

## PART 1 - GENERAL

### 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

#### AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.18 (1984; R 1994) Cast Copper Alloy Solder  
Joint Pressure Fittings

#### AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME/ ANSI B16.22 (1989) Wrought Copper and Copper Alloy  
Solder Joint Pressure Fittings

ASME/ ANSI B16.26 (1988) Cast Copper Alloy Fittings for  
Flared Copper Tubes

#### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 536 (1984; R 1993) Ductile Iron Castings

ASTM A 563 (1994) Carbon and Alloy Steel Nuts

ASTM B 32 (1995; Rev. A) Solder Metal

ASTM B 42 (1993) Seamless Copper Pipe, Standard Sizes

ASTM B 61 (1993) Steam or Valve Bronze Castings

ASTM B 62 (1993) Composition Bronze or Ounce Metal  
Castings

ASTM B 88 (1995) Seamless Copper Water Tube

ASTM C 94 (1994) Ready- Mixed Concrete

ASTM C 150 (1995) Portland Cement

ASTM D 1785 (1994) Poly( Vinyl Chloride) (PVC) Plastic  
Pipe, Schedules 40, 80, and 120

ASTM D 2466 (1994; Rev. A) Poly( Vinyl Chloride) (PVC)  
Plastic Pipe Fittings, Schedule 40

ASTM D 2774 (1994) Underground Installation of  
Thermoplastic Pressure Piping

ASTM D 3139 (1995) Joints for Plastic Pressure Pipes  
Using Flexible Elastomeric Seals

ASTM F 477 (1995) Elastomeric Seals (Gaskets) for  
Joining Plastic Pipe

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C500 (1993) Metal- Seated Gate Valves for Water  
Supply Service

AWWA C509 (1994) Resilient- Seated Gate Valves for  
Water and Sewerage Systems

AWWA C606 (1987) Grooved and Shouldered Joints

AWWA C651 (1992) Disinfecting Water Mains

AWWA C800 (1989) Underground Service Line Valves and  
Fittings

AWWA M23 (1980) PVC Pipe - Design and Installation

FEDERAL SPECIFICATIONS (FS)

FS WW- P- 460 (Rev. D) Pipe Fittings; Brass or Bronze  
(Threaded) Classes 125 and 250 Pound

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND  
FITTINGSINDUSTRY, INC. (MSS)

MSS SP- 80 (1987) Bronze Gate, Globe, Angle and Check  
Valves

UNI- BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI- B- 3 (1988) Installation of Polyvinyl Chloride  
(PVC) Pressure Pipe

UBPPA UNI- B- 8 (1986) Direct Tapping of Polyvinyl  
Chloride (PVC) Pressure Water Pipe

1.2 DESIGN REQUIREMENTS

1.2.1 Water Distribution Mains

Provide water distribution mains indicated as 6 inch lines of Schedule 80 polyvinyl chloride (PVC) plastic pipe conforming to ASTM D-1785, Type 1, Grade1. Provide water main accessories, gate valves as specified and where indicated.

### 1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

#### 1.3.1 SD- 02 Manufacturer's Catalog Data

- a. Water distribution main piping, fittings, joints, valves, and coupling.
- b. Water service line piping, fittings, joints, valves, and coupling
- c. Valve boxes

Submit manufacturer's standard drawings or catalog cuts, except submit both drawings and cuts for push-on rubber- gasketed bell- and- spigot joints. Include information concerning gaskets with submittal for joints and couplings.

#### 1.3.2 SD- 06 Instructions

- a. Installation procedures for water piping

#### 1.3.3 SD- 13 Certificates

- a. Water distribution main piping, fittings, joints, valves, and coupling
- b. Water service line piping, fittings, joints, valves, and coupling

Certificates shall attest that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to be mandatory or otherwise and that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

### 1.4 DELIVERY, STORAGE, AND HANDLING

#### 1.4.1 Delivery and Storage

Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, and valves free of dirt and debris.

#### 1.4.2 Handling

Handle pipe, fittings, valves, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench. Store plastic piping, jointing materials and rubber gaskets that are not to be installed immediately, under cover out of direct sunlight.

## PART 2 - PRODUCTS

### 2.1 WATER DISTRIBUTION MAIN MATERIALS

#### 2.1.1 Piping Materials

##### 2.1.1.1 Polyvinyl Chloride (PVC) Plastic Piping

a. Pipe and Fittings: Pipe, ATSM D-1785 Schedule 80 shall be threaded end or gasketed bell end Type1, Grade 1 with cast-iron-pipe-equivalent OD. Fittings shall be PVC Schedule Class 40 or 80 or ductile iron as approved, for threaded joint suitable for use with PVC plastic pipe or gasketed bell end pipe specified in this paragraph.

b. Joints and Jointing Materials: Joints for pipe shall be threaded joints, ASTM D-2464 or elastomeric gasketed joints, ASTM D 3139 and F 477. Joints between pipe and metal fittings, valves, and other accessories shall be threaded or gasketed as approved.

#### 2.1.2 Valves, and Other Water Main Accessories

##### 2.1.2.1 Gate Valves on Buried Piping

UL 262 valves shall be nonrising stem type with double- disc gates and threaded- joint or gasketed ends as appropriate for the adjoining pipe, UL 262 shall be inside-screw type with operating nut, double- disc or split- wedge type gate, designed for a hydraulic working pressure of 600 psi. Materials for UL 262 valves shall conform to the reference standards specified in AWWA C500. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have O- ring stem seals, except for those valves for which gearing is specified, in which case use conventional packing in place of O- ring seal. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. Valves shall be of one manufacturer.

##### 2.1.2.2 Detection Wire for Nonmetallic Piping

Provide bare copper or aluminum wire not less than 0.10 inch in diameter in sufficient length to be continuous over each separate run of nonmetallic pipe.

#### 2.1.3 Hydrants

Hydrants to meet all requirements of City of Artesia Public Works and UL 246. Hydrants to be provided and installed by the contractor. Hydrants shall be manufactured by Mueller, M&H, U.S. Pipe or Waterous. Hydrants shall be dry barrel type.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PIPELINES

#### 3.1.1 General Requirements for Installation of Pipelines

These requirements shall apply to all pipeline installation except where specific exception is made in the "Special Requirements..." paragraphs.

### 3.1.1.1 Location of Water Lines

Terminate the work covered by this section at a point approximately 5 feet from the building, unless otherwise indicated. Where the location of the water line is not clearly defined by dimensions on the drawings, do not lay water line closer horizontally than 10 feet from any sewer line. Where water lines cross under gravity sewer lines, encase sewer line fully in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber-gasketed joints and no joint is located within 3 feet horizontally of the crossing. Do not lay water lines in the same trench with gas lines, fuel lines, or electric wiring.

### 3.1.1.2 Earthwork

Perform earthwork operations in accordance with Section 02302, "Excavation, Backfilling and Compacting for Utilities".

### 3.1.1.3 Pipe Laying and Jointing

Remove fins and burrs from pipe and fittings. Before placing in position, clean pipe, fittings, valves, and accessories, and maintain in a clean condition. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material. Grade the pipeline in straight lines; avoid the formation of dips and low points. Support pipe at proper elevation and grade. Secure firm, uniform support. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate joints, and couplings. Provide anchors and supports where necessary for fastening work into place. Make proper provision for expansion and contraction of pipelines. Keep trenches free of water until joints have been properly made. At the end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads. Do not lay pipe when conditions of trench or weather prevent installation. Depth of cover over top of pipe shall not be less than 2 1/2 feet.

### 3.1.1.4 Installation of Detection Wire

Bury detection wire directly above non-metallic piping not to exceed 12 inches above the top of pipe.

### 3.1.1.5 Connections to Existing Water Lines

Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line.

## 3.1.2 Special Requirements for Installation of Water Mains

### 3.1.2.1 Installation of PVC Plastic Water Main Pipe

Installation of PVC Plastic Water Main Pipe and Associated Fittings: Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines," joining PVC pipe to fittings and accessories, and setting of hydrants, valves, and fittings; and with the recommendations for pipe joint assembly and appurtenance installation in AWWA M23, Chapter 7, "Installation."

a. Jointing: Make push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel; for push-on joint connections to metal fittings, valves, and other accessories, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint. Use an approved lubricant recommended by the pipe manufacturer for push-on joints. Assemble push-on joints for pipe-to-pipe joint connections in accordance with the requirements of UBPPA UNI-B-3 for laying the pipe and the recommendations in AWWA M23, Chapter 7, "Installation", for pipe joint assembly. Assemble push-on joints for connection to fittings, valves, and other accessories in accordance with the requirements of UBPPA UNI-B-3 for joining PVC pipe to fittings and accessories and with the applicable requirements of AWWA C600 for joint assembly. Make compression-type joints/mechanical joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint; assemble in accordance with the requirements of UBPPA UNI-B-3 for joining PVC pipe to fittings and accessories, with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111/A21.11. Cut off spigot end of pipe for compression-type joint/mechanical-joint connections and do not re-bevel. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using internal stiffeners as previously specified for compression-type joints.

### 3.1.3 Installation of Water Service Piping

### 3.1.4 Disinfection

Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 and 0.5 parts per million, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit the results prior to the new water piping being placed into service.

## 3.2 FIELD QUALITY CONTROL

### 3.2.1 Field Tests and Inspections

The Contracting Officer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the drawings and specifications.

### 3.2.2 Testing Procedure

Test water mains and water service lines in accordance with the applicable specified standard, except for the special testing requirements given in paragraph entitled "Special Testing Requirements." Test PVC plastic water mains in accordance with the requirements of UBPPA UNI- B- 3 for pressure and leakage tests. The amount of leakage on pipelines made of PVC plastic water main pipe shall not exceed the amounts given in UBPPA UNI- B- 3, except that at joints made with sleeve- type mechanical couplings, no leakage will be allowed. Test water service lines in accordance with applicable requirements of AWWA C600 for hydrostatic testing. No leakage will be allowed at copper pipe joints copper tubing joints (soldered, compression type, brazed) plastic pipe joints flanged joints and screwed joints.

### 3.2.3 Special Testing Requirements

For pressure test, use a hydrostatic pressure 50 psi greater than the maximum working pressure of the system, except that for those portions of the system having pipe size larger than 2 inches in diameter, hydrostatic test pressure shall be not less than 150 psi. Hold this pressure for not less than 2 hours. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.

END OF SECTION