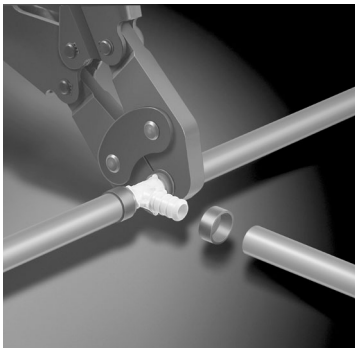


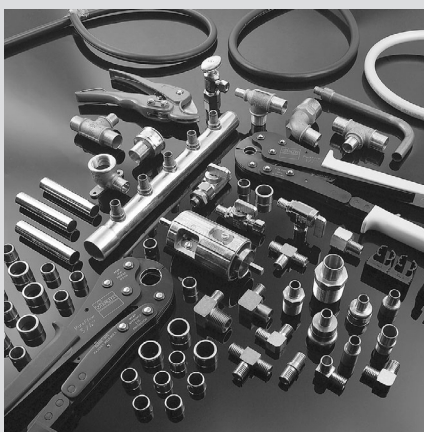
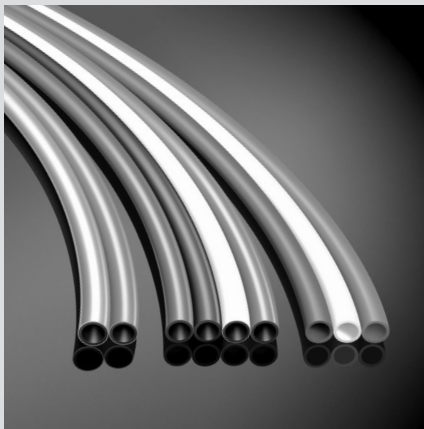
# PureFlow<sup>®</sup> Water Systems

**viega**

## Installation Manual



May 2011



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 MANABLOC is a registered trademark of Viega LLC  
 ViegaPEX is a trademark of Viega LLC  
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## Working with Viega is the perfect solution.

Viega researches, develops and produces complete system solutions for contractors. The components are produced at our plants or are supplied exclusively by the finest quality manufacturers. Each of our systems is developed in-house and tested under stringent quality control conditions to guarantee safety and efficient operation.

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Viega PureFlow plumbing combines technology from both sides of the Atlantic into the very best PEX plumbing systems for our customers.

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## Why you can depend on Viega PureFlow.

- A safe system
- Competitively priced
- Leakproof fitting connection
- Highly flexible and kink resistant
- Lightweight and easy to handle
- Fast and solder-free installation
- No open flame during installation
- Reduced number of fittings used in wall
- Long life expectancy
- Non-corroding
- Reduced flow noises
- In coils or straight lengths
- FostaPEX form stable tubing ideal for exposed runs
- Listed by NSF to meet the requirements of ANSI 14 and 61 and PEX5006 (CL5).
- Listed to ASTM F876 and F877

## IMPORTANT NOTICE

This installation guide is intended for traditional (branch and main) plumbing systems and hybrid plumbing systems using termination manifolds, MANABLOC® and MINIBLOC parallel / manifold plumbing system.

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

NOTE: References to ZERO LEAD throughout this publication identifies meeting the lead free requirements of California and Vermont law effective January 1, 2010, as tested and listed against NSF-61, Annex G.

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 Plumbing Warranty. Nothing in this publication is intended to create any warranty beyond Viega's applicable warranty. For additional information, contact Viega at 800-976-9819.

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## Terms Used in This Guide:

PEX . . . . .	ViegaPEX cross-linked polyethylene tubing
AHJ . . . . .	Authority Having Jurisdiction
PPM . . . . .	Parts Per Million
NSF . . . . .	NSF International, Inc. (formerly National Sanitation Foundation)
CAN/CSA . . . . .	Canadian Standards Association
"shall" . . . . .	Required; a mandatory procedure
"may" or "should" . . . . .	A suggested optional procedure



## 1. INTRODUCTION

### 1.1 Viega

For over 100 years, Viega has been a trusted name in the plumbing business globally.

Through innovative techniques, sophisticated technologies and acquisition of the top PEX plumbing products in the U.S. Viega has become the industry leader for PEX plumbing.

Viega produces a comprehensive range of plumbing and heating equipment. Anywhere that water flows in a building Viega manufactures a system to fit. The company's experience with press fitting technology in bronze, stainless steel and copper led to the development of the PureFlow water distribution system. Viega is positioned as the number-one supplier of PEX plumbing systems in North America.

Today Viega engineers and manufactures more than 12,000 system components at six state-of-the-art factories including our PEX

tubing facility located in the heart of the U.S. Viega quality has proven itself in millions of systems installed each year around the world.

Viega has a history in North America of technological innovation and customer service that is second to none. The Viega product line now is composed of multiple brands including ProPress® flameless copper and ProPress® stainless steel joining technology, PureFlow® flexible PEX tubing plumbing technology, ProRadiant® comfortable efficient heating technology and S-no-Ice® snow and ice melting technology, to name a few. Each line is selected so that components work together to create a complete system concept.

PureFlow plumbing provides complete PEX systems for potable water distribution, including manifolds, PEX and multilayer tubing, fittings and valves. PureFlow fire sprinkler provides a PEX system for multipurpose one and two family residential fire sprinkler

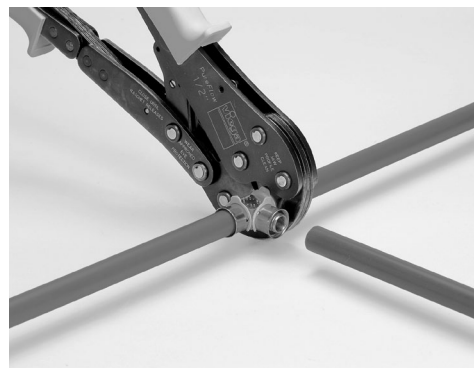
systems, per NFPA 13D, including fittings and ViegaPEX Ultra Black PEX tubing in sizes 3/4" to 2". The ProRadiant program includes a wide range of hydronic radiant systems and controls as well as thermostats and setpoint controls.

In addition, the Viega S-no-Ice line includes snow and ice detection controls, heat exchangers and snow melting systems.

As the pioneer in combining technology and engineering expertise from both sides of the Atlantic into the very best systems for our customers in North America, we are proud to present you the world's finest potable water distribution systems: PureFlow.

The name says it all.

We look forward to sharing our history in the making with you.



## 1.2 PureFlow System Concepts

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

The PureFlow plumbing system offers maximum security thanks to cold press and full circle crimp fitting techniques. These fittings guarantee 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.

Top quality materials such as brass, bronze, stainless steel and durable, environmentally compatible plastics provide the basis for the very highest standards of quality at Viega.

Viega offers a full line of Zero Lead products that meet the requirements of California AB 1953, Vermont ACT 193, and NSF 61 Annex G, which require less than 0.25% lead in all plumbing fittings used in cooking and drinking water systems. All Viega plastic and copper articles are naturally lead free and comply with the new legislation.

ZERO LEAD identifies Viega products meeting the lead free requirements of California and Vermont law, effective January , 2010, as tested and listed against NSF-61, Annex G.

PEX tubing offers outstanding versatility. More than 930 million feet of Viega PEX Tubing has been manufactured since 2006. This is conclusive evidence of this product's considerable importance in plumbing installation, in both quality and quantity.

This is clearly the result of excellent workmanship, fast and simple installation and the reliability and safety which are characteristic of the Viega system concept.

The efficiency of the integrated system concept for Viega branded products is confirmed by:

- Perfectly coordinated components
- Quick delivery at short notice
- Time-saving installation
- Complete installation of an entire system from one supplier

Viega's comprehensive services include technical support and warranty coverage, subject to the exclusive use of PureFlow system components.

PureFlow is a high-quality plumbing system. It is able to withstand high levels of thermal and mechanical stress (180°F at 100 psi, 73.4°F at 160 psi).

### The systems incorporate:

- ViegaPEX tubing: red, white and blue cross-linked polyethylene tubing designed with superior chlorine resistance
- ViegaPEX Ultra tubing: red, white, blue, and black cross-linked polyethylene tubing with added resistance to UV
- ViegaPEX Ultra black tubing: 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 standard and zero lead bronze, brass or plastic fittings for PEX Press and PEX Crimp fitting systems
- PureFlow MANABLOC distribution system for use with Viega PEX tubing
- A range of inline, manifold and stop valves for ViegaPEX fitting systems
- Viega PureFlow press tools and jaws for the PEX Press fitting systems
- Viega PureFlow crimp tools for the PEX Crimp fitting systems



## 2. GREEN BUILDING

### 2.1 General

Green Building incorporates environmental considerations into every phase of the home building process. Multiple factors are considered during construction as well as its operation and its impact on the environment. LEED® (Leadership in Energy and Environmental Design) was established by the U.S. Green Building Council (USGBC) as a system to define and measure “green building.” This voluntary market-driven rating system is based on existing, proven technology, and awards credits for different aspects of environmental design. There are four levels of performance that can be achieved per these resource categories: Certified, Silver, Gold and Platinum.

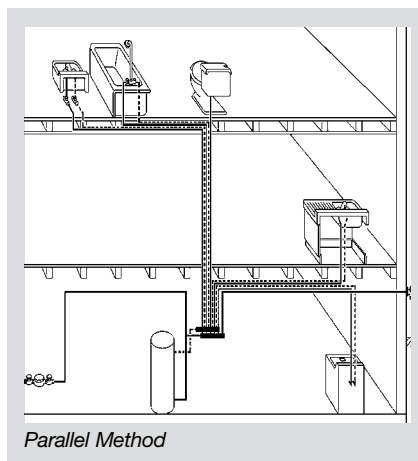
Viega’s PureFlow plumbing systems can be incorporated to improve both water and energy efficiency, earning your home credits toward a LEED certification level (when following LEED installation criteria). To obtain more information concerning LEED certification for your home, contact the USGBC.

### 2.2 Structured Plumbing

Structured plumbing is the practice of installing and/or designing a plumbing system in a manner that enhances the system’s performance by reducing water waste and hot water delivery times. This plumbing strategy is becoming important for home builders in markets where water conservation is prevalent. Viega, being the leader in innovation and technology for the plumbing and heating systems, has embraced this philosophy with its plumbing products.

#### 2.2.1 Parallel Systems

Using home run manifolds (see illustration below), the installer can potentially plumb a house without fittings hidden inside walls. By installing a manifold system near the hot water source, tubing can be run directly to each fixture without using additional fittings. This system provides the lowest pressure losses, as well as eliminates interference between fixtures. Often each fixture can be fed with smaller diameter tubing such as 3/8" diameter, which is easier and faster to install.



The MANABLOC Manifold is a unique plumbing system that not only provides a superior plumbing system for homeowners but can also be incorporated to provide water and energy savings. It’s a simple concept that provides extraordinary performance. Each fixture is fed by its own flexible water distribution line, which runs from a central manifold. By providing each fixture with its own distribution line, the line can be sized appropriately so hot water can be delivered rapidly. Since the line is dedicated to a single hot or cold fixture, less water is required to purge the line. This saves time, energy and can reduce water waste by up to 40%.

#### *Clean System and Clean Installation*

The MANABLOC is preferred by many installers thanks to its fast and safe installation. There are no fumes from solvents to contend with and no torches required on site for installation. Installation time is significantly less than that of a rigid plumbing system due to the flexibility of ViegaPEX tubing and the simplicity of the PureFlow fitting systems. Viega tubing is color coded to make installation easier and the connection of fixtures to the proper distribution line faster and more foolproof. Homeowners can be assured of the purity of the system due to the third party NSF 61 certification carried by both the MANABLOC and ViegaPEX tubing. Homeowners also benefit from the corrosion resistance of ViegaPEX, which helps prevent contamination of drinking water.

#### *Fewer Fittings Behind the Wall*

The MANABLOC requires fewer fittings than branch and main plumbing systems. This means very few are needed behind the wall. The MANABLOC is installed using flexible ViegaPEX tubing that can be bent around obstacles without the need for fittings. In most cases, each dedicated line has a fitting at the MANABLOC and one at the fixture connection with no fittings located behind the walls.

#### *Rich in Homeowner Benefits*

Home builders enjoy the many features the MANABLOC system offers their customers over branch and main plumbing systems including:

- **Faster Hot Water Delivery** – properly sized lines deliver hot water up to four times faster
- **Better Control of the Plumbing System** – individual shutoff valves provide a simple way of servicing a fixture or adding on to the system



- Quiet Operation – Flexible ViegaPEX tubing reduces water hammer noise and provides quiet operation
- Balanced Water Delivery – multiple fixtures can be used simultaneously without noticeable pressure or temperature changes.



*Design Factors for Installing a Parallel System*

### Water Heater Placement

The 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 requiring purging through the 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 (1/2" PEX line supplying a sink instead of a 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

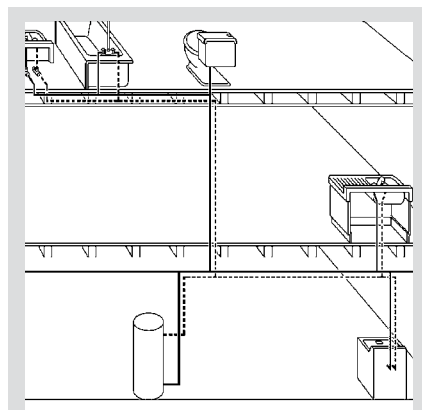
This is just as important as properly sizing each distribution line. Length of a distribution line run can drastically affect the performance of a MANABLOC system. The longer the line is, the more water being stored within it. Therefore, it will take longer to purge it out before hot water can reach 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 MANABLOCs may be required. Place one at each end of the home to split the distribution line distance between them (see section 14.6 for use of multiple MANABLOCs).

### 2.2.2 Branch and Main Systems

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

This system uses a large diameter "main" supply line (minimum 3/4") 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.



*Branch Installation*

While this system can reduce the amount of tubing used, it requires more fittings, which can increase installation time and cost.



*Design Factors for Installing Branch and Main 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 6 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 the fixture groups are not condensed, a branch and main system will have slow hot water delivery times and substantial water waste.

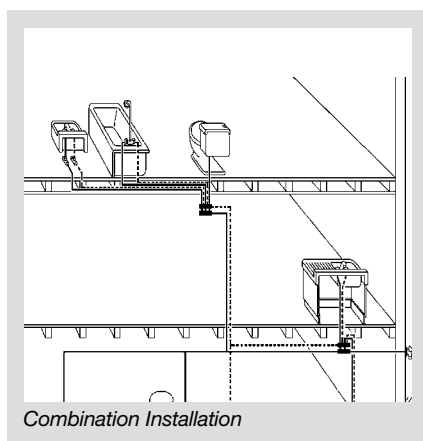
If there is a floor plan that incorporates stacked or back-to-back fixture groups, then a branch and main system can be an effective alternative to a parallel system.

One disadvantage to these systems is they store excess amounts of water in the large main lines. Therefore the farther away the fixture is, the longer the main supply line must be to reach it, and the longer it takes to purge all stored water out before hot water reaches the fixture.

Another problem these systems suffer from is noticeable pressure drop during multiple fixture use. When multiple fixtures are used it increases the water flow (load) within the main line, causing higher friction loss equal to pressure loss at the point of use. This causes a drop in pressure (and potentially a temperature change) in your shower when a toilet is flushed.

## 2.2.3 Combination Systems

A combination system uses multiple manifolds combined with a branch and main type 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 main 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.



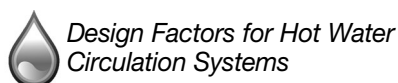
Just like the branch and main system, condensed floor plan layouts are preferable to minimize the length and the amount of water stored in the main supply line, minimizing the amount of water purged before hot water reaches the fixtures. These systems can also suffer from fluctuating pressure during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

## 2.2.4 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 entire 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.



### Installing a hot water circulation system

A tanked water heater shall be used for this type of system. A tankless or instantaneous type water heater will drastically increase the operating cost of the system.

There are many types of these systems available on the market today. Research which type is best for the particular application. Ensure all the components being used within the circulation system are rated and/or approved for a hot water circulation system. The chosen system may require maintenance and/or repairs over time, which could include complete pump replacement.

Note: Utility costs are associated with running these systems due to the electricity required to operate the pump. Costs will vary depending on the frequency of operation and size of the pump.



## 3. VIEGAPEX TUBING

### 3.1 General

ViegaPEX PureFlow tubing is a high-density cross-linked polyethylene tubing (PEX). Cross-linking produces a strong, durable tubing ideal for both hot and cold potable water systems.

### 3.2 PEX - the superior tubing

Cross-linked polyethylene is the ideal tubing choice for potable water systems. Compared to ordinary polyethylene tubing (PE), cross-linked tubing has higher temperature resistance and higher burst pressure.

ViegaPEX tubing is manufactured to ASTM F876/F877 standards and listed to ANSI/NSF Standards 14 and 61. It is chlorine resistance rated for both traditional and continuous recirculation PEX 5006 (CL5) applications. ViegaPEX tubing is rated at 100 psi at 180°F and 160 psi at 73°F.

In addition, the smooth walls of ViegaPEX tubing are resistant to corrosion and scaling.

### 3.3 Colors

ViegaPEX is available in red, white and blue for easy identification of hot and cold lines.

### 3.4 ViegaPEX Properties and Performance

Linear Expansion Coefficient:

- 1.1 inch per 100 feet per 10°F

Temperature and Pressure Ratings:

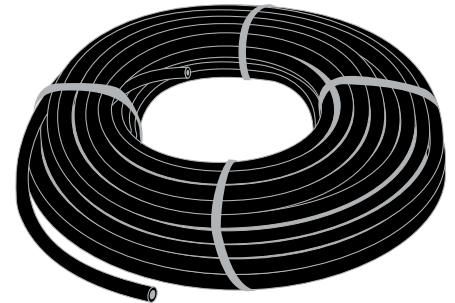
- 200°F at 80 psi
- 180°F at 100 psi
- 73.4°F at 160 psi

UV Resistance:

- maximum exposure 60 days

Flexibility:

- ViegaPEX can be easily bent by hand, or with the use of Viega approved bend supports to a radius as small as 5 times tubing outer diameter.



### 3.5 Tubing Markings

ViegaPEX tubing is marked every 5 feet with the following representative information:

<b>Length Marker</b>	000 Feet
<b>Company</b>	Viega
<b>Product Name</b>	ViegaPEX™
<b>Nominal Tubing Size</b>	1/2"
<b>Standard Dimension Ratio Tube Size</b>	SDR 9 CTS (copper tube size)
<b>Material Designation Code</b>	PEX5006
<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>Plenum Rating*</b>	FS/SD 25/50 ASTM E84
<b>ICC Listing</b>	ES-PMG™ - 1038
<b>HUD Listing</b>	MR 1276
<b>Manufacturer's Date Code</b>	1/1/2010
<b>Material Code</b>	B2X14.2
<b>Country of Manufacture</b>	Made in the USA

\* 3/4" and smaller tube sizes only

### 3.6 ViegaPEX Tubing Dimensions

Nominal Size	Inner Diameter	Outer Diameter	Wall Thickness
3/8"	.350	.500	.075
1/2"	.475	.625	.075
3/4"	.671	.875	.102
1"	.863	1.125	.131

### 3.7 ViegaPEX Sizes

Nominal Size	Available Coil Lengths	Available Straight Lengths
3/8"	100, 500, 1000 feet	*****
1/2"	100, 300, 500, 1000 feet	20-foot lengths in bundles of 50
3/4"	100, 300, 500, 1000 feet	20-foot lengths in bundles of 25
1"	100, 500 feet	20-foot lengths in bundles of 5

## 4. VIEGAPEX ULTRA TUBING

### 4.1 General

ViegaPEX Ultra tubing is a high-density cross-linked polyethylene tubing (PEX). Cross-linking produces a strong, durable tubing ideal for both hot and cold potable water systems.

### 4.2 PEX - the superior tubing

Cross-linked polyethylene is the ideal tubing choice for potable water systems. Compared to ordinary polyethylene tubing (PE), cross linked tubing has higher temperature resistance and higher burst pressure.

ViegaPEX Ultra tubing is manufactured to ASTM F876/F877 standards and listed to ANSI/NSF Standards 14 and 61. It is chlorine resistance rated for both traditional and continuous recirculation PEX 5006 (CL5) applications. ViegaPEX Ultra tubing is rated at 100 psi at 180°F and 160 psi at 73°F.

In addition, the smooth walls of ViegaPEX Ultra tubing are resistant to corrosion and scaling.

### 4.3 Colors

ViegaPEX Ultra, available in red, white, blue and black, is multilayered (2 layers) with a black core that increases the UV resistance of the tubing, enabling exposure of up to 6 months. It also blocks transmission of visible light, preventing most types of algae growth from occurring.

### 4.4 ViegaPEX Ultra Properties and Performance

Linear Expansion Coefficient:

- 1.1 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

UV Resistance:

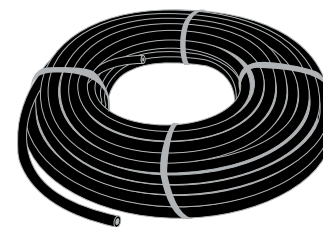
- maximum exposure 6 months

Flexibility:

- ViegaPEX Ultra can be easily bent by hand, or with use of Viega approved bend supports to a radius as small as 5 times tubing outer diameter.

### 4.5 Tubing Markings

ViegaPEX Ultra tubing is marked every 5 feet with the following representative information:



<b>Length Marker</b>	000 Feet
<b>Company</b>	Viega
<b>Product Name</b>	ViegaPEX™ Ultra
<b>Nominal Tubing Size</b>	1/2"
<b>Standard Dimension Ratio Tube Size</b>	SDR 9 CTS (copper tube size)
<b>Material Designation Code</b>	PEX5006
<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>NSF Uniform Plumbing Code Listing</b>	NSF U.P. Code
<b>ASTM Tubing Standards Certification</b>	F876/F877
<b>Candian Standard Assoc</b>	CSA B137.5
<b>Fittings System Compatibility</b>	PureFlow - ASTM F877/F1807/F2159
<b>UL Listing Rating*</b>	cULus 3SAV UL1821 130 PSI @ 120 F
<b>Plenum Rating**</b>	FS/SD 25/50 ASTM E84
<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>	B2X14.2
<b>Country of Manufacture</b>	MADE IN THE USA

\* 3/4" through 2" ViegaPEX Ultra only

\*\* 3/4" and smaller tube sizes only

### 4.6 ViegaPEX Ultra Tubing Dimensions

Nominal Size	Inner Diameter	Outer Diameter	Wall Thickness
3/8"	.350	.500	.075
1/2"	.475	.625	.075
3/4"	.671	.875	.102
1"	.862	1.125	.131
1-1/4"	1.054	1.375	.160
1-1/2"	1.244	1.625	.190
2"	1.629	2.125	.248

### 4.7 ViegaPEX Ultra Sizes

Nominal Size	Available Coil Lengths	Available Straight Lengths
3/8"	100, 500, 1000 feet	-----
1/2"	100, 300, 500, 1000 feet	20-foot lengths in bundles of 50
3/4"	100, 500 feet	20-foot lengths in bundles of 25
1"	100, 500 feet	20-foot lengths in bundles of 5
1-1/4"	100, 300 feet	20-foot lengths in bundles of 5
1-1/2"	100 feet	20-foot lengths in bundles of 5
2"	100 feet	20-foot lengths in bundles of 5

## 5. FOSTAPEX TUBING

### 5.1 General

FostaPEX tubing is the perfect companion for the PureFlow plumbing system. This tubing can be easily bent by hand like the ViegaPEX 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. FostaPEX can be purchased in straight lengths or coils. A unique feature of FostaPEX is that the inner layer is fully dimensioned ViegaPEX 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 PureFlow PEX Press fitting system, which reduces tooling costs for the contractor and simplifies connections.

### 5.2 Advantages of FostaPEX

FostaPEX retains many of the features of ViegaPEX tubing while increasing strength and ease of installation. FostaPEX shares the same PEX Press fitting system as the ViegaPEX tubing, reducing inventory and tooling costs. In addition, the aluminum layer within FostaPEX tubing minimizes expansion during temperature changes. The expansion rate of FostaPEX is similar to that of copper tubing, reducing the necessity for expansion loops and offsets. FostaPEX is ideal for exposed tubing runs, where it can be straightened to present a clean and traditional appearance. A bending tool is also available to assist in making smooth, tight bends in FostaPEX.

FostaPEX tubing is manufactured to ASTM F876/F877 standards and listed to ANSI/NSF Standards 14 and 61. It is chlorine resistance rated for both traditional and continuous recirculation PEX 5006 (CL5) applications. FostaPEX tubing is rated at 100 psi at 180°F and 160 psi at 73°F.

### 5.3 Colors

FostaPEX, available in red and silver, is constructed of a black PEX core, with aluminum and PE outer layers. It also blocks transmission of visible light, preventing most types of algae growth from occurring. In addition, the smooth walls of FostaPEX tubing are resistant to corrosion and scaling.

### 5.4 FostaPEX Properties and Performance

Linear Expansion Coefficient:

- 0.16 inch per 100 feet per 10°F

Temperature and Pressure Ratings:

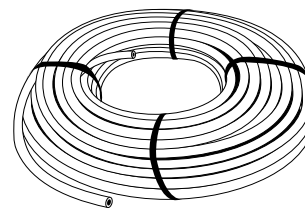
- 200°F at 80 psi
- 180°F at 100 psi
- 73.4°F at 160 psi

UV Resistance:

- Extended (fully dimensioned PEX core is protected by outer AL/PE layers)



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



Flexibility:

- FostaPEX tubing can be bent to a radius of 3.5 x tubing O.D. with the use of a Viega tubing bender.

### 5.5 Tubing Markings

FostaPEX tubing is marked every 5 feet with the following representative information:

<b>Length Marker</b>	000 Feet
<b>Company</b>	Viega
<b>Product Name</b>	FostaPEX®
<b>Nominal Tubing Size</b>	1/2"
<b>Standard Dimension Ratio Tube Size</b>	SDR 9 CTS (copper tube size)
<b>Material Designation Code</b>	PEX5006
<b>Temperature &amp; Pressure Rating</b>	100 PSI @ 180F/ 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>Candian Standard Assoc</b>	CSA B137.5
<b>Fittings System Compatibility</b>	PureFlow - ASTM F877
<b>IAPMO Listing</b>	UPC®
<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>	B2X18.1
<b>Country of Manufacture</b>	Made in the USA

### 5.6 FostaPEX Tubing Dimensions

Nominal Size	Inner Diameter	Outer Diameter*	Wall Thickness*
1/2"	.475	.625	.075
3/4"	.671	.875	.102
1"	.863	1.125	.103

\*Dimensions do not reflect outer aluminum and PE layers

### 5.7 FostaPEX Sizes

Nominal Size	Available Coil Lengths	Available Straight Lengths
1/2"	150, 400 feet	20-foot lengths in bundles of 25
3/4"	150 feet	20-foot lengths in bundles of 25
1"	150 feet	20-foot lengths in bundles of 10

## 6. PUREFLOW PEX PRESS FITTINGS

### 6.1 Bronze PEX Press with Attached Sleeve

PureFlow Bronze PEX Press fittings are cast and machined from a solid bronze alloy available in both zero lead and Viega's standard bronze material that incorporates an attached stainless steel press sleeve with three view holes and a tool locator ring. This gives the fittings high corrosion and stress cracking resistance while simplifying the connection for installation. These bronze alloys have been specially developed to resist dezincification, a process that can weaken ordinary brass fittings over time. The following design criteria make PureFlow PEX Press fittings perfect for use in potable water applications.

- attached sleeve
- high corrosion resistance
- excellent strength properties
- resistant to stress corrosion
- superior wear properties
- compatible with all materials
- color coded tool locator ring matches PEX Press hand tool color

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

**NOTE: Some fittings/adaptors are still sold requiring a separate press sleeve.**

### 6.1.1 Bronze PEX Press Fittings, Manifolds and Sleeves

PureFlow Bronze PEX Press fittings are produced for all connections necessary in a potable water system. PEX to PEX fittings are available as straight couplings, elbows and tees (both single size and reducing). Adapters mate PureFlow tubing to NPT threads, copper tubing and copper fittings.

A full manifold offering is available. PEX Press copper manifolds are available from 2 to 12 outlets and may be installed in concealed locations. The MANABLOC and Minibloc manifold systems are also available with zero lead bronze PEX Press connections.

The stainless steel press sleeves used in the PureFlow PEX Press system ensure the integrity of each connection. The strength of this material guarantees a leak-free connection every time, while the view holes allow both the installer and inspector to easily verify full insertion of the tubing. The tool locator ring ensures a consistent press every time. The stainless steel will not corrode, maintaining a clean appearance for the lifetime of the system.

### 6.1.2 Bronze Press Fitting Markings

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

Manufacturer	VIEGA
ASTM standard	ASTM F877
Temperature Rating	180°F
Certifications	cNSF® <sub>US</sub> pw-G, UPC® cULus® CSA B137.5

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



**Use only Viega Stainless Steel Press Sleeves and Press tools with PureFlow PEX Press fittings**





## 6.2 PEX Press Connection with Attached Sleeve

The PureFlow PEX Press connection with attached sleeve provides a simple and safe connection between the ViegaPEX or FostaPEX tubing and PureFlow system components. The ratchet system in the press tool, simple connection process, three view holes in the press sleeve and color-coded locator rings all ensure a consistent, worry-free press connection. The difference between a finished and unfinished press fitting is also easily visible, making inspection simple.

### 6.2.1 The PureFlow PEX Press Hand Tool

The PureFlow PEX Press connection must always be carried out with the aid of a PureFlow PEX Press tool. The hand tool incorporates a forced compression mechanism to ensure a complete and 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 redone.)

The high mechanical advantage provided by the PureFlow PEX Press tool permits one-handed operation, making the PureFlow PEX Press system perfect for tight spaces and awkward locations.

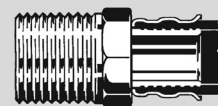
The PureFlow PEX Press hand tool is available for 3/8", 1/2", 3/4" and 1" PureFlow PEX Press connections. Each tool has a color-coded handle that matches the PEX Press fitting locator ring for easy identification on the job site and they are available individually or in convenient sets. See the Viega product catalog for details.

### 6.2.2 The PureFlow PEX Press Power Tool

The PureFlow PEX Press connection may also be carried out with one of the PureFlow power tools. These tools are designed to make the same consistent press as the PureFlow PEX Press hand tools. In addition, these tools have an integrated diagnostic system that monitors tool performance and battery life. The tools have interchangeable jaw sets for 3/8", 1/2", 3/4", 1", 1-1/4", 1-1/2" and 2". PureFlow PEX Press connections and are also compatible with the ProPress copper press system jaw sets. See the Viega product catalog for details.

### 6.2.3 The PureFlow PEX Press Fitting

The PureFlow PEX Press tool compresses the stainless steel sleeve around the tubing and fitting in two places, permanently securing them together — no O-rings. This connection exceeds the requirements of the ASTM F877 standard. The compression of the tool also allows press connections to be made in temperatures as low as -4°F (23°F for power tools).



*Cross-section of a completed PureFlow PEX Press fitting*

Three view holes in the sleeve allow installers to check for proper tubing insertion.



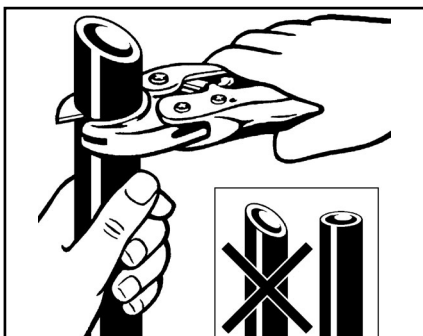
*PureFlow Press Hand Tools*

*PureFlow Press Power Tool*

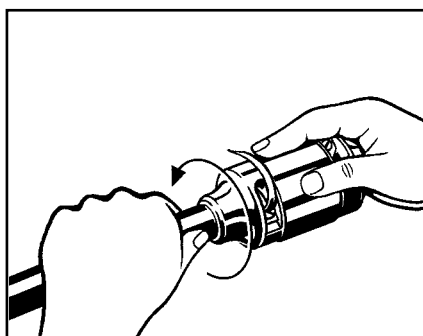
*Jaws*



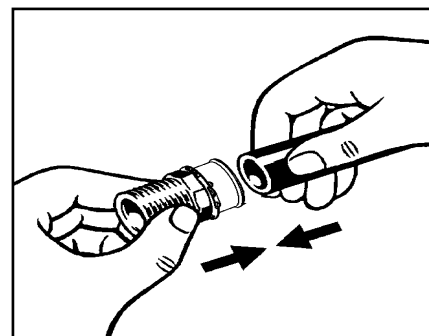
## 6.2.4 Making a PureFlow PEX Press Hand Tool Connection (Attached Sleeves)



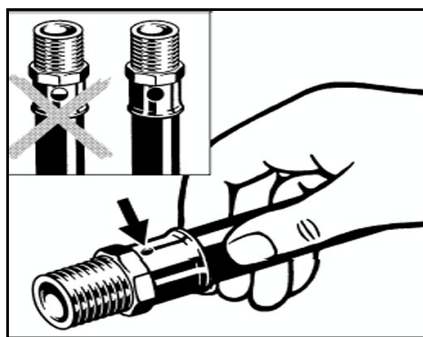
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



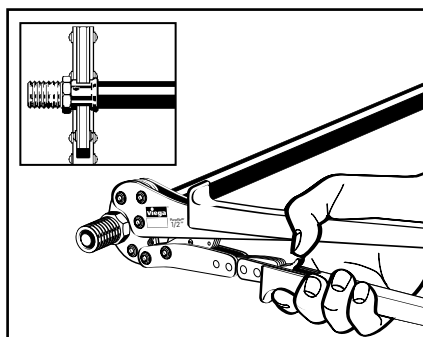
2. If using FostaPEX tubing, insert into prep tool, push and turn until no resistance is felt. If using ViegaPEX, continue to step 3.



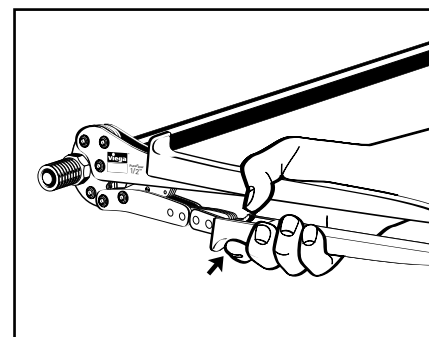
3. Insert PEX Press fitting with attached sleeve into tubing and engage fully.



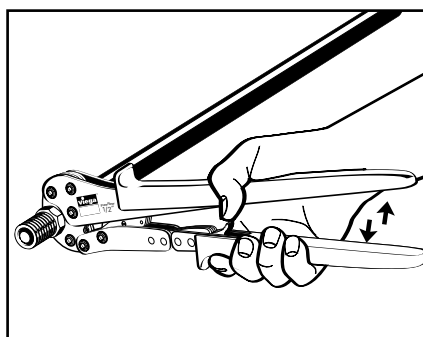
4. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in the one.



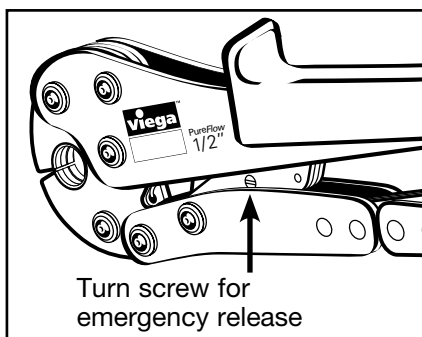
5. Position press tool perpendicular over Press Sleeve resting it against the tool locator ring.  
Note: The tool locator ring must be in the factory installed position while making a press to ensure a consistent leakproof connection. It may be necessary to rotate the tool locator ring to avoid interference between the ring and tool.



6. Close handles, using trigger to reduce grip span if desired.

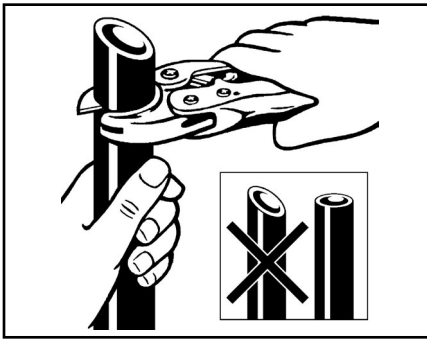


7. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.

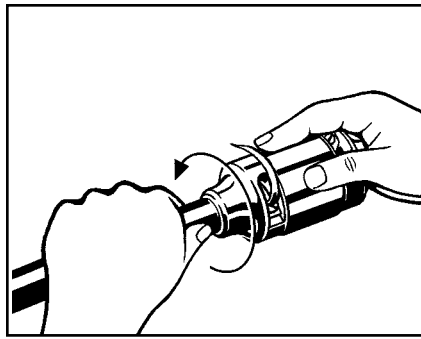


8. **Warning:** The connection is not leakproof when the tool has been opened by emergency release. The tool locator ring must be present to ensure a proper PEX Press connection.

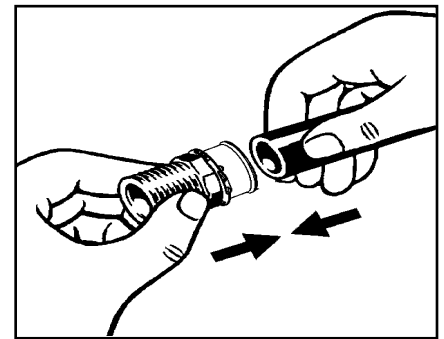
## 6.2.5 Making a PureFlow PEX Press Power Tool Connection (Attached Sleeves)



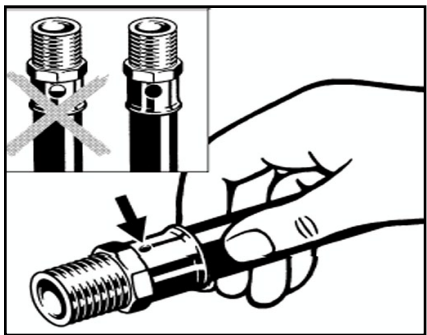
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



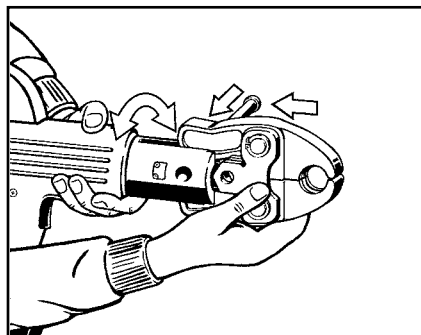
2. If using FostaPEX tubing, insert into prep tool, push and turn until no resistance is felt. If using ViegaPEX, continue to step 3.



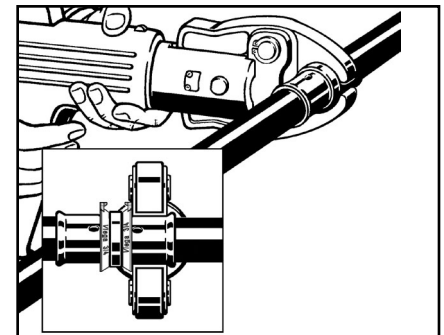
3. Insert PEX Press fitting with attached sleeve into tubing and engage fully.



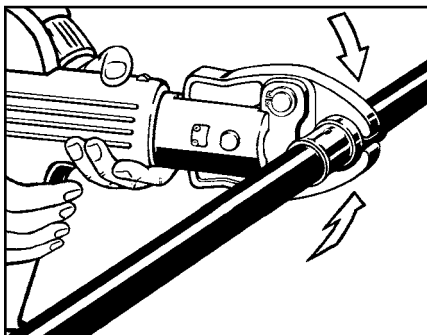
4. Ensure full tubing insertion at view holes in attached press sleeve. Full insertion means tubing must be completely visible in at least two view holes and partially visible in the one.



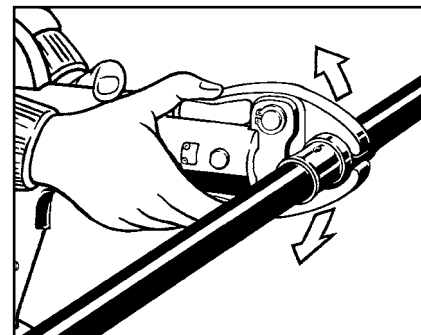
5. Insert the appropriate PureFlow Press Jaw into the press tool and push in the holding pin until it locks.



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 ensure a consistent leakproof 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.  
Warning: The tool locator ring must be present to ensure a proper PEX Press connection.

## 7. PUREFLOW PEX CRIMP FITTINGS

### 7.1 Brass PEX Crimp

PureFlow Brass PEX Crimp fittings are machined from a zero lead ECO Brass®. The following design criteria make PureFlow PEX Crimp fittings perfect for use in potable water applications.

- Cost Effective
- Excellent Strength Properties
- Excellent corrosion resistance
- Fast Installation

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

#### 7.1.1 Brass PEX Crimp Fittings, Manifolds and Crimp Rings

PureFlow Brass PEX Crimp fittings are produced for all connections necessary in a potable water system.

PEX to PEX fittings are available as straight couplings, elbows and tees (both single size and reducing). Adapters mate PureFlow tubing to NPT threads, copper tubing and copper fittings.

PEX Crimp copper manifolds are available from 4 to 10 outlets and may be installed in concealed locations. The MANABLOC and Minibloc manifold systems are also available with zero lead brass PEX Crimp connections.

PEX Crimp Fittings are widely accepted with over 50% of the industry offering this system.

#### 7.1.2 Brass PEX Crimp Fitting Markings

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

Manufacturer	VIEGA
ASTM standard	ASTM, F1807
Certifications	UPC®, or U.P. Code, NSF-pw, CSA B137.5, cNSF@us pw-G

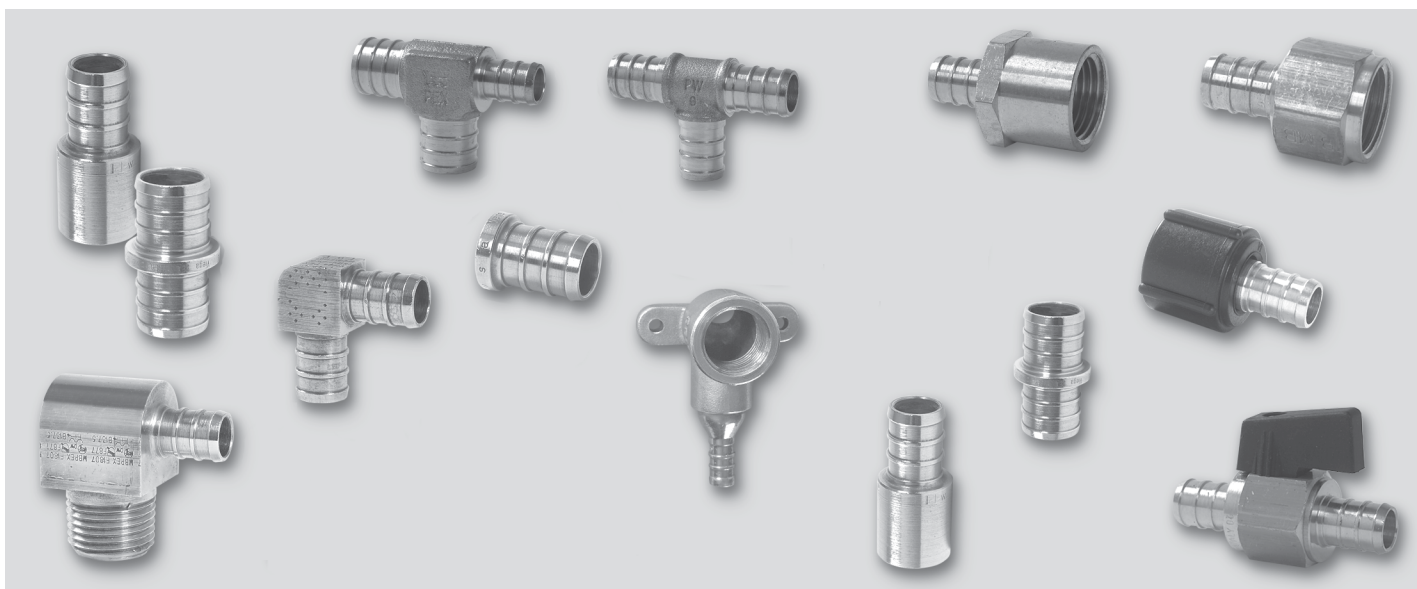
Note: All fittings may not be listed with every organization shown.



**Use only F1807 copper crimp rings and full circle crimp tools with PureFlow PEX Crimp fittings.**



**NOT for use with FostaPEX tubing**



## 7.2 PolyAlloy™ PEX Crimp

PureFlow PolyAlloy PEX Crimp fittings are molded from Acudel®. The following design criteria make PureFlow PolyAlloy PEX Crimp fittings perfect for use in potable water applications.

- Cost Effective
- Superior Wear Properties
- Fast Installation
- High Corrosion Resistance

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



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

### 7.2.1 PolyAlloy PEX Crimp Fittings and Crimp Rings

PureFlow PolyAlloy PEX Crimp fittings are produced for many connections necessary in a potable water system.

PEX to PEX fittings are available as straight couplings, elbows and tees (both single size and reducing). Adapters mate PureFlow tubing to fixture connections. The MANABLOC homerun manifold system is available with PolyAlloy PEX Crimp connections.

PolyAlloy PEX Crimp manifolds are available from 2 to 8 outlets and may be installed in concealed locations. The MANABLOC and Minibloc manifold systems are also available with PolyAlloy PEX Crimp connections.

The material choice and fitting design used in the PureFlow PolyAlloy PEX Crimp system ensure the integrity of each connection.

### 7.2.2 PolyAlloy PEX Crimp Fitting Markings

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

Manufacturer	VIEGA
ASTM standard	ASTM, F2159
Certifications	NSF U.P. Code, cNSF@us-pw, CSA B137.5



**Use only F1807 copper crimp rings and full circle crimp tools with PureFlow PEX Crimp fittings.**



**NOT for use with FostaPEX tubing**



## 7.3 PEX Crimp Connections

The PureFlow PEX Crimp connection provides a simple and safe connection between ViegaPEX and PureFlow PEX Crimp system components.

The full circle crimp tool and simple connection process ensure a consistent, worry-free crimp connection every time.

### 7.3.1 The PureFlow PEX Crimp Hand Tool

The PureFlow PEX Crimp connection must always be carried out with the aid of a PureFlow PEX Crimp tool. There are multiple configurations of PureFlow PEX Crimp tools perfect for tight spaces and awkward locations.

The PureFlow PEX Crimp hand tool is available for 3/8", 1/2", 3/4" and 1" PureFlow PEX Crimp connections. Some tools are available with color-coded handles for easy identification on the job site. See the Viega product catalog for details.



*Crimp tools*

A 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.

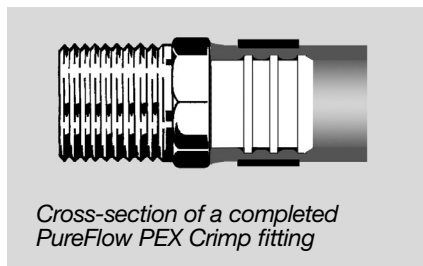
At least one connection should be checked at the beginning and end of each day to ensure proper crimps have been made. Most crimp tools can be recalibrated. Please refer to tool instructions.



*A Go/No Go Gauge is provided to check the crimp tool calibration*

### 7.3.2 The PureFlow PEX Crimp Fitting

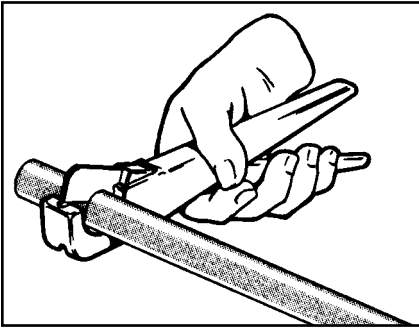
The PureFlow PEX Crimp tool compresses the crimp ring around the tubing and fitting in a full circle, permanently securing them together — no O-rings required. This connection meets the requirements of the ASTM F1807 or F2159 standard. The compression of the tool also allows crimp connections to be made in temperatures as low as -30°F.



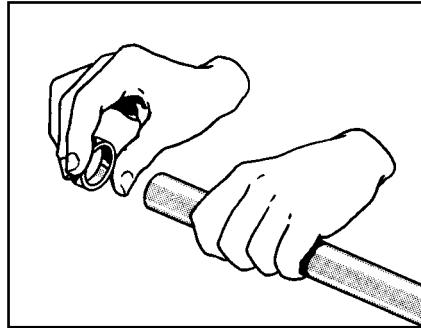
*Cross-section of a completed PureFlow PEX Crimp fitting*



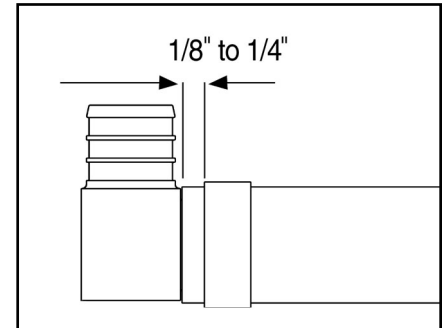
### 7.3.3 Making a PureFlow PEX Crimp Connection



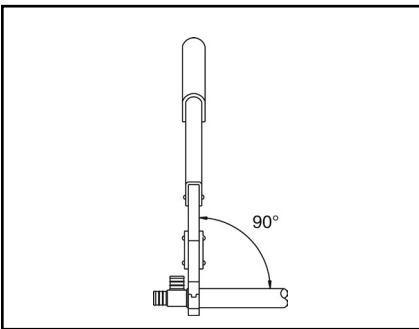
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



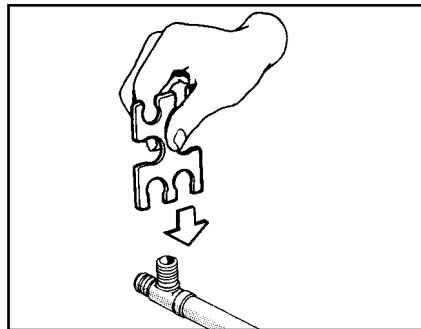
2. Slide the correct size crimp ring over end of the tubing.



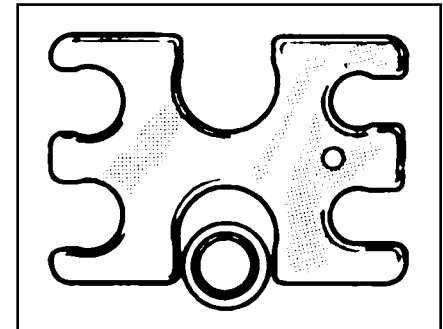
3. Insert the fitting into the pipe to the shoulder or tube stop. Position the ring 1/8" to 1/4" from the end of the tubing.



4. Center the crimping tool jaws exactly over the ring. Keep the tool at 90° and close the handles completely. **DO NOT CRIMP TWICE.**



5. When checking crimps with a 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.



6. A crimp connection is considered good if the GO gauge fits the ring and the NO GO does not. A crimp connection is considered bad if the GO gauge does not fit the ring or the NO GO gauge does fit. Bad crimps must be cut out of the tubing and replaced.

## 8. THE MANABLOC

### 8.1 The MANABLOC

The MANABLOC control unit is molded from PLS (Polysulfone) plastic and tested to the requirements of ASTM F877 and certified by NSF International. The following design criteria make the MANABLOC distribution system perfect for potable water applications:

- Fast Installation
- Fewer Fittings
- Excellent Resistance to Chlorine
- Fast Hot Water Delivery

The MANABLOC supply inlet connections use a special 1" MANABLOC swivel adapter that is not included in the MANABLOC package and must be purchased separately. Transition fittings also available in zero lead materials and include bronze insert (PEX Press), brass insert (PEX Crimp), PolyAlloy insert (PEX Crimp), Male NPT male thread and compression. These transition adapters are available in sizes ranging from 3/4" to 1-1/4" depending on the connection type (see product catalog for a list of sizes). The MANABLOC incorporates color-coded valves for hot and cold water supplies.

### 8.1.1 MANABLOC PEX Connections

Connections for the individual PEX distribution lines are a mechanical-type fitting and will not work with standard pipe fittings. Use only fittings supplied with the MANABLOC or other fittings designed for special port transitions available from Viega, listed in the Product catalog. Refer to Section 16, Installing MANABLOC Distribution Lines, for detailed information. Warranty coverage applies **ONLY** when the MANABLOC is installed with ViegaPEX tubing and in accordance with the Installation Instructions, local code and good plumbing practices.

MANABLOC port connections are available in zero lead Bronze Press, zero lead Brass Crimp, Poly Crimp and Compression available in all 3/8", 1/2" or a combination of both for all connection types.

### 8.1.2 MANABLOC Markings

Each PureFlow MANABLOC is marked where space permits with the following information:

Manufacturer	VIEGA
ASTM standard	ASTM, F877
Certifications	UPC® cNSF@us-pw, CSA B137.5



**Use only Viega approved fittings to connect ViegaPEX tubing to the MANABLOC**



## 9. SYSTEM SIZING AND CALCULATIONS

### 9.1 System Sizing and Calculations

PureFlow 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 at right. 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 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.

**PureFlow PEX Press Fittings**  
**Friction Loss - Equivalent Feet of SDR9 PEX Tubing**

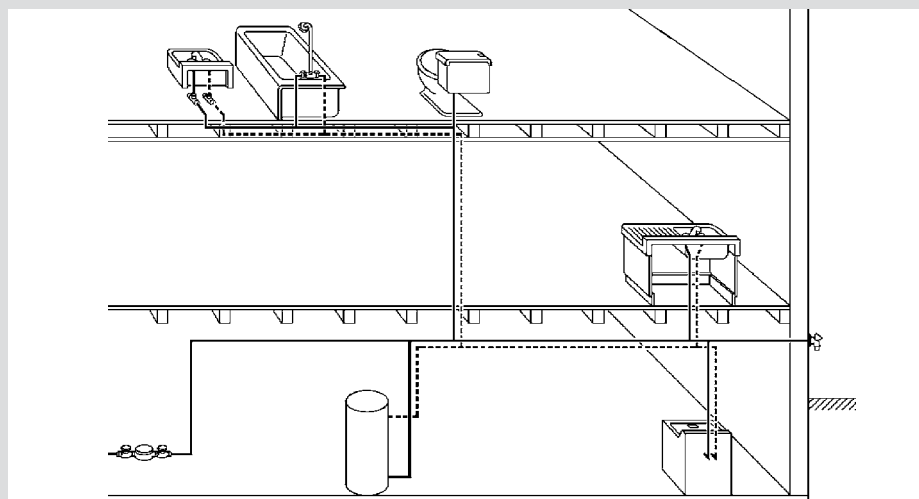
Size	Coupling	Elbow	Tee Run	Tee Branch
3/8"	2.9	9.2	2.9	9.4
1/2"	2	9.4	2.2	10.4
3/4"	1	8	1	9
1"	1	10	2	10
1-1/4"	2	11	2	11
1-1/2"	2	13	2	12
2"	1	19	2	18

**PureFlow PEX Crimp Fittings**  
**Friction Loss - Equivalent Feet of SDR9 PEX Tubing**

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


**PureFlow PolyAlloy PEX Crimp Fittings**  
**Friction Loss - Equivalent Feet of SDR9 PEX Tubing**

Size	Coupling	Elbow	Tee Run	Tee Branch
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



*Branching installation*

Pressure Drop (psi per foot of PEX tubing)							
gpm	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
1	0.070	0.016					
1.5	0.149	0.034					
2.2	0.303	0.069					
2.5	0.385	0.087					
3	0.539	0.122	0.023				
3.5	0.717	0.162	0.030				
4		0.208	0.039				
5		0.314	0.059				
6		0.440	0.082	0.024			
7		0.586	0.109	0.032			
8			0.140	0.041			
9			0.174	0.051			
10			0.211	0.062	0.024		
11			0.252	0.074	0.028		
12			0.296	0.087	0.033		
13			0.343	0.101	0.038		
14				0.116	0.044		
16				0.148	0.056	0.025	
18				0.184	0.070	0.031	
20				0.224	0.085	0.038	
22				0.267	0.102	0.045	
24					0.119	0.053	
26					0.138	0.062	
28					0.159	0.071	
30					0.180	0.080	
32					0.203	0.091	.024
34						0.101	.027
36						0.113	.030
38						0.125	.033
40						0.137	.037
45							.046
50							.056
55							.066
60							.078
65							.090
70							.104
75							.118

 = 8 fps per size tubing

NOTE: Maximum flow for each size based on 12 FPS velocity. PSI x 2.307 = head loss.

## 10. INSTALLING THE PUREFLOW PEX TUBING SYSTEM

### 10.1 Handling PureFlow Tubing

The properties of PureFlow tubing make it very 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 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 tubing to sunlight or any UV source for extended periods of time (less than 60 days for standard ViegaPEX or less than 6 months for ViegaPEX Ultra).
- FostaPEX, with its aluminum layer, is resistant to UV light, but long-term exposure should still be avoided.
- Do not store ViegaPEX or FostaPEX tubing outdoors where it may be exposed to UV light.



Uncoiler, Stock Code 53509

### 10.2 Uncoiling PureFlow Tubing

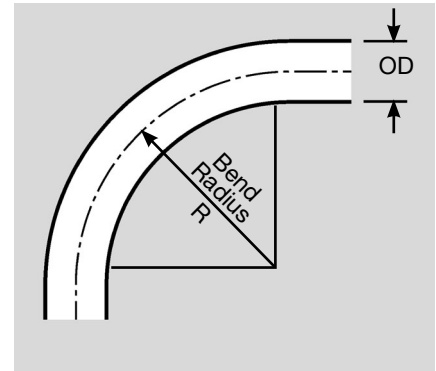
An uncoiler should be used to prevent twisting when removing tubing from 3/8" to 1" coils. Roll coils out and use care to avoid twisting 1-1/4", 1-1/2" and 2" coils or when a uncoiler is unavailable.

### 10.3 Bending PureFlow Tubing

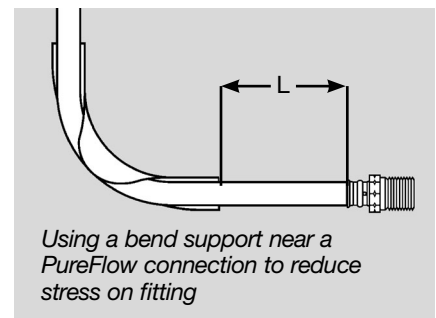
ViegaPEX tubing can be free bent (unsupported bend) to a minimum radius of 8 times the tubing O.D. and 5 times the tubing O.D. with the use of a Viega approved bend support. FostaPEX tubing can be free bent to a minimum radius of 8 times the tubing O.D. and 3.5 times the tubing O.D. with the use of a 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.

To reduce damaging stress on PureFlow 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 to the right for typical installation examples. Since FostaPEX will maintain its shape once bent, these requirements do not apply.

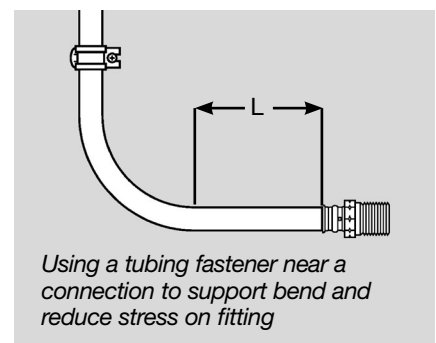
Tubing size	Distance from fitting to bend
3/8" PEX	L = 6 inches
1/2" PEX	L = 8 inches
3/4" PEX	L = 10 inches
1" PEX	L = 12 inches
1-1/4" PEX	L = 14 inches
1-1/2" PEX	L = 16 inches
2" PEX	L = 18 inches



Minimum bending radius for PureFlow tubing



Using a bend support near a PureFlow connection to reduce stress on fitting



Using a tubing fastener near a connection to support bend and reduce stress on fitting

A FostaPEX Tubing bender is available to assist with making accurate, tight bends in all sizes of FostaPEX tubing.



Tubing Bender, stock code 56015



## 10.4 Installation Temperature Range

The flexibility of PureFlow tubing and the strength of the PureFlow PEX connections combine to provide a system that can be installed during any weather. The positive compression provided by the PureFlow PEX Press hand tools allow installation in temperatures down to -4°F (23°F for power tools), and -30°F for PEX Crimp hand tools.

## 10.5 Removing PureFlow PEX Connections

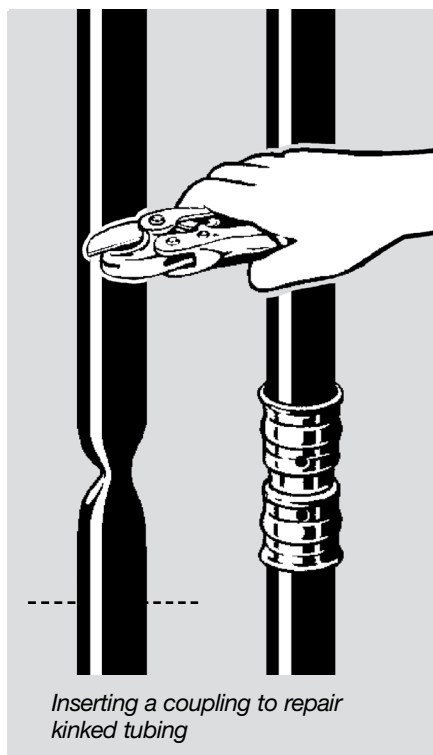
Should a mistake be made, simply cut out the PEX fitting and replace with a new one. Do not reuse PureFlow PEX fittings.



**Do not reuse PureFlow PEX fittings that incorporate an attached press sleeve or copper crimp rings.**

## 10.6 Repairs

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



## 10.7 Tubing Expansion

When installing PureFlow tubing, expansion and contraction of the material must be considered. ViegaPEX tubing should not be pulled tight when installed, as cold water will cause tubing to shrink slightly as the system is filled. A slight amount of slack should be left in each run to allow for this contraction without stressing the fittings.

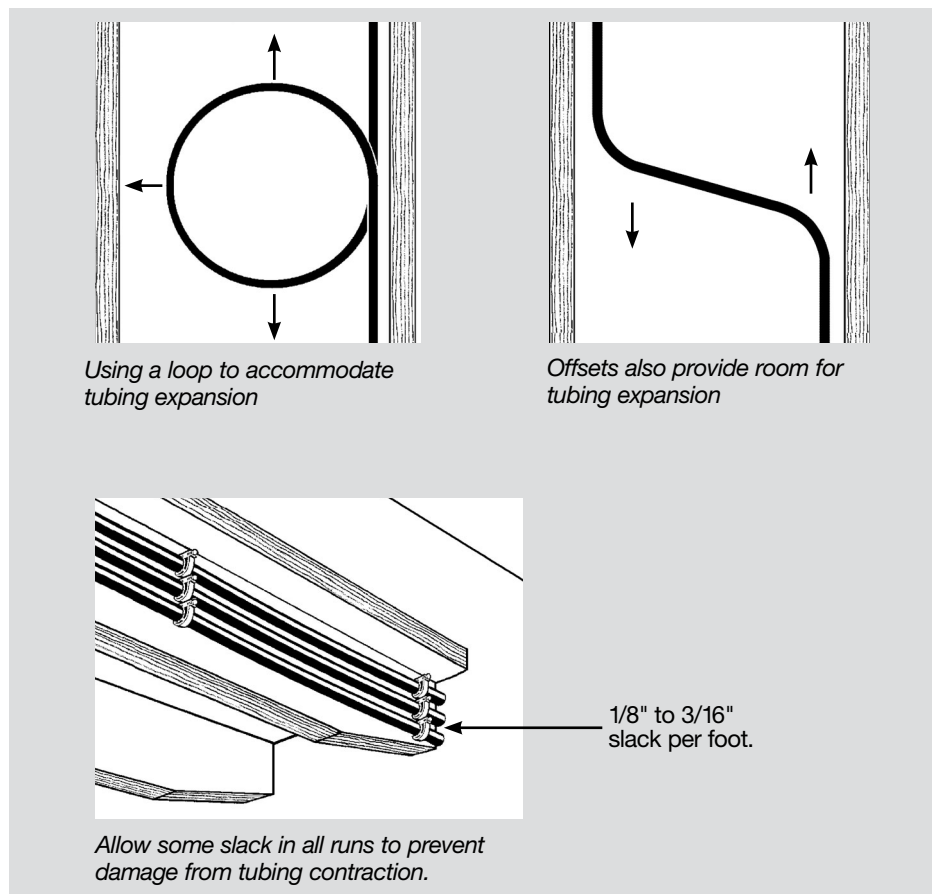
Expansion of the tubing in hot water lines should be accommodated by using expansion loops or offsets. Fasteners should not grip tubing tightly so that it can move slightly as expansion takes place. Expansion loops or offsets will give tubing a place to grow without stressing fittings. Using suspension clip fasteners at all penetrations will allow tubing to move without creating noise.

ViegaPEX expands or contracts 1.1 inches in length per 100 feet of tubing for every 10°F change in temperature. Tubing expansion is less critical with FostaPEX, though still present. The aluminum layer in this tubing limits expansion to 0.16 inches per 100 feet of tubing for every 10°F rise in temperature, similar to copper. This makes FostaPEX ideal for use where expansion is a concern.

## 10.8 Freezing

The flexibility of PureFlow 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.



PEX tubing systems should not be intentionally subjected to freezing.

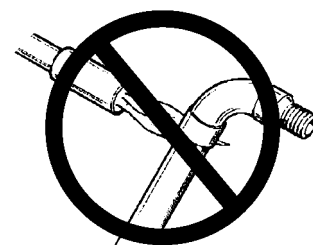
Do not use open torch or excessive heat to thaw PEX tubing. Tubing failure or damage can result.

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.**

They include:

- Hot water
- Wet hot towels
- Handheld 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.

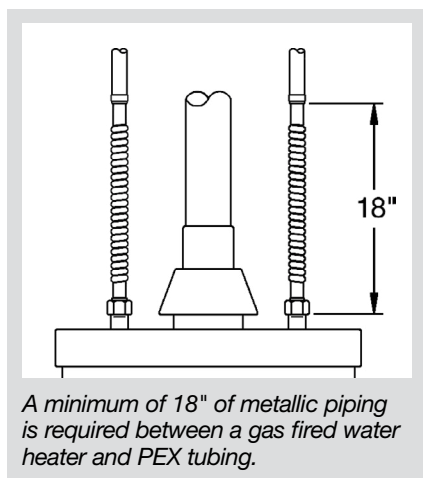


## 10.9 Water Heaters

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

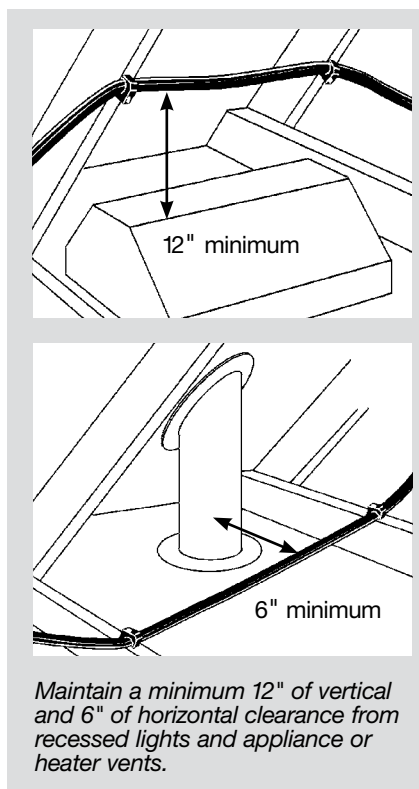
When connecting a PureFlow system to a gas-fired water heater, install a minimum of 18" of metallic piping between the water heater and tubing, keeping tubing more than 6" away from the vent pipe. Where local code allows, PureFlow tubing may be connected directly to electric water heaters and used for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

ViegaPEX 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.



## 10.10 Heaters, Flues, Vents and Recessed Lights

Keep PureFlow PEX 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.

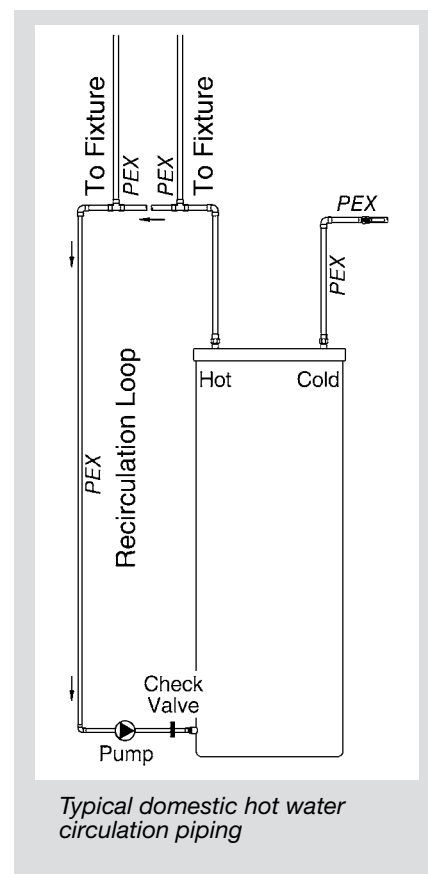
Forced air heating ducts and PVC power vent flues are not generally considered sources of high heat. These areas of installation should be rechecked after further construction and other mechanical systems have been installed.

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.

## 10.11 Continuously Recirculating Hot Water Plumbing Loops

ViegaPEX can be used in continuously 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 PEX5006 (CL5)



## 10.12 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 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 very 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 close 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.

## 10.13 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.

## 10.14 Electrical Grounding

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

## 10.15 Pressure Testing

All PureFlow systems must be pressure tested in accordance with local code after installation, or to at least the system working pressure. Connections may be pressure tested immediately after completion. Refer to section 17.1: Pressure Testing PureFlow Systems for specific testing requirements.

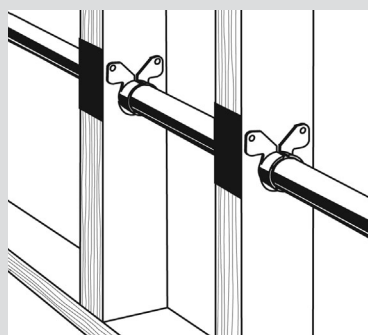
## 11. FASTENING THE PUREFLOW SYSTEM

### 11.1 Wood Frame Construction

ViegaPEX 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 eliminates the potential fire hazard of soldering close to exposed framing members.

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

- Use nailing plates to protect the tubing from nails and screws where it passes through studs
- Suspension clips are optional but can reduce the potential for noise
- 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*

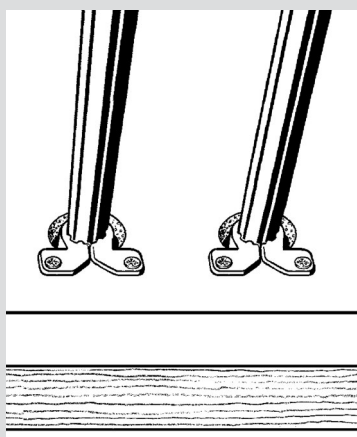
### 11.2 Supporting PureFlow Tubing

Use only plastic tubing supports. Metal supports may damage tubing.

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

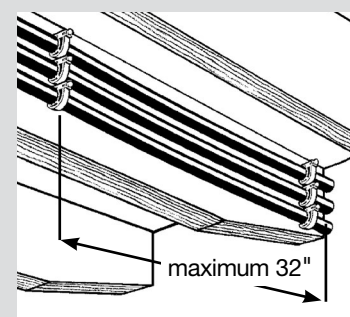
Note that ViegaPEX tubing will expand or contract 1.1 inches per 100 feet for every 10°F of temperature change. In long straight runs allow adequate clearance for this (see section 10.7). The aluminum layer in FostaPEX reduces expansion and contraction, so that it expands only 0.16 inches per 100 feet 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 below).

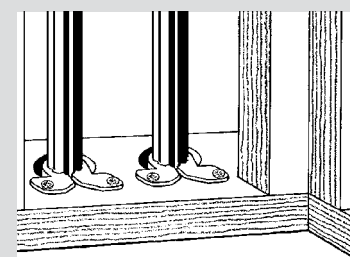


*Suspension clips support tubing in joist penetrations or anywhere abrasion is a concern.*

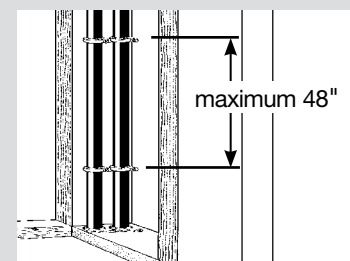
ViegaPEX tubing must be fastened at 32" intervals in horizontal runs (see below), and 32-48" for FostaPEX. In risers or vertical runs, ViegaPEX and FostaPEX tubing should be attached with suspension clips or an approved plastic insulator at each floor or ceiling penetration, and every 4 feet in between (see below).



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



*Suspension clip fasteners used at floor plate*

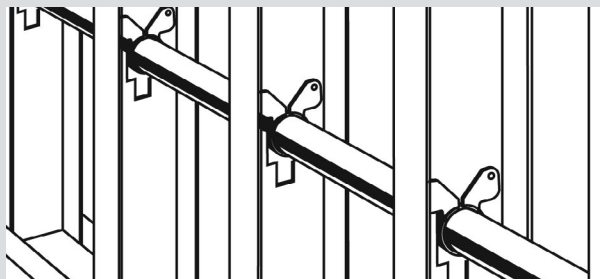


*J-clamp or lock clip fasteners used to support tubing in vertical runs between floors*



### 11.3 Steel Construction

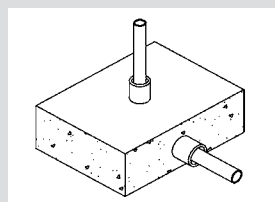
The PureFlow system works as well in steel frame construction as it does in wood. Where tubing runs through metal studs, suspension clip fasteners must be used to protect tubing from sharp stud edges (see illustration to the right). Follow the same guidelines for fastening and supporting the tubing as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



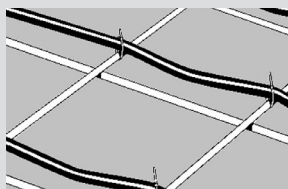
*Suspension clip fasteners used to protect tubing from abrasion when passing through steel studs*

### 11.4 Concrete

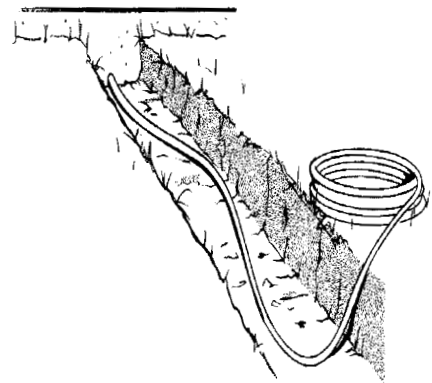
ViegaPEX and FostaPEX tubing may be run within concrete slabs. All penetration points must be sleeved to prevent tubing damage (entry/exit points, expansion joints, etc.). Penetrations in walls, etc. may be sealed with silicone caulk. Do not use oil-based caulk. Every effort should be made to use only 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. When running tubing within a concrete slab, the tubing must be fastened to the reinforcing mesh or rebar every 2 to 3 feet to prevent it from floating up while concrete is curing.



*Elbow sleeves protect tubing at concrete slab penetrations*



*Tubing must be fastened to the reinforcing mesh on rebar*



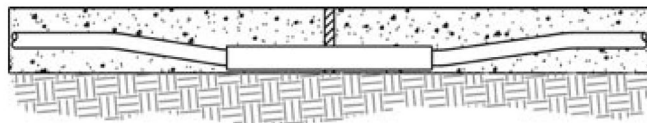
*Allow sufficient slack when tubing is laid in trench*

See section 11.8 for additional information regarding use of PEX tubing in direct burial applications.

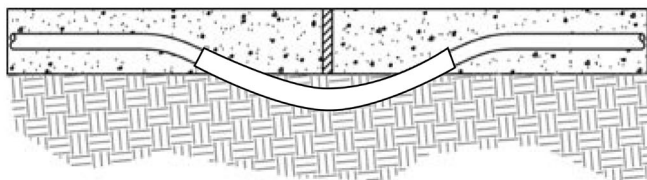
### 11.5 Installing Under the Slab

When installing ViegaPEX 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.

*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.*



**SLEEVE PEX TUBING AT ALL EXPANSION JOINTS**



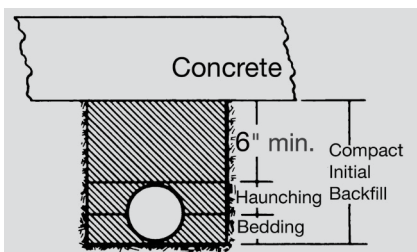
**FOR CUT EXPANSION JOINTS, DIP THE TUBING BELOW THE SLAB TO A SAFE DISTANCE AT THE CUT LINES**

## 11.6 Below Grade and Service Lines

ViegaPEX 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.

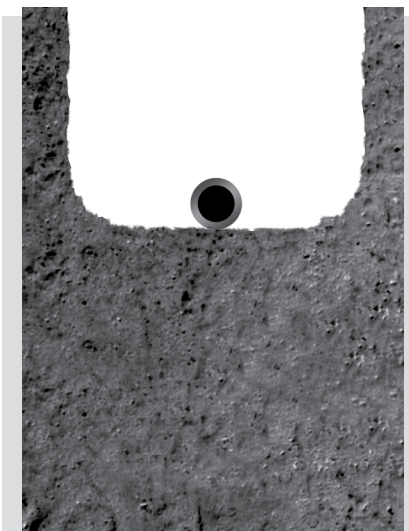
Do not use blocking to support tubing. PEX tubing can be damaged by contact with sharp objects. Ensure that trench bottom and fill do not contain sharp rocks or other items. In good soil conditions tubing may be placed directly on trench bottom. In poor soil conditions (rocky, loose, etc.) the trench should be excavated at least 6 inches below the tubing level and backfilled with appropriate material to provide a stable base (coarse sand, pea gravel or similar).

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. ViegaPEX tubing changes length by 1.1 inches per 100 feet for every 10°F temperature change. FostaPEX tubing changes length by 0.16 inches per 100 feet for every 10°F temperature change.

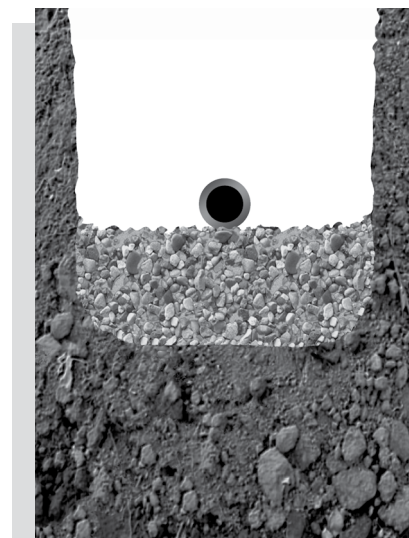


Backfill material must be free of large rocks, glass or other sharp objects. Provide sufficient coverage over tubing so that expected traffic loads will not deform tubing (consult local codes). Compact this material to at least 6" above the tube.

Do not install PureFlow tubing where soil is or may become contaminated with solvents, fuels or similar



*Trench in good soil*



*Trench in poor soil*

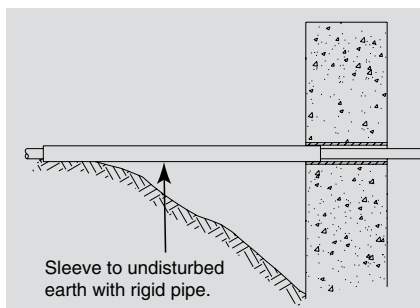
chemicals. Also do not install tubing above or below septic tanks, leach fields, pits or cesspools.

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

## 11.7 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 caulks or sealants in contact with PureFlow tubing.

## 11.8 Direct Burial of PureFlow Fittings

When direct burying PureFlow fittings, PEX Press fittings do not need to be wrapped; however, Brass PEX Crimp fittings do. When Brass PEX Crimp fittings are put in contact with ground soil by direct burial, it is the position of Viega, that these brass fittings and copper crimp rings be securely wrapped using self-fusing, fully cured silicone rubberlike tape with a minimum 0.020" thickness.

Contact a Viega representative for additional information on approved wrapping materials.

## 11.9 Protecting PEX Tubing

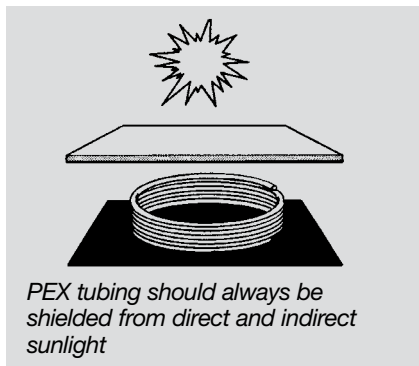


Protect tubing and fittings from UV exposure.

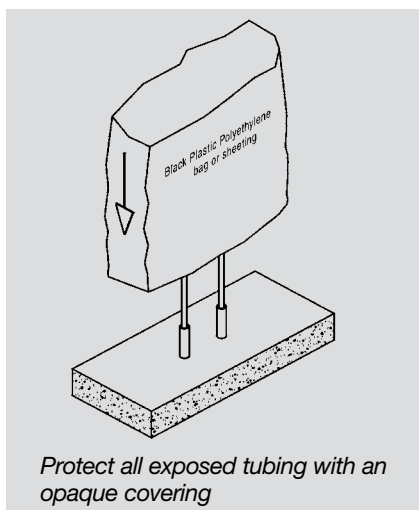
Due to the nature of slab-on-grade installation, tubing and fittings may be exposed to UV light for unspecified periods of time.

To prevent damage from UV exposure, all tubing and PolyAlloy 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, FostaPEX and PolyAlloy fittings not exceeding the total accumulated recommended exposure time are permissible.



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



*Protect all exposed tubing with an opaque covering*



Inform the other trades working on the same structure of the plumbing lines. Common damage to PEX during construction is from staples, nails, screws or other sharp fasteners.

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.



**Sleeve all penetrations of metal, metal studs and masonry or concrete.**

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 caulks.** 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 suggest using water based or urethane based open-cell insulation only. **DO NOT use closed-cell type 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.

If there is no information available on the compatibility of the proposed sealing material, wrap the tubing with several layers of aluminum foil in the area of contact and extending a few inches on both sides before applying the sealing material.

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 available that have been listed for use with PEX tubing. These compounds come in standard caulking tubes and are identified as water based, acrylic or latex. Consult the compound manufacturers' instructions for proper application.



**DO NOT APPLY  
CHEMICALS TO  
VIEGAPEX TUBING!**

## 12. INSTALLING MANIFOLDS AND FITTINGS

### 12.1 General

The use of manifolds can simplify installation of the plumbing system, as well as eliminate hidden fittings in walls and ceilings. Viega offers several different manifolds to meet a variety of applications, whether it is a homerun or a combination installation.

### 12.2 PureFlow PEX Press Brazed Copper Manifolds

PureFlow PEX Press Brazed Copper Manifolds are available for use where permanent connections must be used (concealed locations). These are offered in 3, 4, 5, 6, 8, 10 or 12 outlets. Manifolds are 1" copper with male or female solder inlets and 1/2" PEX Press outlets. The end of each manifold is closed, but can be cut off for through runs or joining to make larger manifolds. The manifolds can be fastened using any standard fasteners for 1" tubing such as Viega Lock Clips.

#### Copper Manifold Dimensions

Number of Outlets	Manifold Length (L)
3	8"
4	10"
5	12"
6	14"
8	18"
10	22"
12	26"

### 12.3 PEX Press ProPress Manifolds

PEX Press ProPress manifolds are modular in design to allow for easy assembly and flexibility on the job site. They may be used where permanent connections are necessary (concealed locations).

These manifolds have a 3/4" or 1" ProPress inlet with 1/2" or 3/4" PEX outlets. The open ends, one straight and one with a ProPress connection, enable the manifolds to be connected together on the job site to create as many outlets as needed. In addition, these manifolds are available with 1" ProPress inlet and 1/2" ProPress outlets that may be assembled with 1/2" ProPress Manifold Valves or the Press Copper Fitting Adapter, to create as many valved outlets as needed. The ProPress Tool is required for connections.

#### PEX Press ProPress Manifold Dimensions

Number of Outlets	Manifold Length (L)
1	3-3/8"
3	7-5/16"

#### ProPress Manifold Dimensions

Number of Outlets	Manifold Length (L)
1	3-11/16"
3	7-5/16"



### 12.4 PureFlow PEX Crimp Brazed Copper Manifolds

PureFlow PEX Crimp Brazed Copper Manifolds are available for use where permanent connections must be used (concealed locations.) These are offered in 4, 6, 8 or 10 outlets. Manifolds are 1" copper with 1" or 3/4" crimp inlets and 1/2" PEX crimp outlets

#### PEX Crimp Manifold Dimensions

Number of Outlets	Manifold Length (L)
4	10-11/16"
6	14-11/16"
8	18-11/16"
10	20-11/16"

### 12.5 PureFlow MANABLOC® Homerun Manifold Plumbing System

Viega offers the industry's leading homerun manifold solution: MANABLOC. MANABLOC has been in use for more than 20 years with exceptional performance and added value to end users. It provides faster hot water delivery times, balanced water delivery and less pressure drop during multiple fixture use. MANABLOC is compatible with all PureFlow fitting systems. Please refer to section 14.

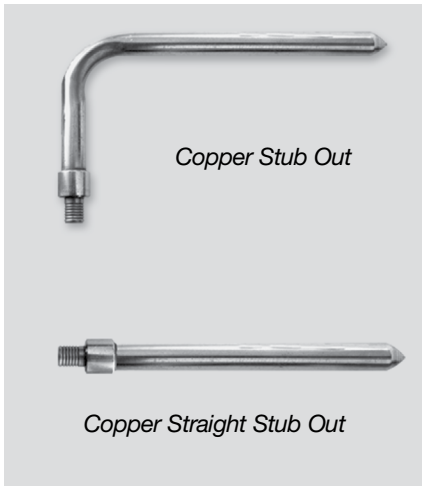


MANABLOC Homerun Manifold Plumbing System



## 12.6 Stub Out Options

The PureFlow 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-degree bends and a closed end to facilitate pressure testing are available in either 3/8" or 1/2" PEX x 1/2" Copper.

Also, PEX Press Copper tube elbows and PEX Crimp shower valve adapters are available for easy connections to tube and shower valves.



Drop ear elbows provide a 1/2" or 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 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-degree 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.



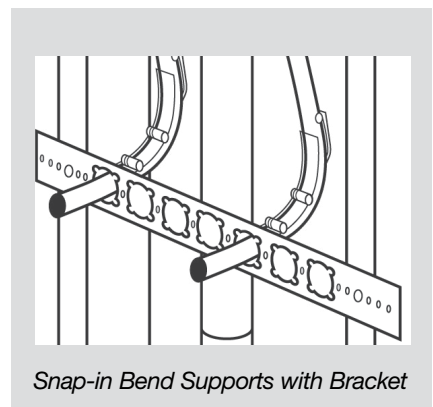
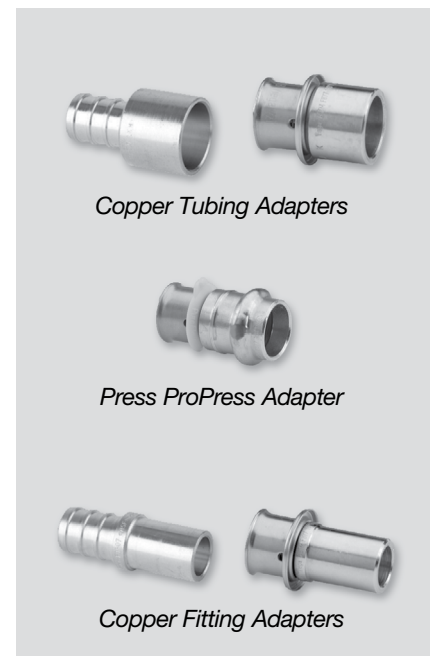
1/2" snap-in bend supports are also available with a metal mounting bracket (sold separately) for quick and easy stub outs with 1/2" ViegaPEX tubing.

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.

## 12.7 Copper Connections

Fittings are available to adapt PureFlow tubing to both copper tubing and copper fittings. Copper tubing adapters slip over copper tubing to provide a sweat or ProPress 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.



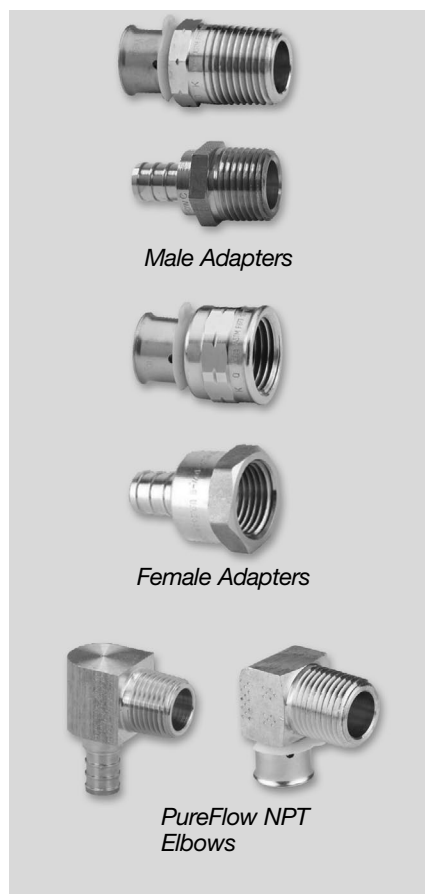


## 12.8 Threaded Connections

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

In addition to the NPT drop ear elbows already mentioned, 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.



## 12.9 Valves

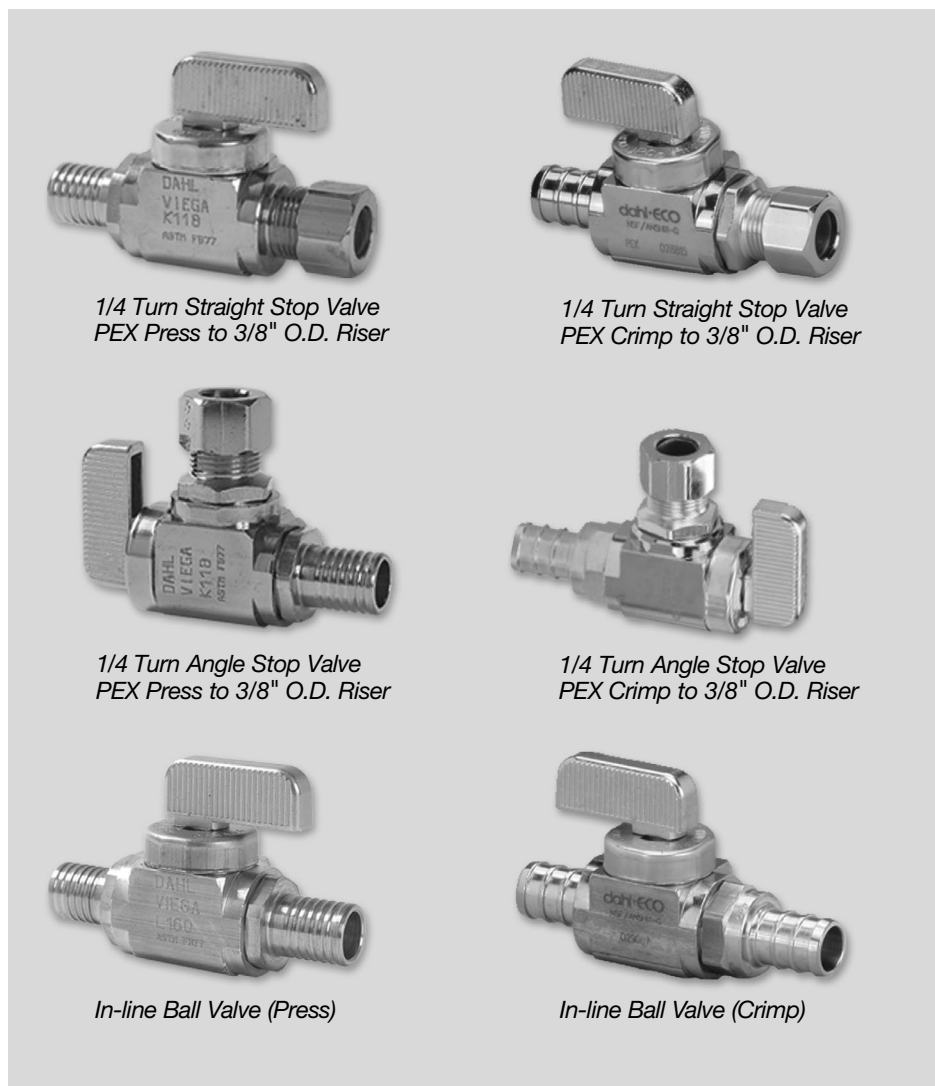
In-line ball valves are available for use with PureFlow tubing. These brass finish valves may be used anywhere an in-line valve is needed.

Stop valves have 3/8" or 1/2" PEX inlets and 1/4" CTS (3/8" O.D.) riser outlets.

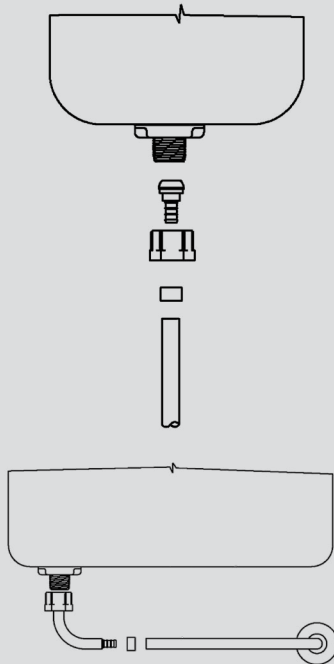
Both straight and angled versions are available depending on installation requirements.

Compression stop valves provide a compression fit over ViegaPEX tubing and a connection to a 3/8" O.D. riser. Use of included insert stiffener and plastic ferrule are required when connecting ViegaPEX tubing to the supply side of a compression stop valve.

After installation, retighten all compression fittings after 30 minutes to ensure a watertight seal. (Compression valves are not designed to work with FostaPEX.)



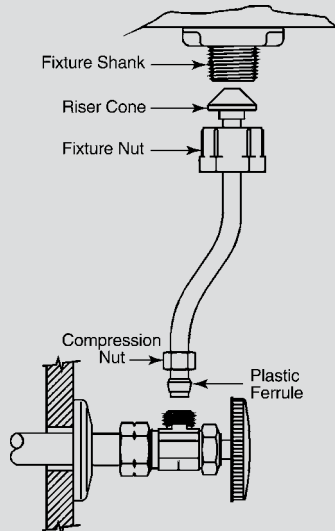
## WATER CLOSET CONNECTIONS



Tighten fixture nut hand tight plus an additional 1/4 turn. Check all connections for leaks.

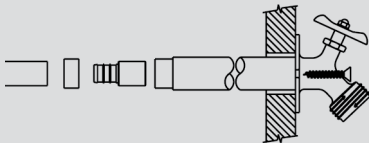
**DO NOT OVERTIGHTEN.**

## RISER CONNECTIONS



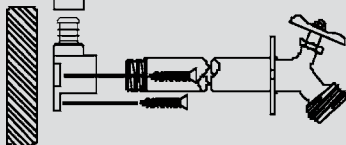
Thread fixture nut onto fixture shank. Tighten fixture nut hand tight plus an additional 1/2 turn. Slide compression nut and supplied plastic ferrule over tube as shown. The long taper of the ferrule goes toward valve. Tighten compression nut according to valve manufacturer's recommendations.

## HOSE BIBB CONNECTIONS

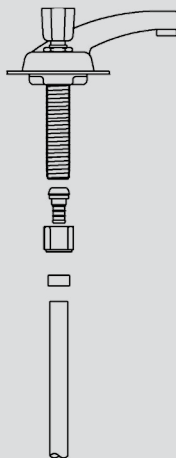


Hose bibbs supported by the structure can be connected directly.

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



## FAUCET CONNECTIONS LAV or KITCHEN



Tighten fixture nut hand tight plus an additional 1/4 turn. Check all connections for leaks.

**DO NOT OVERTIGHTEN.**

## 13. PUREFLOW MANABLOC SYSTEM DESIGN AND SIZING

### 13.1 General

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 MANABLOC and each fixture shall be 60 feet or less to ensure 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.

### 13.2 Supply and Distribution Line Sizing

The service line needs to be sized appropriately for the additional water demand. A typical residential plumbing system cannot be plumbed with all 3/8" distribution lines. It is the decision of the user to choose a combination of both 3/8" and 1/2" lines or to upsize the entire system to 1/2".

However, supplying fixtures with 1/2" lines when it is unnecessary for the fixture demand, will increase the wait time for hot water delivery to those fixtures. 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.

Typical supply line size:

3/4" up to 2-1/2 baths  
1" up to 4-1/2 baths

Typical distribution line size:

**3/8" up to 2-1/2 GPM**

ixture flow requirement (lavs, toilets, bidets, bar sinks, kitchen sinks, dishwashers, some showers (no tub fill)\* and some washing machines)\*\*

**1/2" up to 4 GPM** fixture

flow requirement (hose bibbs, tubs, showers, washing machines, whirlpool baths, soaking tubs, etc.)

\* Due to the many types of shower valves, it is recommended that you consult the valve manufacturer's literature to determine the actual flow rate and required residual pressure demands of the fixture. Use the MANABLOC Tube Size Guide to determine distribution line size and length limitations.

\*\*Some washing machines use a timer instead of a water-level sensor to determine when the machine has been filled with the proper amount of water. There are cases in which low supply pressure or excessive distribution line length may cause some machines to fill to a level less than designed. Consult the washing machine manufacturer's literature to determine the actual fill rate and residual pressure requirements for distribution line 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 PEX Press and PEX Crimp MANABLOC comes with 1/2" ports that are designed to fit both 3/8" and 1/2" PEX port adapters.

The adapters are available to purchase separately (bags of 6) and adapt to these different PEX tube sizes. Note: Each port converted to a larger or smaller size requires one adapter and one PEX Crimp ring or PEX Press sleeve (sold separately).

### 13.3 Plumbing Code Compliance (Parallel Systems)

The MANABLOC parallel water distribution system meets the ASTM F877, standard specification for cross-linked polyethylene (PEX) plastic hot and cold water distribution system utilizing ViegaPEX tubing meeting the requirements of the ASTM F876, standard specification for cross-linked polyethylene tubing.

The International Plumbing Code® (IPC) and the Uniform Plumbing Code™ (UPC) recognize and list these ASTM standards within their respective mandatory standards and/or approved material sections.

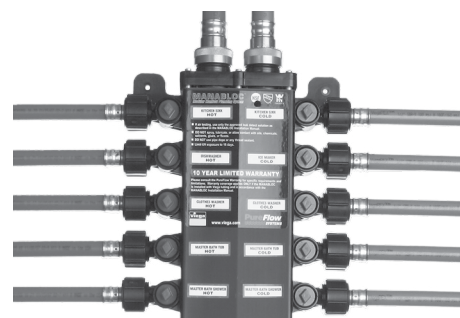
The MANABLOC is IAPMO listed to the UPC utilizing both 3/8" and 1/2" PEX tubing sizes for distribution.

Sizing of Parallel Water Distribution Systems (MANABLOC) are addressed in both the IPC and UPC plumbing codes.

In the IPC, section 604.5 Size of fixture supply states, "The minimum size of individual distribution line utilized in gridded or parallel water distribution systems shall be as shown in Table 604.5." This table includes 3/8", 1/2" and 3/4" size tubing. In the UPC, section 610.4 it states, "Listed parallel water distribution systems shall be installed in accordance with their listing, but at no time shall any portion of the system exceed the maximum velocities allowed by the code." The MANABLOC's IAPMO UPC listing says to install per the manufacturer's current installation instructions. Therefore, these instructions shall be used to size and install these types of systems.

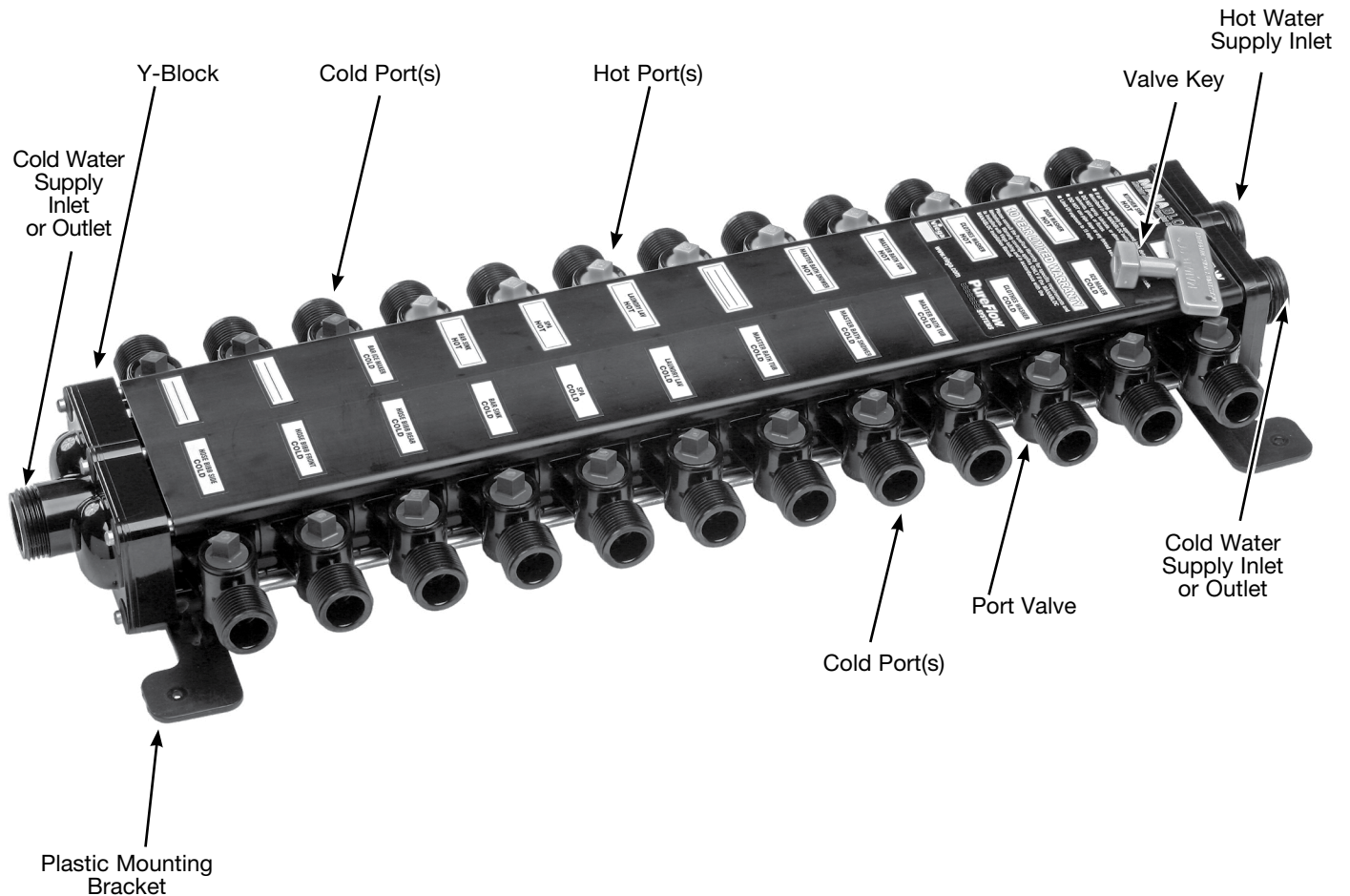
### 13.4 Valve Requirements for Parallel Systems

The IPC and UPC codes address valves in sections 604.10.3 Valves, and 605.5 respectively, which allow the use of manifold valves in parallel systems in lieu of valves at the fixture, as long as they are installed at the manifold and are identified with the fixture being supplied.



Viega IM-PF 0511  
520709

## 14. INSTALLING THE MANABLOC



### 14.1 General

Use the same precautions outlined in section 10 of this guide for proper handling of the PureFlow tubing when installing the MANABLOC.

Components utilized in the MANABLOC plumbing system consist of ViegaPEX, ViegaPEX Ultra, and FostaPEX cross-linked polyethylene tubing, fixture transition fittings, water service swivel connections, compression port connections and the MANABLOC control unit. The MANABLOC and ViegaPEX tubing are manufactured to national and international standards and are listed by recognized third-party agencies.

### 14.2 Overview and Carton Contents

Additional package contents include:

- Valve T-Handle
- Instruction Packet — to be left at installation site
- Port Labels

### 14.3 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.

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.

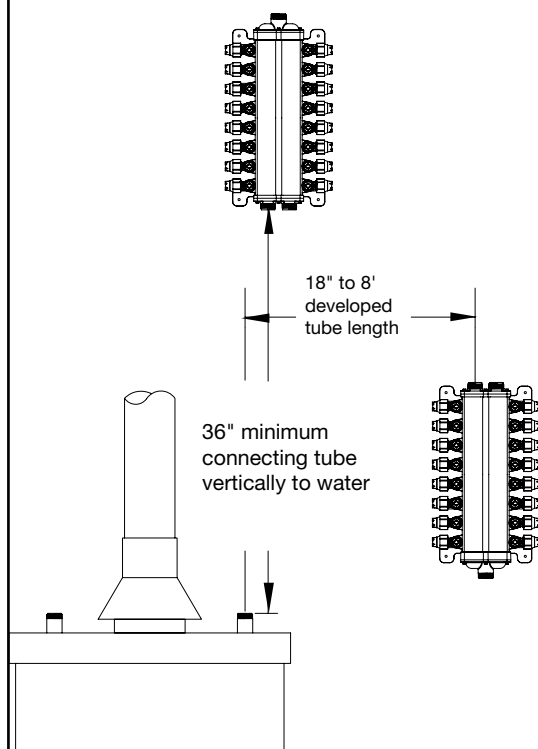
3. When installing the MANABLOC in a location other than between studs, provisions must be made to support the tubing runs as they exit the MANABLOC. (See section 15.3).
4. Any installed cover panel shall allow access to the MANABLOC and its mounting screws, the port valves, distribution line connections 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 8 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.

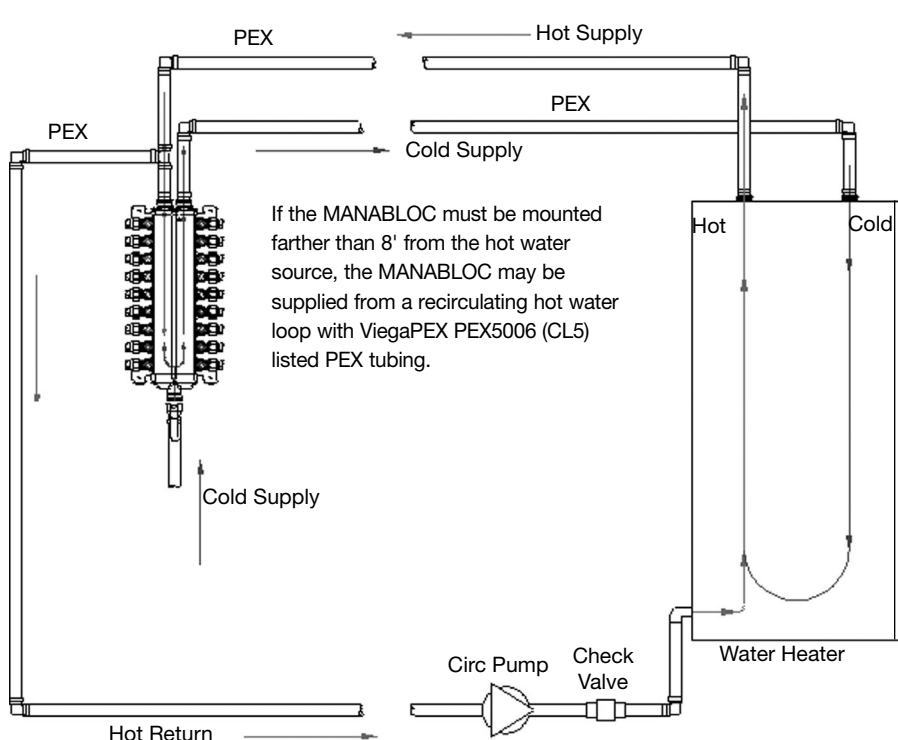
- c. Install the unit in an area that is centrally located to the most dense concentration of served fixtures. Some applications will require that the MANABLOC be mounted farther than eight (8) feet from the hot water source. See design factors for installing a parallel system on page 8 for suggestions 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. (See figure below.)
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 45716 Mounting Straps simplify mounting between studs on 16" centers.

### MANABLOC Location



### Continuously Recirculating Hot Water Plumbing Loops





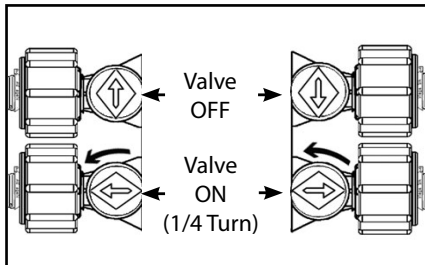
## 14.4 Valve Operation

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.

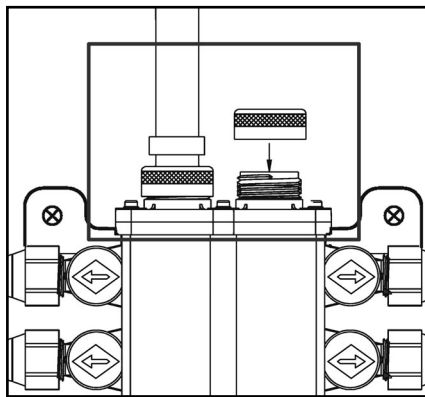
Use the included red key handle to turn each port ON or OFF. Valves are marked with arrows indicating their ON/OFF positions:

Left Port -- Arrow Up for OFF  
Arrow Left for ON

Right Port -- Arrow Down for OFF  
Arrow Right for ON

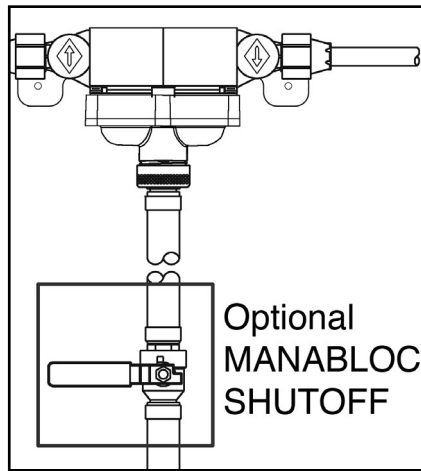


Note: these valves are field-repairable. Contact Viega Customer Service for more information on this procedure.



If a main inlet/outlet will not be used, it must be capped (use Stock Code 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, PRV (pressure reducing valve), back flow preventer, etc. To prevent debris and other particles from entering the system, a strainer may be installed in the service line.

## 14.5 Domestic Hot Water Circulation Systems

ViegaPEX and the MANABLOC can be used in continuously recirculating domestic hot water plumbing loops, provided:

- The plumbing loops operate with water temperatures of 140°F or lower, as required by most model plumbing codes
- The recirculating loop is for supplying hot water more quickly to the MANABLOC, not to circulate through the MANABLOC or the distribution lines

DO NOT include the MANABLOC within a continuously recirculating loop.

## 14.6 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. 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.

## 14.7 ViegaPEX General Design/Installation Practices

The following are general guidelines to consider when installing ViegaPEX tubing with a MANABLOC system. Please refer to section 10 of this installation guide for more detail on PEX tubing installations:

1. Insulating each PEX tube individually or as a group is not 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.
2. Install a minimum 18" of metallic or other piping between the water heater and PEX. For electric water heaters, it is permissible to connect directly to the inlets and outlets with a brass swivel elbow or straight brass swivel fitting.
3. Protect the PEX tubing with non-metallic sleeving material where it enters and/or exits a slab or at mass penetrations. PEX need not be sleeved its entire length within the slab. However, full-length sleeving is allowed.

Penetrations through concrete walls may be sleeved with a larger size metal or plastic tube. Protect the tubing from any sharp edges where it enters and exits larger sleeving material.



#### 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.

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.



**Sleeve all penetrations of metal, metal studs and masonry or concrete.**

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 caulks.** 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 suggest using water based or urethane based open-cell insulation only. **DO NOT use closed-cell type 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.

If there is no information available on the compatibility of the proposed sealing material, wrap the tubing with several layers of aluminum foil in the area of contact and extending a few inches on both sides before applying the sealing material.

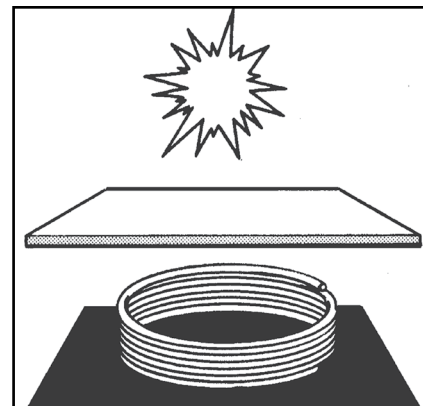
Most building codes require the use of a fire-stopping compound when tubing penetrates a fire-rated wall. There are a number of fire-stopping compounds available that have been listed for use with PEX tubing. These compounds come in standard caulking tubes and are identified as water based, acrylic or latex. Consult the compound manufacturers' instructions for proper application.



**DO NOT APPLY CHEMICALS TO THE MANABLOC**



**PureFlow MANABLOC must be protected from UV exposure and petroleum products which can damage them. In the event of incidental UV exposure during storage, installation and handling, combined exposure shall not exceed 15 days.**



PEX tubing should always be shielded from direct or indirect sunlight.

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, FostaPEX and PolyAlloy fittings, not exceeding the total accumulated recommended exposure time are permissible.

## 15. MOUNTING THE MANABLOC

### 15.1 Mounting the MANABLOC Between Studs

*NOTICE! Please leave this installation guide for the homeowner's reference. Local code may also require additional labeling directly adjacent to the MANABLOC or on the inside of any cover panel.*

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 section 14.3 for guidelines), the MANABLOC may be mounted to a suitable surface between a pair of adjacent studs. For 16" stud spacing, the 45716 Mounting Straps can simplify installation.

#### Tools Required

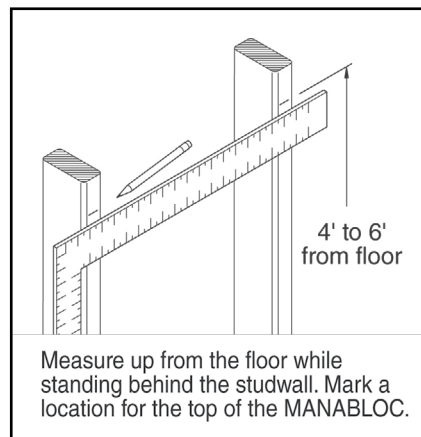
- Electric Drill
- Pencil or Pen
- Framing Square
- Tape Measure
- 3/4" and 1-1/4" Wood Drill Bits
- #2 Phillips Head Screwdriver
- Permanent Marking Pen\*
- Tubing Cutter - Stock Code 21304 or 21307
- PEX Press/Crimp Tool(s)\*
- MANABLOC Wrench\* - Stock Code 50631(Compression Blocs only)

#### Additional Materials

- Wood or Drywall Screws - 1/2" or longer
  - 1/2" or 3/4" Plywood - only required when not mounting between studs
  - Nylon Ties - Stock Code 43714
  - PEX Distribution Line Tubing
  - Supply Line Tubing
  - MANABLOC 1" Swivel Supply Fittings
  - Fixture Transition Fittings
  - Tubing Clamps and Hangers
  - MANAPANEL Access Panel\*
  - Tubing Uncoiler\*
  - Tube Turnouts (recommended)
- \* Optional or may not be required for some installations

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 45716 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.

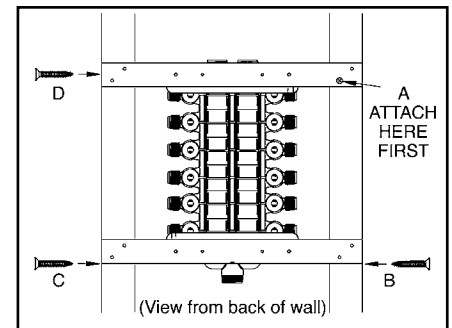
2. Standing behind the studwall, measure up from the floor and make a mark on the back of one of the studs to represent the top of the MANABLOC. (See illustration.)



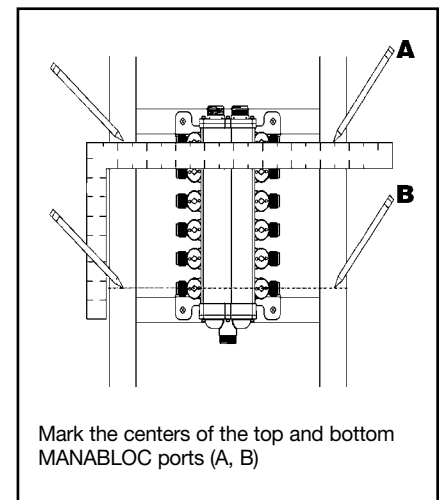
This mark should be between 4 feet and 6 feet from the floor but may be at any height, provided the height will allow all valves on the MANABLOC to be accessible. With a framing square or level, transfer and mark the noted height on the other stud.

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

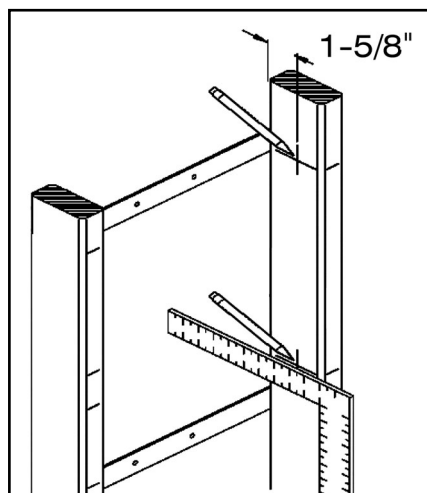
3. Standing behind the stud wall, hold the MANABLOC facing away from you and align the top of the UPPER 45716 Mounting Strap to the line on the stud that you made in Step 2. Loosely attach this Mounting Strap flush to the back outer edge of one stud using a 3/4" or longer drywall or other suitable wood screw (A). See illustration.



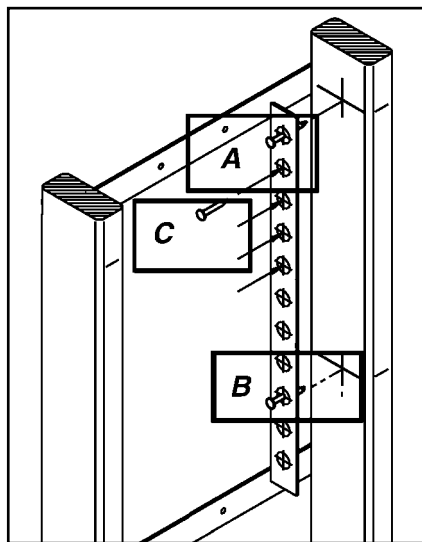
4. Line up the LOWER Mounting Strap with the back outer edge of the stud and attach it in the same manner (B). Attach the remaining strap ends (C & D) to the other stud, and tighten all screws.
5. Standing in front of the wall, using a framing square or straight edge, mark the center line position of the top and bottom ports onto both studs (see illustration).



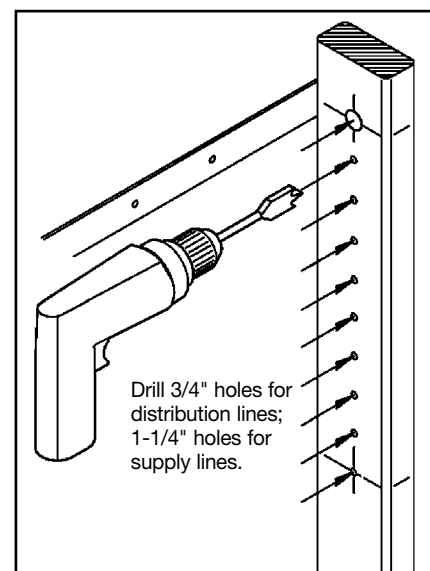
6. Detach the MANABLOC from its Mounting Straps (or 1 x 4s) and remove it from the installation area to prevent wood chips or other debris from falling into the unit.
7. Transfer the port location marks made in step 5 to the insides of the stud cavity using a square and pencil.
8. Measure 1-5/8" from 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 1-5/8" 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 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 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 1-1/4" bit will provide adequate clearance for 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.



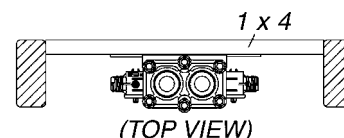
When the MANABLOC is installed prior to wall finishing operations, the unit **MUST** be protected from paint, texture compounds and drywall dust.

**NOTE:** The wall in which the MANABLOC is mounted must be accessible from both sides during installation to use the 45716 Mounting Straps.

## 15.2 Mounting the MANABLOC Between Studs Without Use of 45716 Straps

*If not using the 45716 Mounting Straps, this procedure applies:*

1. Cut two pieces of lumber (1 x 4 - or 3/4" plywood — about 3-1/2" wide) to a length that provides a snug fit **BETWEEN** two studs.



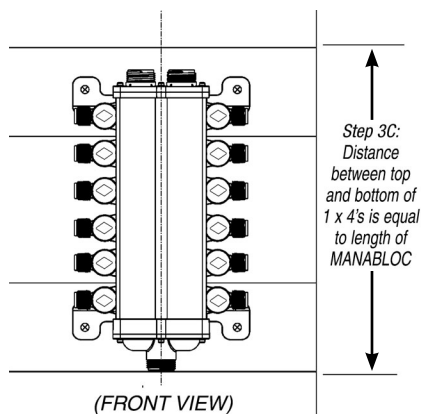
1 x 4s attach at the back, inside the studs, and the MANABLOC is centered between the studs.



2. The top of the MANABLOC should be between 4' and 6' 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:

- Measure the total length of the MANABLOC.
- Attach the first (UPPER) 1 x 4 inside and flush to the back of the studs (see TOP VIEW on previous page) at a height where the center of its width is centered on the marks from step 2.
- Attach the remaining (LOWER) 1 x 4 inside and flush to the back of the studs at a distance below the upper 1 x 4 that is equal to the length of the MANABLOC (step 3a) when measured from the top of the upper 1 x 4 to the bottom of the lower 1 x 4. See FRONT VIEW illustration.

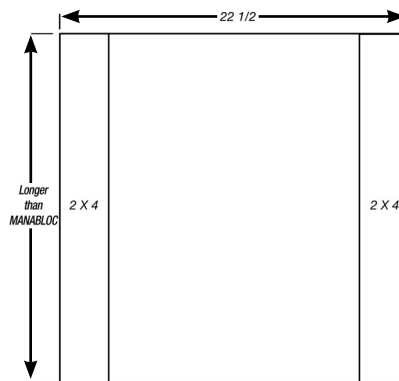


4. CENTER THE MANABLOC IN THE STUD CAVITY: Attach the MANABLOC to the 1 x 4s with four 1/2" - 3/4" drywall screws (DO NOT OVERTIGHTEN).

5. Continue to section 15.1 step 5 to finish installation.

## 15.3 Mounting the MANABLOC Without Studs, Surface Mount

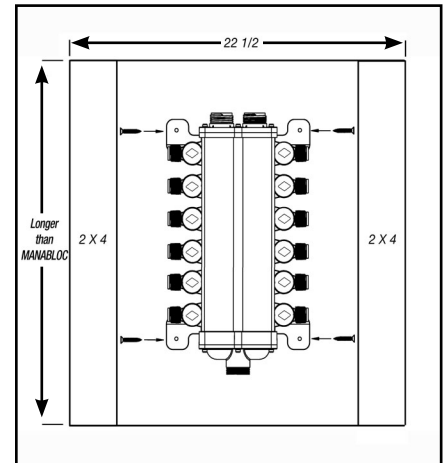
- A suitable base for the MANABLOC can be constructed from a section of 1/2" or thicker plywood that is a minimum 22-1/2" wide and slightly longer than the overall length of the MANABLOC.
- Securely attach a length of 2 x 4, or other suitable framing material with a thickness of 1-1/2" and about 3-1/2" wide on the left and right sides of the mounting base running the full-length of the MANABLOC (see illustration below). The 2 x 4s will be used to secure the distribution lines at the correct height as they exit the the MANABLOC. (Support clamps not to exceed 6" spacing from end of ports.)



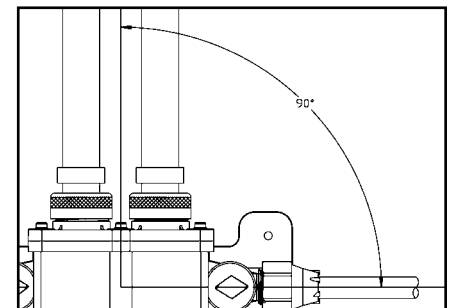
3. Attach the mounting base to the structure in a suitable location (see Section 14.3). The base should be mounted so the top of the MANABLOC is between 4 feet and 6 feet from the floor but may be at any height provided that the height maintains accessibility to all the ports on the MANABLOC.

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 1/2" or longer drywall or wood screws through the holes in the plastic brackets on the MANABLOC. (DO NOT OVERTIGHTEN)

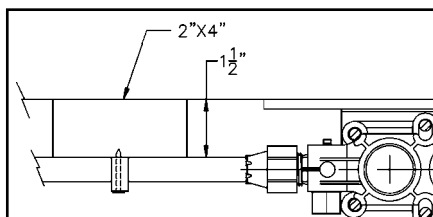


6. As the distribution lines are connected to the MANABLOC (see section 16.2), ensure that the tubing exits the unit at a 90-degree angle to the center line of the MANABLOC so as not to induce bending stress on the MANABLOC.





7. When attaching the distribution line tubing to the 2 x 4 supports, be sure to use appropriately sized Viega tubing clamps (For example, use stock code 52 000 for 3/8" tubing and stock code 52 020 for 1/2" tubing).



Use one clamp per tube to ensure that the tubing is held securely. Position clamps NO FARTHER than six (6) inches from the end of the port. DO NOT pull tubing tight. Leave at least 7" of slack per 50' of tubing run. This is to accommodate for any expansion and/or contraction of the tubing caused by ambient air or water temperature changes.

## 16. INSTALLING MANABLOC DISTRIBUTION LINES

### 16.1 Installing MANABLOC Distribution Lines

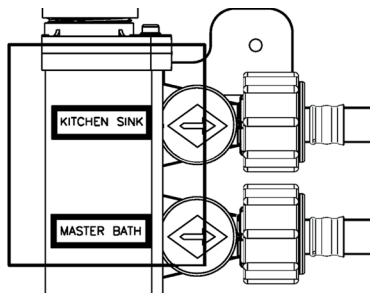
Run distribution lines continuously in the most direct route from the MANABLOC to the fixtures.

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 to supply 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 tubing helps prevent cross-connections.
2. Do not pull tubing tightly. Some slack (7" per 50') 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 distribution lines running to approximately the same location, it is easiest to run these distribution lines bundled together.

Hot and cold lines may be run in the same bundle. For a neat appearance, tie bundles with nylon ties (Stock Code 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.**

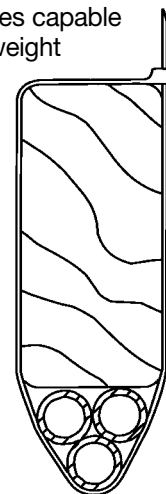
Duct tape will not permit tubing movement.

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

7. The 43714 or 43701 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 10 of this guide.

### 16.2 Connecting Distribution Lines to the MANABLOC

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 to cap them, to protect from the home owner opening the wrong valve. Use Stock Code 36203 (1/2" ports) or 36202 (3/8" ports).



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

### 16.2.1 Compression Connections (3/8" & 1/2" ports)

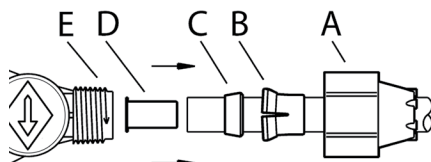
THE WATER SUPPLY TO THE MANABLOC AND THE PORT VALVES SHALL BE TURNED OFF BEFORE ATTEMPTING INSTALLATION OF PEX COMPRESSION CONNECTIONS.



**NOT FOR USE WITH FOSTAPEX**

NOTE: The red MANABLOC valves designate hot ports, 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 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 3/8" ferrule (C) must be TOWARD THE END OF THE TUBE; a 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.

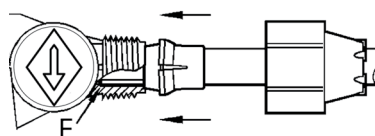


**WARNING: DO NOT** attempt to install the Lock-In insert backwards as it may break.

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.

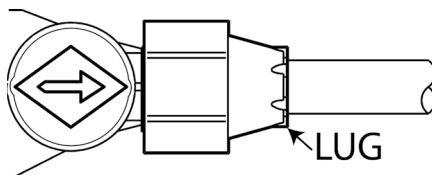
2. Push the tubing into the port socket (E) until it bottoms out.



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 chamfer 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 (Stock Code 50631) until the white Lock-In insert appears between the lugs and becomes flush with the ends of the lugs, plus 1/4 to 1/2 turn.



Complete the connection as soon as each distribution line is connected to the MANABLOC.

**Each valve should be turned counter clockwise a quarter 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 50631 MANABLOC Wrench 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).

### 16.2.2 PEX Press Connections (1/2" ports)

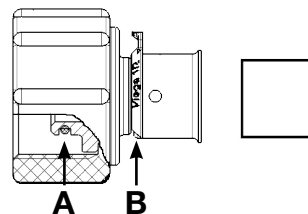
THE WATER SUPPLY TO THE MANABLOC AND THE PORT VALVES SHALL BE TURNED OFF BEFORE ATTEMPTING INSTALLATION OF PEX PRESS ADAPTERS.



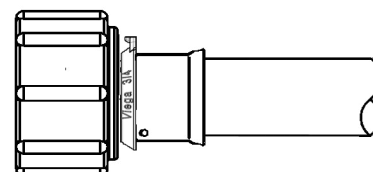
#### CAUTION

Use only sealing elements supplied with the adapters.

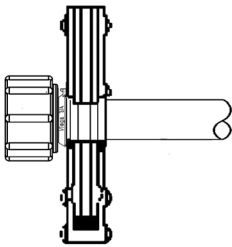
1. Ensure sealing element (A) is in place and the tool locator ring (B) is present in its factory installed position.



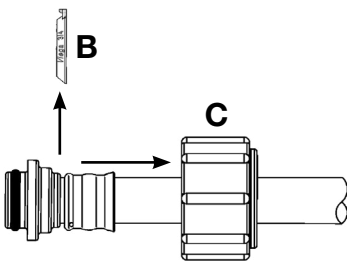
2. Square off tubing to proper length and insert the fitting fully into the end of the tubing as shown.



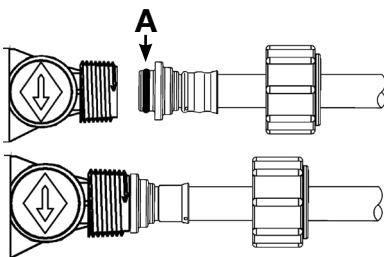
- Placing the PEX Press tool jaw over the attached press sleeve resting it against the tool locator ring, check for full tubing insertion at the view holes then press the sleeve with an appropriately sized press jaw. **DO NOT PRESS TWICE.**



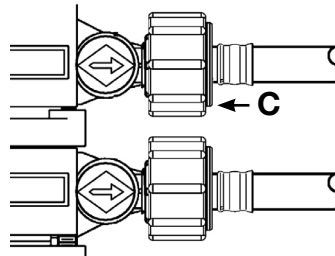
- Remove tool locator ring (B) and slide swivel nut (C) over tubing as shown.



- Ensure sealing element (A) is in place and clean of any dirt or debris, wet sealing element with tap water. Insert the fitting into the desired port until the fitting flange sets flush with the end of the port.



- Thread the swivel nut (C) onto the MANABLOC port. Hand tighten only. Open the port valve(s) before turning on the main water supply.



### 16.2.3 PEX Crimp Connection (1/2" ports)

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

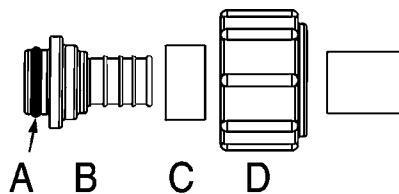


**CAUTION:** Use only sealing elements supplied with the adapters.

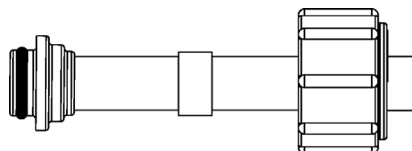


**NOT FOR USE WITH FOSTAPEX**

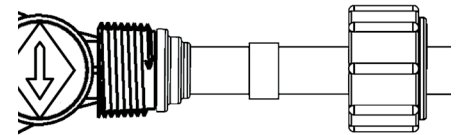
- Slide the supplied swivel nut (D) and a crimp ring (C) 43600 for 3/8" tubing 43620 for 1/2" onto the tubing (threads of the nut toward the end of the tubing).



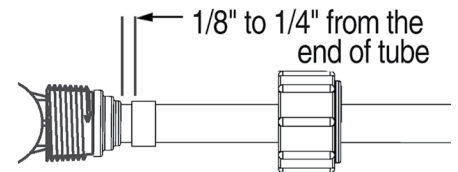
Insert the barbed end of the fitting (B) fully into the end of the tubing as shown.



- Ensure sealing element (A) is in place, then insert the fitting into the desired port until the fitting flange sets flush with the end of the port.



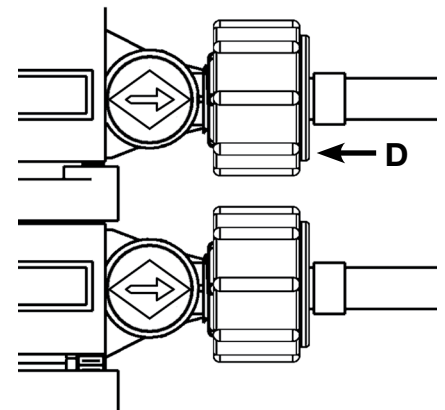
- Slide the crimp ring (C) within 1/8" to 1/4" from the end of tube. Crimp the ring with an appropriately sized full-circle crimp tool.



See section 7 of this guide for crimping instructions.

**DO NOT CRIMP TWICE.**

- Slide the swivel nut (D) over the crimped ring (C) and thread the nut onto the MANABLOC port. Hand tighten only!



- Each valve should be turned clockwise a quarter turn to the open position before tubing on the main water supply.

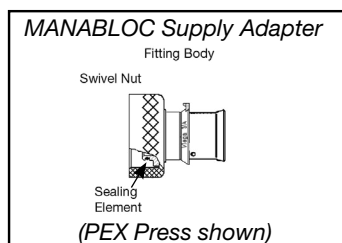
## 16.3 Connecting Distribution Lines to Fixtures

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 12.6 though 12.9 of this guide or the Viega product catalog.

## 16.4 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.

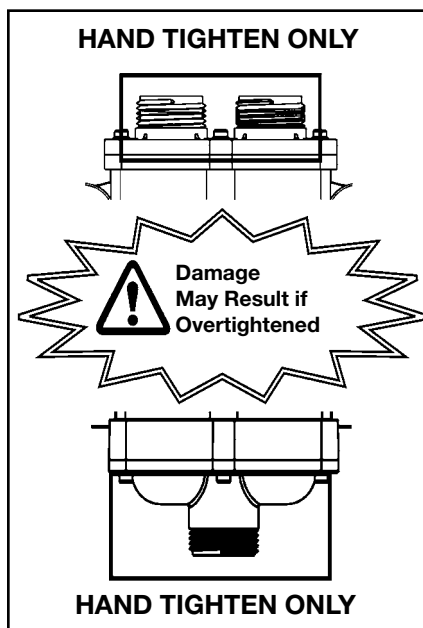
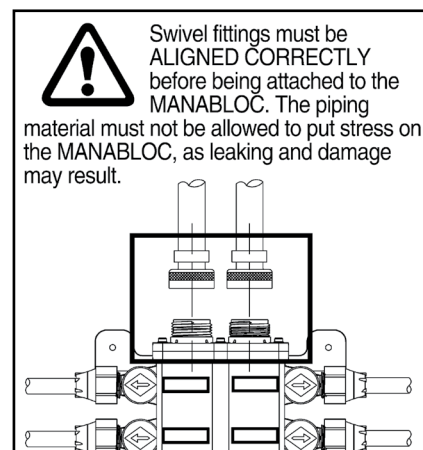
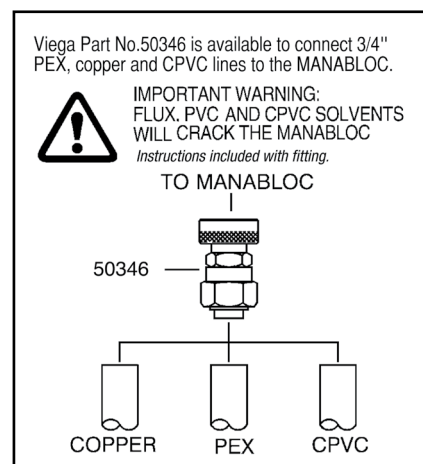
- When using male or female pipe thread transition fittings, to connect to supply tubing, use only Teflon® TAPE to seal pipe threads. **DO NOT** use pipe dopes, thread sealers, Teflon® pastes, etc.
- If copper sweat fittings are used anywhere in the MANABLOC water supply line or water heater supply/return 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.

- 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.
- 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.
- 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.**





## 16.5 Filling and Testing the MANABLOC

All PureFlow systems must be pressure tested in accordance with local code or the system working pressure after installation. Connections may be pressure tested immediately after completion. Refer to section 17.1: Pressure Testing PureFlow Systems for specific testing requirements.

## 16.6 Draining the MANABLOC System

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), then the MANABLOC unit **MUST** be drained to prevent irreparable damage. The process of draining involves loosening and removal of 1 or more supply line connections and 2 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 16.4. 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.

## 16.7 To Completely Drain the 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 4 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 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 only require to be hand tightened.

## 17. PRESSURE TESTING PUREFLOW SYSTEMS

### 17.1 General

Upon completion of the installation the system shall be filled and pressure tested.  
When hydrostatic testing, use only POTABLE water.

NOTE: During the initial pressure test period, the system pressure indicated on the gauge may decrease due to the initial deformation of the pipe, followed by a slow expansion. The pressure drop is dependent on ambient temperature, system capacity and pressure but shall not be more than 8 psi in an hour.

When pressure testing the MANABLOC, open all connected port valves before filling the system with water or air and pressurizing. If the MANABLOC is filled and pressurized before the port valves have been opened, read valve notice below.

Testing 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*



#### NOTICE - 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 Stock Code 51602.

\* If the pressure in the system declines more than eight 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.

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

THE WATER HEATER SHALL BE ISOLATED AND NOT INCLUDED IN THE SYSTEM AIR TEST.



**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.

## 17.2 Leak Detection

Leak detection: Use only a mixture of Original Palmolive Green™ dishwashing soap (#46100-46200) or Palmolive Ultra™ (#356140 or 46128) mixed with potable water at a ratio of 2 ounces of soap to one gallon of water (mix Ultra at a ratio of 1.5 ounces per gallon)

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.

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.

When testing a MANABLOC and no leaks are found on any of the caps or fittings, isolate the MANABLOC by turning the valves to the "OFF" position, repressurized if needed, and apply the same solution to the MANABLOC manifold components.

Any connections found to be in question must be replaced or remade and the pressure test repeated.

## 18. SYSTEM DISINFECTION

### 18.1 General

Local codes may require system disinfection. When no other method is available, follow the time limitations and exposure levels show 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 Gallon 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 or the exposure durations listed in step 1 above, 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.

## 19. CODES, STANDARDS AND APPROVALS

### 19.1 Codes

PureFlow is accepted by the following model codes for use in potable hot and cold water distribution systems.

UPC - Uniform Plumbing Code

IPC - International Plumbing Code

IRC - International Residential Code

NSPC - National Standard Plumbing Code

Most state written codes

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

### 19.2 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 Crosslinked 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.

**F1807 -** This standard contains finite dimensional requirements for metallic insert fittings for SDR9 PEX tubing and other relevant performance tests at different water temperature.

**F2159 -** This standard contains finite dimensional requirements for plastic insert fittings for SDR9 PEX tubing and other relevant performance tests at different water temperatures.

**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.

**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.

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

### 19.3 Listings and 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 -** Product meets requirements of Canadian CSA B137.5 listing.

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

**PEX 5006 -** Tested and listed to the NSF-pw (CL5) 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 5006 (CL5) designation it affirms the product is approved for use in continuous domestic hot water circulation systems with up to 140°F water temperatures.

**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.



# PureFlow® Warranty

viega

## VIEGA LIMITED WARRANTY PUREFLOW® POTABLE WATER PLUMBING SYSTEMS

Subject to the conditions and limitations in this Limited Warranty, VIEGA LLC (Viega) warrants to owners of real property in the United States that the components in its PureFlow 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 ten (10) years from date of installation. This warranty also applies to those supplying products covered by this warranty and installed on the property.

PureFlow Plumbing Systems and components covered by this ten-year warranty are:

ViegaPEX™ and ViegaPEX™ ULTRA cross-linked polyethylene (PEX) tubing, FostaPEX® , MANABLOC® , Minibloc™ or manifolds sold by Viega and using approved connections sold by Viega installed together in manifold plumbing systems.

ViegaPEX and ViegaPEX ULTRA cross-linked polyethylene (PEX) tubing or FostaPEX installed with PEX press fittings and PEX press sleeves sold by Viega.

ViegaPEX and ViegaPEX ULTRA cross-linked polyethylene (PEX) tubing and crimp insert fittings installed with copper crimp rings and meeting the specifications of ASTM F1807 and certified/listed for conformance with ANSI/NSF Standards No. 14/61 and Viega PolyAlloy™ fittings.

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 Press 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 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 stop 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.

Under this limited warranty, you only have a right to reimbursement if the failure or leak resulted from a manufacturing defect in the products covered by this warranty and the failure or leak 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 resulting damage is caused by (1) components in the plumbing system other than those manufactured or sold by Viega; (2) not designing, installing, inspecting or testing 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, inadequate freeze protection, exposure to water pressures or temperatures in excess of the limitations on the tubing or application of unauthorized solvents or chemicals; (4) acts of nature such as earthquakes, fire, flood or lightening. In addition, the warranty does not apply if distribution lines and their connections to the MANABLOC system are not ViegAPEX or FostaPEX tubing or connections sold by Viega.

In the event of a leak or other failure 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 leak or other failure 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 claim 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 in writing 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 and occurred during the time periods 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. 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 full term 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.

\* 301 N Main, 9th Floor, Wichita, KS 67202

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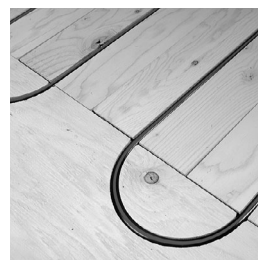
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