



# CHINO VALLEY INDEPENDENT FIRE DISTRICT FIRE PROTECTION STANDARD

## SPECIFICATIONS – Establishing Minimum Standards For Private Water Systems As Related To Fire Protection

STANDARD # 103

REVISED 01/08/1991 PAGES 7

**SCOPE:** These specifications shall govern all Fire Protection Systems installed within the areas served by the Chino Valley Fire Department.

Such as: Condominiums, apartment Complexes, Factories, Commercial Centers, Manufacturing Plants, Private Residential Developments and/or other Like facilities.

### 1.0 General Provisions

- 1.1 These Specifications shall govern the materials used and the installation of same and establish the minimum acceptable Standards of Materials and Methods used in the construction of water systems for fire protection.
- 1.2 Provisions of these specifications shall be enforced by a duly authorized or appointed representative of the Fire Agency.
- 1.3 Agencies and specification thereof to which reference is hereinafter made in the form of abbreviations are:

<b>AWWA</b>	=	American Waterworks Association, Inc.
<b>ASTM</b>	=	American Society for Testing Materials
<b>ASA</b>	=	American Standards Association
<b>UL</b>	=	Underwriter's – Laboratories

- 1.4 All water systems for Fire Protection Shall comply with N.F.P.A. Standard 20 or Fire Department Standard 103.

### 1.0 Water Pipe

- 2.1 All water pipe and fittings used in distribution and transmission mains, at elevation in excess of 700' above sea level shall be designed for a minimum pressure of 150. All mains at lower elevations shall be designed for a minimum pressure of 200 PSI.

- 2.2 All diameters shall be full nominal inside diameter; the actual diameters may not be less than the nominal by more than 5% when measured approximately 3 inches from the ends of the pipe.
- 2.3 All plastic pipe shall comply with AWWA – Specification C900-75. All pipe and couplings shall have a minimum dimension ratio of at least 18 for pressure Class 150 and 14 for pressure Class 200. Outside diameter shall be to “cast iron” dimensions. Installation shall be in conformance with manufacturer’s installation standards and the following Fire Department requirements:
- a. All pipe shall be laid with the identification data facing up to permit inspection and verification of pipe nomenclature.
  - b. A 14 gauge copper trace wire or approved locator tape shall be installed horizontally and wrapped circumferentially at intervals not exceeding 10 feet.

All plastic pipe and fittings shall have or show proof of testing and acceptance by U.L. and any combination of the following:

NSF  
IAPMO  
City of L.A. Building and Safety  
U.P.C.  
F.M.S.

2.4 Pipe Pressure

All water pipes and fittings used in distribution water mains shall be designed for a minimum pressure as specified by this standard.

2.5 Sectional Control Valves

Sectional control valve shall be installed per N.F.P.A. No. 20. These valves shall be provided with tamper switches and shall not control more than five systems or hydrants or any combination thereof.

2.6 Gate Valves, Three Inches or Larger

Gate valves shall conform to AWA – C500 – 61. Valves shall be iron body, all bronze internal, double disc, parallel seat with non-rising stem. Size 3 inch through 12 inches shall be designed for working pressure of 175 psi and 14 inch or larger for a working pressure of 150 psi, unless otherwise indicated. Valves shall open counter-clockwise and shall be equipped with a 2 inch square operating nut indicating the direction of the opening. All valves shall be provided with tamper switches except for fire hydrants.

a. Bronze

All bronze parts, including seat rings, gates and wedges shall conform to “ASRM B62 Grade I” except that the maximum zinc allowed is 2%. Valve stem and stems, and stem nuts shall be cast or forged from zinc free high silicon bronze and shall have a tensile strength of 60,000 psi and a minimum yield strength of 30,000 psi and an elongation of not less than 10% in two inches.

b. Seat Rings

All rings shall be backed faced, threaded, and screwed into matching seats in body.

c. Stem Collars and Stems

Stem collars shall be forged or cast solid with the stems. The threaded length of the stem nuts shall not be less than 1-1/2 times the outside diameter of the stem.

d. Packing

The packing shall be double “O” rings with no recess in the stem, unless the thickness of the stem at the smallest diameter of the groove equals that of a stem required without a groove.

e. Assembly

All gate valves 3 inches through 14 inches shall be designed such that when valve is fully open and bonnet and disc assembly removed from the valve body, the discs cannot be detached from the stem nut.

2.7 Butterfly Valves

Valves shall meet the requirements of “AWWA C504-74” for rubber seat, tight closing valves. They shall be of cast iron body, shaft of stainless steel 18-8 type 304, disc of NL-Resist Type I. Valves shall be class 150. Valves shall open counter-clockwise and have an open-closed indicator where exposed. Valves shall be suitable for buried service.

2.8 Check Valves

All check valves shall meet the requirements of AWWA C508-76, seat readily and completely to assure water tightness. The face of the closure element and valve seat shall be bronze, which will seat tightly under all prevailing conditions in field use. Slow closing check valves shall be used where excessive pressures or water hammer may occur and the static operating pressure is within 20% of the pressure

class or rating of the pipe. All check valves, 4 inches and larger in size for use on distribution mains shall be designed for a minimum of 175 psi cold water working pressure.

#### 2.9 Pressure Regulator Valves

Pressure regulators shall be installed on all fire mains where the flow pressure or working pressure is over 150 psi.

#### 2.10 Flushouts (Blow Offs)

Flushouts (Bow Offs) shall be installed at the terminus of all dead ended water mains or non-circulating flow water mains. They shall be designed for a minimum operating pressure of 150 psi and shall be large enough to allow a minimum velocity of 2.5 feet per second in the diameter not less than 1-1/2 inches.

#### 2.11 Valves Boxes and Vaults on Private Property

A valve box or vault or capped standpipe of a type and at a grade approved by the Fire Chief shall be provided for every valve installed below the street pavement or any location where there is vehicular traffic. They shall be of an approved metallic or reinforced concrete design. All valve boxes, covers and caps for gate valves placed in a street where there is no vehicular traffic shall be of metallic or nonmetallic construction as approved by the Fire Chief. All valve box caps shall be marked with the word "Water" or the letter "W", and suitable identification of the water utility.

#### 2.12 Air and Vacuum Release Valves

All air and vacuum release valves shall be installed in the water system at all points where it is indicated that air pockets may form. The design shall be such so as to insure the release of air automatically from the water main. These valves may also insure the entrance of air into the water main when the pressure inside the line is below atmospheric pressure. All valves shall be designed for a minimum of 150 psi operating with a gate valve or corporation stop to provide a positive closure between the main and the air vacuum valve.

#### 2.0 Cement

All cement shall conform to "ASTN-C150-59".

#### 3.1 Concrete

All concrete used for thrust blocks shall develop an ultimate compressive strength of 2,000 psi at 28 days in accordance with "ASTM-C39-56T". All ready mix concrete shall comply with "ASTM-C94-58".

### 3.0 Taps into Main Line

- a. All taps shall be made as per regulations of individual water company serving the area.

### 4.0 General

Where a water main and a sewer line must cross, the water main shall be at an elevation above the sewer by at least 1 foot of undisturbed or compacted earth. This code recognizes the fact that certain local conditions of topography, available space, etc., create a condition where the design separation cannot be achieved. Where this condition exists, a more rigid construction requirement for sewers and water mains is necessary.

### 5.1 Trench Excavation

All trench excavations shall be in accordance with the requirements and conditions of the applicable Encroachment Permit. Minimum trench widths shall be in accordance with “AWWA-C603-64T”.

### 5.2 Pipe Depth

All water mains shall be installed so that the top of the pipe is not less than 42 inches below the finish grade of street, or as specified in the Excavation and/or Encroachment Permit.

### 5.3 Material Handling

All asbestos-cement pipe materials shall be handled, laid, blocked and jointed in accordance with the manufacturer’s recommendations.

### 5.4 Back Filling

No back filling prior to inspection of pipes and jointing. Pipe may be partially covered to allow for pressure testing after authorization from inspector. All back filling and restoration of surface material removed from trenching shall be in accordance with the Excavation and/or Encroachment Permit. In rocky soils the pipe shall be laid on a 6 inch layer of select back fill. Only good clean sand (no rocks larger than ¾ inch) or earth free from lumps shall be used as selected materials for this phase of the back filling process. Further back filling shall be done with good sound earth, sand or gravel which shall contain no rock larger than 3 inches, oil cake or other lumpy material of a perishable, spongy or otherwise objectionable matter that would prevent consolidation. It shall be compacted thoroughly by puddling or jetting unless otherwise specified.

Before completing the back fill over asbestos-cement or plastic pipe, a locator wire shall be placed on top of the pipe. The wire shall provide a continuous electrical conductor between gate and valve boxes. Each end shall be brought up inside the valve boxes to the ground surface and looped back with 2 feet of wire free or fastened to a vertical metal rod inside the box. The wire may be new or used, solid or standard, a minimum of 14 gauge, but shall be an electrically continuous wire between valve boxes.

#### 5.5 Thrust Devices

A reaction or thrust device shall be installed at all rubber ring valves and at all rubber ring fittings; at all caulked elbows and bends more than 5 degrees, and shall be designed for 150% of the maximum hydrostatic test pressure. A reaction for thrust device shall be provided on all dead ends except welded steel pipe; caulked tees and crosses having one or more openings plugged. The size and shape of the thrust block shall be designed to prevent movement of the water mains when subjected to 150% of the hydrostatic test pressure. Thrust devices shall be cast-in-place concrete. If the thrust exceeds the bearing value of the surrounding soil, the soil shall be pre-compacted before placing concrete. To insure against lateral movement of water main and/or valve fitting where a change in direction of the water main is made, a thrust block is required. Thrust devices shall be used as directed above for P.V.C. pipe.

#### 5.6 Water Main Testing

All water mains shall be tested to minimum hydrostatic pressure 50 psi greater than the design pressure of pipe class. The duration of the test shall be one hour. All asbestos-cement pipe shall be filled with water for at least 24 hours before testing. Before applying the hydrostatic pressure, all entrapped air shall be removed. There shall be no visible leakage at any joint or section of pipe and the allowable leakage for the total lengths of water mains under test shall not exceed that amount specified in “**AWWA-C603-64T**”.

All tests shall be made in the presence of an authorized representative of the Fire Chief, and no joint, valve or fitting shall be completely covered until it has been inspected, tested, and approved by the authorized representative of the Fire Chief. When it is necessary to cover the ditch as soon as the water main is laid, the authorized representative of the Fire Chief may permit the back filling to be completed prior to testing. If the pipe, then tested, exceeds the allowable leakage, per AWWA Standard C603-64T, the pipe must be uncovered, repaired and tested until it meets the allowable leakage. All open ends of all water mains being installed shall be properly covered at the end of each day's work to prevent the entry of foreign matter, animals, debris, or children.

5.7 Flow Tests

Tests shall be made by flowing fire hydrants of all new water distribution systems constructed in accordance with water plans as required by the Fire Chief. The tests shall be made by the Fire Chief or his authorized representative. A member of the utility supplying the water and the contractor should be present at the time of such test

5.0 Water System Plans

Three sets of plans shall be submitted to the Fire Department for approval. These plans shall show all mains, lateral valving, check valves, backflow protection, P.I. valves, vaults, hydrant assemblies, including Fire Department connections, meters, etc.

6.1 Installation

No work shall be done until plans are fully approved by the Fire Chief or his authorized representative, or the water utility company serving the area.

6.0 Size and Location of Water Mains and Hydrants

See Standards 101 and 102.