

SECTION 15101

VALVES AND ACCESSORIES FOR LIFT STATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Valves and accessories for exposed, submerged and other types of piping for lift station.

1.02 REFERENCES

- A. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- B. AWWA C509 - Resilient Seated Gate Valves.
- C. AWWA C508 - Check Valves.
- D. AWWA C500 - Gate Valves.
- E. ASTM A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- F. ASTM A395 - Ductile Iron Castings.
- G. ASTM A48 - Gray Iron Castings.
- H. ASTM A193 - Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service.
- I. ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
 - 1. Valves and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least 5 years.
 - 2. Insofar as possible all valves of the same specific type shall be the product of one manufacturer.

1.04 SUBMITTALS

- A. Submit shop drawings and product data in conformance with all provisions and sections of these specifications.

B. Shop Drawings

1. Submit for review detailed drawings, data and descriptive literature on valves and appurtenances, including:

- a. Dimensions.
- b. Size.
- c. Materials of construction.
- d. Weight.
- e. Protective coating.
- f. Actuator weight, where applicable.
- g. Calculations for actuator torque, where applicable.
- h. Wiring diagram, where applicable.

2. Submit manufacturer's valve sizing calculations for verification of sizing for air release valves, air and vacuum valves, and surge relief valves.

C. Manufacturer's Certifications

1. Submit manufacturer's certificates of compliance with ANSI, AWWA and other listed standards.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01300 - Submittals.

B. Submit a detailed operation and maintenance manual for valves and appurtenances provided under this Section.

1.06 DELIVERY, STORAGE AND HANDLING

A. Have products delivered, stored and protected under provisions of Section 01600 - Material and Equipment.

B. Store valves and appurtenances off the ground in enclosed shelter.

PART 2 PRODUCTS

2.01 BASIC REQUIREMENTS

- A. Mark and identify valves in conformance with standards, these Specifications or to the manufacturer's standard.
- B. Bolts, studs and nuts to be Type 316 stainless steel.
- C. End connections of valves shall be flanged and drilled to ANSI Class 125 unless otherwise specified.
- D. For handwheel operators on valves 4 inches or larger where located more than 5 feet above the operating floor, provide chain and chainwheel or extension operators. Use chainwheels fabricated of malleable cast iron with chain guides. Provide stainless steel chains of a length to extend to within 5 feet of the operating floor.

2.02 CHECK VALVES

- A. Swing check valves 4-inches through 14-inches having a system pressure 30 psi or less, shall be air cushioned with side mount lever and weight. The valve shaft shall extend through both sides of the body with minimum shaft diameters equal to APCO Series 6000. The cushion shall be totally enclosed, swivel mounted at the bottom, and equipped with a micrometer air control valve and air breather filters. Valves shall be similar to APCO Series 6000, or approved equal.
- B. Swing check valves 10-inches through 14-inches having a system pressure greater than 30 psi shall be cushioned with side mount lever and weight. Valves shall be similar to APCO Series 6100, or approved equal.
- C. Swing check valves 16-inches and larger regardless of system operating pressure shall be cushioned with side mount lever and weight. Valves shall be similar to APCO Series 6100, or approved equal.
- D. Check valves of special design utilizing controlled closing of the disc, such as APCO Series 6000B (Bottom-Buffer) and Golden Anderson Fig. #25-DXH or approved equal shall be used when specifically indicated on the Drawings. These valves are special valves used to control the surge pressure in the force main upon multiple pump shutdown during a power failure. Other surge control check valves utilizing ball or cone valve and power cylinder operator may also be used as approved by the City Engineer.
- E. All check valves shall have 300 series stainless steel hinge shafts, stainless steel body seats and stainless steel resilient seat retainer rings.

2.03 GATE VALVES

- A. Gate valves 4 inches through 14 inches: Solid wedge type, with resilient nitrile rubber (Buna- N) tapered seat. Provide valves complying with AWWA C-509. Acceptable manufacturers include Mueller, M&H, AVK, or approved equal.

- B. Gate valves 16 inches and larger: Solid wedge type with bronze to bronze seating surface. Provide valves complying with the AWWA C-500. Acceptable manufacturers include Mueller, M&H, AVK, or approved equal.
- C. Supply gate valves rated as 200 psi water working pressure with 400 psi hydrostatic test for structural soundness for 2 inches through 12 inches and 150 psi water working pressure with 300 psi hydrostatic test for structural soundness for sizes 14 inches through 30 inches.
- D. Stems: OS&Y rising type manganese bronze having a minimum tensile strength of 60,000 psi, a minimum yield strength of 20,000 psi for valve sizes through 24 inches, and a minimum tensile strength of 80,000 psi, a minimum yield strength of 32,000 psi for valve sizes 30 inches and larger. All valves must open counter-clockwise.
- E. Valve Bodies: Cast iron conforming to ASTM A126 or ASTM A395. Fabricate internal trim parts of 300 series stainless steel.

2.04 ECCENTRIC PLUG VALVES

- A. Eccentric plug valves shall open counter-clockwise and be the non-lubricated eccentric type with cast iron bodies, resilient-faced plugs or replaceable resilient seats in the bodies.
- B. Operators: All valves for 4-inch and larger service shall have worm gear operators, nickel or stainless steel seats, and ANSI 125 psi flanged ends. Operators shall clearly indicate valve position. Operators on valves in submerged or buried service shall be lubricated and sealed to prevent entry of dirt and water into the operator.
- C. Resilient facing shall be suitable for the intended service.
- D. All shaft bearings shall be of stainless steel, furnished with permanently-lubricated bearing surfaces.
- E. Valves up to and including 20 inches in size shall have an unobstructed port area of no less than 80 percent of the full pipe area, and not less than 70 percent for larger valves.
- F. Eccentric plug valves shall be manufactured by Clow, De Zurik, Keystone, Val-Matic, or Victualic.

2.05 SEWAGE AIR RELEASE AND SEWAGE AIR AND VACUUM VALVES

- A. Air Release and Air and Vacuum Valves: Provide when shown on Drawings.
- B. Sewage Air Release Valve Design: See specifications Section 02642 Air Release and Vacuum Valves.

- C. Sewage Air and Vacuum Valve Design: See specifications Section 02642 Air Release and Vacuum Valves.
- D. Fit valve with blow off valves, quick disconnect couplings and minimum 6-feet of hose to permit back flushing after installation with dismantling valve.
- E. Provide air and vacuum valves equal to A.R.I. Flow Control Accessories Ltd.

2.06 SURGE RELIEF VALVES

- A. Surge Relief Valves: Provide when shown on Drawings.
- B. Operation: Surge relief valves shall protect piping systems from surges by opening quickly at a set pressure and throttling the flow to maintain line pressure at no more than 5 to 10 percent above the pressure setting indicated. Provide relief pressure adjustment by changing the tension on a spring holding the valve disc on its seat.
- C. Valve Closing Control: By oil dashpots. Oil shall be drawn into the dashpot from a reservoir when the valve opens and return through a flow control valve when the relief valve closes.
- D. Valve Construction: Fabricate valve bodies of cast iron with 300 series stainless steel seat rings. Provide seats that are renewable and resilient. Fabricate hinge shafts of stainless steel and the oil system of bronze. Unless otherwise indicated make the pressure setting 5 percent above normal line pressure.
- E. Provide surge relief valves that are 90-degree elbow body configuration. Acceptable manufacturers include APCO series 3000, A.R.I. Flow Control Accessories Ltd. 625-D, or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install valves and specialties in accordance with manufacturer's written instructions to permit intended performance.
- B. Support and anchor valves and gates in accordance with the Drawings.
- C. Eccentric plug valves shall be installed according to the following:
 - 1. Position the valves with the stem in the horizontal direction.
 - 2. In horizontal pipelines, position the valves so that the plug swings upward when opening to permit flushing of solids.

3. Orient the valves to prevent the valve bodies from filling up with solids when closed; however, orient the valves such that the pressure differential forces the plug against the seat in cases where the pressure differential across a closed valve will exceed 25 psi.

3.02 PAINTING

- A. Paint valves and specialties in accordance with applicable AWWA standards and with the Drawings.

3.03 TESTING

- A. Test valves using a hydrostatic pressure test in accordance with AWWA C-600.
- B. Test valves and specialties in place. Correct defects in valves, specialties or connections.

END OF SECTION