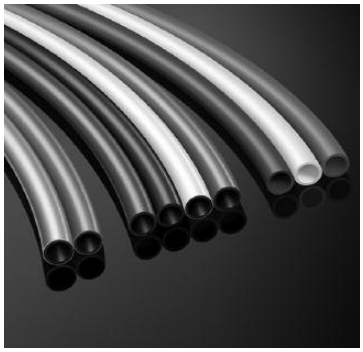
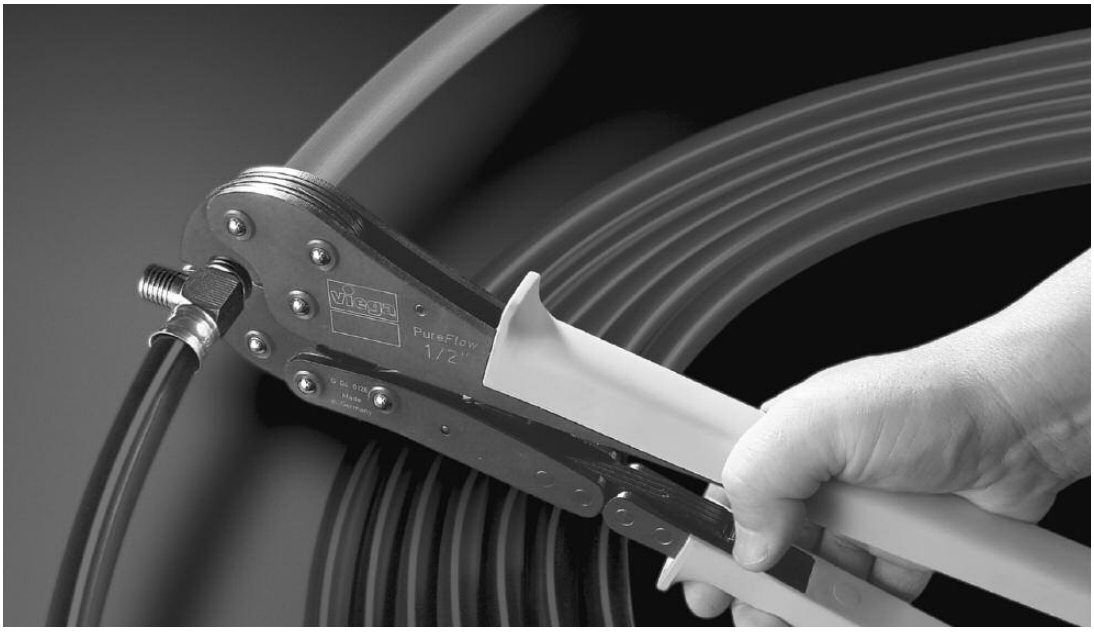
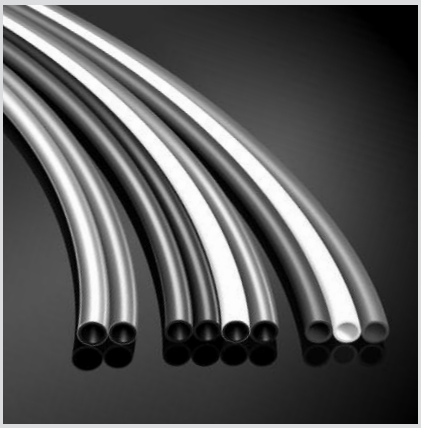
Pure*Flow*® Water System

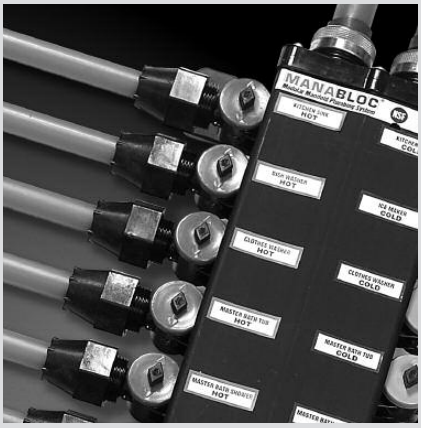
Installation Manual

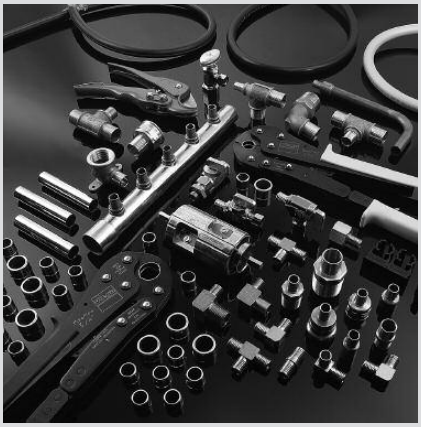


March, 2007







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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.

An international company with a national commitment.

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

Viega's reach extends throughout North America with distribution across the US, Canada and Mexico.

Our network of sales experts and wholesale distributors can meet your needs whether you are in Boston or Berkeley. The products we deliver are the finest quality offered at a highly competitive price. Our goal is to remain on the forefront of the plumbing industry well into the new century, and with our advanced products and a determination to remain the quality leader, we are convinced this accomplishment is well within our reach.

Call 877-VIEGA-NA for your local representative and wholesale location.

Why you can depend on Viega PureFlow.

- A safe system
- Competitively priced
- Leak proof 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 NSF Protocol P171 (CL-R/CL-TD)
- Listed to ASTM F876/F2023 and F877

IMPORTANT NOTICE

This installation guide is intended for traditional (branch and main) plumbing systems and hybrid plumbing systems using termination manifolds. Separate installation instructions for the MANABLOC® Manifold Plumbing System are available from Viega. (The MINIBLOC Manifold Plumbing System uses the MANABLOC Manifold Plumbing System Installation Instructions.)

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

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 877-VIEGA-NA.

CONTENTS

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 US, 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. With the acquisition of Vanguard Piping Systems and the integration of their PEX plumbing products into the PureFlow line, Viega is now positioned as the number one supplier of PEX plumbing systems in North America.

Today Viega engineers and manufactures over 12,000 system components at five state-of-the-art factories including our PEX tubing facility located in the heart of the US. 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 comprised of multiple brands including ProPress® flameless copper 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.

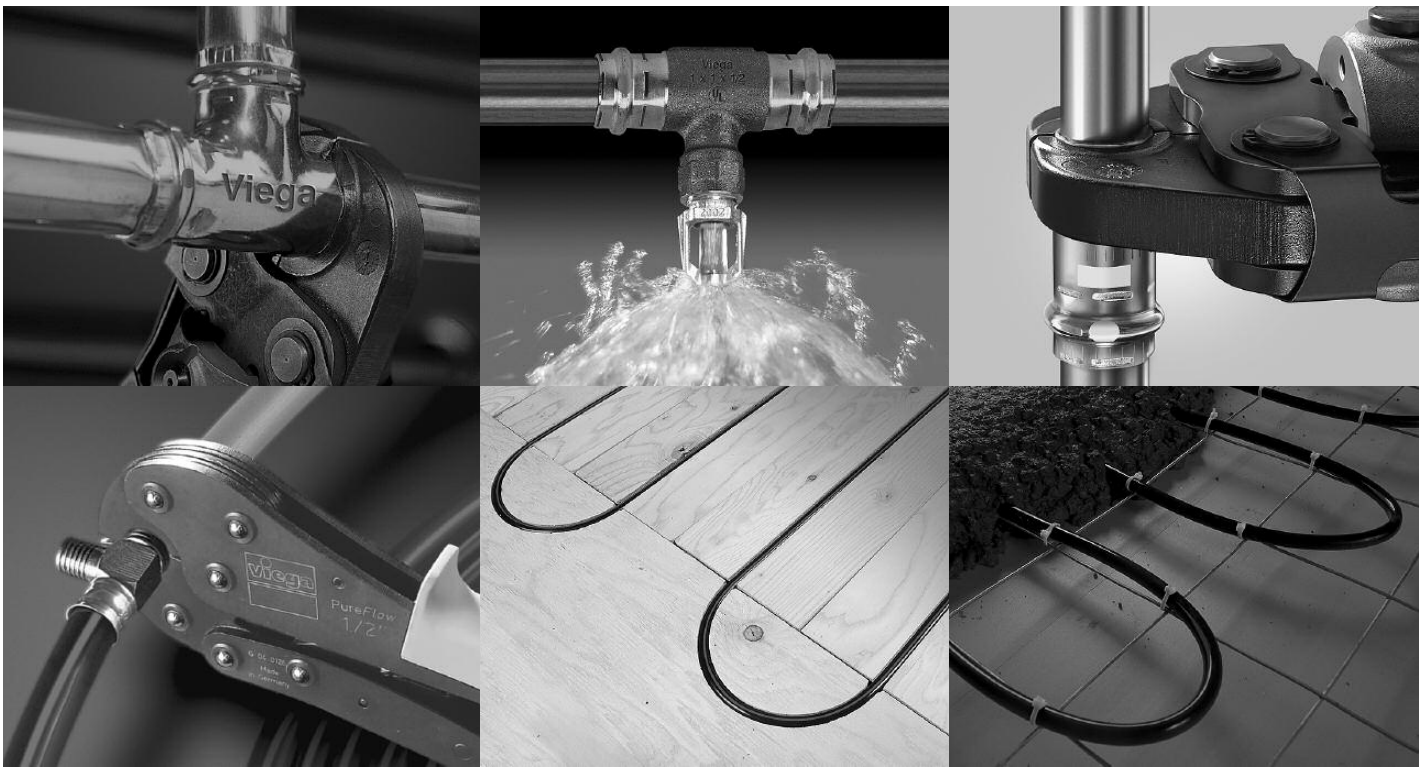
PureFlow plumbing provides complete PEX systems for potable water distribution, including manifolds, PEX and multilayer tubing, fittings, and valves. The ProRadiant program includes a wide range of hydronic radiant systems and controls as well as thermostats.

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.

PEX tubing offers outstanding versatility. A total of 236 million feet of PEX tubing for potable water applications produced in 2004 alone provides 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 (200°F at 80 psi, 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
- 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 bronze, brass or plastic fittings for both PEX Press and PEX Crimp fitting systems
- A range of inline, manifold and stop valves for both press and crimp 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. VIEGAPEX TUBING

2.1 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.

2.2 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 (CL-TD) and continuous recirculation (CL-R) 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.

2.3 Colors

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

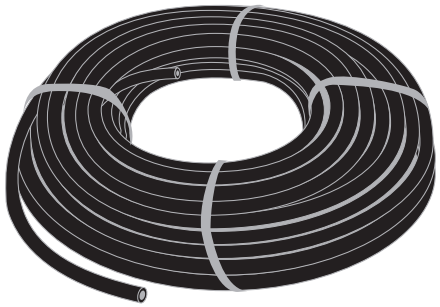
2.4 ViegaPEX Properties and Performance

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.



2.5 Tubing Markings

ViegaPEX tubing is marked every 2 feet with the following representative information:

Length marker	000 Feet
Company	Viega
Product name	ViegaPEX™
Nominal tubing size	1/2”
Standard Dimension Ratio	SDR 9
Temperature & Pressure rating	100 psi @ 180°F / 160 psi @ 73°F
NSF potable water certification	NSF-pw
Chlorine listing	P171 CL-R/CL-TD
ASTM tubing standards certification	ASTM F876/F877
Fitting system compatibility	PureFlow - ASTM F877/F1807/F2159
IAPMO listing	UPC®
Canadian Standard Assoc.	Warnock Hersey (CSA B137.5)
ICC listings	ES ER 5287
HUD listing	MR 1276
Material designation code	PEX 1006
Manufacturer’s date code	1/1/07
Manufacturing code	B2X14.2
Country of Manufacture	Made in the USA

2.6 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

2.7 ViegaPEX Sizes

Nominal Size	Available Coil Lengths	Available Straight Lengths
3/8”	100, 500, 1000 feet	20 foot lengths in bundles of 50
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

3. VIEGAPEX ULTRA TUBING

3.1 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.

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 (CL-TD) and continuous recirculation (CL-R) applications. ViegaPEX 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.

3.3 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.

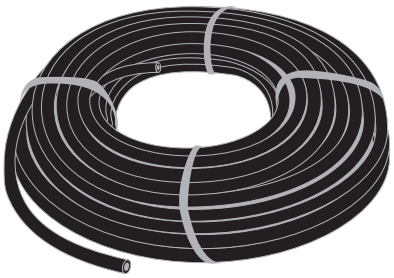
3.4 ViegaPEX Ultra Properties and Performance

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 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.



3.5 Tubing Markings

ViegaPEX Ultra tubing is marked every 2 feet with the following representative information:

Length marker	000 Feet
Company	Viega
Product name	ViegaPEX™ Ultra
Nominal tubing size	1/2”
Standard Dimension Ratio	SDR 9
Temperature & pressure rating	100 psi @ 180°F / 160 psi @ 73°F
NSF potable water certification	cNSF®us-pw
NSF Uniform Plumbing Code listing	NSF U.P. Code
Chlorine listing	P171 CL-R/CL-TD
ASTM tubing standards certification	ASTM F876/F877
Canadian Standard Assoc.	cNSF®us (CSA B137.5)
Fitting system compatibility	PureFlow - ASTM F877/F1807/F2159
ICC listings	ES ER 5287
HUD listing	MR 1276
Material designation code	PEX 1006
Manufacturer’s date code	1/1/07
Manufacturing code	B2X14.2
Country of Manufacture	Made in the USA

3.6 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”	.863	1.125	.131
1-1/4”	1.053	1.375	.160
1-1/2”	1.243	1.625	.190

3.7 ViegaPEX Ultra Sizes

Nominal Size	Available Coil Lengths	Available Straight Lengths
3/8”	100, 500, 1000 feet	20 foot lengths in bundles of 50
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

4. FostaPEX TUBING

4.1 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 like copper or in coils like regular PEX. 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.

4.2 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.

4.3 Colors

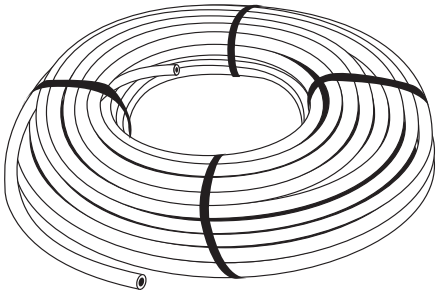
FostaPEX, available in red and silver, is constructed of a black PEX core, with aluminum and PE outer layers. It also blocks transmission of visible light, preventing most types of algae growth from occurring. In addition, the smooth walls of FostaPEX tubing are resistant to corrosion and scaling.

4.4 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)



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

4.5 Tubing Markings

FostaPEX tubing is marked every 3 feet with the following representative information:

Length marker	000 Feet
Company	Viega
Product name	FostaPEX™
Nominal tubing size	1/2”
Standard Dimension Ratio	SDR 9
Material designation code	PEX 1006
ASTM tubing standards certification	ASTM F876/F2023/F877
Temperature & Pressure rating	180°F 100 psi / 200°F 80 psi
NSF radiant floor heating certification	NSF®-rfh
NSF potable water certification	NSF®-pw
IAPMO listing	UPC®
ICC listings	ESR1837, ES ER5944, ES ER5421
Oxygen barrier presence	With oxygen diffusion barrier
Country of manufacture	Made in Germany
Manufacturing Code	HO
Material (cross-linked polyethylene)	PEX
Manufacturer’s date code	12345
Manufacturer’s identifier	WA 999999

4.6 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 PEX layers

4.7 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

5. PUREFLOW PEX PRESS FITTINGS

5.1 Bronze PEX Press

PureFlow Bronze PEX Press fittings are cast and machined from a solid bronze alloy. This gives the fittings high corrosion and stress cracking resistance. The bronze alloy has been specially developed to resist dezincification, a process which can weaken ordinary brass fittings over time. The following design criteria make PureFlow PEX press fittings perfect for use in potable water applications.

- high corrosion resistance
- excellent strength properties
- resistant to stress corrosion
- superior wear properties
- compatible with all materials

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

5.1.1 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 homerun manifold system is also available with 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 hole allows both the installer and inspector to easily verify full insertion of the tubing. The stainless steel will not corrode, maintaining a clean appearance for the lifetime of the system.

5.1.2 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	cNSFus-pw, UPC®

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

5.2 PEX Press Connection

The PureFlow PEX Press connection 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, and the view hole in the press sleeve all ensure a consistent, worry-free press fitting every time. The difference between a finished and unfinished press fitting is also easily visible, making inspection simple.

5.2.1 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.

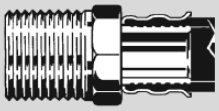
The PureFlow PEX Press hand tool is available for 3/8", 1/2", 3/4", and 1" PureFlow PEX Press connections. Each tool has a color-coded handle for easy identification on the job site and they are available individually or in convenient sets. See the PureFlow product catalog for details.

5.2.2 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", and 1-1/2" PureFlow PEX Press connections and are also compatible with the ProPress copper press system jaw sets. See the PureFlow product catalog for details.

5.2.3 The PureFlow PEX Press Fitting

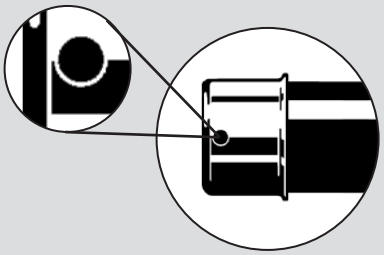
The PureFlow PEX Press tool compresses the stainless steel sleeve around the tubing and fitting in two places, permanently securing them together — no O-rings. This connection exceeds the requirements of the ASTM F877 standard. The compression of the tool also allows press connections to be made in temperatures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



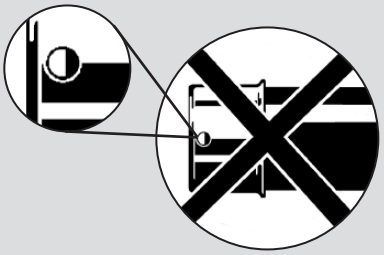
Cross-section of a completed PureFlow PEX Press fitting.

A view hole in the sleeve allows the installer to check for proper tubing insertion.

Detail of the PureFlow PEX Press fitting showing the viewing hole in the sleeve.

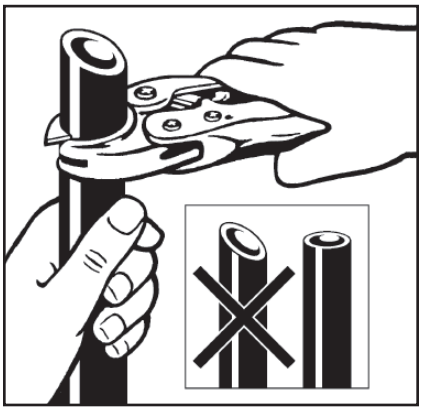


Enlargement of correct tubing insertion.

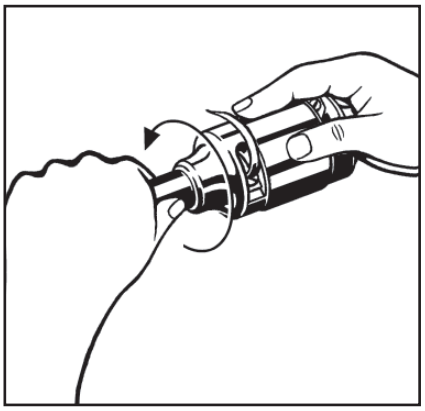


Enlargement of insufficient tubing insertion: end of tubing shows through view hole.

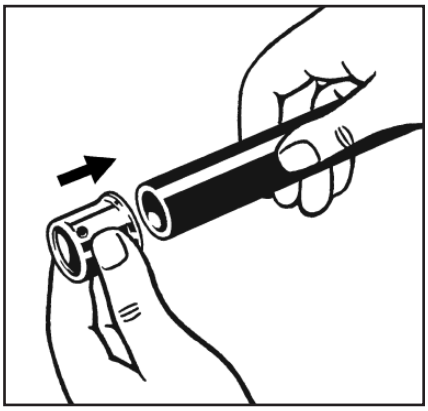
5.2.4 Making a PureFlow PEX Press Hand Tool Connection



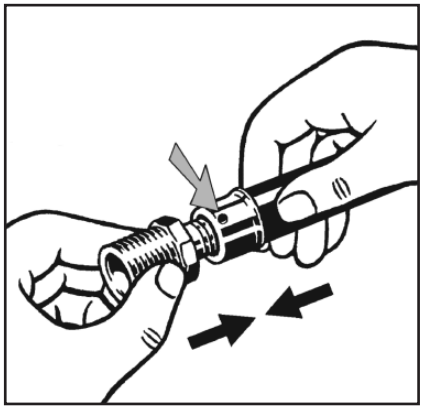
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



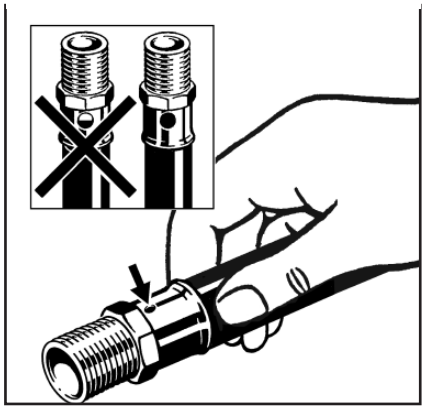
2. If using FostaPEX tubing, insert into prep tool, push and turn until no more resistance is felt. If using ViegaPEX, continue to step 3.



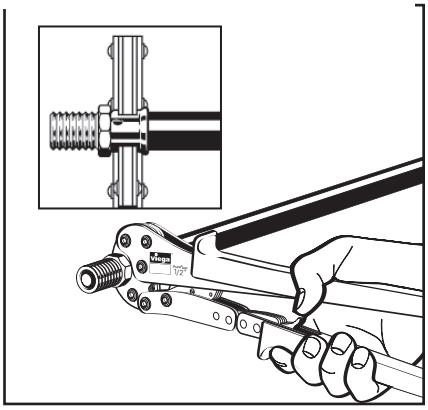
3. Slide press sleeve fully over end of tubing.



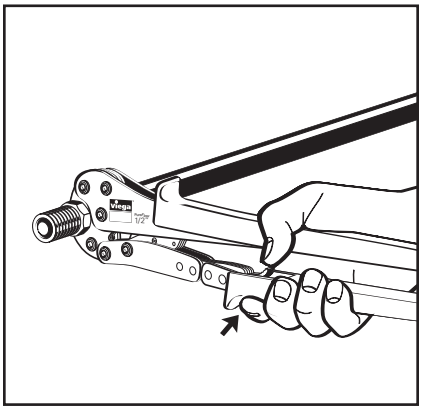
4. Insert press fitting into tubing and engage fully.



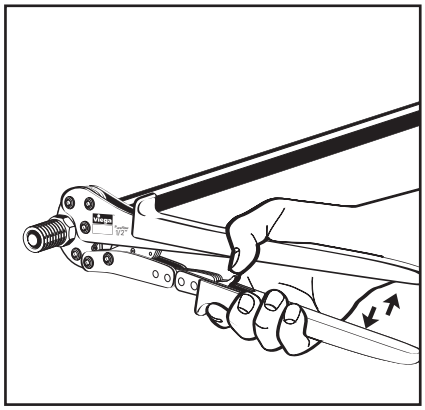
5. Check full tubing insertion at view hole of sleeve.



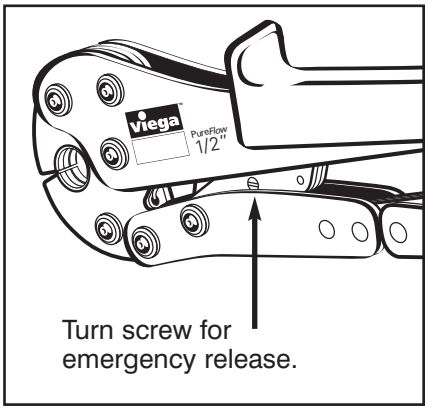
6. Position press tool perpendicular over press sleeve and close tool jaws to engage ratchet.



7. Close handles, utilizing trigger to reduce grip span if desired.

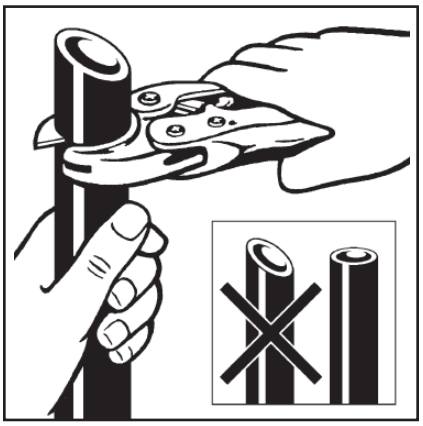


8. Extend handle and continue ratcheting until automatic tool release occurs at proper compression force.

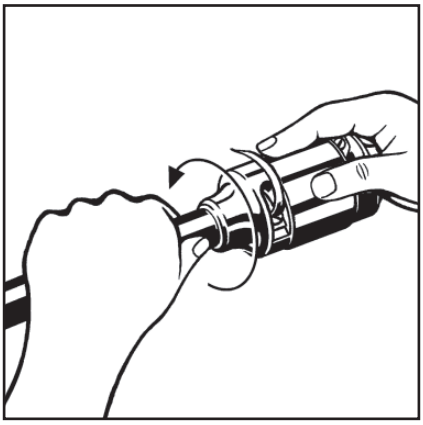


9. **Warning:** The connection is not leakproof when the tool has been opened by emergency release.

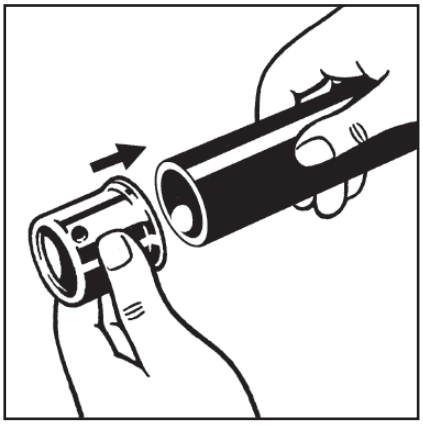
5.2.5 Making a PureFlow PEX Press Power Tool Connection



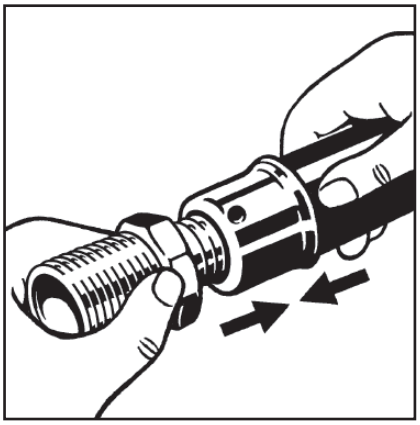
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



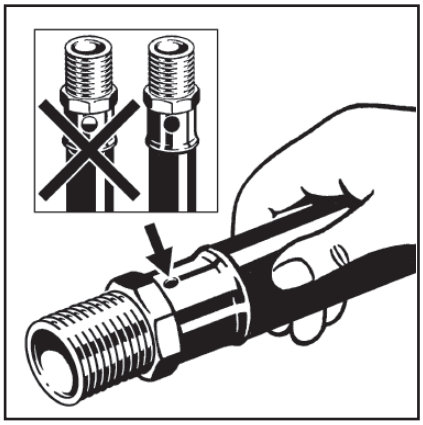
2. If using FostaPEX tubing, insert into prep tool, push and turn until no more resistance is felt. If using ViegaPEX, continue to step 3.



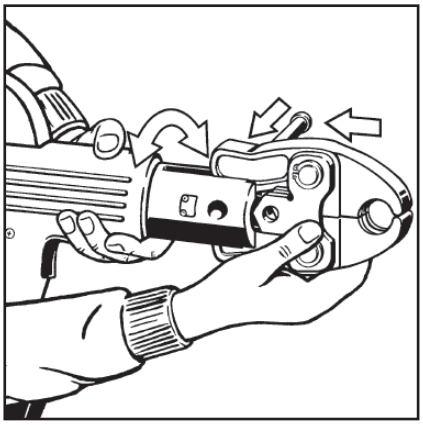
3. Slide press sleeve fully over end of tubing.



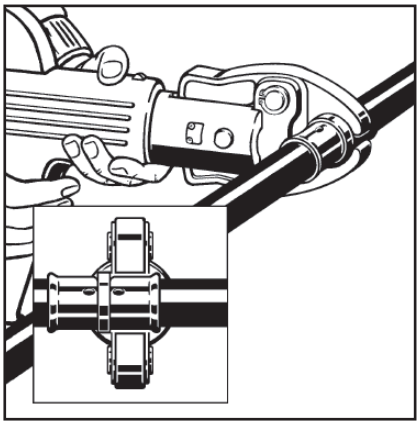
4. Insert press fitting into tubing and engage fully.



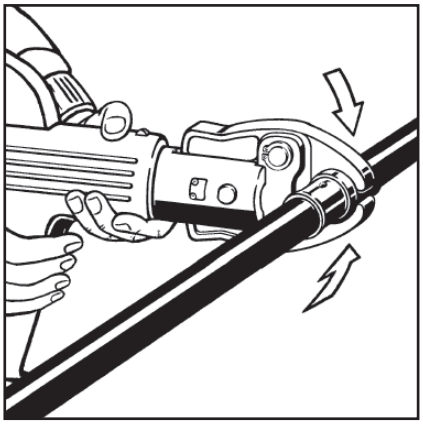
5. Check full tubing insertion at view hole of sleeve.



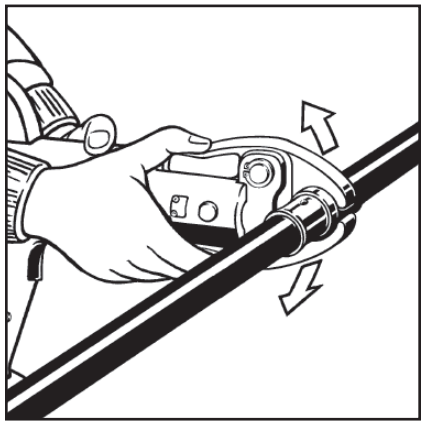
6. Insert the appropriate PureFlow jaw into the press tool and push in the holding pin until it locks.



7. Open the jaw and place at right angle over the press sleeve. Check insertion depth.



8. Start pressing process and hold the trigger until the jaw has automatically released.



9. On completion of press connection, the jaw can be opened and removed.

6. PUREFLOW PEX CRIMP FITTINGS

6.1 Brass PEX Crimp

PureFlow Brass PEX Crimp fittings are machined from a brass alloy. The following design criteria make PureFlow PEX Crimp fittings perfect for use in potable water applications.

- Cost Effective
- Excellent Strength Properties
- Fast Installation

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

6.1.1 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 homerun manifold system is also available with brass PEX Crimp connections.

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

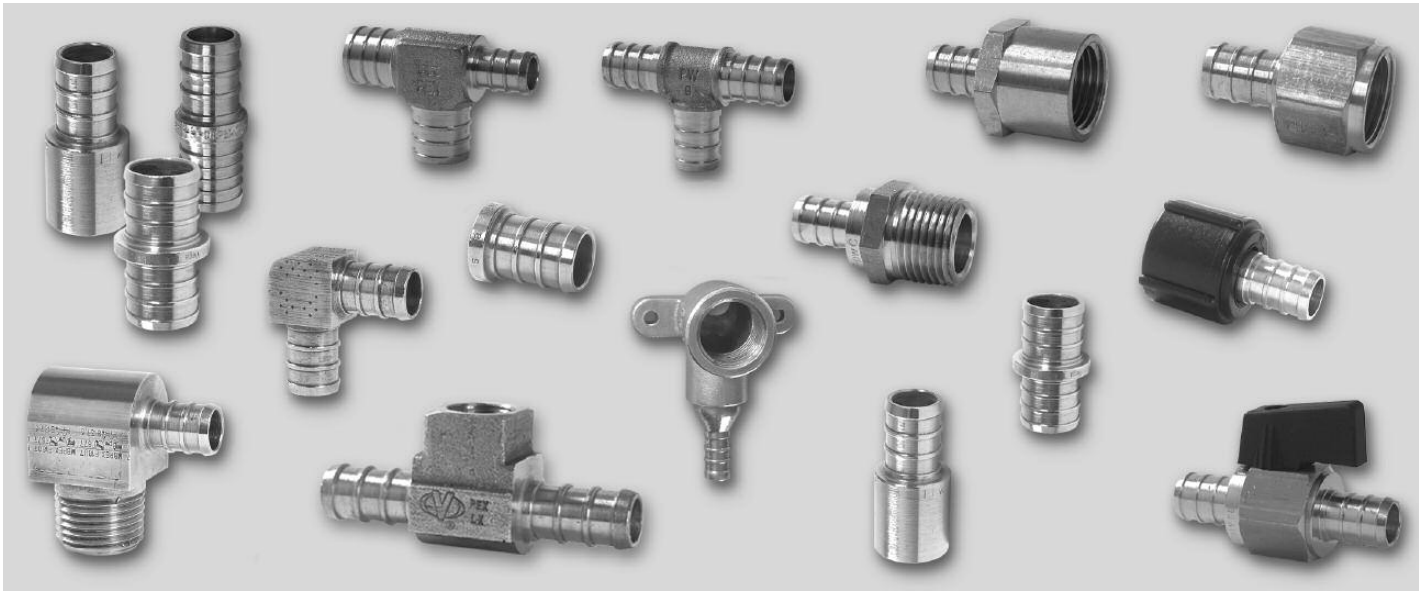
6.1.2 Brass PEXCrimp Fitting Markings

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, cNSFus

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.



6.2 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 exposure during storage, installation and handling, combined exposure of PolyAlloy PEX fittings shall not exceed 15 days.

6.2.1 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.

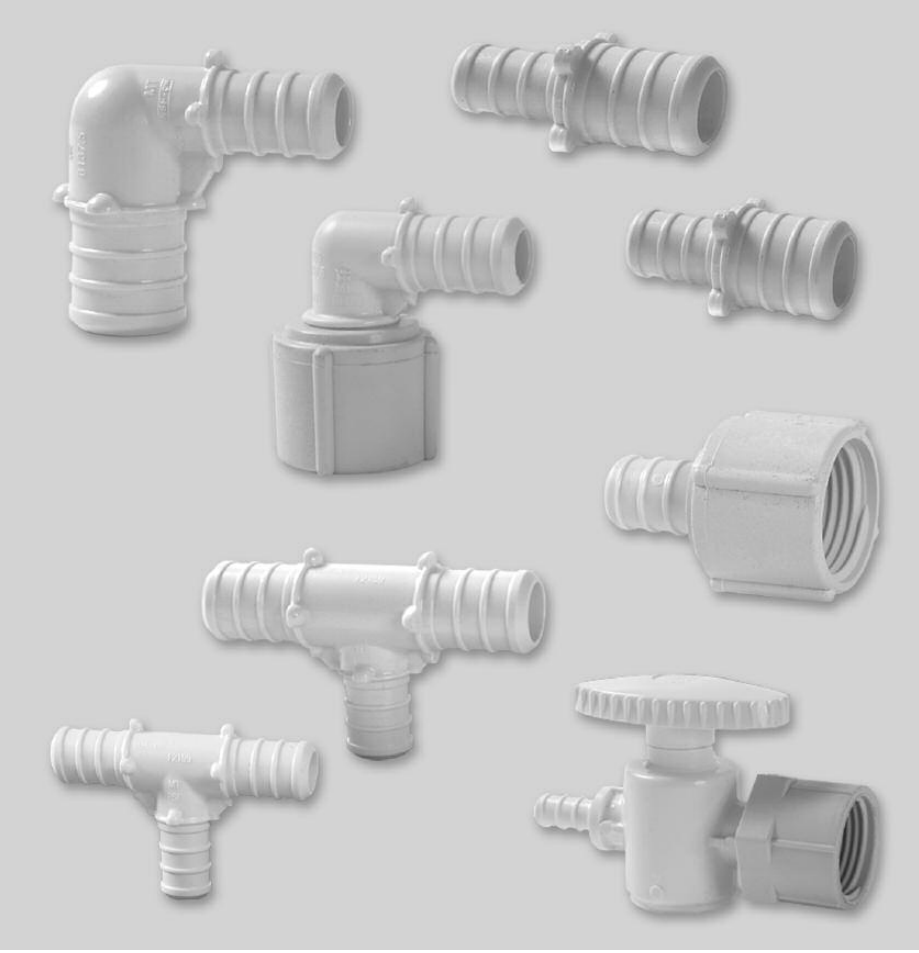
The material choice and fitting design used in the PureFlow PolyAlloy PEX Crimp system ensure the integrity of each connection.

6.2.2 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, NSF-pw, CSA B137.5

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



6.3 PEX Crimp Connections

The PureFlow PEX Crimp connection provides a simple and safe connection between the 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.

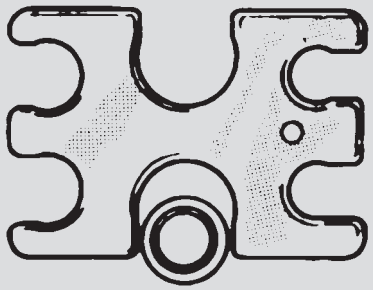
6.3.1 The PureFlow PEX Crimp Hand Tool

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 PureFlow product catalog for details.

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.

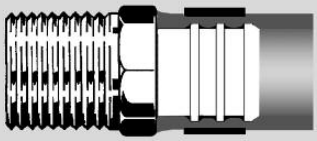
At least one connection should be checked at the beginning and end of each day to ensure proper crimps have been made. Most crimp tools can be recalibrated. Please refer to tool instructions.



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

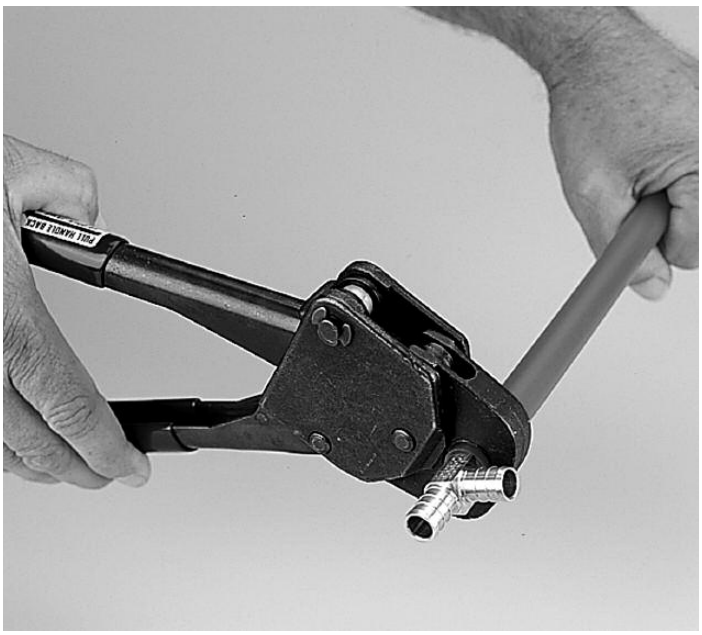
6.3.2 The PureFlow PEX Crimp Fitting

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.



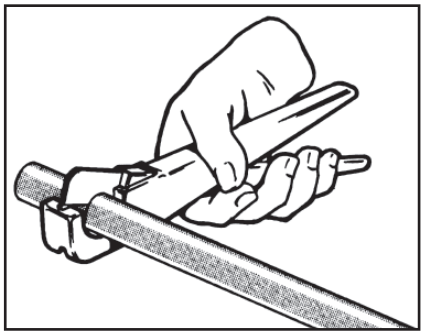
Cross-section of a completed PureFlow PEX Crimp fitting.

1. Position the crimp ring and insert the fitting into the tubing.

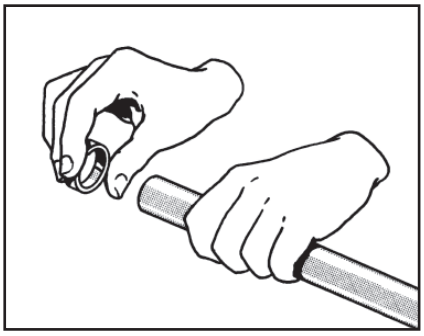


2. Crimp the ring full circle.

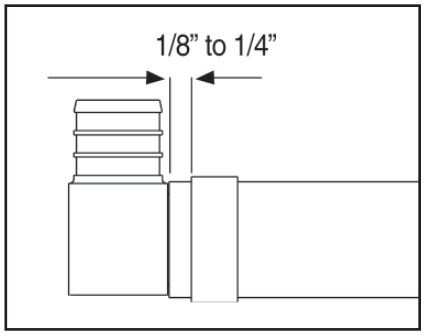
6.3.3 Making a PureFlow PEX Press Crimp Connection



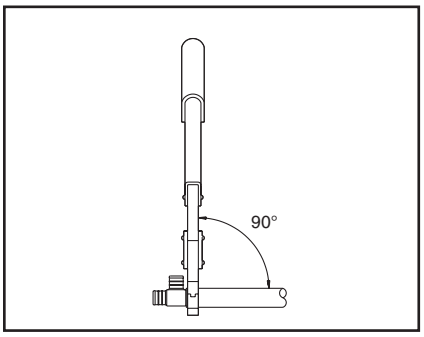
1. Square off tubing to proper length. Uneven, jagged or irregular cuts will produce unsatisfactory connections.



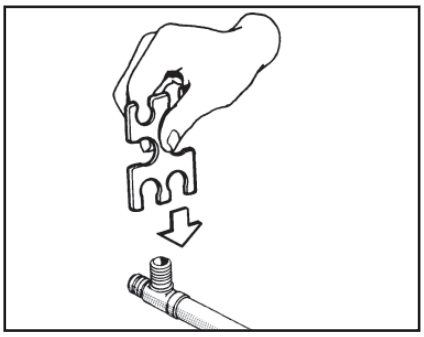
2. Slide the correct size crimp ring over end of the tubing.



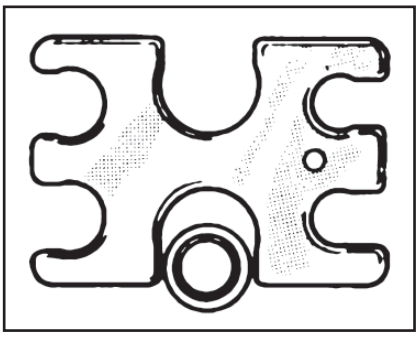
3. Insert the fitting into the pipe to the shoulder or tube stop. Position the ring 1/8" to 1/4" from the end of the tubing.



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.



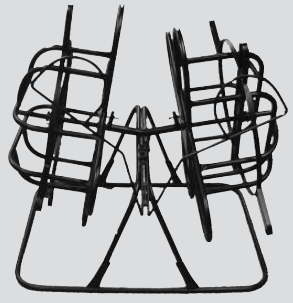
6. A crimp connection is considered good if the GO gauge fits the ring and the NO GO does not. A crimp connection is considered bad if the GO gauge does not fit the ring or the NO GO gauge does fit. Bad crimps must be cut out of the tubing and replaced.

7. INSTALLING THE PUREFLOW SYSTEM

7.1 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.



Stationary Metal Frame Uncoiler Stock Code FHUD-1

7.2 Uncoiling PureFlow Tubing

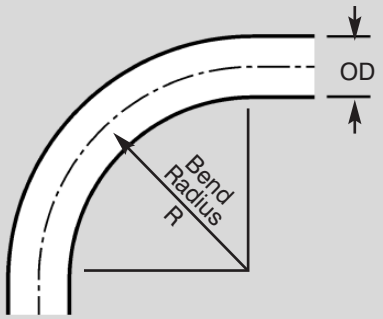
An uncoiler should be used to prevent twisting when removing tubing from 3/8"–1" coils. Roll coils out and use care to avoid twisting 1-1/4" and 1-1/2" coils or when a uncoiler is unavailable.

7.3 Bending PureFlow Tubing

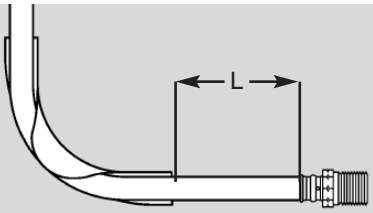
ViegaPEX tubing can be free bent (unsupported bend) to a minimum radius of 8x the tubing O.D. and 5x the tubing O.D. with the use of a Viega approved bend support. FostaPEX tubing can be free bent to a minimum radius of 8x the tubing O.D. and 3.5x the tubing O.D. with the use of a Viega tubing bender. For situations requiring tighter bends, use elbow fittings. If bending against a PEX coil bend direction, the bending radius is 24x 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.

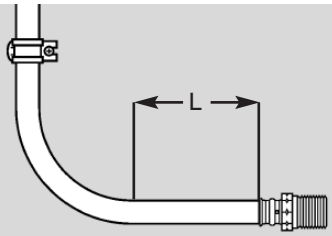
Tubing size	Distance from fitting to bend
3/8" PEX	L = 6 inches
1/2" PEX	L = 8 inches
3/4" PEX	L = 10 inches
1" PEX	L = 12 inches
1-1/4" PEX	L = 14 inches
1-1/2" PEX	L = 16 inches



Minimum bending radius for PureFlow tubing.

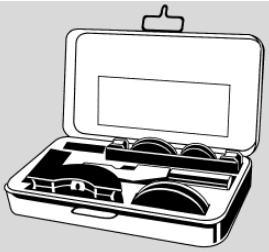


Using a bend support near a PureFlow connection to reduce stress on fitting.



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.

7.4 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.

7.5 Removing PureFlow PEX Press Connections

A PureFlow connection is permanent once full tool compression has been reached.

Should a mistake be made, square off tubing as shown. The complete PEX Press connection can then be heated with a hot-air blower and the tubing can be pulled from the fitting together with the press sleeve. Do not use an open flame to heat the tubing.

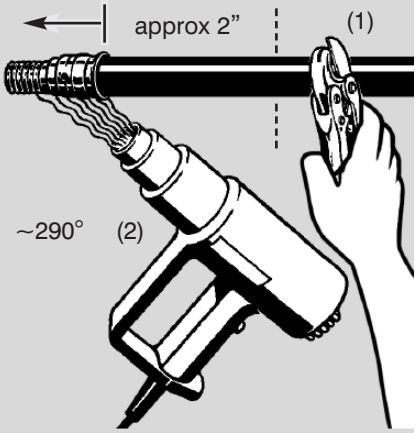
The fitting can be reused, following inspection to verify that it is clean and in perfect condition (no defects or scoring). The press sleeve cannot be reused.

7.6 Removing PureFlow PEX Crimp Connections

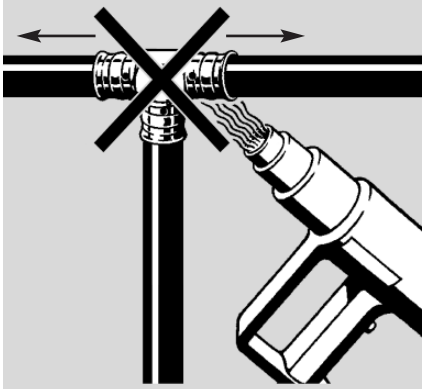
Should a mistake be made, simply cut out the PEX Crimp fitting and replace with a new one. Do not reuse PureFlow PEX Crimp fittings.

7.7 Repairs

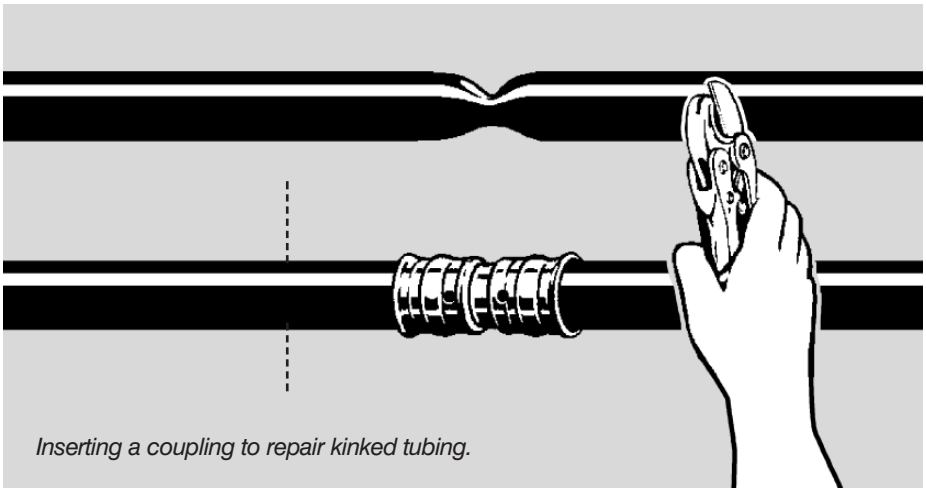
Sections of kinked tubing should be repaired by cutting out the damaged section and installing a repair coupling.



Removing a press fitting.



All connections must be removed from a multiple fitting which is being disconnected.



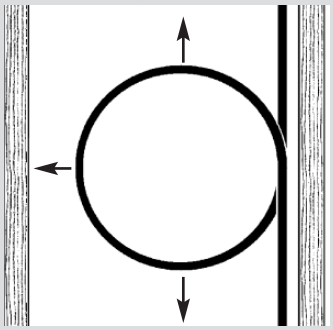
Inserting a coupling to repair kinked tubing.

7.8 Tubing Expansion

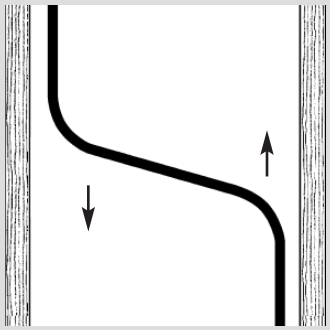
When installing PureFlow tubing, expansion and contraction of the material must be considered. ViegaPEX tubing should not be pulled tight when installed, as cold water will cause tubing to shrink slightly as the system is filled. A slight amount of slack should be left in each run to allow for this contraction 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.

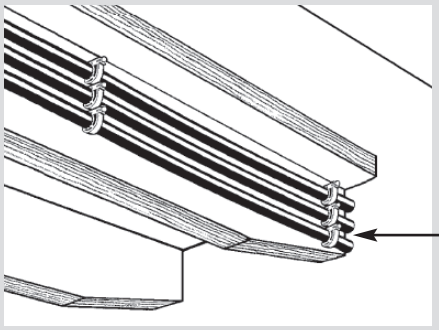
ViegaPEX expands or contracts 1.1 inches in length per 100 feet of tubing for every 10°F change in temperature. Tubing expansion is less critical with FostaPEX, though still present. The aluminum layer in this tubing limits expansion to 0.16 inches per 100 feet of tubing for every 10°F rise in temperature,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



Using a loop to accommodate tubing expansion.



Offsets also provide room for tubing expansion.



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

7.9 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 insulaiton 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:

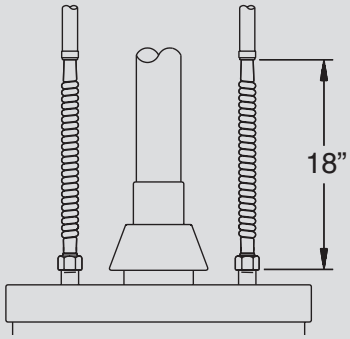
- Hot water
- Wet hot towels
- Hand-held hair dryer
- Low wattage electrical heating tape (self limiting).
- A commercial system which pumps heated water through a tube to the ice blockage, and returns the cooled water for reheating.

7.10 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 beween the water heater and tubing, keeping tubing more than 6 inches 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 inches of the gas heater vent.

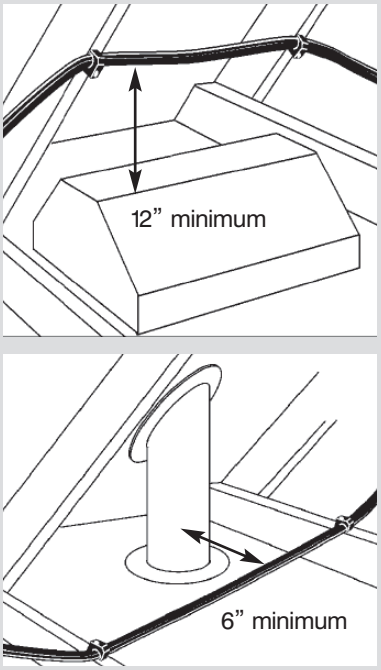
ViegaPEX may be used to connect to **INSTANTANEOUS/TANKLESS WATER HEATERS** or other hot water producing devices. However, consult manufacturer's recommendations for use with plastic tubing and ensure temperature and pressure do not exceed the maximum ratings of the tubing.



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

7.11 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.



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

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 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.

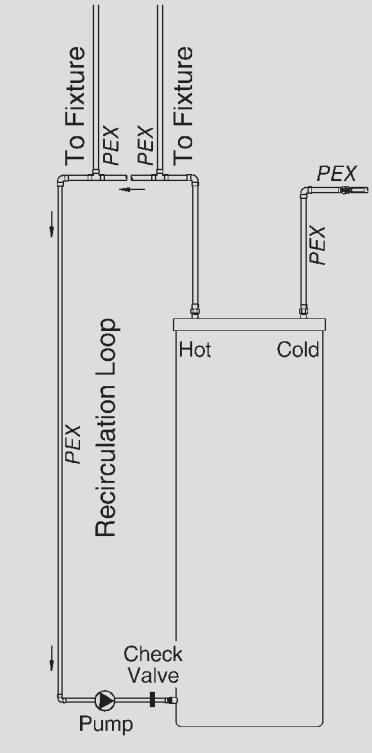
7.12 Continuously Recirculating Hot Water Plumbing Loops

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 NSF Protocol P171 third party certification marking (CL-R).



7.13 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 which 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 shut off. Simply closing fixtures in a less abrupt manner can eliminate hammer noise.

7.14 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.

7.15 Electrical Grounding

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

7.16 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.

Test should not exceed PureFlow pressure ratings (160 psi at 73.4°F). If pressure test is performed with water and the building is unheated, system should be drained after test to prevent freezing. If air testing, use a pressure of no less than 40 psi and no greater than 100 psi. The system shall be tested for a minimum of 15 minutes. During the test, system pressure shall drop no more than 8 psi in a 1 hour period (Use only Viega approved fittings when connecting to pressure testing equipment). If the pressure in the system declines more than 8 psi during the minimum 15 minute 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 plugs or any other fittings in the system with a Viega approved leak detection solution. (Any connection found to be in question must be replaced or remade and the pressure test repeated.)

If pressure loss continues, and it is determined that the connections are leak free, then the tubing must be inspected for damage. Damaged sections must be cut out and repaired with a coupling or if feasible, the entire tubing section replaced. For 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.)

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

Test shall be conducted when significant changes to temperature aren't expected. Please note that significant changes in ambient temperature can affect system pressure.

WATER (NOT ANTIFREEZE SOLUTION) MUST BE PURGED OR DRAINED FROM THE SYSTEM IF TEMPERATURES ARE EXPECTED TO FALL BELOW FREEZING (32°F, 0°C). Low pressure compressed air can be used for purging.

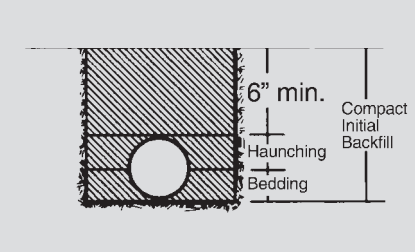
FOLLOW ANTIFREEZE MANUFACTURERS INSTRUCTIONS FOR CONCENTRATIONS. USE ONLY NON-TOXIC ANTIFREEZE APPROVED FOR USE IN DRINKING WATER SYSTEMS.

7.17 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.

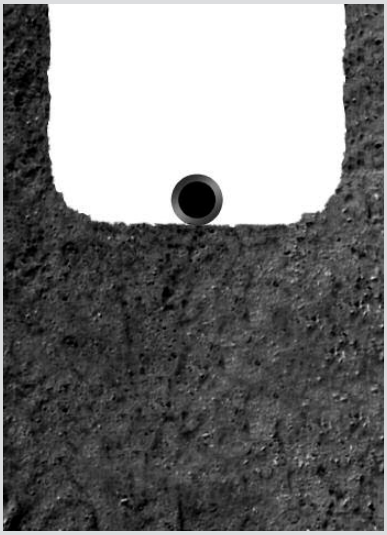
Do not use blocking to support tubing. PEX tubing can be damaged by contact with sharp objects. Ensure that trench bottom and fill do not contain sharp rocks or other items. In good soil conditions tubing may be placed directly on trench bottom. In poor soil conditions (rocky, loose, etc.) the trench 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 chemicals. Also do not install tubing above or below septic tanks, leach fields, pits, or cesspools.



Trench in good soil.

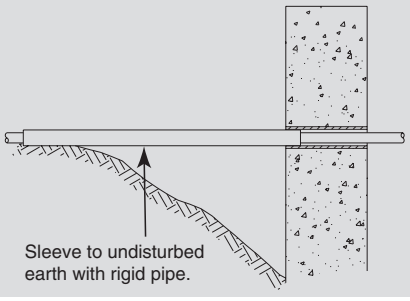
Trench in poor soil.

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.

7.18 Foundation Penetration

Where service lines penetrate foundation or basement walls, to prevent shearing or pinching off of the tube when back fill 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.

7.19 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.

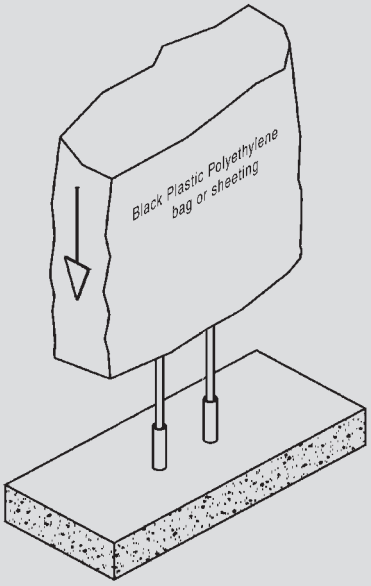
Contact a Viega representative for additional information on approved wrapping materials.

7.20 Protecting PEX Tubing

Protection of 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.

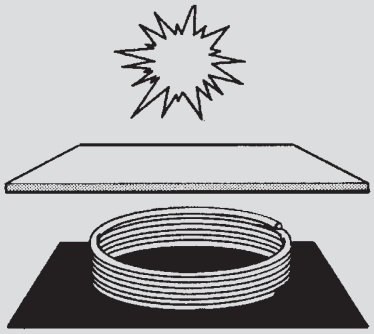


Protect all exposed tubing with an opaque covering.

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 reccomended exposure time are permissible. See sections 2.4, 3.4, 4.4, and 6.2 for more information.

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.



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

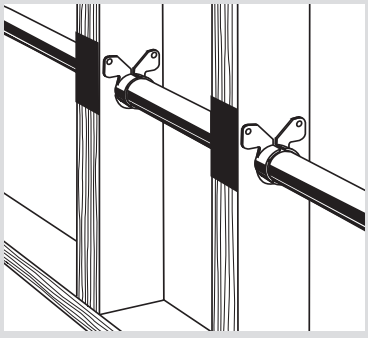
8. FASTENING THE PUREFLOW SYSTEM

8.1 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 recommended to 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.

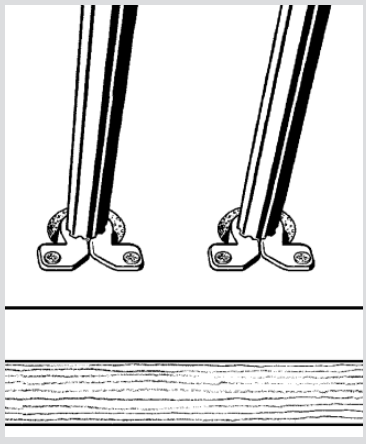
8.2 Supporting PureFlow Tubing

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.

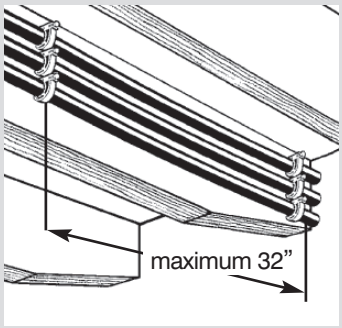
Note that ViegaPEX tubing will expand or contract 1.1 inches per 100 feet for every 10°F of temperature change. In long straight runs allow adequate clearance for this (see section 7.8). The aluminum layer in FostaPEX reduces expansion and contraction, so that it expands only 0.16 inches per 100 feet 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 to prevent abrasion and possible noise as tubing moves (see below).



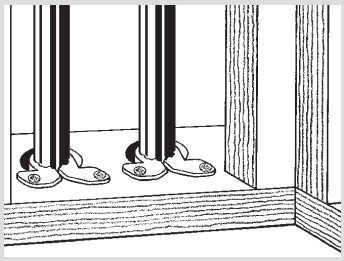
Suspension clips support tubing in joist penetrations or anywhere abrasion is a concern.

ViegaPEX tubing must be fastened at 32” intervals in horizontal runs (see below), and 32-48” for FostaPEX.

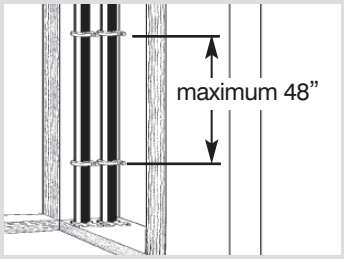


Tubing supported with U-clip or lock clip fasteners on horizontal runs.

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).



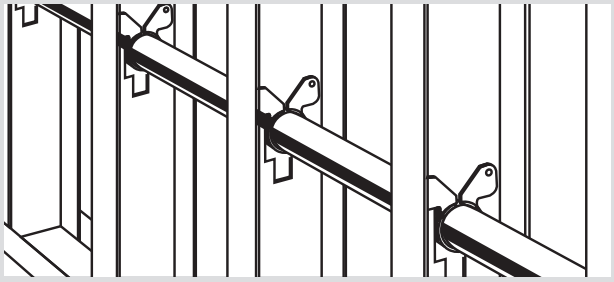
Suspension clip fasteners used at floor plate.



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

8.3 Steel Construction

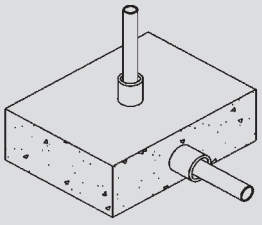
The PureFlow system works as well in steel frame construction as it does in wood. Where tubing runs through metal studs, suspension clip fasteners must be used to protect tubing from sharp stud edges (see illustration to the right). Follow the same guidelines for fastening and supporting the tubing as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



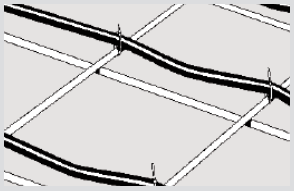
Suspension clip fasteners used to protect tubing from abrasion when passing through steel studs.

8.4 Concrete

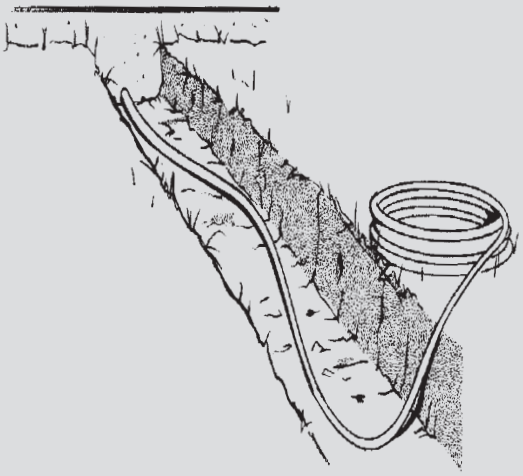
ViegaPEX and FostaPEX tubing may be run within concrete slabs. All penetration points must be sleeved to prevent tubing damage (entry/exit points, expansion joints, etc.). Penetrations in walls, etc. may be sealed with silicone caulk. Do not use oil based caulk. Every effort should be made to use only 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.



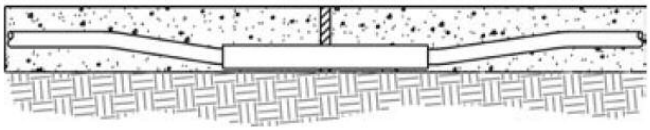
Allow sufficient slack when tubing is laid in trench.

See section 7.17 for additional information regarding use of PEX tubing in direct burial applications.

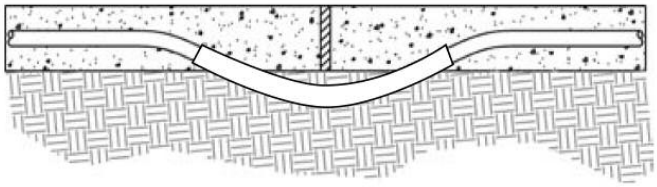
8.5 Installing Under The Slab

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

9. INSTALLING MANIFOLDS AND FITTINGS

9.1 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.

9.2 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"

9.3 PEX Press ProPress Manifolds

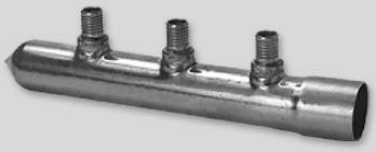
PEX Press ProPress manifolds are modular in design to allow for easy assembly and flexibility on the job site. They may be used where permanent connections are necessary (concealed locations). These manifolds have a 3/4" or 1" ProPress inlet with 1/2" or 3/4" PEX outlets. The open ends, one straight 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"



PEX Press Brazed Copper Manifold

PEX Press ProPress Manifold

9.4 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"

9.5 PureFlow MANABLOC® Homerun Manifold Plumbing System

Viega offers the industry's leading homerun manifold solution: MANABLOC. MANABLOC has been in use for over 15 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 MANABLOC Installation Guide for specific instructions regarding this system.

MANABLOC Homerun Manifold Plumbing System

9.6 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.

Copper Stub Out.

Copper Straight Stub Out.

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 tub els and PEX Crimp shower valve adapters are available for easy connections to tub and shower valves.

Copper Tub El.

Shower Valve Adapter.

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.

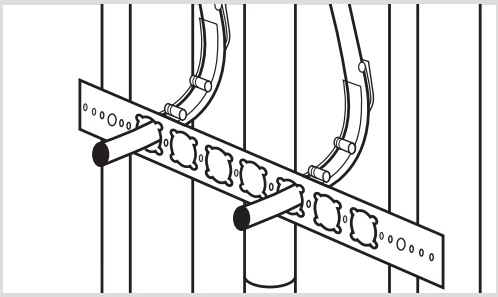
The exposed tubing can then be connected to a valve, using an optional chrome sleeve to cover the tubing if desired.

Drop Ear Elbow.

Drop Ear Bend Support.

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.



Snap-in Bend Supports with Bracket.

9.7 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.

Copper Tubing Adapters.

Press ProPress Adapter.

Copper Fitting Adapters.

9.8 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

Male Adapters.

Female Adapters.

PureFlow NPT Elbows.

9.9 Valves

Inline 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" PureFlow inlets and 1/4" CTS (3/8" O.D.) riser outlets.

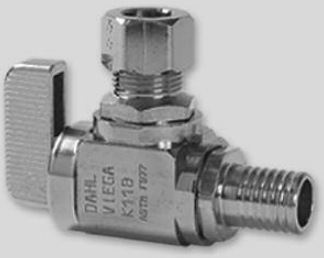
Both straight and angled versions are available depending on installation requirements.

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.)

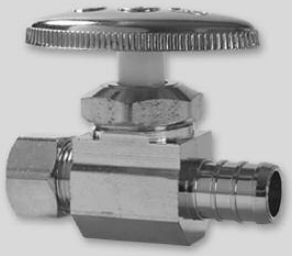
1/4 Turn Straight Stop Valve PEX Press to 3/8" O.D. Riser.

In-line Ball Valve.



1/4 Turn Angle Stop Valve PEX Press to 3/8" O.D. Riser.

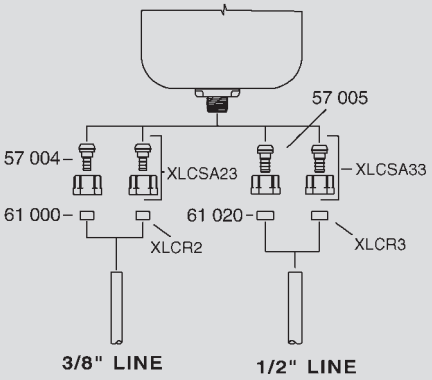
Compression Angle Stop Valve PEX to 3/8" O.D. Riser.

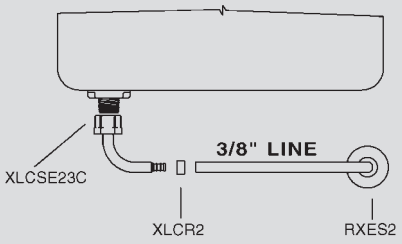


Multi Turn Straight Stop Valve PEX Crimp to 3/8" O.D. Riser.

Multi Turn Angle Stop Valve PEX Crimp to 3/8" O.D. Riser.

WATER CLOSET CONNECTIONS



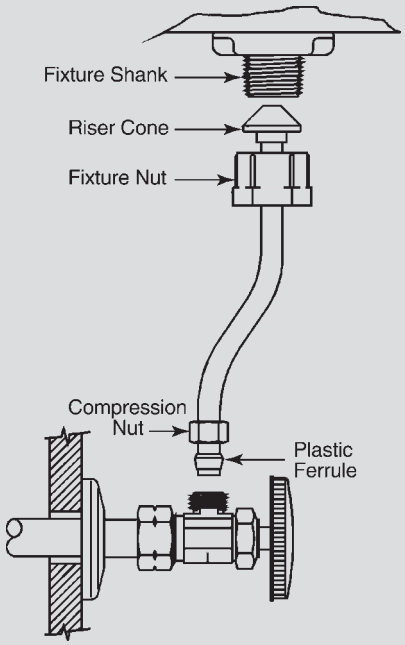


Tighten fixture nut hand tight plus an additional 1/4 turn.

Check all connections for leaks.

DO NOT OVER TIGHTEN.

RISER CONNECTIONS

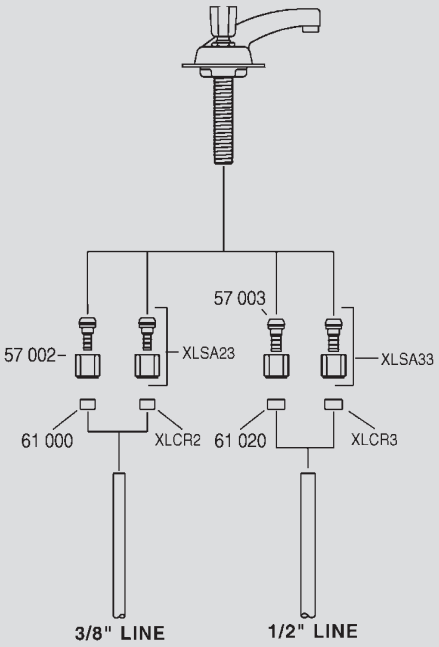


Thread fixture nut onto fixture shank. Tighten fixture nut hand tight plus an additional 1/2 turn.

Slide compression nut and supplied plastic ferrule over tube as shown. The long taper of the ferrule goes towards valve.

Tighten compression nut according to valve manufacturer's recommendations.

FAUCET CONNECTIONS LAV or KITCHEN

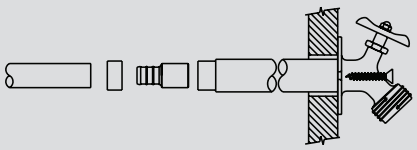


Tighten fixture nut hand tight plus an additional 1/4 turn.

Check all connections for leaks.

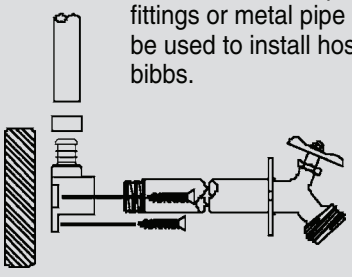
DO NOT OVER TIGHTEN.

HOSE BIBB CONNECTIONS



Hose bibbs supported by the structure can be connected directly.

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



10. 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 chart 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 below or on the following page.

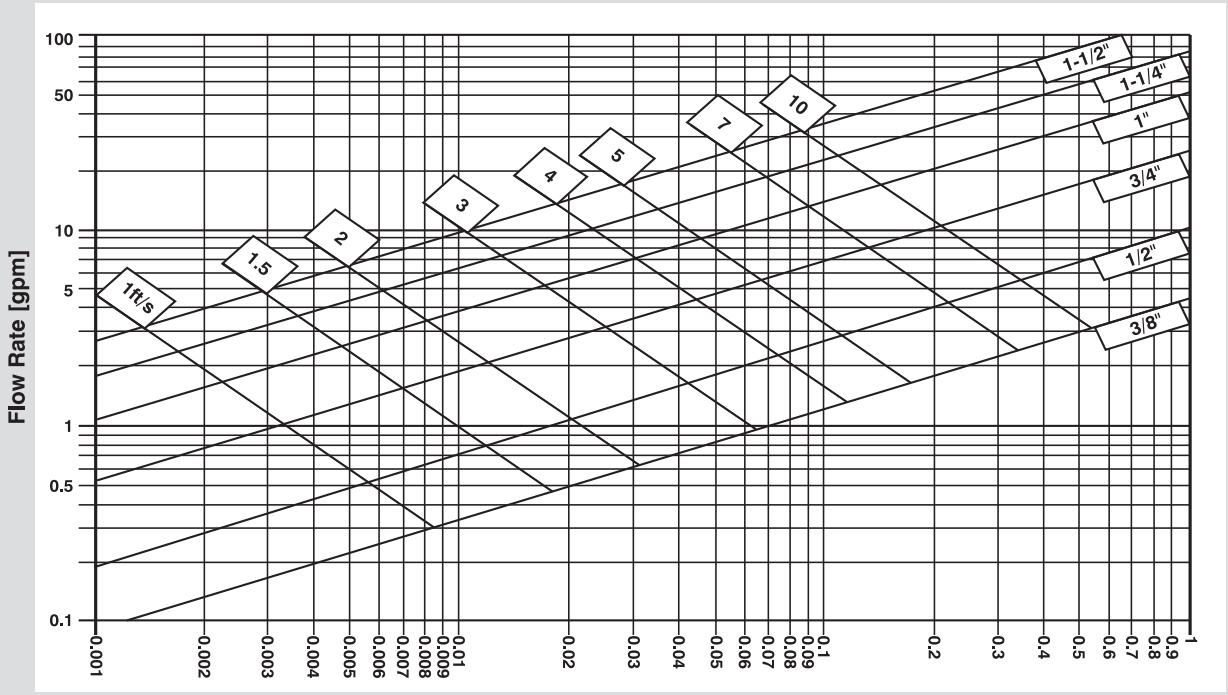
To determine the pressure drop through runs of ViegaPEX and FostaPEX tubing, refer to the pressure drop graph below or the chart on the following page. For a known flow rate, tubing size, and tubing length, the pressure drop through the run can be easily determined.

PureFlow PEX Press and Pex Crimp Fittings
Friction Loss - Equivalent Feet of SDR9 PEX Tubing

Size	Coupling	90° 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
1-1/4”	5.5	11.0	4.8	13.0
1-1/2”	6.1	13.0	5.0	16.0

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



Pressure Drop (psi per foot of PEX tubing)						
gpm	**3/8"**	**1/2"**	**3/4"**	**1"**	**1 1/4"**	**1-1/2"**
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
34						0.101
36						0.113
38						0.125
40						0.137

= 8 fps per size tubing

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

11. INSTALLATION METHODS

The flexibility of the PureFlow system and the manifold installation options provide the designer and installer with exceptional versatility. The availability of PureFlow tubing in various diameters and lengths makes it easy to design an appropriate system for any project, and the choice of coils or straight lengths in both ViegaPEX and FostaPEX simplifies installation. FostaPEX is an excellent choice for visible piping, since it can be run straight and presents a finished appearance.

11.1 Parallel Method (homerun)

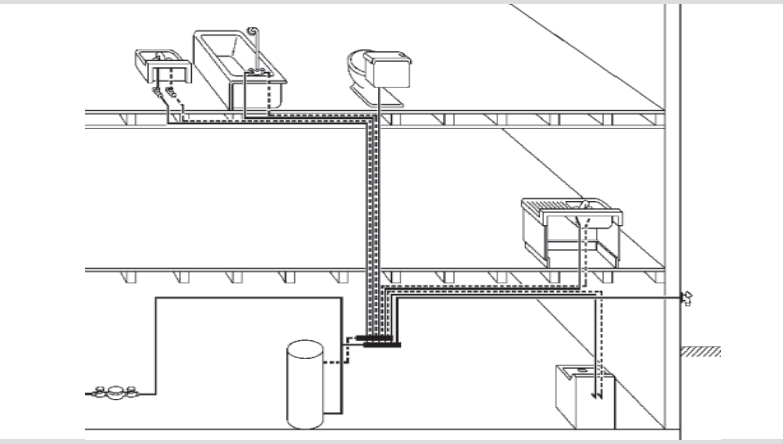
Using manifolds (see top illustration to the right), the installer can plumb a house with no fittings hidden inside walls. By installing a manifold system near the water source, tubing can be run directly to each fixture without using further fittings. This system provides the lowest pressure losses as well as eliminating interference between fixtures. Often each fixture can be fed with smaller diameter tubing which is easier and faster to install. Refer to the Viega MANABLOC Installation Guide for additional information.

11.2 Branching Installation (conventional)

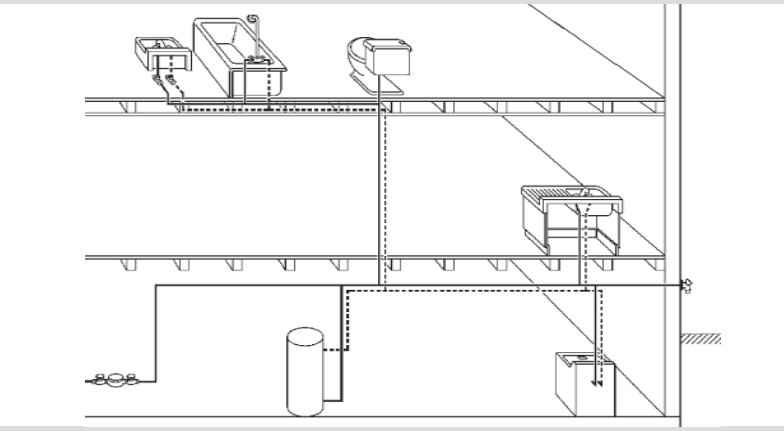
The PureFlow system can also be installed using a branching method identical to copper plumbing methods (see center illustration to the right). This reduces the total amount of tubing used, but requires more fittings (and thus increases installation time and cost). Tubing must be sized properly to feed the fixtures on each branch.

11.3 Combination Installation

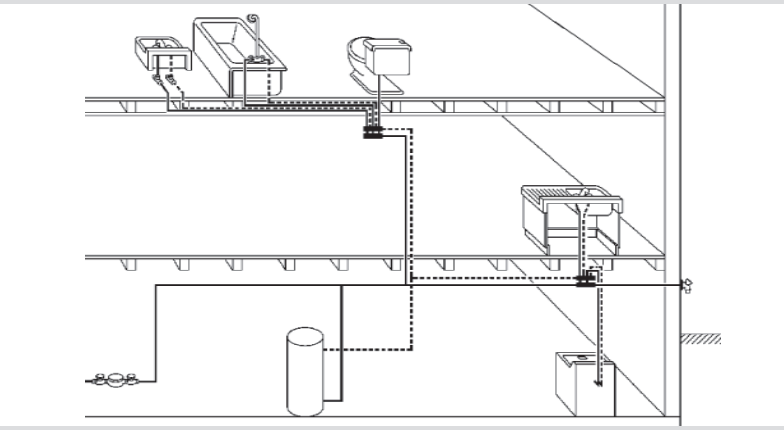
A third option is a combination of manifolds and branching, taking advantage of the benefits of both. By locating several smaller manifolds near groups of fixtures, tubing use can be reduced while keeping hidden fittings to a minimum (see bottom illustration to the right).



Parallel Method.



Branching installation.



Combination installation.

12. SYSTEM DISINFECTION

12.1 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.

13. CODES, STANDARDS, AND APPROVALS

13.1 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.

13.2 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 i-nsert 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.

13.3 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.

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

NSF P171 CL-R/CL-TD - Product meets requirements of NSF Protocal P171, Chlorine Resistance of Plastic Piping Materials; exeeding the pass/fail criteria of both traditional domestic and domestic continuous recirculation ratings.

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 Evaluation Services Report - Product complies with International Plumbing Code and Uniform Plumbing Code.

14. PUREFLOW WARRANTY

The Viega PureFlow system is covered by an extensive warranty. Please refer to the separate warranty document for specific details.

NOTES

Professional products, service and training for professional contractors

Rely on Viega for the most complete line of high tech/high quality plumbing, heating and snow melting systems available today… plus the most comprehensive customer field support in the industry.

Dedicated to education, Viega has been recognized by industry professionals as offering some of the most innovative, informative and interactive training courses. We have a comprehensive list of sessions in a variety of forms from half day workshops to rigorous three-day programs. Call to receive our complete course catalog.

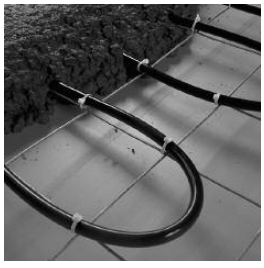
Pro*Press*® System
Flameless copper joining technology.

Pro*PressG*™ System
Flameless copper fuel gas joining technology.

Pure*Flow*® Systems
Flexible PEX tubing plumbing technology.

Pro*Radiant* Systems
Comfortable, efficient heating technology.

S-no-*Ice*® System
Snow and ice melting technology.



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