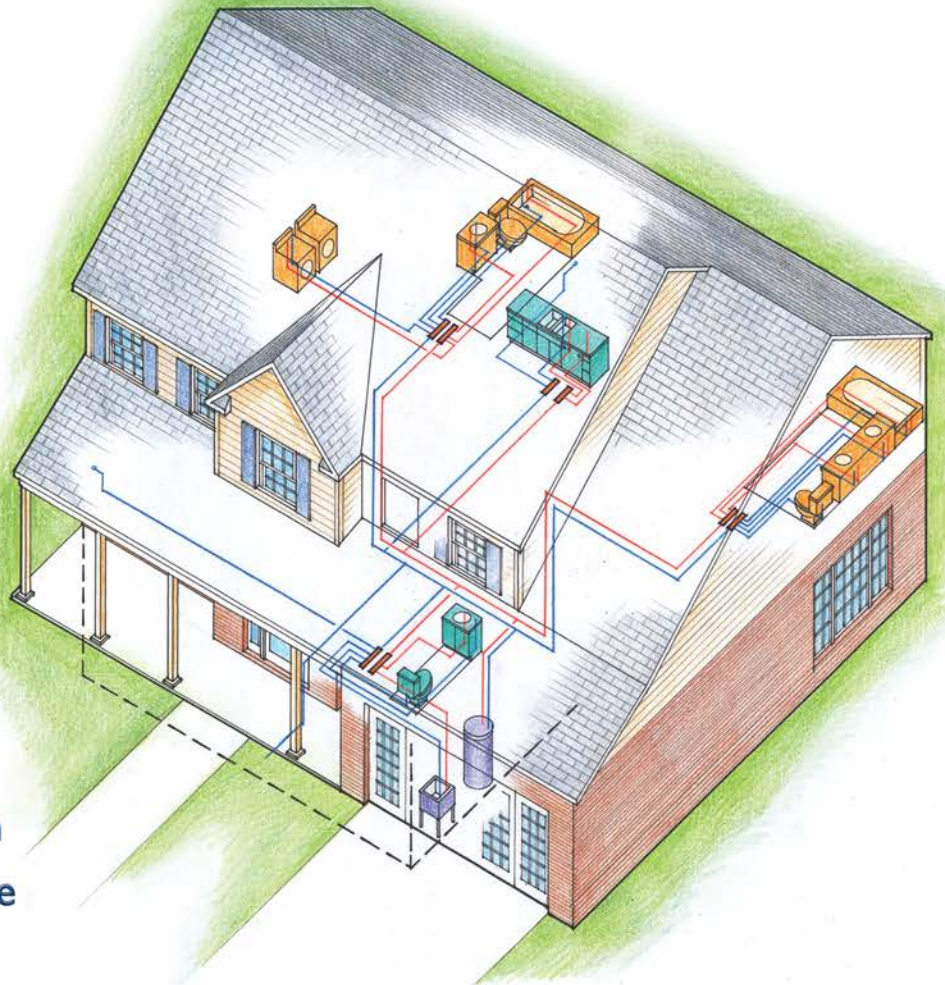


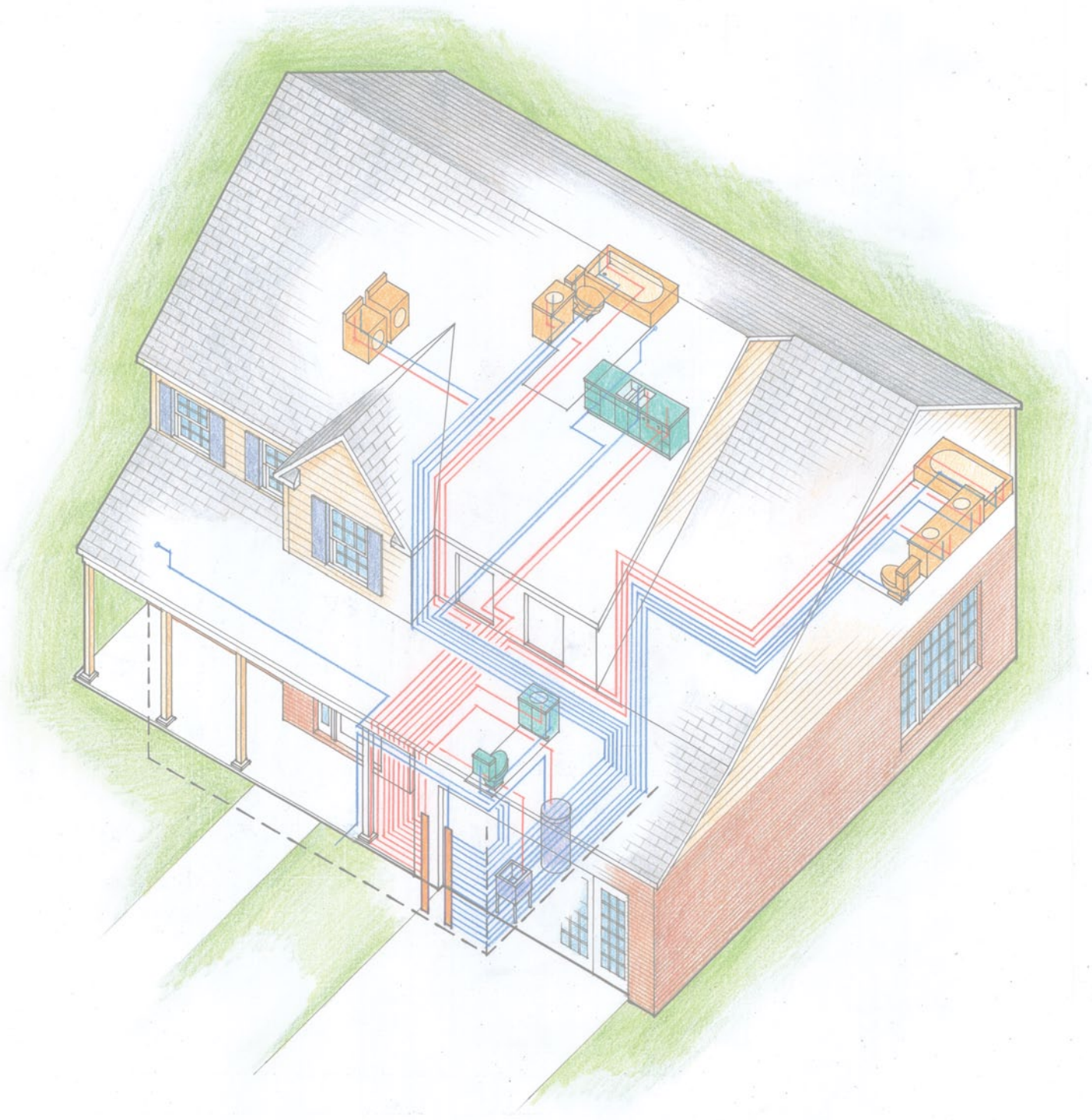
# DESIGN GUIDE

## Residential PEX Water Supply Plumbing Systems

Second Edition

Applications  
Advantages  
Material Properties  
Joining Methods  
Code Acceptance  
System Design  
Installation  
and more







# DESIGN GUIDE

## Residential PEX Water Supply Plumbing Systems

Second Edition

Prepared for



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# TESTIMONIALS

## **Don Carpenter, Director of Product Development**

### **Oakwood Homes of Denver, Colorado**

As part of the Partnership for Advancing Technology in Housing (PATH) Program, administered by the U.S. Department of Housing and Urban Development (HUD), a Field Evaluation of technologies was conducted at Green Valley Ranch in Denver, Colo. According to Don Carpenter of Oakwood Homes, the company began using PEX piping with a central manifold and parallel system in 2000, after hearing of reduced labor, shortened construction cycle time, and decreased long-term costs. However, cost savings isn't the only reason the company chooses PEX pipe. "We look at it from a quality standpoint," said Carpenter, director of product development. "It's less money to install, and it's a superior plumbing system. For the homeowner, it's control over every fixture in the house, and the ability to easily adapt the plumbing when adding fixtures, building additions to the house, or finishing the basement." Oakwood saves the buyers an average of \$800 per home because of the PEX piping system chosen for the indoor plumbing system.

## **Rodney Ketzner, Plumbing Supervisor**

### **Plumbing Specialists Inc., Wichita, Kansas**

"The system goes in almost twice as fast as copper systems. After a new house has been framed, I walk through the house with the homebuyer to discuss fixtures and plumbing issues, including manifold plumbing systems using PEX. We offer conventional copper as an option but after I explain the system and the benefits it offers, homebuyers almost always choose it."

"My customers also like the quietness of the system. It's designed with both the homeowner and the plumbing contractor in mind."



**Kenny Hodges, Owner**

**Hodges Plumbing, Blackshire, Georgia**

“The owner said it was a good system and he’s right. I wish I had used it in my own home!”

**Alan Boone, Plumber**

**Middleton Plumbing, Statesboro, Georgia**

“My supplier mentioned that we could save a lot of time on installation with the PEX plumbing system. The PEX we used was much easier to install and required very few fittings. The red and blue color-coded pipe also made the installation go in quickly and easily identified hot and cold lines. It’s a great choice on large-scale projects. If we’d gone with copper, we’d still be there working.”

**Tony Partusch, Shop Foreman**

**Partusch Plumbing, Anchorage, Alaska**

“With our climate, copper doesn’t work very well. We see a lot of problems with copper sweat joints leaking. With PEX systems we’ve been able to eliminate 90 percent of the copper sweat joints in a system and now the chance of having a leak at a sweat joint is nearly nonexistent.”

“Usually you have to pay a lot more when you upgrade to a better product but PEX manifold plumbing systems are easy to sell because it’s a better product for about the same price.”

**Jim Manning, President**

**Interstate Plumbing & Air Conditioning, Las Vegas, Nevada**

“[PEX] tubing is clean, doesn’t corrode, and it’s not affected by corrosive water and soil. It even comes with a 25-year warranty. We wanted a system that would save us time, eliminate our copper theft problem, and ensure quality and reliability. [PEX] has proven itself to be a system that can do all this and more.”

**Don George, Owner**

**Modern Plumbing, Portland, Oregon**

“We’ve been installing [PEX] for years in custom homes. We utilize manifolds in most of our installations and our customers are continually impressed with how quiet the system is.”

**Chris McGinnis, Owner**

**Tucson Plumbing and Heating, Tucson, Arizona**

“The [PEX] connection is the most positive connection available. My plumbers can tell just by looking at the fitting if they’ve made a good connection. With [PEX], the installation is fast and easy, and the tubing can be buried directly in concrete—something the codes won’t allow us to do with copper. My plumbers like the ease of installation provided by the [PEX] fitting and the time savings that result. Rigid systems ... require more connections and more time without the assurance of a positive connection. With [PEX], we have eliminated many of our callbacks, which is also a nice benefit.”

### **Vince Lopoarchio and Levon Paul, Plumber and Project Foreman VHL Plumbing, Burbank, California**

Second generation plumber Vince Lopoarchio states, “The best thing is there are no leaks so when we’re done we’re done.”

VHL and the developer benefited with consistent connections, no leaks, flexible pipe, no solder, no flux, and no flame which made for a cleaner, more secure, and faster installation process. Running 1 inch, 3/4 inch and 1/2 inch PEX tubing, four installers can complete four typical condo units per day, keeping VHL ahead of schedule.

Veteran installer and project foreman Levon Paul says, “The PEX system is very quiet so our customers are happy. It’s a pleasure working with this system after 30 years of working with copper. I would tell anybody that with [PEX] technology labor savings, the hand tools will pay for themselves on the first multi-unit job.”





# GLOSSARY

**ASTM:** American Society for Testing and Materials

**Corrosion:** deterioration in metals caused by oxidation or chemical action

**Crosslinked polyethylene:** a polyethylene material which has undergone a change in molecular structure using a chemical or a physical process whereby the polymer chains are chemically linked. Crosslinking of polyethylene into PEX for pipes results in improved properties such as elevated temperature strength and performance, chemical resistance, and resistance to slow crack growth.

**Elasticity:** a measure of material stiffness or the ability of the material to stretch or deform temporarily under a load

**Fitting:** a device or connection that allows the PEX pipe to change direction or size, such as a tee, elbow, or coupling

**Fixture:** a device or appliance at the end of a water supply distribution pipe line. Example: lavatory, water closet, tub/shower, dishwasher

**IAPMO:** International Association of Plumbing and Mechanical Officials

**ICC:** International Code Council

**IPC:** International Plumbing Code

**IRC:** International Residential Code

**Joint:** the connection of the PEX pipe to a fitting, fixture, or manifold

**Manifold:** a device having a series of ports that are used to connect distribution lines for several fixtures

**NSPC:** National Standard Plumbing Code



**Outlet:** see fixture

**Parallel:** a plumbing design that utilizes a central manifold and distribution piping to each hot and cold water fixture

**pH:** a scale ranging from 0 to 14 that ranks how acidic or alkaline a liquid is; water with a pH below 7 is considered acidic and water with a pH above 7 is considered alkaline

**PPFA:** Plastic Pipe and Fittings Association

**PPI:** Plastics Pipe Institute

**Scaling:** process of mineral buildup on the interior of a pipe

**Test fixture:** the tub-shower unit farthest from the water source that was instrumented to measure flow rate, flowing pressure, and mixed water temperature in the lab tests

**Thermoplastic:** having the property of becoming soft when heated and hard when cooled

**Thermoset:** having the property of becoming permanently hard and rigid when heated or cured

**Trunk and branch:** a plumbing design that has a large main line that feeds smaller pipes to each fixture

**Ultraviolet:** high energy light waves found in sunlight that lead to the degradation of many plastics and materials (UV)

**UPC:** Uniform Plumbing Code

**Wait time:** the time it takes for hot water to be delivered to the Test Fixture; delivery time

**Water hammer:** a banging noise heard in a water pipe following an abrupt alteration of the flow with resultant pressure surges

**Zone:** a plumbing system that uses trunk lines from the water source to small manifolds at grouped fixtures, such as a bathroom; can be flow-through or closed end

