

# **ZURN**<sup>®</sup>

## ***PEX PLUMBING AND RADIANT HEATING SYSTEMS***

*Tomorrow's plumbing and heating solutions, today!™*



## ZURNPEX System Overview



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plumbing systems





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## **Manufacture in state of the art production facilities in Commerce, TX and Elkhart, IN.**

- Commerce Facility (NE of Dallas near Greenville); Elkhart is near South Bend.
- Manufacturing in North Texas for more than 20 years. Manufacturing in Indiana for more than 30 years.
- Excellent support for the US market with the following located in Commerce, TX:
  - Research and Development Engineering
  - Code Development and Approvals
  - Sales and Marketing
  - Manufacturing
  - Quality Control



## **PEX PLUMBING AND RADIANT HEATING SYSTEMS**

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PEX Tubing  
Straights



Copper  
Manifolds



Unassembled  
Manifolds



Tools



Thermostat  
Controls



Design  
Software



Installation  
Accessories



Uncoller



Portable  
Uncoller



PEX Tubing  
Coils



Brass Mini  
Manifolds



Assembled  
Manifolds



Tools



Alumicor™  
PEX-AL-PEX



Tools



Baseboard  
Connections



Design  
Service

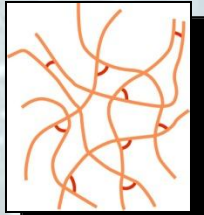
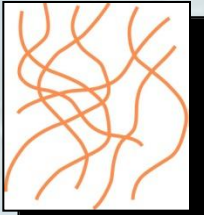


Comprehensive  
Training

## **PEX Manufacturer with Experience**

- Largest PEX Plumbing Manufacturer in North America
- More than 30 years of experience
- Billions of feet of ZURNPEX tubing have been installed throughout North America.
- Complete Radiant Heat and Plumbing system supplier.
- Nearly 350 million ZURNPEX fittings are in service in North America over the last 25 years.
- Easiest fitting system to install and most reliable/time tested.
- ZURNPEX tubing has UV protection.
- ZURNEX tubing has chlorine protection.
- Cost competitive





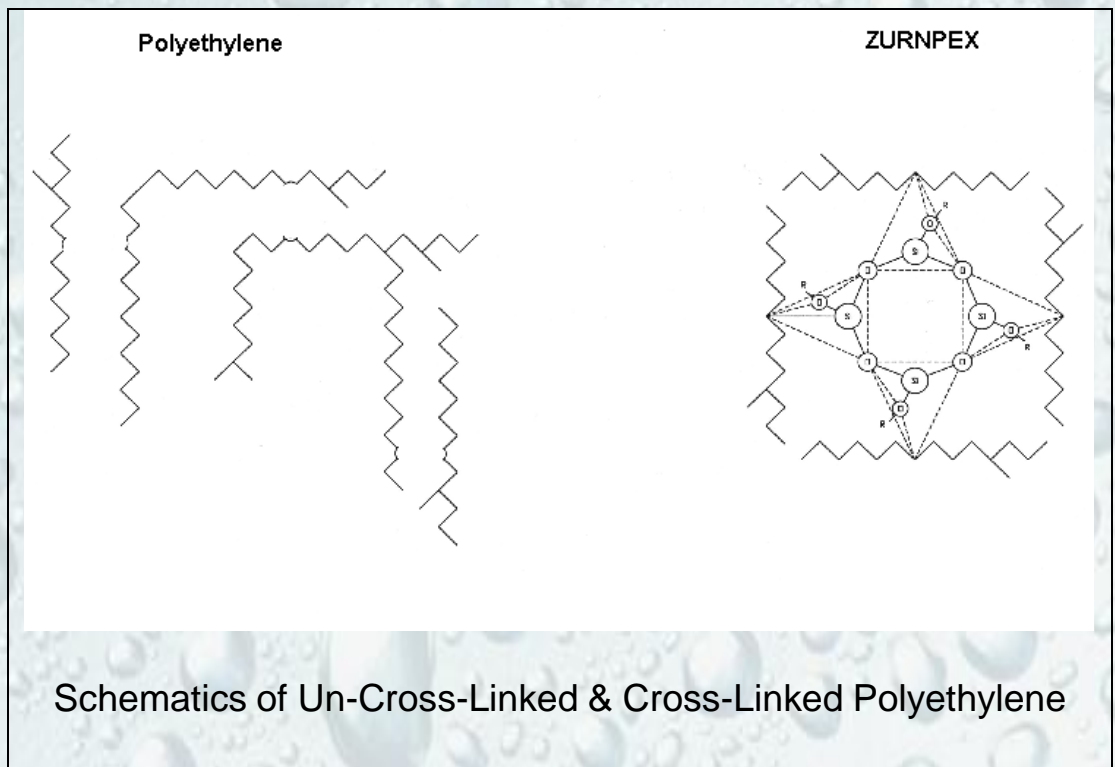
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## What is PEX ?

PEX is an acronym which stands for “Cross-Linked Polyethylene.” It’s a highly engineered polymer where the molecular structure of polyethylene is “linked” together in a 3-dimensional manner to increase the tubing’s resistance to temperature and pressure degradation.





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## How Strong is ZURNPEX?

### Strength:

- Tensile Yield Strength (psi) (stress point at which the material becomes permanently deformed)

<u>Material</u>	<u>73°F</u>	<u>180°F</u>
– ZURNPEX	<b>2922</b>	<b>1806</b>

- Quick Burst Testing Analysis (psi) (average quick burst pressure at 180°F in accordance with ASTM standards)

<u>Material</u>	<u>Test Results</u>
• ZURNPEX	<b>375 PSI @ 180 °F</b> <b>+/- 1000 PSI @ 73 °F</b>



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# Zurn PEX Plumbing System Advantages



## – Fitting Systems:

### – QuickSert I Insert & Crimp

- » 30 Year track record of proven reliability with our tubing
- » Over 200 million Zurn QuickSert I fittings in service
- » Easy to install
- » 2,000 - 3,000 ft. lbs. of torque exerted from tool when compressing ring
- » Full strength immediately
- » Easy to check crimp with Go/No Go Gauge
- » Not effected by cold weather
- » Most widely used fitting system in the industry
- » (note: PEX systems need a universal fitting system like copper & CPVC to help gain widespread acceptance)





## PEX PLUMBING AND RADIANT HEATING SYSTEMS

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# ZURNPEX Warranty

- **25 year warranty on ZURNPEX tubing and fittings**

- **Warranty is written to the "owner" of the property - transferable (not the "original" owner)**

- **Covers incidental damages to the structure – not just replacement of the product**

- **Backed by Zurn/Jacuzzi**



### Zurn PEX Plumbing and Radiant Heating Systems PROFESSIONAL INSTALLATION LIMITED WARRANTY

Subject to the terms and conditions of this Limited Warranty, Zurn PEX Plumbing and Radiant Heating Systems warrants only to the owner of the real property when installed by licensed professional contractors or authorized distributors who purchase and properly install in a potable plumbing system and/or radiant heating system its:

- (i) Zurn PEX non-barrier and barrier cross-linked polyethylene tubing (PEX) and Click/Sert<sup>®</sup> insert fittings, when installed as a system with our Zurn PEX non-barrier and barrier cross-linked polyethylene tubing (PEX), for a period of twenty-five (25) years, and
- (ii) Click/Port plumbing manifolds, under normal conditions of use, for a period of ten (10) years, and
- (iii) Click/Sert<sup>®</sup> insert fittings, when not installed with Zurn PEX non-barrier and barrier cross-linked polyethylene tubing (PEX) and installed with PEX tubing that meets the ASTM F876 requirements, for a period of five (5) years, and
- (iv) The associated hardware and accessories, including manifolds, distribution headers, valves, electrical controls, tools, and miscellaneous fittings, for a period of two (2) years from the date of installation, and
- (v) Zurn PEX riser tubes and supplies, if installed properly, for a period of one (1) year from the date of installation.

In order for this Limited Warranty to apply, the above referenced products must be installed by a licensed professional contractor in accordance with Zurn installation instructions as outlined in the Zurn PEX Plumbing and Radiant Heating Systems Installation Guide, meeting all applicable code requirements and good plumbing practices. FAILURE TO INSTALL ZURN PRODUCTS ACCORDING TO MANUFACTURER'S INSTRUCTIONS WILL VOID ALL APPLICABLE WARRANTIES AND MAY RESULT IN SEVERE WATER DAMAGE. See our free Zurn PEX Installation Guide for instructions. For your copy, call toll-free 1-800-872-7277. Under this warranty, you only have a right to reimbursement if the failure or leak is a direct result of a manufacturing defect in the products covered by this warranty and occurred during the warranty period. This warranty does not apply and you do not have a right of reimbursement if the failure or resulting damage is caused by:

- (i) freezing during or after the installation or inadequate freeze protection;
- (ii) damage due to tear, breaks, or other external damages before, during, or after installation;
- (iii) components not manufactured or sold by Zurn;
- (iv) exposure to temperatures and pressures beyond the specified range for Zurn products as specified on the product or in the Zurn PEX Installation Manual or Zurn Design Manual;
- (v) exposure to harmful, unauthorized, or unanticipated chemicals or substances or corrosive water conditions;
- (vi) exposure to ultraviolet light;
- (vii) damage or wear from abnormal operating conditions, accident, abuse, misuse, or unauthorized alterations or repair.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR OBLIGATIONS, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ZURN DOES NOT GUARANTEE OR IN ANY WAY WARRANT THE INSTALLATION OF ZURN PEX PRODUCTS DUE TO THE WIDE VARIANCE IN INSTALLATION PRACTICES AND OTHER CONDITIONS BEYOND OUR CONTROL.

If you believe that a product fails to meet the above Limited Warranty, you should notify us in writing within 30 days following the failure and prior to expiration of the applicable warranty period set forth above, at the following address:

Zurn Industries, Inc.  
PEX Plumbing and Radiant Heating Systems  
1801 Pittsburgh Avenue  
Erie, PA 16502  
ATTENTION: CLAIMS DEPARTMENT

Notification should include a description of the product, the failed part, model number (if available), date of purchase and/or date of installation, and how the product fails to meet the above warranty. Upon receipt of a written claim under this Limited Warranty and evidence/identification of the date of manufacture of product, and after inspection by an authorized Zurn representative and determination of a manufacturing defect, Zurn will reimburse the property owner for reasonable repair or replacement charges, to include drywall and painting as well as damages to real property and the premises within which the product is installed, resulting from the failure or leak. At our option, and in our sole discretion, we will either repair or replace the product with a Zurn product of the same or similar type, size, and like quantity. Except as specified above, we will not pay any costs (labor or otherwise) associated with removing previously installed product(s), installing replacement product(s), or transportation or return of a product. If, as determined by Zurn, repair or replacement of the product is not commercially practicable, or cannot be completed in a timely manner, we may return the ultimate purchase price paid for the product upon verification by providing a copy of your purchase order, invoice, receipt, or bill of sale.

ZURN WILL NOT BE LIABLE FOR ANY OTHER LOSS OR EXPENSE(S) NOT SPECIFICALLY DESCRIBED ABOVE, AND DISCLAIMS ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

For more information, call Zurn toll free at 1-800-872-7277.

Form No. ZYM03125, 8/03  
ZURN PEX PLUMBING AND RADIANT HEATING SYSTEMS 1801 PITTSBURGH AVENUE, ERIE, PA, U.S.A. 16502 PHONE: 800/872-7277 FAX: 800/236-5148 WEBSITE: [www.zurn.com](http://www.zurn.com)  
IN CANADA: ZURN INDUSTRIES LIMITED 3544 NASHUA DRIVE, MISSISSAUGA, ONTARIO L4V 1L2 PHONE: 905/405-8272 FAX: 905/405-1292






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# Warranties

## Highlights of Copper Warranty:

- **50 Years - tubing & fittings**
- **Transferable - passes to new owner**
- **Warranty is from Specific Copper Manufacturer - does not cover crossover usage**
- **Replacement or Repair Only - does not cover incidental damage to building**
- **Does Not Cover - if failure is caused by aggressive water or if installation is in "hostile environment." (among other things)**
- **Only 8 Copper Manufacturers Participate- out of 175 (listed on the Copper Fabr. Database)**



### RESIDENTIAL COPPER PLUMBING PRODUCTS LIMITED WARRANTY

**WHAT THE WARRANTY TERMS MEAN**  
In this warranty "Manufacturer" refers to the company listed below which manufactured the Product and any person or company that assumes its obligations under this warranty. "Homeowner" means you as the owner of the residential building in the United States in which the Product has been installed and also means any succeeding owner during the original warranty term. "Product" means the copper water tube and/or copper or brass fittings manufactured by the Manufacturer for the residential building market in the United States. Each Manufacturer listed below separately and individually warrants only Products it has manufactured and does not warrant Products of any other company, whether or not listed below.

**DATE THE WARRANTY BEGINS**  
The warranty begins on the date of the new home purchase, or in the case of home additions or renovations, on the date the installation is completed. The warranty is transferable to succeeding Homeowners for the remainder of the original warranty term, in which case the date the warranty begins shall continue without change.

**WHAT IS COVERED**  
The Manufacturer warrants to the Homeowner for a period of 50 years from the date the warranty begins that its properly installed Product will be free of failure as a result of defects in material or workmanship in manufacturing the Product.

**WHAT THE MANUFACTURER WILL DO FOR YOU**  
As long as (1) such a failure occurs within 50 years from the date the warranty begins and (2) the Homeowner promptly notifies the Manufacturer of the Product of that failure by contacting it through its 800 phone number listed below, the Manufacturer will correct that failure by repairing or replacing the Product within a reasonable time without charge. This warranty is limited to the cost of repairing or replacing the Product, including installation.

**WHAT IS NOT COVERED; DISCLAIMER OF LIABILITY FOR CONSEQUENTIAL AND OTHER DAMAGES**  
The Manufacturer does NOT warrant against failure:  
1. of any product, parts, or systems that it has not manufactured;  
2. if the Product is used for purposes other than residential plumbing applications;  
3. caused by, contributed in whole or in part by, or resulting from, any of the following:  
(a) improper installation;  
(b) abuse, such as, without limitation, vandalism;  
(c) natural disasters, such as, without limitation, flooding, windstorm and lightning;  
(d) attachments or modifications to the Product that the Manufacturer did not authorize;  
(e) external causes, where external physical or chemical qualities produce damage to the Product, such as, without limitation, aggressive water or an unsuitable or hostile environment; or  
(f) any other cause beyond the Manufacturer's control.  
The Manufacturer shall NOT be liable under any circumstances for any other direct or any indirect, incidental or consequential damages of any kind.

**THIS IS THE ONLY WARRANTY**  
THIS WARRANTY IS THE ONLY WARRANTY FOR THE PRODUCT PROVIDED BY THE MANUFACTURER, AND IS AND SHALL BE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO AN IMPLIED WARRANTY OF MERCHANTABILITY, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF THE MANUFACTURER. NONE OF THE MANUFACTURER'S EMPLOYEES, AND NO OTHER PERSON OR BUSINESS, IS AUTHORIZED TO MAKE ANY OTHER WARRANTY ON THE MANUFACTURER'S BEHALF COVERING THE PRODUCT.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

**MANUFACTURERS**

Cambridge-Lee Industries Inc.	Reading, PA	800-926-5588
Cerro Copper Products	St. Louis, MO	888-237-7811
Elliott Products Corporation	Elliott, IN	800-284-4851
Halstead Industries, Inc.	Greensboro, NC	800-348-8464
Howell Metals Company	New Market, VA	800-247-2048
Muebler Manufacturing Entities		
c/o Mueller Industries, Inc.	Memphis, TN	800-348-8464
NIBCO Inc.	Eldersburg, IN	888-446-4226
Wolverine Tube, Inc.	Huntsville, AL	800-633-4078

January 1, 1998

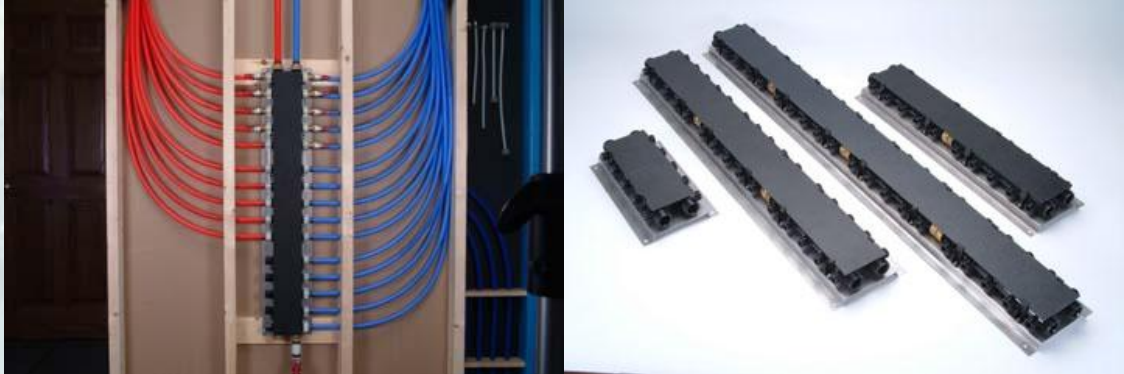


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## Zurn PEX QICKPORT<sup>®</sup> Manifolds



### – Plumbing Manifolds:

- **Zurn** - QickPort Modular Manifold System (PLS)
  - Can be installed in various configurations
  - basic 5 port header which can be built up with Add-A-Port Tees, Elbows or additional headers
  - Utilizes cone technology to seal
  - Crimp or Nut-Ring-Cone connections
  - Can be installed with or without valves
  
- **Now available in pre-assembled configurations!**
  - Advantages -
    - » Fewer seals - less chance of a leak
    - » Can be installed with or without ball valves (brass ball valves)
    - » Can connect 3/8", 1/2", 3/4" or 1" ZURNPEX
    - » Expandable using Add-A-Ports™





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## Installation Options - Branch & Tee System

**Due to Zurn PEX's flexibility, it can be installed in a variety of techniques.**

Primary methods of installation:

- Branch & Tee
- Manifold
- Continuous Loop/Remote Manifold



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# Installation Options - Branch & Tee System

### Advantages:

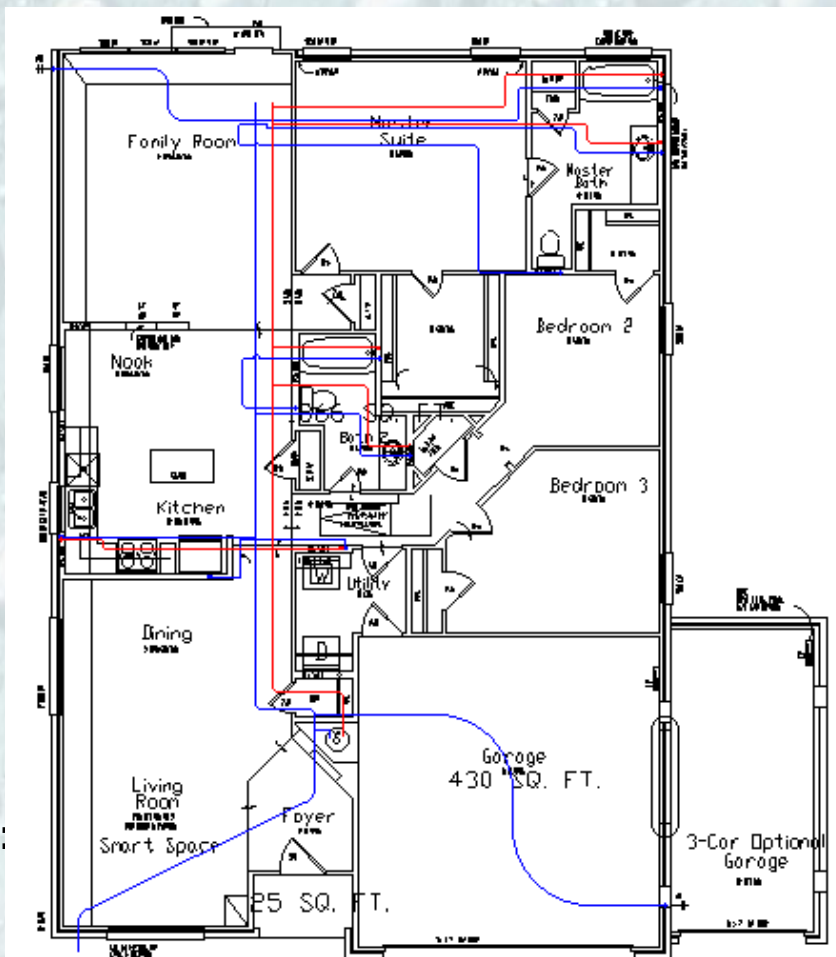
- Uses the least amount of materials.
- Fastest Installation.

### Disadvantages:

- Typically can't be installed below slab (most codes do not allow) - either in attic, between floors or in basement/crawl.
- Slower delivery of hot water to distant fixtures.

### Special Considerations:

- Local codes may not permit attic installations or may require specific insulation requirements.



Plumbing Layout - Single Story  
Attic Branch & Tee Installation

FLOOR PLAN







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# Installation Options - Manifold System

### Advantages:

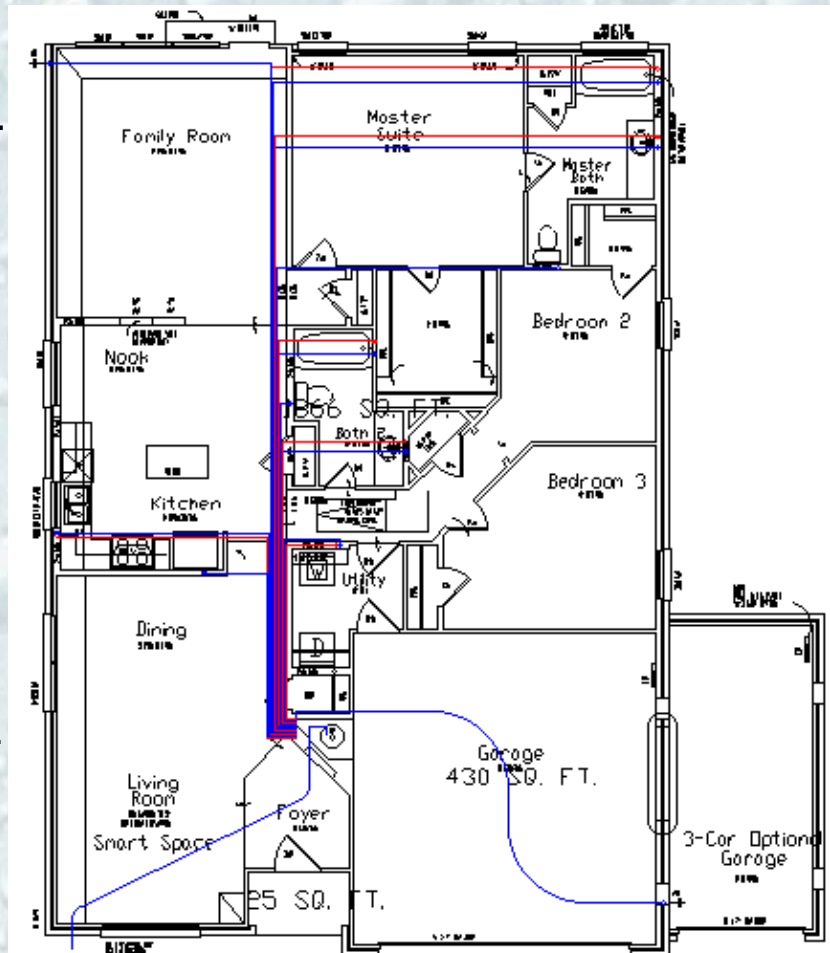
- Delivers hot water quickly to remote fixtures.
- Centralized shut-offs for easy system control.
- Fast installation.
- Reduces the number of connections.

### Disadvantages:

- More expensive due to increased material.
- Stop valves should be installed at Lavs and water closets for servicing.

### Special Considerations:

- Local codes may not permit attic installations or may require specific insulation requirements.



Plumbing Layout – Single Story  
Attic Manifold Installation

FLOOR PLAN





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# Installation Options - Continuous Loop/ Remote Manifold System

### Advantages:

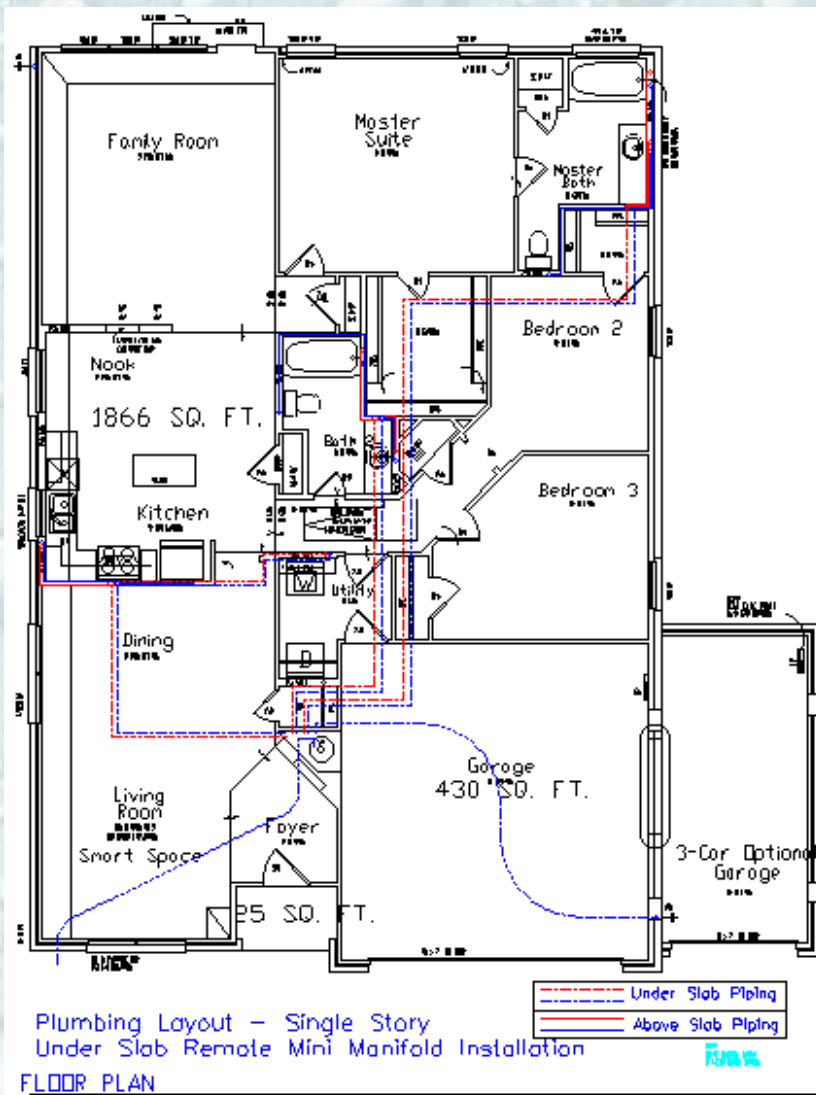
- Similar installation to copper - plumbers are familiar with it.
- Easy top outs.

### Disadvantages:

- Labor intensive on rough in.
- Chance of tubing being moved during pour.

### Special Considerations:

- Care must be taken to locate walls.
- Care must be taken to secure tubing so it does not move during pour.







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## **Code Approval Overview**

- **National** - PEX is listed as an approved product in the International Plumbing Code (IPC) and Uniform Plumbing Code (UPC) - used by BOCA, SBCCI and ICBO

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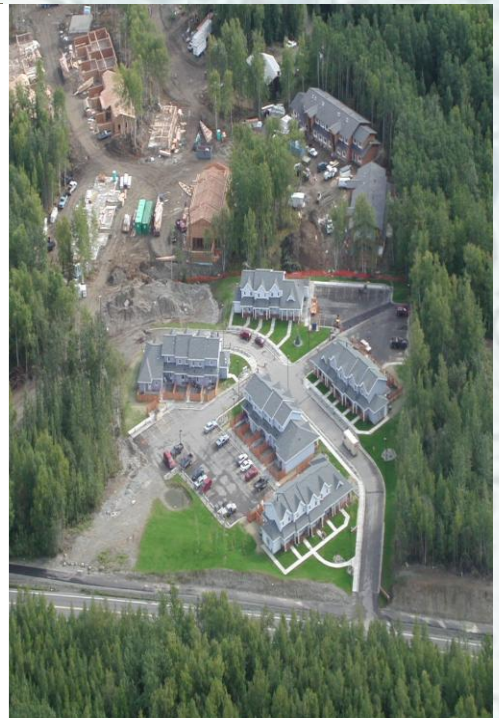
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# High Profile Projects

## *Plumbing*

- IUPUI Dormitories - IN
- Holly Hills Retirement Community - AK
- Mobile Apt. Complex - AL





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## Why use PEX over Copper or CPVC?

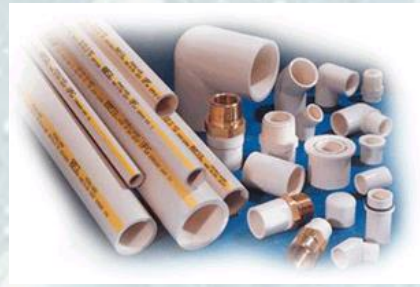


**VS.**



PEX was developed because of CPVC and copper's inefficiencies just like copper was developed years ago to replace steel pipe. ***PEX is the "Next Generation" of quality engineered plumbing systems.***





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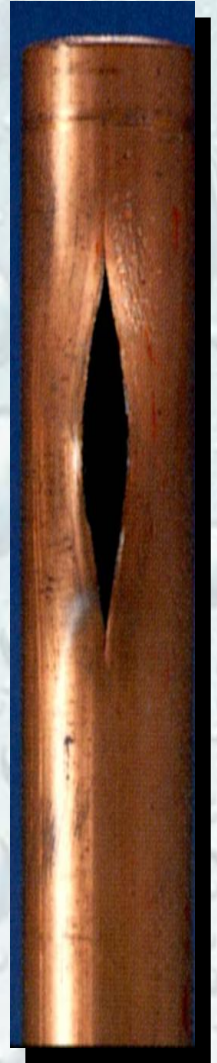
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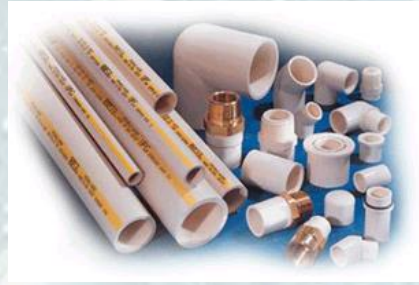
## **ZURNPEX vs. Copper & CPVC**

### **Here Are The Facts:**

- PEX is extremely strong with ratings up to 200°F@80 PSI for more than 100 years of service.
- PEX is easier and less expensive to install than copper and CPVC.
- PEX requires up to 90% less fittings than copper and CPVC saving time and money with less pressure loss.
- PEX is more sanitary than copper and CPVC because it does not contain heavy metals or use chemicals to connect.
- PEX is more resistant to mineral, lime and scale build-up than copper.
- PEX is completely corrosion resistant unlike copper.
- PEX is quieter than copper and CPVC.
- PEX absorbs water hammer into its flexible walls unlike copper or CPVC which are less flexible and can promote water hammer.
- PEX pricing is very stable unlike copper and CPVC.
- PEX can be installed with branch & tee or with dedicated lines to each fixture (Home-Run/Manifold) eliminating temperature and pressure fluctuations.
- PEX is more energy efficient than copper and CPVC because it does not dissipate heat as readily.
- PEX will not be stolen by "Recycling Pirates" like copper, saving millions of dollars per year nationwide.
- PEX is more resistant to freezing and typically does not require repairs after thawing unlike copper and CPVC.
- PEX does not require a torch so the contractors' liability exposure is lower because no open flames on the job site.







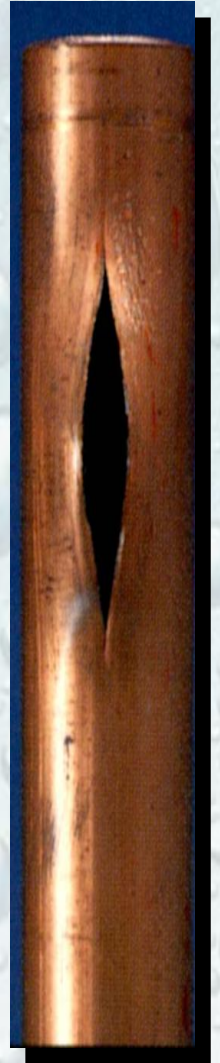
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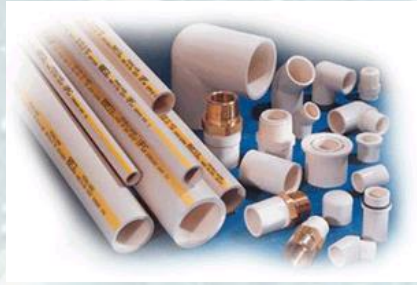
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## **Considerations of CPVC & copper pipe according to Builders Websource:**

- The EPA lists copper as a contaminant in drinking water.
- With copper, some report of "metallic taste" to water
- Copper can produce "pin hole" leaks in presence of acidic water
- Copper is limited in some areas to use only when water pH is less than 6.5 - 6.8 (acidic)
- Copper tubing can leach lead or copper into water supply
- Copper is only suitable for use when pH is between 6.5 and 8.5
- Copper is subject to job site theft
- Copper has labor intensive installation process and requires skilled labor
- With copper, calcium build-up can occur, constricting water flow
- Copper has higher initial installed cost (labor and materials)
- With copper, thermal loss - requires insulating jacket
- With copper, condensation can occur if not properly insulated
- Copper is noisy at high water velocities







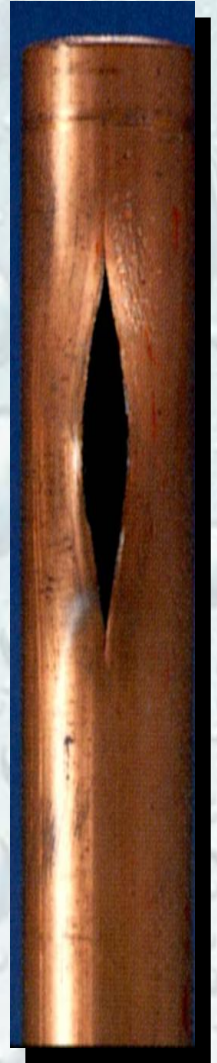
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## Considerations of CPVC & copper pipe:

- Copper is subject to water hammer at velocities higher than 5 FPS; may require water hammer arrestors to mitigate damage
- Copper joints prone to failure at high temperatures (180°F and velocities)
- Installation with gas torch is a potential fire hazard
- With copper, repairs difficult for DIY'ers, requiring special training and tools
- With copper, cannot make solder repairs with water in pipes
- Price of copper fluctuates over time depending on raw materials demand
- With CPVC, some complaints of "plastic taste" in water
- With CPVC, fittings and pipe subject to cracking or damage on job site if dropped or stepped on
- With CPVC, solvents used to join fittings and pipe contain volatile organic compounds (VOCs) which are known pollutants and require proper ventilation during installation
- CPVC cement can go bad in cold temperatures which compromise the quality of the connection
- Unclean joints can break apart over time







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**Considerations of copper pipe:**

- EPA connects the “Corrosion of household plumbing system,” to potential health problems in 1991.

**EPA National Primary Drinking Water Standards**

	Contaminant	MCL or TT <sup>1</sup> (ppm, L2)	Potential health effects from exposure above the MCL	Common source of contaminant in drinking water	Public Health Goal
OC	Acrylamide	1.0	Nervous system or blood problems	Added to water during sewage/wastewater increased risk of cancer treatment	zero
OC	Atrazine	0.003	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R	Alpha particles	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
OC	Asbestos	0.005	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries, the redoubts; ceramic electrolytic solder	0.005
OC	Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronics production wastes	0
OC	Asbestos (fibers <10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign neoplastic polyps	Decay of asbestos cement in water mains; erosion of natural deposits	3 MFL
OC	Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
OC	Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC	Bromine	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC	Chloroform (Trihalomethanes (THMs))	0.002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
OC	Cadmium	0.005	Renal (kidney) damage	Discharge from metal refineries and coal-burning facilities; discharge from electrical, aerospace, and defense industries	0.005
OC	Chromium (hexavalent)	0.05	Increased risk of cancer	Erosion of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as alpha and beta radiation	zero
OC	Copper	1.3	Increased risk of cancer	Byproduct of drinking water distribution	zero
OC	Cyanide	0.05	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.05
OC	Dieldrin	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC	Fluoride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
OC	Lead	MCLG=0	Eye, nose irritation; stomach discomfort; anemia	Water additive used to control corrosion	MCLG=0

OC Organic Chemical  
 OC Organic Chemical  
 R Radioactive

IOC	Copper	TT <sup>1</sup> ; Action Level = 1.3	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
	Contaminant	TT <sup>1</sup>	Gastrointestinal illness (e.g. diarrhea)	Human and animal fecal waste	zero



## PEX PLUMBING AND RADIANT HEATING SYSTEMS

Tomorrow's plumbing and heating solutions, today!™

### Considerations of copper pipe:

“Copper works its way into the water by dissolving from copper pipes in the household plumbing.”

“Newer homes with copper pipes may be more likely to have a problem.”

“...anytime the water has not been used for more than six hours—overnight, for example, or during the day when people have been gone to work or school—it should be cleared from the pipes before being used for drinking or cooking.”

#### Copper in Drinking Water Health Effects and How to Reduce Exposure

In 1991, the U. S. Environmental Protection Agency (EPA) established rules for controlling lead and copper levels in public water supplies. Since that time, water systems across the country have been sampling water in the homes of their customers to determine if there is a problem. Included is information on copper in drinking water: why it is a cause for concern, how it enters water, and how you and your family can reduce your exposure to it.

Copper is a natural metal that occurs naturally in rock, soil, water, and air. It is an essential element in the human body and is used in many electrical uses in our society and in a wide variety of plumbing and pipes. It is an essential element in the human body and is used in many electrical uses in our society and in a wide variety of plumbing and pipes. It is an essential element in the human body and is used in many electrical uses in our society and in a wide variety of plumbing and pipes.

#### How can I reduce my exposure to copper?

Copper works its way into the water by dissolving from copper pipes in the household plumbing. The longer the water has stood still in the pipes, the more copper it is likely to have absorbed. Newer homes with copper pipes may be more likely to have a problem. Over time, a coating forms on the inside of the pipes and can insulate the water from the copper in the pipes. In newer homes, this coating has not yet had a chance to develop. Thus, anytime the water has not been used for more than six hours—overnight, for example, or during the day when people have been gone to work or school—it should be cleared from the pipes before being used for drinking or cooking.

The human body has a natural mechanism for maintaining the proper level of copper in it. However, children under one year old have not yet developed this mechanism and, as a result, are more vulnerable to the toxic effects of copper. People with Wilson's disease also have a problem with maintaining the proper balance and should also exercise particular care in limiting exposure to copper.

Water is one of the ways that copper may enter your home. The EPA has established an "action level" of 1.3 parts per billion of copper in drinking water. This action level is based on the amount of copper that is expected to be collected by a water system in one year (one gallon per liter or 1,300 parts per billion).

This can be achieved by letting the cold water faucet run until you can feel the water getting colder—usually 30 to 60 seconds. This must be done before taking drinking water from any faucet in the house.

This level has been set to protect against acute toxic effects in humans. However, it is not protective against copper toxicity in sensitive members of the population, such as children with Wilson's disease, who will have to further limit their intake of copper from all sources.

In addition, hot water dissolves copper more quickly than cold water, so a result, water to be used for drinking or cooking should not be drawn from the hot water tap. If you need hot water for cooking or drinking, take water from the cold tap and heat it. It is especially important not to use the hot water for making baby formula.

What is my local water supply doing about copper? Water supply systems are required to take a number of steps to deal with copper in their water. They should be testing the source water for contamination and treating the water to make it safe to drink.

Department of Health Division of Environmental Health  
Seventh Place P.O. Box 64975 St. Paul, Minnesota 55164-0975  
<http://www.health.state.mn.us/drinkwater>  
Request this document in another format, call 651-213-0700, TDD: 651-213-0707, 541-0710-2  
Voice through the Minnesota Relay Service, 1-800-927-3529 (ask for 651-213-0700) August 1995





- **Codes and Standards**

- **STANDARDS**

- **American Society for Testing and Materials**

- ASTM D2737 - Polyethylene (PE) tubing.
      - ASTM F876 - Crosslinked Polyethylene (PEX) tubing.
      - ASTM F877 - Crosslinked Polyethylene (PEX) tubing and fitting systems.
      - ASTM F1807 - Brass insert fittings.

- **CSA Internationa**

- IB137.0 - General requirements for thermoplastic pressure piping.
      - B 137.5 - Crosslinked Polyethylene (PEX) tubing and fitting systems.

- **NSF International**

- Standard 14 - Plastic piping system components.
      - Standard 61 - Drinking water system components-health effects.

- **LISTINGS**

- **NSF International**

- Zurn PEX oxygen barrier and non-barrier tubing, Qicksert® fittings, Qicktite® fittings, Zurn polyethylene cold water service tubing,
      - Zurn PEX supply tubes.

- **International Association of Plumbing & Mechanical Officials (IAPMO)**

- Zurn PEX oxygen barrier and non-barrier tubing, Qicksert® fittings, Zurn PEX supply tubes, Waterflex® water heater connectors.

- **National Evaluation Service (NES)**

- Zurn PEX oxygen barrier and non-barrier tubing, Qicksert® fittings.

- **CSA International**

- Zurn PEX non-barrier tubing, Qicksert® fittings, Qicktite® fittings, Zurn PEX supply tubes.



- **MODEL CODES**

- The following model codes recognize Crosslinked Polyethylene (PEX) tubing for use in hot and cold water distribution systems:

- **International Plumbing Code (BOCA, ICBO, SBCCI)**
- **CABO One and Two Family Dwelling Code (BOCA, ICBO, SBCCI)**
- **Standard Plumbing Code (SBCCI)**
- **Uniform Plumbing Code (IAPMO)**
- **U.S. Department of Housing and Urban Development (HUD)**
- **The following model codes recognize Crosslinked Polyethylene (PEX) tubing for use in radiant heating systems:**
- **IAPMO Uniform Mechanical Code (IAPMO)**
- **ICBO Uniform Mechanical Code (ICBO)**
- **International Mechanical Code (BOCA, ICBO, SBCCI)**
- **Standard Mechanical Code (SBCCI)**
  - **It is the responsibility of the installer to ensure that these products are accepted by local code authorities.**