to Step 3.
3. Insert PEX Press fitting with attached sleeve into tubing and engage fully.
4. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in the third.

### 5.5.2 Pressing with a hand tool



5. Position press tool perpendicular over press sleeve, resting it against the tool locator ring.  
Note: The tool locator ring must be in the factory-installed position while making a press to provide a consistent leakproof PEX press connection. It may be necessary to rotate the tool locator ring to avoid interference between the ring and tool.
6. Close handles, using trigger to reduce grip span if desired.
7. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.
8. **Warning:** The PEX press connection is not leakproof when the tool has been opened by emergency release. The tool locator ring must be present to ensure a proper PEX Press connection.

### 5.5.3 Pressing with a power tool



5. Insert the appropriate Viega PEX Press jaw into the press tool and push in the holding pin until it locks.
6. Open jaw and position perpendicular over press sleeve, resting it against the tool locator ring.  
Note: The tool locator ring must be in the factory-installed position while making a press to provide a consistent leakproof PEX press connection. It may be necessary to rotate the tool locator ring to avoid interference between the ring and tool.
7. Start pressing process; hold the trigger until the jaw has automatically released.
8. When press connection is complete, open and remove jaw.
9. **Warning:** The tool locator ring must be present to ensure a proper PEX Press connection.

## 6 Viega PEX Crimp Fittings

Viega PEX Crimp fittings are in metallic or polymer configurations. The following design criteria make Viega PEX Crimp fittings ideal for use in potable water applications.

- Excellent strength properties
- Corrosion resistant
- Fast installation

All Viega PEX tubing, fittings and manifolds are NSF certified for use in potable water systems.

### 6.1 Viega PEX Crimp Eco Brass fittings

PEX Crimp Eco Brass fittings are manufactured from a high-grade Zero Lead alloy known for its superior properties.

### 6.2 Viega PEX Crimp PolyAlloy fittings

PEX Crimp PolyAlloy fittings are manufactured from a performance-grade polymer (Acudel® and/or Radel-R®) with excellent chlorine- and corrosion-resistant properties.

### 6.3 Viega PEX Crimp fitting markings

Each Viega PEX Crimp fitting is marked where space permits with the following information:

Manufacturer	VIEGA
ASTM Standard	ASTM F1807 (metallic) F2159 (polymer)
Temperature Rating	180°F
Certifications	UPC®, or U.P. Code, NSF-pw, CSA B137.5, cNSF®us pw-G, ICC-ES PMG™ 1038

Note: All fittings may not be listed with every organization shown.



Use only ASTM F1807 copper crimp rings and full-circle crimp tools with Viega PEX Crimp fittings.



NOT for use with FostaPEX tubing.



Viega PEX Crimp PolyAlloy fittings must be protected from UV exposure, which can damage them. In the event of incidental UV exposure during storage, installation and handling, combined exposure of PEX Crimp PolyAlloy fittings shall not exceed 15 days.



Do not expose Viega products to any foreign substance that includes but is not limited to VOC (volatile organic chemical) compounds, paints, solvents, glues, cleaners and disinfectants. Viega products that are exposed to these types of substances are at risk of having failures (leaks).



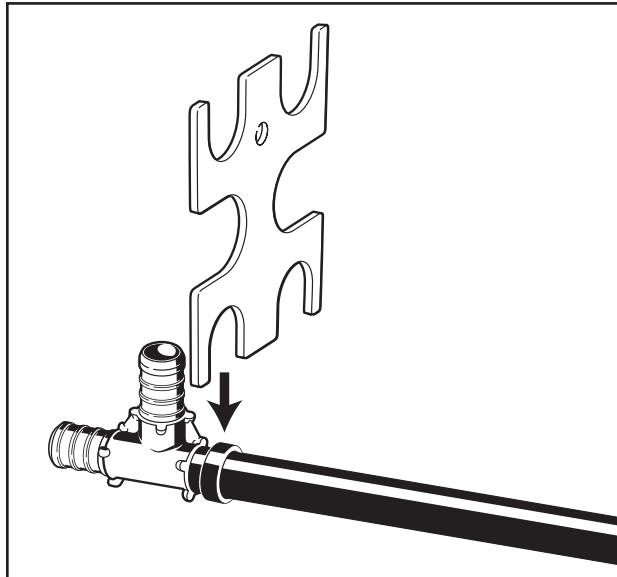
## 6.4 The Viega PEX Crimp hand tools

The Viega PEX Crimp connection must always be carried out with the aid of a Viega PEX Crimp tool. There are multiple configurations of Viega PEX Crimp tools that are ideal for tight spaces and awkward locations. The compression of the tool also allows for crimp connections to be made in temperatures as low as -30°F.



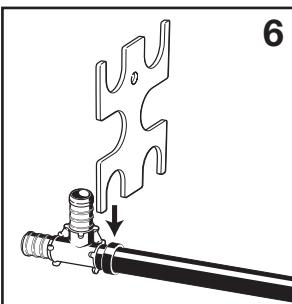
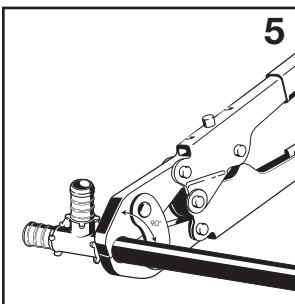
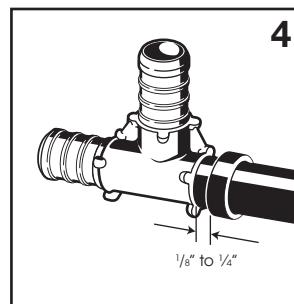
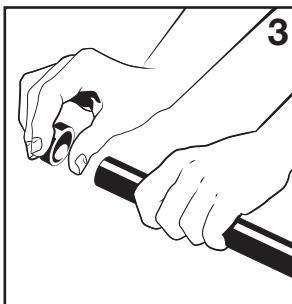
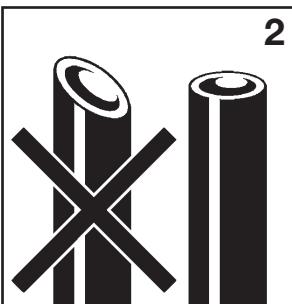
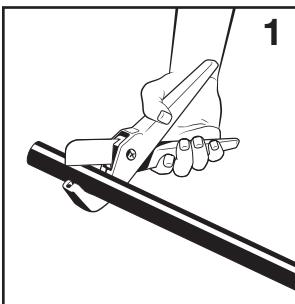
A caliper (GO/NO GO gauge) is provided to check the calibration of the crimp tool. A crimp is good if the GO gauge fits over the ring and the NO GO gauge does not.

At least one connection should be checked at the beginning and end of each day to ensure proper crimps have been made. Most crimp tools can be recalibrated. Please refer to tool instructions on the next page.



*A caliper (GO/NO GO gauge) is provided to check the crimp tool calibration.*

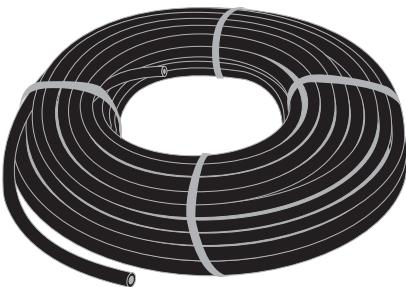
## 6.5 Making a Viega PEX Crimp connection



RING SIZE	MINIMUM	MAXIMUM
3/8"	0.580"	0.595"
1/2"	0.700"	0.715"
3/4"	0.945"	0.960"
1"	1.175"	1.190"

Table 6.1 Crimp Diameter Dimensions. Crimp outside diameters should fall within these dimensions when measured with a micrometer or caliper.

1. The tubing should be cut squarely and evenly without burrs. Uneven, jagged or irregular cuts will produce unsatisfactory connections.
2. The diagram shows a correctly cut tube compared with an incorrectly cut tube.
3. Slide the crimp ring onto the tubing and insert the fitting into the pipe to the shoulder or tube stop.
4. Position the ring  $\frac{1}{8}$ " to  $\frac{1}{4}$ " from the end of the tubing.
5. The ring must be attached straight. Center the crimping tool jaws exactly over the ring. Keep the tool at  $90^\circ$  and close the handles completely. **DO NOT CRIMP TWICE.**
6. When checking crimp connections with a caliper (GO/NO GO gauge), push the gauge STRAIGHT DOWN over the crimped ring. NEVER slide the gauge in from the side. Do not attempt to gauge the crimp at the jaw overlap area. The overlap area is indicated by a slight removal of the blackening treatment. A **crimp is acceptable** if the GO gauge fits the ring and the NO GO does not. A **crimp is unacceptable** if the GO gauge does not fit the ring or the NO GO gauge does fit. An incorrect crimp must be cut out of the tubing and replaced. If you check the crimp connections with a micrometer or caliper, use the dimensions shown in the chart above.



ViegaPEX Ultra cross-linked polyethylene is the ideal tubing choice for potable water systems. In addition, the smooth walls of ViegaPEX Ultra tubing are resistant to corrosion and scaling.

## 7.1 ViegaPEX Ultra properties and performance

Linear Expansion Coefficient:

- 1.1 inch per 100 feet per 10°F

Temperature and Pressure Ratings:

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

UV Resistance:

- Maximum exposure 6 months

Chlorine Resistance:

- PEX 5306 — end-use condition of 100% at 140°F (approved for continuous domestic hot water circulation systems)

Bend Radius:

- ViegaPEX Ultra can be easily bent by hand, or with the use of Viega-approved bend supports to a radius as small as five times tubing outer diameter.

## 7.2 Tubing markings

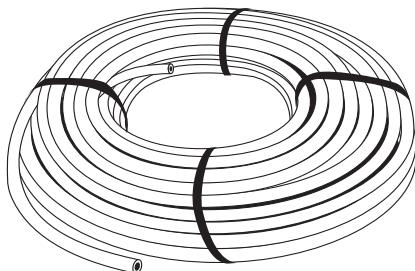
ViegaPEX Ultra tubing is marked every five feet with the following representative information. See Table 7.1.

Print Line Markings	
<b>Length Marker</b>	000 feet
<b>Company</b>	Viega
<b>Product Name</b>	ViegaPEX™ Ultra
<b>Nominal Tubing Size</b>	½"
<b>Standard Dimension Ratio Tube Size</b>	SDR 9 CTS (copper tube size)
<b>Material Designation Code</b>	PEX 5306
<b>Temperature &amp; Pressure Rating</b>	100 psi @ 180F 160 psi @ 73F
<b>NSF Listing (Potable)</b>	cNSF®us-pw
<b>NSF Chlorine Listing</b>	CL5
<b>ASTM Tubing Standards Certification</b>	F876/F877
<b>Canadian Standard Assoc</b>	CSA B137.5
<b>Fittings System Compatibility</b>	PureFlow - ASTM F877/F1807/F2159
<b>IAPMO Listing</b>	UPC®
<b>UL Listing Rating*</b>	cULus 3SAV UL1821 130 psi @ 120F
<b>Plenum Rating**</b>	FS/SD 25/50 ASTM E84 CAN/ULC S102.2
<b>Fire Resistance Ratings</b>	CAN/ULC S101 ANSI/UL 263
<b>ICC Listing</b>	ES-PMG™ - 1038
<b>AWWA Listing</b>	C904
<b>HUD Listing</b>	MR 1276
<b>Manufacturer's Date Code</b>	1/1/2010
<b>Material Code</b>	X14.2
<b>Country of Manufacture</b>	Made in the USA

Table 7.1

\* ¾" through 2" Black ViegaPEX Ultra only

\*\* 2" and smaller tube sizes when wrapped with ½" - 1" thick E84 rated insulation, ½" and smaller with no insulation per ULC S102.2 listing. Tubing may include fitting connections when wrapped.



Viega FostaPEX tubing is the ideal companion for the Viega PEX plumbing system. This tubing can be easily bent by hand like the ViegaPEX Ultra tubing but holds its shape after bending (combining the benefits of both rigid and flexible tubing). The result is fewer fittings and bend supports and less labor. A unique feature of FostaPEX is that the inner layer is fully dimensioned Black ViegaPEX Ultra tubing. The aluminum and outer PE layers surround the inner PEX tubing. This construction allows the inner layer alone to meet all temperature and pressure requirements of the system. Using the prep tool to remove the outer layers allows the use of the standard Viega PEX Press bronze and polymer fitting systems, which reduces tooling costs for the contractor and simplifies connections.

## 8.1 FostaPEX properties and performance

Linear Expansion Coefficient:

- 0.16 inch per 100 feet per 10°F

Temperature and Pressure Ratings:

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

\*For non-potable hydronic heating systems only

UV Resistance:

- Maximum exposure 12 months. FostaPEX should not be installed where permanently exposed to sunlight.

Chlorine Resistance:

- PEX 5306 - end-use condition of 100% at 140°F (approved for continuous domestic hot water circulation systems)

Bend Radius:

- FostaPEX tubing can be bent to a radius of 3.5 times tubing outer diameter with the use of a Viega tubing bender.

 **Not for use with PEX Crimp fittings.**

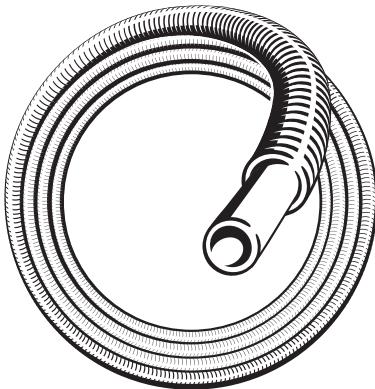
## 8.2 Tubing markings

FostaPEX tubing is marked every five feet with the following representative information. See Table 8.1.

Print Line Markings	
<b>Length Marker</b>	000 feet
<b>Company</b>	Viega
<b>Product Name</b>	FostaPEX®
<b>Nominal Tubing Size</b>	½"
<b>Standard Dimension Ratio Tube Size</b>	SDR 9 CTS (copper tube size)
<b>Material Designation Code</b>	PEX 5306
<b>Temperature &amp; Pressure Rating</b>	100 psi @ 180°F 160 psi @ 73F
<b>NSF Listing (Potable/Heating)</b>	cNSF®us-pw-rfh
<b>NSF Chlorine Listing</b>	CL5
<b>ASTM Tubing Standards Certification</b>	F876/F877
<b>Canadian Standard Assoc</b>	CSA B137.5
<b>Fittings System Compatibility</b>	PureFlow ASTM F877
<b>IAPMO Listing</b>	UPC®
<b>Plenum Rating*</b>	FS/SD 25/50 ASTM E84 CAN /ULC S102.2
<b>Fire Resistance Ratings</b>	CAN/ULC S101 ANSI/UL 263
<b>ICC Listing</b>	ES-PMG™ - 1015,1038
<b>AWWA Listing</b>	C904
<b>HUD Listing</b>	MR 1276
<b>Manufacturer's Date Code</b>	1/1/2010
<b>Material Code</b>	X18.1
<b>Country of Manufacture</b>	Made in the USA

\* 2" and smaller tube sizes when wrapped with ½" - 1" thick E84 rated insulation, ½" and smaller with no insulation per ULC S102.2 listing. Tubing may include fitting connections when wrapped.

Table 8.1



Viega PEX tubing is available with a flexible polypropylene corrugated sleevi that is pre-installed on ViegaPEX Ultra red and blue 300 foot coils in  $\frac{1}{2}$ " and  $\frac{3}{4}$ " sizes. This sleeved PEX product is ideal for direct burial and/or cast in cement applications.

### 9.1 ViegaPEX Ultra with corrugated sleevi

Linear Expansion Coefficient:

- 1.1 inch per 100 feet per 10°F

Temperature and Pressure Ratings:

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

UV Resistance:

- Maximum exposure 6 months

Chlorine Resistance:

- PEX 5306 — end-use condition of 100% at 140°F (approved for continuous domestic hot water circulation systems)

Bend Radius:

- ViegaPEX Ultra can be easily bent by hand, or with the use of Viega-approved bend supports to a radius as small as five times tubing outer diameter.

### 9.2 Tubing markings

ViegaPEX Ultra tubing is marked every five feet with the following representative information. See Table 9.1.

Print Line Markings	
<b>Length Marker</b>	000 feet
<b>Company</b>	Viega
<b>Product Name</b>	ViegaPEX™ Ultra
<b>Nominal Tubing Size</b>	$\frac{1}{2}$ "
<b>Standard Dimension Ratio Tube Size</b>	SDR 9 CTS (copper tube size)
<b>Material Designation Code</b>	PEX 5306
<b>Temperature &amp; Pressure Rating</b>	100 psi @ 180F 160 psi @ 73F
<b>NSF Listing (Potable)</b>	cNSF®us-pw
<b>NSF Chlorine Listing</b>	CL5
<b>ASTM Tubing Standards Certification</b>	F876/F877
<b>Canadian Standard Assoc</b>	CSA B137.5
<b>Fittings System Compatibility</b>	PureFlow - ASTM F877/F1807/F2159
<b>IAPMO Listing</b>	UPC®
<b>UL Listing Rating*</b>	cULus 3SAV UL1821 130 psi @ 120F
<b>Plenum Rating**</b>	FS/SD 25/50 ASTM E84 CAN/ULC S102.2
<b>Fire Resistance Ratings</b>	CAN/ULC S101 ANSI/UL 263
<b>ICC Listing</b>	ES-PMG™ - 1038
<b>AWWA Listing</b>	C904
<b>HUD Listing</b>	MR 1276
<b>Manufacturer's Date Code</b>	1/1/2010
<b>Material Code</b>	X14.2
<b>Country of Manufacture</b>	Made in the USA

Table 9.1

\*  $\frac{3}{4}$ " through 2" Black ViegaPEX Ultra only

\*\* 2" and smaller tube sizes when wrapped with  $\frac{1}{2}$ " - 1" thick E84 rated insulation,  $\frac{1}{2}$ " and smaller with no insulation per ULC S102.2 listing. Tubing may include fitting connections when wrapped.

## 10.1 ManaBloc

The general sizing information shown may be appropriate for many ManaBloc installations. These recommendations are based on flow rates of typical fixtures that require 8 psi residual pressure.

The length of distribution tubing run between the Viega ManaBloc and each fixture shall be 60 feet or less to maximize optimal performance of the ManaBloc system. Exceeding this recommended distance affects the system's ability to efficiently deliver hot water, lengthening the time it takes for hot water to reach the fixture as well as increasing water waste.

### 10.1.1 Supply and distribution line sizing

The best water and energy savings of a ManaBloc system are realized when distribution lines are sized according to the fixture demand and the length of the individual line. Viega recommends the following tube sizing:

Typical supply line size:

- $\frac{3}{4}$ " up to 2½ baths
- 1" up to 4½ baths

Typical distribution line size:

- $\frac{3}{8}$ " up to 2½ GPM fixture flow requirement (lavs, toilets, bidets, bar sinks, kitchen sinks, dishwashers)
- $\frac{1}{2}$ " up to 4 GPM fixture flow requirement (hose bibbs, tubs, showers, washing machines, whirlpool baths, soaking tubs, etc.)

Consult the fixture manufacturer's literature to determine the actual fill rate and residual pressure requirements for distribution line size. In addition, confirm with local Authority Having Jurisdiction (AHJ) for acceptable PEX tubing size.

**Hose Bibb Note:** If a hose bibb is primarily for irrigation purposes, it should be supplied from the main service line prior to the ManaBloc.

A Viega PEX Press and PEX Crimp ManaBloc come with  $\frac{1}{2}$ " ports that are designed to fit both  $\frac{3}{8}$ " and  $\frac{1}{2}$ " PEX port adapters.



*Design factors for installing a home run system*

### Water heater placement

The Viega ManaBloc should be as close as possible to the water heater to minimize extra water from being stored in the larger hot water supply lines between the ManaBloc and water heater.

The longer the hot water supply line is, the greater the volume of water needed to purge through that line and faucet before hot water is available. This creates water waste and longer hot water delivery times.

## Proper water distribution line sizing to each fixture

This is crucial for overall system performance. If you oversize a distribution line to a fixture ( $\frac{1}{2}$ " PEX line supplying a sink instead of a  $\frac{3}{8}$ " PEX line) you are essentially doubling the volume of water being stored in that line. It can take roughly twice as long to purge an oversized line compared to a properly sized line.

The fixture is what dictates water flow (federally mandated, governed by code). The tubing applies a friction loss dictated by its size and length. Therefore, as long as you do not undersize a distribution line or run it excessive distances (60 feet or greater), the system will perform properly, maintaining sufficient pressure and flow.

### The length of a distribution line run to each fixture

This is just as important as properly sizing each distribution line. Length of a distribution line run can drastically affect the performance of a Viega ManaBloc system. The longer the line is, the more water being stored within it. Therefore, it will take longer to purge it out before hot water can reach the fixture. The ManaBloc should be located somewhat central to your fixture groups, keeping within 60 feet or less of each fixture for maximum performance.

If this cannot be accomplished with one ManaBloc, multiple Mana Blocs may be required. Place one at each end of the home to split the distribution line distance between them. (See "13.5 Multiple ManaBloc installations" on Page 31.)

### 10.1.2 Plumbing code compliance (home run / parallel systems)

The Viega ManaBloc system is listed to ASTM F876/F877 standards for cross-linked polyethylene (PEX) distribution systems. The below model plumbing codes recognize and allow the use of PEX distribution systems:

- International Plumbing Code (IPC)
- Uniform Plumbing Code (UPC)
- National Plumbing Code (NPC)

Sizing of Parallel Water Distribution Systems (ManaBloc) is addressed in these model plumbing codes under their respective water supply and distribution sections. The Viega ManaBloc is also IAPMO (UPC) and ICC-ES PMG listed for use with  $\frac{3}{8}$ " and  $\frac{1}{2}$ " PEX tubing sizes for water distribution.

## 10.2 Combination systems

PEX combination systems can be sized in a similar manner as a typical branch-and-tee system. Refer to your local or model plumbing code for the required tube and manifold sizing based on the system demand (Water Service Fixture Units, WSFU). If low service pressure is present, Viega provides the equivalent feet of PEX tubing factors for PEX fittings to ensure any additional pressure drop is accounted for in your design.



*Design factors for installing combination systems*

### Design the layout as condensed as possible

Keep the main hot supply line close to the fixture groups with the branch lines shorter than six feet. This will help provide hot water in a reasonable amount of time with less wasted water.

The limiting factor for installers to accomplish an optimal design is how spread out the fixture groups are within the structure.

If there is a floor plan that incorporates stacked or back-to-back fixture groups, a combination system can be an effective alternative to a parallel system.

## 10.3 Branch-and-tee systems

The same general sizing practices can be applied to a PEX branch-and-tee system as with any code-approved piping material. Refer to your local or model plumbing code for proper tube sizing.



*Design factors for installing branch-and-main systems*

Just like the combination system, condensed floor plan layouts are preferable to minimize the length and the amount of water stored in the main supply line, minimizing the amount of water purged before hot water reaches the fixtures. These systems can also suffer from fluctuating pressure during multiple fixture use.

If the fixture groups are not condensed, a branch-and-main system will have slow hot water delivery times and substantial water waste.

## 11 System Sizing and Calculations

### 11.1 General

Viega PEX systems should be designed following standard plumbing engineering practice. Follow local codes to determine minimum tubing size and required fixture pressures.

Pressure drop through fittings can be estimated from the charts below. Values are expressed in equivalent length of PEX, so add the values for the relevant fittings to the length of tubing in the run, and then determine the total pressure drop from the charts on the following page.

To determine the pressure drop through runs of ViegaPEX Ultra and FostaPEX tubing, refer to the pressure drop chart on the following page. For a known flow rate, tubing size and tubing length, the pressure drop through the run can be easily determined.

### 11.2 Viega PEX fittings

#### 11.2.1 Viega PEX Press friction loss — equivalent feet of SDR9 PEX tubing

PEX Press Bronze Fittings				
Size	Coupling	Elbow	Tee Run	Tee Branch
3/8"	2.9	9.2	2.9	9.4
1/2"	2.0	9.4	2.2	10.4
3/4"	1.0	8.0	1.0	9.0
1"	1.0	10.0	2.0	10.0
1 1/4"	2.0	11.0	2.0	11.0
1 1/2"	2.0	13.0	2.0	12.0
2"	1.0	19.0	2.0	18.0

PEX Press Polymer Fittings				
Size	Coupling	Elbow	Tee Run	Tee Branch
3/8"	4.5	14.3	6.5	14.7
1/2"	2.6	12.6	3.9	14.0
3/4"	2.5	18.9	3.6	19.1
1"	3.1	17.7	3.8	18.4
1 1/4"	4.0	18.6	6.4	18.7
1 1/2"	5.2	29.4	7.9	28.3
2"	8.9	36.4	10.2	37.5

#### 11.2.2 Viega PEX Crimp friction loss — equivalent feet of SDR9 PEX tubing

PEX Crimp Eco Brass Fittings				
Size	Coupling	Elbow	Tee Run	Tee Branch
3/8"	2.9	9.2	2.9	9.4
1/2"	2.0	9.4	2.2	10.4
3/4"	0.6	9.4	1.9	8.9
1"	1.3	10.0	2.3	11.0

PEX Crimp PolyAlloy Fittings				
Size	Coupling	Elbow	Tee Run	Tee Branch
3/8"	10.9	22.3	N/A	N/A
1/2"	7.1	16.5	7.2	17.9
3/4"	4.8	17.4	6.6	17.7
1"	4.5	18.0	6.0	17.0

## 11.3 ViegaPEX Ultra tubing

### 11.3.1 Flow Velocity Table

Flow Rate GPM	Flow Velocity ft/sec						
	3/8	1/2	3/4	1	1 1/4	1 1/2	2
0.5	1.7	0.9			Velocity < 0.5 ft/sec		
0.75	2.5	1.4	0.7				
1.0	3.3	1.8	0.9	0.5			
1.5	5.0	2.7	1.4	0.8	0.6		
2.0	6.7	3.6	1.8	1.1	0.7	0.5	
2.5	8.3	4.5	2.3	1.4	0.9	0.7	
3.0	10.0	5.4	2.7	1.6	1.1	0.8	
3.5		6.3	3.2	1.9	1.3	0.9	0.5
4.0		7.2	3.6	2.2	1.5	1.1	0.6
4.5		8.1	4.1	2.5	1.7	1.2	0.7
5.0		9.1	4.5	2.7	1.8	1.3	0.8
6.0		10.9	5.4	3.3	2.2	1.6	0.9
7.0			6.4	3.8	2.6	1.8	1.1
8.0			7.3	4.4	2.9	2.1	1.2
9.0			8.2	4.9	3.3	2.4	1.4
10.0			9.1	5.5	3.7	2.6	1.5
11.0			10.0	6.0	4.0	2.9	1.7
12.0			10.9	6.6	4.4	3.2	1.8
13.0			11.8	7.1	4.8	3.4	2.0
14.0				7.7	5.1	3.7	2.2
15.0				8.2	5.5	4.0	2.3
16.0				8.8	5.9	4.2	2.5
17.0				9.3	6.3	4.5	2.6
18.0				9.9	6.6	4.8	2.8
19.0				10.4	7.0	5.0	2.9
20.0				11.0	7.4	5.3	3.1
25.0					9.2	6.6	3.8
30.0					11.0	7.9	4.6
35.0						9.2	5.4
40.0						10.6	6.2
45.0						11.9	6.9
50.0							7.7
55.0							8.5
60.0							9.2
65.0							10.0
70.0							10.8
75.0							11.5

### 11.3.2 Pressure Loss Table

Flow Rate GPM	60°F (16°C) Water						
	Pressure Loss PSI/ 100 ft of Pipe						
	3/8	1/2	3/4	1	1 1/4	1 1/2	2
0.5	2.0						
0.75	4.1						
1.0	7.0	1.6		Pressure Loss <1 PSI			
1.5	14.9	3.4					
2.0	25.4	5.8	1.1				
2.5	38.5	8.7	1.6				
3.0	53.9	12.2	2.3				
3.5		16.2	3.0				
4.0		20.8	3.9	1.1			
4.5		25.8	4.8	1.4			
5.0		31.4	5.9	1.7			
6.0		44.0	8.2	2.4			
7.0			10.9	3.2	1.2		
8.0			14.0	4.1	1.6		
9.0			17.4	5.1	1.9		
10.0			21.1	6.2	2.3	1.0	
11.0			25.2	7.4	2.8	1.2	
12.0			29.6	8.8	3.3	1.5	
13.0			34.3	10.1	3.8	1.7	
14.0				11.6	4.4	2.0	
15.0				13.2	5.0	2.2	
16.0				14.9	5.6	2.5	
17.0				16.7	6.3	2.8	
18.0				18.5	7.0	3.1	
19.0				20.5	7.7	3.4	
20.0				22.5	8.5	3.8	1.0
25.0					12.8	5.7	1.5
30.0		Pressure Loss Excessive as Flow velocity is > 12 ft/sec			18.0	8.0	2.2
35.0						10.7	2.9
40.0						13.7	3.7
45.0						17.0	4.6
50.0							5.6
55.0							6.6
60.0							7.8
65.0							9.0
70.0							10.4
75.0							11.8

**NOTE:** Pressure Loss based on Hazen-Williams Formula (C = 150)  
 Pressure Loss for Actual Length can be calculated by following formula:  
 Actual Length / 100 ft X Value from chart above

### 11.3.3 Velocity limits

Viega recommends the following design velocities for hot and cold PEX water distribution systems:

- Domestic cold water — 10 fps
- Domestic hot water — 8 fps

The flow velocity through Viega's PEX fittings does not fall under these limitations. The equivalent length of PEX tube for Viega PEX fittings is available from Viega to assist in system sizing where applicable. (Refer to Section "11.2 Viega PEX fittings" on Page 22.)

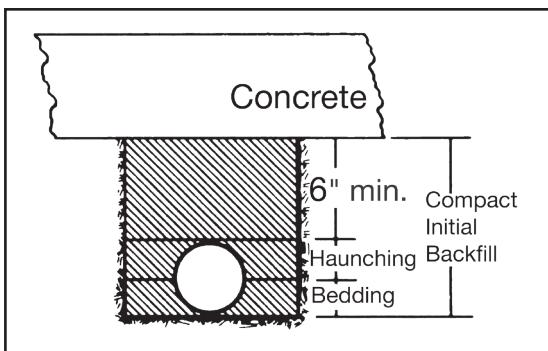
## 12.1 Below grade and service line

ViegaPEX Ultra and FostaPEX tubing may both be used underground and for water service piping. When running lines underground, it is important to provide a stable, continuous trench base to support the tubing.

Always allow sufficient slack when tubing is laid in trenches. Snake the tubing slightly side-to-side to provide for contraction due to temperature change.

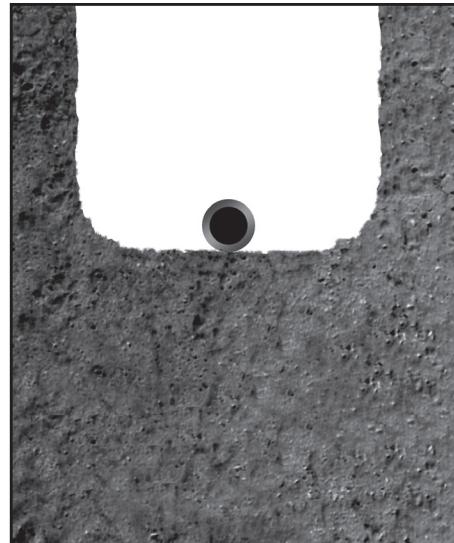
Do not use blocking to support tubing. PEX tubing can be damaged by contact with sharp objects. Ensure that trench bottom and fill do not contain sharp rocks or other items. In good soil conditions tubing may be placed directly on trench bottom. In poor soil conditions (rocky, loose, etc.) the trench should be excavated at least six inches below the tubing level and backfilled with appropriate material to provide a stable base (coarse sand, pea gravel or similar).

Backfill material must be free of large rocks, glass or other sharp objects. Provide sufficient coverage over tubing so that expected traffic loads will not deform tubing (consult local codes). Compact this material to at least 6" above the tube.

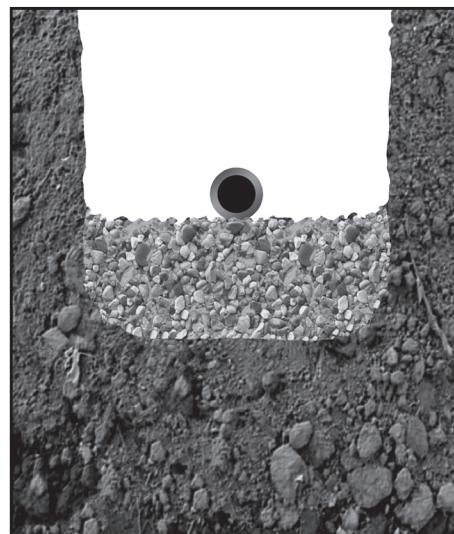


Do not install ViegaPEX Ultra tubing where soil is or may become contaminated with solvents, fuels or similar chemicals. Do not install tubing above or below septic tanks, leach fields, pits or cesspools.

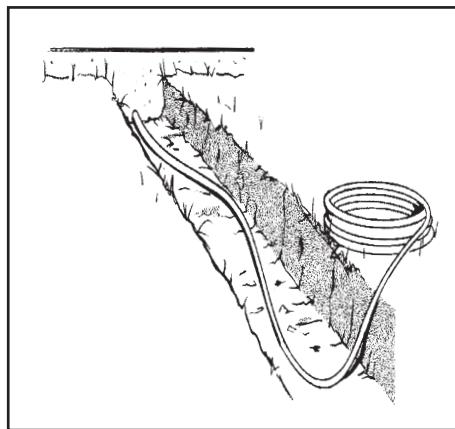
Always follow local codes when installing ViegaPEX Ultra tubing. Consult standards such as ASTM D2774: Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping for further information.



Trench in good soil



Trench in poor soil



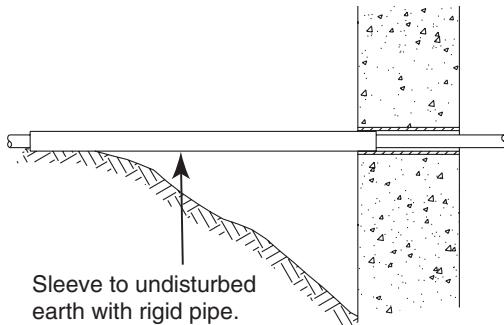
Allow sufficient slack when tubing is laid in trench

## 12.2 Foundation penetration

Where service lines penetrate foundation or basement walls, to prevent shearing or pinching off of the tube when backfill below the tubing settles, plastic tubing must be properly sleeved.

If there is an area of over-excavation through which the tubing must pass, it shall be sleeved with a larger rigid pipe (Schedule 40 PVC or equivalent) to undisturbed earth. The foundation end of the rigid pipe must also be supported by the foundation wall.

Slight over-excavations (12" or less) do not require rigid sleeving when the area below the tubing is back-filled and well compacted to the level of penetration. Always sleeve plastic tubing where it passes through concrete. Do not use oil-based caulk or sealants in contact with tubing.



## 12.3 Direct burial of Viega PEX fittings

Installing PEX fittings in direct contact with ground soil (direct burial) may require protective measures. Refer to the below direct burial requirements for each fitting type.

Viega PEX Press fittings (Zero Lead bronze and polymer) do not require any protective wrap for direct burial installations.

Viega PEX Crimp fittings (Eco Brass and Polymer) and their crimp rings shall be securely wrapped with tape meeting the following criteria for direct burial installations.

- Self-fusing
- Formaldehyde-free
- Fully cured silicone tape
- Minimum of 0.020" thickness

The wrap is available from Viega (part number 15320).

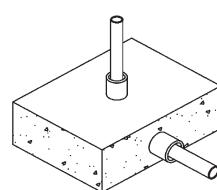
## 12.4 Concrete

ViegaPEX Ultra and FostaPEX tubing may be run within concrete slabs. All penetration points must be sleeved to prevent tubing damage (entry/exit points, expansion joints, etc.). Penetrations in walls, etc., may be sealed with silicone caulk. Do not use oil-based caulk. Every effort should be made to use only continuous lengths of tubing within a slab. If the use of fittings buried in concrete is necessary for repairs, all such fittings must be wrapped with insulation, noncorrosive tape (no adhesives) or sleeved to prevent corrosion. The wrap shall be a self-fusing, formaldehyde-free, fully cured silicone tape with a minimum of 0.020" thickness. The wrap is available from Viega (part number 15320). Contact a Viega representative for additional information on approved wrapping materials.

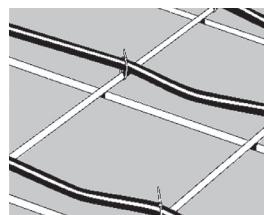
When running tubing within a concrete slab, the tubing must be fastened to the reinforcing mesh or rebar every two to three feet to prevent it from floating up while concrete is curing.

## 12.5 Installing under the slab

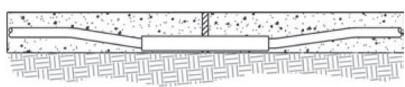
When installing ViegaPEX Ultra or FostaPEX tubing in the ground under the slab, the tubing should be snaked from side to side in the prepared trench. The trench bottom should be smooth and free of rocks and debris. Lay the tubing directly on the trench bottom. Tubing must be continuously supported by the trench bottom. Use only continuous lengths of tubing in or under slab. Any connections shall be outside the slab or in an access box.



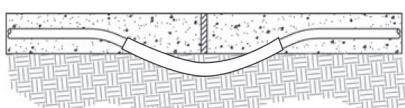
Elbow sleeves protect tubing at concrete slab penetrations



Tubing must be fastened to the reinforcing mesh on rebar



SLEEVE PEX TUBING AT ALL EXPANSION JOINTS



FOR CUT EXPANSION JOINTS, DIP THE TUBING BELOW THE SLAB TO A SAFE DISTANCE AT THE CUT LINES

PEX tubing must be sleeved at all expansion joints and every point where it enters, exits or penetrates the slab. For expansion joints that are to be cut, the tubing must be dipped below the slab to prevent damage.

## 12.6 Protecting ViegaPEX Ultra tubing



Protect tubing and fittings from UV exposure.

Due to the nature of slab-on-grade installation, tubing and fittings may be exposed to UV light for unspecified periods of time.

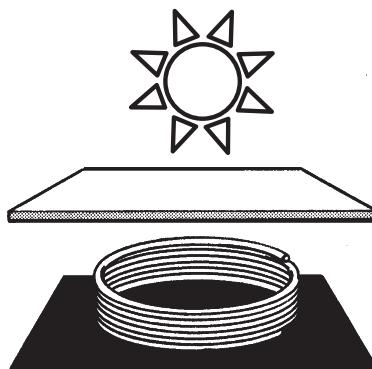
To prevent damage from UV exposure, all ViegaPEX Ultra tubing and polymer fittings shall be protected with an opaque covering (black plastic polyethylene bag or sheeting) immediately after they have been installed.

PEX tubing shall be stored under cover, shielded from direct and indirect sunlight when the material is stored for any length of time. Short exposure times of ViegaPEX Ultra, FostaPEX and polymer fittings not exceeding the total accumulated recommended exposure time are permissible.

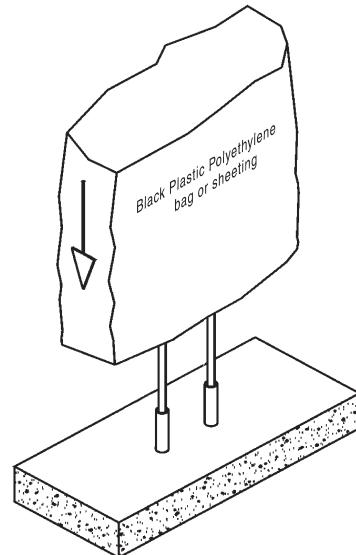
Informing the other trades of the presence of the lines may help prevent damage.

When the tubing penetrates at an angle in relation to the hole, it may be subject to a sharp edge that can damage the pipe. Acceptable sleeving materials include flexible plastic tubing, foam pipe insulation or an approved plastic insulator.

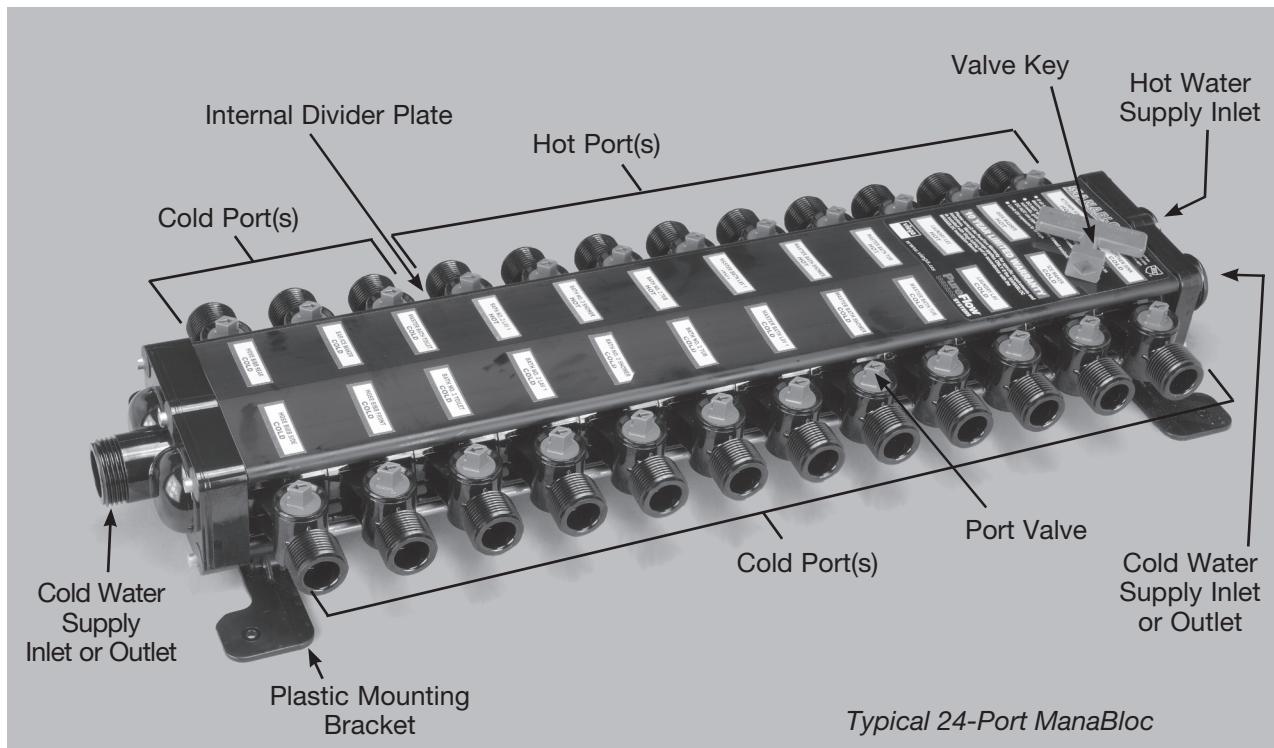
It is not necessary to sleeve PEX when penetrating wooden framing members or non-metallic finished or unfinished walls. However, if there is a doubt, sleeve the pipe or install an insulator.



*PEX tubing should always be shielded from direct and indirect sunlight*



*Protect all exposed tubing with an opaque covering*



### 13.1 Overview and carton contents

Additional package contents include:

- Valve T-Handle
- Instruction Sheet/Drill Guide
- Port Labels

### 13.2 Location

*Before installing the ManaBloc, review the following instructions.*

**NOTE:** The ManaBloc is much like an electrical breaker box. When a fixture needs repair, the line to that fixture may be shut off at the ManaBloc, eliminating the need to shut down the water supply for the entire house. This feature requires that the ManaBloc be accessible after installation.



**COLD WEATHER CAUTION!** The thermoplastic components of the ManaBloc, like all thermoplastics, have decreased resistance to impact under freezing conditions and can be damaged. Care must be exercised when installation occurs in freezing conditions.

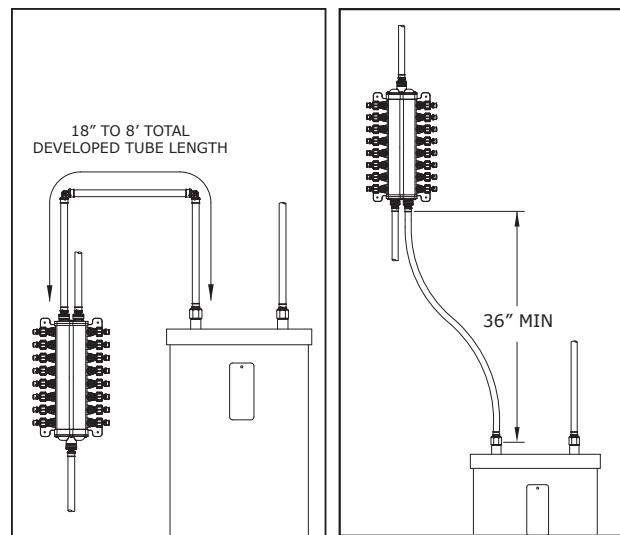
**BEFORE INSTALLING THE MANABLOC, MAKE SURE THE LOCATION REQUIREMENTS HAVE BEEN MET.**

Take extra caution when handling the ManaBloc in temperatures that are below freezing. Tubing penetrations may require sleeving or the installation of an insulator.

1. **UNDER NO CIRCUMSTANCES** shall the ManaBloc be located in a permanently covered area (behind sheetrock, plywood, paneling) or where freezing temperatures may occur. Do not install in direct sunlight. **THE MANABLOC MUST BE ACCESSIBLE** and there shall be sufficient clear area in front of the ManaBloc to provide access.
2. When local code allows, mount the ManaBloc unit in a fire-rated wall, provided an access door meeting the same rating requirements as the wall is installed over the access opening.
3. When installing the ManaBloc in a location other than between studs, provisions must be made to support the tubing runs as they exit the ManaBloc. (See "16.3 Bending ViegaPEX Ultra tubing" on Page 44.)
4. Any installed cover panel shall allow access to the ManaBloc and its mounting screws, the port valves, distribution line connections and supply line connections.
5. To maximize potential water and energy savings, the ManaBloc should be mounted as close as is practical to the hot water source, taking the following into consideration:
  - a. When the ManaBloc is mounted above the water heater, there shall be a minimum of 36" of connecting tubing between the water heater and the ManaBloc to reduce the chance of heat stacking.

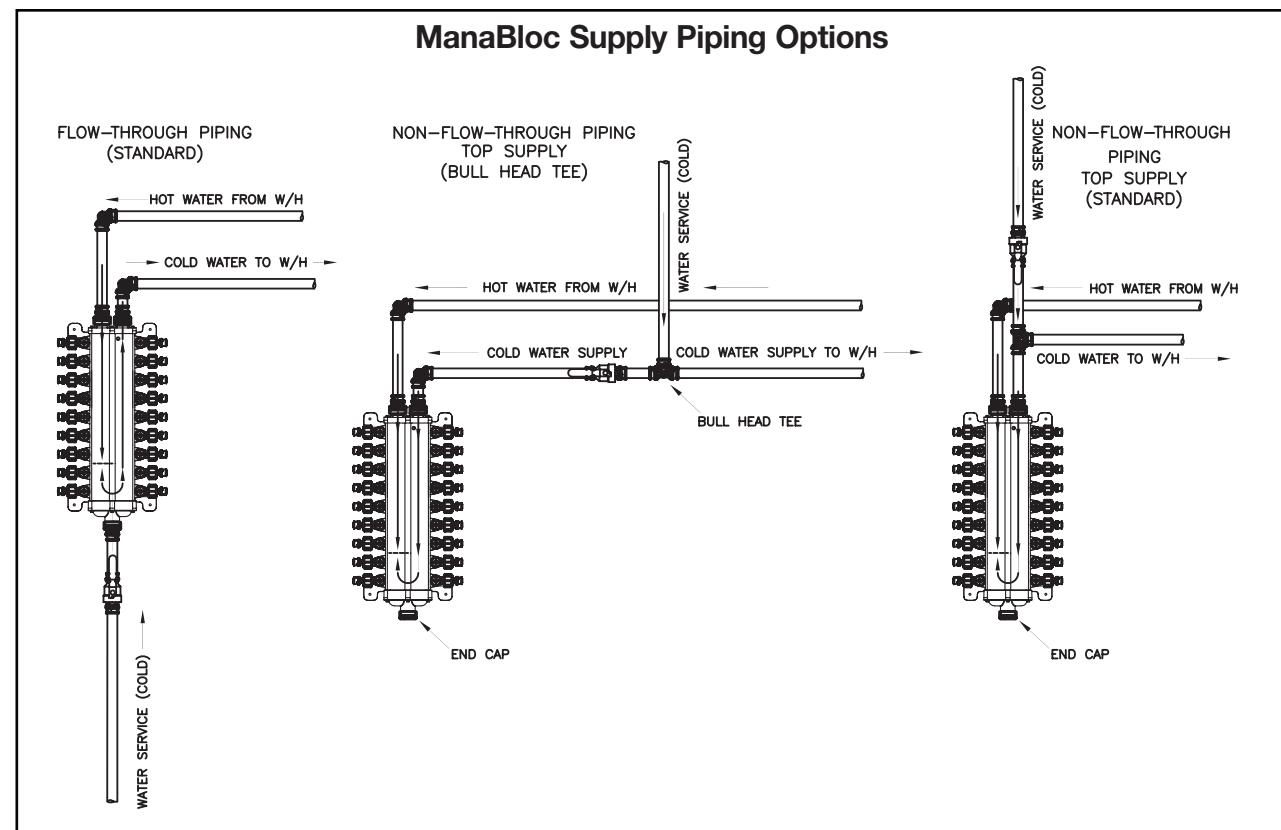
- b. When the ManaBloc is mounted beside the water heater and is connected with tubing incorporating a horizontal flow, there shall be at least 18" of developed tube length. Mounting the ManaBloc within eight feet of developed tube length of the water heater will minimize delivery time of hot water to individual fixtures. The ManaBloc may be mounted closer than 12" to the hot water source (tank) if it does not exceed the minimum allowable vertical and horizontal spacing outlined in this section.
- c. Install the unit in an area that is centrally located to the most dense concentration of served fixtures. Some applications will require that the ManaBloc be mounted farther than eight feet from the hot water source. See design factors for installing a parallel system, "3.1 Home run systems" on Page 8, for suggestions on reducing hot water delivery times in these instances.
6. DO NOT install the ManaBloc within a continuously recirculating hot water plumbing loop. The ManaBloc, however, may be supplied from a recirculating hot water loop. Refer to "Section 17.10 Domestic hot water circulating systems" on Page 55 for recommended piping options.

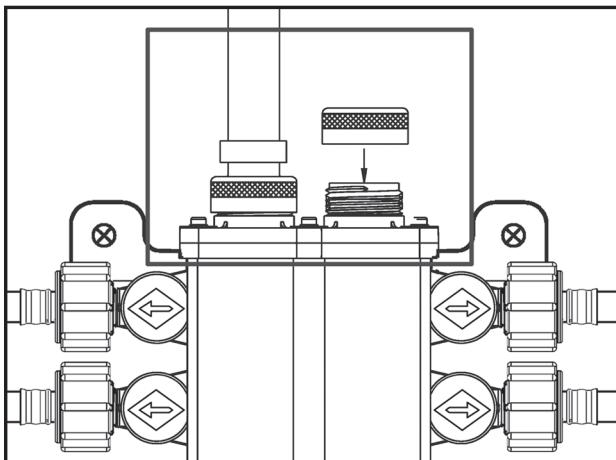
### ManaBloc Locations



7. Position the ManaBloc so that it can be securely fastened through the holes provided in the mounting brackets. The mounting surface should be as flat as possible so as not to induce any twisting or bending forces on the unit. The mounting straps (part number 45716) simplify mounting between studs on 16" centers.

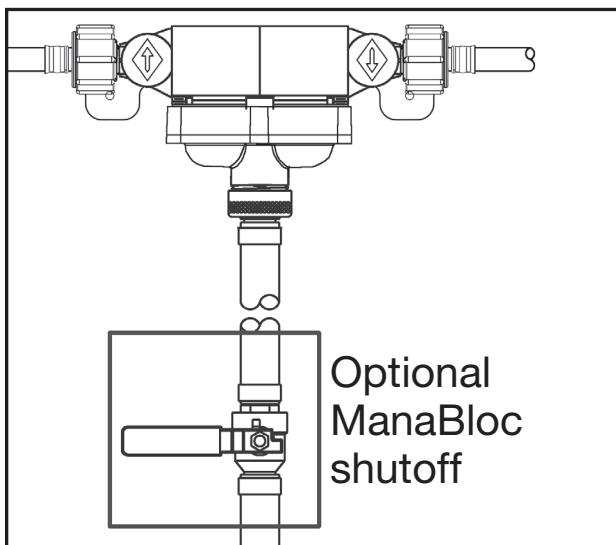
### ManaBloc Supply Piping Options





If a main inlet/outlet will not be used, it must be capped. (Use part number 53601.)

The main service line to the ManaBloc may include a main shutoff valve, as required by local code. Although a shutoff valve for the main service line at the ManaBloc itself is not required, it can be a beneficial option for a homeowner and is recommended.



Local code may also require the installation of a check valve, Pressure Reducing Valve (PRV), back flow preventer, etc. To prevent debris and other particles from entering the system, a strainer may be installed in the service line.

### 13.3 Draining the ManaBloc unit

If the ManaBloc system has been filled with water and there exists the possibility that the ambient temperature will drop close to or below 32°F (0°C), the ManaBloc unit MUST be drained to prevent irreparable damage. The process of draining involves loosening and removal of one or more supply line connections and two distribution lines from the ManaBloc.

**NOTE:** Depending on the installation, some supply connections may be capped. If that is the case, remove the cap(s) as instructed below.

1. Turn off all water supply(s) feeding the ManaBloc. Open both sides of all fixtures served by the manifold and leave the fixtures open during draining. For each port of the ManaBloc where there is a distribution line connected, make sure the port valve is in the open position.
2. Loosen and remove the bottom supply connection(s) (or cap(s)) and the lowest pair of hot and cold distribution lines.
3. As the connections are removed, most of the water contained in the ManaBloc main bores and some of the water in the distribution lines should purge from the system.
4. Allow to drain until no water purges.
5. Reattach the supply line(s) or cap(s) and the distribution lines. Tighten the supply connections according to the instructions in Section 14.5. When reconnecting the distribution lines, DO NOT overtighten the connections. These only need to be hand-tight.

**NOTE:** The procedure described above will leave a small amount of water in the ManaBloc unit and, depending on the installation, may leave some or most of the water in the distribution lines. This remaining water should not cause damage to the manifold unit or to the PEX distribution lines in the event of a freeze. However, for complete assurance that freeze damage will not occur, perform the following additional steps.

### 13.4 Draining the ManaBloc system

1. Loosen and remove all of the supply line connections (or caps) and all of the distribution lines from the ManaBloc.
2. Remove the four attachment screws and withdraw the ManaBloc unit from its mounting. Note: Grasp the unit firmly before removing the last attachment screw to prevent the unit from falling and being damaged.
3. Completely drain the ManaBloc unit by inverting the unit several times until there is no water coming from any of the supply connections or ports.
4. To purge the PEX distribution lines, first make sure that both sides of all of the fixtures are in the open position. Using low-pressure air from a tank or compressor, force the water from the lines by connecting the air pressure source to each line one at a time and blow air through the lines until no water flows from the fixtures.
5. Reattach the ManaBloc and reconnect the supply and distribution line connections.

**NOTE:** When reconnecting the distribution lines, DO NOT overtighten the connections. Compression

connections should require only about  $\frac{1}{8}$  turn past hand-tight when reinstalling connections that were previously tightened to the specifications outlined in this installation guide. PEX Press and PEX Crimp connections must be only hand-tightened.

### 13.5 Multiple ManaBloc installations

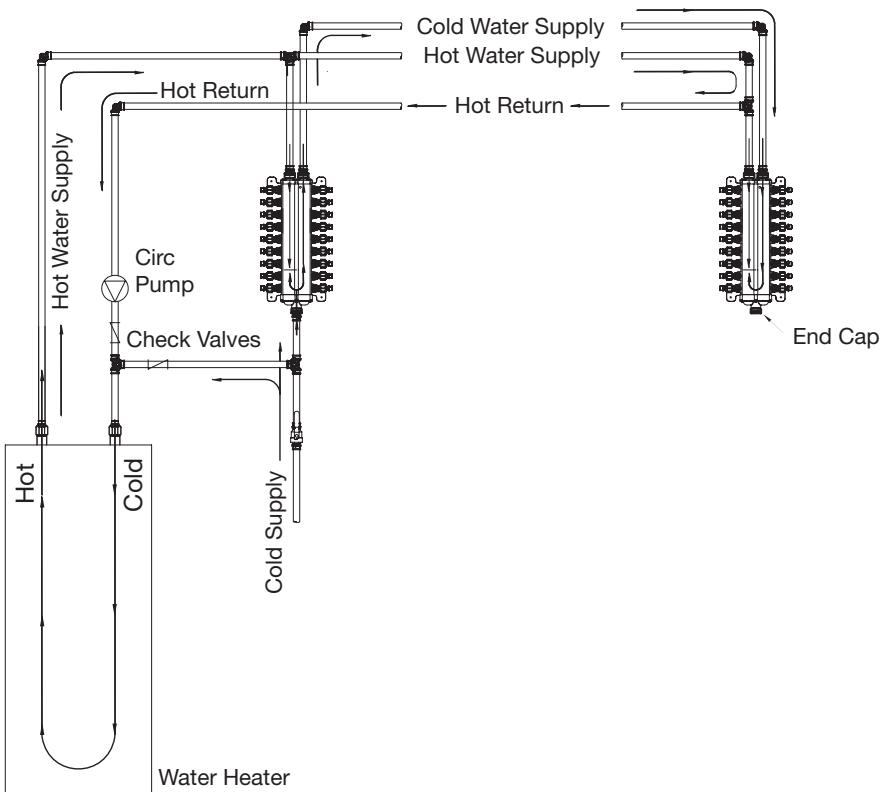
If a home requires multiple ManaBlocs to service the number of fixtures in the home, these guidelines should be followed if the ManaBlocs are closely located to each other.

- Consider dividing high-demand fixtures between the units
- Consider a reasonable division, i.e. upstairs/downstairs, east/west or front/back

#### *Locating a remote ManaBloc*

A remote ManaBloc is sometimes recommended to achieve maximum efficiency from your ManaBloc system. It is advantageous when the line lengths are excessive from one centralized ManaBloc unit. When the home requires more than one unit due to the number of fixtures or size of the home, consider locating a remote unit near an outlying group of fixtures.

### Domestic Hot Water Circulating Loop Supplying Two ManaBlocs



## 14 Mounting the ManaBloc

### 14.1 Mounting the ManaBloc between studs

Dimensions in these instructions are for 16" stud centers and must be adjusted for other stud spacing.

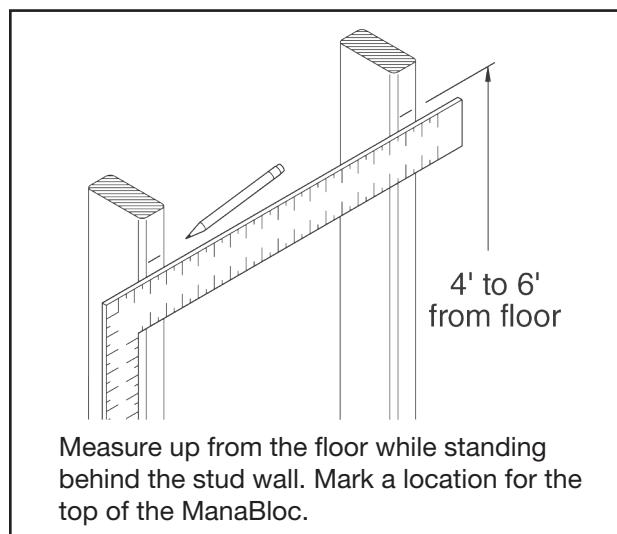
Once the general location of the ManaBloc has been determined (see "13.2 Location" on Page 28), the ManaBloc may be mounted to a suitable surface between a pair of adjacent studs. For 16" stud spacing, the mounting straps (part number 45716) can simplify installation.

#### Additional Tools and Materials

- Electric Drill
- #2 Phillips Head Screwdriver
- Pencil or Pen
- Permanent Marking Pen\*
- Framing Square
- Tape Measure
- 3/4" and 1 1/4" Wood Drill Bits
- ManaBloc Wrench\* - for compression ManaBlocs only
- Wood or Drywall Screws - 1/2" or longer
- 1/2" or 3/4" Plywood - when flush mounting ManaBloc

\*Optional

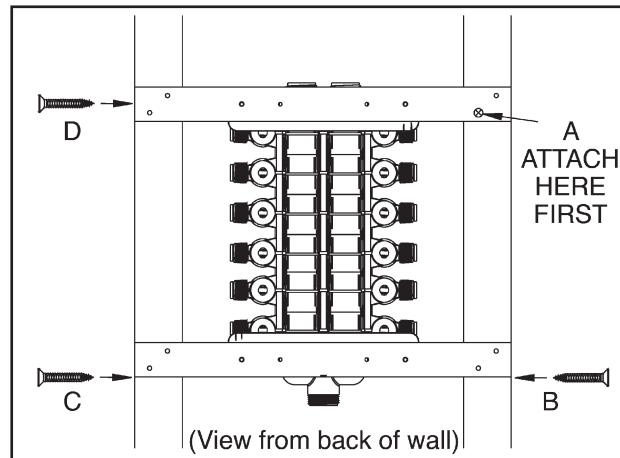
1. Lay the ManaBloc, plastic brackets down, on a suitable flat surface that is large enough to accommodate the full length of the ManaBloc. Place a mounting strap under each plastic mounting bracket (located at the top and bottom ends of the ManaBloc). Attach the plastic mounting bracket at one end of the ManaBloc to the two outer center holes of a mounting strap using the provided self-tapping pan-head screws. The screw heads must be on the accessible side of the mounting strap. Repeat at the other end of the ManaBloc. Tighten screws securely.
2. Standing behind the stud wall, measure up from the floor and make a mark on the back of one of the studs to represent the top of the ManaBloc. (See illustration.)



This mark should be between four feet and six feet from the floor but may be at any height, provided the height will allow all valves on the ManaBloc to be accessible. With a framing square or level, transfer and mark the noted height on the other stud.

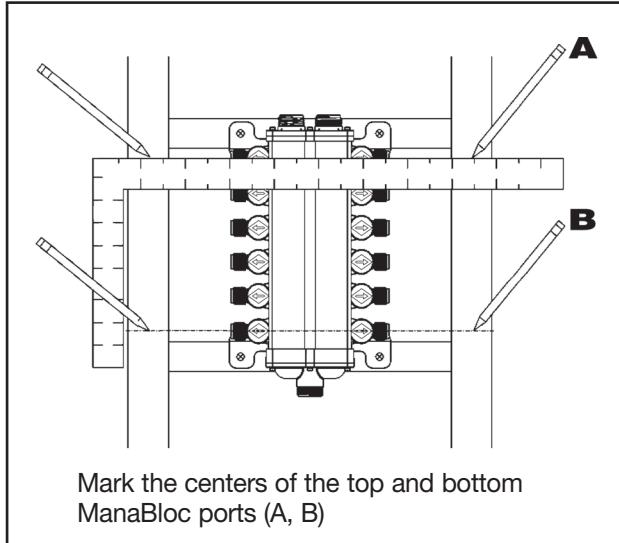
NOTE: A residence intended for disabled persons may require that the ManaBloc be mounted lower in the wall to provide access.

3. Standing behind the stud wall, hold the ManaBloc facing away from you and align the top of the UPPER mounting strap to the line on the stud that you made in Step 2. Loosely attach this mounting strap flush to the back outer edge of one stud using a 3/4" or longer drywall or other suitable wood screw (A). (See illustration.)

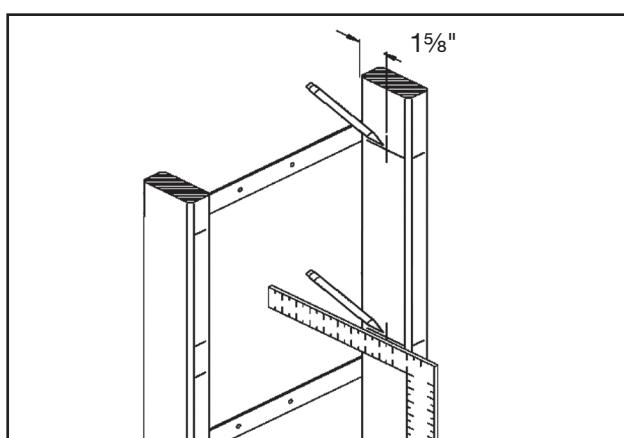


4. Line up the LOWER mounting strap with the back outer edge of the stud and attach it in the same manner (B). Attach the remaining strap ends (C and D) to the other stud, and tighten all screws.

5. Standing in front of the wall, using a framing square or straight edge, mark the center line position of the top and bottom ports onto both studs. (See illustration.)

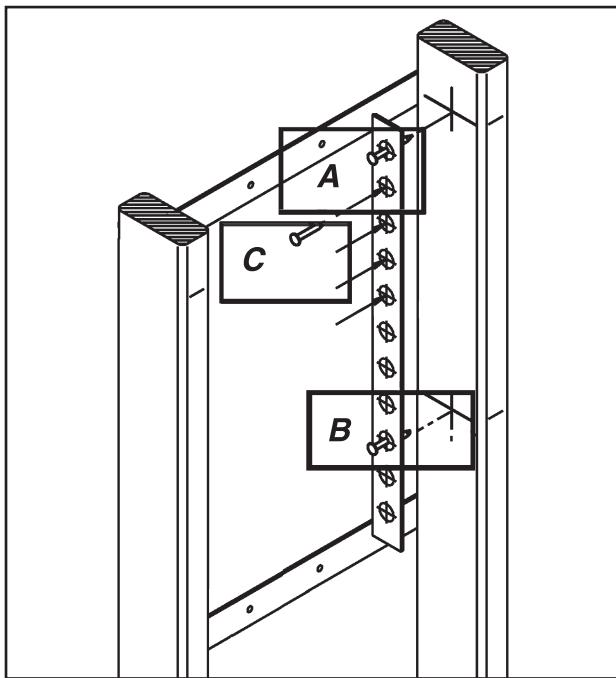


6. Detach the ManaBloc from its mounting straps (or 1x4s) and remove it from the installation area to prevent wood chips or other debris from falling into the unit.
7. Transfer the port location marks made in Step 5 to the insides of the stud cavity using a square and pencil.
8. Measure 1 $\frac{5}{8}$ " from the mounting surface. Draw a vertical line on the studs that passes through each of the horizontal port center lines marked in Step 7. (See illustration below.) Be sure to mark the inside of both studs.

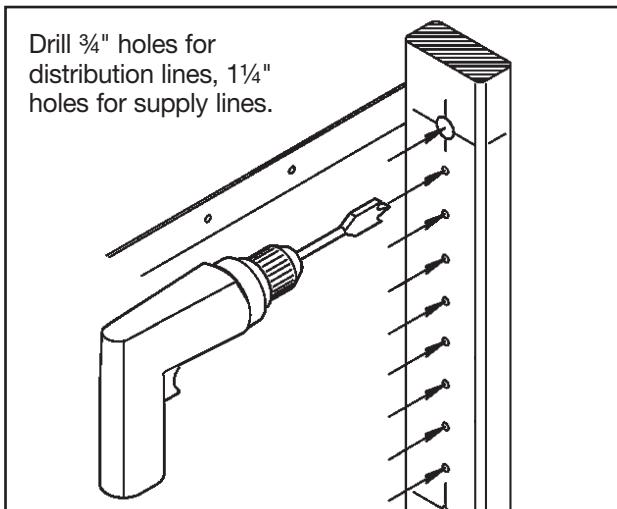


9. Push a small nail through the printed center line at one end of the Drill Guide (A). Push the nail into the cross formed where the top port mark intersects with the 1 $\frac{5}{8}$ " mark. Tap the nail into the stud to hold the Drill Guide in place.

10. Push a small nail through the printed center line on the lower end of the Drill Guide with the center line of the port (B). Tap the nail into the stud to hold the Drill Guide in place.



11. Using an awl, nail or other pointed tool (C), mark the stud by tapping through the Drill Guide at each printed center line between the two nails.
12. Carefully remove the Drill Guide and repeat the marking procedure on the adjacent stud.
13. Drill  $\frac{3}{4}$ " holes through both studs at each marked location. Be sure to hold the drill level perpendicular to the stud to prevent drilling holes at an angle. Remove any splinters or burrs made during drilling.
14. Mark and drill any holes for main water supply and hot water supply/return lines at this time. A 1 $\frac{1}{4}$ " bit will provide adequate clearance for  $\frac{3}{4}$ " or 1" tubing. The tubing shall enter and/or exit the ManaBloc in a straight line so as not to induce bending stress on the ManaBloc. Necessary elbows, couplings and tees are allowed in the main water supply lines.



15. Reattach the ManaBloc to the mounting straps.



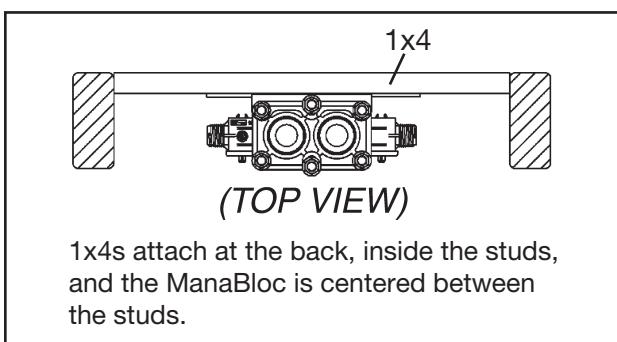
**When the ManaBloc is installed prior to wall finishing operations, the unit **MUST** be protected from paint, texture compounds and drywall dust.**

NOTE: The wall in which the ManaBloc is mounted must be accessible from both sides during installation to use the mounting straps.

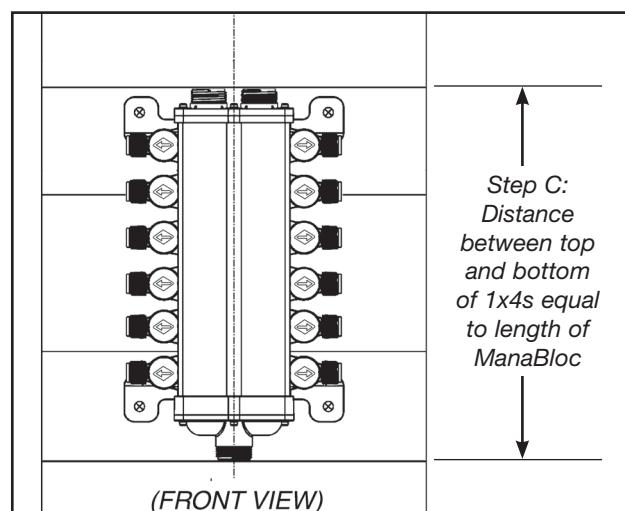
#### 14.2 Mounting the ManaBloc between studs without use of mounting straps

*If not using the mounting straps, this procedure applies:*

1. Cut two pieces of lumber (1x4 — or  $\frac{3}{4}$ " plywood — approximately  $3\frac{1}{2}$ " wide) to a length that provides a snug fit **BETWEEN** two studs.



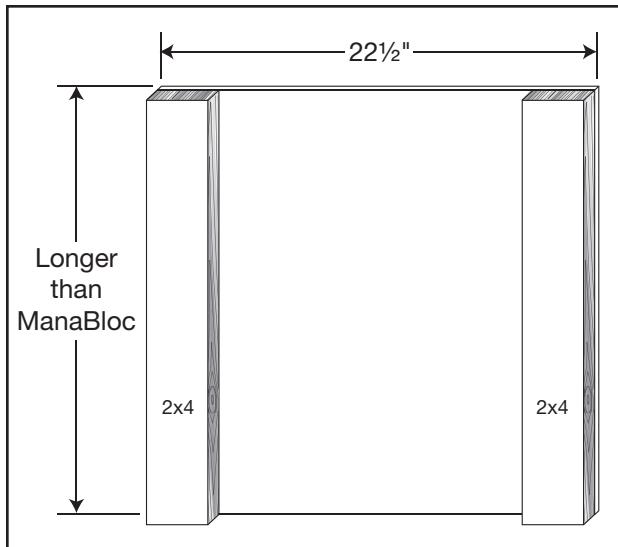
2. The top of the ManaBloc should be between four feet and six feet from the floor (but may be at any height provided that it maintains accessibility to all of the ports on the ManaBloc). Make a mark near the back of the inside of one stud that would represent the top of the ManaBloc. With a framing square or level, mirror the mark on the inside back of the other stud.
3. Attaching the ManaBloc between the studs:
  - a. Measure the total length of the ManaBloc.
  - b. Attach the first (UPPER) 1x4 inside and flush to the back of the studs (see TOP VIEW, below left) at a height where the center of its width is centered on the marks from Step 2.
  - c. Attach the remaining (LOWER) 1x4 inside and flush to the back of the studs at a distance below the upper 1x4 that is equal to the length of the ManaBloc (Step 3a) when measured from the top of the upper 1x4 to the bottom of the lower 1x4. (See FRONT VIEW illustration.)



4. **CENTER THE MANABLOC IN THE STUD CAVITY:** Attach the ManaBloc to the 1x4s with four  $1\frac{1}{2}$ " -  $3\frac{1}{4}$ " drywall screws. **DO NOT OVERTIGHTEN.**
5. Continue to Section 13.1, Step 5, to finish installation.

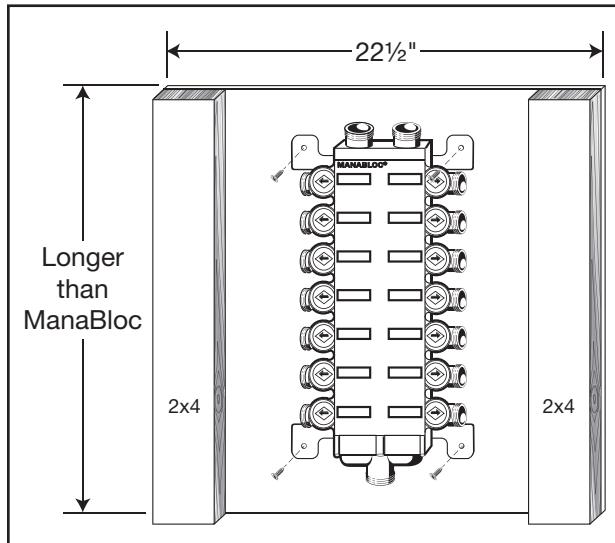
### 14.3 Mounting the ManaBloc - surface mount

1. A suitable base for the ManaBloc can be constructed from a section of  $1\frac{1}{2}$ " or thicker plywood that is a minimum  $22\frac{1}{2}$ " wide and slightly longer than the overall length of the ManaBloc.
2. Securely attach a length of 2x4, or other suitable framing material with a thickness of  $1\frac{1}{2}$ " and about  $3\frac{1}{2}$ " wide on the left and right sides of the mounting base running the full length of the ManaBloc. (See illustration below.) The 2x4s will be used to secure the distribution lines at the correct height as they exit the ManaBloc. (Support clamps not to exceed 6" spacing from end of ports.)

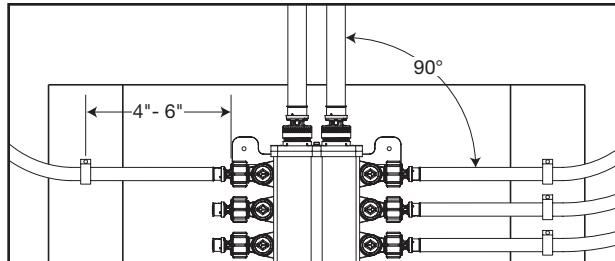


3. Attach the mounting base to the structure in a suitable location. (See "13.2 Location" on Page 28.) The base should be mounted so the top of the ManaBloc is between four feet and six feet from the floor but may be at any height provided that the height maintains accessibility to all the ports on the ManaBloc.
4. The mounting base must be firmly attached to a structure solid enough to support, at a minimum, the weight of the ManaBloc filled with water. The base should be square and level.

5. Center the ManaBloc on the base both vertically and horizontally, as shown here. Attach the ManaBloc to the mounting base with four  $1\frac{1}{2}$ " or longer drywall or wood screws through the holes in the plastic brackets on the ManaBloc. DO NOT OVERTIGHTEN.

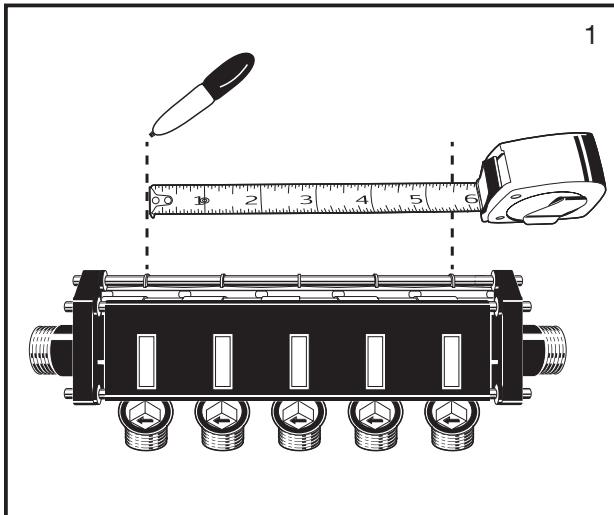


6. As the distribution lines are connected to the ManaBloc (see "15.3 Connecting distribution lines to the ManaBloc" on Page 39), ensure that the tubing exits the unit at a  $90^\circ$  angle to the center line of the ManaBloc so as not to induce bending stress on the ManaBloc.
7. When attaching the distribution line tubing to the 2x4 supports, be sure to use appropriately sized Viega tubing clamps. (For example, use part number 52000 for  $\frac{3}{8}$ " tubing and part number 52020 for  $\frac{1}{2}$ " tubing.) Use one clamp per tube to ensure that the tubing is held securely. Position clamps NO FARTHER than 6" from the end of the port. DO NOT pull tubing tight.

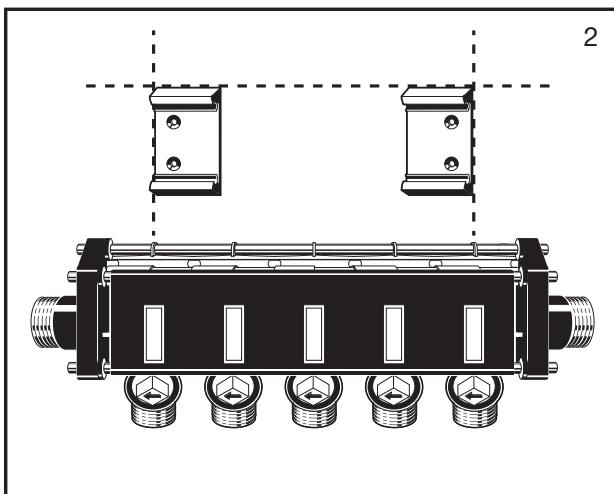


#### 14.4 Mounting the MiniBloc

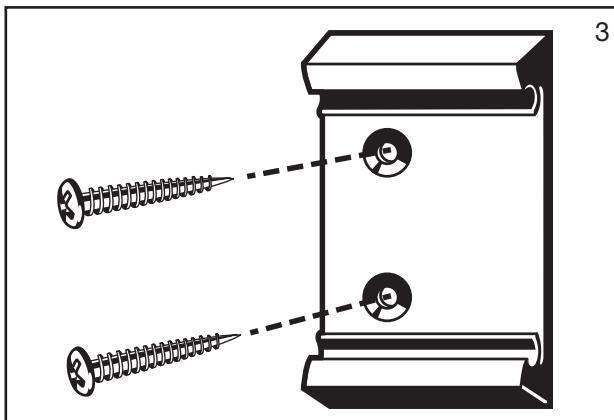
1. For proper bracket spacing, measure distance between the center ribs of the first and last MiniBloc modules. Mark this distance on the selected mounted surface.



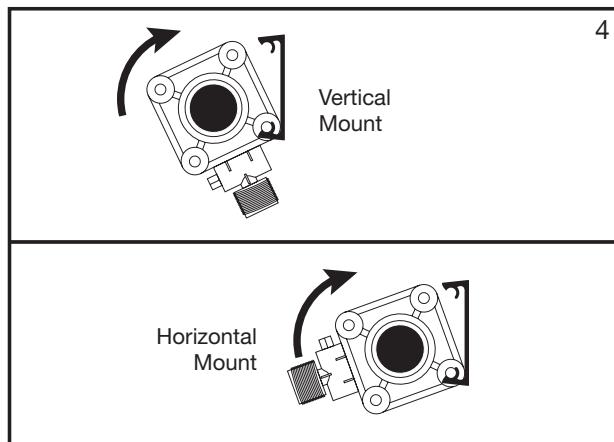
2. Align the outside edge of each bracket within each end mark. Mounting brackets shall be mounted level and parallel to each other before affixing the MiniBloc manifold. NOTE: Use both mounting brackets provided with each MiniBloc manifold. Ensure the mounting surface is suitable to support the weight of the manifold and attached tubing when filled with water.



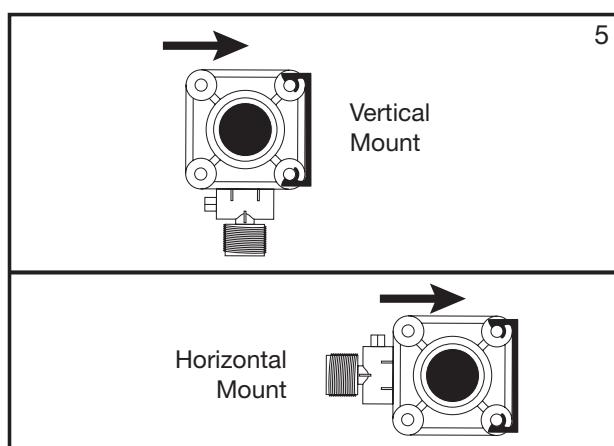
3. Use two wood screws per bracket, 1" or longer, to prevent misalignment.



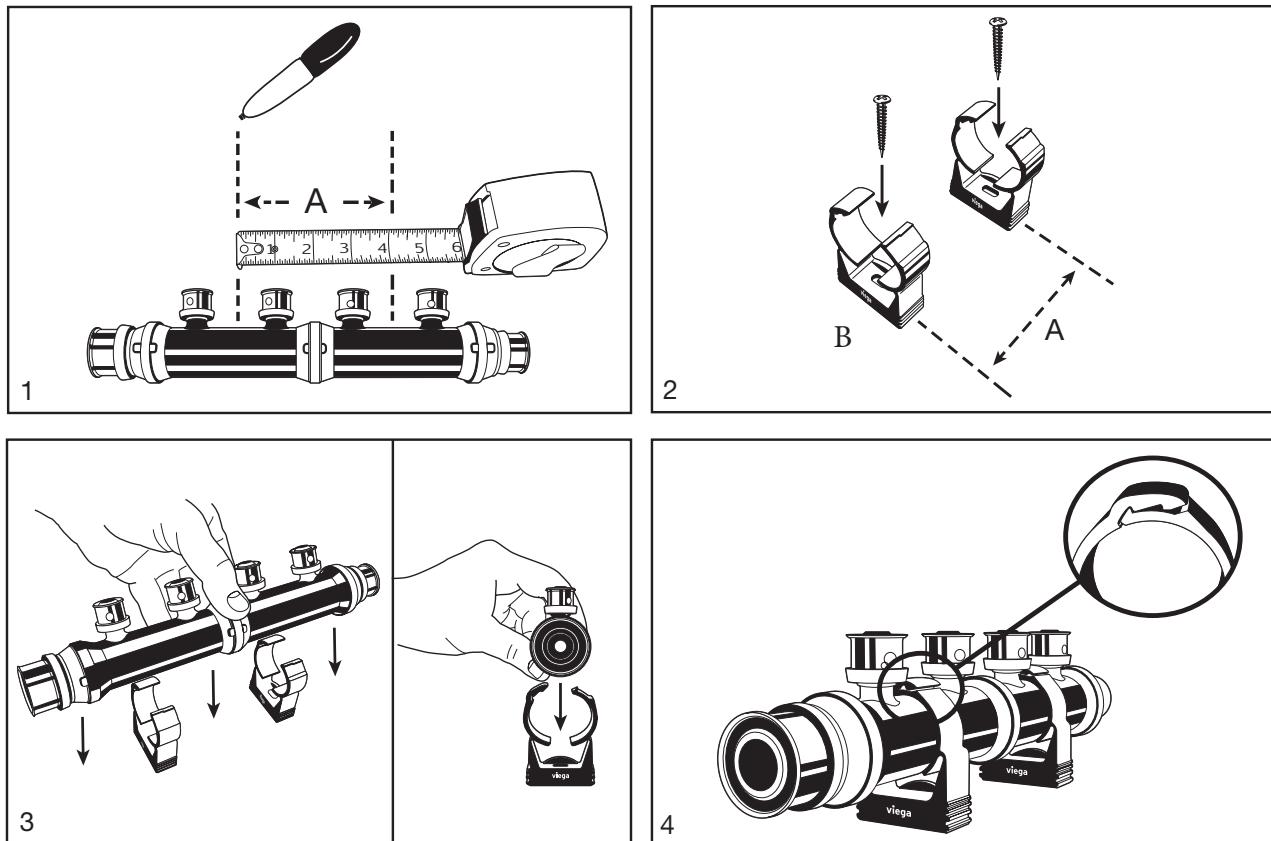
4. Position bottom metal tie-rod into the bottom clip of the mounting brackets then roll manifold toward top clip. The MiniBloc may be mounted either vertically or horizontally.



5. Complete mounting by firmly pushing the MiniBloc toward the top clip of the mounting brackets, which should spread and snap over top metal tie-rod.



## 14.5 Mounting Viega PEX Press and PEX Crimp Polymer manifolds



Viega recommends using a minimum of two mounting brackets on manifolds with three ports and larger.

1. Measure the distance (A) between the first and last set of manifold ports (as shown). Using a straight edge, mark dimension (A) on mounting surface. Ensure the mounting surface is level and suitable to support the weight of the manifold filled with water.
  2. Align the 1 1/4" lock clips\* (B) with the marks transferred on the mounting surface from Step 1 and attach them using a 1" or longer screw appropriate for the mounting surface.
  3. With the lock clips in the open position, insert the manifold body into the clips, centering them between the end ports.
  4. Push evenly on both ends of the manifold until lock clips snap manifold body firmly into place.
- NOTE: Lock the clips into their second locking position to adequately secure the manifold.

\* Lock clips sold separately (part number 58075).

## 15 Installing Manifold Distribution Lines

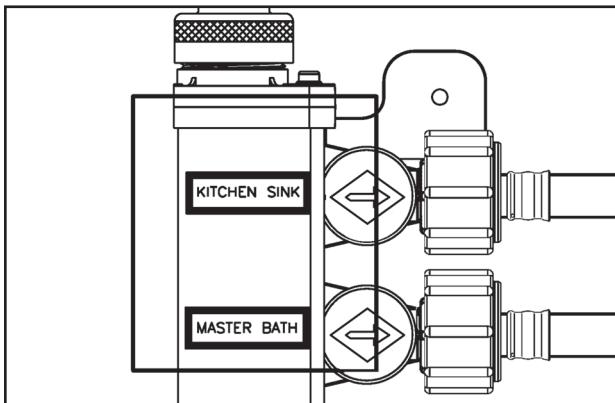
### 15.1 Installing manifold distribution lines

Run distribution lines continuously in the most direct route from the ManaBloc to the fixtures.

A distribution line may contain a coupling or other fitting for purposes such as repairing a damaged section of tubing, handling a change of direction that cannot be made within the minimum bend radius guidelines, accommodating a fixture location change that requires a longer line or supplying a low-demand accessory (i.e., ice maker). However, several pieces of shorter tubing should not be connected with fittings for the purpose of using up leftover lengths of tubing.

**NOTE:** It is the responsibility of the installer to ensure that further construction, finishing and other mechanical system installations do not compromise the ManaBloc plumbing system as installed according to these instructions.

1. Tubing coils are usually placed at the ManaBloc location and tubing is pulled to the fixture through stud cavities, holes drilled overhead in floor joists, etc. Several tubes may be pulled at one time. Viega's color-coded ViegaPEX Ultra tubing helps prevent cross-connections.
2. Do not pull tubing tightly. Some slack (7" per 50 feet) is necessary to accommodate expansion and contraction. Leave enough excess tubing at the beginning and end of runs to make connections without putting strain on the tubing.
3. Exercise care when pulling PEX tubing to prevent cutting or abrading. Take care to prevent kinking of the coiled tubing. If kinking or cutting occurs, cut out the damaged section and install a coupling.
4. For the best results, connect the distribution lines to fixtures and the ManaBloc immediately upon installation. Label the end-use fixture on the ManaBloc cover plate next to the port.



*Self-adhesive labels are supplied with the ManaBloc. Mark tubes pulled as a bundle or those not connected immediately at both ends with a permanent marker to designate the fixture supplied.*

5. Since plumbing fixtures are generally located in groups, and there may be several ViegaPEX Ultra distribution lines running to approximately the same location, it is easiest to run these distribution lines bundled together.

For a neat appearance, tie bundles with nylon ties (part number 43714 or 43701 or plastic strapping at regular intervals).

**NOTE:** Bundles shall be sufficiently tied for tubing support but shall NOT restrict tubing expansion and contraction caused by temperature variations.

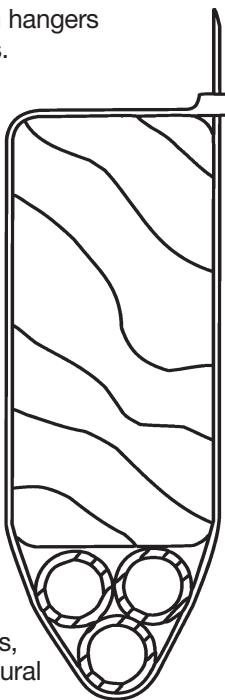
 **CAUTION: DO NOT USE DUCT TAPE FOR BUNDLING.** Duct tape will not permit tubing movement.

6. Bundles can be supported with hangers designed for larger tubing sizes.

7. The nylon ties can be used to support PEX lines directly from wooden framing members.

Any plastic cable ties capable of supporting the weight of the tube or bundle when filled with water can be used.

8. Holes drilled through studs, joists, plates, headers, etc., must be large enough to accommodate tubing bundles without binding to allow free movement. Several smaller holes (accommodating a few lines each) may be preferable to drilling a bundle-size hole. In no case should the hole size exceed building code guidelines, as this could weaken the structural support members.



For more detailed instructions, refer to Section 16 of this guide.

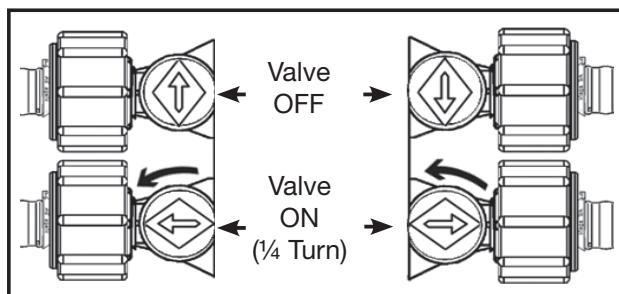
## 15.2 Valve operation

A ManaBloc system, which has valves on all of the outlet ports, does not require stop valves at the fixtures. However, the Authority Having Jurisdiction (AHJ) may require stop valves at some fixtures.

Use the included red key handle to turn each port ON or OFF. Valves are marked with arrows indicating their ON/OFF positions:

Left Port – Arrow Up for OFF  
Arrow Left for ON

Right Port – Arrow Down for OFF  
Arrow Right for ON



Note: These valves are field-repairable. Contact Viega Customer Service for more information on this procedure.

## 15.3 Connecting distribution lines to the ManaBloc

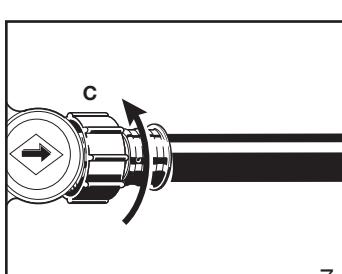
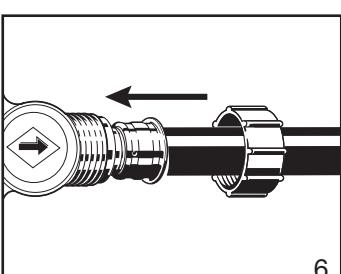
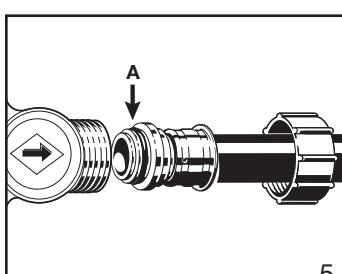
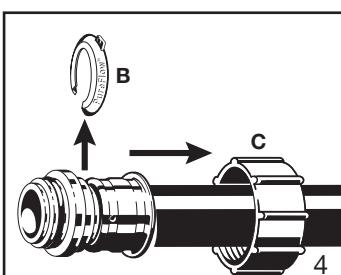
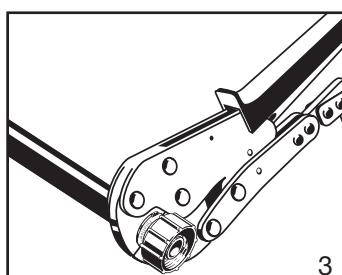
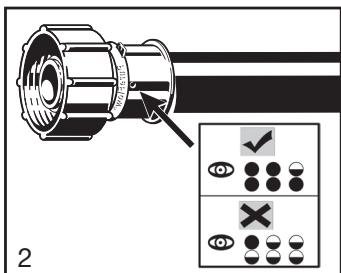
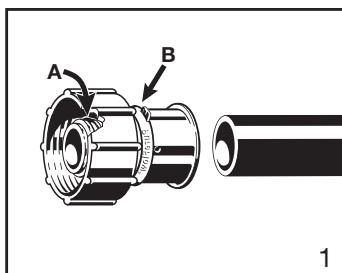


**THE WATER SUPPLY TO THE  
MANABLOC AND THE PORT VALVES  
SHALL BE TURNED OFF BEFORE  
ATTEMPTING INSTALLATION OF PEX  
CONNECTIONS.**

PEX Press, PEX Crimp and Compression connection models are available and included with each ManaBloc model. Supply connections are not included and must be ordered separately. If there are unused ports, Viega recommends capping them to protect from the home owner opening the wrong valve. Use part number 36205 (½" ports) or 36204 (⅜" ports).

### 15.3.1 Port connections

For PEX Press connections:



The water supply to the ManaBloc and the port valves shall be turned off before attempting installation of press adapters.

**CAUTION** Use only sealing elements supplied with the adapters.

1. Ensure sealing element (A) is in place and the tool locator ring (B) is present in its factory-installed position.
2. Square off tubing to proper length and insert the fitting fully into the end of the tubing as shown. Full insertion means tubing must be completely visible in at least two viewing holes and may be partially visible in one.
3. Place the PEX Press tool jaw over the attached press sleeve, resting it against the tool locator ring. Press the sleeve with an appropriately sized press jaw. **DO NOT PRESS TWICE.** Refer to current Viega PEX Water Systems Manual for additional pressing information.
4. Remove tool locator ring (B) and slide swivel nut (C) over tubing as shown.
5. Ensure sealing element (A) is in place and clean of any dirt or debris. Wet sealing element with tap water.
6. Insert the fitting into the desired port until the fitting flange sets flush with the end of the port.
7. Thread the swivel nut (C) onto the ManaBloc port. Hand-tighten only. Open the port valve(s) before turning on the main water supply.

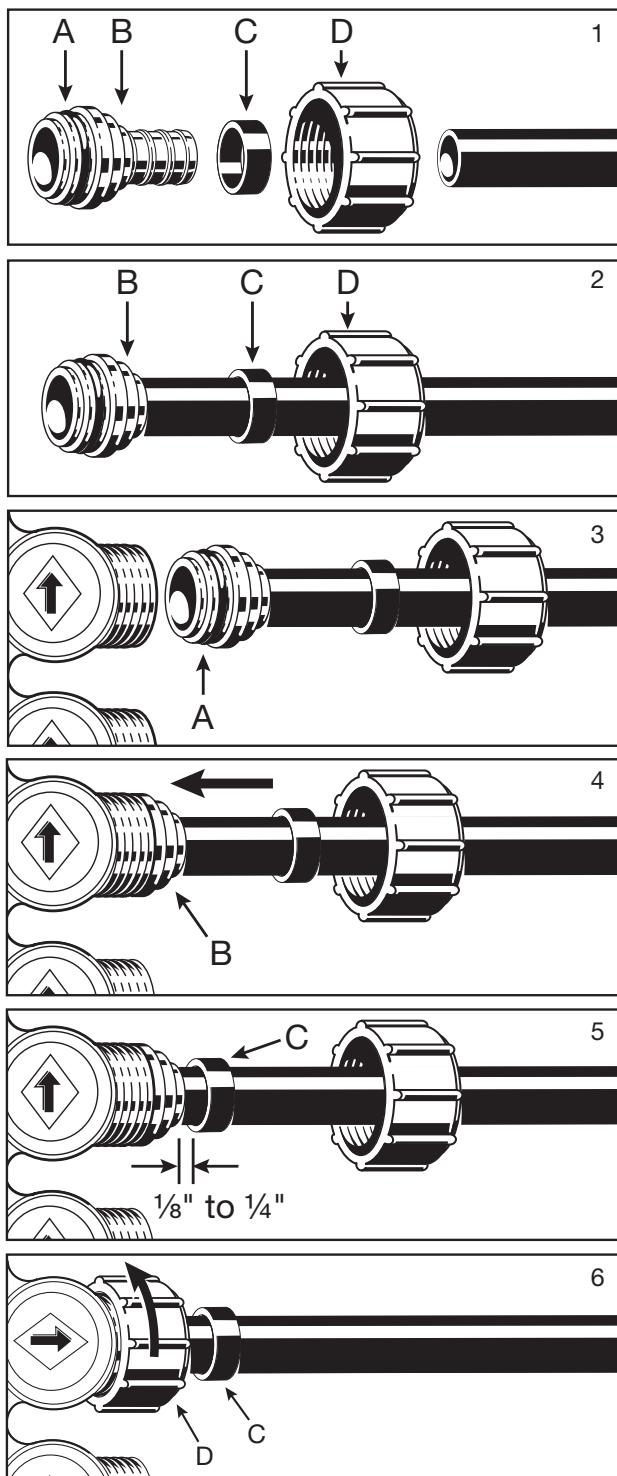


Hand-tighten only!



UNDER NO CIRCUMSTANCES shall any form of thread sealant (Teflon® paste, pipe dope, etc.) be used on distribution line connections. The carriers present in these compounds can crack the plastic port connections, resulting in leaks and water damage.

For PEX Crimp connections:



**The water supply to the ManaBloc and the port valves shall be turned off before attempting installation of crimp adapters.**

**⚠ CAUTION** Use only sealing elements supplied with the adapters.

**⚠ CAUTION** Not for use with FostaPEX®

1. Ensure sealing element (A) is in place.
2. Slide the supplied swivel nut (D) and a crimp ring (C) onto the tubing and insert the barbed end of the fitting (B) fully into the end of the tubing as shown.
3. Ensuring sealing element (A) is in place and clean of any dirt or debris, wet sealing element with tap water.
4. Insert fitting (B) into desired port until the fitting flange sets flush with the end of the port.
5. Slide the crimp ring (C) to within  $\frac{1}{8}$ " to  $\frac{1}{4}$ " from the end of tube. Crimp the ring with an appropriately sized full-circle crimp tool. DO NOT CRIMP TWICE. See "6.5 Making a Viega PEX Crimp connection" on Page 16.
6. Slide the swivel nut (D) over the crimped ring (C) and thread the nut onto the ManaBloc port. HAND-TIGHTEN ONLY. Open the port valve(s) before turning on the main water supply.

Hand-tighten only!

UNDER NO CIRCUMSTANCES shall any form of thread sealant (Teflon® paste, pipe dope, etc.) be used on distribution line connections. The carriers present in these compounds can crack the plastic port connections, resulting in leaks and water damage.

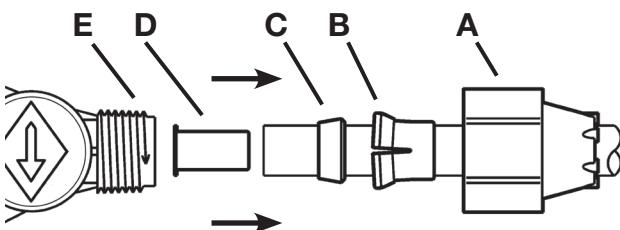
## For compression connections:



## NOT FOR USE WITH FOSTAPEX

**NOTE:** The red ManaBloc valves designate hot ports and the blue valves designate cold ports. Make sure the distribution lines are connected to the correct ports (hot or cold). The use of color-coded ViegaPEX Ultra tubing reduces the possibility of cross connections.

1. For each distribution line, slide the Lock-In compression nut (A), Lock-In insert (B) and the plastic ferrule (C) onto the tubing in that order. (See illustration below.)

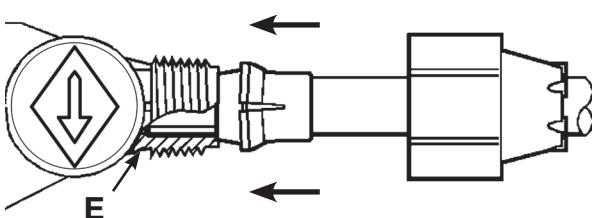


The long taper of a  $\frac{3}{8}$ " ferrule (C) must be TOWARD THE END OF THE TUBE; a  $\frac{1}{2}$ " ferrule is symmetrical and may be installed facing either direction. Insert the stainless steel stiffener (D) COMPLETELY into the end of the tubing.



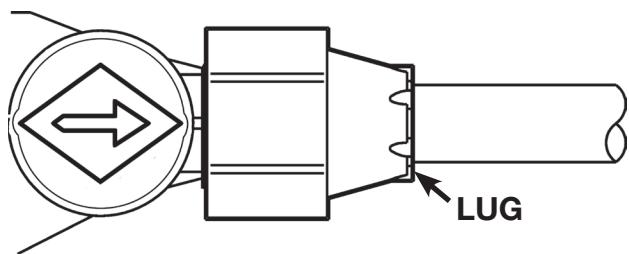
**WARNING:** DO NOT attempt to install the Lock-In insert backward as it may break. ALWAYS insert the long portion of the insert sleeve over the tube first.

DO NOT attempt to use or reuse inserts that are defective, cracked, broken or otherwise damaged, as connection failure will result.



2. Push the tubing into the port socket (E) until it bottoms out. Holding the tube so that it does not back out of the port socket, slide the white Lock-In insert and ferrule snugly against the chamber inside the port socket.

While holding the tube against the bottom of the socket, thread the Lock-In compression nut onto the port and tighten hand-tight.



3. While holding the tube securely to prevent turning, finish tightening the nut with the ManaBloc Wrench (part number 50631) until the white Lock-In insert appears between the lugs and becomes flush with the ends of the lugs, plus  $\frac{1}{4}$ - to  $\frac{1}{2}$ -turn.

Complete the connection as soon as each distribution line is connected to the ManaBloc. Each valve should be turned counter clockwise  $\frac{1}{4}$ -turn to the open position after completing each connection, as shown above.

**WARNING: DO NOT use slip-joint pliers to tighten the Lock-In nuts. Use the ManaBloc wrench (part number 50631) to tighten the compression connections.**

4. After all connections are complete, recheck that all of the Lock-In inserts are visible between the lugs and are flush or protruding slightly beyond the lugs.
5. As the distribution lines are connected to the ManaBloc, they should immediately be labeled on the cover plate as to which fixture that line supplies.

Fixture labels are included with each ManaBloc. Affix the appropriate label to the cover plate next to the port.



## COMPRESSION CONNECTION CAUTION

This plumbing system relies upon the proper tightening of distribution line compression connections.

Failure to properly complete ALL connections may result in system failure. Incomplete or improper connections can hold pressure during a system test but may fail at a later date, resulting in water damage.



## DO NOT OVERTIGHTEN compression fittings.

Overtightening of the Lock-In compression nuts may cause damage to the tubing, nut, valve or fitting body. DO NOT tighten Lock-In nuts beyond the recommendation of these instructions (Step 3).

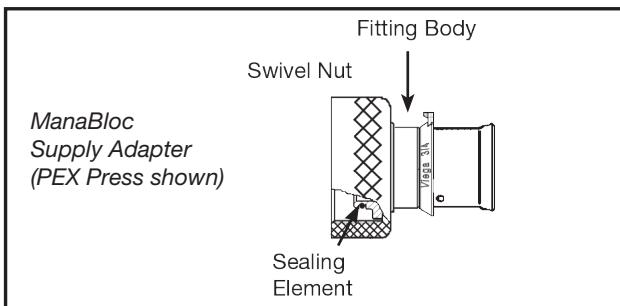
## 15.4 Connecting distribution lines to fixtures

There are a variety of male and female adapters, sweat adapters, turn out supports and stub out adapters to assist in terminating at the fixture. Refer to Section 18.1 through 18.4 of this guide or the Viega product catalog.

## 15.5 Water supply connections

*The main water supply shall be turned off before making water supply connections.*

The ManaBloc water supply connection uses a special 1" swivel ManaBloc transition fitting that seals with a sealing element.



This connection is used on the cold water supply and the hot water supply/return lines. This connection to the ManaBloc does not require any form of thread sealant and none shall be used.



**DO NOT USE ANY FORM OF THREAD SEALANT TO MAKE THIS CONNECTION.**

**NOTE:** Water service connections to adapt to most types of plumbing supply materials are available. Consult the Viega Product Catalog for a complete listing of available connections.

1. Connect water service adapters to water supply piping before attaching the swivel fitting to the ManaBloc (instructions included with adapters). Excessive force from threaded fittings or solvents from solvent welding (PVC or CPVC) will cause damage to the ManaBloc. Drill all holes in wood members for water supply/return tubing BEFORE mounting the ManaBloc.
2. When using male or female pipe thread transition fittings, to connect to supply tubing, use only Teflon® tape to seal pipe threads. DO NOT use pipe dopes, thread sealers, Teflon® pastes, etc.
3. If copper sweat fittings are used anywhere in the ManaBloc water supply line or water heater supply/return lines, these fittings must be soldered, cooled and flushed of any flux residue before these lines are connected to the ManaBloc.

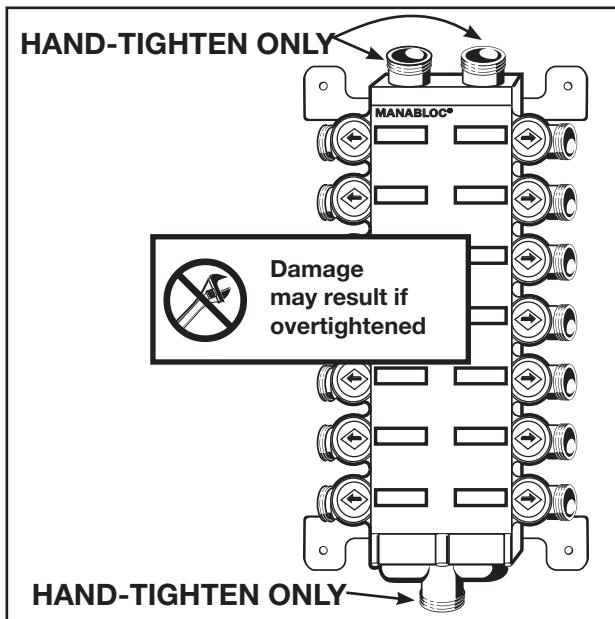
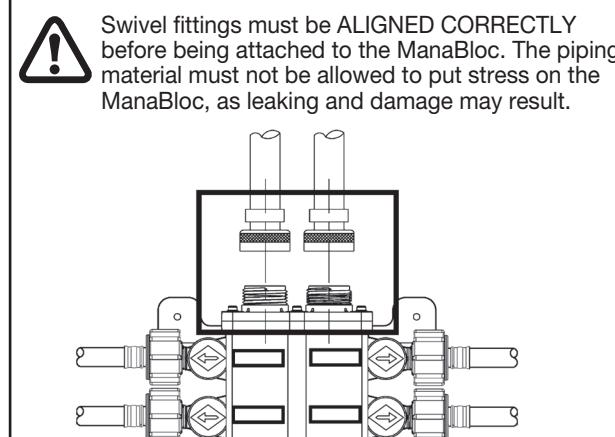
Soldering creates a tremendous amount of heat, which could melt the ManaBloc, and solder flux contains strong acids and may also contain petroleum products.

These compounds can attack the plastic materials from which the ManaBloc is made and cause crazing, cracking and failure of the ManaBloc, resulting in leaks and water damage.

4. Ensure that the hot/cold supply lines are connected to the correct supply inlet/outlet on the ManaBloc. Red valves designate hot ports; blue valves designate cold ports.
5. Supply lines shall enter and/or exit the ManaBloc in a straight line. If bending of the supply lines is required, the tubing must be anchored to a framing member to isolate the bend stress from the ManaBloc or use a directional fitting.
6. After the supply tubing has been connected to the transition fitting, remove the plastic protective cap from the ManaBloc inlet/outlet part and thread the swivel nut onto the threaded male adapter hand-tight only. DO NOT CROSS-THREAD.



**DO NOT ELECTRICALLY GROUND TO THIS SYSTEM.**



## 16 Installing the ViegaPEX Ultra Tubing System

### 16.1 Handling ViegaPEX Ultra tubing

The properties of ViegaPEX Ultra tubing make it easy to work with and install in most types of construction. Some care must be taken to prevent damage to the tubing before and during installation:

- Use care to protect both ViegaPEX Ultra and FostaPEX tubing from physical damage during storage and installation. Keep the tubing away from sharp objects, open flames, etc., and do not place heavy objects on the tubing.
- Damaged sections of tubing should be cut out and discarded.
- Do not expose ViegaPEX Ultra tubing to sunlight or any UV source for extended periods of time exceeding six months.
- FostaPEX, with its aluminum layer, is resistant to UV light, but long-term exposure should still be avoided.
- Do not store ViegaPEX Ultra or FostaPEX tubing outdoors where it may be exposed to UV light.

### 16.2 Uncoiling ViegaPEX Ultra tubing

An uncoiler should be used to prevent twisting when removing tubing from  $\frac{3}{8}$ " to 1" coils. Roll coils out and use care to avoid twisting 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " and 2" coils or when an uncoiler is unavailable.

### 16.3 Bending ViegaPEX Ultra tubing

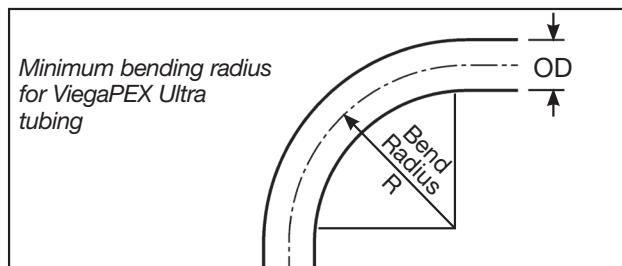
ViegaPEX Ultra tubing can be free bent (unsupported bend) to a minimum radius of eight times the tubing O.D. and five times the tubing O.D. with the use of a Viega-approved bend support. FostaPEX tubing can be free bent to a minimum radius of eight times the tubing O.D. and 3.5 times the tubing O.D. with the use of a Viega tubing bender. For situations requiring tighter bends, use elbow fittings. If bending against a PEX coil bend direction, the bending radius is 24 times the tubing O.D. Viega does not allow the practice of "hot bending" ViegaPEX Ultra tubing to make a tighter bend radius.

ViegaPEX Ultra	Minimum Radius	
Nominal Size*	Free Bend (8 x O.D.)	Supported (5 x O.D.)
$\frac{3}{8}$ "	4"	2.5"
$\frac{1}{2}$ "	5"	3.1"
$\frac{3}{4}$ "	7"	4.4"
1"	9"	5.6"
1 $\frac{1}{4}$ "	11"	6.75"
1 $\frac{1}{2}$ "	13"	8.1"
2"	17"	10.6"

\*ViegaPEX Ultra bend radius values were calculated using standard CTS O.D. dimensions, which are  $\frac{1}{8}$ " larger than the nominal tube size listed.

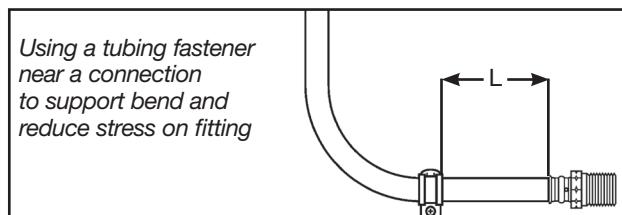
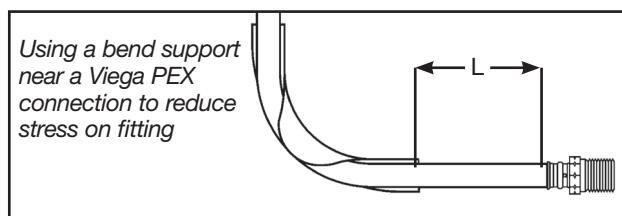
FostaPEX	Minimum Radius	
	Nominal Size**	Free Bend (8 x O.D.)
1/2"	5.6"	2.4"
3/4"	7.5"	3.3"
1"	9.6"	4.2"

\*\* FostaPEX bend radius values were calculated using the actual O.D. dimensions, which include the additional aluminum and PE layers.



To reduce damaging stress on Viega PEX fittings, bend supports or tubing fasteners must be used to anchor all bends made close to fittings. Support must be provided for tubing bends located closer to fittings than distance "L" in table below. (See the diagrams below for typical installation examples.) Since FostaPEX will maintain its shape once bent, supports may not be necessary. However, support must be used at the "L" distance while making the bend.

Tubing size	Maximum distance from fitting to bend
$\frac{3}{8}$ " PEX	L = 6 inches
$\frac{1}{2}$ " PEX	L = 8 inches
$\frac{3}{4}$ " PEX	L = 10 inches
1" PEX	L = 12 inches
1 $\frac{1}{4}$ " PEX	L = 14 inches
1 $\frac{1}{2}$ " PEX	L = 16 inches
2" PEX	L = 18 inches



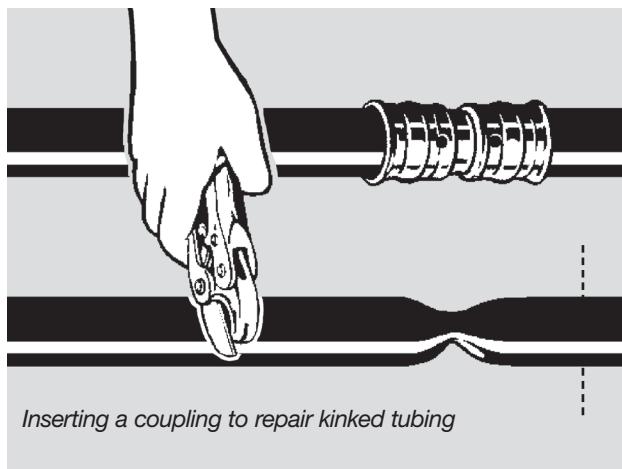
## 16.4 Removing Viega PEX connections

Should a mistake be made, simply cut out the PEX fitting and replace with a new one.

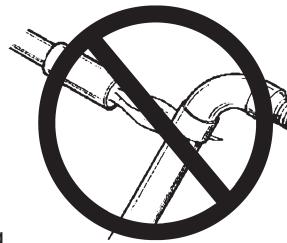
 **Do not reuse Viega PEX fittings**

## 15.5 Repairs

Sections of kinked tubing should be repaired by cutting out the damaged section and installing a repair coupling.



PEX tubing systems should not be intentionally subjected to freezing.



Do not use open torch or excessive heat to thaw PEX tubing. Tubing failure or damage can result.

Heat (DO NOT USE A TORCH) must be applied directly to the frozen tubing section. Temperature on tubing shall not exceed 180°F.

**Several suitable methods exist to thaw PEX tubing:**

- Hot water
- Wet, hot towels
- Hand-held hair dryer
- Low-wattage electrical heating tape (self limiting)
- A commercial system that pumps heated water through a tube to the ice blockage and returns the cooled water for reheating

## 16.6 Freezing

The flexibility of ViegaPEX Ultra tubing makes it resistant to damage from freezing, but precautions to prevent freezing should be taken when low temperatures might be encountered.

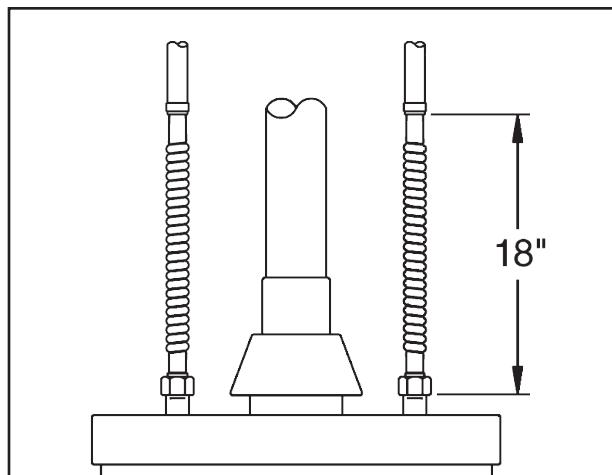
Insulating each PEX tube individually or as a group is not generally necessary if the PEX tubing is installed within the insulation envelope of the structure, i.e. the heated area. For example, the tubing may be installed under the insulation in the attic or within an interior wall of a heated space.

## 16.7 Water heaters

ViegaPEX Ultra tubing should not be connected directly to gas-fired water heaters. The high temperatures of these appliances can damage the tubing.

When connecting a Viega PEX system to a gas-fired water heater, install a minimum of 18" of metallic piping between the water heater and tubing, keeping tubing more than 6" away from the vent pipe. Where local code allows, ViegaPEX Ultra tubing may be connected directly to electric water heaters and used for hot water recirculation lines that do not come within 6" of the gas heater vent.

ViegaPEX Ultra may be used to connect to instantaneous/tankless water heaters or other hot-water-producing devices. However, consult manufacturer's recommendations for use with plastic tubing and ensure temperature and pressure do not exceed the maximum ratings of the tubing.



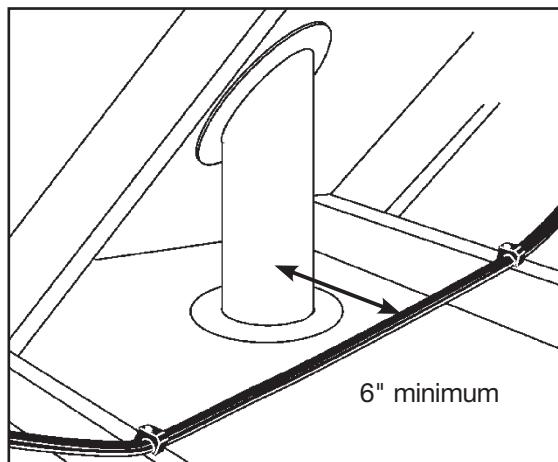
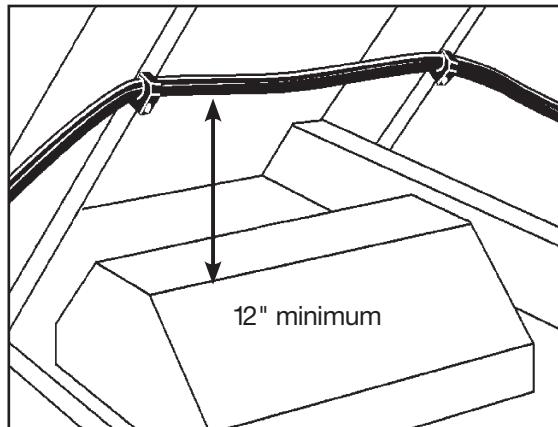
*A minimum of 18" of metallic piping is required between a gas-fired water heater and PEX tubing.*

## 16.8 Heaters, flues, vents and recessed lights

Keep ViegaPEX Ultra tubing a MINIMUM of **12" vertically and 6" horizontally** from sources of high heat such as gas flue vents, heating appliances or electric motors. Concerning recessed lighting (including low-voltage types) and proper installation clearance, Viega recognizes the following types of lighting fixtures: Type IC or Inherently Protected, which allow direct contact with thermal insulation and other combustible materials, and Type Non-IC, which require a minimum clearance of 3" to thermal insulation. If room does not allow for the minimum clearance spacing specified by Viega, then the PEX tubing must be insulated with a suitable pipe insulation capable of withstanding the specific maximum temperatures generated by the fixture. Minimum clearance between any pipe insulation and fixture shall be per the requirements of the fixture type and local building codes.

Forced air heating ducts and PVC power vent flues are not generally considered sources of high heat. These areas of installation should be rechecked after further construction and other mechanical systems have been installed.

In cases where light leakage (direct beam) from a UV-generating light source (special lighting or heating-type lamps) is possible, tubing must be adequately protected with light-blocking insulation.



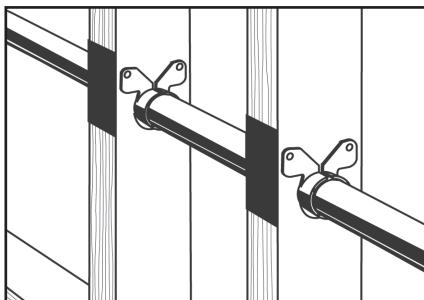
*Maintain a minimum 12" of vertical and 6" of horizontal clearance from recessed lights and appliance or heater vents.*

### 17.1 Wood frame construction

ViegaPEX Ultra and FostaPEX tubing are ideal for use in wood frame construction. The ability to bend the tubing around corners and obstacles greatly simplifies installation. This system eliminates the expensive and time-consuming use of fittings where tubing turns within a wall, and it eliminates the potential fire hazard of soldering close to exposed framing members.

A few rules should be followed when running ViegaPEX Ultra tubing in wood frame construction:

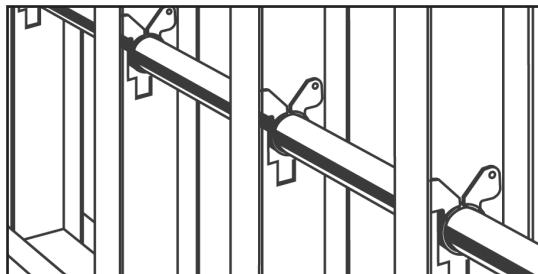
- Use nailing plates to protect the tubing from nails and screws where it passes through studs
- Suspension clips are required for metal studs and optional for wooden studs
- When turning tubing sharply to exit from a wall, a bend support must be provided. Either use a drop-ear bend support, drop-ear elbow or a stub out. Neglecting to use a support will place excessive stress on the fitting, and the tubing will not exit perpendicular to the wall (except FostaPEX).



*Nailing plates protect tubing passing through studs and joists from nails.*

### 17.2 Steel construction

The Viega PEX system works as well in steel frame construction as it does in wood. Where tubing runs through metal studs, suspension clip fasteners must be used to protect tubing from sharp stud edges. (See illustration below.) Follow the same guidelines for fastening and supporting the tubing as for wood frame construction.



*Suspension clip fasteners used to protect tubing from abrasion when passing through steel studs*

### 17.3 Supporting ViegaPEX Ultra tubing

Use only plastic or plastic-coated tubing supports. Metal supports may damage tubing.

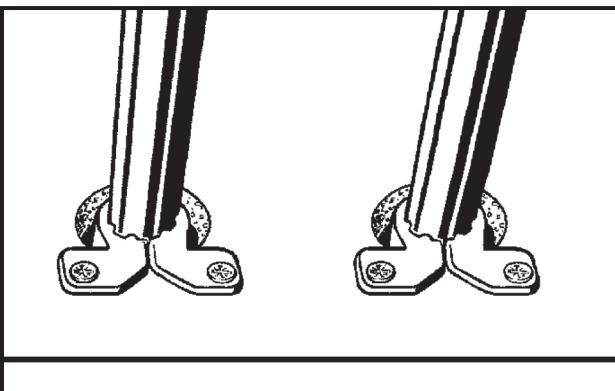
When running tubing, leave a small amount of slack between fasteners to account for tubing contraction.

Note that ViegaPEX Ultra tubing will expand or contract 1.1" per 100' for every 10°F of temperature change. In long straight runs, allow adequate clearance for this. (See "17.9 Tubing expansion" on Page 49.) The aluminum layer in FostaPEX reduces expansion and contraction, so that it expands only 0.16" per 100' for every 10°F of temperature change. This makes it ideal for locations where expansion must be minimized.

Tubing should be allowed freedom to move slightly as it expands. Do not clip it tightly into place or locate it where it will be tightly constrained. Use suspension clips or an approved plastic insulator where tubing passes through studs or joists where abrasion and noise is a concern. (See illustrations to right.) ViegaPEX Ultra tubing must be fastened at a minimum interval noted in the table below for vertical and horizontal support.

	PEX Size	Horizontal	Vertical
ViegaPEX Ultra	1/2" - 1"	32" O.C.	Base of each floor with midlevel guide
	1 1/4" - 2"	48" O.C.	
FostaPEX	1/2" - 1"	32" O.C.	

Table 17.1 PEX Support

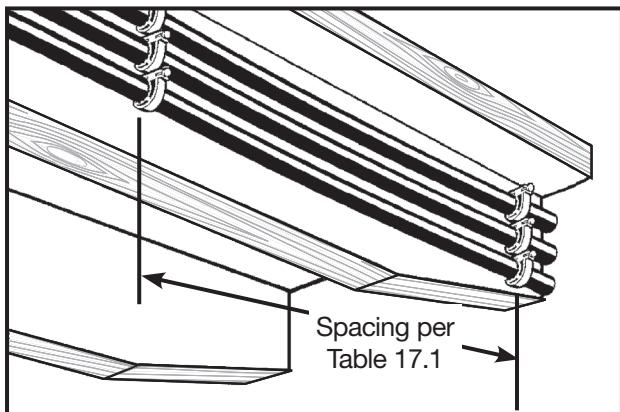


Suspension clips support tubing in joist penetrations or anywhere abrasion is a concern.

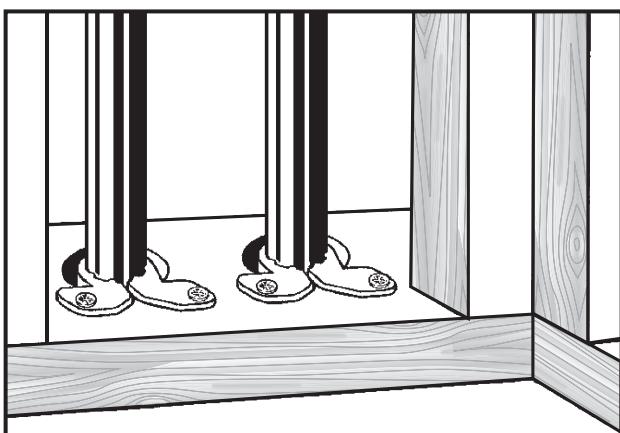


Some model codes may allow greater support spacing intervals for plastic tubing. Always refer to local code for approved spacing requirements that exceed the ones referenced in this manual.

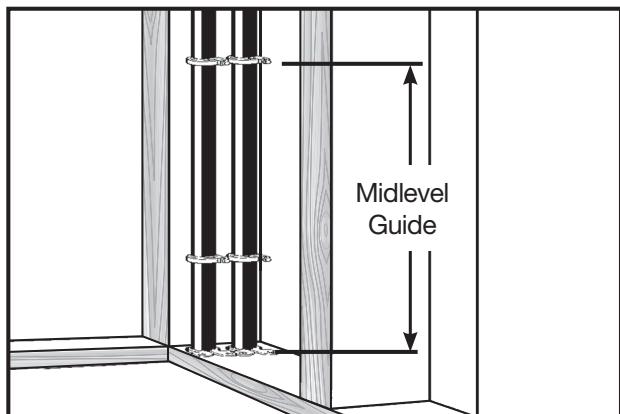
In risers or vertical runs, ViegaPEX Ultra and FostaPEX tubing should be attached with suspension clips or an approved plastic insulator at each floor or ceiling penetration, and every four feet in between (see below).



Tubing supported with U-clip or lock clip fasteners on horizontal runs



Suspension clip fasteners used at floor plate



J-clamp or lock clip fasteners used to support tubing in vertical runs between floors

## 17.4 Noise and water hammer in PEX systems

As with all plumbing materials under some operating conditions, water hammer can occur in PEX plumbing systems. The inherent flexibility of ViegaPEX Ultra drastically reduces the magnitude of pressure surges compared with metallic plumbing materials. Damage to plumbing components in a PEX system due to these pressure surges is highly unlikely, although noise can sometimes result.

Fortunately, there are solutions to minimize or eliminate water hammer noise.

- Install fixtures that are not water hammer prone. As a general rule, two-handle fixtures are less likely to cause hammer than single-handle fixtures. Single-handle shower valves, which rotate to close and therefore are difficult to close quickly, might be good choices.
- Clamping or strapping more frequently may help prevent tubing noise. It is important that the tubing not be in contact with wallboard, forced air ducts or other high-resonance articles. Insufficiently or improperly clamped or strapped tubing may move during fixture operation and hit against these surfaces.
- Install a water hammer arrester at fixtures where noise is a problem. A water hammer arrester (AA sized) installed as closely as possible to the fixture on the cold-water side only will eliminate the source of the noise (the pressure wave). It should be noted that even with an arrester, tubing that is clamped or strapped insufficiently may still hit against something as it moves slightly when the water flow is stopped.
- Avoid operating fixtures in such a way that causes near instantaneous shutoff. Simply closing fixtures in a less abrupt manner can eliminate hammer noise.

## 17.5 Shower valves

PEX lines should only be run to the inlet connections of tub/shower valves unless specifically approved by the valve manufacturer for other connections.

## 17.6 Electrical grounding

Neither ViegaPEX Ultra nor FostaPEX tubing may be used as an electrical ground. Consult the NEC for recommended grounding method when plastic pipe is used.

## 17.7 Expanding foams

When penetrations must be sealed for air infiltration purposes, there are several options available. Use a good grade of silicone, acrylic or siliconized acrylic caulking. **DO NOT use oil-based caulk.** Most canned expanding foams and open- or closed-cell pipe insulation are good sealing materials and may be used in direct contact with PEX tubing. Other materials may be used provided they do not cause short- or long-term damage to the PEX tubing.



When using expanding spray foam to insulate walls in a structure, there are several options available. Viega suggests using water-based or urethane-based open-cell insulation only. **DO NOT use closed-cell spray foams.** Closed-cell spray foams have the potential to generate high temperatures during their expansion process, especially when not applied properly, which can damage PEX tubing. Always follow the spray foam manufacturer's installation instructions and warnings.



**Do not expose Viega products to any foreign substance that includes but is not limited to Volatile Organic Chemical (VOC) compounds, paints, solvents, glues, cleaners and disinfectants. Viega products that are exposed to these types of substances are at risk of having failures (leaks).**

## 17.8 Fire Stop compounds

Most building codes require the use of a fire-stopping compound when tubing penetrates a fire-rated wall. There are a number of fire-stopping compounds identified as water based, acrylic or latex that have been listed for use with PEX tubing that include but are not limited to the following.

- 3M Fire Protection — CP 25WB+ Caulk
- Tremco, Inc — TREMstop® IA
- Specified Technologies, Inc. — SpecSeal® SSS 100 / SSS 102
- Passive Fire Protection Partners — Fire Stop™ 4800 DW / 4100 DW / 4100 NS / 3600 EX

It is the responsibility of the user to determine the suitability of these or any products for the intended application and install the compounds in accordance with the product's installation instructions and listing.

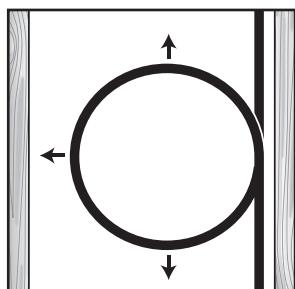
## 17.9 Tubing expansion

ViegaPEX Ultra tubing, as with any PEX tubing, expands and contracts with temperature changes in the environment or the fluid inside the tubing. The longer the tubing run and the higher the temperature change, the more linear expansion the system will experience. This expansion and contraction can affect the appearance as well as integrity of the system by putting stress on the tubing, fittings, valves and fasteners.

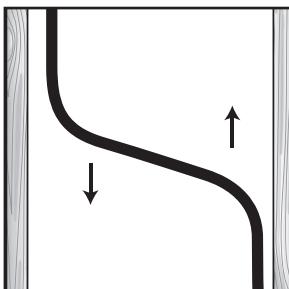
Tubing fasteners perform two functions: providing support for the tubing and guiding the tubing during expansion and contraction. It is important to keep this in mind when installing fasteners. An expansion compensator will not be effective if the fasteners prevent linear movement of the piping system.

Tubing sizes smaller than  $\frac{3}{4}$ " generally do not require expansion compensators with fittings and can easily be bent into loops and offsets to absorb linear expansion. Tubing sizes 1" and larger, refer to "17.9.1 Calculating expansion loops and offsets" for compensation options.

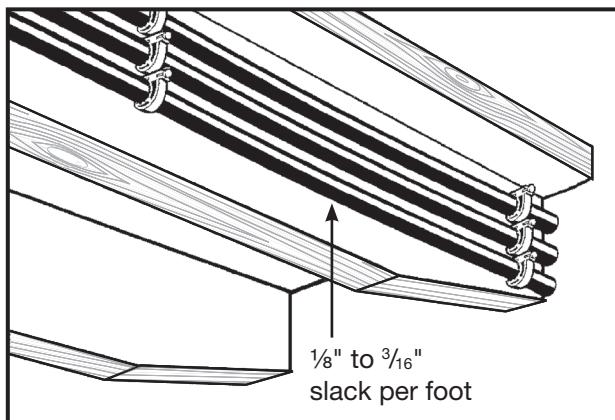
For unconstrained tubing runs (not within the floor) Viega recommends the use of expansion offsets. This can be accomplished at a corner or by using offsets or loops on straight tubing runs. Expansion compensators should be installed at the midway point of tubing runs and should be spaced no more than 50 feet apart.



Using a loop to accommodate tubing expansion

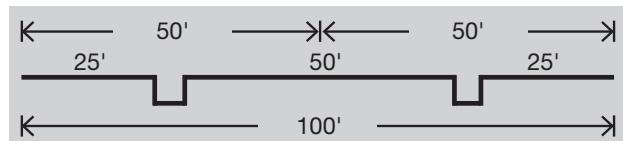


Offsets also provide room for tubing expansion.



Allow some slack in all runs to prevent damage from tubing contraction.

Below is an example of required offsets for a 100-foot tubing run. Note that the expansion compensators are no more than 50 feet apart.



### 17.9.1 Calculating expansion loops and offsets

There are three types of expansion offsets recommended for use with large-diameter tubing: the corner expansion offset, the Z-type expansion offset and the U-type expansion loop. A description, illustration and dimensions chart for each type of offset is on the next few pages. See "FostaPEX" on Page 54 for FostaPEX recommendations.

#### Linear expansion:

To calculate linear expansion for PEX tubing, use the following formula:

$$\Delta L = \frac{\text{PEX expansion rate}}{100' \times 10^\circ\text{F}} \times \Delta T \times LT$$

Where:

ViegaPEX Ultra expansion rate = 1.1" per 100' per  $10^\circ\text{F}$

$\Delta T$  = Change in temperature (in  $^\circ\text{F}$ )

LT = Length of tube between fixed points (in ft.)

For example:

40' of 1" ViegaPEX Ultra tubing going from  $70^\circ\text{F}$  to  $130^\circ\text{F}$

$$\Delta L = \frac{1.1"}{1000} \times 60^\circ \times 40' = 2.64"$$

$$\Delta L = 2.64"$$

**Compensation distance:**

To calculate the dimensions of the expansion compensation offset needed, use the following formula:

$$L = C\sqrt{OD} \times \Delta L$$

Where:

$L$  = length of compensation distance

$C$  = 12 (PEX material specific constant)

OD = outer tubing diameter ( $1/8"$  + nominal tube size)

$\Delta L$  = change in length from temperature change

**Corner expansion offset:**

Where piping takes a corner after a long straight run, a simple 90° elbow in the piping will allow for the absorption of expansion.

Calculate the necessary "L" dimension between elbow and nearest fastener or use the chart below, which was figured using the maximum run for a single expansion compensator (50 feet).

Following the previous example:

$$L = C\sqrt{OD} \times \Delta L$$

Where:

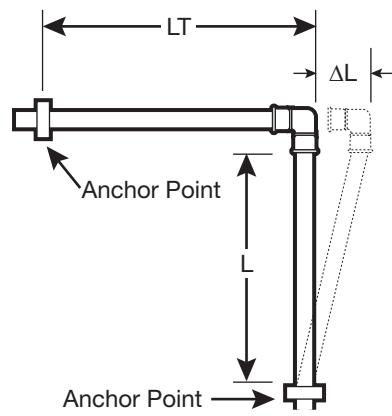
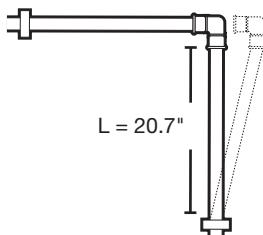
$C$  = 12

OD = 1.125 (1" PEX)

$\Delta L$  = 2.64"

$$L = 12\sqrt{1.125" \times 2.64"} = 20.7"$$

$$L = 20.7"$$

*Illustration of Example*

Corner Offset

Figure 17.1 Corner Expansion

		Corner Expansion Offset (L, in) per 50 linear feet of run								
Tubing	Tube nom.	ΔT(°F)	60	80	100	120	140	160	180	200
ViegaPEX & ViegaPEX Ultra	3/4"	20.4	23.6	26.4	28.9	31.2	33.4	35.4	37.3	
	1"	23.2	26.7	29.9	32.8	35.4	37.8	40.1	42.3	
	1 1/4"	25.6	29.6	33.1	36.2	39.1	41.8	44.4	46.8	
	1 1/2"	27.8	32.1	35.9	39.4	42.5	45.5	48.2	50.8	
	2"	31.8	36.8	41.1	45.0	48.6	52.0	55.1	58.1	

Table 17.2 Corner Expansion

**Z-type expansion offset:**

The Z-type expansion offset integrates two 90° elbows that form a “Z” pattern.

With this type of configuration  $\frac{1}{2}$  of the “L” dimension is applied to the center area of the “Z” (represented as L1 in the table and illustration) while  $\frac{1}{4}$  of the “L” dimension would be applied to each of the top and bottom areas (represented as L2).

Calculate the necessary L1 and L2 dimensions or use the chart below, which was figured using the maximum run for a single expansion compensator (50 feet).

$$L = 20.7"$$

$$L1 = \frac{1}{2} (L)$$

$$L1 = 20.7"/2 = 10.35"$$

$$L1 = 10.35"$$

$$L2 = \frac{1}{4} (L)$$

$$L2 = 20.7"/4 = 5.18"$$

$$L2 = 5.18"$$

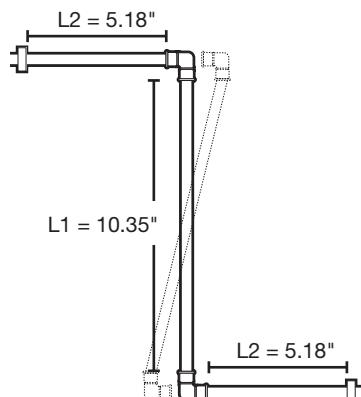
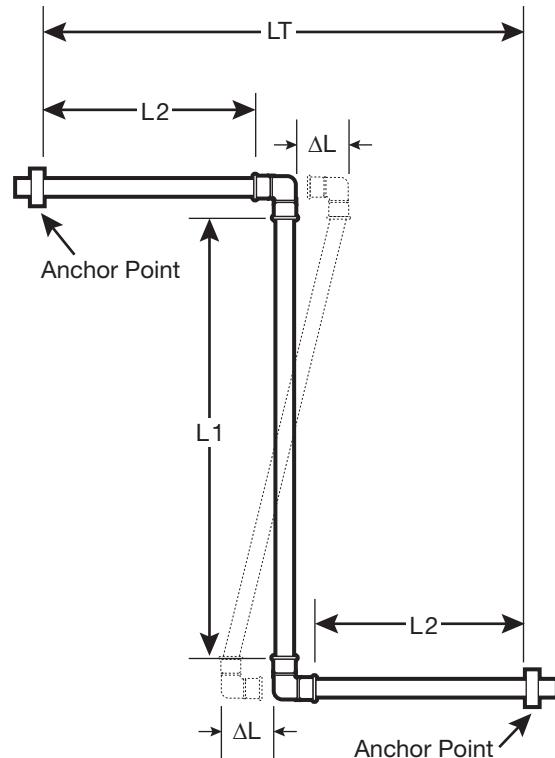
*Illustration of Example*

Figure 17.2 Z-Type Expansion



Z-Type Offset

		$\Delta T(^{\circ}F)$	Z- Type Expansion Offset (in) per 50 linear feet of run																
Tubing	Tube nom.		60		80		100		120		140		160		180		200		
			L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	
ViegaPEX & ViegaPEX Ultra	$\frac{3}{4}$ "	10.2	5.1	11.8	5.9	13.2	6.6	14.4	7.2	15.6	7.8	16.7	8.3	17.7	8.8	18.6	9.3		
	1"	11.6	5.8	13.4	6.7	15.0	7.5	16.4	8.2	17.7	8.8	18.9	9.5	20.1	10.0	21.1	10.6		
	$1\frac{1}{4}$ "	12.8	6.4	14.8	7.4	16.5	8.3	18.1	9.1	19.6	9.8	20.9	10.5	22.2	11.1	23.4	11.7		
	$1\frac{1}{2}$ "	13.9	7.0	16.1	8.0	18.0	9.0	19.7	9.8	21.3	10.6	22.7	11.4	24.1	12.1	25.4	12.7		
	2"	15.9	8.0	18.4	9.2	20.5	10.3	22.5	11.3	24.3	12.2	26.0	13.0	27.6	13.8	29.1	14.5		

Table 17.3 Z-Type Expansion

**U-type expansion offset:**

The U-type expansion loop integrates four 90° elbows that form a “U” pattern.

With this arrangement  $\frac{1}{6}$  of the “L” dimension is applied as the width (represented as L3) while  $\frac{5}{6}$  of “L” is applied as each leg in the other dimension (represented as L4).

Calculate the necessary L3 and L4 dimensions or use the chart below, which was figured using the maximum run for a single expansion compensator (50 feet).

$$L = 20.7"$$

$$L3 = \frac{1}{6} (L)$$

$$L3 = 20.7" / 5 = 4.14"$$

$$L3 = 4.14"$$

$$L4 = \frac{5}{6} (L)$$

$$L4 = 2(20.7") / 5 = 8.28"$$

$$L4 = 8.28"$$

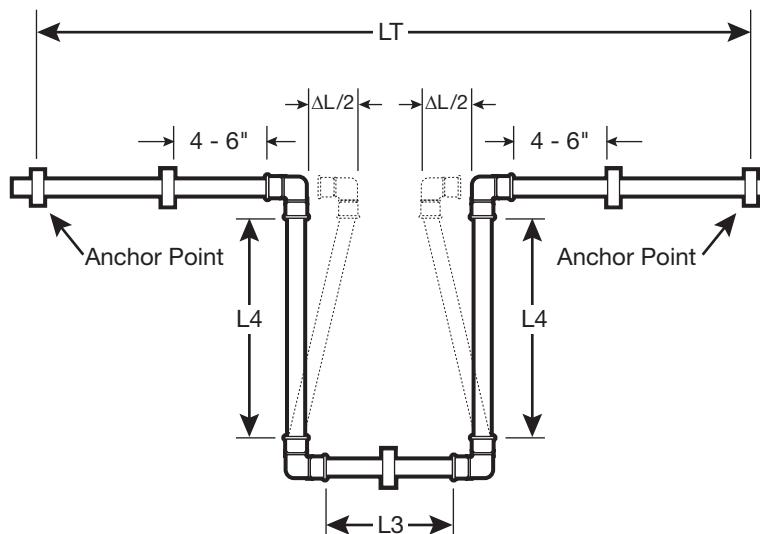
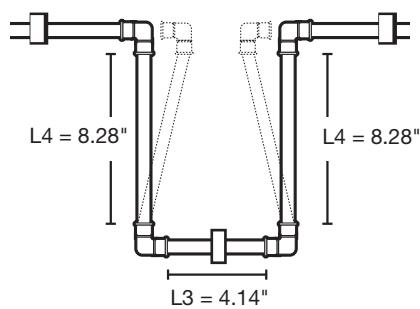
*Illustration of Example*

Figure 17.3 U-Type Expansion

### Looped Offset

The fastener shown on the L3 leg may be required to provide additional support depending on how the expansion loop is installed (horizontal/vertical).

Tubing	Tube nom.	U-Type Expansion Offset (in) per 50 linear feet of run															
		60		80		100		120		140		160		180		200	
ΔT(°F)		L3	L4	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4	L3	L4
ViegaPEX & ViegaPEX Ultra	3/4"	4.1	8.2	4.7	9.4	5.3	10.5	5.8	11.6	6.2	12.5	6.7	13.3	7.0	14.2	7.5	14.9
	1"	4.6	9.3	5.3	10.7	6.0	12.0	6.6	13.1	7.1	14.2	7.6	15.1	8.0	16.0	8.5	16.9
	1 1/4"	5.1	10.2	5.9	11.8	6.6	13.2	7.2	14.5	7.8	15.6	8.4	16.7	8.9	17.7	9.4	18.7
	1 1/2"	5.6	11.1	6.4	12.9	7.2	14.4	7.9	15.7	8.5	17.0	9.1	18.2	9.6	19.3	10.2	20.3
	2"	6.4	12.7	7.4	14.7	8.2	16.4	9.0	18.0	9.7	19.5	10.4	20.8	11.0	22.1	11.6	23.2

Table 17.4 U-Type Expansion

**FostaPEX:**

FostaPEX tubing has a fully dimensional PEX wall with an additional outer layer of aluminum and polyethylene. As a result of these extra layers, FostaPEX expands considerably less than that of standard PEX tubing and slightly more than copper tubing (0.16" per 100' per 10°F).

An approved method for expansion absorption when using FostaPEX is through the use of a coiled loop expansion compensator (at least every 50 feet). Do not use fitting offsets with FostaPEX as the stiffness of FostaPEX may lead to high stress at connections.

**Coiled loop:**

The coiled loop configuration calls for loops within the piping system. The diameter of the loop (D) is shown in the table and will increase or decrease as the tubing in the system expands and contracts.

Note: Tubing fasteners should be secured as to not prevent linear movement of tubing.

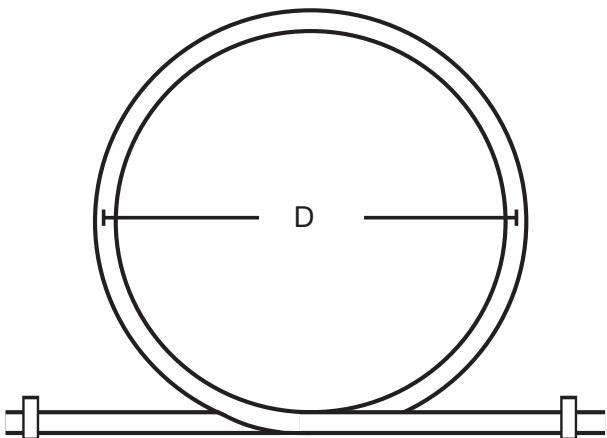


Figure 17.4 Coiled Loop Expansion

Tube nom.	D (in)
1/2" FostaPEX	12"
5/8" FostaPEX	14"
3/4" FostaPEX	16"
1" FostaPEX	20"

Table 17.5 Coiled Loop Expansion

## 17.10 Domestic hot water circulating systems

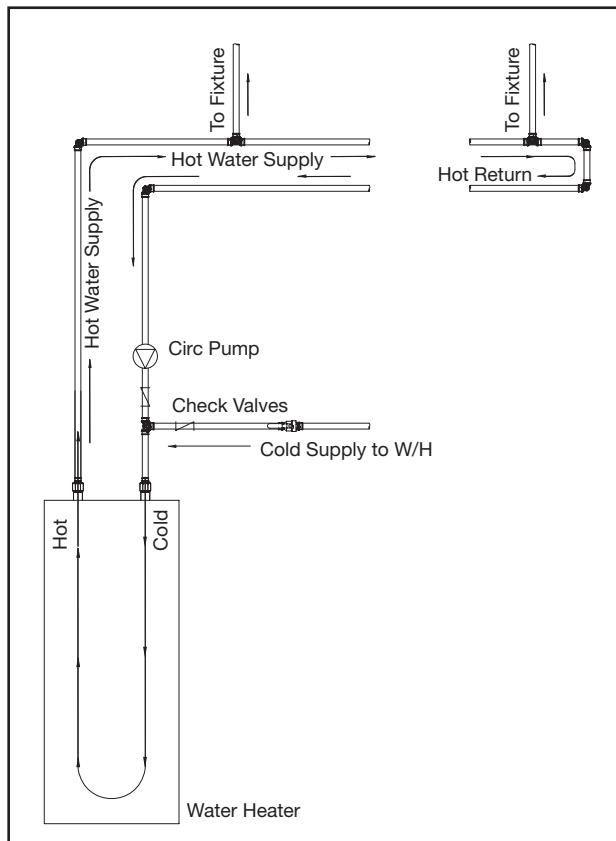
A hot water circulation system can be incorporated into most plumbing systems and works by constantly (or periodically throughout the day on a timer) circulating hot water through the main hot supply line of your plumbing system.

This is done by using a return line at the end of the main hot supply line, and a low-flow pump (usually near the hot water tank). The circulating system keeps hot water readily available throughout the main hot water supply line, eliminating the need to purge the entire line before hot water is present at the fixture.

There are a number of hot water circulation systems available in the marketplace that offer a variety of options. These systems are ideal for branch-and-main or combination systems with spread-out fixture groups/floor plans, as well as for larger homes using multiple ManaBlocs in a parallel-type system.

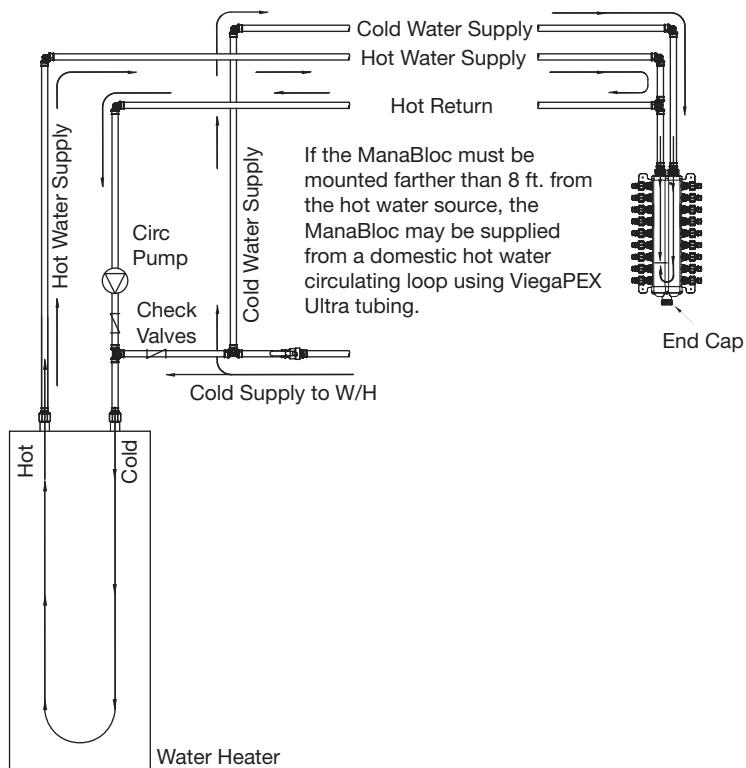
ViegaPEX Ultra can be used in recirculating domestic hot water plumbing loops, provided:

1. The plumbing loops shall operate with water temperatures of 140°F or lower, as required by most model plumbing codes.
2. The recirculating loop is for supplying hot water more quickly to the fixture.
3. The tubing is marked as rated for "continuous recirculation" as evidenced by the ASTM F876 certification marking PEX 5306 (CL5).



Typical domestic hot water circulation piping

### Continuously Recirculating Hot Water Plumbing Loops



### 18.1 Stub out options

The Viega PEX system includes fittings to accommodate most plumbing needs. Stub outs are available for a variety of fixture situations, as well as fittings and valves to connect to other plumbing materials and fixtures.



Standard stub outs with 90° bends and a closed end to facilitate pressure testing are available in either  $\frac{3}{8}$ " or  $\frac{1}{2}$ " PEX x  $\frac{1}{2}$ " copper.

Also, PEX Press copper tub elbow and PEX Crimp shower valve adapters are available for easy connections to tub and shower valves.



Drop-ear elbows provide a  $\frac{1}{2}$ " or  $\frac{3}{4}$ " F NPT threaded connection at a wall or floor penetration as well as a flange for securing the fitting.

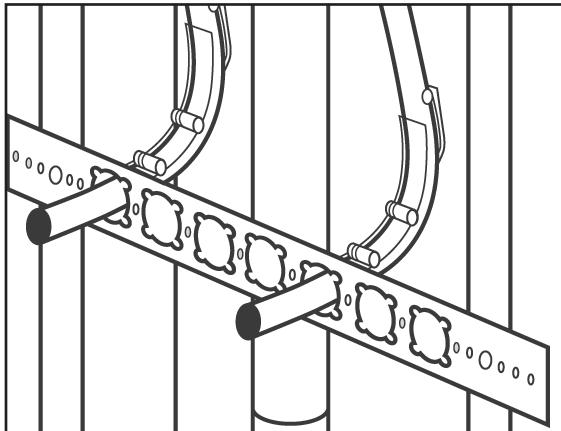
Drop-ear bend supports allow ViegaPEX Ultra tubing to be directly stubbed out of a wall. These supports allow the tubing to make the tight bend necessary to exit the wall at a 90° angle as well as providing a flange for securing the support.

The exposed tubing can then be connected to a valve, using an optional chrome sleeve to cover the tubing if desired.

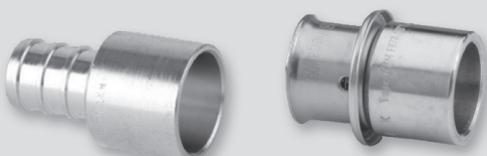


Half-inch, snap-in bend supports are also available with a metal mounting bracket (sold separately) for quick and easy stub outs with 1/2" ViegaPEX Ultra tubing.

Seven stub out locations and numerous nail holes make this a versatile option for stubbing out any number of lines or supporting tubing near manifolds.



*Snap-in Bend Supports with Bracket*



*Copper Tubing Adapters*



*Press ProPress Adapter*



*Copper Fitting Adapters*

## 18.2 Copper connections

Fittings are available to adapt ViegaPEX Ultra tubing to both copper tubing and copper fittings. Copper tubing adapters slip over copper tubing to provide a sweat connection. Always make the sweat connection to the fitting before connecting PEX to avoid heat damage to the tubing.

Copper fitting adapters fit into copper fittings to mate PEX to standard sweat or ProPress fittings. As with copper tubing adapters, always make sweat connections prior to PEX connection to avoid tubing damage.



**PEX Crimp fitting adapters are not for use with the Viega ProPress connection.**

### 18.2.1 Soldering Zero Lead alloy PEX fittings

Viega's Zero Lead PEX fittings are manufactured from alloys known for their low lead content and corrosion-resistant properties. These alloys have lower thermal conductivity compared to standard (leaded) alloys, which tends to make them more sensitive to soldering conditions. It is important to follow the steps below to ensure consistent leak-free solder connections.

#### Prepping and cleaning

Zero Lead alloys are harder than standard alloys. Cleaning and prepping the Zero Lead solder joint area with an abrasive product like emery cloth, sandpaper or wire brush is an important step in the solder process. Do not rely on flux alone. This surface preparation removes the natural oxidative barrier that tends to form on Zero Lead alloys. Once this is done, fluxing and soldering should be done immediately to ensure the oxide film does not reform on the freshly cleaned surface.

#### Use of proper flux and solder

Only use flux containing chloride compounds. Solder fluxes without chloride compounds are not recommended for use on Zero Lead alloys.



**Only lead-free solder should be used to make Zero Lead solder connections.**

### Heating

Like standard (leaded) alloys, heating of the Zero Lead solder joint should be done evenly and gradually using an appropriately sized tip with constant movement of the flame over the joint. Be careful not to overheat the Zero Lead alloy while making a solder joint. Overheating will result in a brown discoloration of the metal, which is an indication that flux has burned out of the solder joint, potentially causing incomplete solder coverage. If you suspect this has occurred, disassemble the joint, clean and repeat the process using proper heating techniques.

### Proper Cool Down

Because Zero Lead alloys have a lower thermal conductivity than standard alloys they do not cool down as quickly after making a solder connection. If excessive heating has occurred and an accelerated cooling process is required, apply a damp cloth to the freshly completed solder joint. This will help minimize the risk of the solder joint moving or leaking solder out of the joint before the joint can cool.

### 18.3 Threaded connections

The Viega PEX system also provides a number of fittings to adapt ViegaPEX Ultra and FostaPEX tubing to NPT threads.

In addition to the NPT drop-ear elbows already mentioned, metallic male and female adapters and male NPT elbows provide threaded connections.

The threaded connection should always be made before the PEX connection to avoid twisting the PEX connection.



**Do not use metallic threaded adapters when connecting to polymer threads.**



*Male Adapters*



*Female Adapters*



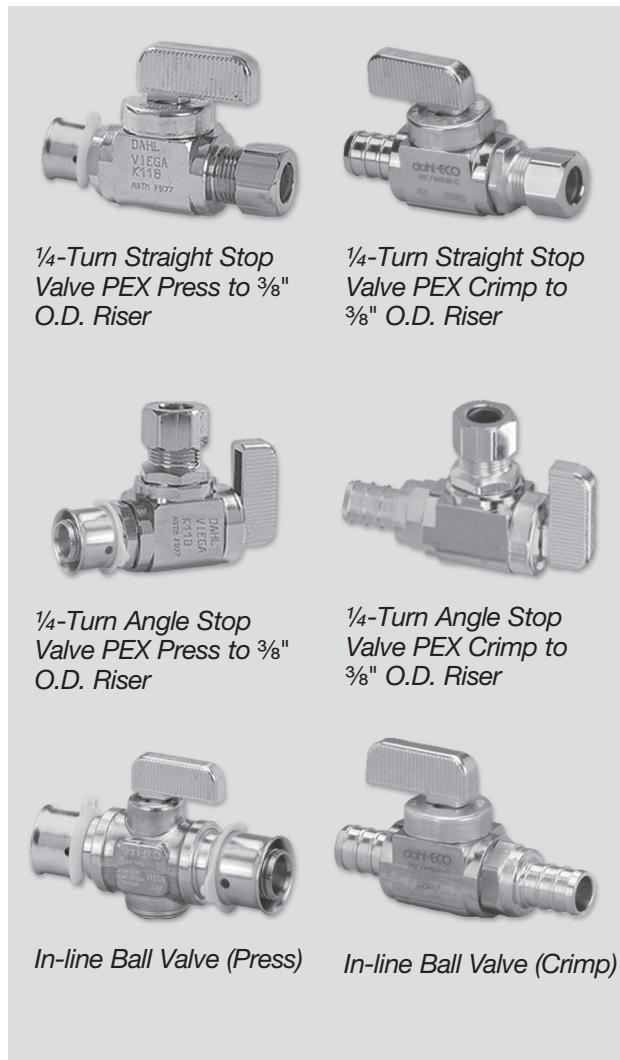
*NPT Elbows Adapters*

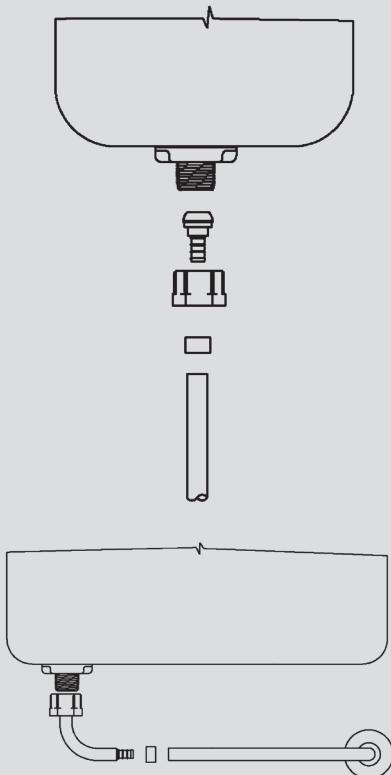
## 18.4 Valves

In-line ball valves are available for use with ViegaPEX Ultra tubing. These brass finish valves may be used anywhere an in-line valve is needed.

Stop valves have  $\frac{3}{8}$ " or  $\frac{1}{2}$ " PEX inlets and  $\frac{1}{4}$ " CTS ( $\frac{3}{8}$ " O.D.) riser outlets and are available in both straight and angled versions depending on installation requirements.

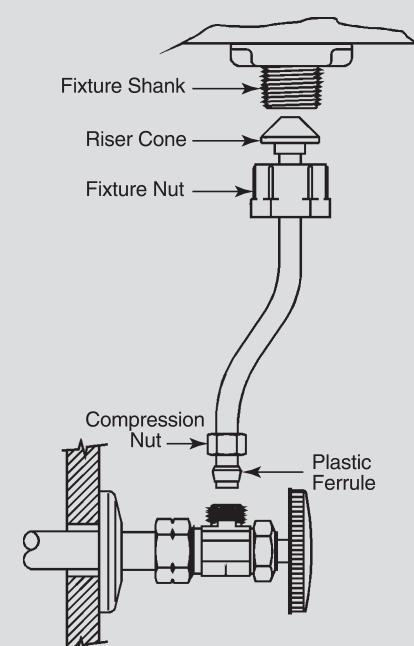
 **Only plastic ferrules should be used when connecting to PEX tubing/risers. Brass ferrules are for use with copper tubing.**



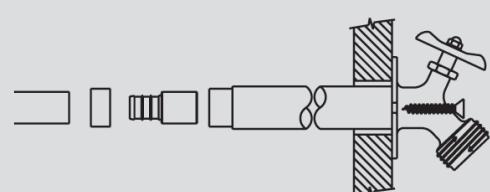
**Viega Water Closet Connections**

Tighten fixture nut hand-tight plus an additional  $\frac{1}{4}$ -turn. Check all connections for leaks.

**DO NOT OVERTIGHTEN.**

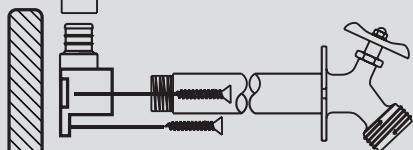
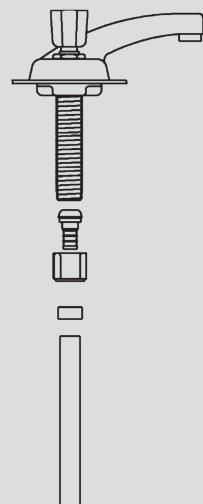
**Viega Riser Connections**

Thread fixture nut onto fixture shank. Tighten fixture nut hand-tight plus an additional  $\frac{1}{2}$ -turn. Slide compression nut and supplied plastic ferrule over tube as shown. The long taper of the ferrule goes toward the valve. Tighten compression nut according to valve manufacturer's recommendations.

**Viega Wall Hydrant Connections**

Hose bibbs supported by the structure can be connected directly.

Freestanding hose bibbs shall not be supported by ViegaPEX Ultra. Well-anchored drop-ear fittings or metal pipe shall be used to install hose bibbs.

**Lav Or Kitchen Faucet Connections**

Tighten fixture nut hand-tight plus an additional  $\frac{1}{4}$ -turn. Check all connections for leaks.

**DO NOT OVERTIGHTEN.**

## 19.1 General

Upon the completion of installing a Viega PEX plumbing system, a hydrostatic (potable water) pressure test shall be conducted. If potable water is not available, or the potential for a freezing condition exists, pneumatic\* (air or nitrogen) testing and/or the use of an RV antifreeze\*\* solution are also acceptable methods for pressure testing.

- \* Use air testing only if approved by local code or the Authority Having Jurisdiction (AHJ)!
- \*\* RV antifreeze shall be drained and flushed from all portions of the plumbing system prior to consumer use.

Always refer to local plumbing code for pressure testing requirements and approved methods specific to plastic plumbing systems. If none is specified, refer to Table 19.1 for acceptable methods, test pressures and durations.



### NOTICE - ManaBloc VALVE INFORMATION!

Opening a port valve to an empty or unpressurized distribution line may cause valve damage.

To prevent potential valve damage or failure, open the port valves before filling and pressurizing the lines. The force of water rushing to fill an empty line can cause the valve's seal to "clip off," resulting in incomplete sealing or complete valve failure.

CARE must be exercised when opening a port valve to an empty or unpressurized line. The fixture to which the line is connected should be in the OFF position and the valve must be opened slowly until water starts to flow into the line.

DO NOT CONTINUE to open the valve until the line is full and pressurized. Open the valve fully only after the line is up to system pressure. The fixture can then be opened to purge the line of air.

Valve stems are replaceable. Order part number 51602.



WATER TESTING SHALL BE AVOIDED DURING FREEZING CONDITIONS. UNDER NO CIRCUMSTANCES SHALL THE SYSTEM BE TESTED AT TEMPERATURES LOWER THAN 10°F (-12°C).



FOLLOW ANTIFREEZE MANUFACTURER'S INSTRUCTIONS FOR CONCENTRATIONS. Use only nontoxic antifreeze approved for drinking water systems.

**NOTE:** If such a solution is used, the antifreeze solution must be sufficiently concentrated to withstand the lowest temperature encountered while the testing fluid is in the system. Antifreeze solutions should be purged and the system flushed with potable water prior to consumer use.



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 a test medium. 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.

Testing Viega PEX Systems (Branch and Main / ManaBloc)				
Test Method	Min/Max Duration (Min)	Max Pressure (psi)	Min Pressure (psi)	Allowable Variance (psi)
Water	15 min/1 hr	100	40	N/A
Air	15 min/1 hr	100	40	8*

Table 19.1

\* If the pressure in the system declines more than 8 psi during the 15-minute to one-hour period, repressurize the system to the original test pressure and retest. If the system pressure declines more than 8 psi again during the test period, test the distribution line test caps or any other fittings in the system with the approved leak-detect solution.

NOTE: Some plumbing fixtures may not withstand test pressures greater than 80 psi. Consult fixture manufacturer's instructions for pressure limitations or plug all distribution lines at the fixture end. The system shall, at a minimum, withstand the test pressure, without leaking, for a period of 15 minutes.

## 19.2 Air testing

Air testing of a Viega PEX plumbing system shall use the checklist provided to ensure safety.



**It is the responsibility of the installer to read and understand the below pressure testing criteria and all safety precautions.**

**Compressed air can store extremely high energy as compared to compressed water systems. Failure to follow these steps could result in personal injury, death and/or property damage.**

### Preparing for air pressure test:

- ✓ Notify other trades that air pressure test will be conducted on the plumbing system. Only qualified personnel should be present during the system testing.
- ✓ Use only compressed air or nitrogen that is free of any kind of lubricating oils.
- ✓ Do not conduct pressure testing overnight or if a large temperature change is anticipated.
- ✓ Before pressurizing the system, conduct a visual inspection to ensure proper connections have been made throughout the plumbing system.
- ✓ All personnel involved in the pressure testing shall wear, at a minimum, eye and hearing protection. It is recommended the person applying the pressure to the system wear a full face shield.
- ✓ Only Viega PEX plumbing system components (tubing/fittings/manifolds) shall be pressure tested. All other system components (water heaters and fixtures) shall be isolated from the pressure test.
- ✓ Contact the inspector and schedule the pressure test.

### Pressurizing the system:

- ✓ Verify no other trades are present prior to starting the pressure test. Only qualified testing personnel should be present during pressure test.
- ✓ Introduce pressure into the system as outlined in the stages below.

**Stage 1:** Gradually increase system pressure to 10 psi (approx. 30-sec. duration).

- Wait for 10 minutes before inspecting pressure gauge.
- If pressure holds steady, continue to Stage 2.
- If pressure falls over the test period, look for potential leaks with an approved leak-detect solution. Once system pressure is completely relieved and the leak is fixed, restart test procedure.

**Stage 2:** Gradually increase system pressure to 50 psi (approx. 1-min. duration).

- Wait for 10 minutes before inspecting pressure gauge.
- If pressure holds stable, continue to Stage 3.

- If pressure falls over the test period, look for potential leaks with an approved leak-detect solution. Once system pressure is completely relieved and the leak is fixed, restart testing procedure from beginning.

**Stage 3:** Gradually increase system pressure to 100 psi (approx. 1-min. duration).

- Inspect gauge pressure over next 10-minute period to verify pressure has not decreased more than the allowable variance noted in Table 19.1.
- If pressure variance allowed is not exceeded, the system test has passed.
- If pressure decreases more than the allowable variance, the test has failed. Apply approved leak-detect solution (see “19.3 Leak detection” below) on fitting and/or manifold connections to isolate the location of the leak. Once system pressure is completely relieved and the leak is fixed, start testing procedure from beginning.

### Completing the air test:

- ✓ Depressurize system.
  - Use of the same safety equipment applies to these steps.
  - Slowly bleed off any remaining air pressure from system (approx. 1-min. duration).
  - Notify other trades the test is complete and work area is safe to occupy.
  - Document the time and date test was completed and the pressure and duration of the test.

## 19.3 Leak detection

Viega has identified the leak detect solutions listed below as being compatible for use with Viega PEX Press system components. Consult leak detect manufacturer for proper application and product instructions. To determine the compatibility of other leak detect solutions not listed below, contact Viega Technical Services prior to their use.

- megabubble® Leak Detector
- Oatey® All Purpose Leak Detector
- Snoop Liquid Leak Detector

As an alternative leak detect, a mixture of Original Palmolive Green™ dishwashing soap (#46100-46200) or Palmolive Ultra™ (#356140 or 46128) mixed with potable water at a ratio of two ounces of soap to one gallon of water (mix Ultra at a ratio of 1.5 ounces per gallon) may be used.

**NOTE:** If the solution does not show a leak on any of the caps or fittings, isolate the ManaBloc by turning the valves to the “OFF” position, repressurize if needed and apply the same solution to the ManaBloc manifold components.

## 20.1 General

Local codes may require system disinfection. When no other method is available, follow the time limitations and exposure levels shown below.

1. Use a chlorine solution and one of the exposure durations listed below:

Concentration	Period	Authority
200 PPM	3 hours	IPC/UPC®
50 PPM	24 hours	IPC/UPC®

2. Mix the disinfection solution thoroughly before adding it to the system.
3. The chlorine solution must reach all parts of the system. Open all fixtures (both sides) and flow water until a chlorine smell is present. As an alternative, chlorine test tablets can be used to detect chlorine at each fixture.
4. The chlorine source for the solution can be, but is not limited to, the following:

Chlorine Source	% Active Chlorine	Form	Amount Per 100 Gallons Water for a 200 PPM Solution
Laundry bleach	5.25	Liquid	3 pints (48 oz.)

5. After the solution has been in the system for the time required by the Authority Having Jurisdiction (AHJ) or the exposure durations listed in Step 1, the system shall be flushed completely with potable water.
6. The system must be purged or drained of all water or protected from freezing.



### FAILURE TO FLUSH THE SYSTEM NOTICE!

To prevent reduced service life of system components, disinfection solutions shall not be allowed to stand in the system longer than 24 hours. Thoroughly flush the system with potable water after disinfection.

## 20.2 California flushing requirements

The State of California requires all installations of PEX piping, where it is the initial plumbing system installed in new construction, shall be flushed twice over a period of at least one week. The piping system shall be first flushed for at least 10 minutes and then filled and allowed to stand for no less than one week, after which all the branches of the piping system must be flushed long enough to fully empty the contained volume. This shall not apply to installations of PEX pipe where it replaces an existing tubing system of any material.

At the time of fill, each fixture shall have a removable tag, shown on the right.

This new plumbing system was first filled and flushed on \_\_\_\_\_ (date)  
by \_\_\_\_\_ (name)

The State of California requires that the system be flushed after standing at least one week after the fill date specified above. If this system is used earlier than one week after the fill date, the water must be allowed to run for at least two minutes prior to use for human consumption.

This tag may not be removed prior to the completion of the required second flushing, except by the building owner or occupant.







## VIEGA® LLC PEX WATER SYSTEMS LIMITED WARRANTY

Subject to the conditions and limitations in this Limited Warranty, VIEGA LLC (Viega) warrants to the owner of applicable real property in the United States (including its territories) and Canada that the components in its PEX Plumbing Systems (as described below) when properly installed by licensed plumbers in potable water systems, under normal conditions of use, shall be free from failure caused by manufacturing defects for a period of twenty-five (25) years from date of installation.

Viega PEX Plumbing Systems and components covered by this twenty-five (25) year warranty are:

ViegaPEX™ and ViegaPEX™ Ultra cross-linked polyethylene (PEX) tubing or FostaPEX® tubing installed with PEX metal or polymer press fittings and PEX Press sleeves sold by Viega installed as a system.

ViegaPEX and ViegaPEX Ultra cross-linked polyethylene (PEX) tubing and ASTM F1807 metal crimp insert fittings sold by Viega and ASTM F2159 PolyAlloy™ crimp fittings sold by Viega installed with copper crimp rings as a system.

Viega warrants that ManaBloc®, MiniBloc™ or polymer or metallic manifolds, and their approved connections, sold by Viega and installed as a manifold plumbing system under normal conditions of use, shall be free from failure caused by manufacturing defects for a period of ten (10) years from date of installation.

Power tools and jaws used with PEX Press fittings are warranted by the manufacturer and Viega extends no separate warranty on those tools or jaws. Viega warrants that PEX hand tools sold by Viega, under normal conditions of use, shall be free from failure caused by manufacturing defects for a period of two (2) years from date of sale. Viega warrants that PEX Crimp hand tools and tubing cutters sold by Viega, under normal conditions of use, shall be free from failure caused by manufacturing defects for a period of twelve (12) months from date of sale.

Viega warrants that properly installed PEX valves, PEX lav and closet risers and riser accessories manufactured and/or sold by Viega shall be free from failure caused by manufacturing defects for a period of two (2) years from date of installation.

Viega does not extend any warranty on its components used in systems with tubing, fittings, manifolds, or press sleeves not sold by Viega or installed by other than a licensed plumber. In addition, the warranty does not apply if distribution lines and their connections to manifold plumbing systems sold by Viega are not ViegaPEX, ViegaPEX Ultra or FostaPEX tubing or approved connections sold by Viega.

Connection to non-Viega plumbing products intended for riser and/or water service applications does not void the systems warranty provided all pipe, fittings, valves and manifolds are sold by Viega after the transition location.

Termination connections to non-Viega end-use devices or equipment such as filtration, water softeners, shower valves, faucets, stops and other such devices, when utilizing ViegaPEX, ViegaPEX Ultra and FostaPEX does not void the system warranty as described.

Under this limited warranty, you only have a right to reimbursement if the failure or leak or resulting damage resulted from a manufacturing defect in the products covered by this warranty and the failure or leak or resulting damage occurred during the warranty period. You do not have a remedy or right of reimbursement under this warranty and the warranty does not apply if the failure or leak or resulting damage is caused by (1) components in the plumbing system other than those manufactured or sold by Viega; (2) not designing, installing, inspecting, testing, or operating the system in accordance with Viega's installation instructions at the time of the installation, applicable code requirements and good plumbing practices; (3) improper handling and protection of the product prior to and during installation, exposure to ultra violet light, inadequate freeze protection, exposure to water pressures or temperatures in excess of the limitations on the tubing or application of unauthorized or harmful solvents or chemicals; (4) chemically corrosive or aggressive water conditions; or (5) acts of nature such as earthquakes, fire, flood or lightning.

In the event of a failure or leak in the system, it is the responsibility of the property owner to obtain and pay for repairs. Only if the warranty applies will Viega be responsible for reimbursement under this warranty. The part or parts which you claim failed should be kept and Viega contacted at the address below or by telephoning 800-976-9819 within thirty (30) days after the failure or leak and identifying yourself as having a warranty claim. You should be prepared to ship, at your expense, the product which you claim failed due to a manufacturing defect, document the date of installation, and the amount of any claimed bills for which you seek reimbursement. Within a reasonable time after receiving the product, Viega will investigate the reasons for the failure, which includes the right to inspect the product at Viega and reasonable access to the site of damage in order to determine whether the warranty applies. Viega will notify you of the results of this review.

In the event that Viega determines that the failure or leak and any resulting damages were the result of a manufacturing defect in the products covered by the 10-year or 25-year limited warranties and occurred during the first ten (10) years covered by this warranty, Viega will reimburse the property owner for reasonable repair or replacement charges to include drywall, flooring and painting costs, as well as damages to personal property, resulting from the failure or leak. The remaining 15-year limited warranty for products covered by the 25-year limited warranty will cover material costs for pipe and fittings only, sold by Viega, not inclusive of any labor or installation costs. Any change in property ownership after the first ten years will nullify any remaining warranty coverage.

**VIEGA SHALL NOT BE LIABLE FOR CONSEQUENTIAL ECONOMIC LOSS DAMAGES UNDER ANY LEGAL THEORY AND WHETHER ASSERTED BY DIRECT ACTION, FOR CONTRIBUTION OR INDEMNITY OR OTHERWISE.**

THE ABOVE LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF FOUND APPLICABLE, ANY IMPLIED WARRANTIES ARE LIMITED TO THE DURATION OF THE TIME LIMITS SET OUT IN THIS WRITTEN WARRANTY. Other than this limited warranty, Viega does not authorize any person or firm to create for it any other obligation or liability in connection with its products. This written warranty applies for the first 10 years of the applicable warranty regardless of any change of ownership in the property.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on the duration of implied warranties in certain types of transactions, so the above exclusion or limitations may not apply to you. This limited warranty gives you specific legal rights and you also may have other rights which vary from state to state. This warranty shall be interpreted and applied under the law of the state in which the product is installed.

Effective 02/01/2016

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\*Zero Lead identifies Viega® products meeting the lead free requirements of NSF 61-G through testing under NSF/ANSI 372 (0.25% or less maximum weighted average lead content).

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