SECTION 15110 - SUPPLEMENTAL

AWWA BUTTERFLY VALVES AND ELECTRIC MOTOR OPERATORS

PART 1 - GENERAL

1.1 SCOPE. Specifications covers furnishing of 25 resilient seated Butterfly Valves and Electric Actuators of size 48 inch (600mm) diameter suitable for wastewater application.

AWWA butterfly valves shall be furnished complete with actuators and accessories as specified herein. The valve shall be designed for the rated working pressure of 250 psig minimum plus additional 40% for surge pressure.

1.2 GENERAL. Butterfly valves shall be of Resilient Seated, tight closing design and fully comply with the latest revision of AWWA Standard C504-06 and shall be supplied with floor mounts. The Valves shall be bi-directional with bubble-tight shut off at rated pressure, and shall be suitable for applications involving throttling service, ON/OFF service and for applications requiring valve actuation after long periods of inactivity.

The manufacturer shall have manufactured Resilient Seated butterfly valves for a period of at least ten years.

1.2.01 General Equipment Requirements. The General Equipment Stipulations in Master Specification Section 01180, Equipment, Materials, parts, and Tools shall apply to all equipment and materials furnished under this section.

1.2.02 Governing Standard. Except as modified or supplemented herein, all butterfly valves and manual actuators shall conform to the applicable requirements of ANSI/AWWA C504.

1.2.03 Marking. Supplementing the requirements of Section 6.1 of the governing standard, the country of origin of all castings and an identifying serial number shall be stamped on a corrosion-resistant plate attached to the valve body.

1.2.04 Temporary Number Plates. Each butterfly valve shall be tagged or marked in the factory with the identifying number listed in the Contract Documents.

1.2.05 Permanent Number Plates. All butterfly valves, except buried or submerged valves, shall be provided with a permanent number plate. The location of number plates and the method of fastening shall be acceptable to Engineer. Numerals shall be at least 1 inch (25 mm) high and shall be black baked enamel on anodized aluminum plate or as indicated in the Contract Documents.

1.3 SUBMITTALS. Complete drawings, details, and specifications covering the valves and their appurtenances shall be submitted in accordance with Master

Specification Section 01080, Project Submittals. Included in the submittal shall be drawings by the valve manufacturer to indicate the position of the valve actuator and valve shaft. Submittal drawings shall clearly indicate the country of origin of all ductile iron valve components.

The drawings shall include separate wiring diagrams for each electrically operated or controlled valve and the electrical control equipment. Each drawing shall be identified with the valve number or name as specified in this section.

Certified copies of test results as specified herein by Section 5 of ANSI/AWWA C504, with an affidavit of compliance as indicated in Section 1.7 of C504, shall be submitted to Engineer before the valves are shipped. Certified copies of physical and chemical test results shall be submitted for the materials of construction of valve components. Manufacturer shall submit certification that each valve and all appurtenances furnished is in accordance with the reference standards. Submit pressure, vacuum and temperature ratings of valve.

Contractor shall submit results of all pressure and leakage testing.

1.4 WARRANTY. For a period of one year from date of acceptance, or installation and final payment under this specification, the Contractor shall repair or remove and replace to the satisfaction of the Engineer without additional cost to the Owner, any and all parts which in the opinion of the Engineer prove defective either in design, material or workmanship and shall supply without charge any service required because of such defects.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS. Butterfly valves shall be limited to the manufacturers as specified herein. Sizes and styles for the manufacturers shall be limited as indicated, without exception:

Manufacturer

A. TYCO

B. DEZURIK

C. PRATT

D. VALVE-MATIC

2.2 MATERIALS. Except as modified or supplemented herein, materials used in the manufacture of butterfly valves shall conform to the requirements of ANSI/AWWA C504.

Acceptable shop coatings are listed in the following table.

Asphalt Varnish	Fed. Spec. TT-C-494
Epoxy Enamel (NSF certified systems)	Ameron “Amerlock 400 High-Solids Epoxy Coating”, Carboline “Carbogard 891”, Tnemec “Series N140 Pota-Pox Plus”, or approved equal, immersion service.
Epoxy Enamel (non-NSF certified)	Ameron “Amercoat 385 Epoxy”, Carboline “Carbogard 890”, Tnemec “Series 69 Hi-Build Epoxoline II”, or approved equal
Universal Primer	As recommended by the manufacturer and compatible with the field coating
Rust-Preventive Compound	As recommended by manufacturer

2.3 VALVE CONSTRUCTION.

2.3.01 Valve Design. The butterfly valve shall be of triple eccentric resilient seat and will fully comply with AWWA Standard C-504-06 having 30 inch long body, flanged of class 250B suitable for a maximum steady state fluid working pressure up to 150 PSI.

2.3.02 Valve Body. All valve bodies shall be cast ductile iron ASTM A536 Grade 65-45-12. Flange drilling shall be in accordance with ANSI B 16.47. Body wall thickness shall be in strict accordance with AWWA C504.

2.3.03 Flanges. Flanges shall be finished to true plane surfaces within a tolerance limit of 0.005 inch (125 µn). The finished face shall be normal to the longitudinal valve axis within a maximum angular variation tolerance of 0.002 inch per foot (0.017 percent) of flange diameter. Flanges shall be drilled and spot faced per ANSI B16.1, Class 250. The degree of smoothness of the flange faces shall be 125 RMS.

2.3.04 Mechanical Joint Ends. Mechanical joint ends shall be either mechanical joint or push-on ends conforming to ANSI/AWWA C111/A21.11.

2.3.05 Valve Shafts. All shafts shall be turned, ground, polished and constructed of AISI 321 or Type 316/316L stainless steel. Shafts shall be two-piece, stub type and keyed for actuator connection. Shaft diameters shall meet minimum requirements established by the latest revision of AWWA Standard C504 for their class, where applicable. Shafts shall be protected and be of the dry shaft design.

2.3.06 Valve Seats. Acceptable seating surfaces mating with rubber are AISI Type 316 stainless steel, or monel for all valves; bronze for 20 inch (500 mm) and smaller valves.

Seats shall be located on the valve body or disc as required. Valve seat configurations which rely on the mating pipe flange to hold the seat in position in the valve body will not be acceptable.

The valve seat shall be natural rubber or Buna-N that is certified compliant with NSF 61.

2.3.07 Valve Seat Ring. The body shall retain the third eccentricity by means of stainless steel 316 bolted in, mating seat ring and epoxy coating on valve interior (Wetted Ferrus Surfaces Only) meeting to AWWA standard C550. This third eccentricity shall ensure non-rubbing opening and closing action, torque closing instead of position closing functionality, and a whipping action whilst closing. In case of a stainless seat ring this ring shall be pressure tight by means of an O-ring chambered behind the seat ring.

2.3.08 Valve Seal. All seals shall be constructed of synthetic rubber compound such as Buna N or EPDM and suitable for bi-directional shutoff at rated pressure. Seals shall be retained in the valve disc by mechanical means with a retaining ring. Seals shall be a full 360 degrees circumference and replaceable without dismantling the actuator, disc or shaft and without removing the valve from the line. Actual tight shut off shall be achieved by given interference between the resilient disc seal and the body seat ring.

2.3.09 Valve Bearings. All butterfly valves shall be fitted with sleeve-type bearings. Bearings shall be of corrosion resistant and self-lubricating. Bearing load shall not exceed 1/5 of the compressible strength of the bearing or shaft material.

2.3.10 Valve Disc. All valve discs shall be constructed of cast ductile iron ASTM A536 Grade 65-45-12. Disc and shaft connection shall be made with stainless steel pins. Disc shapes shall be lens shaped. Optionally the disc should have the ability to be positively locked out mechanically with two retractable stainless steel rods against full line pressure. The retracted position of these rods should be externally visualized. The retraction devices need to be encapsulated and lockable. Optionally the valve requires an integrated device which enables the disc/shaft train to be movable in axial position for minimum in one direction and in opposite direction when the valve is in full open position. The device needs to be operated from the outside of the valve.

2.3.11 Rotation. The direction of rotation of the handwheel to open the valve shall be to the left (counterclockwise).

2.3.12 Valve Accessories. The Valve shall be supplied with Floor mounting bracket shall be made of Ductile Iron.

2.4 ELECTRIC MOTOR OPERATORS. Valve actuators shaft shall conform to AWWA Standard C504 and shall be designed to hold the valve in any intermediate position between full open and fully closed without creeping or fluttering. Electrical actuators shall be Multiturn type.

2.4.01 Manufacturers

- Limitorque. L120-85 with PT Series PTA-120 worm gear actuator.
- Rotork. A Range with Type IW or Type IWS worm gear actuator.
- Auma. SABV07.1 through SABV48.1, EIM Series M/MG.

2.4.02 Enclosure. NEMA 4X.

2.4.03 Power Supply. As scheduled in the Contract Drawings.

2.4.04 Space Heaters. Provide in motor and control enclosures for condensation control during normal operations.

Minimum Rating: 10 watts, 120 volts.

During storage, connect heaters to 120 volt power supply

2.4.05 Design Parameters: Design to allow operator to be mounted and removed without unloading operated stem, and to allow operation of stem without actuator operator.

2.4.06 Valve Position Indication:

Electronically monitored indicator.

Open, closed, and mid-position stamped on enclosure.

Provide a stainless steel band graduated in 10 percent increments and fastened to actuator operator.

2.4.07 Limit Switches: Provide a minimum of four limit switches, with at least two reserved for remote indication of valve position.

SPST contacts rated for 10 amperes at 120 VAC.

Factory set to the full open and full closed position, adjustable with power applied to any point between or beyond full open and full closed position.

2.4.08 Local Controls: Provide each actuator operator with “Local-Remote” selector switch and “Close-Hold-Open” control pushbuttons.

The control switches shall be of the heavy duty; industrial type rated 10 amperes at 600 volts.

Provide 10 Amps, 120 AVC rated dry type output contact to close when “Remote” selection is selected for remote monitoring.

Include high intensity LED indication lights for the following:

- Red for open position.
- Green for closed position.
- Both lit during intermediate travel.

2.4.09 Complete Operator Assembly: The electric valve operator shall consist of a motor, reduction gearing, limit switches and all other accessories required providing satisfactory operation of the valve.

The operator and all accessories shall be enclosed in watertight housings, which shall effectively withstand a water spray from any angle for a period of not less than one hour.

The operator and any required extension shall be mounted directly on the valve.

2.4.10 Handwheel. The operator shall be equipped with a handwheel for manual operation.

All reduction gearing in the operator shall run in an oil bath or shall be grease lubricated.

Ball or roller bearings shall be used throughout.

The location and type of bearings used to handle thrust load of the electric operator shall be approved by the Engineer.

A handwheel for manual operation shall be attached to the operating shaft.

Operation of the handwheel in a counter-clockwise direction shall open the valve.

A direction arrow with the word “OPEN” shall be cast on the handwheel.

2.4.11 Operation From Intermediate Position: The valve operator shall be designed to operate the valve from and/or to any intermediate position and shall be of sufficient size and rating to open and close the valve under any condition of operation.

2.4.12 Reduction Gearing The reduction gearing shall be made of steel or bronze and shall be rated to withstand safely at least twice the forces required to operate the valve at its rated unbalanced working pressure.

2.4.13 Motor. The motor shall be of the high torque, low starting current, reversing, squirrel cage, three (3) Phase continuous duty designed specifically for valve operation service and shall be in conformity with all applicable requirements of current NEMA and ANSI Standards.

The motor current shall not exceed the nameplate rating under any condition of operation of the valve.

The motor shall be designed for a temperature rise not to exceed that permissible for the insulation used in accordance with ANSI Standards.

The motor shall have ball bearings and shall be equipped with grease seals.

RPM of the motor shall not exceed 1800.

2.4.14 Torque Switches The operator shall be equipped with an approved device designed to limit the force applied to the valve.

Provide four SPST, 10 Amps, 120 VAC rated output contact to monitor valve overtorque condition.

This device shall be adjustable and shall be designed to protect the valve from damage during the entire operating cycle.

2.4.15 Transfer from Motor Operation to Manual Operation

A mechanical shifting device of approved design shall accomplish the transfer from motor operation to manual operation.
Manually operated electrical interlock shall be provided which shall prevent electric motor operation unless the interlock is operated.

The setting of the operator for motor or manual operation shall be clearly indicated.

The manual operating handwheel shall not rotate during electric motor operation.

2.4.16 External Connection Provisions:

All wiring for external connection shall be terminated at terminal blocks except those terminal studs may be used for motor leads.

The terminal blocks shall be made of molded plastic with integral barriers between terminals.

Terminal screws shall be made of brass with machine threads.

The terminal blocks shall be equipped with white marking strips, which shall be marked as shown on the drawings.

2.4.17 Enclosure Location/Conduit Provisions

The enclosures housing the electrical components shall be attached to the side of the operator at locations as approved by the Engineer.

The enclosure housing the terminal blocks shall be drilled and tapped for two 1½-inch (40 mm) conduit connections.

The conduit openings shall be so located that there will be an unobstructed access for conduit connection after installation of the operator.

2.4.18 Operators for Open/Close Service

Accept and latch momentary OPEN and CLOSE dry contacts for the purpose of driving the valve to one of the two extreme ends of travel. Mid-travel positioning is not available in the remote control mode.

Motor:

- Three-Phase Actuators Operators: Three-phase, AC, induction motor. Include self-correcting circuitry or lock-out circuitry for protection against out-of-phase rotation.
- Size for a minimum of 1.5 times the required actuator torque.

Motor Controller: Electrically interlocked OPEN and CLOSE contactors rated for 60 starts per hour.

2.5 PAINTING. All surfaces of the valve shall be clean, dry and free from grease before applying paint or coating. Coating to be NSF 61 approved (Ameron 2). The valve interior and exterior surfaces, except for the seating surfaces, shall be provided with the manufacturers standard unless otherwise specified by contract.

2.6 TESTING. Hydrostatic and leakage tests shall be conducted in strict accordance with AWWA Standard C504.

2.7 PROOF OF DESIGN. The manufacturer furnishing the valves and gear units under the specification shall be prepared to show that the valves provided meet the design requirements of AWWA Standard C504.

2.8 SPARE PARTS. The following spare parts shall be provided.

1. (1) Complete valve / electric actuator Unit
2. (4) Seal Rings
3. (4) Radial bearings
4. (4) Packing and O-Ring Kits
5. (2) Torque Switches
6. (2) Complete Shaft
7. (4) Complete maintenance kit including gasket, seal, bearing, fasteners, (4)

limit switches

PART 3 - EXECUTION

3.1 INSTALLATION. Valves will be installed in accordance with Master Specification Section 15010, Valve Installation.

3.1.01 Installation Check. An experienced, competent, and authorized representative of the manufacturer shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. The representative shall be present when the equipment is placed in operation in accordance with Master Specification Section 01180, Equipment, Materials, Parts, and Tools and shall revisit the job site as often as necessary until any problems are corrected and the equipment installation and operation are satisfactory in the opinion of Engineer.

The manufacturer's representative shall furnish a written report certifying that the equipment has been properly installed and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping and appurtenances; and has been operated under full load conditions and that it has operated satisfactorily.

End of Supplemental Section

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