

Making ProPEX® Connections

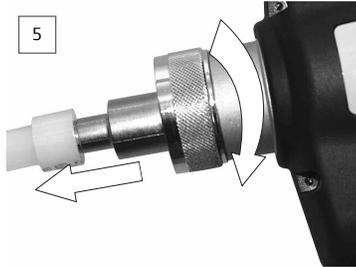
Uponor's exclusive ProPEX® fittings make solid, permanent connections without torches, glues or gauges. The unique shape memory of Wirsbo AQUAPEX®, Wirsbo AQUAPEX® plus and Wirsbo hePEX™ plus tubing forms a tight seal around the fitting, creating a strong, reliable connection.

This document shows how to make proper ProPEX connections using one of Uponor's expander tools (battery, air or hand). The steps are virtually the same for all three tools with a slight variation for the type of tool used.

1. Square cut the PEX tubing perpendicular to the length of the tubing. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the ProPEX Ring over the end of the tubing. Extend the end of the ring over the end of the tubing no more than $\frac{1}{16}$ of an inch (1mm).
3. When using the ProPEX Hand Expander Tool, 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 tubing 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 tubing and rotate it one-eighth turn. Slide the tool head into the tubing in the newly rotated position and expand again.
4. When using the ProPEX Air or Battery Expander tools, slide the expander head into the tubing until it stops. Full expansions are necessary to make a proper connection. Press the trigger to expand.

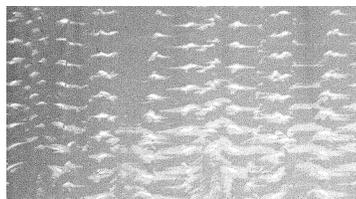


5. Release the trigger, remove the head from the tubing and rotate it one-eighth turn after each expansion. Slide the tool head into the tubing in the newly rotated position and expand again.

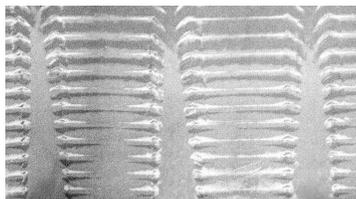


Important: Rotate the tool one-eighth turn in either direction after each expansion to provide smooth and even expansion of the tubing. If the head is not repositioned after each expansion, the segments on the tool head may cause deep grooves in the tubing. These grooves can result in potential leak paths.

Note: It is not necessary to rotate the tool in only one direction. Alternating the turning direction will ease expansion in confined spaces. The photos below show enlarged views inside expanded tubing.



Expansion with Proper Rotation



Expansion without Proper Rotation



6. Repeat the expansion process until the tubing and ring are snug against the shoulder on the expander head. See **Table 1** on page 3 for the recommended number of expansions for each tubing size.

Note: H referenced in **Table 1** refers to the H-series expander heads.



7. Immediately remove the ProPEX expander tool. As you slide the tubing over the fitting, you should feel some resistance. If the tubing reaches the shoulder of the fitting without any resistance, the tubing may be over-expanded and may require additional time to fully shrink over the fitting. The tubing and ProPEX Ring should seat against the shoulder of the fitting for a proper connection.

Important Tips for a Proper ProPEX Connection

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

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

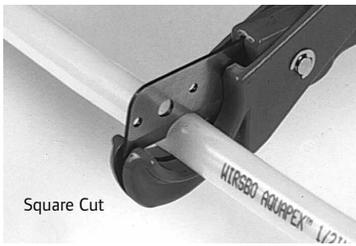
- The number of expansions in **Table 1** on page 3 is the recommended number of expansions. Experience, technique and weather conditions influence the actual number of expansions. Fewer expansions may be necessary under certain conditions. The correct number of expansions is the amount necessary for the tubing and the shoulder of the fitting to fit snugly together.
- Good connections result when the ProPEX Ring rests snugly against the stop of the ProPEX fitting shoulder. If there is more than $\frac{1}{16}$ of an inch between the ring and the shoulder of the fitting, square cut the tubing 2 inches away from the fitting, and make another connection using a new ProPEX Ring.

Tubing Size	Ring Marking	Head Marking			Number of Expansions		
		Hand	Air	Battery	Hand	Air	Battery
3/8"	3/8"	3/8"	3/8"	—	4-5	4-5	6-7
1/2"	1/2"	1/2"	1/2"	—	3-4	3-4	3-4
5/8"	5/8"	5/8"	5/8"	—	5-7	5-7	5-7
3/4"	3/4"	3/4"	3/4"	3/4"H	7-9	7-9	8-9H
1"	1"	1"	1"	1"H	12-14	12-14	6-7H
1 1/4"	1 1/4"	—	—	1 1/4"H	—	—	6-7H
1 1/2"	1 1/2"	—	—	1 1/2"H	—	—	7-8H
2"	2"	—	—	2"H	—	—	4-5H

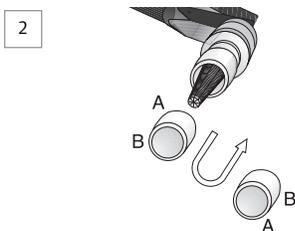
Table 1: Recommended Number of Expansions

Making 3/8" ProPEX Connections

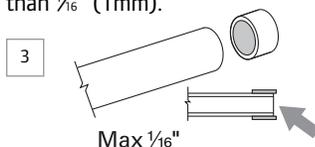
The 3/8" ProPEX Ring is smaller and thicker than the ProPEX Rings used for other tubing sizes. The 3/8" ProPEX Ring must be expanded once on each side to properly fit over the tubing. Expansion of the ProPEX Ring is only necessary for 3/8" PEX.



1. Square cut the 3/8" PEX tubing perpendicular to the length of the tubing.
2. Expand each side of the 3/8" ProPEX Ring with the ProPEX Expander Tool once.



3. Slide the expanded 3/8" ProPEX Ring over the end of the tubing. Extend the end of the ring over the end of the tubing no more than 1/16" (1mm).



Once the 3/8" ProPEX Ring is properly expanded and on the tubing, refer to steps 3 through 5 on pages 1 and 2 for further instruction.

Important Tips for a Proper 3/8" ProPEX Connection

- When the temperature is above 40°F, ProPEX connections to 3/8" PEX tubing require four to five expansions. When the temperature is below 40°F, only four expansions are necessary.
- The thicker ProPEX Ring used for 3/8" ProPEX connections shrinks over the fitting faster than other size rings.

Disconnecting a ProPEX Brass Fitting

ProPEX Brass Fittings are manufactured connections and can be concealed in walls, ceilings and floors.

However, when necessary, ProPEX Brass Fittings can be disconnected (APR and EP fittings cannot be reclaimed or reused). To disconnect a ProPEX Brass Fitting:

1. Make sure the system is not pressurized.
2. Use a heat gun to heat one side of the ProPEX Ring. When the ring is clear, use a utility knife to carefully cut through the ring. Take care to cut only the ring and not the tubing. This will

protect the fitting from being gouged by the knife. Remove the ProPEX Ring from the tubing with pliers or another tool to avoid touching the hot ring.

Note: Do not gouge the fitting when cutting the ProPEX Ring. Nicks and gouges in the fitting may result in leaks. If nicked, discard the fitting.

3. Remove the ProPEX Ring and apply heat directly around the fitting and tubing connection. Gently work the tubing back and forth while pulling slightly away from the fitting until the tubing separates from the fitting.
4. After removing the tubing from the fitting, square cut the tubing 2 inches (minimum) from the end of the tubing.
5. Use a new ProPEX Ring and follow the steps to make a new ProPEX connection (see page 1). Allow the fitting to cool before attempting to make another connection.

Troubleshooting ProPEX Connections

Trouble-free ProPEX installations begin with a ProPEX Expander 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. The following troubleshooting suggestions are designed to assist with problems in the field.

For Fittings That Will Not Seal:

- Make sure the expander head is securely screwed onto the tool (hand-tightened).
- Make sure the segment fingers are not bent. If the head does not completely close when the battery tool's 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 ProPEX connections.
- Examine the fitting for any damage. Nicks and gouges on the fitting 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. The longer the tubing and ProPEX Ring are held in the expanded position, the greater the chance for a leak.
- Be sure to rotate the tool one-eighth turn after each expansion.

If Expansion is Difficult:

- Make sure the internal cone is properly greased.

If the Expansion Head Slips out of the Tubing When Making Expansions:

- Ensure the tubing and ProPEX Ring are dry.
- Make sure that grease is not getting into the tubing.
- Examine the segment fingers to make sure that none are bent.

If the ProPEX Ring Slides Down the Tubing During Expansion:

- Ensure your hands are clean while handling the tubing. 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 across the tubing during expansion.
- If you anticipate the ProPEX Ring may possibly slide down, position the ring slightly farther over the end of the tubing and make the first couple of expansions slowly. Once the ring and the tubing begin to expand together, you can 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 tubing and expand as described in the previous bullet point.

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

- Make sure that the head is hand-tightened to the expander tool.
- Examine the segment fingers to make sure that none are bent.
- Be sure to completely cycle the tool on each expansion, (i.e., close the manual tool handle or release the battery expander tool trigger).

Cold-weather Expansions:

- Temperatures affect the time required for the tubing 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.
- Make ProPEX connections at temperatures above 5°F (-15°C).
- Fewer expansions are necessary in temperatures below 40°F.