



Uponor

PLUMBING, FIRE SAFETY,
AND RADIANT HEATING
AND COOLING SYSTEMS

INSTRUCTIONAL GUIDE



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Making ProPEX Connections

Uponor ProPEX ASTM F1960 and CAN/CSA B137.5 cold-expansion fittings make solid, permanent, manufactured connections without the need for torches, glues, solder, flux or gauges. The unique shape memory of Uponor PEX-a piping forms a tight seal around the fitting, creating a strong, reliable connection.

This document shows how to make proper ProPEX connections using one of the following tools.

- Milwaukee® M12™ or M18™ Expansion Tools
- ProPEX 201 Corded Expander Tool
- ProPEX Hand Expander Tool

General ProPEX Connection Tips

- If the fitting does not slide into the piping all the way to the stop, immediately remove it from the piping and expand the piping one final time.

Note: To avoid over-expanding the piping, do not hold the piping in the expanded position.

- The number of expansions in **Table 1** is the recommended number of expansions. Experience, technique and weather conditions influence the actual number of expansions. Fewer expansions may be necessary under certain conditions. The correct number of expansions is the amount necessary for the piping and the shoulder of the fitting to fit snugly together.
- Ensure the ProPEX Ring rests snugly against the fitting shoulder. If there is more than $\frac{1}{16}$ " (1mm)

between the ring and the shoulder of the fitting, square cut the piping 2" to 3" (50.8 to 76.2mm) away from the fitting, and make another connection using a new ProPEX Ring and fitting. Note that Uponor requires 3" (76.2mm) minimum for $1\frac{1}{4}$ " to 2" pipe. Brass ProPEX fittings can be disconnected and reused. Engineered Polymer (EP) fittings must be discarded. Be sure to follow the recommended minimum distance between ProPEX fittings chart in **Table 2**.

Piping Size	Milwaukee ProPEX Tool		Uponor ProPEX Tool		
	M12	M18	Manual	100 & 150	201
$\frac{3}{8}$ "	8	9	5	7	—
$\frac{1}{2}$ "	5	6	4	4	—
$\frac{3}{4}$ "	9	8	9	9H	—
1"	13	5	14	7H	—
$1\frac{1}{4}$ "	—	7	—	7H	—
$1\frac{1}{2}$ "	—	6	—	8H	—
2"	—	—	—	—	5H

Table 1: Recommended Number of Expansions for $\frac{3}{8}$ " to 2" Piping at 73.4°F (23°C)

Note: "H" in the table refers to Uponor H-series expander heads.



Nominal Fitting Size	Cut Length of Pipe
$\frac{1}{2}$ "	$2\frac{1}{2}$ "
$\frac{3}{4}$ "	$3\frac{1}{2}$ "
1"	$4\frac{1}{2}$ "
$1\frac{1}{4}$ "	$5\frac{1}{2}$ "
$1\frac{1}{2}$ "	$6\frac{1}{2}$ "
2"	$7\frac{1}{2}$ "

Table 2: Minimum Distance Between ProPEX Fittings



Making ProPEX Connections with Milwaukee ProPEX Expansion Tools

Note: All standard Uponor Expander Heads are compatible with the M12 and M18 tools. Uponor expander heads will not auto-rotate on the Milwaukee tools (only Milwaukee expansion heads will auto-rotate on the M12 and M18). H-heads are not compatible with Milwaukee tools and Milwaukee heads are not compatible with Uponor tools. Milwaukee heads are easily distinguished by color coding and the Milwaukee logo.

Important! Making expansions are slightly different when using a tool that features auto rotation. When making a ProPEX connection, be sure to follow the guidelines for the tool you are using in your application.

1. Square cut the PEX piping perpendicular to the length of the piping. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the ProPEX Ring over the end of the piping until it reaches the stop edge. If using a ProPEX Ring without a stop edge, extend the ring over the end of the piping no more than $\frac{1}{16}$ " (1mm).



$\frac{3}{8}$ " and $\frac{1}{2}$ " Milwaukee Expansion Head



$\frac{3}{4}$ " to $1\frac{1}{2}$ " Milwaukee Expansion Heads

Important! If making a $\frac{3}{8}$ " ProPEX Connection, you must first expand each side of the ring before placing it on the piping. Refer to the "Making $\frac{3}{8}$ " ProPEX Connections" on **page 8** for further information.

With Auto Rotation (Standard Milwaukee Heads)

3. Milwaukee ProPEX Expansion Tools come with built-in auto rotation. If using a Milwaukee expansion head, simply hold the piping and tool in place while holding the trigger to expand the piping. The head will automatically rotate to ensure the piping is evenly expanded. Continue expanding until the piping and ring are snug against the shoulder on the expander head. See **Table 1 on page 1** for the recommended number of expansions for each piping size.

Note: Do not force the pipe onto the expander head. Ensure the expander head is rotating during each expansion.



Expansion with Milwaukee M12 ProPEX Expansion Tool

Without Auto Rotation (Standard Uponor Heads)

4. Press the trigger to expand the piping.
5. Release the trigger, remove the head from the piping, rotate it $\frac{1}{8}$ turn and slide the head back into the piping. Continue expanding and rotating until the piping and ring are snug against the shoulder on the expander head. See **Table 1 on page 1** for the recommended number of expansions.

Important! Rotating the tool between expansions will provide smooth, even expansion of the piping. Failure to rotate the tool will cause deep grooves in the piping which can result in potential leak paths.





ProPEX Coupling

Insert ProPEX Fitting into 1/2" Uponor PEX-a Piping.



ProPEX Tee

Insert ProPEX Fitting into 1" Uponor PEX-a Piping.

6. After the final expansion, immediately remove the tool and insert the fitting. Ensure the piping and ring seat against the shoulder of the fitting.

Important! Only perform the necessary number of expansions. DO NOT over expand the pipe. You should feel some resistance as the fitting goes into the piping.

If you do not feel any resistance, the piping may be over expanded and will require additional time to shrink over the fitting.



Expansion with Milwaukee M18 ProPEX Expansion Tool





Making ProPEX Connections with the ProPEX 201 Corded Expander Tool

1. Square cut the PEX piping perpendicular to the length of the piping. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the ProPEX Ring over the end of the piping until it reaches the stop edge. If using a ProPEX Ring without a stop edge, extend the ring over the end of the piping no more than $\frac{1}{16}$ " (1mm).
3. Slide the expander head into the piping until it stops. Full expansions are necessary to make a proper connection.
4. Press the trigger to expand the piping.



5. Release the trigger, remove the head from the piping, rotate it $\frac{1}{8}$ turn and slide the head back into the piping. Continue expanding and rotating until the piping and ring are snug against the shoulder on the expander head. See **Table 1 on page 1**.



Insert ProPEX Fitting into 2" Uponor PEX-a Piping.



ProPEX EP Tee Inserted into 2" Uponor PEX-a Piping



ProPEX 2" Brass Fitting Inserted into Uponor PEX-a Piping



Making ProPEX Connections with the ProPEX Hand Expander Tool

1. Square cut the PEX piping perpendicular to the length of the piping. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the ProPEX Ring over the end of the piping until it reaches the stop edge. If using a ProPEX Ring without a stop edge, extend the ring over the end of the piping no more than $\frac{1}{16}$ " (1mm).

Important! If making a $\frac{3}{8}$ " ProPEX Connection, you must first expand each side of the ring before placing it on the piping. Refer to the "Important Tips for a Proper $\frac{3}{8}$ " ProPEX Connection" instructions on **page 8** for further information.

3. Brace the free handle of the tool against your hip, or place one hand on each handle. Fully separate the handles and slide the expander head into the piping until it stops. Full

expansions are necessary to make a proper connection. Bring the handles together to expand. Separate the handles, remove the head from the piping, rotate it $\frac{1}{8}$ turn and slide the head back into the piping. Continue expanding and rotating until the piping and ring are snug against the shoulder on the expander head.

See **Table 1 on page 1** for the recommended number of expansions for each piping size.

Important! Rotating the tool between expansions will provide smooth, even expansion of the piping. Failure to rotate the tool will cause deep grooves in the piping which can result in potential leak paths.



ProPEX Hand Expander Tool

4. After the final expansion, immediately remove the tool and insert the fitting. Ensure the piping and ring seat against the shoulder of the fitting.

Important! You should feel some resistance as the fitting goes into the piping. If you do not feel any resistance, the piping may be over expanded and will require additional time to shrink over the fitting.



Insert ProPEX Fitting into Uponor PEX-a Piping.

Proper Expander Tool and Head Maintenance

Use a lint-free cloth to apply a light coat of lubricant to the cone prior to making any ProPEX connections.

If used regularly, apply the lubricant daily to the cone of the ProPEX Expander Tool (manual, air or battery) as well as the ProPEX Auto Rotation Adapter. Failure to keep these tools lubricated may result in improper connections.

The handles of the ProPEX Hand Expander Tool will open and close smoothly if properly lubricated.



Caution: Excessive lubrication may result in improper connections. Only use a small amount of lubrication to keep the tool working properly.



Keep all other parts of the tool free from lubricant.

Once a month, soak the heads in degreasing agent to remove

any grease from between the segments. Clean the cone using a clean, dry cloth.

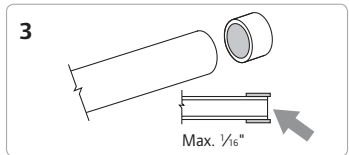
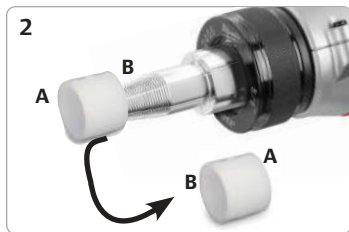
Making 3/8" ProPEX Connections

The 3/8" ProPEX Ring must be expanded once on each side to properly fit over the piping. Refer to the following instructions to make a 3/8" ProPEX connection.

1. Square cut the PEX piping perpendicular to the length of the piping. Remove all excess material or burrs that might affect the fitting connection.
2. Expand each side of the 3/8" ProPEX Ring once.
3. Slide the expanded ring over the end of the piping. Extend the end of the ring over the end of the piping no more than 1/16" (1mm).
4. After the ring is on the piping, continue with the regular steps for making a proper connection with your specific tool.



1
E6081128 Pipe Cutter (plastic)



Important Tips for a Proper 3/8" ProPEX Connection

- The thicker 3/8" ProPEX Ring shrinks over the fitting faster than larger-sized rings.
- When the temperature is below 40°F (4.4°C), fewer expansions are required.

Disconnecting a ProPEX Brass Fitting

ProPEX brass and EP fittings are manufactured connections that can be concealed in walls, ceilings and floors. When necessary, ProPEX brass fittings can be disconnected.

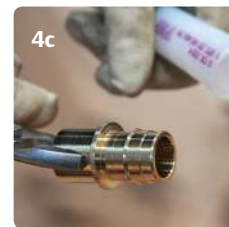
Important! EP fittings cannot be reclaimed.

Refer to the following guidelines for disconnecting a ProPEX brass fitting.

1. Ensure the system is not pressurized.
2. Use a utility knife to carefully cut through the ProPEX Ring.

Important! Do not heat the ring prior to cutting it. Take care to cut only the ring and not the piping or fitting. Gouges in the fitting may result in leaks. If you accidentally damage the fitting, you must discard it.

3. Remove the ProPEX Ring from the piping.
4. After removing the ring, apply heat directly around the fitting and piping connection. **Do not use open flame.** Gently work the piping back and forth while pulling slightly away from the fitting until the piping separates from the fitting.
5. After removing the fitting, measure 2" to 3" minimum from the end of the piping. (Uponor requires 3" minimum for 1 1/4" to 2" pipe.)
6. Square cut the piping at the proper marking.
7. Allow the fitting to cool before making the new connection.
8. Use a new ProPEX Ring and follow the steps to make a new connection.



Troubleshooting ProPEX Connections

Trouble-free ProPEX installations begin with a tool that is maintained in proper working condition. If the tool or segment fingers are damaged, it is very difficult to make a proper connection. Refer to the following guidelines to assist with challenges in the field.

Fittings Won't Seal

- Make sure the expander head is securely tightened onto the tool.
- Ensure the segment fingers are not bent. If the head does not completely close when the drive unit is fully retracted or the handles of the manual tool are open, replace the head.
- Examine the tool for excess grease on the segment fingers. Remove excess grease prior to making connections.
- Check the fitting for damage. Nicks and gouges will cause the fitting to leak.
- Make sure the internal driver cone is not damaged or bent.
- Make sure the last expansion is not held in the expanded position before the fitting is inserted. You should feel some resistance as the fitting goes into the piping. If you do not feel any resistance, the piping may be over expanded and will require additional time to shrink over the fitting.
- Be sure to rotate the tool $\frac{1}{8}$ turn after each expansion to avoid deep grooves in the piping which can result in potential leak paths.

Expansion is Difficult

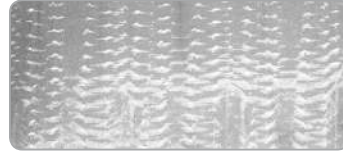
- Make sure the internal cone is properly greased.

Expansion Head Slips Out of Piping When Making Expansions

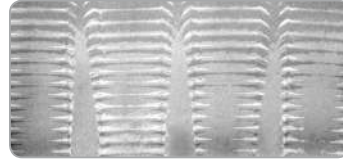
- Ensure the piping and ProPEX Ring are dry.
- Make sure that grease is not getting into the piping.
- Examine the segment fingers to ensure they are not damaged or bent.

ProPEX Ring Slides Down Piping During Expansion

- Ensure your hands are clean while handling the piping. Any sweat or oils on your hands can act as a lubricant. Due to the smoothness of PEX, any form of lubricant can cause the ProPEX Ring to slide down the piping during expansion.
- If you anticipate the ProPEX Ring may possibly slide down, position the ring slightly farther over the end of the piping and make the first couple of expansions slowly. Once the ring and the piping begin to expand together, continue with the normal number and type of expansions.
- Place your thumb against the ProPEX Ring to help support it and feel for any movement. If caught early, you can slide the ring up the piping and expand as described in the previous bullet point.



Expansion with Proper Rotation



Expansion without Proper Rotation

More Than the Recommended Number of Expansions are Needed to Make a Connection

- Ensure the head is hand-tightened to the expander tool.
- Examine the segment fingers for damage.
- Be sure to completely cycle the tool on each expansion (i.e., close the manual tool handle or release the trigger).

Cold-weather Expansions

- Temperatures affect the time required for the piping and ring to shrink onto the fitting. The colder the temperature, the slower the contraction time.
- Warming ProPEX fittings and ProPEX Rings reduces contraction time. Put fittings and rings in your pockets prior to installation to keep them warm.
- Fewer expansions are necessary in temperatures below 40°F (4.4°C)

Uponor ProPEX Lead-free* (LF) Brass Fittings

Uponor offers a complete line of LF brass transition fittings, valves, stub-outs, water-heater connectors and wall boxes.

- All Uponor LF brass products comply with NSF/ANSI 61 Annex G, NSF/ANSI 372 and conform to the lead-content requirements for “lead-free” plumbing as defined by California, Vermont, Maryland and Louisiana state laws as well as the U.S. Safe Drinking Water Act, effective January 2014.

*Per NSF Annex G, lead-free products contain not more than 0.25% weighted average lead content on wetted surfaces.



- All Uponor LF brass fittings marked as NSFus-pw-G comply with the dezincification resistance (DZR) and stress-corrosion cracking (SCC) requirements of Sections 5.8.1 and 5.8.2 per the current NSF 14 Standard.
- Uponor’s LF brass is approved for direct burial in soil per NSF/ANSI Standard 14 testing which established minimum performance criteria for DZR/SCC resistance for PEX fittings intended for potable water.

Soldering

- When soldering LF brass fittings, Uponor recommends using a lead-free flux and solder which meet the requirements of NSF/ANSI 372 or NSF/ANSI 61 Annex G. Please refer to the solder and flux manufacturer for details on properly soldering lead-free brass materials.

Fittings by Others

Uponor PEX-a piping can be used with any type of SDR9 PEX fitting, including compression fittings. Compression fittings must be installed with an insert stiffener to ensure that the pipe wall doesn’t collapse under compression, compromising the connection.

Note that Uponor cautions the use of other manufacturer’s PEX pipe with Uponor ProPEX Rings as well as using other’s expansion rings with Uponor PEX-a pipe. Because of the lower degree and uniformity of crosslinking in PEX-b and PEX-c pipe, stress cracking of the PEX-b and PEX-c pipe wall can occur during expansion, compromising the strength of the fitting connection.

Additionally, the 25-year limited warranty for Uponor PEX-a systems is only valid when both Uponor PEX-a pipe and Uponor ProPEX fittings are used. Mixing the ProPEX Rings with other manufacturer’s PEX pipe or other’s expansion rings with Uponor PEX-a pipe will limit the warranty.

For complete warranty details, refer to www.uponorpro.com/warranties.

Note: Uponor does not permit a press-type fitting to be used with ProPEX sweat or fitting sweat adapters. Brass material is not nearly as malleable as copper material, causing undo stress and affecting the integrity of the connection.

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