SECTION 02515

UTILITY VALVES AND ACCESSORIES

PART 1 - GENERAL

1.1 Summary

A. Description of the Work

The work to be performed in accordance with this Section includes all work associated with the installation and testing of all valves, hangers and supports, gauges, and other accessories associated with the project piping.

The work shall include the furnishing of all labor, tools, equipment, materials and performing all operations to install all valves hangers and supports, gauges, and other accessories.

B. Related Work Specified Elsewhere

Water Line Construction ..... Section 2550
Sewer Line Construction ..... Section 2560
Protective Coatings..... Section 9900
Electrical ..... Division 16

1.2 Quality Assurance

A. Reference Standards and Specifications

1. American National Standards Institute (ANSI)

ANSI B16.1 - Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.

2. American Society for Testing and Materials (ASTM)

ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.

ASTM A276 - Stainless and Heat Resisting Steel Bars and Shapes.

ASTM A536 - Ductile Iron Castings.

3. American Water Works Association (AWWA)

AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

AWWA C207 - Steel Pipe Flanges for Waterworks Service, Sizes 4 Inch through 144 Inch.

AWWA C504 - Rubber Seated Butterfly Valves.

AWWA C507 - Ball Valves, 6 Inch through 48 Inch.

AWWA C508 - Swing-Check Valves for Waterworks Service, 2 Inch through 24 Inch NPS.

AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.

AWWA C512 - Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.

AWWA C550 - Protective Epoxy Interior Coatings for Valves and Hydrants.

AWWA C600 - Installation of Ductile-Iron Water Mains and their Appurtenances.

B. Manufacturer Quality Assurance

Manufacturers shall be experienced in the design and manufacture of specific valves and accessories for a minimum period of 5 years and all values and fittings shall be manufactured in U.S.

C. Field Testing

1. Perform on piping and valves as specified in Section 2560 and for the following:

a. Check valves.

b. Butterfly valves.

c. Plug valves.

d. Gate valves.

e. Ball valves.

f. Air and air/vacuum valves.

g. Surge relief valves.

h. Gauges.

1.3 Submittals

A. Submit as specified in Section 1330.

B. Include, but not limited to, the following:

1. Catalog data or illustrations showing principal dimensions, parts, and materials.

2. Spare parts list referenced to illustration of parts.

3. Assembly and disassembly or repair instructions.

4. Dimensions of the clearance required for butterfly valve discs, handwheels, actuators or any other moving part.

C. Certificates and Affidavits: Furnish prior to shipment. Include the following:

1. Test certificates.

2. Affidavit of compliance with applicable AWWA Standard.

1.4 Delivery, Storage, and Handling

A. Ship all valves with suitable end covers to prevent entrance of foreign material into valve body.

B. Protect valve threads, flanges, stems, and operators from damage.

C. Ship valves 2-1/2-inch and larger to the Project Site tagged with the valve number shown on the Drawings and valve schedule. Tag smaller valves to show the piping system in which it is to be used.

1.5 Responsibility

Actuators, their controls, and accessories shall be the responsibility of the valve manufacturer for sizing, assembly, certification, field testing, and any adjustments necessary to operate the valve as specified.

PART 2 - MATERIALS

2.1 Eccentric Plug Valves

A. Acceptable Manufacturers

1. DeZurik, a unit of General Signal Corporation.

2. Keystone Valve USA, Inc.

3. Milliken Valve Company, Inc.

4. Val-Matic Valve and Manufacturing Corporation.

5. Victaulic Company of America.

6. Or approved equal

B. Design

1. Quarter-turn nonlubricated eccentric type with resilient faced plug. Valves with vane type seat rings are not acceptable. Shutoff up to scheduled rating with pressure in reverse direction where scheduled.

2. Suitable for 250 psi operating pressure.

3. Port areas for valves through 16-inch shall be at least 80% of full pipe area and 24-inch and larger shall be at least 70% full pipe area.

4. Plugs shall be eccentric type with no backing ring or frame.

5. Valve body cavity shall be smooth without protrusions or baffles.

C. Materials and Construction

1. Bodies shall be of ASTM A126, Class B cast iron.

2. Valve plug shall be ASTM A126, Class B cast iron or ASTM A536 ductile iron. Resilient plug facing or replaceable style body seats shall be synthetic rubber, neoprene, or Buna N compound suitable for use with wastewater applications.

3. Seat rings shall be threaded, or welded of corrosion-resistant 18-8 stainless steel, nickel, or Monel conforming to AWWA C504. Sprayed or plated mating seat surfaces are not acceptable.

4. Bearings shall be replaceable. Sleeve type and thrust bearings in the upper and lower journals shall be corrosion-resistant stainless steel.

5. Shaft seals shall be multiple O-ring or self-adjusting U-cup or chevron type packing conforming to AWWA C504. Pull-down packing is not acceptable.

6. Shaft seals shall be field adjustable or replaceable under pressure and without valve disassembly.

7. All exposed fastening hardware shall be zinc plated or stainless steel. Provide stainless steel for buried service.

D. Connections

1. Valve connections to be flanged for valves within the wet well, valve vault and flowmeter vault and mechanical joint for all buried valves.

2. Flanged valve ends shall be faced and drilled to conform to ANSI B16.1, Class 125 for thickness and drilling.

E. Actuators

1. Manual Actuators

a. All valves shall open counterclockwise.

b. Provide indicators to show position of plug.

c. Worm gear actuators shall be totally enclosed, grease sealed, gear type furnished with AWWA nut, crank, handwheel, or chainwheel. All buried valves shall be provided with worm gear actuators, AWWA nut, and enclosed cover plate. All valves with reverse pressure capacity requirement shall be provided with worm gear actuators. Worm gear actuators shall be self-locking at all variable opening positions and sized to meet the torque ratings of AWWA C504. The shaft in a worm gear actuator shall have a nonmetallic sleeve type bearing. Submit manufacturer's parts and materials drawings.

d. Handwheels shall be located in positions indicated or as otherwise determined when manufacturer's drawings are submitted.

D. Shop Painting: Apply interior coating conforming to AWWA C550 to exposed ferrous metal surfaces. Provide affidavit or certificate of compliance per AWWA C550.

2.2 Cushioned Swing Check Valves

A. Acceptable Manufacturers

1. APCO, Valve and Primer Corporation.

2. GA Industries, Inc.

B. Operational Requirements

1. Prevent reverse flow without shock or hammer.

2. Seat tightly with internal pipeline forces.

3. Cushioned with air cylinder controls in manner permitting adjustment of speed of closure.

C. **Design:** Conform to AWWA C508 and as specified.

1. Swing disc type with single shaft and flanged body. Flanges shall be ANSI B16.1, Class 125.

2. Cushion chamber shall be mounted externally on valve body.

3. Valve disc shall have external lever and counterweight to initiate closure.

4. Suitable for 250 psi operating pressure.

D. Materials and Construction

1. Valve body shall be cast iron, ductile iron, or steel.

2. Valve disc shall be cast iron, ductile iron, or stainless steel.

3. Seats and seat ring shall be renewable. Seats shall be bronze or stainless steel. Seat rings shall be Buna-N or bronze.

2.3 Bronze Swing Check Valves

A. Acceptable Manufacturers

1. Crane

2. Nibco

3. Approved equal.

B. Design

1. "Y" Pattern check swing type.

2. Rated for 200 psi cold working pressure.

C. Operation

1. Prevent reverse flow without shock or hammer.

2. Seat tightly with internal pipeline forces.

3. For use on service water lines 2" and less.

D. Materials and Construction

1. Valve body shall be bronze ASTM B62.

2. Valve disc shall be composition or PTFE.

3. Seats and seat ring shall be renewable. Seats shall be bronze.

4. Bonnet to be screwed cap type.

E. Connections

1. Connections to be threaded.

2.4 Automatic Air/Vacuum Release Valves

A. Acceptable Manufacturers

1. APCO, Valve and Primer Corporation.

2. Crispin Valves, Multiplex Manufacturing Company.

3. G.A. Industries, Inc.

4. Val-Matic Valve and Manufacturing Corporation.

B. Design: Conform to AWWA C512 and as specified.

1. Valve shall be heavy-duty air and vacuum valve; sewer style.

2. Body and cover shall be ASTM 126 cast iron.

3. Float shall be ASTM A276 Type 316 stainless steel. Valve seats shall be Teflon or Buna-N.

4. All internal parts shall be stainless steel.

5. Single body construction built for 300 psi service.

6. Provide valves 3 inches and smaller with internal deflector and external adjustable discharge orifice to control leakage or blow-by of liquid.

7. Provide valves 4 inches and larger with internal surge check unit ahead of air/vacuum valve to ensure gentle closing upon.

C. Operation

1. Release air when filling line.

2. Admit air when emptying line.

3. Release accumulated air while pipeline is full and operating under pressure.

D. Connection

1. Connect air valves 2 inches and smaller to pipeline through ductile iron pipe service saddles with 304 SS straps. Corporation stops may be used of Mueller Company Style H-10003, H-10013, H-10045 or Engineer approved equal.

2. Connect air valves 3 inches and larger through tapped bosses or flanged outlets as indicated on drawings. Air vacuum valve inlet and outlet shall be provided with ANSI B16.1 125 psi flanged connections. Locate valve and vault either directly over pipeline or off to one side as indicated.

3. Connecting fittings and pipe shall be bronze, brass, or copper rated for 250 psi service.

5. Couplings or unions indicated between pipeline and air valve piping shall be insulated style.

6. Blowoff valves and shutoff valves with backflushing attachments shall be provided for all air valves.

E. Valve Schedule

As indicated on Drawings.

2.4 Surge Relief Valves

A. Acceptable Manufactures

1. G.A. Industries, Inc.

2. Or approved equal.

B. Operational Requirements

1. Valve shall be normally closed and shall open when the system pressure exceeds 135 psi.

2. Valve shall close at a slow speed to prevent hammer or pipeline shock.

C. Design

1. Valve shall be wye body configuration.

2. Flanges shall be ANSI B16.1, Class 125.

D. Materials and Construction

1. Valve body shall be ASTM A126 cast iron.

2. Valve seats and seat rings shall be renewable. Seats shall be resilient. Seat rings shall be bronze or stainless steel.

3. Disc movement shall be guided for proper alignment throughout its stroke and shall provide for full opening.

4. External springs shall be enclosed in protective casings and shall be in compression.

5. Provide two coats of the manufacturer's standard coating.

E. Valve Schedule

As indicated on Drawings.

2.6 Isolation Valves

A. Isolation valves shall be provided for all air/vacuum valves and pressure switches and shall be bronze gate valve, Crane No. 424 or Engineer-approved equal for sizes 3 inches and smaller unless otherwise noted. Isolation valves 4 inches and larger shall be flanged AWWA C504 butterfly valves.

2.5 Pipe Hangers and Supports

A. Pipe hangers and supports shall meet the requirements of Section 5, Chapter II of ANSI B31.1 and shall be types as given for MSS Standard Practice SP-58 and SP-69.

B. Constant Support, Spring and Rigid Hangers: Bergen, Blaw Knox, Fee and Mason, Grinnell, or NAVCO.

C. Pipe hanger and supports shall be of the types listed in Table 1 "Hanger and Support Selection," MSS Standard Practice SP-69 except that the following figure types given in Fig. 1 will not be acceptable: Types 5, 6, 11, 12, 7, 9, 10, and 25.

D. All hangers shall be stainless steel.

E. All hanger rods shall be stainless steel.

F. Concrete Inserts and Expansion Shields

1. Inserts shall be 316 stainless steel and have a recommended load capacity of 2,000 pounds per foot of length in average good concrete with a safety factor of 3.

2. Inserts shall be continuous and located as required.

3. Provide end caps at each end. End caps shall have attached anchor if spacing from end of insert to next anchor is greater than 2 inches.

2.6 Meters and Gauges

A. General

1. Provide all instruments, meters, gauges, and thermometers, complete with interconnecting stainless steel tubing, piping, valves, as specified and as indicated.

2. Provide gauge stainless steel cock in the piping for all instruments, meters, and gauges, both at point of takeoff and at the instruments, meters and gauges. Gauge cock shall be of the same design requirements as the lines they serve.

B. Indicating Pressure Gauges

1. Ashcroft "Duragauge," Crosby or Marsh.

2. Bourdon Tube

a. 160-psi maximum graduation: Stainless steel Grade A phosphor bronze, brazed joints stress relieved.

b. 200-psi to 800-psi maximum graduation: 316 stainless steel threaded.

3. Socket and Tip

a. 160-psi maximum graduation: 316 stainless steel.

b. 200 psi and over graduation: 316 stainless steel.

4. Case: High-impact glass-fiber-reinforced polypropylene, weatherproof with safety blowout discs or release back plate.

5. Ring: Bayonet-locking type.

6. Movement: All stainless steel mounted on socket with milled teeth on pinion and sector.

7. Dial: 6 inches, white laminated phenol with black markings.

8. Pointer: Aluminum with micrometer adjustment.

9. Accuracy: 1/2 of 1% over full range of scale.

10. Range: As required for the pressure range to be measured.

11. Mount all pressure gauges on rigid surfaces. Differential strainer gauges shall be line-mounted. Mount outdoor gauges on pump flange. Install an instrument needle valve with each gauge.

12. Be solid-front type recalibrated from back without removing dial.

13. Ashcroft Type 45-2464 with back connection for flush mounting on gauge boards.

14. Ashcroft Type 45-2462 with lower connection for differential strainer on line or pump-mounted gauges.

2.7 Valve Boxes

A. Acceptable Manufacturers

1. Clay and Bailey Manufacturing Company.

2. Dresser Industries, Inc.

3. Mueller Company.

4. Neenah Foundry Company.

5. Tyler Company.

B. Provide for all buried valves.

C. Design

1. Boxes shall be three-piece cast-iron screw type with 5-1/4-inch shaft.

2. Provide extension stem to bring operating nut within 2 feet of valve box top.

2.8 Shop Painting

A. Prepare surfaces and paint or coat all valves, corporation stops, and all related accessories to the standard of the manufacturer unless otherwise specified herein.

B. Paint and coatings shall be suitable for the service intended.

C. Submit type of paint or coating proposed with drawings and data for Engineer approval prior to fabrication.

PART 3 - EXECUTION

3.1 Installation

A. Comply with provisions of AWWA C600 and as specified.

B. Thoroughly clean and remove all shipping materials prior to setting. Operate all valves from fully opened to totally closed.

C. Equip with anchorage where indicated.

D. In accordance with Section 2560, Sewer Line Construction and Section 2550 Water Line Construction.

3.2 Field Painting

A. Manufacturer shall provide adequate coating system equal to shop coating for field touch-up.

3.3 Hangers, Supports and Anchors

A. General

1. The design, selection, spacing, and application of pipe hangers, supports, and anchors shall be in accordance with the codes and standards specified except the ANSI B31.1 - Code for Power Piping shall take precedence over the MSS SP-69 standard.

2. Hanger class and selection of components shall be in accordance with those specified.

3. Furnish and install all rigid and spring supports, whether or not they are shown and detailed, but are required to adequately support the piping systems.

4. Furnish and install for all pipe installed under this Contract.

5. Include all necessary structural aluminum or 316 stainless steel, brackets, concrete inserts, and similar items which are not a part of the building, or specified but required to properly support the piping systems.

6. Include necessary temporary supports, pins, and related items for the hydrostatic testing of any lines that are spring supported.

7. Install piping and provide necessary supports and anchors to prevent the forces and mounting imposed on Equipment from exceeding the limits specified by the Equipment manufacturer.

B. Adjustment

1. Prior to putting the piping systems into service, adjust all solid hangers to correct position and remove all temporary hangers used in erection and testing.

2. After and during the time the piping systems are being put into service, align all hanger rods to the vertical position.

C. **Hangers and Related Items not on Drawings:** Pipe hanger assemblies, anchors, and sway braces other than those indicated on the Drawings shall be designed, selected, and located by Contractor or hanger manufacturer in accordance with the following:

1. Make accurate weight balance calculations to determine the required supporting force on each hanger and to show the reaction and forces on Equipment on the Shop Drawings. Calculate expansion and movement of all pipe installed under this Contract and select hanger type and components to allow for pipe expansion and movement.

2. Submit detail Shop Drawings of each hanger assembly for review and comments.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement

A. No measurement will be made for this item.

4.2 Payment

A. Payment for Utility Valves and Accessories will be made at the contract lump sum price and shall be considered full payment for providing labor and materials to perform this work.

B. Progress payments for valves will be based on the Schedule of Values per valve for each size and type of valve and shall be considered as full payment for the valve in place including any fittings, flexible couplings, anchor and thrust blocks, hydrostatic testing, disinfection, plastic pipe wrap, trench excavation, bedding and backfill. No payment will be made until the hydrostatic testing and disinfection is satisfactorily completed.

**** END OF SECTION 2515 ****