

# Connecting PEX

A close look at the ever-expanding options  
for joining PEX plumbing

BY MATTHEW MILLHAM

**A**nybody who has spent any amount of time sweating copper is likely to appreciate the relative ease of working with PEX. There are no fumes, no open flames, and usually less worry about whether you made a solid connection. But while working with PEX is comparatively simple, picking PEX fittings—the elbows and tees that connect the tubing—is another story. There are numerous types of fittings, and in some cases, multiple ways to connect the same ones. With few exceptions, the tools used for one type of connection can't be used for another.

But we're beyond the point of no return. PEX has overtaken copper supply lines in new-home construction. A decade ago, the question was, "Should I choose PEX?" Today, the question is, "Which PEX fitting system should I choose?"

The answer to that question probably hinges on three things: tubing compatibility, how much PEX work you're going to do, and cost.

There are four major categories of fittings for joining PEX supply lines: push, press, expansion, and crimp/clamp. No matter what system you choose, you have to match your fitting to your tubing. PEX tubing typically has stamps that list its compatible fittings. Many fitting manufacturers make their own tubing, and sticking to a single brand for both can ensure compatibility and cover you if a connection fails. Beware: Some manufacturers only warrant their fittings in conjunction with their tubing, so read the fine print. □

---

Matthew Millham is an associate editor.  
Photos by Patrick McCombe.

# CRIMP INEXPENSIVE, WIDELY AVAILABLE, CROSS COMPATIBLE

Crimp fittings are among the most common types of fittings for connecting PEX, and they are pretty much ubiquitous at home-improvement stores. There are three common methods for connecting crimp fittings to PEX tubing, and each requires different tools. Copper crimp rings and

stainless-steel clamps are the more popular choices, but various stainless-steel crimp sleeves are also available.

Manual tools for crimp-ring and clamp connections are relatively inexpensive and easy to find, while tools for crimp-sleeve connections are rarer and range widely in price. Crimp-ring connections

require an additional go/no-go gauge to check that the ring hasn't been over- or under-crimped. Clamp tools should be calibrated regularly to ensure proper function. Using manual tools in tight spaces can be tricky, but some power tools, like Ridgid's PEX-One tool, make crimping a breeze in most spaces.

## To make a crimp-ring connection you need

- ✗ Compatible PEX tubing
- ✗ Crimp fitting and copper crimp ring
- ✗ Crimp tool

## Cost breakdown\*

- Lead-free brass tee (shown): \$1.07/ea.
- Poly tee: \$0.59/ea.
- Copper crimp rings: \$0.17/ea.



1 Slide a copper crimp ring onto the tubing, then insert the fitting into the tubing, making sure it's fully seated.



2 Align the crimp ring so that it's about 1/8 in. to 1/4 in. from the end of the tubing. Aim to have the ring aligned over the fitting's central ribs.



3 Fit the crimp tool's jaws over the ring and squeeze the handles all the way to crimp the ring into place.



4 After crimping, check the result using a go/no-go gauge. If the go/no-go check fails, cut the tubing just beyond the end of the fitting, and start over.

## To make a clamp connection you need

- ✗ Compatible PEX tubing
- ✗ Crimp fitting and stainless-steel clamp
- ✗ Ratcheting clamp tool

## Cost breakdown\*

- Lead-free brass tee: \$1.07/ea.
- Poly tee (shown): \$0.59/ea.
- Stainless-steel clamps: \$0.20/ea.



1 Slide a stainless-steel clamp onto the tubing.



2 Insert the fitting into the tubing, making sure it's fully seated.



3 Align the clamp so it's about 1/8 in. to 1/4 in. from the end of the tubing. As with crimping, the clamp should be aligned over the fitting's central ribs.



4 Place the tool's jaws over the clamp's tab, and squeeze until the tool releases. A mechanism prevents the tool from releasing until the connection is complete.

\* Prices shown for 1/2-in. fittings and accessories purchased in bulk at supplyhouse.com, accurate at time of writing

# PRESS FAST CONNECTIONS, EXPENSIVE TOOLS

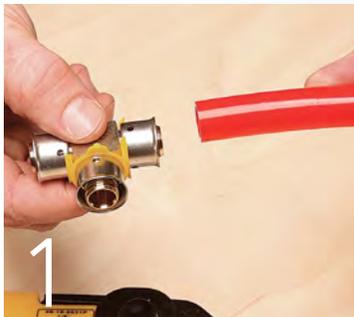
Viega PEX press fittings come with stainless-steel connection sleeves attached, so there are no additional parts to buy. Viega, the system's sole producer, sells fittings in both brass and plastic. Viega only warrants connections in conjunction with its own tubing. It's a fast and easy system, growing in popularity since it came on the market in 2012, but the tools are expensive compared to many systems. Viega's manual press tools run about \$170 each, with a different tool for each-size connection. Milwaukee's battery-operated PEX press tool kit has jaws for 1/2-in., 3/4-in. and 1-in. connections and costs about \$700. Ridgid offers its PEX-One tool in a similar kit at a comparable price.

## To make a PEX Press connection you need

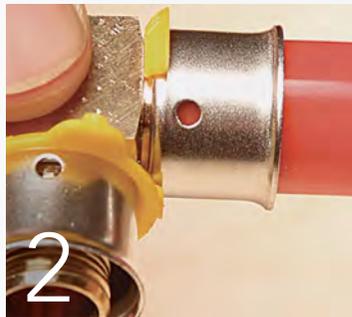
- ✗ Compatible PEX tubing
- ✗ PEX press fittings
- ✗ PEX press tool

## Cost breakdown\*

- Lead-free bronze tee (shown): \$4.42/ea.
- Poly tee: \$2.35/ea.



1 Slide the fitting onto the tubing.



2 Check the witness holes to verify it's fully seated.



3 Align the PEX press tool squarely over the fitting sleeve.



4 Squeeze the trigger to engage the tool and press the fitting.



For a series of videos about PEX fitting systems and tools, visit [FineHomebuilding.com/magazine](http://FineHomebuilding.com/magazine).

There are more tools to make PEX connections than there are fitting systems. Some are aimed squarely at pros, while others are accessible to the masses.

SharkBite 1/2-in. and 3/4-in. Crimp Tool ~\$60



Bluefin Heavy Duty PEX Ratchet Clamp and Cutting Tool ~\$60



Rehau Comboloc F2080 Tool ~\$435 (bare)



Milwaukee M12 ProPEX Expansion Tool Kit ~\$400



Milwaukee M18 Short Throw Press Tool Kit with Viega PureFlow Jaws ~\$700



Rehau Everloc+ Power Tool ~\$1000

All good PEX connections start with a clean cut. Position your PEX cutting tool at 90° to the tubing and cut it square. Shown here is the Uponor plastic tube cutter (\$20).



# EXPANSION FULL FLOW, STRONGER OVER TIME

All expansion systems rely on a tool to enlarge the end of the PEX tubing just enough to allow a metal or plastic fitting to be inserted. Within seconds, the expanded PEX shrinks back around the fitting. Because the interior diameter of expansion fittings is about the same as the diameter of the tubing

itself, these connections are often touted as being “full flow.”

The difference between types of expansion systems is how the connections are reinforced. ASTM F1960 connections rely on a ring of PEX-a that is expanded with the tubing. ASTM F2080 connections use metal

compression sleeves that are pulled over the connection like a tight sock. The Everloc+ system is a hybrid, using the same concept as F2080, but with PEX-a compression sleeves in place of metal.

Metal fittings for all expansion systems are pricey; plastic versions are more affordable.

## To make an ASTM F1960 connection you need

- ✗ Compatible PEX tubing
- ✗ ASTM F1960 fitting and ProPEX ring
- ✗ PEX expansion tool

### Cost breakdown\*

Lead-free brass tee: \$5.45/ea.  
Poly tee (shown): \$1.09/ea.  
ProPEX rings: \$0.18/ea.



1 Slide a ProPEX ring over the end of the tubing. Insert the tool head into the tubing, and expand the tubing and sleeve.



2 Repeat the expansion process until the tubing and ring butt up to the shoulder of the expansion head.



3 Remove the tool and insert the fitting so its shoulder is snug against the sleeve. The fitting should be secure within seconds.

## To make an ASTM F2080 connection you need

- ✗ Compatible PEX tubing
- ✗ ASTM F2080 fitting and compression sleeve
- ✗ F2080 combo tool

### Cost breakdown\*\*

Lead-free brass tee: \$15.22/ea.  
Sleeves: \$1.05/ea.  
Lead-free brass coupling (shown): \$4.04/ea.



1 Slide a compression sleeve onto the tubing, beveled end toward the fitting, pushing it far enough so it won't interfere with the expansion process.



2 Insert the expansion-tool head into the tubing, and expand it. Release the tool, rotate it 45°, expand the tubing again, and hold it for five seconds.



3 Release and remove the expansion tool, and immediately insert the fitting so that its last barb is just shy of the end of the tubing (about 1/16 in. away).

## To make an Everloc+ connection you need

- ✗ Compatible PEX tubing
- ✗ Everloc+ fitting and sleeve
- ✗ Everloc+ power tool

### Cost breakdown\*\*\*

Poly tee (shown): \$1.72/ea.  
Sleeves: \$0.20/ea.

\* Prices shown for 1/2-in. fittings and accessories purchased in bulk at [supplyhouse.com](http://supplyhouse.com), accurate at time of writing

\*\* From Sioux Chief's 2017 Price Index, effective March 20, 2017

\*\*\* Prices provided by Rehau



1 Slip a sleeve onto the tubing, sliding it back far enough that it doesn't interfere with the expansion.



2 Insert the expansion-tool head into the tubing, pull the trigger to expand once; then rotate the tool slightly and expand again.



3 Remove the tool and immediately insert the fitting so that the tubing is snug against the fitting's stop.

# PUSH NO TOOLS REQUIRED

Push—also called *push-fit* or *push-to-connect*—fittings are the easiest of all types to install, requiring no special tools. By easy, I mean this is how most of them work: Push the fitting onto the PEX tubing. Done. Some fittings require additional stiffener inserts, or an additional twist to secure

the connection. They're great for emergency repairs, and some can be removed and reused. The same fittings can be used interchangeably with PEX-a, -b and -c, plus copper and CPVC, making them useful for remodels.

These fittings are more expensive than most, but can be comparatively

inexpensive since no tools are required to install them. Tools to disconnect the fittings are inexpensive—many are under \$2—and are usually available where the fittings are sold.

Be sure to check with local plumbing codes before using push fittings in concealed applications.

## To make a push connection you need

- ✗ Compatible PEX tubing
- ✗ Push fitting

## Cost breakdown\*

SharkBite lead-free brass tee (shown): \$9.45/ea.  
John Guest CTS ProLock Tee: \$6.65/ea.



Slide the fitting onto the tubing until it bottoms out.



To remove the fitting, place the removal tool over the tubing, and press it against the fitting's plastic collar until the fitting releases.



Turn the tool around and slide the compression jaws onto the fitting and tubing. Squeeze the handles repeatedly to pull the compression sleeve over the fitting and complete the connection.



Turn the tool around and slide the compression jaws onto the fitting and tubing. Pull the trigger to pull the sleeve all the way to the fitting's collar. The tool stops and resets automatically.



## Plastic vs. metal fittings

Every now and then, someone new to PEX asks, "Are the plastic fittings okay, or should I pony up for metal?"

Most pros would probably tell you: Go plastic.

The savings from choosing plastic over metal fittings can be huge. The bulk price for a single 1/2-in. brass-tee expansion fitting, for example, is \$5.45 at supplyhouse.com, while the plastic polymer equivalent is just \$1.09.

But the reason most people ask the question is due to concerns about reliability. Some early acetal-based plastic fittings failed at alarming rates. But the sulfone polymers used in today's plastic fittings are strong and durable, and handle harsh water conditions better than metal, according to manufacturers.

"There's just very little to no reason for a customer to choose brass over engineered polymer," Jayson Drake, director of portfolio management for Uponor, says.

The exceptions are where metal fittings are required by code, and in transitions to other types of pipe.

All the manufacturers I spoke with say they expect their plastic fittings to perform at least as well as their metal products if installed correctly, and that confidence is reflected in their warranties.

For plumbers, plastic is increasingly the way to go. Uponor now sells three plastic fittings for every metal one, Drake says. For Zurn, one of Uponor's competitors, plastic fittings make up an even larger share of sales.

—M.M.