



**CANBY UTILITY**  
**Water System Standard Specification**

**1. GENERAL**

- 1.1 When a contractor is installing water system infrastructure the contractor shall provide all labor, equipment and materials in accordance with this specification for construction of all Canby Utility public water system improvements.
- 1.2 All construction shall comply with the requirements of Oregon Administrative Rules, Chapter 333, Division 61, Public Water Systems, 1991 edition or current revision, as amended herein.
- 1.3 The contractor shall coordinate with Canby Utility Operations Management on all construction activities impacting operations of the water system or impacting service to private properties.
- 1.4 The materials specified herein shall establish the type and level of standard for comparable substitution. All materials shall be as specified or equal as determined by Canby Utility.
- 1.5 Street Opening Permit – Prior to initiating any construction within the public right-of-way, a street opening permit must be secured from the City of Canby, Public Works Department.
- 1.6 Utility permits must be applied for and paid for prior to any connections being made to the water system. Connection to the water system shall be inspected by water department personnel prior to backfill. Forty-eight (48) hours (2 working days) notice for inspection is required.
- 1.7 Backflow assemblies or devices are required on all commercial, industrial, large multi-family residential with water meter sizes 1½ or larger, and public or semi-public facilities, irrigation and fire service connections to the water system. Canby Utility to determine level of hazard and assembly/device requirements during plan review/design.
- 1.8 Projects will be considered “Accepted” when the “Project Construction Cost” form and corrected or revised “As-Built” plans are received.
- 1.9 All joints must have mechanical restraint.
- 1.10 In all cases where a dead end is created, the developer will furnish and install a Hydro Guard HG 4 automatic flushing system and plumb the unit to the storm drain system.

A tablet style dechlorination system will be a required option for the unit to discharge to the storm drain system capable of handling the discharge. Discharge to a sanitary sewer system may be an option, at the discretion of Canby Utility, if a storm drain system is not available. Canby Utility may waive the requirement for an automatic flushing system, on a case by case basis, if an alternative method of maintaining water quality is available.

## 2. PIPING FOUNDATION, BEDDING AND BACKFILL

- 2.1 All trench foundations shall be native material except where groundwater or adverse conditions exist which cannot support the pipe. In those conditions, nominal 1½ minus crushed rock shall be installed to the depth required to stabilize the foundation. Materials shall be compacted to a minimum of 95% of maximum density as determined by AASHTO T-99.
- 2.2 Bedding and pipe zone materials for all pipelines shall be ¾ minus crushed rock; hand compacted to a minimum depth of 4 - 6 around all sides of the pipeline.
- 2.3 Backfill in all traffic areas shall be select ¾ minus crushed rock, compacted to a minimum of 95% of maximum density as determined by AASHTO T-180. Top of trench backfill shall meet bottom of street rock grade.
- 2.4 Backfill in all non-traffic areas shall be acceptable native material capable of being compacted, with 100% of the material able to pass through a 2 screen. Backfill in non-traffic areas shall be compacted to a minimum of 90% of maximum density as determined by AASHTO T-180.

## 3. PIPELINE MATERIALS AND FITTINGS

- 3.1 All mainlines shall be ductile iron pipe conforming to the requirements of AWWA C-151, minimum thickness class 52, cement mortar line per AWWA C-104, bitumastic seal coated fully lined fully gauged and domestic origin. Joint shall be rubber gasket flexible restrained joint gasket supplied by the manufacturer of the pipe. Gaskets with vulcanized internal stainless steel locking segments may be used for 4 through 16 ductile iron pipe or mechanical restraint per AWWA C-111.
- 3.2 All mainline fittings shall be cast or ductile iron conforming to the requirements of AWWA C-110 standard fittings or AWWA C-153 compact fittings and of domestic origin. Joints shall conform to the requirements of AWWA C-111. End configuration to be mechanical joint or flanged.
- 3.3 Typical 1 water service lines shall be (SDR9) 1 Municipex, (CTS), a crosslinked polyethylene (PEXa) piping, conforming to AWWA C-904, ANSI/NSF 61, and Canby Utility specifications. Water service lines shall be blue in color.

- a. All end fittings shall be ball style and the 110 style compression connection. Stainless steel insets or stiffeners are required when using Municipex.
  - b. Typical non-metallic water service line installation requires the use of trace or locate wire from mainline to water meter. This wire will be blue in color, 12 gauge, and will have a polyethylene insulating sheath with a single conductor. It shall be suitable for direct burial. Connect to existing main line locate wire, if available.
- 3.4 Water service lines for 1½ and 2 services shall be (SDR9) 2 Municipex (CTS), a crosslinked polyethylene (PEXa) piping, conforming to AWWA C-904, ANSI/NSF61 and Canby Utility specifications. Water service lines shall be blue in color.

#### 4. VALVES AND APPURTENANCES

- 4.1 All valves shall be resilient wedge gate valves, conforming to the requirements of AWWA C-509. Valves shall be cast iron, epoxy coated per AWWA C-550, NRS, rated for 200 psi working pressure, or approved equal. Valve stem extensions shall be provided where operating nut is over 48 deep.
- 4.2 Valve boxes shall have cast iron top and lid, EJIW 3663 or equal, minimum inside diameter of 10 , with 8 PVC (D3034) riser pipe as required. Cast iron lid will be marked with a “W” cast into the lid.
- 4.3 Service connections installation. Direct taps shall be 1 corporations with CC thread and approved compression connection. Saddled connections shall consist of stainless steel strap with nylon or epoxy coated ductile iron body conforming to applicable AWWA C-800 requirements. 1 saddles shall be single strap and IPT; 1½ and 2 saddles shall be double strap and IPT. Sized bronze saddles are required on PVC main lines.
- 4.4 Corporation stops shall be iron pipe thread or CC thread by compression coupling, brass body ball style, conforming to the requirements of AWWA C-800. 1 valves shall be Mueller style model B-25028 or B-25008, 2 shall be Mueller model B-25028 or B25008 or approved equal.
- 4.5 Meter stops shall be angle pattern with locking wing compression coupling by meter swivel nut, brass body ball style, full port conforming to the requirements of AWWA C-800. 1 valves shall be Mueller style model B-24258, 1½" – 2 shall be Mueller style model 107B2423- -2-17.
- 4.6 Residential meter boxes located in planter strips or sidewalks shall be DWF Plastics Inc. DWF486WBC-12-1M Body, H20 rating. Meter box lid shall be DWF Plastics

Inc. C-4M Lid Grey Solid Meter Box Cover, with magnet, 11 x18 Polymer, H2O rating. Substitution only with written approval of Canby Utility.

- 4.7 Curbs shall be installed prior to service lines. Canby Utility requires curbs to be stamped with a "W" directly above all service connections. Residential, commercial, and industrial services shall be noted on the face of the curb with lettering a minimum of 4 inches in size.

## 5. FIRE HYDRANTS

- 5.1 Fire hydrants shall be EJ Watermaster 5CD250. Hydrants shall be EJ Product Number 70551D for 3'-6" DOB, 72591D for 4'-0" DOB, or 72591D for 4'-6" DOB. The hydrant will have **3'-6"** DOB, unless otherwise noted. Storz adapter must connect directly to hydrant body. Aluminum threaded Storz with set screws are not allowed. Storz cap must have 1½" Pentagon-point to flat nut for removal. Distance from mechanical joint (or specified) connection, shall be no less than 5.5 inches.
- 5.2 Fire hydrants shall meet the latest revisions of AWWA Standard C502, be rated for 250 psi working pressure, be listed by Underwriters Laboratories Inc. (UL246), and shall meet the test requirements of Factory Mutual (1510) at this pressure.
- 5.3 Hydrants shall be of a true compression type, opening against the pressure and closing with the pressure. Composition of the main valve shall be a molded rubber having a durometer hardness of 91 +/- 5. The rubber seat valve shall fit a 5¼" opening and not be less than 1" thick.
- 5.4 Fire hydrants shall be **three-way** in design, having **WaterMaster 5" Storz C & X Dome** pumper nozzle, and **2½" NST C Dome** hose nozzle. Nozzles shall "thread" counterclockwise into hydrant barrel utilizing "o" ring pressure seals. A suitable nozzle lock shall be in place to prevent inadvertent nozzle removal. Wedging devices and/or ductile iron retainer rings to secure nozzles shall not be allowed.
- 5.5 The lubrication system shall be sealed from the waterway and any external contaminants by use of "o" ring pressure seals. Anti-friction washers shall be in place above and below the thrust collar of the operating nut to further minimize operating torque. The grease reservoir shall be factory filled with an FDA approved food grade lubricant. Oil shall not be used.
- 5.6 The operating nut shall be a one-piece design, manufactured of ASTM B-584 bronze. It shall be **1½" Pentagon-point to flat** in size/shape. The operating nut shall be affixed to the bonnet by means of an ASTM B-584 bronze hold down nut. The hold down nut shall be threaded into the bonnet in such a manner as to prevent accidental disengagement during the opening cycle of the hydrant. A resilient weather seal shall be incorporated with the hold down nut, for the purpose of protecting the operating mechanism from the elements.

- 5.7 The direction of opening shall be **left**. An arrow shall be cast on the top of the hydrant to indicate the opening direction.
- 5.8 The hydrant bonnet shall be attached to the upper barrel by no more than six bolts and nuts. All nuts and bolts below grade shall be 304 stainless steel.
- 5.9 Hydrants shall be of the "Traffic Model" design, provided with a safety coupling and flange design that will permit a full 360 degree facing of the nozzles. O-rings shall be the Quad-Ring® type and be installed in a groove on the bottom of the joint so that taping or gluing to the upper standpipe or extension is not required. The safety coupling shall be a one-piece design. Multiple parts and cast iron not allowed.
- 5.10 The operating stem shall be a two-piece design, not less than 1¼" diameter (excluding threaded or machined areas). Threads shall be Acme type with no 60 deg. V threads allowed. Travel stops shall be in the inlet/shoe and are not allowed in the bonnet area. Screws, pins, bolts or fasteners used in conjunction with the stem coupling shall be stainless steel.
- 5.11 The inside diameter of the hydrant barrels shall not be less than 7¼ inches and the hydrant shall be painted **Orange**.
- 5.12 Heavy duty drip shutoff (top plate) and valve seat shall be high strength manganese bronze. Valve seat shall be installed in a bronze seat ring. Drain shall be **automatic**, bronze lined and 3/8-inch diameter minimum. They shall operate without the use of springs, toggles, tubes, levers or other intricate synchronizing mechanisms. Lower valve plate shall be a one-piece ductile iron casting and not require a separate cap nut. Drains shall be open and flushed during the first 4 turns of opening the hydrant before positively closing while operating the hydrant.
- 5.13 The shoe connection shall be **Mechanical Joint** or as specified. The inlet/shoe shall be fusion bonded epoxy coated per ANSI/AWWA C550 and with an NSF61 approved coating having ample blocking pads for sturdy setting. Six stainless steel bolts and nuts are required to fasten the shoe to the lower barrel. The shoe/inlet shall be directly connected to the standpipe flange. Designs using a sandwich piece in between the standpipe and shoe/inlet shall not be allowed.
- 5.14 External parts: the top bonnet, upper standpipe, lower standpipe and shoe shall be ductile iron to ensure strength throughout the exterior of the hydrant. Gray Iron hydrant body parts will not be allowed. Canby Utility reserves the right to accept only those materials which are in full compliance with these specifications and deemed most advantageous to its interests. Upon request, supplier shall furnish flow data indicating friction loss in psi at a flow of 1,000 gpm from the pumper nozzle. Such friction loss shall not exceed 2.5 psi. Also, the Canby Utility may request the manufacturing "point of origin" for any/or all hydrant parts. All cast components shall

be made in the USA. Failure to comply with any of these above requirements is sufficient cause for rejection of proposed hydrants.

6. THRUST RESTRAINT

- 6.1 All fittings, valves, joints etc. shall have thrust restraint to prevent movement. Mechanical thrust restraint shall be provided in all cases.
- 6.2 Mechanical restraint shall be standard 125-pound flanges, MJ Gripper Glands by U.S. Pipe, Mega Lug by EBBA Iron, JCM Industries Restraint System, Gripper by Romac, or equal, designed to withstand a minimum of 250 psi line pressures.
- 6.3 Typical Soil Bearing Values, lbs/sf

SAND	1,000 lbs/sf
SAND and GRAVEL	1,500 lbs/sf
SAND and GRAVEL with Clay	2,000 lbs/sf

7. CONSTRUCTION

- 7.1 All pipeline materials shall be installed in accordance with the manufacturers' recommendations. All materials shall be handles with care to avoid damage and protected from dirt or foreign matter at all times.
- 7.2 Valves, fitting and appurtenances shall be joined to the pipe and supported in a manner to prevent stress on the pipe, valves, or fittings.
- 7.3 Valve boxes shall be installed plumb with adequate clearance to avoid transmitting shock or stress to the valve, with the box cover flush with the surface. The valve operator nut shall be centered and readily accessible for operation through the opening in the box.
- 7.4 All concrete for thrust blocks and hydrant pads shall attain a minimum of 3,300 psi at 28 days.

8. SEWER/WATER LINE SEPARATION

Parallel placement of sewers and water lines

- 8.1 Sewers shall be laid at least 10 feet horizontally from any existing or proposed water line. The distance shall be measured edge-to-edge. There is no minimum vertical

separation required provided the 10-foot horizontal separation is maintained. Structures, other than pipelines or conduits, through which sanitary wastewater flows such as, but not limited to, manholes, valve vaults, meter pits and pump station wet wells shall also be constructed at least 10 feet horizontally from any existing or proposed water line, measured edge-to-edge.

- 8.2 In cases where it is not possible to maintain a 10-foot horizontal separation, sewers shall be laid at least 5 feet horizontally and a minimum of 18 inches vertically below any existing or proposed water line. The distance shall be measured edge-to-edge.
  - a. The sewer pipeline and/or structures and water line shall be laid in separate trenches and conform to the minimum requirements of OAR 333-061-0050 (9) Figure 1.
  - b. The crown of the sewer pipeline shall be at least 18 inches below the invert of the water line.
- 8.3 In situations where it is impossible to obtain proper horizontal and vertical separation as stipulated above, the following protection shall be provided:
  - a. Encasement of the sewer pipeline in concrete (min 6-inch thickness) or a carrier pipe for at least 10 feet either side of the area not complying with the minimum horizontal and vertical separation, or
  - b. The design and construction of the sewer pipeline must meet the requirements applicable to water lines (any AWWA-approved material for potable water conveyance), and pressure tested in accordance with AWWA Specifications, or
  - c. In instances of conflict with sanitary wastewater structures mentioned above, relocate the water line to achieve the required horizontal or vertical separation.
  - d. A minimum of 18' of physical separation face-to-face.

#### Sewers crossing water lines

- 8.4 Sewers crossing over water lines should be avoided, but if conditions warrant this situation, then adequate structural support shall be provided for the sewer to maintain line and grade.
  - a. Wherever possible, the bottom of the water line shall be 1.5 feet or more above the top of the sewer line and one full length of the water line shall be centered at the crossing;
  - b. Where the water line crosses over the sewer line but with a clearance of less than 1.5 feet, the sewer line shall be exposed to the sewer line joints on both sides of the crossing to permit examination of the sewer pipe. If the sewer pipe is in good

condition and there is no evidence of leakage from the sewer line, the 1.5-foot separation may be reduced. However, in this situation, the water supplier must center one length of the water line at the crossing and must prepare a written report of the findings and indicating the reasons for reducing the separation. If the water supplier determines that the conditions are not favorable or finds evidence of leakage from the sewer line, the sewer line shall be replaced with a full length of pipe centered at the crossing point, of PVC pressure pipe (ASTM D-2241, SDR 32.5), high-density PE pipe (Drisco pipe 1000), ductile-iron Class 50 (AWWA C-51), or other acceptable pipe; or the sewer shall be encased in a reinforced concrete jacket for a distance of 10 feet on both sides of the crossing.

- c. Where the water line crosses under the sewer line, the water supplier shall expose the sewer line and examine it as indicated in paragraph b. If conditions are favorable and there is no evidence of leakage from the sewer line, the sewer line may be left in place, but special precautions must be taken to assure that the backfill material over the water line in the vicinity of the crossing is thoroughly tamped in order to prevent settlement which could result in the leakage of sewage. In this situation, the water supplier must center one length of the water line at the crossing and must prepare a written report recording the manner in which the sewer line was supported at the crossing and the material and methods used in backfilling and tamping to prevent settlement of the sewer. If the water supplier determines that conditions are not favorable or finds evidence of leakage from the sewer line, the provisions of paragraph b apply.

### Sewer Laterals

8.5 Sewer laterals crossing over or under water lines within the 18-inch vertical separation shall be constructed of SDR 11 HDPE pipe material. Should electrofusion couplings be required due to length, the engineering firm shall witness the electrofusion process and confirm satisfactory machine readings on each. Engineering firm shall include measurement from cleanout in sidewalk to electrofusion coupling location on as-built plan provided to Canby Utility at completion of the project.

- a. A minimum of 4-inch separation is required for any crossing.

8.6 In Sections 8.1 through 8.5, all references to sewers shall mean sanitary sewers and water lines shall be defined as any conduit or pipeline that conveys potable water.

## 9. HYDROSTATIC TESTING

9.1 After the pipe has been installed and backfilled, each valved section of pipe shall be subjected to a hydrostatic pressure test of 150 psi measured at the end high point of the test section for a 2-hour duration.



- 9.2 All test equipment and procedures shall be approved by the Canby Utility with respect to capability of developing test pressures required and calibration accuracy of measuring devices.
- 9.3 Each valved section of pipe shall be filled and allowed to stabilize for a period of not less than 12 hours. After stabilizing, water shall be slowly pumped into the line until the specified test pressure, based on the elevation of the highest point of the line or section under test, and corrected to the elevation of the test gauge, is achieved.
- 9.4 Before applying the maximum specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed, and the test pressure applied. At conclusion of the pressure test, the corporation cocks shall be removed and plugged.
- 9.5 Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound materials and the test shall be repeated until it is satisfactory to the owner.
- 9.6 Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified test pressure, measured at the completion of the two-hour test duration.
- 9.7 No pipe installation will be acceptable if the leakage is greater than the allowable leakage determined by the following formula:

$$L = \frac{SD P}{133,200}$$

In which L is the allowable leakage, in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

- 9.8 Acceptance shall be determined on the basis of allowable leakage, if any test of pipe laid, allows leakage greater than that permitted, the contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance.

## 10. DISINFECTION

- 10.1 Prior to placing any line in service and pressure testing, all lines shall be disinfected in accordance with the procedures of OAR 333.61.0020, 0025, 0050; Public Water System.

- 10.2 Prior to disinfection, the facilities shall be cleaned and flushed with potable water.
- 10.3 A chlorine solution with a free chlorine residual of 25 mg/1 shall be introduced into the system in a manner which will result in a thorough wetting of all surfaces and the discharge of all trapped air. The solution shall remain in place for 24 hours. Maximum chlorine content shall be 50 mg/1 or system shall be flushed per Section 10.7 and a new chlorine solution shall be introduced.
- 10.4 After the 24-hour period, the free chlorine residual shall be checked, and if it is found to be 10 mg/1 or more, the chlorine solution shall be drained, and the facility shall be flushed with potable water.
- 10.5 If the checked measurement taken after the 24-hour contact period indicated a free chlorine residual of less than 10 mg/1, the facilities shall be flushed, rechlorinated and checked until final residual of 10 mg/1 or more is achieved.
- 10.6 During the process of chlorination, the piping and all appurtenances shall be operated to thoroughly disinfect all surfaces.
- 10.7 Following chlorination, all treated water shall be flushed from the pipeline. Follow EPA guidelines for de-chlorination and disposal of test water.

## 11. SAMPLING AND ACCEPTANCE

- 11.1 After completion of disinfection and flushing, Canby Utility will collect a bacteriological sample and submit it for testing at the contractor's expense. The sample must test free of coliform organisms or the disinfection procedures will be repeated at no cost to Canby Utility. A second sampling will be taken 24 hours after the first under existing static pressure.
- 11.2 Canby Utility will have a representative on site during any construction to inspect construction of all public water system improvements. The contractor shall pay all costs of the inspections at the current hourly inspection rates including overtime as required.
- 11.3 Any pipe fitting or fixtures backfilled or covered prior to inspection shall be uncovered at the contractor's expense and at the discretion of Canby Utility.
- 11.4 Any pipe, fitting or fixtures added to the existing distribution system will be covered under Section 8, 9 and 10.