

SECTION 1019 VALVES AND APPURTENANCES

Delete this Section in its entirety and replace with the following:

SECTION 1019 VALVES AND APPURTENANCES

1019-1 GENERAL: Valves shall have manufacturer's name and pressure rating cast in raised letters.

- a. All valves to include operator, actuator (handwheel, chain wheel, extension stem, floor stand, or operating nut), chain, wrench, and accessories to allow a complete operation from the intended operating level.
- b. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.
- c. Valve same size as adjoining pipe, unless otherwise called out on the Drawings or in the Supplements.
- d. Valve ends to suit adjacent piping.
- e. All valves shall have no leakage (drop-tight) in either direction at the valve rated design pressure unless otherwise allowed for this section or in the stated valve standard.
- f. Size operators and actuators to operate valve for the full range of pressures and velocities.
- g. Valve to open by turning counterclockwise.
- h. Factory mount operator, actuator, and accessories.
- i. Buried valves shall have mechanical joint ends and 3-piece cast iron valve boxes. Box shall have a 2-piece screw-type barrel with a 5-1/4-inch shaft. Upper section shall have a flanged bottom and cast iron cover with the word "SEWER" cast in raised letters. One 6-foot long T-handle wrench with 2-inch square nut end shall be provided for each project. Boxes not in pavement shall be set in a 4-inch thick, 2-foot square concrete slab.
- j. Exposed valves whose operator is five (5) feet or higher above surface from which valve will be manipulated shall be furnished with chainwheel operators.

1019-2 MATERIALS:

- a. Bronze and brass valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.
- b. Approved alloys are of the following ASTM designations: B61, B62, B98/B98M (Alloy UNS No. C65100, C65500, or C66100), B139 (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
- c. Stainless steel Alloy 18-8 may be substituted for bronze.

1019-3 FACTORY FINISHING:

- a. Epoxy Lining and Coating:
 1. Use where specified for individual valves described herein. Lining in accordance with AWWA C550 unless otherwise specified. Coating to be the same material and application process as the lining.
 2. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as "fusion" or "fusion bonded" epoxy.
 3. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.

1019-4 GATE VALVES:

- a. **Gate Valve 3 Inches and Smaller (Non-rising Stem):** All-bronze, screwed bonnet, packed gland, single solid wedge gate, Class 125 rated 200 psi CWP, complies with MSS SP-80 Type 1.
- b. **Gate Valve 3 Inches and Smaller (Rising stem):** All-bronze, screwed bonnet, packed gland, single solid wedge gate, Class 125 rated 200 psi CWP, complies with MSS SP-80 Type 2.
- c. **Resilient Seated Gate Valve 3 Inches to 36 Inches:** Ductile iron body, resilient seat, bronze stem and stem nut, ANSI Class 125 flanged ends, non-rising stem, in accordance with AWWA C509 or AWWA C515, full port, fusion-epoxy coated inside and outside per AWWA C550, NSF Standard 61 certified where used for potable water service.
- d. **Resilient Seated Gate Valve 3 Inches to 36 Inches, for Buried Service:** Ductile iron body, resilient seat, bronze stem and stem nut, mechanical joint ends, non-rising stem, in accordance with AWWA C509 or AWWA C515, 2-inch operating nut, full port, fusion epoxy coated inside and outside per AWWA C550, NSF Standard 61 certified where used for potable water service.

1019-5 PLUG VALVES: Valves shall be full port (100% port area), nonlubricated eccentric type with resilient faced plugs as manufactured by Val-matic, or approved equal. Valves shall be in accordance with AWWA C 517. Valves shall be epoxy lined and coated. Minimum pressure rating shall be 175 psi for less than 14" valves; 150 psi for valves 14" and larger.

- a. Flanges shall be faced and drilled to ANSI 125/150-lb standard; mechanical joint ends shall conform to AWWA C 111 or C 153; and threaded ends shall be NPT.
- b. Body shall be cast iron conforming to ASTM A 126, Class B or ductile iron. Plug cast iron with round or rectangular port of no less than 100% of connecting pipe area and coated with Buna-N and seats welded nickel.
- c. Plug stem shall be of one-piece construction and made of ASTM A126 Class B Cast Iron or ductile iron with a resilient facing per ASTM D2000-BG and ANSI/AWWA C 517 requirements. Radial shaft bearings shall be of self-lubricating type 316 stainless steel. The top thrust bearing shall be Teflon. The bottom thrust bearing shall be Teflon or Type 316 stainless steel or bronze, stem seal multiple V-rings, or U-cups with O-rings of nitrile rubber, grit seals on both upper and lower bearings. Cover Bolts shall be corrosion resistant with zinc plating.

- d. Buried valves shall have valve boxes as specified in Subsection 1019-1.i and shall have a remote position indicator in valve box showing position of valve. A stainless steel or aluminum centering and I.D. plate shall be provided showing direction of opening and number of turns to open for each valve.
- e. Buried or submerged valves and actuators shall have sealed shafts and watertight gasketed housing covers.

1019-6 CHECK VALVES:

- a. **Rubber Flapper Swing Check Valves:** Valves shall be Val-matic Series 500A, GA Fig 200BF, or approved equal rubber flapper type with long body, flanged ends (ANSI B16.1, Class 125) and minimum 150-lb pressure rating. Valves shall be epoxy lined and coated.
 - 1. The valves shall be designed, manufactured and tested in accordance with AWWA C508.
 - 2. The valve body shall have full flow equal of nominal pipe diameter at any point through the valve. The seating surface shall be on a 45-degree angle to minimize disc travel. The top access port shall be full sized to allow removal of the disc without removing the valve from the pipeline.
 - 3. The disc shall be of one-piece construction, precision molded with an integral o-ring type sealing surface that contains steel and nylon reinforcements.
 - 4. Backflow capabilities shall be provided by means of a screw type backflow actuator. The valve will be provided with proximity switch to detect valve position, equipped with EYS conduit seal fitting.
 - 5. The valve body and cover shall be ASTM A126, Class B cast iron or ductile iron. The disc shall be Buna-N, ASTM D2000-BG.
 - 6. The valve shall be cycle tested 1,000,000 times with no sign of wear or distortion to the valve disc or seat.

1019-7 QUICK CONNECT COUPLINGS: Couplings shall be Dover Corporation OPW Division Model 733-DL (threaded, 2" and less) or 733-LDS (flanged, 2-1/2" to 4") coupler with Model 634A plug.

1019-8 COMBINATION AIR VALVE: Valves shall be suitable for sewage service; combine the operating functions of both an air and vacuum valve and an air release valve. The air and vacuum portion shall automatically exhaust air during filling of a system and allow air to re-enter during draining or when a vacuum occurs. The air release portion shall automatically exhaust entrained air that accumulates in system. Single body unit with air and vacuum valve and an air release valve in a single housing.

- a. Rated working pressure of 150 psi.
- b. Materials:
 - 1. Body:
 - i. 3" and smaller valves shall be cast-iron, ductile iron, 316 stainless

- steel, or reinforced nylon body and covers,
- ii. 4" and larger valves shall be 316 stainless steel body and covers.

- 2. Internals: 316 stainless steel or corrosion resistant composite materials.
- c. 3" and smaller valves shall be NPT screwed inlet connection and 4" and larger valves shall be ANSI Class 125 flanged inlet connections.
- d. The valve shall be supplied with back flushing attachments including hose assembly, nipples, gate valves, and quick couplings.
- e. Fitted with body blowoff valve.
- f. Manufacturers:
 - 1. A.R.I. USA, Inc.;
 - 2. Val-Matic Valve;
 - 3. Or equal

1019-9 CORPORATION STOPS: Corporation stops shall be 3/4" Mueller Company H-15029 for 100 psi test pressure.

1019-10 FLANGE ADAPTER COUPLINGS: Couplings shall be Dresser Company Style 128W, 150 psi pressure rating. Victaulic adapters may be used in lieu of Dresser couplings.

1019-11 FLEXIBLE COUPLINGS: Flexible couplings shall be either split type or sleeve type.

- a. Split couplings shall be used with interior piping and, when specified, with exterior piping.
 - 1. Couplings shall be mechanical type for radius groove piping. Couplings shall mechanically engage and lock grooved pipe ends in a positive couple and allow for deflection, contraction and expansion.
 - 2. Couplings shall consist of ASTM A47, Grade 32510 iron housing clamps in 2 or more parts, a chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and 2 or more oval track head bolts with hexagonal nuts conforming to ASTM A 183 to assemble clamps.
- b. Victaulic type couplings may be used in lieu of flanged joints for non-buried applications only.
 - 1. Pipes shall be radius grooved as specified for use with couplings.
 - 2. Flanged adapter connections shall be Victaulic Vic Flange Style 741.
- c. Sleeve couplings used with buried piping shall be Dresser Style 38 or Style 40 with high strength low alloy steel bolts and nuts. Steel shall meet AWWA Standard C111. Couplings shall be furnished with pipe stop removed and gaskets of a composition suitable for exposure to domestic sewage.
- d. Where indicated on the Drawings, flexible couplings shall consist of a ductile iron spool piece with mechanical joint ends and restrained follower glands, EBBA Iron or

equal, to provide thrust restraint at the joint.

1019-12 DIAPHRAGM SEALS: Diaphragm seals shall be installed on pressure gage or pressure switch connections where specified.

- a. Seal shall be thread attached to piping and pressure sensing devices. Seals shall be 316 stainless steel, with neoprene sleeve and ethylene glycol and water fill. Seals shall be 2 inch size and shall be mounted with a 2 inch isolation ball valve on the pipeline side and have a 3/4 inch flushing ball valve on the opposite side. Seals shall be Red Valve series 42 (horizontal mount) or series 742 (vertical mount). The pressure sensing device(s) shall be factory mounted.
- b. Full circle sensing seals that insert between adjacent pipe flanges, such as Red Valve Company Series 40 Flanged Sensor, may be used in lieu of seal specified above. The pressure sensing device shall be factory installed on the seal.

1019-13 UNIONS: Unions for pipe less than 2 1/2" shall be galvanized malleable iron, 150-lb class. Unions for 2 1/2" or larger pipe shall be flange pattern, galvanized, 125-lb class. Unions shall be gasketed.

1019-14 MECHANICAL WALL SEALS: Seals shall consist of an adjustable modular bolted, synthetic rubber and plastic sealing element. Sealing element shall be Thunderline Corporation Link-Seal. Hardware shall be for corrosive service. Sleeves for use with seals shall be Schedule 40 steel pipe with waterstop approximately 2" wide and 1/4" thick welded around periphery of pipe and galvanized.

1019-15 HOSE END FAUCETS: Faucets for potable water shall be Zurn Model Z-1385 with removable key.

1019-16 PRESSURE GAGES: Each pressure gage shall be direct mounted, fiberglass reinforced polypropylene case, glycerine filled, with a 4 1/2" diameter dial with a clear acrylic window, 3/8" shut-off valve, and a bronze pressure snubber. Provide diaphragm seals between shut-off valve and pressure gage on lines with non-nuclear matter in suspension or solution. Gages shall be weatherproofed. Face dial shall be white finished aluminum with black graduations and figures and shall be dual scale (psi and ft of H₂O).

Each suction or discharge line shall have H.O. Trerice Company Series 450 gages of minimum sizes as follows with changes required by pump shutoff head shown on pump station data table for each installation:

<u>Pump</u>	<u>Suction</u>	<u>Discharge</u>
Centrifugal	-15 (-35) to 15 (35) psi (ft)	0 to 60 (138) psi (ft)
Submersible	_____	0 to 60 (138) psi (ft)

1019-17 REDUCED PRESSURE BACKFLOW PREVENTERS: Reduced pressure principle backflow preventers shall be listed by the University of Southern California – Foundation for Cross Connection Control and Hydraulic Research (USC-FCCCHR) as having met the requirements of ASSE 1013 and ANSI/AWWA C511. A Watts Model 909 QTS backflow preventer or approved equal shall be provided on potable water supply to pump station, and shall have a strainer and ball type isolation valve.

1019-18 DIAPHRAGM AND FLAP CHECK VALVES: These valves are for use on wet well end of valve pit drain piping. Diaphragm check valves shall be Red Valve Series TF-2. Compression

bands for attaching valves shall be stainless steel. Flap valves shall be Clow Figure No. F-3016.

1019-19 OPERATORS AND ACTUATORS:

a. Manual Operators:

1. General:

- i. For AWWA valves, operator force not to exceed the requirements of the applicable valve standard. For non-AWWA valves, operator force not to exceed applicable industry standard or 80 pounds, whichever is less, under any operating condition, including initial breakaway. Provide gear reduction operator when force exceeds requirements.
- ii. Operator self-locking type or equipped with self-locking device.
- iii. Position indicator on quarter-turn valves.
- iv. Worm and gear operators one-piece design worm-gears of gear bronze material. Worm hardened alloy steel with thread ground and polished. Traveling nut type operator's threaded steel reach rods with internally threaded bronze or ductile iron nut.

2. Exposed Operator:

- i. Galvanized and painted handwheels.
- ii. Cranks on gear type operators.
- iii. Chain wheel operator with tiebacks, extension stem, floor stands, and other accessories to permit operation from normal operation level.
- iv. Valve handles to take a padlock, and wheels a chain and padlock

3. Buried Operator:

- i. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut.
- ii. Buried operators on valves 2 inches and smaller shall have cross handle for operation by forked key.
- iii. Where the depth of the valve is such that its centerline is more than 3 feet below grade, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover. Extension stem shall be pinned to the operating nut; set screws are not acceptable.
- iv. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
- v. Design buried service operators for quarter-turn valves to withstand

450 foot-pounds of input torque at the FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi.

b. Electric Motor Actuators (when specified on the Drawings):

1. Electric Motor Actuators shall be provided for each plug valve at the specified pump stations.

- i. The actuators will comply with the latest version of AWWA C542.
- ii. The actuators will be sized to 1 -1/2 times required operating torque. Motor stall torque not to exceed torque capacity of valve.
- iii. Controls integral with the actuator and fully equipped as specified in AWWA C542.

2. Actuator Operation – General

- i. Suitable for full 90-degree rotation of quarter-turn valves.
- ii. Provide manual override option.
- iii. Open/close indication.
- iv. Operate from FULL CLOSED to FULL OPEN positions or the reverse in 30 seconds.

3. Modulating (M) Service:

- i. Size motors for continuous duty.
- ii. Feedback potentiometer, or equivalent, and integral electronic positioner/comparator circuit to maintain valve position.
- iii. HAND-OFF-AUTO (Local-Off-Remote) Selector Switch, padlockable in each position:
 - A. Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control valve in HAND (Local) position.
 - B. 4 to 20 mA dc input signal to control valve in AUTO (Remote) position.
 - C. Auxiliary contact that closes in AUTO (Remote) position.
 - D. Valve shall open upon loss of signal, unless otherwise indicated.
- iv. Ac motor with solid state reversing starter or dc motor with solid state reversing controller, and built-in overload protection. Controller capable of 600 starts per hour.

4. Actuator Power Supply:

- i. 480 volts, three-phase, or 240 volts, three-phase, as indicated on the drawings.
 - ii. Control power transformer, 120-volt secondary.
 - iii. Externally operable power disconnect switch.
- 5. Enclosure:
 - i. As defined in NEMA 250, Type 7.
 - ii. Contain 120-volt space heaters, if required to prevent condensation.
- 6. Limit Switch:
 - i. Single-pole, double-throw (SPDT) type, field adjustable, with contacts rated for 5 amps at 120 volts ac.
 - ii. Each valve actuator to have a minimum of two auxiliary transfer contacts at end position, one for valve FULL OPEN and one for valve FULL CLOSED.
 - iii. Housed in actuator control enclosure.
- 7. Manufacturer and Product: Flowserve Limatorque; Model LY or approved equal.