STANDARD SPECIFICATION SECTION 15112 BACKFLOW PREVENTION ASSEMBLIES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of backflow preventer assemblies and detector check assemblies. Assemblies shall be installed at the locations as shown on the Drawings or as established in the field by the District's Representative. The District will perform the initial test of the completed assembly to certify the installation. Future maintenance and annual certification of the assembly shall be the responsibility of the Customer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Standard Drawings.
- B. Record Drawings and Submittals: STD SPEC 01300.
- C. Trenching, Backfilling, and Compacting: STD SPEC 02223.
- D. General Concrete Construction: STD SPEC 03000.
- E. Miscellaneous Metalwork: STD SPEC 05121.
- F. Painting and Coating: STD SPEC 09900.
- G. Polyethylene Sheet or Tube Encasement: STD SPEC 09954.
- H. Fusion-Bonded Epoxy Lining and Coating: STD SPEC 09961.
- I. General Piping Requirements: STD SPEC 15050.
- J. Disinfection of Piping: STD SPEC 15141.
- K. Pressure Testing of Piping: STD SPEC 15144.

1.03 SUBMITTALS

- A. Submit submittal packages in accordance with Standard Specification Section 01300.
- B. Submit manufacturer's catalog data, descriptive literature, and assembly drawings. Show dimensions, materials of construction by specification reference and grade, linings, and coatings.

C. Submit manufacturer's certificate of compliance with AWWA C511 for reduced pressure principle backflow preventers.

1.04 MASONRY RETAINING WALLS

If the aboveground portion of the assembly is located within a cut slope or embankment fill, a masonry retaining wall shall be constructed on three sides around the assembly. Construct the concrete foundation and retaining wall similar to the requirements that San Diego Gas and Electric uses for their facilities. The face of wall shall be a minimum of one foot beyond the dimensional values of the concrete pad to be poured for the assembly as shown on the Standard Drawings. Use tan colored slump block and grout each cell solid. The concrete pad to be poured around the assembly shall extend to the face of the three walls and also to the adjacent sidewalk or curb. The District's Representative will decide whether the requirements of this paragraph are being followed by the Contractor. If in the opinion of the District's Representative modifications or changes are necessary, the work shall be performed as directed.

1.05 PRIVATE PUMPING FACILITIES

The addition of a backflow prevention assembly to any given size water service assembly will reduce the available water service pressure. A larger size water service and backflow prevention assembly may be required to provide adequate water service pressure. The District will not provide pumping facilities to increase water service pressure. Private pumping facilities shall be independent and located downstream of backflow prevention assemblies.

1.06 THERMAL EXPANSION

The addition of a backflow prevention assembly to a water service will constitute a closed system. The District will not provide thermal expansion facilities for this condition. Provide sufficient facilities for thermal expansion and check for proper operation of existing thermal or pressure relief devices.

PART 2 - MATERIALS

2.01 MANUFACTURERS

Provide backflow prevention assemblies of the described type that are on the "List of Approved Backflow Prevention Assemblies" as issued by the State of California, Department of Health Services. A copy of the list is available from the District's Backflow Department.

2.02 BACKFLOW PREVENTERS

A. General: Backflow preventers shall be the same size as and never smaller than the upstream water service assembly. Where normal minimum water service pressure is less than 80 psi; the District may require the next larger assembly size.

- B. Backflow preventers of the reduced pressure principle type shall conform to the material specifications of the state approved manufacturers. See the instructions in paragraph 2.01 for obtaining the "List of Approved Backflow Assemblies".
- C. Backflow preventers, 2 inches and smaller, shall be of the conventional in-line design for installation in a horizontal position. See the instructions in paragraph 2.01 for obtaining the "List of Approved Backflow Assemblies".
- D. Backflow preventers, 2-1/2 inches through 10 inches, shall be of the conventional in-line design for installation in a horizontal position. Provide adjustable pipe supports to augment the installation to prevent flange damage. See the instructions in paragraph 2.01 for obtaining the "List of Approved Backflow Assemblies".
- E. DETECTOR CHECKS
- F. General: Detector checks shall be sized according to the demands of the fire protection system. Provide double check detector checks for Class 1, 2, 3, and 4 fire protection systems. Provide reduced pressure detector checks for Class 5 and greater fire protection systems.
- G. Double check detector checks shall conform to AWWA C510 with a minimum rated working pressure of 175 psi for operation on cold water pipelines. Provide two independently acting, spring loaded check valves; two resilient seated gate valves with outside stem and yoke; four, full ported, bronze ball valve test cocks; and a low flow by-pass line with registration meter and a double check valve assembly in series. Assemble the by-pass meter and double check valves to the main line assembly as an integral unit. The meter shall be a totalizing type with registration in cubic feet. Main check valves shall be constructed for servicing without removing the assembly from the line. Construct main line valve bodies and covers of ductile iron conforming to ASTM A 536 Grade 65-45-12 with bronze trim conforming to ASTM B 584 Alloy C83600. Construct by-pass line components of bronze or brass.
 - 1. Double check detector checks, 4 inches through 8 inches, shall be of the compact design ("N" series) for inlet flow in a vertical up direction and outlet flow in a vertical down direction. Provide valve setters with the appropriate end connections to augment the installation. Double check detector checks shall be Cla-Val Model DD8N, Febco Model 876V, or District approved equal.
 - 2. In lieu of the compact design, double check detector checks, 4 inches through 10 inches, shall be of the conventional in-line design for installation in a horizontal position. Provide adjustable pipe supports to augment the installation. Double check detector checks shall be Cla-Val Model DD7L, Febco Model 806YD, or District approved equal.
- H. Reduced pressure detector checks, 4 inches through 10 inches, shall be similar to backflow preventers of the reduced pressure type described in paragraph 2.02, B. Provide a by-pass line with registration meter and a bronze reduced pressure backflow preventer assembly in series. The by-pass reduced pressure backflow preventer shall operate identically to the main line assembly and open to detect initial flow. The meter shall be a totalizing type with registration in cubic feet. Reduced pressure detector checks shall be of the conventional inline design for installation in a horizontal position. Provide adjustable pipe supports to

augment the installation to prevent flange damage. Detector checks shall be Cla-Val Model RD7L, Febco Model 826YD, or District approved equal.

I. Where required by the fire department, provide an exposed inlet connection on the downstream side of the detector check. Replace the ductile iron bend with a ductile iron flanged tee. Install a flange with a 4-inch threaded outlet on the run. Thread a 4-inch brass nipple into the flange and install a swing check valve and a two-way, 90 degree, angle inlet connection. The 4-inch swing check valve shall be of brass construction with spring loaded check and have threaded ends. The inlet connection shall be a two-way, 90 degree angle outlet of cast brass construction with 4-inch by 2-1/2-inch size. Provide either single or double clapper style as specified by the fire department and pin lug swivels. Cast on the top of the connection the words "AUTO SPKR" or "STANDPIPE" as directed by the fire department. Provide brass plug with chain for each inlet swivel. The swing check valve and inlet connection shall be as manufactured by Potter-Roemer, Inc. or District approved equal.

2.03 LINING AND COATING OF ASSEMBLIES

Coat interior and exterior ferrous surfaces of the backflow preventers and detector checks with fusion-bonded epoxy per Standard Specification Section 09961. Do not coat bronze, rubber, or stainless steel items.

2.04 VALVE END CONNECTIONS

- A. Valves, 2 inches and smaller, shall have screwed ends. Valves, 2-1/2 inches and larger, shall have flanged ends.
- B. Screwed ends shall conform to ANSI B1.20.1,NPT.
- C. Flanged ends shall conform to ANSI B16.1, Class 125.
- 2.05 PACKING, O-RINGS, AND GASKETS

Unless otherwise stated; packing, O-rings, and gaskets shall be one of the following nonasbestos materials.

- A. Teflon.
- B. Kevlar aramid fiber.
- C. Acrylic or aramid fiber bound by nitrile. Provide Garlock "Bluegard," Klinger "Klingersil C4400," or District approved equal.
- D. Buna-N (Nitrile).
- 2.06 BOLTS, NUTS AND GASKETS FOR FLANGES

See Standard Specification Section 15050.

2.07 VALVE SETTERS

Provide valve setters to augment the installation of the compact design ("N" series) detector checks. Valve setters shall be constructed with integral support arms between the elbows to transfer thrust downstream. Construct valve setters of ductile iron conforming to ASTM A 536 Grade 65-45-12. Coat interior and exterior surfaces of the ductile iron with fusion-bonded epoxy per Standard Specification Section 09961. End connections shall be a combination of flanged ends and mechanical joints as shown on the Standard Drawings. Flanged ends shall conform to ANS B16.1 Class 125. Valve setters shall be Cla-Val Model VS, Febco Model 611, or District approved equal.

2.08 ADJUSTABLE PIPE SUPPORTS

Provide adjustable pipe support of welded steel construction with fusion-bonded epoxy coating. Locate the pipe supports under flanges or valve bodes as shown. Provide 2-inch galvanized steel pipe, cut to length, and place between the collar and base. Provide Material Resources "Standon Pipe Support Model S-89," or District approved equal.

2.09 POLYETHYLENE ENCASEMENT

See Standard Specification Section 09954.

2.10 GUARD POSTS

See Standard Specification Section 05121. Provide guard posts around the assembly when directed by the District's Representative to protect the installation.

2.11 ENCLOSURE

Provide an enclosure over and around the assembly when directed by the District's Representative to protect installation.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION

Operate the shutoff valves and test cocks on the assemblies from closed to fully open, then close again before installing. Check for broken, cracked, or missing parts; malfunctioning stems; and faulty operation.

3.02 INSTALLATION

- A. See Standard Specification Section 02223 for earthwork requirements. Use imported sand in the pipe base and pipe zone.
- B. Install piping and riser section per the instructions contained in the appropriate Standard Specification for the material used.
- C. Piping from the main to the backflow prevention assembly shall be placed level or on a continuous upward grade to avoid pocketing air. No outlets will be allowed in the piping between the main and the assembly. Trench backfilling shall not commence until the

OMWD 06-2008 BACKFLOW PREVENTION ASSEMBLIES District's Representative has inspected this section of piping and is satisfied with the installation.

- D. Install backflow prevention assemblies in a horizontal position, aboveground, and at the dimensions shown on the Standard Drawings. Locate the assemblies where shown or as established in the field by the District's Representative. The District shall be the final authority as to location, installation, size, and type of backflow prevention assembly required.
- E. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing screwed valves. Joints shall be watertight.
- F. Install flanged joints per the installation instructions in Standard Specification Section 15050.
- 3.03 INSTALLING POLYETHYLENE ENCASEMENT

After applying primer for wax tape coating to all buried bolts and nuts, wrap ferrous pipe risers including base bends and valve setters with polyethylene material per Standard Specification Section 09954. Complete the wrap prior to placing concrete anchor blocks or concrete trust blocks on base bends or valve setters. Repair polyethylene material damaged during construction.

3.04 PLACING CONCRETE

Place concrete anchor blocks around the elbow of the pipe riser or valve setter. Where a thrust block is required, place concrete against the base bends and undisturbed ground. Place concrete back to back between the base bends. Allow concrete to set and be hard enough to be self-supporting. Place and compact trench backfill up to the subgrade of the concrete pad on grade. Pour a concrete pad on grade around the pipe risers. Concrete shall be Class C per Standard Specification Section 03000.

3.05 SETTING GUARD POSTS

Position guard posts to protect the backflow prevention assembly. Locate posts as directed by the District's Representative. Excavate a hole 16 inches in diameter by 3-1/2 feet deep for each post. Set posts plumb, fill holes with concrete to 2 inches above finish grade, and crown to slope away from post. Posts shall be embedded a minimum of 3 feet in concrete. Fill posts with grout and crown top. Concrete shall be Class C per Standard Specification Section 03000.

3.06 INSTALLING THE ENCLOSURE

Set enclosure over the assembly and center in place as directed by the District's Representative. Use driller in or adhesive stainless steel anchors to attach the enclosure to the concrete pad.

3.07 PAINTING AND COATING

A. Paint aboveground surfaces of the pipe risers, elbows or bends, and adjustable pipe supports per Standard Specification Section 09900, System No. 20. Color of finish coat shall be OSHA Blue. Do not paint backflow prevention assemblies.

OMWD 06-2008 BACKFLOW PREVENTION ASSEMBLIES B. Paint aboveground surfaces of the guard posts per Standard Specification Section 09900, System No. 20. Color of finish coat shall be OSHA Yellow.

3.08 PRESSURE TESTING

Test backflow prevention assemblies at the same time that the connecting pipelines are pressure tested. See Standard Specification Section 15144 for pressure testing requirements. Repair leaks in the backflow prevention assemblies and joints of the interconnecting piping and retest.

3.09 DISINFECTION

See Standard Specification Section 15141 for chlorination requirements.

3.10 INITIAL TESTING

Upon completion of the installation and inspection by the District's Representative, an initial test will be performed by certified personnel of the District's Backflow Department. The initial test will be conducted to certify the adequacy and operational compliance of the assembly with both state and District regulations. Backflow prevention assemblies will not be placed into service until the District has tested and certified the installation.

END OF SECTION