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# SharkBite<sup>®</sup> New Construction System Installation Guide

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SharkBite<sup>®</sup> EvoPEX<sup>®</sup> Fittings SharkBite Universal Fittings SharkBite Integral Valves <u>SharkBite PEX</u> Pipe

### An Evolutionary PEX Push System

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### Introduction

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FEATURES & BENEFITS OF SHARKBITE EVOPEX FITTINGS

- Instant push-to-connect connection for increased ease-of-use-No soldering, clamps, unions or glue required. Permanent connection.
- Visual indicator to confirm successful 
   connection
- PEX Only

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- · ID pipe seal
- No tools required
- Pressure test system immediately
- · Made in the USA
- Patent pending

The purpose of this guide is to familiarize plumbing professionals with the SharkBite<sup>®</sup> Connection System, and the recommended method of installing the SharkBite<sup>®</sup> EvoPEX<sup>®</sup> system, SharkBite Universal brass push-to-connect fittings, and SharkBite PEX Pipe.

SharkBite EvoPEX fittings and SharkBite Universal brass fittings are for use in hot and cold domestic water, and radiant heating/cooling systems. The SharkBite EvoPEX push-to-connect fittings are for use with only PEX Pipe and has a 25 year system warranty when installed with SharkBite PEX Pipe. SharkBite EvoPEX system is rated to 80 PSI @ 200°F (93°C), 100 PSI @ 180°F (82°C), and 160 PSI @ 73.4°F (23°C). SharkBite Universal fittings are rated to 200°F (93°C) max and 200 PSI max.

#### FEATURES & BENEFITS OF SHARKBITE UNIVERSAL FITTINGS

- Instant push-to-connect connection
   for increased ease-of-use-No soldering,
   clamps, unions or glue required. Removable
   fitting with demount clip or tongs.
- Universal transition fitting for copper, CPVC, PE-RT, HDPE SDR-9, and PEX Pipe
- No tools required
- Made in Australia and in the USA
- Integral pipe liner for PEX installations

   Integrated design means no loose components, ensures secure, reliable connection
- Compact, robust DZR brass body– Foundation of a strong, corrosion resistant, durable fitting
- Patented Technology

### CERTIFICATIONS

- SharkBite EvoPEX and SharkBite Universal push-to-connect fittings, size 1/2", 3/4", and 1" are:
- Largest push-to-connect fitting brand listed with CSA
- Certified to ASSE 1061, ASTM F877\* and CSA B125.3 standards
- Listed to ASSE 1061, NSF/ANSI 61, NSF/ANSI 372, ASTM F877\* by IAPMO
- Tested to CAN/ULC S102.2
- UPC, IPC, NSPC, and NPC of Canada compliant
- SharkBite Universal brass fittings are certified for underground applications. All SharkBite Universal fittings with brass bodies (Universal and EvoPEX) must have an impervious barrier between the fitting and the surrounding soil. Self-fusing, formaldehyde and chloride-free, fully cured silicone tape with a minimum thickness of 0.020" should be used for this purpose. Failure to adequately wrap SharkBite Universal Fittings will void warranty.
- SharkBite EP EvoPEX fittings are certified for underground applications without a wrapping material and have a 10 year warranty when buried.
- Approved for behind the wall installations without access panels. Designed for potable water distribution, as well as non-potable water applications such as radiant and hydronic heating.

\*EvoPEX Only

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## **Making a SharkBite EvoPEX Connection**

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**STEP 1** 

When cutting SharkBite PEX Pipe, ensure that the ends are cut square and the surface is smooth. Ensure that both the EvoPEX pipe and fitting are clean and free of dirt and debris in preparation for making a connection.



### **STEP 2**

Push the pipe into the fitting firmly (a twisting action reduces insertion force). Take care to avoid inserting the pipe at an angle.



**STEP 3** Ensure that the pipe is pushed into the fitting fully and engaged properly by checking that the green indicator ring is fully visible in all four slots. This ensures a permanent connection.

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### Making a SharkBite Universal Connection

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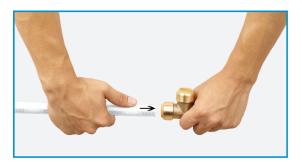


When cutting SharkBite PEX Pipe, ensure that the ends are cut square and the surface is smooth. Ensure that both the PEX pipe and fitting are clean and free of dirt and debris in preparation for making a connection.



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**STEP 2** Insert the pipe through the release collar to rest against the grab ring.





#### **STEP 3**

Push the pipe firmly with a slight twisting action until it reaches the tube stop. To ensure that the pipe is correctly inserted, check that the depth mark is within 0.005 in (0.13 mm) of the end of the release collar.

NOTE: Install SharkBite push-to-connect fittings at least 1" apart to enable disassembly of the joint.

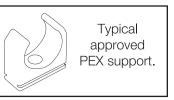
### DISCONNECT

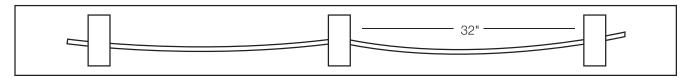
- Place the SharkBite disconnect clip around the pipe with the non-branded face against the release collar. If using the SharkBite disconnect tongs, place the teeth around the fitting assembly. The fork end with the SharkBite brand logo should be positioned around the pipe and the other end around the neck of the fitting.
- 2. Push the clip against the release collar and pull the pipe with a twisting action to release the pipe. If using the SharkBite disconnect tongs, squeeze the tool with one hand and pull the pipe with a twisting action to release the pipe.
- 3. Check the fitting and pipe end for damage. The fitting and pipe should be free of damage, foreign objects and marks on the outside diameter. If the pipe is damaged or marked, then cut and use a new section of pipe.

### **PROPER SUPPORT OF SHARKBITE PEX PIPE**

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SharkBite PEX Pipe must be properly supported to protect against excessive strain. For both vertical and horizontal applications we recommend the pipe be supported every 32" between supports (sizes 1" and smaller), leaving a little slack (1/8"-1/4") in the pipe to allow for normal expansion and contraction. Always use approved PEX supports and never use a support that has sharp edges.





### **CONCRETE INSTALLATION OF SHARKBITE® PEX PIPE**

The SharkBite PEX Pipe can be submerged in concrete but we recommend following these guidelines to ensure a long lasting, maintenancefree installation.

- Protect the SharkBite PEX Pipe with non-metallic sleeves when entering or exiting the concrete slab. A larger diameter piece of SharkBite PEX Pipe also works well in this application.
- Do not allow joints within the slab. Use a continuous length of SharkBite PEX Pipe within the slab and be sure to check for leaks before pouring concrete.

### **CROSS LINKING METHODS**

Cross linking is a process that changes the chemical structure of high density polyethylene used to make PEX Pipe, so that the polymer chains are connected with each other in a three-dimensional matrix by chemical bonds. PEX A, B and C are terms used to describe the different manufacturing methods used to produce PEX Pipe, not grades of PEX. Regardless of which manufacturing method is used, all PEX Pipe meets the same ASTM standards for commercial and residential plumbing applications.

#### **Classification of Crosslinked Polyethylene**

	Typology	Method	Symbol
А	Chemical	Peroxide cross linking	PEX-a
В	Chemical	Silane cross linking	PEX-b
С	Physical	Radiation cross linking (beta)	PEX-c

### **TECHNICAL DATA FOR SHARKBITE PEX PIPE**

### **SHARKBITE PEX PIPE MARKING:**

All SharkBite PEX Pipe is marked with:

### **TUBING LENGTH**

	MANUFACTURER					
		OPTIONAL FO	R OXYGEN BARRIER PIPE ONLY			
			TUBING SIZE & IDENTIFICATION	MANUFACTURING LOCATION & DATE		
			CHLORINE RESISTANCE			
0025 ft	CASH ACME	02 BARRIER	1/2" SDR9 PEX5006 160PSI@73F - 100PSI@180F	C1 WG 6.12.14=16:00		

### CODE EVALUATION

CSA B137.5 ANSI/AWWA C904 ASTM F876/877 (ASTM F1807, ASTM F2098, ASSE1061)

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### **TECHNICAL DATA FOR SHARKBITE PEX PIPE (CONT'D)**

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### **CERTIFICATIONS:**

The SharkBite PEX Pipe is design certified to ASTM F-876, F-877, UL 1821, CSA B137.5 standards, and is listed to the NSF standards 14 and CSA B137.5 standards for use in potable water systems.

### **MAXIMUM WORKING PRESSURE:**

160psi @ 73.4°F (23°C) 100psi @ 180°F (80°C) 80psi @ 200°F (93°C)

### **THERMAL EXPANSION:**

Since SharkBite PEX Pipe will expand and contract during temperature changes, please allow slack when running the pipe through the building. SharkBite PEX Pipe will expand and contract at a rate of approximately 1" per 100 feet of Pipe for each 10°F change in temperature (see equation below). We recommend that offsets and expansion loops be used as ways to compensate for expansion and contraction. The change of pipe length due to temperature increase can be calculated as follows:

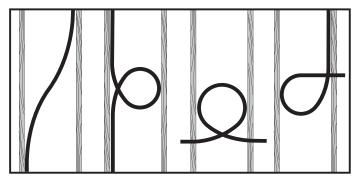
 $\Delta L = \alpha(L \cdot \Delta T)$ 

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where:  $\Delta L$  = change of length (inches)  $\Delta T$  = change of temperature (°F) L = original pipe length (feet)  $\alpha$  = coefficient of linear expansion = (8 x 10-5 @ 68°F)

**EXAMPLE:** ΔT = 10°F L = 100' ΔL = 0.08"

### **EXPANSION/CONTRACTION LOOP METHODS:**



### SHARKBITE PEX PIPE DIMENSIONS, BEND RADIUS AND FLUID CAPACITY:

Nominal Diameter	OD inches	ID inches	Bend Radius	Fluid Cap 100'/Gals
3/8"	0.5	0.35	4"	0.53
1/2"	0.625	0.475	5"	0.96
3/4"	0.875	0.671	7"	1.9
1"	1.125	0.885	10"	3.1

### **PRESSURE LOSS DATA:**

Flow Rate	Pressure Loss psi/100 ft of pipe			
GPM	3/8"	1/2"	3/4"	1"
0.2	0.427	0.099	0.019	0.006
0.3	0.880	0.204	0.039	0.012
0.4	1.470	0.341	0.065	0.019
0.5	2.189	0.508	0.097	0.029
0.6	3.032	0.703	0.135	0.040
0.7	3.993	0.926	0.177	0.053
0.8	5.069	1.175	0.225	0.067
0.9	6.258	1.450	0.278	0.082
1	7.555	1.751	0.335	0.099
1.1	8.960	2.076	0.397	0.118
1.2	10.470	2.425	0.464	0.138
1.3	12.080	2.799	0.535	0.159
1.4	13.800	3.195	0.611	0.181
1.5	15.610	3.615	0.691	0.205
1.6	17.520	4.058	0.776	0.230
1.7	19.530	4.523	0.865	0.256
1.8	21.640	5.010	0.958	0.284
1.9	23.840	5.519	1.055	0.313
2	26.140	6.050	1.157	0.343
2.5	39.000	9.024	1.724	0.511
3	54.100	12.510	2.390	0.708
3.5	71.360	16.500	3.150	0.933
4		20.970	4.002	1.185
4.5		25.900	4.943	1.463
5		31.300	5.972	1.768
6		43.440	8.284	2.451
7			10.930	3.232
8			13.890	4.108
9			17.170	5.076
10			20.750	6.134
11			24.630	7.281
12			28.810	8.514
13				9.832
14				11.240
15				12.720

### Frequently Asked Questions (FAQs) SharkBite EvoPEX

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- Q. Why are SharkBite EvoPEX push-to-connect fittings recommended to be used only with SharkBite PEX Pipe while SharkBite Universal brass fittings are recommended to be used with any manufacturers PEX Pipe that meets ASTM F876?
- A. SharkBite EvoPEX fittings have been designed with SharkBite PEX Pipe in mind. We control the OD and wall thickness of our PEX Pipe to more rigorous tolerances than the ASTM standards to optimize O-Ring sealing and provide long fitting life. Use of other manufacturer's PEX pipe with SharkBite EvoPEX fittings may result in increased insertion force. SharkBite Universal brass fittings have been designed as transition fittings to connect to copper, PEX, CPVC, and PE-RT with enough O-Ring compression to cover the OD of all approved pipe types and their OD variation allowed within ASTM standards.

### Q. Can SharkBite EvoPEX fittings be installed on copper or CPVC pipe?

A. No, SharkBite EvoPEX fittings cannot be installed on copper or CPVC pipe due to the inner pipe seal.

#### Q. Can a SharkBite fitting be rotated on the pipe?

A. Yes, SharkBite EvoPEX fittings and SharkBite Universal brass fittings can be rotated after assembly and will not affect the integrity of the joint.

# *Q. What is the effect of water hammer on the SharkBite fittings since they can rotate?*

A. SharkBite Universal and EvoPEX fittings exceed the ASSE 1061 requirements to withstand pressure pulsation or water hammer. The rotation feature of the fitting does not impact the performance or make noise. However severe water hammer/ pressure pulsation within the plumbing system is an indication that there are other issues within the system and should be investigated and resolved as a matter of cause.

### Q. Can I use SharkBite fittings and SharkBite PEX Pipe for anything other than potable water (e.g., air, gas, oil, etc.) applications?

A. No, SharkBite fittings and PEX Pipe are only certified for potable water installations, Glycol mix up to 100% and non-potable applications such as hydronic and potable heating.

# Q. How well do SharkBite joints hold up in freezing temperatures?

A. SharkBite PEX water systems are less susceptible to burst in freezing conditions due to the pipe's ability to expand. When water freezes, it expands and creates pressure that exceeds plumbing system pressure capabilities, i.e. pipes and fittings may burst.

### Q. Does the outside temperature affect installation or testing of SharkBite Universal or SharkBite EvoPEX Systems?

A:The outside temperature does not affect installation of SharkBite Universal or SharkBite EvoPEX Systems and can be tested immediately once all connections are made.

# Q: Is SharkBite PEX Pipe approved for continuous hot water recirculation?

A: SharkBite PEX pipe for potable water applications is certified by NSF International to meet the latest ASTM F876 oxidativeresistance requirements for continuous recirculation, as indicated by the PEX 5106 designation on white, red, and blue tubing. SharkBite PEX Pipe meets the highest chlorine resistance rating that indicates suitability for use in continuous recirculation systems where tubing is exposed to hot (up to 140 Deg. F), chlorinated water 100 percent of the time.

### Q. Are SharkBite fittings approved for underground use?

- 1-A. All SharkBite Universal fittings with brass bodies (Universal and EvoPEX) must have an impervious barrier between the fitting and the surrounding soil. Self-fusing, formaldehyde and chloride-free, fully cured silicone tape with a minimum thickness of 0.020" should be used for this purpose.
- 2-A. SharkBite EP EvoPEX fittings are certified for underground applications without a wrapping material and have a 10 year warranty when buried. Cut pipe square and ensure that both the EvoPEX pipe and fitting are clean and free of dirt and debris in preparation for making a connection.

# Q. How long after installation can a SharkBite system be pressure tested?

A. A SharkBite system can be tested immediately once all connections are made. Refer to page 11 for pressure testing guidelines and requirements.

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### Frequently Asked Questions (FAQs) SharkBite EvoPEX

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A. SharkBite Universal brass fittings can be used in sunlight when installed on copper or CPVC. SharkBite PEX Pipe and EvoPEX fittings are UV resistant for up to one (1) month.

### Q. Are tools needed for SharkBite EvoPEX or SharkBite Universal brass fittings?

A. No tools are required to make a fitting connection. PEX cutters are required for cutting PEX pipe. Proper pipe cutters and deburring tools are needed for other pipe types used with Universal fittings.

# Q. What is the insertion depth for SharkBite EvoPEX fittings?

A. Insertion depth will depend on the size of the fitting. Push the SharkBite PEX Pipe into the SharkBite EvoPEX fitting until green indicator ring appears in collet window. The visual appearance of the green indicator ring through the collet window is verification that the pipe is fully inserted for a proper connection.

### Q. What is the insertion depth for SharkBite Universal brass fittings?

A. Insertion depth will depend on the size of the fitting. Push the SharkBite PEX Pipe into the SharkBite Universal brass fitting per the insertion depth below for each fitting size:

1/4" Pipe Insertion Depth = 13/16"
3/8" Pipe Insertion Depth = 15/16"
1/2" Pipe Insertion Depth = 15/16"
5/8" Pipe Insertion Depth = 1-1/8"
3/4" Pipe Insertion Depth = 1-1/8"
1" Pipe Insertion Depth = 1-5/16"

# Q. Can SharkBite EvoPEX and SharkBite Universal brass fittings be removed?

A. SharkBite EvoPEX fittings are a permanent connection with PEX Pipe only and cannot be removed. SharkBite Universal brass fittings can be removed with SharkBite Disconnect Clips or Disconnect Tongs.

### Q. Can SharkBite PEX Pipe be installed to a water heater?

A. SharkBite PEX Pipe should not be installed closer than 18" of the water heater unless specified otherwise by local code. SharkBite corrugated and stainless steel braided water heater connection hoses may be installed directly to a water heater. SharkBite Tank Booster is a thermostatic mixing valve with connections that may be installed directly to a water heater. Please reference www.sharkbite. com for more information regarding SharkBite water heater connectors and Tank Booster thermostatic mixing valves.

# Q. Is there a minimum space requirement between fittings?

A. SharkBite EvoPEX fittings have no space requirement between fittings; whereas SharkBite Universal brass fittings require 1" spacing between fittings for removal if needed.

### Q. Do extreme temperatures in excess of 140° Fahrenheit in an attic affect the quality or performance of SharkBite fittings?

A. SharkBite EvoPEX fittings are suitable for attic applications with temperature pressures of (80 PSI @ 200°F (93°C), 100 PSI @ 180°F (82°C), and 160 PSI @ 73.4°F (23°C)) when installed as per the installation instructions and relevant plumbing codes.

### Q. What are additional precautions to take during the installation process with SharkBite EvoPEX fittings?

A. Prevent the EvoPEX fittings from coming in contact with primers, solvent cements, and other solvents. When using firestops, spray polyurethane foam (SPF) insulation, or other expanding fillers, protect the EvoPEX fittings from contact by wrapping (polyethylene wrap min. 2 layers) the fittings in areas where contact is possible. Recommend to use SharkBite silicone wrap #25406. Only use dishwashing liquid soap and water to detect plumbing leaks. Avoid using 'Leak Detector' spray products..

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### **Installation Requirements**

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#### SharkBite Burial

SharkBite Universal fittings are suitable for burial in most applications; however care is required when using fittings in applications that require burial to ensure the correct installation practices are used and due care is given to any environmental factors that may have a detrimental effect on the life expectancy of the fittings and pipe.

The installation of SharkBite Universal fittings in applications that will require the burial of the fitting must comply with all local plumbing code requirements.

SharkBite Universal fittings and SharkBite PEX are not suitable for use in areas where the soil is or may become contaminated\* including the soil used for back filling. All SharkBite Universal fittings with brass bodies must have an impervious barrier between the fitting and the surrounding soil. Self-fusing, formaldehyde and chloride-free, fully cured silicone tape with a minimum thickness of 0.020" should be used for this purpose.

The soil used for back filling must be free of rocks, debris or any sharp objects that may cause damage to the fitting or pipe through impact or abrasion.

\* Examples of contamination include, but are not limited to, petrochemicals (reclaimed service station sites), high levels of nitrogen compounds (this could be caused by animal waste or fertilizer that may be found in some agricultural applications), low pH levels (below pH 6), high pH levels(above pH 8), run off from land fill, formaldehyde compounds, and solvents. It should be noted that such contaminants have been known to migrate through plastic piping systems and contaminate the Potable water supplied throughthese pipes.

#### SharkBite Silicone Burial Wrap

Make a SharkBite Universal connection ensuring pipe is inserted to proper depth. While leaving the protective film in place, measure the amount of tape needed to completely wrap the fitting. To ensure a proper seal, overlap tape by 1"past the end of the fitting on every end and 1/4" - 1/2"between/across the fitting. Wrap the fitting by pulling the tape tight and removing the protective film. Completely cover the fitting. The tape will bond to itself within minutes and will cement to itself within a few hours forming an air and water tight seal.

#### SharkBite Distance Between Fittings

Allow at least 1" of spacing between SharkBite Universal fittings for removal purposes.

#### SharkBite Grounding on Copper Pipe

When connecting a SharkBite Universal fitting to a copper piping system, install a copper jumper cable to ensure proper grounding. SharkBite Universal fittings are not an electrically continuous fitting.

#### **Threaded Connectors**

Teflon tape should be used with threaded SharkBite connectors to make a proper seal. Do not use Loctite on any plastic threaded SharkBite connectors.

#### **Galvanized Tubing**

SharkBite Universal fittings should not be installed (threaded or push-to-connect) on galvanized tubing.

### SharkBite Soldering

When soldering is required near a SharkBite Universal connection, make all solder joints first and then make the SharkBite connections. Flame can cause the pipe to reach high temperatures and should not be used close to a SharkBite Universal fitting.

### **Installation Requirements**

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#### SharkBite Fitting Reuse

SharkBite Universal fittings are intended to be a permanent connection and are not designed for repeated connection and disconnection. If the need arises to change a fitting after initial installation this can be done given that proper care is taken when removing and reinstalling SharkBite Universal fittings.

SharkBite disconnect tongs or SharkBite disconnect clips must be used when removing the fittings.

The initial pipe and the new pipe must be clean and free from scratches and burrs.

Mark the correct insertion depth, insert the fitting to the mark, turn the water back on and check for leaks.

#### Working Pressure and Temperature

SharkBite Universal fittings have a maximum temperature of 200°F maximum pressure 200 psi when used on copper pipe. When used on PVC, CPVC, PEX, PE-RT or HDPE refer to the maximum pressure temperature rating of the pipe.

### **PEX Stiffeners**

SharkBite Universal fittings (3/8" to 1") come with an Integral PEX Stiffener. 1/4" (3/8" OD) fittings do not require PEX stiffeners. PEX Stiffener are required for PEX, PE-RT and HDPE pipe. 2XL PEX Stiffeners sold separately.

#### Pressure Testing EvoPEX Systems:

Always refer to local code for pressure testing EvoPEX systems after installation. Testing must be completed prior to concealing fittings with concrete or by other means. Only use dishwashing liquid soap and water to detect plumbing leaks. Avoid using 'Leak Detector' spray products.

#### Water Testing:

When water is used for pressure testing and the building is unheated, the system should be drained after testing to prevent freezing. The test pressure applied to the system must meet the pressure testing requirements of local code, but cannot be lower than the system operating pressure. The pressure with water cannot exceed the following pipe listings:

73.4F (23C) at 160psi 180F (82.2C) at 100psi 200F (93.3C) at 80psi

It is recommended to test at a pressure of 80psi (unless local code indicates higher pressures). The test duration should not be less than 15 minutes.

#### Air Testing:

When air is used for pressure testing pressure should be from 40 psi to 125 psi, a common test pressure is 100 psi. The duration should be not be less than one hour and the pressure shall not drop more than 8 psi in one hour (deformation of the tube and slow expansion can cause the 8 psi pressure drop). If the system pressure falls more than 8 psi in one hour the test needs to be repeated. If the problem continues use a soapy solution to detect the faulty connection, replace the connection and repeat the test.  $( \bullet )$ 



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