



## SECTION 22 11 16

### Domestic Water Piping

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A.** PEX-a tubing and fittings for domestic water piping.

##### **1.2 REFERENCES**

- A.** American National Standards Institute (ANSI)/American Water Works Association (AWWA)

- 1.** ANSI/AWWA C904 - Standard for Cross-Linked Polyethylene (PEX) Pressure Pipes, ½ In. (12 mm) Through 3 In. (76 mm) for Water Service

- B.** American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) International ([www.nsf.org](http://www.nsf.org))

- 1.** ANSI/NSF-14 – Standard 14 Plastic Piping System Components and Related Materials
  - 2.** ANSI/NSF-61 – Drinking Water System Components – Health Effects
  - 3.** ANSI/NSF-372 – Drinking Water System Components - Lead Content

- C.** American National Standards Institute (ANSI)/Underwriters Laboratories (UL)

- 1.** ANSI/UL 263 - Standard for Fire Tests of Building Construction and Materials

- D.** American Society of Mechanical Engineers (ASME)/Canadian Standards Association (CSA)

- 1.** ASME A112.18.1/CSA B125.1 – Plumbing Supply Fittings

- E.** American Society of Testing and Materials (ASTM) International ([www.astm.org](http://www.astm.org))

- 1.** ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
  - 2.** ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems
  - 3.** ASTM F876 – Standard Specification for Crosslinked Polyethylene (PEX) Tubing
  - 4.** ASTM F877 – Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
  - 5.** ASTM F1807 – Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Crosslinked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing
  - 6.** ASTM F 1960 - Standard Specification for Cold Expansion Fittings with PEX

Reinforcing Rings for Use with Crosslinked Polyethylene (PEX) Tubing.

**7.** ASTM F2159 – Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Crosslinked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

**8.** ASTM F2023 – Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water

**9.** ASTM F2657 - Standard Test Method for Outdoor Weathering Exposure of Crosslinked Polyethylene (PEX) Tubing

**F.** Canadian Standards Association (CSA) International ([www.csagroup.org](http://www.csagroup.org))

**1.** CAN/CSA B137.5 – Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications

**G.** MrPEX Systems ([www.mrpexsystems.com](http://www.mrpexsystems.com))

**1.** MrPEX Systems Potable Water System Installation Guide

**H.** International Association of Plumbing and Mechanical Officials (IAPMO) ([www.iapmo.org](http://www.iapmo.org))

**1.** Uniform Plumbing Code (UPC)

**I.** International Code Council (ICC) ([www.iccsafe.org](http://www.iccsafe.org))

**1.** International Plumbing Code (IPC)

**J.** National Association of Plumbing, Heating and Cooling Contractors (NAPHCC)

**1.** National Standard Plumbing Code (NSPC)

**K.** Plastic Pipe Institute (PPI) ([www.plasticpipe.org](http://www.plasticpipe.org))

**1.** Technical Report TR- 4

**L.** Underwriters' Laboratories of Canada (ULC) ([www.ul.com](http://www.ul.com))

**1.** CAN/ULC S101 – Standard Methods of Fire Endurance Tests of Building Construction and Materials

**2.** CAN/ULC S102.2 – 2007/2010 – Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies with, and without, fiberglass insulation

**3.** CAN/ULS S115 - Standard Method of Fire Tests of Firestop Systems

### **1.3 SYSTEM DESCRIPTION**

**A.** Design Requirements

**1.** Standard grade hydrostatic pressure ratings from Plastics Pipe Institute (PPI) in accordance with TR-3 as listed in TR-4. The following standard-grade hydrostatic ratings are required.

- a.** 200 degree F (93 degree C) at 80 psi (550 kPa)
- b.** 180 degree F (82 degree C) at 100 psi (689 kPa)
- c.** 73.4 degree F (23 degree C) at 160 psi (1,102 kPa)

**2.** Certification of flame spread/smoke development rating of  $\leq 25/\leq 50$  in accordance with CAN/ULC S102.2 – 2007/2010 provided the installation meets one of the following requirements.

**a.** Tubing spacing is a minimum of 8 inches apart for the following nominal sizes (no insulation required).

- 1)** ½ inch (13 mm)

**b.** Tubing is wrapped with ½ inch thick fiberglass insulation that is Warnock Hersey listed with a flame spread of not more than 25 and a smoke-developed rating of not more than 50.

- 1)** ½ inch (13 mm)
- 2)** ¾ inch (19 mm)
- 3)** 1 inch (25 mm)
- 4)** 1¼ inch (32 mm)
- 5)** 1½ inch (38 mm)
- 6)** 2 inch (51 mm)

**3.** Certification of flame spread/smoke development rating of  $\leq 25/\leq 50$  in accordance with ASTM E84 provided the installation meets one of the following requirements.

**a.** Tubing spacing is a minimum of 18 inches apart for the following nominal sizes (no insulation required).

- 1)** ½ inch (13 mm)
- 2)** ¾ inch (19 mm)

**b.** Tubing is wrapped with ½ inch thick fiberglass insulation that is ASTM E84 listed with a flame spread of not more than 25 and a smoke-developed rating of not more than 50.

- 1)** ½ inch (13 mm)
- 2)** ¾ inch (19 mm)
- 3)** 1 inch (25 mm)

**4)** 1¼ inch (32 mm)

**5)** 1½ inch (38 mm)

**6)** 2 inch (51 mm)

**B. Performance Requirements**

- 1.** Show compliance with ANSI/NSF-14.
- 2.** Show compliance with ANSI/NSF-61.
- 3.** Show compliance with ASTM F877.
- 4.** Show compliance with ASTM F2023.
- 5.** Installed through rated walls in compliance with CAN/ULC S115-05 and ASTM E814 through certification listings

with Underwriters Laboratories (UL) and Underwriters Laboratories of Canada (cUL), and Warnock Hersey (WH) – See INFO 23 (L2323) for more details.

**a. Canada: Concrete Floor/Wall or Block Wall**

**1)** cUL System No. C-AJ-2030C – max rating: F = 2h; FH = 2h

**2)** cUL System No. C-AJ-2061b – max rating: F = 2h; FH = 2h

**3)** WH System No. PHV 120-11 – max rating: F = 2h; FH = 2h

**b. Canada: Wood Ceiling/Floor**

**1)** cUL System No. F-C-2030C – max rating: F = 1h; FH = 1h

**2)** cUL System No. F-C-2045a – max rating: F = 1h; FH = 1h

**3)** WH System No. PH 60-04 – max rating: F = 1h; FH = 1h

**c. Canada: Gypsum Wall**

**1)** cUL System No. W-L-2012C – max rating: F = 2h; FH = 2h

**2)** cUL System No. W-L-2061a – max rating: F = 2h; FH = 0h

**3)** WH System No. PV 60-02 – max rating: F = 1h; FH = 1h

**d. USA: Concrete Floor/Wall or Block Wall**

**1)** UL System No. C-AJ-2626 – max rating: F = 2h; T = 2h

**2)** UL System No. C-AJ-2567c – max rating: F = 2h; T = 2h

**e. USA: Concrete and Steel Joist Floor**

**1)** UL System No. F-E-2040 – max rating: F = 1h; T = 1h

**f.** USA: Wood Ceiling/Floor

- 1)** UL System No. F-C-2391 – max rating: F = 1h; T = 1h
- 2)** UL System No. F-C-2081e – max rating: F = 2h; T = 2h
- 3)** UL System No. F-C-2334a – max rating: F = 1h; T = 1h

**g.** USA: Gypsum Wall

- 1)** UL System No. W-L-2543 – max rating: F = 2h; T = 2h
- 2)** UL System No. W-L-2474a – max rating: F = 2h; T = 0h

#### **1.4 SUBMITTALS**

**A.** Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

**B.** Product Data

- 1.** Provide manufacturer's product submittal data and installation instructions.

**C.** Quality Assurance/Control Submittals: Submit the following:

**1.** Test Reports

- a.** Upon request, submit test reports from recognized testing laboratories.

**2.** Certificates

- a.** Certificate indicating that the installer is authorized to install the manufacturer's products.

**D.** Closeout Submittals

- 1.** Warranty documents specified herein
- 2.** Operation and maintenance data

#### **1.5 QUALITY ASSURANCE**

**A.** Qualifications

- 1.** Use an installer with demonstrated experience on projects of similar size and complexity and possessing documentation proving successful completion of PEX plumbing installation training by the PEX tubing manufacturer.

**B.** Certifications

- 1.** Installer is trained by the PEX tubing manufacturer to install the PEX potable water distribution system.
- 2.** Installer will use skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed trades professional.

## 1.6 DELIVERY, STORAGE, AND HANDLING

**A.** Comply with Division 1 Product Requirement Section.

**B.** Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

**C.** Delivery

**1.** Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

**D.** Storage and Protection

**1.** Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

**2.** Store PEX tubing in cartons or under cover to avoid dirt or foreign material from being introduced into the tubing.

**3.** Do not expose PEX tubing to direct sunlight for more than 12 months. If construction delays are encountered, provide cover to portions of tubing exposed to direct sunlight.

## 1.7 WARRANTY

**A.** MrPEX Systems offers a limited warranty of up to 30 years for its MrPEX POTABLE tubing. 5 years for plastic and brass fittings when installed by a certified plumbing professional.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

**A.** MrPEX Systems

**1.** Contact: 5300 Alpine Dr NW, Ramsey, MN, USA, 55303; Toll free (800) 716-3406, Fax: (952) 423-6114; web: [www.mrpexsystems.com](http://www.mrpexsystems.com)

**B.** Product Substitutions

**1.** Substitutions: MrPEX Systems or Approved Equal.

### 2.2 COMPONENTS

**A.** PEX-a Tubing (½ inch (13 mm) to 2 in (51 mm) nominal size)

**1.** Material: Crosslinked polyethylene (PEX) manufactured by PEX-a or Engel method.

**2.** Type: MrPEX POTABLE PEX-a.

**3.** In compliance with ASTM F876, ASTM F877, ASTM F1960, ASTM F2023, CAN/CSA B137.5, NSF/ANSI-14, NSF/ANSI-61, NSF/ANSI-372, AWWA C904 and tested for compliance by an independent third-party agency.

**4.** Standard grade hydrostatic design and pressure ratings from PPI TR-4.

**5.** Fire-rated assembly listings in accordance with CAN/ULC S101 and ANSI/UL 263 through certification listings with Underwriters Laboratories (UL) and Underwriters Laboratories of Canada (cUL), and Warnock Hersey (WH)

**B.** Pre-Sleeved Piping (½ inch (13 mm) to ¾ inch (19 mm) nominal size)

**1.** Material

**a.** High Density Polyethylene (HDPE) corrugated sleeve with PEX-a carrier tubing.

**2.** Type: MrPEX POTABLE PEX-a Pipe-in-Pipe.

**C.** Stainless Steel Press Sleeve

**1.** Material: 304 Annealed Stainless Steel.

**2.** Type: MrPEX Stainless Steel Press Sleeve.

**3.** In compliance with ASTM F877, CAN/CSA B137.5, NSF/ANSI-14, NSF/ANSI-61, NSF/ANSI-372 and tested for compliance by an independent third-party agency.

**D.** PEX-a Fittings: elbows, couplings, plugs, tees, adapters (½ inch (13 mm) to 2 in (51 mm) nominal size)

**1.** Material

**a.** Modified Polyphenylsulfone.

**b.** Polyphenylsulfone.

**c.** UNS No. C69300 Eco Brass.

**2.** Type:

**a.** MrPEX PPSU fittings.

**b.** MrPEX No Lead Brass fittings.

**3.** In compliance with ASTM F2159, ASTM F1960 or ASTM F1807, and ASTM F877, CAN/CSA B137.5, NSF/ANSI-14, NSF/ANSI-61, NSF/ANSI-372 and tested for compliance by an independent third-party agency.

**4.** PEX tubing connection to each ASTM F2159, ASTM F1960 or ASTM F1807 outlet by corresponding stainless steel press sleeve.

**E.** Manifolds

**1.** Material

**a.** Modified Polyphenylsulfone.

**b.** Polyphenylsulfone.

**2.** Type:

**a.** MrPEX PPSU Multiport Tees.

**3.** In compliance with ASTM F2159, ASTM F877, CAN/CSA B137.5, NSF/ANSI-14 and tested for compliance by an independent third-party agency.

**4.** PEX tubing connection to each ASTM F2159 outlet by corresponding stainless steel press sleeve.

**F.** Supply stops

**1.** Material: UNS No. C69300 Eco Brass.

**2.** Type: MrPEX No Lead Ball Valves.

**3.** In compliance with ASTM F1807 or ASTM F1960, CAN/CSA B137.5, NSF/ANSI-61, NSF/ANSI-372, ASME A112.18.1/CSA B125.1 and tested for compliance by an independent third-party agency.

**4.** PEX tubing connection to each ASTM F1807 outlet by corresponding stainless steel press sleeve.

**G.** Accessories

**1.** Bend supports designed for maintaining tight radius bends are supplied by the PEX tubing manufacturer.

**2.** Press tools to install the Stainless Steel Press Sleeves are supplied by the PEX tubing manufacturer.

**3.** The tubing manufacturer provides clips for supporting tubing runs.

**4.** All horizontal tubing hangers and riser clamps are epoxy-coated material.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

**A.** Site Verification of Conditions

**1.** Verify that site conditions are acceptable for installation of the PEX potable water system.

**2.** Do not proceed with installation of the PEX potable water system until unacceptable conditions are corrected.

**3.2 INSTALLATION**

**A.** Comply with manufacturer's product data, including product technical bulletins, installation instructions, design drawings, including the following.

**B.** PEX-a tubing installation

**1.** Install piping in compliance with MrPEX Potable Water System Installation Guide.



**C. Through-penetration Firestop**

- 1.** Ensure compliance of one- and two-hour rated through penetration assemblies in accordance with CAN/ULC S115-05 and ASTM E814.
- 2.** A list of firestop manufacturers that list PEX tubing with their firestop systems is available from the PEX tubing manufacturer.

**D. Related Products Installation**

- 1.** Refer to other sections listed in Related Sections paragraph herein for related products installation.

**3.3 FIELD QUALITY CONTROL**

**A. Site Tests**

**B. Manufacturer's Field Services:** Provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

- 1.** Site Visits

**3.4 CLEANING**

- A.** Remove temporary coverings and protection of adjacent work areas.
- B.** Repair or replace damaged installed products.
- C.** Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
- D.** Remove construction debris from project site and legally dispose of debris.

**3.5 PROTECTION**

- A.** Protect installed work from damage due to subsequent construction activity on the site.
- B.** Manifolds to be wrapped with plastic sheets for protection from dirt/dust, construction chemicals, and/or concrete in the course of construction.

**End of Section**