

## **SECTION 22 11 00 – VALVES, HYDRANTS, AND ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Valves
- B. Fire Hydrants
- C. Valve Boxes
- D. Related Items

#### **1.2 RELATED SECTIONS**

- A. Section 33 41 20: Solid Wall PVC Pipe

#### **1.3 QUALITY CONTROL**

- A. Supervision:
  - 1. Provide full time supervisor trained and familiar with the work to be undertaken.
- B. Workmanship:
  - 1. All workmen shall be skilled and experienced in the specified work.

#### **1.4 SUBMITTALS**

- A. Original drawings, prepared by Contractor, subcontractor, supplier or distributor, which illustrate some portion of the Work; showing fabrication, layout, setting or erection details.
- B. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
- C. Reproductions for submittals:
  - 1. Opaque diazo prints or blueprints.
- D. Manufacturer's standard schematic drawings:
  - 1. Modify drawings to delete information which is not applicable to project.
  - 2. Supplement standard information to provide additional information applicable to project.
- E. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.
  - 1. Clearly mark each copy to identify pertinent materials, products or models.
  - 2. Show dimensions and clearances required.
  - 3. Show performance characteristics and capacities.
  - 4. Show wiring diagrams and controls.

## **PART 2 - PRODUCTS**

### **2.1 VALVES**

- A. Gate valves 16 inches and smaller:
  - 1. All gate valves shall comply with requirements of "Standard Specifications for Resilient Seated Gate Valves for Ordinary Water Works Service" AWWA C509 except as amended herein. All valves shall be resilient seated wedge type.
  - 2. All gate valves unless noted otherwise on the plans shall have ends of standard mechanical joints conforming to ASA Spec. A21.11. Flanged end valves shall conform to ASA Spec. B16.1.
  - 3. All gate valves shall be mounted in the line in a vertical position unless noted otherwise on the plans.
  - 4. All gate valves shall be provided with "O" rings for sealing of the valve stem.
  - 5. All gate valves shall be equipped with 2 inch square operating nuts. Valves shall close on clockwise rotations.
  - 6. All valves shall be designed for operation at a working pressure of not less than 200 psi.
  - 7. Gate valves shall be manufactured by Mueller (2360 or 2362), M&H (4067 or 4068), or approved equal.
  - 8. All gate valves must have 316 stainless steel bolts. Both red epoxy or bituminous exterior coatings are also acceptable.
  - 9. AWWA C-515 RSGVs with reduced wall thicknesses are not acceptable.

### **2.2 FIRE HYDRANTS**

- A. All fire hydrants shall comply with requirements of "AWWA Standard for Fire Hydrants for Ordinary Water Works Service" C502 except as amended herein.
- B. All hydrants shall have replaceable "breakable" sections. Hydrants shall be compression type closing with line pressure. Hydrants shall have inlet connection of 6-inch size with standard flange connection for direct bolting to auxiliary gate valve.
- C. All hydrants shall have two hose outlets with National Standard 2-1/2-inch hose threads, and on 4-1/2 inch steamer connection with National Standard threads. Operating nut shall conform to National Standard measurements.
- D. Valve opening shall be 5-1/4 inch.
- E. Hydrant valve shall open on counter-clockwise rotation of the operating nut.
- F. Hydrants shall be painted a finish coat of red above the ground line.
- G. Burial depths for hydrants will and may vary, but shall not be less than 4 feet. The steamer connection shall not be less than 12 inches nor greater than 24 inches above finish grade. The contractor shall furnish and install all spool pieces as may be necessary to adjust hydrants to the proper height.
- H. Hydrants shall be M&H 129, Mueller Super Centurion 250, Clow Medallion F2545 (with full body glands and red primer), or approved equal.

## **2.3 VALVE BOXES**

- A. Traffic areas:
  - 1. Valve boxes shall be Clay & Bailey, or equal, three-piece, slip type 5-1/4 inch shaft for roadway service. Cover shall have the word "Water" cast on its top.
- B. Non-traffic areas:
  - 1. Use 6 inch PVC C1.160 and extend 24 inches above grade. Install Clay and Bailey 2194 cover and 1108 lid.

## **2.4 TAPPING SLEEVES**

- A. Tapping sleeves shall be as manufactured by the Mueller Co., Cascade, Ford, JCM, Romac, Smith-Blair, or approved equal for 150 psi working pressure. Sizes and number shall be as indicated on the plans. Joints shall be mechanical joint suitable for the pipe to be tapped. Outlet shall be flanged ASA B 16.1.
- B. Valves for tapping sleeves shall be as per 2.01 A in this section except that end connection shall be flanged and mechanical joint.

## **2.5 AIR RELEASE VALVES**

- A. The air release valve shall operate (open) while pressurized, allowing entrained air to escape from the water pipeline, pump or reservoir tank, thru the air release orifice. After entrained air escapes thru the air release orifice, the valve orifice shall be closed by a needle mounted on the compound lever mechanism, energized by a CONCAVE FLOAT to prevent water from escaping. The air release valve will then stay closed until more air accumulates in it and the opening cycle will repeat automatically.
- B. Air release valves shall conform to the requirements of AWWA C-512.
- C. The needle shall be Buna-N for tight shut-off and be resilient to prevent seepage due to pipeline or pump vibrations.
- D. The air release valve compound internal level mechanism shall be all Bronze. All other internals must be stainless steel. The stainless steel float must be CONCAVE and sufficiently buoyant to operate water and be SPURT FREE.
- E. The valve shall withstand 500 psi test pressure and have a 3/16 inch orifice for operating (opening) pressure up to 150 psi. The venting capacity @ 150 psi shall be 55 CFFAM.
- F. Valve to be Cla-Val, Val-Matic, APCO, Vent-O-Mat, or approved equal.

## **2.6 LOCATING WIRE**

- A. No. 12 bare copper wire shall be installed in the trench above the water main.

## 2.7 SERVICE CONNECTIONS

### A. Service pipe:

1. The pipe from the main to the meter holding device shall be 1-inch rigid plastic pipe SDR 13.5 for 315 pounds working pressure and shall conform to the preceding specifications for plastic pipe or polyethylene service tubing (ASTM). If polyethylene tubing is used, Ford No. 82 stainless steel insert sleeves shall be used on each pack joint end. All service line installed in highway right-of-way shall be type K copper and subject to approval by the ODOT.

### B. Meter holding device:

1. The meter holding device shall provide a complete mounting for the installation of and the holding of the water meter so that the line of flow through the meter shall be 18 inches above the lower edge of the meter box.
2. The copper meter yoke shall be provided with an inverted ground key angle valve or shut-off valve on the inlet side. On the customer side of the setter, a check valve is to be serviceable, spring loaded and one seat of resilient material. Check valve shall be guaranteed and tested to withstand a vacuum or external pressure test of 10.8 psia (22 in Hg) for 1 hour with no leakage. Each end of the yoke shall be provided with a combination tailpiece with inside I.P. thread. The yoke shall provide a copper, brass, or bronze passage entirely through the meter box with the exception of the meter. The construction shall be such that the meter may be removed without removing the meter holding device, and the footing or the discharge leg of the yoke shall extend at least 18 inches from the centerline of the meter box. Setter shall have a pack joint for PVC on each end. The meter holding device shall be a Ford Meter Box Co. Model V92-18 coppersetter, or approved equal.

### C. Service saddle:

1. Service saddle for main line shall be Ford S71. Corporation stop shall be 3/4 inch male IPS by 3/4 inch pack joint for PVC.

### D. Service meter:

1. Meters furnished under these specifications shall be product of a manufacturer with at least 5 years experience in meter manufacturing for the American Water Works market. Meter shall be of the positive displacement type for cold water service, of split-case design with provision for frost protection and must be either notating disk or oscillating piston type.
2. Meters shall comply with AWWA C700 and C701.
3. Meters may be either mechanically or magnetically driven with sealed registers. Meters with stuffing box, spindle and packing gland will not be acceptable.
4. Meters shall be readily adaptable to remote readout capability designed and manufactured for the brand of meter being bid.
5. Meters shall carry a minimum 5 year warranty against defective materials and workmanship and shall be Badger Beacon with HR-E encoders, LTE Endpoints; or approved equal.
6. The body cases shall be of high quality bronze with the manufacturer's serial number imprinted thereon and have raised markings to indicate the direction of flow.
7. A hinged cover bearing the name of the manufacturer in raised letters shall be provided for the register glass. Thread protectors shall be supplied for the connection ends and the cases shall have provisions for wire sealing the meter body. Cases must be capable of withstanding working pressures of 150 psi.
8. Registers shall be straight-reading in U.S. Gallons, sealed to prevent fogging and to prevent fluid contact with water being measured and with provision for test reading the

flow to within 0.1 gallon. Register components shall be constructed of corrosion resistant material.

E. Meter box:

1. The meter box to be used on this project shall be of PVC Plastic, 18 inch in diameter and not less than 36 inches in length. Boxes shall be Accucast, Bass & Hays Mid States, Sigma, or approved equal.

F. Meter box cover:

1. The meter box covers shall be of cast iron construction of a good quality cast iron at least 50 percent of which shall be new pig. It shall be constructed to fit on the meter box with lugs extended into the box to prevent displacement of the cover.
2. The lid shall be held to the body with lugs and shall lock therein with a bronze or bronze-bushed worm lock. The box cover shall be not less than 4 inches high.

G. Cover:

1. The trench for service lines shall provide not less than 36 inches of cover and shall be not less than 6 inches in width.

H. Meter box location:

1. Excavation for the meter boxes shall be made at the location indicated by the Engineer.

I. Boring under street roadways for service connections:

1. Where it is necessary to go under streets and paved roadways with service connections, it will be accomplished by boring unless special permission for trenching is secured.

## 2.8 CAP EXISTING SERVICE TAP

A. Materials:

1. Materials to be used to cap an existing service line connection on a main shall be a Smith-Blair 242 repair clamp with stainless steel bolt.

## PART 3 - EXECUTION

### 3.1 VALVES AND VALVE BOXES

- A. Valves and valve boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves, with the top of the box brought flush with the finished grade. After being placed in proper position, earth shall be filled in around each valve box and thoroughly tamped for a distance on each side of the box of 4 feet at the top of the pipe and 2 feet measured at the top of the trench.
- B. Each valve shall be inspected before installation to ensure that all foreign substances have been removed from within the valve body, and shall be opened and closed to see that all parts are in first-class working condition.
- C. Valves or corporation stops buried in the ground shall be provided with cast iron valve stacks of proper dimensions to fit over the valve bonnets, and to extend to the finished ground line in paved areas or slightly above finished grade in other areas.

- D. Tops shall be complete with covers and shall be adjustable.
- E. Valve stacks shall be set vertical and concentric with the valve stem.
- F. A concrete pad shall be poured around all valve stacks when not in paved areas. 6'x6' pad.
- G. All gate valves shall be non-rising stem unless otherwise indicated and shall turn counterclockwise to open.
- H. Valves shall be provided with a square operating nut unless otherwise designated.
- I. Valves or corporation stops for buried service shall be provided with 2-inch square nut operator and shall be installed with extension stems where required to extend operating nut to within 12 inches of the finished grade.

### **3.2 FIRE HYDRANTS**

- A. Hydrants shall be set at such an elevation that the minimum pipe cover is provided throughout the length of the branch supply line and that the nozzles are at least 12 inches and not more than 24 inches above the ground.
- B. Each hydrant shall be set on a concrete foundation not less than 18 inches square and 6 inches thick. To prevent the hydrant from blowing off the supply connection, the bowl of each hydrant shall be blocked against the end of the trench with precast concrete blocks, or it shall be tied to the pipe with suitable rods or clamps.
- C. Hydrant drainage shall be provided by installing around the hydrant, and below the top of the hydrant supply pipe, not less than 7 cubic feet of a mixture of two parts gravel or crushed stone retained on a 3/4 inch screen to one part of coarse sand.
- D. Hydrant to be painted fire engine red.
- E. Hydrants will need to be 5 feet bury. When necessary due to conflicts, an extension of 1 foot may be used.
- F. All hydrants shall stand plumb. Hydrants with pumper nozzles shall have their hose nozzles parallel with, and the pumper nozzle perpendicular to, the curb line. Hydrants having hose nozzles 90 degree apart shall be set so that the line bisecting the angle between the nozzles is perpendicular to the curb line. Hydrants located behind curbs where the sidewalks extend close to, or abut against, the curb shall be set that no portion of the pumper or hose nozzle caps will be less than 6 inches nor more than 12 inches from the gutter face of the curb. Where set in a parking between the curb and sidewalk, or between the sidewalk and property line, no portion of the hydrant or nozzle cap shall be within 6 inches of the sidewalk.
- G. Immediately before installation of a hydrant, the following operations shall be performed: (a) the hydrant shall be carefully inspected; (b) the hydrant interior shall be thoroughly cleaned; (c) the hydrant shall be opened and closed as many times as may be necessary to determine if all parts are in proper working order, with valves seating properly and the drain valve operating freely; and (d) the packing gland checked to determine if the packing is in place and the gland nut properly tightened.

**PART 4 - MEASUREMENT AND PAYMENT**

- 4.1 Payment is on a unit basis for each fire hydrant assembly including 6-inch gate valve and box, installed regardless of barrel depth and coating.**
- 4.2 No separate payment will be made for gate valves. Include payment in unit price for water.**

**END OF SECTION**