

**SECTION 02640**  
**UTILITY VALVES AND APPURTENANCES**

**PART 1 -- GENERAL**

1.1 SECTION DESCRIPTION

- A. This section includes materials and installation standards, and contractor responsibilities associated with the furnishing of all labor materials, equipment and incidentals required to properly place and install all utility valves and appurtenances for utility pipeline construction as shown on the Drawings and as specified herein.
  
- B. Materials shall include, but not be limited to, the following:
  - 1. Gate Valves
  - 2. Butterfly Valves
  - 3. Plug Valves
  - 4. Ball Valves
  - 5. Check Valves
  - 6. Corporation Stops
  - 7. Curb Stops
  - 8. Air Release Valves
  - 9. Service Saddles
  - 10. Locating Devices
  - 11. Valve Boxes
  - 12. Water Meter Boxes
  - 13. Pipe Restraints
  - 14. Tapping Sleeves

1.2 SUBMITTALS

- A. Submit shop drawings of all equipment and appurtenances to be installed, showing required size, specific type and specified information for approval prior to ordering materials.
  
- B. Special tools, if required for normal operation and maintenance, shall be supplied with the materials at no additional cost to SLCU.

## PART 2 -- PRODUCTS

### 2.1 GENERAL:

- A. All equipment and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
- B. All equipment and appurtenances shall have the name of the maker, the size and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body. Valves shall open left (counterclockwise).
- C. Approved Pipe and Fittings: The valves tabulated below, within the size range indicated and for the applicable service, are approved for system construction:

<u>Valves</u>	<u>Service</u>	<u>Size</u>
Gate	Water Distribution	4 inch thru 12 inch
Butterfly	Water Distribution	14 inch and above
Gate	Force and Low Pressure Mains	3 inch and above
Ball	Low Pressure Main	2 and 2 1/2 inch

- D. Gate Valves (GV):
  - 1. Underground Service (General): Valves four inches and larger shall be iron body, bronze mounted, conforming to AWWA C509, resilient seat, mechanical joints, nonrising stem-type, and shall be equipped with two-inch square cast iron wrench nuts.
  - 2. Above Ground Service (General): Valves shall be iron body, bronze mounted, resilient seat gate valves, conforming to AWWA C-509. Valves shall be OS&Y, rising stem type.
- E. Butterfly Valves (BFV):
  - 1. Valves shall be cast or ductile iron body; alloy cast iron or ductile iron disc; one-piece stainless steel shaft; short or long body-type; with the valve class, shaft size, and other special requirements selected in accordance with the specific design; and shall comply with the provisions of AWWA C504, "Rubber-Seated Butterfly Valves".
  - 2. The valve disc shall be cast iron or ductile iron. The valve disc or valve body shall be fitted with a resilient seat of synthetic rubber.
  - 3. Valves shall open counterclockwise. Operators shall comply with AWWA C504 with 2-inch square operating nut. Operators shall be fully gasketed and grease-packed to withstand an external water pressure of 10 psi.

Operators shall be capable of developing torque's listed in Table 1 of AWWA C504 for Class 150B valves. Valve operators for valves 24-inch and smaller shall be traveling nut or worm gear type fully field adjustable stops so the operator does not have to be disassembled for valve seat adjustment. Valves larger than 24-inch shall be equipped with worm gear type operators.

F PVC Ball Valves (BV):

1. Ball valves shall be designed to be fully open by a 90° turn of the operating handle and shall be full port design with bi-directional sealing rated for 150 psi minimum working pressure.
2. Valve shall be true union type, made from high gloss injection molded PVC, type I-II. Teflon seats against PVC Ball.
3. If valve is buried more than 24" from surface, a handle extension shall be supplied and fitted onto the valve handle, within a valve box.
4. Valve ends can be threaded if Schedule 80 PVC used. Push-on restrained or solvent welded ends for other PVC.

G Plug Valves (PV):

1. Wastewater plug valves, where required, shall be cast or ductile iron or steel body, non-lubricated, eccentric-type, with resilient faced plugs, and capable of drip-tight shutoff at the rated pressure if applied at either port. Valve surfaces in contact with the plug face shall be 90 percent pure nickel. Operation of all valves ten inches or larger, and smaller sizes in exposed locations which require handwheels or chainwheels, shall be by approved gear actuators, equipped with position indicator and stop, and shall be furnished by the valve manufacturer. Gear actuators for buried or submerged installations shall be furnished with sealed enclosures. Valves shall be equipped with 2" actuating nuts, cast iron handwheels, or chain operators, with galvanized steel chains, as appropriate for the installation and type of operator.
2. Port areas of valves sized 3-inch through 20-inch shall be at least 75 percent of full pipe area.
3. Valves shall be non-lubricated and rated for 150 psi pressure differential acting in either direction. At this differential the valve shall provide drip tight shutoff.

4. The valves shall have a balanced plug to assure low torque and drip tight shutoff. Valves shall be equipped with resilient plug facings to provide drip tight shutoff without use of sealing lubrications. Even if small solids are trapped between the plug and seat, the resilient facing shall provide tight shutoff and prevent seat damage.
5. Plug valves shall have heavy-duty upper and lower guide bearings capable of resisting corrosion and preventing binding. Bearings shall be stainless steel or bronze bushing.

H. Check Valves (CV):

1. General Service: Water Main and Force Main valves shall be swing type and meet AWWA C-508. Valve shall be iron body, bronze mounted, outside lever and weight, and equipped with removable inspection covers. Check valves 4 to 12 inches shall have a minimum working pressure of 175 psi, and units 16 to 24 inches shall be rated for 150 psi minimum working pressure and shall permit full flow area equal to that of the connecting pipe.
  2. Valves 2-Inches and Smaller (water): Valves shall be bronze body and disc, swing check-type, with removable inspection covers, and rated for 150 psi minimum working pressure.
  3. Silent Check Valves: Valve shall be spring loaded, globe style with a minimum working pressure rating of 175 psi. Valve shall be tight seating and shall be furnished with an easily replaceable bronze seat with a resilient Buna-N Seal. Valve shall have stainless steel trim (type 316) as well as all other internal fasteners and screws.
  4. PVC Valves 2 inches and smaller (Low Pressure Mains): Valves shall be a PVC check valve, all rubber flapper type rated for 150 psi. The check valve will provide a full-ported passageway when open. Rubber flapper shall be fabric reinforced, synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A non-metallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating, even at a very low backpressure. The valve body shall be high gloss injection molded PVC type I-II
- I. Corporation Stops and Curb Stops: Units shall be brass, equipped with connections compatible with the connecting service pipe-type; must have pack joint type connections for polyethylene tubing with locking collars and stainless steel inserts.
- J. Air Release Valves - Water (Vent Only): Valves shall comply with AWWA C-512, be cast iron or ductile iron or bronze body, cover and baffle, stainless steel float and stainless steel trim, suitable for domestic water service, rated for a minimum 150 psi working pressure.

- K. Service Saddles: Saddles for PVC or ductile iron pipe shall be double strap, stainless steel, or brass full circle type saddles, as applicable. Sealing gaskets shall be suitable for the applicable service and straps shall be corrosion resistant alloy steel.
- L. VALVE APPURTENANCES
1. Valve Boxes: Units shall be adjustable, cast iron, two-piece screw-type with minimum interior diameter of five inches, with covers cast with the applicable inscription in legible lettering on the top: "SEWER", "WATER" or "RECLAIMED WATER". Boxes shall be suitable for the applicable surface loading and valve size. Extension pieces, if required, shall be the manufacturer's standard screw-type for use with the valve box.
  2. Extension Stem for Valve Operators: Where the depth of the operating nut is more than 3 feet (unless otherwise specified), operating extensions shall be provided to bring the operating nut to a point 6 inches below finished grade. The extension shall be high strength, corrosion resistant steel construction and permanently attached to the operating nut or handle on the valve. A steel centering plate shall be welded to the extension.
  3. Valve boxes shall be provided with concrete base and valve nameplate with suitable anchors for casting in concrete. Nameplate shall be 3-inch diameter bronze disk with 1/8 inch high lettering. Information on disk shall be of specific valve type, size, direction and number of turns, etc. All water valve locations to be marked by a blue Reflective Pavement Marker (RPM) and sewer valves by a green RPM at the edge of pavement.
- M. Meter boxes: Meter boxes shall be high-density polyethylene body and cover with a cast iron meter lid. Meter boxes shall be the same type throughout the project and of the type currently utilized by SLCU.
- N. Tapping Sleeves and Valves: Tapping sleeve shall be split-type stainless steel or MJDI with flanged outlet for connection to tapping valve. Valves shall conform to the specifications set forth previously, for the applicable service conditions. Additionally, units shall be compatible with the connecting sleeve or saddle and specially designed for wet tapping installation operations.
- O. Locating Devices:
1. The Locator Wire, when specifically required to be installed with PVC & HDPE mains, shall be connected at each valve as detailed on the Drawings.
  2. Service Connections (Type II) for water mains and low-pressure mains shall be provided with an Electronic Marker, placed directly above the end of the pipe at the R.O.W. or easement line. The marker shall be installed in

accordance with the manufacturer's requirements and be capable of operating at a depth of 6 feet below the ground surface. The markers shall have separate and unique frequencies for water service connections and for low-pressure service connections. The Contractor shall provide a portable electronic marker locator. The locator shall be a complete unit with all necessary equipment, operating manual and batteries. The locator shall be adjustable for the different frequencies required for water and low pressure mains (wastewater). The system must be compatible with SLCU's existing system.

P. Pipe Restraints:

1. All pressure pipe at fittings and for lengths specified within the Construction Drawings shall be restrained by appropriate restraint devices meeting requirements of UNI-B-13 for PVC pipe and Ductile Iron Pipe Research Association for ductile iron pipe, and be UL listed. Specific criteria in establishing required pipe restraint lengths is found within the Standard Construction Details. Shop drawings shall specify the particular system to be utilized and be approved by SLCU or Engineer of Record. After an acceptable restraint device is approved, no substitutions will be allowed without resubmittal of shop drawings and written approval from SLCU or Engineer of Record.

### **PART 3 – EXECUTION**

#### **3.1 INSTALLATION:**

A. General Requirements:

1. Valves and appurtenances shall be installed in accordance with these Standards and, in general, with the manufacturer's recommendations for the applicable service.

B. Valves:

1. General: Valves shall be carefully inspected, opened wide, and then tightly closed, and all the various nuts and bolts thereon shall be tested for tightness. Special care shall be taken to prevent joint materials, stones or other substances from becoming lodged in the valve seat. Valves, unless otherwise

required, shall be set with their stems vertically above the centerline of the pipe. Any valve that does not operate correctly shall be adjusted to operate properly or removed and replaced.

2. Buried valves shall be installed vertically where depth of cover permits. Where depth of cover does not permit, side operators shall be used. Extension stems shall be provided on all buried valves when the operating nut is deeper than three feet below the final grade. Where extension stems are required within valve boxes, approved insert stem guides shall be provided. All water valve locations to be marked by use of a blue reflective marker (RPM) attached at pavement edge. All force main and low-pressure main valve locations to be marked by the use of a green RPM attached at pavement edge.
3. Valve boxes shall be carefully centered over the operating nuts of underground valves to permit a valve wrench to be easily fitted to the nut. The tops of valve boxes shall be set to the required grade. The valve box shall not transmit surface loads directly to either the pipe or valve. Care shall be taken to prevent earth and other material from entering the valve boxes. Any valve box that becomes out of alignment or is not to grade shall be dug out and adjusted. Concrete pads will be provided around boxes with brass disc providing information as to valve type, size, direction and number of turns.

#### C. Service Connections

1. Service Connections (Water Main): Connections to water mains shall be made by installing service saddles. A corporation stop shall be placed at the saddle or fitting, with the service line extended 24" beyond the R.O.W. line at the side property line, perpendicular to said line, and terminating with a curb stop and magnetic locating device, pending meter installation.
2. Service Connections (Low Pressure Main): Connection to low pressure mains will be made by use of a tapping sleeve and valve, and check valve, with the service line extended to the R.O.W. line, perpendicular to said line, and terminating with a cap and electronic locating device. Schedule 80 PVC is only pipe acceptable to tap for threads.
3. Services undercrossing roadways shall be bored or jacked, pushed or moled. Jetting will not be allowed. No open cutting of roads for service lines will be allowed unless specifically stated. The service line shall have a minimum cover of 30-inches with slight grade sloping away from the water main or low pressure main. The service shall be enclosed within a casing pipe. Casing pipe shall be either back iron or schedule 80-PVC.

#### D. Pipe Restraint: Shall be installed in accordance to the manufacturer's requirements

for the pipe used and for lengths specified within the construction drawings and Standard Construction Details. During installation, each required joint to be restrained must be observed by the SLCU, Engineer of Record or their appointed Field Representative before backfilling at that joint.

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