

SECTION 15105 - CHECK VALVES

City of San Diego, CWP Guidelines

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing check valves of the types and sizes indicated with epoxy coating, appurtenances, and accessories.

1.2 RELATED SECTIONS

- A. The WORK of the following Section applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

- 1. Section 15100 Valves, General

1.3 FACTORY TESTING

- A. Valves shall be tested in compliance with AWWA C506, AWWA C508, and Section 15100.
- B. Proof-of-design tests shall be submitted in compliance with Section 15100 for all check valves size 10-inch and larger.

PART 2 - PRODUCTS

2.1 SWING CHECK VALVES (3-INCH AND LARGER)

- A. **General:** Except as otherwise indicated, swing check valves designed for water, sewage, sludge, and general service shall be of the outside lever and spring or weight type, complying with AWWA C 508, and full-opening; valves shall be designed for a water-working pressure of 150 psi and shall have a flanged cover piece designed to provide access to the disc. Corrosive surfaces of valves, 4-inch and larger, intended to be in contact with water, shall be epoxy-coated complying with Section 09800.
- B. **Body:** The valve body and cover shall be fabricated with cast iron conforming to ASTM A 126, with flanged ends conforming to ANSI B 16.1, or mechanical joint ends, as indicated.
- C. **Disc:** The valve disc shall be fabricated of cast iron, ductile iron, or bronze conforming to ASTM B 62.
- D. **Seat and Rings:** The valve seat and rings shall be fabricated of bronze conforming to ASTM B 62 or B 148, or of Buna-N.
- E. **Hinge Pin:** The hinge pin shall be fabricated of bronze or stainless steel.
- [F. **Proximity Switch:** A proximity switch shall be provided to indicate when the disc is closed.

2.2 SWING CHECK VALVES (2-1/2-INCH AND SMALLER)

- A. **General:** Swing check valves intended for steam, water, oil, or gas in sizes 2-1/2-inch and smaller shall be designed for a steam pressure of 150 psi and a cold water pressure of 300 psi. They shall have threaded ends and caps.
- B. **Body:** The valve body and cap shall be fabricated of bronze conforming to ASTM B 61 and with threaded ends complying with ANSI/ASME B1.20.1.
- C. **Disc:** Valves designed for steam service shall have bronze discs, and valves designed for cold water, oil, and gas service shall have replaceable composition discs.
- D. **Hinge Pin:** The hinge pins shall be fabricated with bronze or stainless steel.

2.3 INTERNAL SPRING-LOADED CHECK VALVES (GLOBE STYLE)

- A. **General:** Internal spring-loaded check valves designed for water pumps, compressors, gas, air, and steam shall be of the full-flow internal spring-loaded poppet type. The valves shall be designed for a water-working pressure of not less than 150 psi unless otherwise indicated. Corrosive ferrous surfaces of valves 4-inch and larger shall be epoxy-coated complying with Section 09800.
- B. **Body:** Bodies of valves in sizes 3-inch and larger shall be fabricated of cast iron with 125-lb flanged ends conforming to ANSI B 16.1 unless otherwise indicated. Valves shall include positive, watertight seal between the removable seat and valve body and the stem guide shall be integrally cast with the body or screwed into the body.
- C. Valves smaller than 3 inches shall have bronze bodies suitable for the intended use with threaded ends conforming to ANSI/ASME B 1.20.1, suitable for a minimum working pressure of 200 psi, and temperature of 250 degrees F, unless otherwise indicated.
- D. **Disc and Stem:** The disc and stem of valves in sizes 3-inch and larger shall be fabricated with bronze or stainless steel. The stem shall have two-point bearings with the downstream bearing fabricated of bronze or other suitable bushings designed to provide smooth operation.
- E. Valves smaller than 3 inches shall have discs and retaining rings of Teflon, Nylon, or other suitable material, and stems of bronze, brass, or stainless steel suitable for the intended service.
- F. **Seat:** Valves for general service at temperatures up to 250 degrees F shall have bubble-tight shut-off with resilient seats of Buna-N, Teflon, or other suitable material. Valves for steam service and temperatures over 250 degrees F shall have metal-to-metal seating of bronze or stainless steel, as recommended by the manufacturer for the specific service condition. Resilient seats shall be firmly attached to the seating ring by compression-molding or other acceptable method.
- G. **Spring:** Valves in sizes 3-inch and larger shall have stainless steel springs, and valves smaller than 3-inch shall have stainless steel or beryllium copper springs and be suitable for the service. The spring tension of the valves shall be designed for the individual pressure condition indicated for each valve.

2.4 DOUBLE-LEAF CHECK VALVES

- A. **General:** Double-leaf check valves intended for air and gas service and where indicated, shall be of the wafer-type designed to fit between ANSI B16.1 flanges rated at 125-lb. The check valve leaves shall be spring-loaded. Flow from one direction shall cause the valve to open, and upon valve shutoff, the spring shall shut the valve leaves before reverse flow starts and at a point of zero velocity, with non-slam closure. The spring-tension of each valve shall be designed for the individual operating condition.
- B. **Body:** The valve body shall be fabricated of cast iron with integrally-cast seat, rated for minimum 150-lb working pressure at up to 250 degrees F.
- C. **Leaves:** The leaves shall be of bronze, aluminum bronze, or ductile iron, revolving on stainless steel or monel hinge pins with retainers.
- D. **Seat:** The valves shall have resilient seats designed for bubble-tight shut-off suitable for temperatures up to 250 degrees F without sticking. The seats shall be Buna-N, Viton, or other material suitable for the intended purpose. The seat rings shall be firmly attached to the body or disc by compression-molding or proper method.
- E. **Springs:** The springs shall be of Type 316 stainless steel, or Inconel and recommended by the manufacturer for use in the service indicated.

2.5 SLANTING DISC CHECK VALVES

- A. **General:** Slanting disc check valves intended for water and sewage service shall have a seating angle of approximately 55 degrees. Valves shall have replaceable seat rings and disc rings. The water passage cross-sectional area shall be equal to the full pipe area. Valves shall have sufficient clearance around the pivot pins to permit free seating of the disc without binding and shall not stick in the closed position. Slanting disc check valves shall have position indicators [with electrical signal switches for indication of disc position] and two flanged connections for attachment of dashpots or hydraulic snubbers. The valves shall be designed for a water working pressure of 150 psi, except as otherwise indicated.
- B. **Body:** The valve body shall be fabricated with cast iron conforming to ASTM A 48 or A 126, class B, with flanged ends conforming to ANSI B 16.1, class 125 unless otherwise indicated.
- C. **Disc:** The valve disc shall be designed with an "aerofoil" configuration of cast iron or ductile iron, with bronze seating face, except that valves 10 inches or smaller shall have solid bronze or aluminum bronze discs. Discs shall be partially balanced with a short travel, designed to resist slamming.
- D. **Seat Ring:** The seat ring shall be fabricated with centrifugally cast bronze, aluminum bronze, or stainless steel, with beveled edges, and be firmly clamped or screwed into the valve body.
- E. **Pins:** The pivot pins and bushings shall be fabricated with stainless steel, bronze, or aluminum bronze, designed to allow free movement of the disc without binding.
- F. **Dashpot:** A [top] [bottom] mounted hydraulic dashpot shall be provided to control the opening and closing cycle of the valve to prevent surge and water hammer. The dashpot shall have two control flow rates: (1) 90 percent rapid rate and (2) 10 percent slow rate during shutdown and startup. Each rate shall be independently adjustable. The dashpot shall be a self contained oil system separate and independent from the water line media. The oil reservoir for the closing cycle shall be stainless steel and open to the atmosphere with an air breather

cap to prevent oil spillage. The oil reservoir for the opening cycle shall be stainless steel and hermetically sealed to contain pressure (air over oil) and be equipped with a 3-inch diameter pressure gauge and pneumatic fill valve.

2.6 PLASTIC BALL CHECK VALVES

- A. **General:** Plastic ball check valves designed for corrosive fluids, in sizes up to 4-inch, shall be used for vertical upflow conditions only, unless the valves include spring actions.
- B. **Construction:** The valve bodies and balls shall be fabricated with polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), polyvinylidene fluoride (PVDF), or polypropylene (PP) and recommended by the manufacturer for the service indicated. Valves shall include unions with socket connections, or flanged ends conforming to ANSI B16.5, class 150. Seals shall have Viton O-rings and valve design shall minimize possibility of the balls sticking or chattering. Valves shall be suitable for a maximum working non-shock pressure of 150 psi at 73 degrees F.

2.7 PLASTIC SWING CHECK VALVES

- A. **General:** Plastic swing check valves intended for corrosive fluids, in sizes up to 8 inches, may be used for either horizontal or vertical upflow conditions.
- B. **Construction:** Valve bodies and discs shall be fabricated with PVC, PP, or PVDF and recommended by the manufacturer for use in the service indicated. Valves shall have flanged ends conforming to ANSI B16.5, class 150, and flanged top access covers, and shall be designed for positive shut-off at no-flow conditions. Seats and seals shall be EPDM, Teflon, or Viton. PVC valves shall be rated for a maximum non-shock working pressure of 150 psi at 73 degrees F for sizes 3-inch and smaller. For larger sizes and other materials and temperatures the pressure rating will be recommended by the manufacturer for use in the service indicated.

2.8 MANUFACTURERS

- A. Check valves shall be manufactured by the following (or equal):

- 1. Swing check valves (3-inch and larger):

American-Darling Valve Co.
APCO (Valve and Primer Corp.)
Kennedy Valve Mfg. Co. (ITT Grinnell)
Mueller Company
Stockham Valves and Fittings

- 2. Swing check valves (2-1/2-inch and smaller):

Milwaukee Valve Company
Stockham Valves and Fittings
Wm. Powell Company

- 3. Internal spring-loaded check valves (globe-style):

APCO (Valve and Primer Corp.)

CPV (Combination Pump Valve Company)
Miller Valve Co., Inc.
VAL-MATIC (Valve and Manufacturing Corporation)

4. Double-leaf check valves:

APCO (Valve and Primer Corporation)
TRW Mission Manufacturing Company
VAL-MATIC (Valve and Manufacturing Corporation)

5. Slanting disk check valves:

APCO (Valve and Primer Corporation)
Crane Company
VAL-MATIC (Valve and Manufacturing Corporation)

6. Plastic ball valves:

ASAHI-AMERICA
Harrington Industrial Plastics, Inc.
NIBCO Inc. (Chemtrol)

7. Plastic swing check valves:

ASAHI-AMERICA
Harrington Industrial Plastics, Inc.

PART 3 - EXECUTION

3.1 GENERAL

- A. Valves shall be installed in accordance with Section 15100.

** END OF SECTION **