ComfortPro Systems

System selection and installation

AquaSeal

A better approach to piping and plumbing systems

PEX piping and plumbing products

AquaSeal

Aquaseal Plumbing Systems

System types

New Joining methods and connection guidelines

AquaSeal

Aquaseal product offering

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



AquaSeal Pex-A pipe. in red, blue, and natural colors. Tubing is made using the Engel method. The Engel method is a hot cross-linking process, meaning the actual cross-linking takes place during the extrusion process when the base polyethylene is above its crystal melting temperature. The Engel method provides more precise control over the degree, consistency and uniformity of cross-linking. This means the tubing is evenly cross-linked, with no weak links within its molecular chains.
Available in 3/8”,1/2”, 3/ 4”, 1” pipe sizes. Avaiable in 20’, 100’, 300’, 1,000’ lengths.

AquaSeal SDR-9 large diameter pipe is available in natural color in 1-1/4”, 1-1/2”, and 2” pipe sizes. It is avaiable by the foot, 20’, 100’, and 300’ lengths.

AquaSeal SDR-11 large diameter pipe is available in natural color in 40mm, 50mm, 63mm, 75mm, 90mm, 110mm pipe sizes. It is avaiable by the foot, 20’, 100’, and 300’ lengths.

AquaSeal Pex-C pipe in red, blue, and natural colors. Tubing is manufactured using the irradiation method of cross-linking. The Irradiation method the pipe is extruded first and then sent through an accelerator to complete the cross-linking process. The Irradiation method provides more precise control over the degree, consistency and uniformity of cross-linking. This means the tubing is evenly cross-linked, with no weak links within its molecular chains.
Available in 3/8”,1/2”, 3/4”, 1” pipe sizes.

AquaSeal

Brass and Plastic fittings

AquaSeal cold expansion F1960 lead free brass fittings conform to ASTM F877, F1960, NSF-61, PW-G, CAN/CSA B137.5 standards. Pex rings are manufactured from Pex-A material and includes a leading edge chamfer and stop edge. F1960 fittings can be used on Pex plumbing and radiant heating systems. F1960 fitting connections are completed using a manual or powered PEX expander tool.





AquaSeal brass fittings meet the requirements of ASTM F1807 & CSA B137.5 standards




Aquaseal ProPlas insert fittings are manufactured to ASTM F-2159 & CSA B137.5 standards




AquaSeal ProPlas series polymer insert fittings for use with CTS-OD, SDR9 cross-linked polyethylene (Pex) tubing represent a new generation of joining products specifically designed for Pex hot-cold water distribution systems. The ProPlas series of fittings is produced from an engineering thermoplastic polymer called Acudel® developed by Solvay Advanced Polymers, L.L.C. Acudel® resin offers many improved performance characteristics that make it an excellent choice for molded components installed in the demanding environment of a hot and cold water plumbing or heating system.

Key Features:

- Superior resistance to environmental stress cracking
- Exceptional mechanical toughness, ductility and resistance to creep
- Excellent hydrolytic stability to hot water
- Excellent resistance to chlorinated water and many other oxidative agents
- Fully approved, certified and listed for use in potable water systems
- Suitable for use in hydronic radiant heating systems

AquaSeal cold expansion F1960 Poly plastic fittings are manufactured from Acudel, a modified polyphenlsylfone (PPSU) that conforms to ASTM F877, F1960, NSF-61, PW_G, CAN/CSA B137.5 standards. Rings are manufactured from Pex and includes a leading edge chamfer and stop edge. F1960 Poly fittings can be used on Pex plumbing systems. F1960 fitting connections are completed using a manual or powered PEX expander tool.





AquaSeal F1807 Poly Mini Manifolds are manufactured from Acudel, a modified polyphenlsylfone (PPSU) that conforms to ASTM F877, F1960, NSF-61, PW_G, CAN/CSA B137.5 standards. Poly Mini Manifolds can be used on Pex plumbing systems. F1807 manifold fittings connections are completed using Pinchlok clamps or stainless steel press sleeves.



ASTM F-876 / F-877 / F-2023
NSF- 61
CSA B137.5
ICBO
IAPMO
ICC

ASTM F 1960: Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-Linked Polyethylene (PEX) Tubing

ASTM F 1807: Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-Linked Polyethylene (PEX) Tubing

ASTM F 2098: Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-Linked Polyethylene (PEX) Tubing to Metal Insert Fittings

ASTM F 2159: Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-Linked Polyethylene (PEX) Tubing

IAPMO – IGC 188: Removable and Non-Removable Push Fit Fittings ASSE Standard – 1061

Important Notice

All AquaSeal products should be installed by a licensed plumbing contractor. It is the sole resposiblity of the installer to verify that the product meets local standards.

Like most plastic material, crosslinked polyethylene is subject to ultraviolet (UV) deterioration and must not be exposed to direct or indirect sunlight, unless it is UV protected. Storage outside is not recommended but if this becomes necessary, the pipe must be covered with a material which will protect it from ultraviolet light. Failure to do so will void the warranty.

For best results install AquaSeal pipe and fittings with ambient temperature above 40 degrees.

AquaSeal

Advanatages of Pex

Durable	Strongest plumbing pipe available, three times stronger than steel.
Environmentally Sound	PEX pipe is inert and nontoxic. Fittings are lead free.
Ease of Installation	Flexibility eliminates fittings and labor.
Clean Smooth Surfaces	Pipe walls will not collect mineral scale or corrosion.
Noise Reduction	Eliminates water hammer noise common in metal systems.
Equalized Pressure Drops	Minimizes hot and cold surges found in branch and tee systems.
Multiple Joining Methods	Cold expansion with PEX ring, copper crimp ring stainless locking clamp, stainless press sleeve.
Multiple Repair Methods	Cold expansion with PEX ring, copper crimp ring stainless locking clamp, stainless press sleeve.
Cost Effective	Material costs 1/3 of copper, labor savings up to 40%.
Easier to Mount	Reduced material weight smaller mounting and hanging methods.
Conserves Energy and Water	Approved for continuous recirculation of hot water.
Resistance to Freeze Damage	PEX expands with freezing water minimizing .pipe splitting.
Multiple Design Options	Home run, trunk and branch, remote manifold, or combination of all.
Chlroine Resistance	AquaSeal Pex is manufactured to meet the new Chlorine standard ASTM F2023.
Plenum Rated	May be run in drop ceilings and chases.
Warranty	25 year limited.

Should not be exposed to open flame.

Should not be permanently exposed to UV light.

Should not use bituminous (coal tar) glue or any material that affects the basic properties of crosslinked polyethylene.

Should not be used in excess of 180°F and 100psi.

Should not install within 6" of any gas applicance vent piping, or within 12" of any recessed light fixtures.

Should not solder pipe connections within 16" of any AquaSeal pipe in the same water line.

Should not come into contact with low molecular weight petroleum products such as fuels or solvents..

Should not be used for LP or natural gas.

Should not be installed below 40 degrees F for best results installation of fittings.

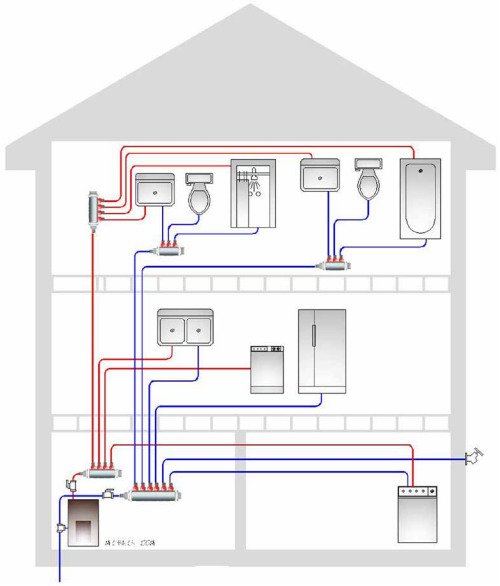
Like most plastic material, crosslinked polyethylene is subject to ultraviolet (UV) deterioration and must not be exposed to direct or indirect sunlight, unless it is UV protected. Storage outside is not recommended but if this becomes necessary, the pipe must be covered with a material which will protect it from ultraviolet light. Failure to do so will void the warranty.

Plastic Fittings

The following recommendations are intended to provide individuals with guidelines for the safe handling, storage and installation of ProPlas insert fittings. An understanding of the strengths and limitations of ProPlas insert fittings will help to ensure that they maintain optimum performance characteristics throughout the life of the system.

In all phases of ProPlas product handling, from the manufacturing facility to the shipping company, in warehousing and ultimately into the possession of the contractor, the following controls must be implemented.

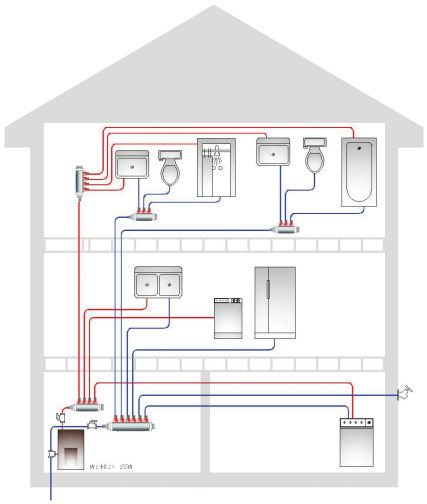
DO NOT allow fittings come into contact with solvents, oils or grease products.
DO NOT lubricate fitting insert barbs.
USE ONLY Teflon® thread tape on Poly-Alloy male threads



HOME RUN SYSTEM
ProPort w/ shut offs

Advantages
- Central location
- Shut-off on each line
- Performance

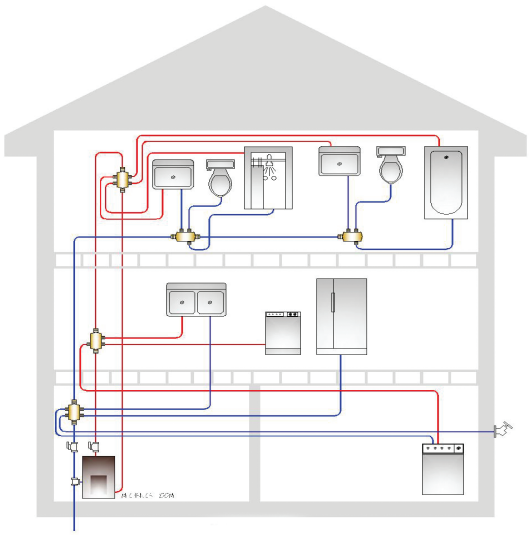
Disadvantages
- Uses more pipe



MODIFIED HOME RUN SYSTEM
ProPort w/ shut offs

Advantages
- Less pipe
- Shut-off on each line
- Performance

Disadvantages
- Manifolds are expensive



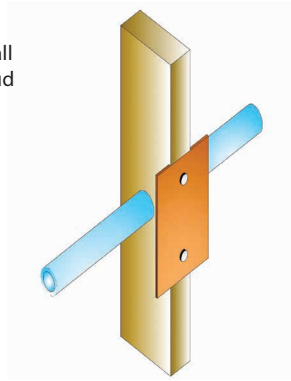
MULTIPORT TEE

Advantages
- Pex costs less than copper
- Installs faster than copper

Disadvantages
- Performs the same as branch and tee

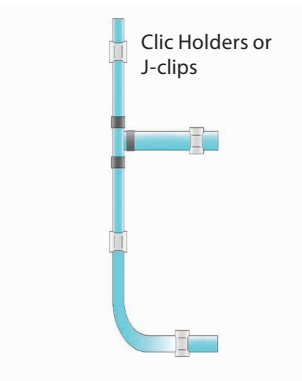
- Tightest bend radius for PEX is 6 times the outside diameter at 68°F (20°C).
- AquaSeal® expands or contracts 1' in every 100' of pipe with every 10°F temperature change; allow slack, 1/8" per foot of PEX, to compensate.
- Use protective sleeves when penetrating floors, laminated wood, or metal studs.
- Drill holes at least 1/4" larger to provide free movement of tube.
- Multiple tube bundles must be protected by heavy gauge protective sheet at the area of abrasion
- Protect pipe with steel plate if it is within 2" of a stud, plate or nailing surface (see Figure 1).
- Prevent strain on fittings by holding PEX in position when bending (see Figure 2).
- Horizontal runs should be supported every 32".
- Vertical runs need support every 4' ft. vertically (see Figure 3).

Figure 1



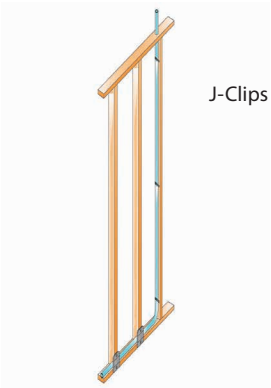
Steel plate must be placed in front of PEX pipe if it is within 2" of surface

Figure 2



Always hold PEX pipe in position to prevent strain on fittings when bend is being made.

Figure 3



PEX pippe needs to be supported at every floor if run vertically.

89122 pipe tracking

12005 Tube tallon

86115 metal bend support

86105 Plastic bend support

- When running AquaSeal PEX be sure to install at least 6" away from any gas appliance vent piping, or 12" from any recessed light fixtures. (see Figure 4).
- If Aquaseal PEX is notched or cut, section of PEX must be cut out and replaced.
- Use 18" long copper connectors on gas fired water heater before transitioning to AquaSeal on both inlet and outlet.
- Use copper stub-outs or elbow sleeves for tight 90° turns when exiting walls (see Figure 5).
- Water distribution manifolds should not be mounted closer than 36" vertically or 18" horizontally from any water heating source or exhaust venting pipe. (see Figure 7)
- Do not install mainfolds in locations where they may be exposed to freezing temperatures.
- Be sure to properly insulate any wall cavity with an outside facing surface such as between an unheated garage and the house interior.
- Do not leave manifolds under water pressure if the structure will be unoccupied and unheated during periods when freezing weather may occur.

Figure 4

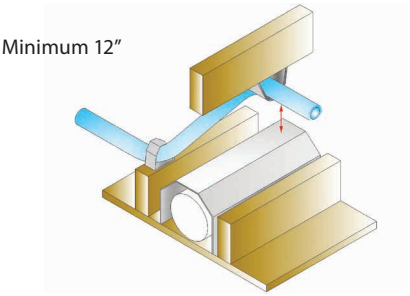


Figure 5

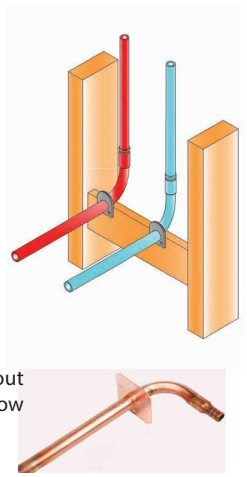
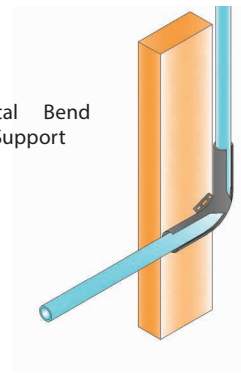


Figure 6



INTUMESCENT FIRE STOP PRODUCTS AND THEIR COMPATIBILITY WITH CROSS LINKED POLYETHLYENE PIPE

Intumescent compounds commonly used as fire stop materials expand up to ten times their previous size when heated to seal openings used for routing plumbing pipes.

Products containing bituminous compounds can attack pex pipe and destroy the cross linking. These coal tar and petroleum compounds are used as evaporative agents in many paints and sealants and must be avoided.

Below is an approved list of fire stop caulk products that may be used with pex pipe.

MANUFACTURER	TRADE BRAND NAME	CATALOG NO.
Hercules	Plumbers firestop sealant	25696
3M	FIRE BARRIER	CP-25WB
A/D Fire Protection Systems	A/D Firebarrier Intumescent Caulk	
USG	FIRECODE	
DAP	DAP Fire Stop Sealant	070798188068

TABLE 1.1 Demand Load Of Fixtures			Fixture Units		
Fixture	Occupancy	Type of Supply Control	Cold	Hot	Total
WC	PUBLIC	FLUSH VALVE	10.00		10.00
WC	PUBLIC	FLUSH TANK	5.00		5.00
URINAL	PUBLIC	1" FLUSH VALVE	10.00		10.00
URINAL	PUBLIC	3/4" FLUSH VALVE	5.00		5.00
URINAL	PUBLIC	FLUSH TANK	3.00		3.00
LAVATORY	PUBLIC	FAUCET	1.50	1.50	2.00
BATH	PUBLIC	FAUCET	3.00	3.00	4.00
SHOWER	PUBLIC	MIXING VALVE	3.00	3.00	4.00
BASIN	OFFICE	FAUCET	2.25	2.25	3.00
KITCHEN SINK	HOTEL, RESTAURANT	FAUCET	3.00	3.00	4.00
DRINKING FOUNTIAN	OFFICE	3/8" VALVE	0.25		0.25
WC	PRIVATE	FLUSH VALVE	6.00		6.00
WC	PRIVATE	FLUSH TANL	3.00		3.00
BASIN	PRIVATE	FAUCET	1.00	1.00	1.50
BATH	PRIVATE	FAUCET	1.50	1.50	2.00
SHOWER	PRIVATE	MIXING VALVE	1.50	1.50	2.00
KITCHEN SINK	PRIVATE	FAUCET	1.50	1.50	2.00
LAUNDRY TRAY	PRIVATE	FAUCET	2.25	2.25	3.00
DISHWASHER	PRIVATE	FAUCET		1.00	1.00
WASHING MACHINE 8lbs	PRIVATE	AUTOMATIC	1.50	1.50	2.00
WASHING MACHINE 8lbs	PUBLIC OR GENERAL	AUTOMATIC	2.25	2.25	3.00
WASHING MACHINE 10lbs	PUBLIC OR GENERAL	AUTOMATIC	3.00	3.00	4.00

Definition of Terms

Fixture Unit: The demand imposed by a number of fixtures used intermittently cannot be determined exatly, so each fixture is given a factor known as a fixture unit which corresponds to a demand in GPM.

Note: for the purposes of this book the fixture unit is used only to determine the size of distribution pipe required; it is not necessary to know the corresponding GPM.

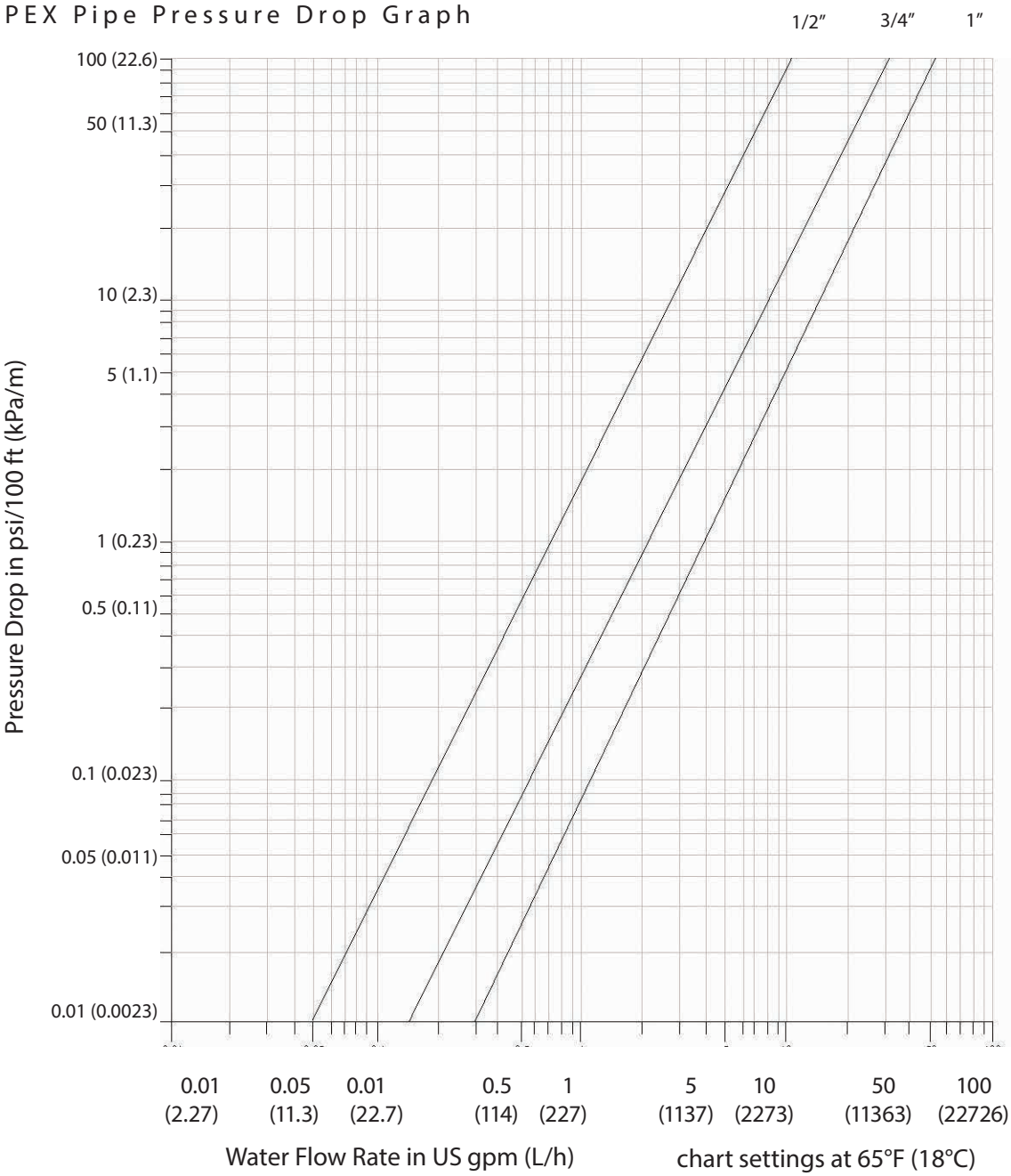
Distribution pipe: Pipe from manifold to fixture

Service pipe: Pipe feeding manifold

NR: Not recommended

Note: fixture unit information supplied from general code book info. Please check with your local code authority to confirm the local recognized standard.

PEX Pipe Pressure Drop Graph



Note:

1 kPa = 10 mbar
100 Pa = 1 mbar
0.0145 psi = 1mbar
14.5 psi = 1000 mbar

1 ft H_2O/ft = 97.97 mbar/m
1 mbar/m = 0.010207 ft H_2O/ft
1 ft H_2O/ft = 0.4331 psi/ft
1 mbar/m = 0.004421 psi/ft

1 mbar = 0.033456 ft H_2O
1 ft H_2O = 29.89 mbar

F-1960 COLD EXPANSION CONNECTIONS FOR PEX-A PIPE

American Society for Testing and Materials (ASTM) Standard Specification for Cold-Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) Tubing.

- F-1960 fittings can be made from variuos certifieds, listed and approved materials. See ASTM standard for acceptable brass alloys. Assure your fitting is made from a listed material.
- F-1960 compression rings are PEX.
- Compression is made by plcing a compression ring onto tube, expanding PEX tube and ring. insterting a full flow fitting, and holding it in place until the tube / ring memory secures the connection.
- Handling requirements are included within the Fittting / Ring limitation Section.
- Fittings are reusable if barb is undamaged.

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

2. Install PEX sleeve onto OD of tubing.

3. Using tube expander, expand sleeve fully. Repeat expansions, rotating expander 1/8-turnbetween expansions

4. Insert fitting into expanded tube and sleeve. Assure proper expansion so that fitting is touching tube and sleeve. Hold fitting in place until tube/sleeve memory constrict annularly around the fitting.

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

Note: To limit the amounnt of time in cold enviroonments, expand the tube / sleeve slowly and only enough to fully insert the fitting. Keeping the sleeves warm will speed retraction and inhibit unequal expansion. Expansion tool cone should be kept greased to insure that it proper tool release from pex.

AquaSeal

Aquaseal system connection methods

STAINLESS STEEL PRESS SELEVES

ASTM F-1807 Stainles Steel Press Sleeves for use with (SDR-9) Cross-linked Polyethylene (PEX) Tubing.

- ComfortPro has patented a stainless steel sleeve for F1807 and/or F2159 fittings
- Press Sleeve is a compression sleeve that incorporates tube stop at the top to evidence proper placement of the tube against the the tube stop on a fittingensuring a perfect installation.
- Connection is made by compressing the sleeve to create a full 360-degree seal over the press sleeve.
- Sleeves can be pre-loaded onto the tube or fitting before installation and can remain in place for ease of installation.

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

2. Install compresstion Press Sleeve onto the OD of tubing OR on to the fitting. Load rolled edge stop to the shoulder of the fitting.

3.Install either an F1807 fitting or an F2159 fitting fully into tube. Witness a fully inserted tube through the rolled edge stop.

4. Assure sleeve is fully installed onto square cut tube and assembly iis installed fully over a fittting.

5. Compress tool perpendicular to tubing run. Compress only once. Remove defective connections. Use a gauge to assure a proper joint. Test completed joint.

Note: Press Sleeve tool teeth assure a 360 degree compression of stainless sleeve.

ASTM-2098 PINCHLOK CLAMPS

Overview:
The PinchLok clamp should be installed in accordance to local plumbing code and practices. In addition to these standards, the following should be considered:

Warranty:

Pinchlok/Oetiker clamps have a lifetime warranty when installed following our installation guidelines using the AquaSeal 12147 domestic tool.

Tools: use an approved tool such as AquaSeal's Pinchlok 11247 clamp tool or equivalent (must be ratcheting-type tool meeting ASTM 2098 specifications). Failure to use this type of tool may result in an improper fit and voids the factory warranty. Use of other tools, such as pliers, may result in an improper fit.

Making AquaSeal connections using PinchLok clamps

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

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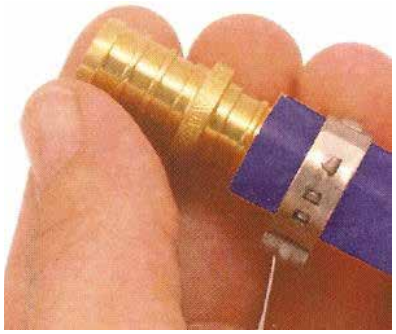
Making AquaSeal connections using PinchLok clamps

2. Slide the PinchLok Clamp over the end of the AquaSeal pipe. Allow enough room to allow for the fitting to be inserted.



3. Insert the fitting into the tube end making sure the tube is fully sealed over the fitting. Allow for 1/8" of clearance between the Pinchlok Clamp and the fitting.

4. Position the open jaws of the PinchLok Tool over the tabs of the Clamp and squeeze. The ratchet effect of the PinchLok Tool will not allow for an improper connection. The PinchLok Tool will release automatically when the connection is complete.

5. Verify the connection is secure by visually checking the PinchLok Tab. The tab should be shaped as shown below.

THE CLAMP "EAR" SHOULD BE DEFORMED WITH A CONSTANT FORCE IF POSSIBLE.
PROPERLY FORMED "EAR" OPEN CLAMP.

F-1807 COPPER CRIMP RINGS

Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR-9 Cross-linked PEX tubing .

- F1807 fittings can be from various listed materials. See ASTM standard for acceptable brass alloys. Assure your fitting is made from a listed material.
- F1807 systems use a copper crimp ring to compress around a fitting.
- Connection is made by positioning a crimp ring ove a fittings sealing barbs and compressing it into position.
- Fittings are reusable if barbs are not damaged.

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

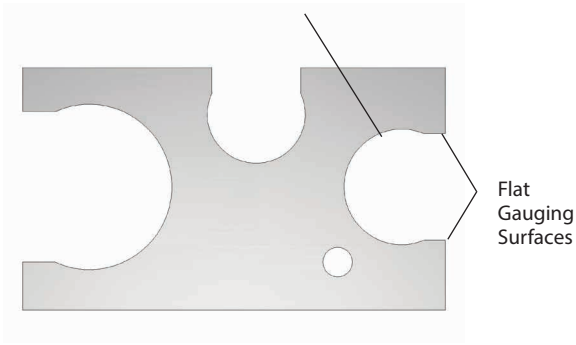
2. Install PEX crimp ring onto OD of tubing.

3. Install PEX fitting into tube end.

4. Position ring over sealing barbs of the fitting. The ring should be positioned approximately 1/8" to 1/4" from the end of the tube.

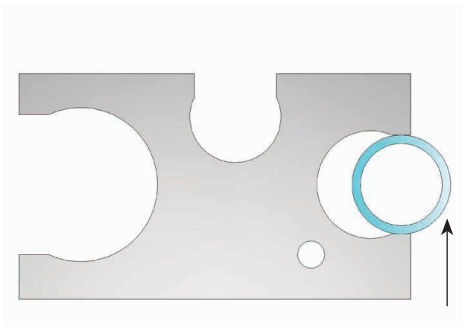
5. Compress tool perpendicular to tubing run. Compress only once. Remove defective connections. Use a gauge to assure a proper joint. Test completed joint.

Using the Crimp Gauge (#11100) Properly

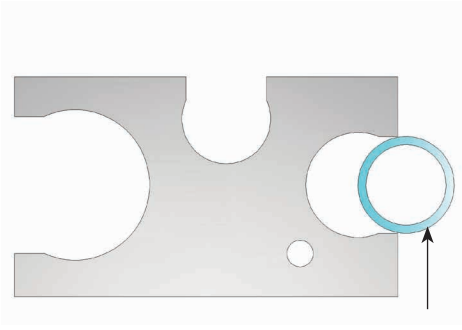


1. The flat portion of the opening is the gauging area.
2. The "GO" opening should go freely across a crimped ring anywhere on its diameter with the possible exception the upset area on the ring surface caussed by the tool jaws closing. do not force the gauge across the ring.
3. The gauge should always be pushed across the crimped ring from the side. do not slide the gauge along the tube up to the crimped ring.

Correct Crimp tight enough–GO



Incorrect Crimp not tight enough – NO GO



Note: Fitting and tube are not shown in illustrations for clarity. The crimp gauge is to be used only on crimp rings that have been crimped onto tube and fittings.

Kinked Pipe Repair

One of the most important features of Aquaseal crosslinked pipe is its ability to "memorize" its structure and shape. As such, a kinked area can be heated with an electric hot air gun to approximately 260°F (125°C). Please note that open flame can not be used. Heat should be applied evenly until pipe appears clear around it's entire circumference. Let the pipe cool undisturbed at room temperature. The repair is now complete.

Testing

- Once the Aquaseal® brass and plastic insert plugs are available in 3/8", 1/2", 3/4" and 1".
- An appropriate test kit must be connected to the roughd in system, and should include a pressure gauge for monitoring.
- Water or air may be used for testing. If allowed by local codes, air is often preferable because of ease of use.
- If testing with water, test to 25 psi above operating pressure.
- If testing with air, test to 50 psi above operating pressure.
- Duration of test should be at least 20 minutes.

Test requirements specified in your local building and plumbing codes must always be followed

ComfortPro Systems LLC
751 N. Rohlwing Rd. Itasca, IL 60143
Phone: 1-800-968-8905
www.comfortprosystems.com

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