SECTION 33 14 19.23
REDUCED-PRESSURE ZONE BACKFLOW PREVENTERS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: Labor and material for installation of backflow preventers.

B. Related Requirements: Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this Section.

1.02 REFERENCES

A. Abbreviations and Acronyms:

1. ASSE: American Society of Sanitary Engineering
2. BPA: backflow prevention assembly
3. DC: double check valve assembly
4. DWR: Division of Water Resources
5. EPA: Environmental Protection Agency
6. GPM: gallons per minute
7. PSI: pounds per square inch
8. PWS: public water supply
9. RPZ: reduced pressure zone
10. TDEC: Tennessee Department of Environment and Conservation
11. USCFCC&HR: University of Southern California Foundation for Cross-Connection Control and Hydraulic Research.

B. Definitions:

1. Cross-Connection: Any physical connection whereby the PWS is connected with any other water supply system, whether public or private, either inside or outside of any public building or buildings, in such a manner that a flow of water into the PWS is possible either through the manipulation of valves, ineffective check or back pressure valves, or because of any other arrangement.
2. Inter-Connection: Any system of piping or other arrangement whereby the public water supply is connected directly with a sewer, drain, conduit, pool, storage reservoir or other device which does or may contain sewer or other waste, or liquid which would be capable of importing contamination to the PWS.

C. Reference Standards: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event the requirements of the following referenced standards and specifications conflict with the specification section, the requirement of this specification shall prevail. In the event the requirements of

any of the following referenced standards and specifications conflict with each other, the more stringent requirement shall prevail.

1. American Society of Sanitary Engineering (ASSE): 1013, Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies and Reduced Pressure Fire Protection Backflow Preventers and 1060, Performance Requirements for Outdoor Enclosures for Fluid Conveying Components
2. American Water Works Association (AWWA):
   a. C511, Reduced-Pressure Principle Backflow Prevention Assembly.
   b. C550, Protective Interior Coatings for Valves and Hydrants.
3. International Code Council (ICC): International Plumbing Code (IPC).
4. NSF International (NSF):
   a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
   b. NSF/ANSI 372, Drinking Water System Components - Lead Content
5. Environmental Protection Agency (EPA): Cross Connection Control Manual.
6. TDEC DWR Cross Connection Control Manual.
7. University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USCFCC&HR)

1.03 GENERAL REQUIREMENTS

A. Outdoor installations that require year-round water service are required to adhere to enclosure specifications.

B. In accordance with the Tennessee Code Annotated, and Owner's Rules and Regulations, no person shall cause a cross-connection or inter-connection to be made or allow one to exist for any purpose whatsoever unless the construction and operation of the same have been approved by the Owner.

C. Protective Assemblies are required to:
   1. Protect the Owner's water system from contamination.
   2. Eliminate or control existing or potential cross connections between potable and non-potable water systems.
   3. Protect the occupants or users of the water supply within the customers premises in certain situations from in-house contamination.

D. Protective assemblies will be required when the nature of use of the water supplied to a premise by the Owner is such that it is deemed:

   1. Impractical to provide an effective air gap separation.
   2. The property owner and/or occupant cannot or will not demonstrate to the Owner that water use and protective features of the plumbing are such that they pose no threat to the safety or potability of the water supply.
   3. The nature and mode of operations within a facility are such that frequent plumbing changes are made.
   4. There is likelihood that protective measures may be subverted, altered or disconnected (portable or temporary meters).

5. A type of facility requiring protection as listed by TDEC and or EPA.
6. To come into contact with chemicals or remain stagnant within the water line. Use of secondary meters to supply fire suppression systems, irrigation systems, pools, fountains, and hot tubs.

E. Dual assemblies installed in parallel are required where continuous, uninterrupted services is required and there is no auxiliary service line. Refusal to install two parallel assemblies shall constitute agreement by the property owner or occupant that water service may be interrupted as necessary to test the assembly.

F. No installation, alteration or change(s) shall be made to any backflow prevention assembly (BPA) connected to Public Water Supply (PWS) without first securing permission from the Owner.

G. BPA is required at point of interconnection between the PWS and any private water main.

H. For new BPAs that will be installed on a fire line, customer or Contractor must contact the Owner at (865) 524-2911 at least 24 hours in advance to schedule a time to close the valve on the existing fire line.

I. Area Plumbing Inspectors' Offices may require a plumbing permit and inspection for the installation of BPAs. The city or county office should be contacted to determine their requirements prior to installing a BPA. If a permit and inspection is not required by the city or county, then the property owner or occupant must call the Owner to schedule an inspection after the device is installed.

PART 2 – PRODUCTS

2.01 GENERAL

A. A reduced pressure zone (RPZ) BPA is required for protection of the water distribution system as it will protect against backpressure and back-siphonage conditions. Only RPZ's listed in the USCFCC&HR list of Approved BPAs shall be installed on the Owner's water system. (The only exception is on non-chemical fire suppression systems, where a double check valve assembly (DC) may be used instead of an RPZ.)

B. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by Manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372. Use or reuse of components and materials without a traceable certification is prohibited.

C. BPA should be of sufficient size to deliver the same gpm capacity as the water meter supplying the premises when its installed in the main line.

D. The RPZ assembly must contain two spring loaded, resilient seat check valves and be equipped with a relief valve mechanism between the two check valves that ensures the pressure in the zone is always at least 2 psi lower than the inlet pressure.

E. BPA must be installed between the two tight-closing resilient seated, inside and outside coated fusion epoxy gate valves or full port ball valves.

F. Test cocks must be bronze, stainless steel, or polymer, construction. They must also be resilient seated, have full port characteristics, and be located as follows:

1. On the upstream side of the #1 shut-off valve.
2. Between the #1 shut-off valve and the #1 check valve.
3. Between the check valves
4. Between the #2 check valve and the #2 shut-off valve

2.02 BACKFLOW PREVENTION ASSEMBLIES

A. Reduced-Pressure Backflow Prevention Assemblies (3/4 Inch Through 2 Inches):

1. Manufacturers and Products: Compliant with TDEC DWR approved systems.
2. Unless otherwise shown on drawings and standard details:
   a. Regulatory Compliance: AWWA C511, CSA B64.4, FCCHR of USC Section 10, ASSE 1013, ASSE 1060, ICC (IPC).
   b. Valve Body: Bronze.
   c. End Connections: Threaded, NPT.
   d. Maximum Working Pressure: 175 psi (350 psi test).
   e. Temperature Range: 32 degrees F to 180 degrees F.
   f. Shutoff Valve: Full port, resilient seated, bronze ball valve with bronze ball valve test cock.
   g. Inlet Strainer for Commercial Applications: Bronze wye strainer, 40-mesh perforated, Type 304 stainless steel, complete with blow down
   h. Accessories: Drainline air gap fitting.

B. Reduced Pressure Backflow Prevention Assemblies (2-1/2 Inches Through 10 Inches):

1. Manufacturers and Products: Compliant with the TDEC DWR approved systems.
2. Description:
   a. Regulatory Compliance: AWWA C511, CSA B64.4, FCCHR of USC Section 10, ASSE 1013, IAPMO (UPC), SBCCI.
   b. Valve Body: Ductile or cast iron, Class 125, fusion epoxy-coated (FDA-approved).
   c. End Connections: Flanged.
   d. Maximum Working Pressure: 175 psi (350 psi test).
   e. Temperature Range: 32 degrees F to 180 degrees F.
   f. Shutoff Valve: Nonrising stem, resilient seated gate valve with bronze ball valve test cock.
   g. Inlet Strainer for commercial applications: Cast-iron wye strainer, Class 125 flanged, fusion epoxy AWWA C550 coated, perforated stainless steel screen (1/16-inch perforations on 2-1/2 inches to 4 inches; 1/8-inch perforation on 6 inches to 10 inches), threaded cap plug blowdown opening.
   h. Accessories: Drainline air gap fitting.

2.03 ENVIRONMENTAL ENCLOSURES

A. Backflow Prevention Assemblies 3/4 Inch to 2 Inches:

1. Description:
   a. Enclosure shall be factory-assembled unit providing heat and accessibility to the system BPAs. Unit shall meet the requirements of NFPA and ASSE for testing of the BPA. Design to protect to minus 30 degrees F. Unit shall be suitable for concrete pad mounting.
   b. Adjustable thermostat shall control electric heaters/cables. Set thermostat to maintain 40 degrees F.
   c. Fiberglass construction, 1-inch-thick, factory applied unicellular nonwicking insulation, minimum R-value of 8, hinged and lockable access doors. Designed for exterior installation.
2. Heating Capacity:
   a. 3/4-Inch to 1-1/2-Inch: 60-watt heater, 120 volt, single-phase.
   b. 2-Inch: 90-watt heater, 120 volt, single-phase.
   c. 3-Inch: 1,500-watt heaters, 120 volt, single-phase.

B. Backflow Preventer Assemblies 2 1/2 Inches to 10 Inches:

1. Description:
   a. Enclosure shall be factory-assembled unit providing heat and accessibility to the system BPAss. Unit shall meet the requirements of NFPA and ASSE for testing of the BPA. Design to protect to minus 30 degrees F. Unit shall be suitable for concrete pad mounting.
   b. Adjustable thermostat shall control electric heaters. Set thermostat to maintain 40 degrees F.
   c. Reinforced 18-gauge aluminum construction, factory applied unicellular nonwicking insulation, minimum R-value of 8, hinged and lockable access doors. Designed for exterior installation.
   d. Verify unit length, width, and height with Manufacturer based on actual BPA provided.
2. Heating Capacity:
   a. 4 Inches: One 2.0-kW heater, 120 volt, single-phase.
   b. 6 Inches and 8 Inches: Two 1.5-kW heaters, 120 volt, single-phase.
   c. 10 Inches: Two 2.0-kW heaters, 120 volt, single-phase.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install, arrange, and connect equipment as shown on Drawings and in accordance with Manufacturer's recommendations.

B. Unless otherwise shown on the Drawings or approved by Owner install such that:

1. Master valve (if installed) should be located after the BPA.
2. Assembly is located before first use of water, and any location that is not in close proximity to the water meter. Consultation with the Owner is required
3. Assembly is not installed in way that allows it to be bypassed; therefore, no unprotected connections are made between the backflow prevention assembly and the water meter.

4. Assembly can be easily accessed for testing on an annual basis and repaired as needed.
5. Assembly is installed with at least 12 inches between the ground, floor, or mulch and the bottom of the relief valve.
6. Assembly is installed at least 6 inches away from walls for backflow assemblies size 2 inches and under and at least 12 inches away from walls for backflow assemblies over 2 inches.
7. Assembly is not installed below ground or inside a pit.
8. Assembly is not exposed to grit, sticky, corrosive, or abrasive substances.
9. Assembly is protected from mechanical abuse, freezing, and flooding.
10. The device is adequately supported to prevent the unit from sagging. Special supports are needed for units in the 4" to 10" range.
11. The assembly should have at least 24" of clearance on each side of the assembly to facilitate service and testing if an outdoor enclosure is required.
12. The assembly installation orientation should be determined by referencing the USCFCC& HR list of approved BPAs that are recognized by TDEC DWR.
13. The test cocks, valve stems, or name plates should not be painted. Their accessibility, operation or legibility should not be altered. Applicable relief valve passage shall also not be restricted.
14. The relief valve of an RPZ should never be plugged, restricted or solidly piped to a drain, ditch or pump. Rigidly secured air-gap funnels may be used to direct discharges away from the RPZ, provided an approved air-gap separation is present at the relief valve discharge and again at the discharge end of the drain pipe.

C. The water line shall be thoroughly flushed to expel all debris prior to installation of the BPA. Debris lodging under check valves is one of the most common reasons for assembly failure.

D. The TDEC DWR determines the types of facilities requiring cross connection protection. A current list of these facilities may be obtained by contacting the Owner. A current list of these facilities may be viewed at www.kub.org/cross-connection.

E. The RPZ assembly shall be installed in accordance with installation drawings of these specifications (see Attachments A, B, and C)

3.02 INSPECTION

A. The Owner shall examine:

1. Properties subject to frequent changes in on-site plumbing, where new cross-connections may be installed and existing protection may be bypassed, removed or otherwise made ineffective shall be subject to an annual inspection.
2. New Construction - All new commercial construction plans and specifications shall be made available to the Owner for review.
3. Existing Facilities – Existing facilities cross connection protection shall be subject to inspection to determine the degree of hazard. Should installation of BPA or plumbing changes be required, the Owner will notify the occupant of the requirements and a follow-up inspection will be made to assure proper protective assemblies to be installed.

4. Upon installation of a new BPA that serves as a containment assembly for the PWS, a final inspection by the Owner should be scheduled to ensure that compliance requirements are met. The Contractor can contact (865) 594-8333 to schedule the final inspection.

3.03 TESTING

A. Unless otherwise specified, it shall be the duty of the property owner/occupant to ensure annual (or more frequent, if necessary) testing of BPAs. Failure to test the BPA may result in additional enforcement actions taken including the potential for termination of water service.

B. BPAs shall be successfully tested:

1. Immediately upon completion of installation
2. At least every 12 months, recommended more often for high-hazard installations.
3. When unit has been disassembled for cleaning and/or repairs.
4. When there is any indication, the BPA is not functioning properly.

C. All costs associated with the subject program are to be borne by the customer or appropriate party. This includes the initial purchase of the BPA and its proper installation, testing and maintenance.

D. Accessibility to the BPA should maintain at least 24” of clearance to facilitate maintenance and testing.

3.04 ACCESS

A. The procedures outlined herein are based on the principal of containment of the potential or actual hazard within the customer’s premises. Should a customer refuse the right of entry of the Owner or their designated representative, the Owner must assume maximum hazard and therefore require the highest degree of protection on such a customer’s service line.

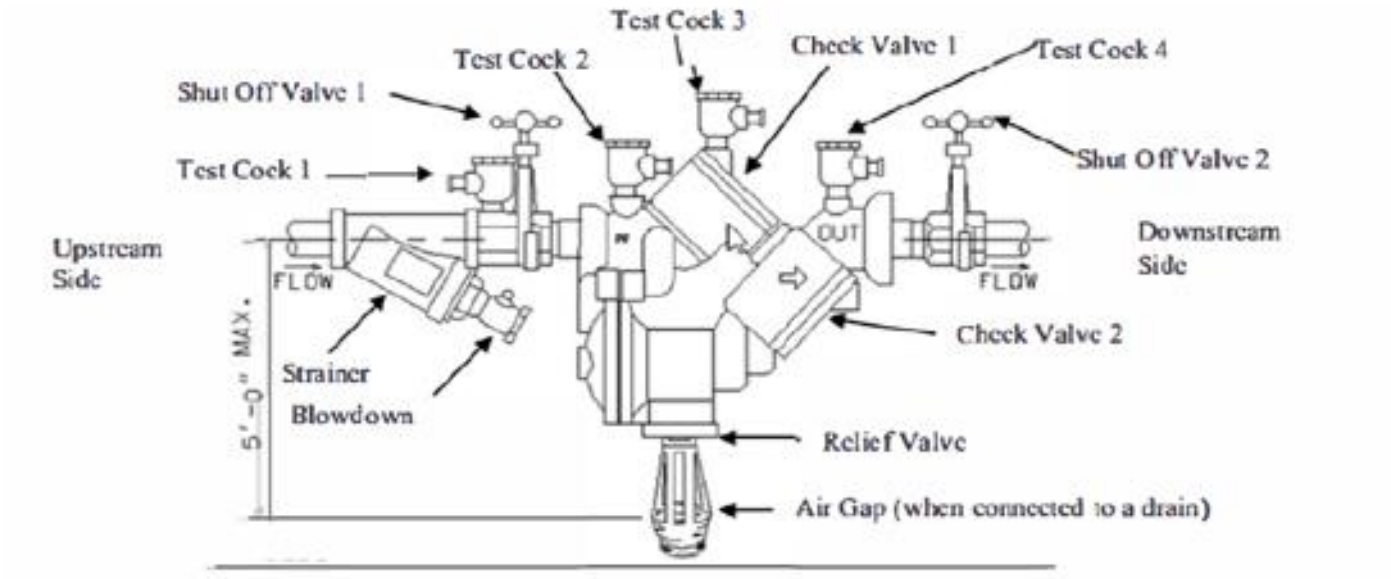
3.05 ATTACHEMENTS

A. Figure 1: RPZ Size ¾” to 2” BPA

B. Figure 2: RPZ Indoor Installation, Size 2 ½” – 10” BPA

C. Figure 3: RPZ Outdoor Installation, Size 2 ½” – 10” BPA

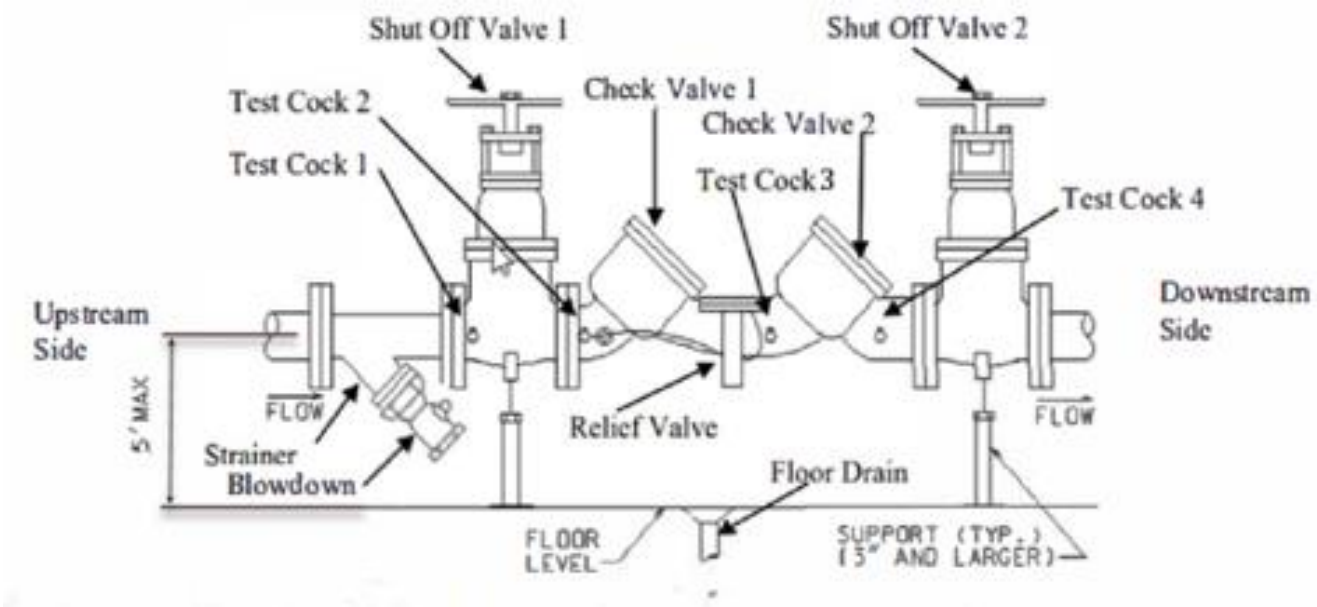
END OF SECTION



NOTES: The assembly must be installed:

A. With a strainer (only on commercial properties),
B. Above Ground Level,
C. With suitable air gap between relief valve discharge port and ground level or flood level (12" minimum, 5' maximum to centerline of BPA),
D. With a minimum of 6" clearance from all walls to any components of the BPA
E. With adequate support to prevent the unit from sagging.
F. BPA installation orientation must adhere to BPA configuration requirements, consult website for USCFCC&HR for details.

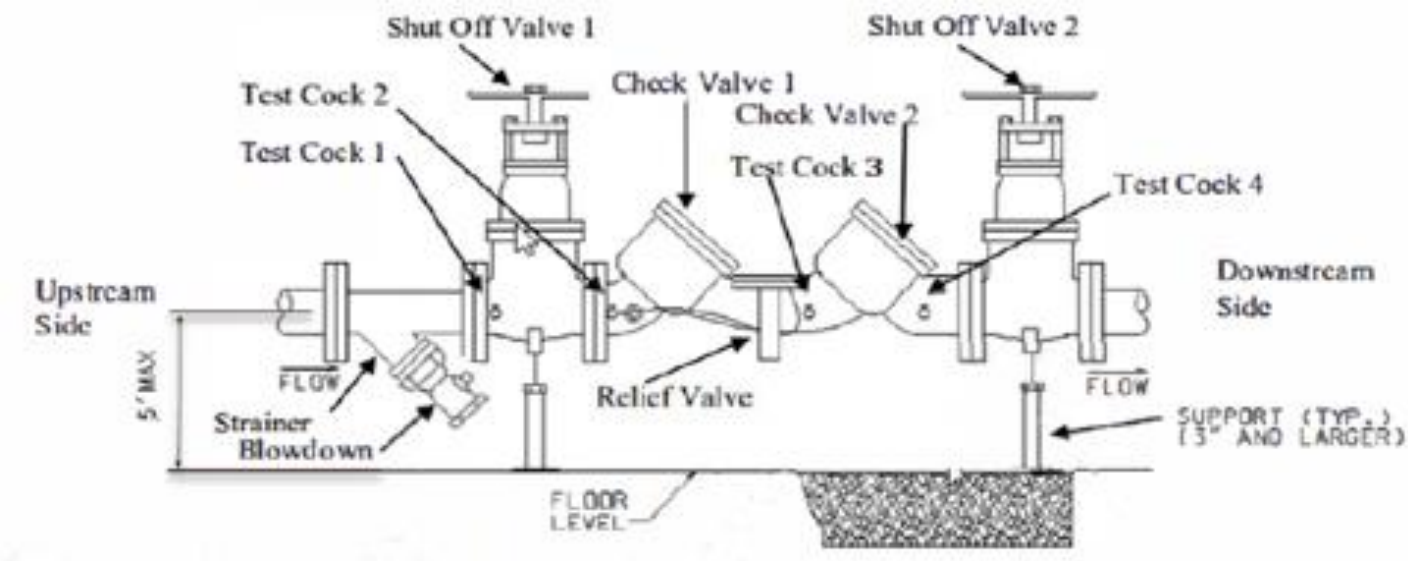
Figure 1: RPZ Size ¾" to 2" BPZ



NOTES: The assembly must be installed:

A. With a strainer (only on commercial properties),
B. Above Ground Level,
C. With suitable air gap between relief valve discharge port and ground level or flood level (12" minimum, 5' maximum to centerline of BPA),
D. With a minimum of 12" clearance from all walls to any components of the BPA
E. With adequate support to prevent the unit from sagging.
F. BPA installation orientation must adhere to BPA configuration requirements, consult website for USCFCC&HR for details.

Figure 2: RPZ Indoor Installation, Size 2 ½" – 10" BPA



NOTES: The assembly must be installed:

A. With a strainer (only on commercial properties),
B. Above Ground Level,
C. With suitable air gap between relief valve discharge port and ground level or flood level (12" minimum, 5' maximum to centerline of BPA),
D. With a minimum of 12" clearance from all walls to any components of the BPA
E. With adequate support to prevent the unit from sagging.
F. BPA installation orientation must adhere to BPA configuration requirements, consult website for USCFCC&HR for details.

Figure 3: RPZ Outdoor Installation, Size 2 ½" – 10" BPA

Master Specification Section Owner: Water Systems Engineering
Discipline Reviewer: Water Systems Engineering Manager
Cross-Discipline Reviewer:

Summary of Changes:

Rev. No.	Revision Date	Description / Justification	Author
1.	05/01/23	Original Issuance	
2.	08/08/2025	Update	Blake Brown
3.			
4.			
5.			
6.			
7.			
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SECTION 33 14 19.19
DOUBLE CHECK VALVE AND DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSEMBLIES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes: All labor, material, equipment, and incidentals to provide and install double check valves and detectors.

B. Related Requirements: Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this Section.

1.02 REFERENCES

A. Abbreviations and Acronyms:

1. ASSE: American Society of Sanitary Engineering
2. AWWA: American Water Works Association
3. BPA: backflow prevention assembly
4. DC: Double check valve detector assembly
5. DCDA: Double Check Valve Detector Assembly
6. DWR: Division of Water Resources
7. EPA: Environmental Protection Agency
8. GPM: gallons per minute
9. ICC: International Code Council
10. NFPA: National Fire Protection Association
11. PSI: pounds per square inch
12. PWS: public water supply
13. RPZ: reduced pressure zone
14. TDEC: Tennessee Department of Environment and Conservation
15. USCFCC&HR: University of Southern California Foundation for Cross-Connection Control and Hydraulic Research

B. Definitions:

1. Cross-Connection: Any physical connection whereby the PWS is connected with any other water supply system, whether public or private, either inside or outside of any public building or buildings, in such a manner that a flow of water into the PWS is possible either through the manipulation of valves, ineffective check or back pressure valves, or because of any other arrangement.
2. Inter-Connection: Any system of piping or other arrangement whereby the PWS is connected directly with a sewer, drain, conduit, pool, storage reservoir or other device which does or may contain sewer or other water, or liquid which would be capable of importing contamination to the PWS.

C. Reference Standards: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event the requirements of the following referenced standards and specifications conflict with the specification section, the requirement of this specification shall prevail. In the event the requirements of any of the following referenced standards and specifications conflict with each other, the more stringent requirement shall prevail.

1. ASSE 1015: Performance Requirements for Double Check Backflow Prevention Assemblies
2. ASSE 1048: Performance Requirements for Double Check Detector Fire Protection Backflow Prevention Assemblies
3. ASSE 1060: Performance Requirements for Outdoor Enclosures for Fluid Conveying Components
4. AWWA C510: Double Check Valve Backflow Prevention Assembly
5. AWWA C550: Protective Interior Coating for Valves and Hydrants
6. ICC: International Plumbing Code
7. NSF/ANSI 61: Drinking Water System Components – Health Effects
8. NSF/ANSI 372: Drinking Water System Components – Lead Content
9. EPA Cross Connection Control Manual
10. TDEC DWR Cross-Connection Control Manual
11. University of Southern California Foundation for Cross-Connection Control and Hydraulic Research

1.03 ADMINISTRATIVE REQUIREMENTS

A. In accordance with the Tennessee Code Annotated, and Owner's Rules and Regulations, no person shall cause a cross-connection or inter-connection to be made or allow one to exist for any purpose whatsoever unless the construction and operation of the same have been approved by Owner.

B. Protective Assemblies are required to:

1. Protect the Owner's water system from contamination.
2. Eliminate or control existing or potential cross-connections between potable and non-potable water systems.
3. Protect the occupants or users of the water supply within the customer's premises in certain situations from in-house contamination.

C. Protective assemblies will be required when the nature of use of the water supplied to a premise by the Owner is such that it is deemed:

1. Impractical to provide an effective air gap separation.
2. The property owner and/or occupant cannot or will not demonstrate to the Owner the water use and protective features of the plumbing are such that they pose no threat to the safety of potability of the water supply.
3. The nature and mode of operations within a facility are such that frequent plumbing changes are made.
4. There is likelihood that protective measures may be subverted, altered, or disconnected (portable or temporary meters).
5. A type of facility requiring protection as listed by the Tennessee Department of Environment and Conservation (TDEC) and/or the Environmental Protection Agency (EPA)

6. To come into contact with chemicals or remain stagnant within the water line. Use of the secondary meters to supply fire suppression systems, irrigation systems, pools, fountains, and hot tubes.

D. Dual assemblies installed in parallel are required where continuous, uninterrupted services are required and there is no auxiliary service line. Refusal to install two parallel assemblies shall constitute agreement by the property owner or occupant that water service may be interrupted as necessary to test the assembly.

E. No installation, alteration or change(s) shall be made to any backflow prevention assembly (BPA) connected to the public water supply without first securing permission from the Owner.

F. BPA is required at point of interconnection between the PWS and any private water main.

G. For new BPAs that will be installed on a fire line, customer or Contractor must contact the Owner at least 24 hours in advance top schedule a time to close the valve on the existing fire line.

H. Area plumbing Inspector's Offices may require a plumbing permit and inspection for the installation of BPAs. The City or County office should be contacted to determine their requirements prior to installing a BPA. If a permit and inspection is not required by the City or County, the property owner or occupant must call the Owner to schedule an inspection after the device is installed.

PART 2 – PRODUCTS

2.01 GENERAL

A. Double check or Double Check Detector (DCDA_ BPAs have been approved for protection of the water distribution system on non-chemical fire lines only. A DC or DCDA does not provide the same degree of protection as the RPZ. Only DCs and DCDAs listed in the USCFCC&HR list of approved BPAs shall be installed on the Owner's water system.

B. Components and Materials in Contact with Water For Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by Manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF.ANSI 61 and NSF/ANSI 372.

C. The DC or DCDA should be of sufficient size to deliver the same gallons per minute (GPM) capacity as the water meter supplying the premises when it's installed in the main line.

D. The DC or DCDA must have two internally loaded, independently acting, resilient seat valves is series. The unit includes tightly closing shutoff valves on each end of the assembly and suitable connections for testing the water tightness of each check valve.

E. The DC or DCDA will function under pressure for extended periods and, when functioning properly, will protect against backpressure and back-siphonage conditions. Unlike the RPZ, protection against backflow is not provided when both check valves leak.

F. Test cocks must be of bronze, stainless steel, or polymer construction. They must also be resilient seated, have full port characteristic and be located as follows:

1. On the upstream side of the #1 check valve.
2. Between the #1 shut off valve and the #1 check valve.
3. Between the check valves.
4. Between the #2 check valve and the #2 shut off valve.

G. A DCDA consists of a main line double check valve assembly with a smaller factory installed DC and meter in a bypass configuration to detect leakage or unauthorized usage.

H. A DC may not be retrofitted or converted into a DCDA. If a bypass line and meter are needed, a DCDA shall be installed.

I. In DCDAs the number one check valve spring and the number two check valve spring are not interchangeable.

2.02 BACKFLOW PREVENTION ASSEMBLIES

A. Double Check Valve and Double Check Detector Backflow Prevention Assemblies (3/4” Inch through 2 inches

1. Manufacturers and Products: Compliant with the TDEC DWR approved systems.
2. Description:
   a. Regulatory Compliance: AWWA C510, CDA B64.5, FCCHR of USC Section 10, ASSE 1015/ASSE 1048m ICC (IPC).
   b. Valve Body: Bronze
   c. End Connections: Threaded, NPT
   d. Maximum Working Pressure: 175 psi (350 psi test)
   e. Temperature Range: 32 degrees F to 140 degrees F
   f. Shutoff Valve: Full port, resilient seated, bronze ball valve with bronze ball valve test cock
   g. Inlet Strainer is optional. If selected must be of bronze wye strainer, 40-mest perforated, Type 304 stainless steel.

B. Double Check Valve and Double Check Detector Backflow Prevention Assemblies (2-1/2 inches through 10 inches)

1. Manufacturers and Products: Compliant with the TDEC DWR approved systems.
2. Description:
   a. Regulatory Compliance: AWWA C510, CDA B64.5, FCCHR of USC Section 10, ASSE 1015/ASSE 1048m ICC (IPC).
   b. Valve Body: ductile or cast iron, Class 125, epoxy-coated (FDA-approved)
   c. End Connections: Flanged
   d. Maximum Working Pressure: 175 psi (350 psi test)
   e. Temperature Range: 32 degrees F to 140 degrees F
   f. Shutoff Valve: Nonrising stem, resilient seated gate valve with bronze ball valve test cock

g. Inlet Strainer is optional. If selected must be of cast-iron wye strainer, Class 124 flanged, fusion epoxy AWWA C550 coated, perforated stainless steel screen (1/16-inch perforations on 2-1/2 inches to 4 inches; 1/8-inch perforation on 6 inches to 10 inches, threaded cap plug blowout opening.

2.03 ENVIRONMENTAL ENCLOSURES

A. Backflow Prevention Assemblies ¾ inch to 2 inches:

1. Description:
   a. Enclosure shall be factory-assembled providing heat and accessibility to the system BPAs. Unit shall meet the requirements of NFPA and ASSE for testing of the BPA. Design to protect to minus 30 degrees F. Unit shall be suitable for concrete pad mounting.
   b. Adjustable thermostat shall control electric heaters/cables. Set thermostat to maintain 40 degrees F.
   c. Fiberglass construction, 1-inch thick, factory applied unicellular nonwicking insulation, minimum R-value of 8, hinged and lockable access doors. Designed for exterior installation.
2. Heating Capacity:
   a. ¾-inch to 1-1/2 inch: 60-watt heater, 120 volts, single-phase.
   b. 2-inch: 90-watt heater, 120 volt, single phase

B. Backflow Prevention Assemblies 2- ½ inches to 10 inches:

1. Description:
   a. Enclosure shall be factory-assembled providing heat and accessibility to the system BPAs. Unit shall meet the requirements of NFPA and ASSE for testing of the BPA. Design to protect to minus 30 degrees F. Unit shall be suitable for concrete pad mounting.
   b. Adjustable thermostat shall control electric heaters/cables. Set thermostat to maintain 40 degrees F.
   c. Reinforced 18-guage aluminum construction, factory applied unicellular nonwicking insulation, minimum R-value of 8, hinged and lockable access doors. Designed for exterior installation.
   d. Verify unit length, width, and height with Manufacturer based o actual BPA provided.
2. Heating Capacity:
   a. 3-inch: 1,500-watt heaters, 120 volts, single phase.
   b. 4-inch: One 2.0-kW heater, 120 volts, single phase
   c. 6-inch and 8-inch: two 1.5-kW heaters, 120 volt, single phase
   d. 10-inches: Two 2.0-kW heaters, 120 volt, single phase

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install, arrange, and connect equipment as shown on the Contract Drawings and in accordance with Manufacturer's recommendations.

B. Unless otherwise shown on the Contract Drawings or approved by Owner, install such that:

1. Master valve (if installed) is located after the BPA
2. Assembly is located before first use of water, and any location that is not in close proximity to the water meter, consultation with the Owner is required.
3. Assembly is not installed in a way that allows it to be bypassed, therefore no unprotected connections are made between the BPA and the water meter or water main.
4. Assembly can be easily accessed for testing on an annual basis and maintained as needed.
5. Assembly is installed with at least 12 inches between floor and bottom of BPA.
6. Assembly, or assembly component, is installed at least six inches away from walls for BPAs of 2-inches and under and at least 12 inches away for BPAs over two inches.
7. Assembly is not installed below ground or inside a pit.
8. Assembly is not exposed to grit, sticky, corrosive or abrasive substances.
9. Assembly is protected from mechanical abuse, freezing, and flooding.
10. Assembly is adequately supported to prevent the unit from sagging. Special supports are need for units in the 4-inch to 10-inch range.
11. Assembly should have at least 24 inches of clearance on each side of the BPA to facilitate service and testing inf an outdoor enclosure is required.
12. Assembly installation orientation should be determined by referencing the USCFCC&HR list of approved BPAs that are recognized by TDEC DWR.
13. The test cocks, valve stems, or name plates should not be painted. Their accessibility, operation or legibility should not be altered.

C. Outdoor installations of backflow prevention assemblies that require year-round service must adhere to enclosure specifications.

D. The water lines shall be thoroughly flushed to expel all debris prior to installation of the BPA.

E. The TDEC DWR determines the types of facilities requiring cross-connection protection. A current list of these facilities may be obtained by contacting the Owner or viewed at www.kub.org/cross-connection.

F. DC and DCDA assemblies shall be installed in accordance with the figures of this specification section and according to Manufacturer's instructions. Any variation from these figures must have prior approval of the Owner.

3.02 FIELD QUALITY CONTROL

A. Inspections:

1. Properties subject to frequent changes in on-site plumbing, where new cross-connections may be installed and existing protection may be by-passed, removed or otherwise made ineffective shall be subject to an annual inspection.
2. All new commercial construction plans and specifications shall be made available to the Owner for review.
3. Existing facilities' cross-connection protection shall be subject to inspection to determine the degree of hazard. Should installation of BPA or plumbing changes be required, the Owner will

notify the occupant of the requirements and a follow-up inspection will be made to assure proper protective assemblies have been installed.

4. Upon installation of a new BPA that serves as a containment assemble for the PWS, a final inspection by the Owner should be scheduled to ensure compliance requirements are met. The Contractor can contact Owner to schedule the final inspection.

B. Testing:

1. Unless otherwise specified, it shall be the duty of the property owner/occupant to ensure annual (or more frequent if necessary) testing of BPAs. Failure to test the BPA may result in additional enforcement actions taken including the potential for termination of water service.
2. BPAs shall be successfully tested:
   a. Immediately upon completion of installation.
   b. At least every 12 months, recommended more often for high-hazard installations.
   c. When unit has been disassembled for cleaning or repairs.
   d. When there is any indication the BPA is not functioning properly.
3. All costs associated with the subject program are to be borne by the customer or appropriate party. This included the initial purchase of the BPA and is proper installation, testing, and maintenance.
4. Accessibility to the BPA should maintain at least 24 inches of clearance to facilitate maintenance and testing.

3.03 ACCESS

A. The procedures outlined herein are based on the principal of containment of the potential or actual hazard within the customer's premises. Should a customer refuse the right of entry of the Owner or their designated representative, the Owner must assume maximum hazard and therefore require the highest degree of protection on such a customer's service line.

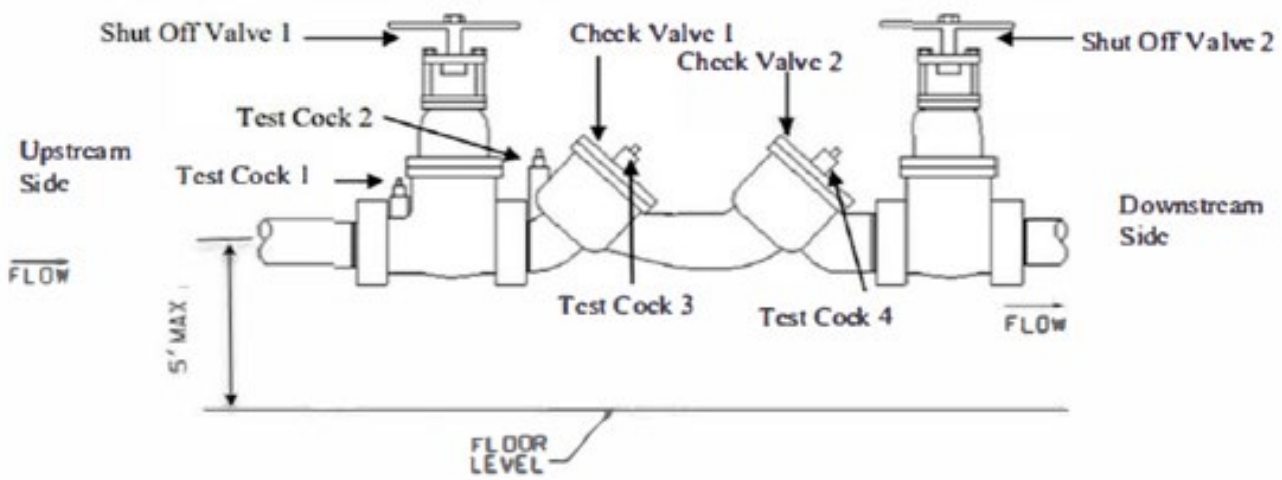
3.04 ATTACHMENTS

A. Figure 1: DC Size ¾" to 2" BPA

B. Figure 2: DC Size 2 ½" to 10" BPA

C. Figure 3: DCDA

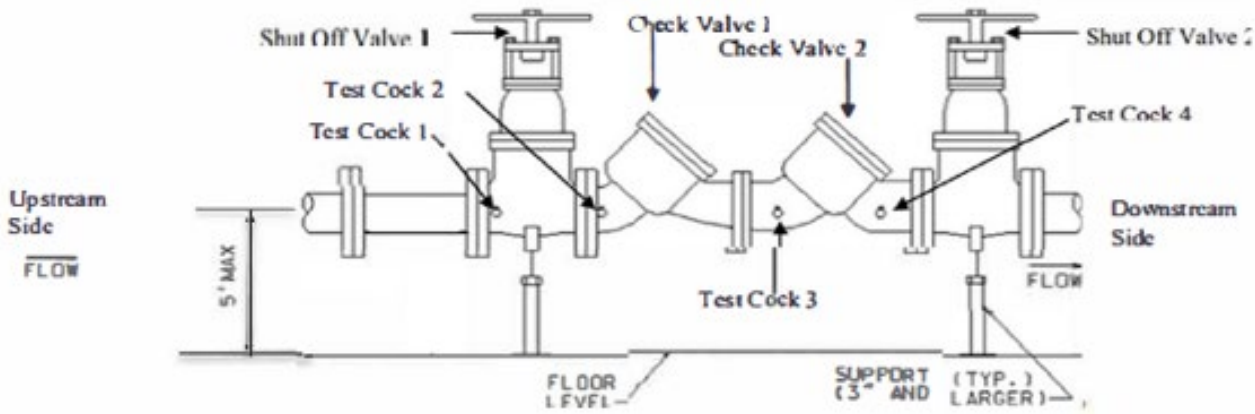
END OF SECTION



NOTES: The assembly must be installed:

A. Above ground level.
B. Within a minimum of 12” and maximum of 5’ form the floor or ground level to the centerline of the BPA.
C. Within a minimum of 6” clearance from all walls to any component of the BPA.
D. With adequate support to prevent sagging.
E. BPA installation orientation must adhere to BPA configuration requirements. Consult website for USCFCC&HR details.

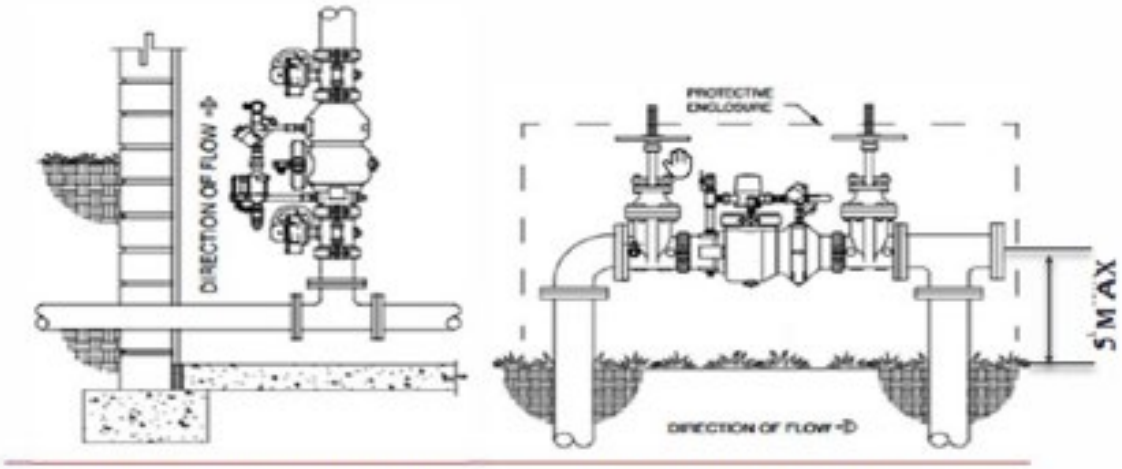
Figure 1: DC Size ¾” to 2” BPA



NOTES: The assembly must be installed:

A. Above ground level.
B. Within a minimum of 12” and maximum of 5’ form the floor or ground level to the centerline of the BPA.
C. Within a minimum of 6” clearance from all walls to any component of the BPA.
D. With adequate support to prevent sagging.
E. BPA installation orientation must adhere to BPA configuration requirements. Consult website for USCFCC&HR details.

Figure 2: DC Size 2 ½” to 10” BPA



NOTES: The assembly must be installed:

A. Above ground level.
B. Within a minimum of 12” and maximum of 5’ form the floor or ground level to the centerline of the BPA.
C. Within a minimum of 6” clearance from all walls to any component of the BPA.
D. With adequate support to prevent sagging.
E. BPA installation orientation must adhere to BPA configuration requirements. Consult website for USCFCC&HR details.

Figure 3: DCDA

Master Specification Section Owner: Water Systems Engineering
Discipline Reviewer: Water Systems Engineering Manager
Cross-Discipline Reviewer:

Summary of Changes:

Rev. No.	Revision Date	Description / Justification	Author
1.	05/01/23	Original Issuance	
2.	08/08/25	Update	Blake Brown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			