

## **SECTION 22 11 16.13**

### **CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION**

#### **PART 1: GENERAL**

##### **1.01 SUMMARY**

- A. This Section includes water-distribution backflow prevention products and installation specifications.

##### **1.02 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver backflow prevention devices in a clean and undamaged condition. Store backflow prevention devices off the ground. Backflow prevention assemblies shall be delivered and stored in accordance with AWWA C210, AWWA C213, and AWWA C550.
- B. Keep interior of backflow prevention devices free from water, dirt, and other foreign matter. The port openings shall be covered with plastic, cardboard, or wood while in transit and during storage in the field. These covers shall remain in place until the backflow assembly is ready to be installed.
- C. Backflow assemblies shall not be stored in contact with bare ground.
- D. Backflow assemblies shall not be stacked. Do not stack other products on backflow prevention devices.

##### **1.03 PROJECT CONDITIONS**

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by AW or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
  - 1. Notify Owner no fewer than two weeks in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of water-distribution service without AW Project Manager's written permission.

##### **1.04 COORDINATION**

- A. Coordinate connection to water main with AW Project Manager.

## **PART 2: PRODUCTS**

### **2.01 REDUCTION OF LEAD IN DRINKING WATER ACT COMPLIANCE**

- A. The Contractor shall comply with the requirements and standards of the Reduction of Lead in Drinking Water Act.
- B. Any pipe, fitting or fixture (e.g. corp stops, curb valves, gate valves less than 2 inches in diameter, backflow prevention devices, water meters, hose bibs, etc.), solder and flux installed or requiring replacement as of January 4, 2014 must be "lead free". The Contractor shall be responsible to comply with the State, local laws, ordinances, codes, rules, and regulations governing the Reduction of Lead in Drinking Water Act that may have additional limitations or requirements."
- C. The definition of 'lead free' is as follows:
  - 1. Not containing more than 0.2 percent lead when used with respect to solder and flux; and
  - 2. Not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

### **2.02 BACKFLOW PREVENTERS**

- A. General: The type of backflow prevention device furnished for a particular installation shall be in accordance with American Water's Cross Connection Practice Manual
- B. Reduced-Pressure Principle Backflow Preventers (RPZs):
  - 1. Reduced-pressure principle backflow prevention device shall meet the requirements of ANSI/AWWA C511 and ASSE 1013. Reduced-pressure principle backflow prevention device shall be as listed on the University of Southern California Foundation for Cross Connection Control and Hydraulic Research Foundation "Manual of Cross Connection Control" most current list.
  - 2. Reduced-pressure principle backflow prevention device shall consist of two independently-operated, spring-loaded, wye-pattern, poppet-type check valves designed for installation in a normal horizontal flow attitude. An independent spring-loaded relief valve shall be located between the two check valves. Backflow prevention assembly shall be manufactured as a complete unit including test cocks, and upstream and downstream isolation gate valves. Test cocks shall be arranged such that backflow prevention device can be tested without removing backflow prevention device from the line.

3. Isolation gate valves furnished with backflow prevention assembly shall be as specified in this Section.
  4. Reduced-pressure principle backflow prevention device shall include an integral sensing system that automatically opens a relief valve whenever the differential pressure between the inlet supply and the reduced pressure zone drops to 2 psi. Relief valve shall remain open until a positive pressure differential of 2 psi is re-established. If pressure upstream of first check valve drops to atmospheric or below, relief valve shall remain fully open and provide an internal air gap between the first check valve and the water level in the reduced pressure zone. Reduced-pressure principle backflow prevention device shall also be constructed such that any minor leakage of second check valve will result in visible flow from the relief valve, even if first check valve is totally disabled.
  5. Reduced-pressure principle backflow prevention device shall have all bronze bodies for sizes 3-inches and smaller and cast iron bodies for sizes 4-inches and larger. Check valve and relief valve springs shall be stainless steel, and all other internal working parts shall be bronze and stainless steel. Check valve and relief valve seats shall be stainless steel or bronze and shall be field replaceable without removing the device from the service line. Cast iron bodies shall be coated with a two-part thermosetting epoxy coating in accordance with ANSI/AWWA C550.
  6. Backflow prevention device shall be designed for a working pressure of 150 psi and a temperature range of 32°F to 140 °F.
- C. Double Check, Backflow-Prevention Assemblies:
1. Double check valve backflow prevention device shall meet the requirements of ANSI/AWWA C510 and ASSE 1015. Double check valve backflow prevention device shall be as listed on the University of Southern California Foundation for Cross Connection Control and Hydraulic Research Foundation "Manual of Cross Connection Control" most current list.
  2. Double check valve backflow prevention device shall consist of two independently operated, spring loaded, wye pattern, poppet type check valves designed for installation in a normal horizontal flow attitude. Backflow prevention assembly shall be manufactured as a complete unit including test cocks, and upstream and downstream isolation gate valves. The test cocks shall be arranged such that backflow prevention device can be tested without removing backflow prevention device from the line.
  3. Isolation gate valves furnished with backflow prevention assembly shall be as specified in this Section.

4. Double check valve backflow prevention device shall open under normal flow conditions at a pressure differential not less than 1 psi at each check valve. Check valves shall close when downstream pressure is greater than supply pressure.
5. Double check valve backflow prevention device shall have all bronze bodies for sizes 2-inches and smaller and cast iron bodies for sizes 2 1/2-inches and larger. Check valve springs shall be stainless steel, and all other internal working parts shall be bronze and stainless steel. Check valve seats shall be stainless steel or bronze and shall be field replaceable without removing the device from the service line. Cast iron bodies shall be coated with a two-part thermosetting epoxy coating in accordance with ANSI/AWWA C550.
6. Backflow prevention device shall be designed for a working pressure of 150 psi and a temperature range of 32°F to 140 °F.

## 2.03 ISOLATION VALVES

- A. General: Backflow prevention device assembly shall be furnished complete with upstream and downstream isolation gate valves.
- B. Gate valves 2-inches in size and smaller shall be all bronze valves conforming to Federal Specification WW-V-54, Type I, Class A designed for a working pressure of 150 psi. Bronze for valve body and internals shall meet the requirements of ASTM B61. Valves shall be furnished with screwed ends, hand wheel operator, non-rising stem, one-piece solid wedge disc, and union bonnet.
- C. Gate valves 3 to 12-inches shall be in conformance to Section – Gate Valves.

## 2.04 PROTECTIVE ENCLOSURES

- A. Freeze-Protection Enclosures:
  1. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40°F when external temperatures reach as low as minus 34°F.
    - a. Standard: ASSE 1060.
    - b. Class I: For equipment or devices other than pressure or atmospheric vacuum breakers.
    - c. Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
      - 1) Housing: Reinforced fiberglass construction.

- a) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
- b) Drain opening for units with drain connection.
- c) Access doors with locking devices.
- d) Insulation inside housing.
- e) Anchoring devices for attaching housing to concrete base.

2) Electric heating cable or heater with self-limiting temperature control shall be provided when directed by the AW Project Manager.

**B. Enclosure Bases:**

1. Description: 4-inch minimum thickness 3000 psi concrete, of dimensions required to extend at least 6-inches beyond edges of enclosure housings. Include openings for piping. Reinforce with a minimum of 6x6x6 gauge welded wire fabric.

## **PART 3: EXECUTION**

### **3.01 INSTALLATION**

**A. Backflow Prevention Assemblies**

1. Install backflow prevention assemblies in accordance with the manufacturer's written installation instructions and as shown on the Drawings, if available.
2. Install backflow prevention assemblies so that assemblies are easily accessible for testing, maintenance, and repair.
3. Install backflow prevention assemblies horizontally, with 18-inches minimum clearance between finished grade and lowest point on bottom of backflow prevention assembly.

**B. Connecting Piping and Supports**

1. Joints for backflow prevention assembly connections to inlet and outlet piping shall be installed under Specification Section 33 11 00 Piping – General Provisions.
2. Piping and fittings for units 3-inches and larger in size shall have flanged joints.
3. Piping, fittings and valves for units 3-inches and larger in size shall be properly supported with concrete foundations and adjustable pipe support stands as shown on the Drawings, if available.

**C. Reduced-Pressure Principle Backflow Prevention Assembly Drain**

1. Install drain for discharge from reduced-pressure principle backflow prevention device relief valve.

### 3.02 FIELD TESTING

- A. Hydrostatic Test: Hydrostatically test backflow prevention assembly with piping in which backflow prevention assembly is installed.
- B. Functional Test - Perform functional test of backflow prevention assemblies after backflow prevention assemblies are installed and hydrostatic testing is completed.
- C. Perform functional tests in the presence of the following:
  1. AW Project Manager
- D. Functional tests performed when AW Project Manager is not present shall be repeated at no additional cost to the AW.
- E. Functional test shall be performed by certified backflow prevention device tester.
- F. Perform functional test on each backflow prevention assembly. Verify proper operation of backflow prevention assemblies.
- G. Functional Test Report: Backflow prevention device tester shall submit copies of backflow prevention device functional tests.
- H. Failed Test: Repeat failed tests at no additional cost to the AW.
- I. Defects - If any defects are detected during testing, correct defects by adjustment, repair, modification, or replacement. Backflow prevention devices shall only be repaired by a certified backflow prevention device technician.
- J. Re-test backflow prevention assemblies following correction of defects. Backflow prevention devices shall only be retested by a certified backflow prevention device tester. Re-test backflow prevention assemblies at no additional cost to AW.

### 3.03 CLEANING

- A. Clean grease, oil, or any other foreign substance from exterior surfaces of backflow prevention assemblies.

**END OF SECTION 22 11 16.13**