SECTION 22 11 16

DOMESTIC WATER PIPING

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\*\* NOTE TO SPECIFIER \*\* Uponor; plumbing piping, hydronic piping, radiant heating and cooling.  
This section is based on the products of Uponor which is located at:  
5925 148th Street West  
Apple Valley, MN 55124  
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click Here for additional information  
With over 40 years of performance in structures around the globe, Uponor is the professional's choice for commercial plumbing, hydronic distribution and radiant heating and cooling systems. Using technologies proven in the most demanding environments, Uponor has perfected the art of providing systems that exceed expectations and deliver consistent quality for decades of use.  
Get Uponor product data, in the right formats, in the right places, to quickly and accurately design and estimate your PEX-a plumbing, radiant heating/cooling and hydronic piping project. 2D/3D CAD files and BIM files in multiple platforms are available at www.uponorengineering.com/catalog.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* This is not a standalone specification section. The information below is intended for inclusion in the project Domestic Water Piping Specification.

* + 1. PEX-a pipe and fittings for domestic water piping.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required

* + 1. Section 23 21 13 - Hydronic Piping.
    2. Section 23 21 13 - Hydronic Piping.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM International (ASTM):
       1. ASTM D 2765 - Test Methods for Determination of Gel Content and Swell Ratio of Crosslinked Ethylene Plastics.
       2. ASTM D 6394 - Specification for Sulfone Plastics (SP).
       3. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
       4. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
       5. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
       6. ASTM F 876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing.
       7. ASTM F 877 - Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems.
       8. ASTM F 1960 - Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Crosslinked Polyethylene (PEX) Tubing.
    2. American Water Works Association:
       1. AWWA C904 Standard for Crosslinked Polyethylene (PEX) Pressure Pipe, 1/2 in. Through 3 in., for Water Service.
    3. American National Standards Institute (ANSI)/National Sanitation Foundation (NSF)
       1. ANSI/NSF Standard 14 Plastics Piping System Components and Related Materials.
       2. ANSI/NSF Standard 61 Drinking Water System Components - Health Effects.
       3. ANSI/NSF Standard 359 Valves for Crosslinked Polyethylene (PEX) Water Distribution Tubing Systems.
    4. American National Standards Institute (ANSI)/Underwriters Laboratories, Inc. (UL)
       1. ANSI/UL 263 Standard for Safety for Fire Tests of Building Construction and Materials.
       2. ANSI/UL 2846 Standard for Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics.
    5. American Society of Mechanical Engineers (ASME):
       1. ASME B 16.5 Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
       2. ASME B16.51 Copper and Copper Alloy Press-Connect Pressure Fittings.
    6. Canadian Standards Association (CSA)
       1. CAN/CSA B137.5 Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications.
       2. CSA B242-05 Groove-and Shoulder-Type Mechanical Pipe Couplings.
    7. International Code Council (ICC)
       1. International Plumbing Code (IPC)
    8. International Association of Plumbing Officials (IAPMO)
       1. Uniform Plumbing Code (UPC)
    9. National Association of Plumbing, Heating and Cooling Contractors (NAPHCC)
       1. National Standard Plumbing Code (NSPC)
    10. Plastics Pipe Institute (PPI)
        1. PPI Technical Report TR-4/06
    11. Underwriters Laboratories (UL):
        1. UL 2846 Standard for Fire Tests of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics.
    12. Uponor, Inc.
        1. Uponor Plumbing Design Assistance Manual (PDAM), 2017.
        2. Uponor Piping Pocket Guide, 2017.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Provide manufacturer's product submittal data.
  2. QUALITY ASSURANCE
     1. Installer Qualifications: Installer shall have successfully completed the Uponor Commercial Piping Systems Training Course (formerly Uponor AquaPEX Certification) and is able to provide proof/verification. Course shall be conducted by the manufacturer or a manufacturer's representative.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
     2. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
     3. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
        1. Store PEX tubing in cartons or under cover to avoid dirt or foreign material from entering the tubing.
        2. Do not expose PEX tubing to direct sunlight for more than 30 days. If construction delays are encountered, cover the tubing to prevent exposure to direct sunlight
  4. WARRANTY
     1. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
     2. Manufacturer's Warranty: PEX-a manufacturer system warranty shall cover piping and fittings for a duration of 25 years from the date of installation. Piping system warranty shall apply to potable water distribution and water service systems constructed of pipe and fitting products sourced from the same manufacturer.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Uponor , which is located at: 5925 148th St. W.; Apple Valley, MN 55124; Toll Free Tel: 800-321-4739; Tel: 952-891-2000; Fax: 952-891-2008; Email: [request info (daniel.worm@uponor.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Uponor+&coid=36585&rep=&fax=952-891-2008&message=RE:%20Spec%20Question%20(15140upo):%20%20&mf=); Web: [http://www.uponorengineering.com](http://http://www.uponorengineering.com)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
  1. PEX PIPE AND FITTINGS
     1. PEX-a (Engel-Method Crosslinked Polyethylene) Piping: ASTM F 876 and F877 (CAN/CSA-B137.5) by Uponor.
     2. PEX-a Fittings: elbows, adapters, couplings, plugs, tees and multi-port tees (1/2 inch through 3 inch nominal pipe size): ASTM F1960 cold-expansion fitting manufactured from the following material types:
        1. UNS No. C69300 Lead-free (LF) Brass.
        2. UNS No. C27453 Lead-free (LF) Brass.
        3. 20% glass-filled polysulfone as specified in ASTM D 6394.
        4. Unreinforced polysulfone (group 01, class 1, grade 2) as specified in ASTM D 6394.
        5. Polyphenylsulfone (group 03, class 1, grade 2) as specified in ASTM D 6394.
        6. Blend of polyphenylsulfone (55-80%) and unreinforced polysulfone (rem.) as specified in ASTM D 6394.
        7. Reinforcing cold-expansion rings shall be manufactured from the same source as PEX-a piping manufacturer and marked "F1960".
     3. Pre-Sleeved Piping (1/2 inch (16mm) through 3/4 inch (20mm) nominal pipe size): PEX-a piping, with a high-density polyethylene (HDPE) corrugated sleeve.
     4. Pre-Insulated Piping (1/2 inch (16mm) through 2 inch (50mm) nominal pipe size): PEX-a piping, with a closed-cell polyethylene foam insulation.
     5. Multi-Port Tees: Multiple-outlet fitting complying with ASTM F 877 (CAN/CSA B137.5); with ASTM F 1960 inlets and outlets.
        1. Engineered polymer branch multi-port tee.
        2. Engineered polymer flow-through multi-port tee.
        3. Engineered polymer commercial branch multi-port tee.
        4. Engineered polymer commercial branch multi-port elbow.
        5. Engineered polymer commercial flow-through multi-port tee.
     6. Manifolds: Multiple-outlet assembly complying with ASTM F 877 (CAN/CSA B137.5); with ASTM F 1960 outlets.
        1. Engineered polymer valved manifold.
        2. Engineered polymer valveless manifold.
        3. Lead - free copper branch manifold.
        4. Lead-free copper valved manifold.
  2. TRANSITION FITTINGS
     1. PEX-to-Metal Transition Fittings:
        1. Manufacturers: Provide fittings from the same manufacturer of the piping.
        2. PEX-a to Thread Transition: One-piece brass fitting with male or female threaded adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
        3. PEX-a to Copper Sweat Transition: One-piece brass fitting with sweat adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
        4. PEX-a to Copper Press Transition: One-piece lead free (LF) brass fitting with one ASME B16.51 copper press end and one ASTM F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
        5. PEX-a to Flange Transition: Two-piece fitting with one steel flange conforming to ASME B 16.5and one lead free (LF) brass adapter conforming to ASTM F 1960.
        6. PEX-a to Groove Transition: One-piece lead free (LF) brass fitting with one CSA B242-05 groove end in either iron pipe size (IPS) or copper tube size (CTS) and one ASTM F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
        7. PEX-a to Water Meter Transition: Two-piece fitting with one NPSM union thread and one ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
     2. PEX-to-Thermoplastic Transition Fittings:
        1. PEX-a to CPVC Transition: Thermoplastic fitting with one spigot or socket end and one ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
  3. VALVES
     1. PEX-to-PEX, Lead Free (LF) Brass Ball Valves (1/2 inch (16 mm) through 2 inch (50 mm) nominal pipe size)
        1. Manufacturers: Provide ball valve(s) from the same manufacturer as the piping system.
        2. Full-port ball valve: two-piece, ASTM F1960 cold-expansion ends, with PEX-a reinforcing cold-expansion ring.
        3. LF brass valve with a positive stop shoulder manufactured from C69300 brass.
        4. In compliance with: 250 CWP, ANSI/NSF 359, ANSI/NSF 14/61, cNSF-us-pw\_G lead free 0.25% Lead max., ASTM F1960, ASTM F 877 (CAN/CSA B137.5).

1. EXECUTION
   1. EXAMINATION
      1. Site Verification of Conditions: Verify that site conditions are acceptable for installation of the domestic water piping. Do not proceed with installation until unacceptable conditions are corrected.
   2. INSTALLATION
      1. Install plumbing system according to approved shop drawings and coordination drawings.
      2. Comply with manufacturer's product data, including product technical bulletins, installation instructions and design drawings, including the following.
      3. Piping Installation:
         1. Install piping system in compliance with the Uponor Piping Pocket Guide (2017).
         2. PEX shall not be installed in areas within five feet of UV light.
      4. Hangers and Supports:
         1. Horizontal PEX-a Piping Hangers: Install CTS hangers suitable for PEX-a piping in compliance with the Uponor Piping Pocket Guide (2017) and local codes, with the following maximum spacing:
            1. National Plumbing Code of Canada (NPCC): 3 inch (75mm) and below: Maximum span, 32 inches (0.81 m).
            2. International Plumbing Code (IPC) & Uniform Plumbing Code (UPC): 1 inch (25 mm) and below: Maximum span, 32 inches (0.81 m).
            3. IPC & UPC: 1-1/4 inch (31 mm) and above: Maximum span, 48 inches (1.2 m).
            4. Note: The above maximum hanger spacing requirements may be extended with the use of a continuous support channel such as Uponor PEX-a Pipe Support.
         2. Horizontal PEX-a Piping with PEX-a Pipe Channel: Install hangers for PEX-a piping with horizontal support channel in accordance with local jurisdiction and manufacturer's recommendations, with the following maximum spacing:
            1. 3/4 inch (20 mm) and below: Maximum span, 6 feet (1.8 m).
            2. 1 inch (25 mm) and above: Maximum span, 8 feet (2.4 m).
         3. Vertical PEX-a Piping: Support PEX-a piping with maximum spacing of 5 feet (1.5 m).
         4. PEX-a Riser Supports: Install CTS riser clamps at the base of each floor and at the top of every other floor for domestic hot-water systems. Install mid-story guides between each floor. Install CTS riser clamps at the base of each floor and at the top of every fourth floor for domestic cold-water systems. Install mid-story guides.
      5. Piping Schedule:
         1. Underground / under-building slab, domestic water piping (3 inch and below) shall be the following:

\*\* NOTE TO SPECIFIER \*\* Use for field-insulated PEX.

* + - * 1. 1/2 inch (16 mm) through 3 inch (75 mm) - PEX-a piping with engineered polymer (EP) or lead-free brass F1960 cold-expansion fittings. Insulate in compliance with Section - 9 "Plumbing Piping Insulation." Use the fewest possible joints and install per manufacturer's recommendations.

\*\* NOTE TO SPECIFIER \*\* Use for pre-insulated PEX.

* + - * 1. 1/2 inch (16 mm) through 2 inch (50 mm) - Pre-insulated PEX-a piping with PEX-foam insulation with engineered polymer (EP) or lead-free brass ASTM F 1960 cold-expansion fittings. Use the fewest possible joints and install per manufacturer's recommendations.
        2. 3/4 inch (20 mm) through 2 inch (50 mm) - Pre-insulated PEX-a piping with multi-layer, closed-closed cell PEX-foam insulation and a corrugated HDPE jacket with engineered polymer (EP) or lead-free brass ASTM F 1960 cold-expansion fittings. Use the fewest possible joints and install per manufacturer's recommendations.
      1. In-slab, domestic water piping (3 inch (75mm) and below) shall be the following: Bare PEX-a piping, pre-sleeved PEX-a piping, or pre-insulated PEX-a piping with engineered polymer (EP) or lead-free brass F1960 cold-expansion fittings. Use the fewest possible joints and install per manufacturer's recommendations.
      2. Aboveground domestic water piping (3 inch (75mm)and below) shall be the following: PEX-a piping, with engineered polymer (EP) or lead-free brass F1960 cold-expansion fittings.
    1. Pipe Joint Construction: PEX-a Connections: Install per manufacturer's recommendations. Use manufacturer-recommended cold-expansion tool for ASTM F 1960 connections.
    2. Field Quality Control: Do not expose PEX piping to direct sunlight for more than 30 days. If construction delays are encountered, provide cover to portions of piping exposed to direct sunlight.

END OF SECTION