

Section 33 11 13.23
Plastic Public Water Utility Distribution Piping
(MUNICIPEX Municipal Water Service Pipe)

This draft specification is for municipal water service piping. REHAU supplies this PEXa piping under the name REHAU MUNICIPEX Pipe.

This draft specification is provided only as an aid in architect's/engineer's development of the final specification and is not intended as a substitute for sound architectural/engineering judgment. The architect/engineer shall be responsible to convert this draft specification into a final specification that meets the functional and aesthetic needs of his/her client, as well as to comply with all applicable codes.

Part 1 - General

1.01 Summary

- A. Municipal water service piping system, where shown on the Drawings and Schedules, shall be crosslinked polyethylene pipe, and shall include the following:
 - 1. Crosslinked polyethylene (PEXa) piping
 - 2. Produced in accordance with AWWA C904
 - 3. Required to demonstrate ability to satisfy the performance requirements of section F.7 of PPI TR-3 for PE materials in order to apply a 0.63 design factor resulting in a 200 psi pressure rating at 73.4°F (23°C)
 - 4. Required 1 year UV resistance rating when evaluated in accordance with ASTM F876 and ASTM Test Method F2657
 - 5. Required PEX designation code 3306 with Class 3 chlorine resistance rating
 - 6. Approved AWWA C800 compression joint valves and fittings, suitable for buried applications, using stainless steel or plastic support liners inside pipe at each joint; or
 - 7. Cold-expansion compression-sleeve fittings in accordance with ASTM F2080
 - 8. Supervision and field engineering required for the complete and proper function of the system as deemed necessary per specifying engineer

1.02 References

- A. Publications listed here are part of this specification to the extent they are referenced. Where no specific edition of the standard or publication is identified, the current edition shall apply.
- B. ASTM International (American Society for Testing and Materials)
 - 1. ASTM F876 – Standard Specification for Crosslinked Polyethylene (PEX) Tubing
 - 2. ASTM F2023 – Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water
 - 3. ASTM F2080 – Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe
 - 4. ASTM F2657 - Standard Test Method for Outdoor Weathering Exposure of Crosslinked Polyethylene (PEX) Tubing
- C. AWWA – American Water Works Association
 - 1. AWWA C904 – Crosslinked Polyethylene (PEX) Pressure Pipe, 1/2 in.(12 mm) Through 3 in. (76 mm), for Water Service
 - 2. AWWA C800 – Underground Service Line Valves and Fittings
- D. CSA Group (Canadian Standards Associations)
 - 1. CSA B137.5 – Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications

- E. ISO – International Organization for Standardization
 - 1. ISO 9001 – Quality Management Systems – Requirements
- F. NSF International
 - 1. NSF/ANSI 14 – Plastic Piping System Components and Related Materials
 - 2. NSF/ANSI 61 – Drinking Water System Components – Health Effects
- G. Plastic Pipe Institute PPI TR-3 –
 - 1. Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Hydrostatic Design Stresses (HDS), Pressure Design Basis (PDB), Strength Design Basis (SDB), Minimum Required Strength (MRS) Ratings, and Categorized Required Strength (CRS) for Thermoplastic Piping Materials or Pipe

1.03 Definitions

- A. Crosslinked polyethylene or PEX is a modified polyethylene material, typically high-density polyethylene (HDPE), which has undergone a change in the molecular structure using a chemical or a physical process whereby the polymer chains are permanently linked to each other. This crosslinking of the polymer chains results in improved performance properties such as elevated temperature strength, chemical resistance, environmental stress crack resistance (ESCR), resistance to slow crack growth (SCG), toughness, and abrasion resistance. Crosslinking also makes PEX a “semi-thermoset” polymer, providing excellent long-term stability.
- B. This specification requires PEX to be designated as PEXa, the high-pressure peroxide method.

1.04 System Description

- A. Design Requirements
 - 1. Standard grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with PPI TR-3. The following standard-grade hydrostatic ratings are required:
 - a. 100 psi (690 kPa) at 180°F (82°C)
 - b. 160 psi (1105 kPa) at 73.4°F (23°C)
- B. PEXa water service pipe shall be required to demonstrate ability to satisfy the performance requirements of section F.7 of PPI TR-3 for PE materials in order to apply a 0.63 design factor resulting in a 200 psi pressure rating at 73.4°F (23°C)
- C. Performance Requirements: To provide a municipal water piping system, which is manufactured, fabricated and installed to comply with local requirements and to maintain performance criteria stated by the PEX pipe manufacturer without defects, damage or failure.
- D. Compliant to the following standards:
 - 1. AWWA C904
 - 2. NSF/ANSI Standards 14 and 61
 - 3. ASTM F876
 - 4. CSA B137.5
- E. Pipe shall have ability for kink repair using a heat gun. No need to cut out kink.
- F. Pipe shall be approved by manufacturer for use with squeeze-off tool.

1.05 Submittals

- A. Comply with Section 01 33 00, Submittal Procedures. Approval and/or acceptance of all submittals are required prior to fabrication.
- B. Product Data: Submit manufacturer's product submittal forms, catalog cuts, brochures, specifications and installation instructions. Submit data in sufficient detail to indicate compliance with the contract documents.

1. Submit manufacturer's instructions for installation.
2. Submit data for equipment, fittings and associated items necessary for the installation of the piping.

C. Certification:

1. Submit third-party certification results for the piping systems from an accredited testing laboratory.
2. The design shall be approved by a professional appropriately licensed in the jurisdiction where the installation will take place, as being complete and accurate.

1.06 Quality Assurance

- A. Comply with Section 01 43 00, Quality Assurance.
- B. Manufacturer: Must be a company specializing in the Work of this Section with a minimum of 15 years documented experience.
- C. Pipe shall be manufactured in a facility whose quality management system is certified according to ISO 9001.
- D. Crosslinked polyethylene (PEXa) pipe shall conform and be certified to AWWA C904, ASTM F876, and CSA B137.5. Fittings shall conform and be certified to AWWA C800, or, ASTM F2080 and CSA B137.5.

1.07 Delivery, Storage and Handling

- A. Comply with Section 01 60 00, Product Requirements.
- B. Deliver and store pipe in shipping containers with labeling in place.
 1. Pipe shall be kept in original packaging until required for installation.
- C. PEXa pipe shall be stored in a way that prevents damage as a result of crushing or piercing, excessive heat, harmful chemicals, or exposure to sunlight for excessive periods..
 1. Do not expose pipe to ultraviolet light beyond exposure limits recommended by manufacturer.
 2. Protect pipe from entry of contaminating materials. Install suitable caps or plugs in open pipe ends until installation.
 3. Pipe shall not be dragged across the ground or other surfaces, and shall be stored on a flat surface with no sharp edges.
- D. Protect materials from damage by other trades.
- E. Pipe shall be protected from oil, grease, paint, and other elements as recommended by manufacturer.

1.08 Warranty

- A. Provide manufacturer's standard written warranty.
 1. The pipe manufacturer shall warrant the crosslinked polyethylene pipe to be free from defects in material and workmanship for a period of twenty-five (25) years.

Part 2 - Products

2.01 Acceptable Manufacturer

- A. REHAU Construction LLC, 1501 Edwards Ferry Road, NE; Leesburg, VA 20176; email: rehau.mailbox@rehau.com; website: na.rehau.com; upon whose products and equipment these specifications are based.
- B. No Substitutions allowed.

2.02 Components

- A. Piping

1. All pipe shall be crosslinked polyethylene manufactured using the high-pressure peroxide method of crosslinking (known as PEXa). Pipe shall conform and be third-party certified to AWWA C904, ASTM F876, CSA B137.5, NSF/ANSI 14 and NSF/ANSI 61.
2. Pipe shall be rated for continuous operation of 100 psi gauge pressure at 180°F temperature (690 kPa @ 82°C), and 160 psi gauge pressure at 73.4°F temperature (1105 kPa @ 23°C) as defined in AWWA C904.
3. Pipe shall be rated for continuous operation at 200 psi gauge pressure at 73°F temperature (1378 kPa @ 23°C) when evaluated using a 0.63 design factor (see item 20 for details).
4. Pipe shall be listed by PPI to standard TR-3 as Standard Grade,
5. Pipe to be tested for resistance to hot chlorinated water in accordance with ASTM F2023. Pipe to have a minimum Class 3 chlorine resistance rating when evaluated to F876 and tested in accordance to F2023.
6. PEXa pipe shall be listed with a material designation code of "3306" per the ASTM F876 standard and PPI TR-3.
7. Pipe to have a co-extruded UV Shield made from UV-resistant polyethylene, color blue. Pipe to have minimum recommended UV exposure time of 12 months when tested in accordance with ASTM F2657 and evaluated in accordance with ASTM F876.
8. Pipe shall be manufactured in a facility whose quality management system is certified according to ISO 9001.
9. Bend Radius: The minimum bend radius for cold bending of PEXa pipe shall be not more than five (5) times the outside diameter.

B. Fittings

1. Compression joint fittings shall be manufactured in accordance with AWWA C800. Fittings must meet the pressure requirements of the PEX pipe at 73°F (23°C) when used with stainless steel or plastic inserts.
2. Cold-expansion compression-sleeve fittings shall be in accordance with ASTM F2080.

2.03 Markings

- A. Pipe shall carry the following markings every three (3) feet (0.9 meters): Manufacturer's name and trademark, nominal size, PEXa 3306 (material designation code) SDR9 (standard dimension ratio), POTABLE TUBING, AWWA C904, ASTM F876/ F2023 / F2080, CSA B137.5, NSF-pw-g, U.P. Code 160psi/73°F 100psi/180°F 200psi/73°F at 0.63 Design Factor, manufacturing date and footage mark.

2.04 Packaging

- A. Coiled pipe shall be shipped in protective packaging marked with product name and size.

Part 3 - Execution

3.01 Installation

- A. Install in accordance with manufacturer's published installation manual and/or published guidelines and final shop drawings.
- B. At connections and fittings, use a plastic pipe cutter to ensure square (90°) and clean cuts, and join pipes immediately or cap ends of pipe to seal from contaminants.

3.02 Field Quality Control

- A. Filling, Testing and Balancing: Tests of public water utility systems shall comply with authorities having jurisdiction, and, where required, shall be witnessed by the building official.

END OF SECTION