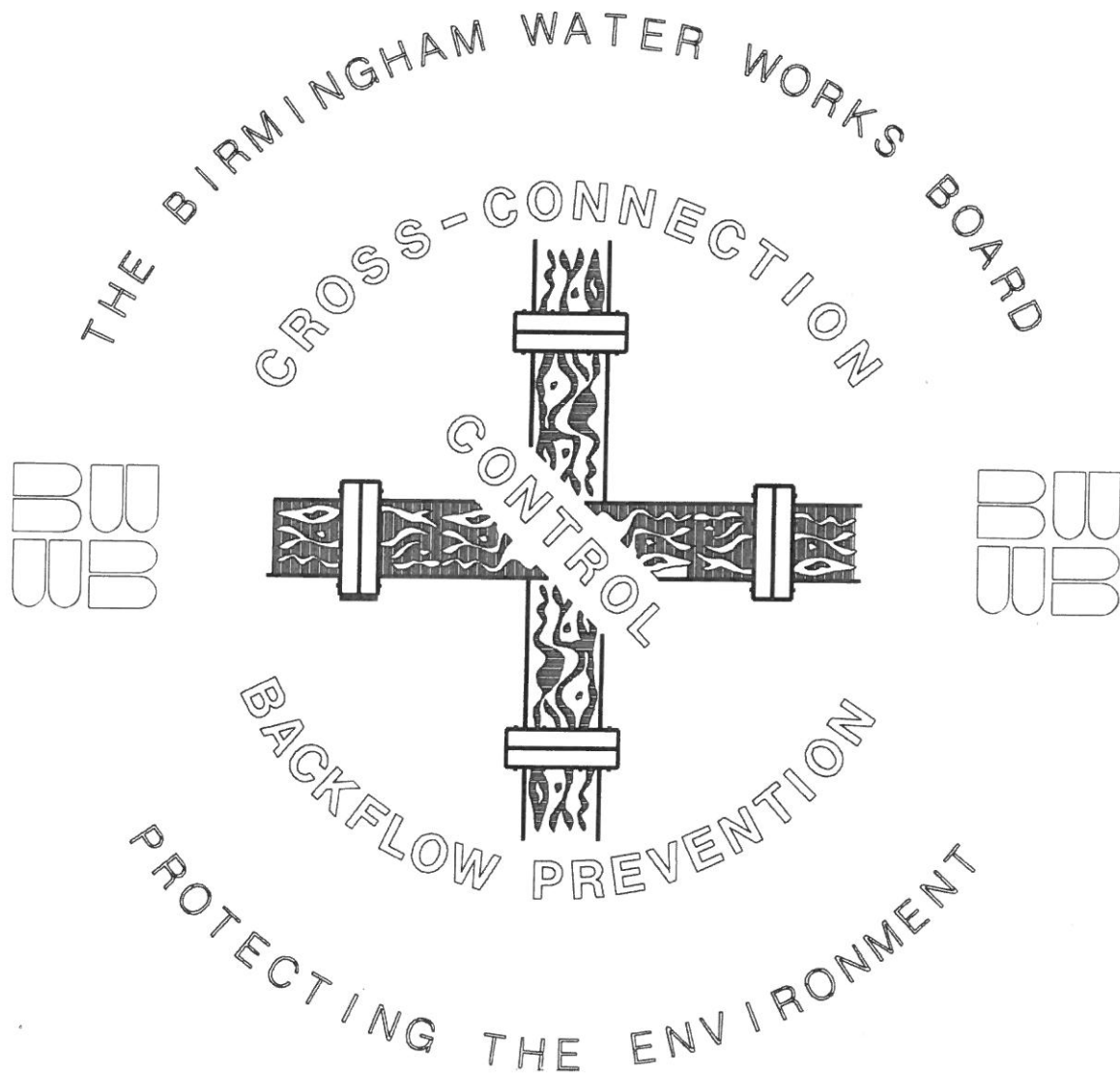


THE WATER WORKS BOARD
OF THE CITY OF BIRMINGHAM, ALABAMA

2" AND SMALLER BACKFLOW PREVENTERS



2" & Smaller Backflow Preventers

Note:

FIRE SERVICES FOUND ACTIVATED BY OTHER THAN WATER BOARD PERSONELL WILL BE TERMINATED BY BOARD PERSONELL AND ALL EXPENSES BILLED TO THE APPLICANT.

A TEMPORARY TURN ON FOR AN EIGHT (8) HOUR PERIOD FOR TESTING PURPOSES WITHOUT FINAL APPROVAL BY THE FIRE SERVICE INSPECTOR WILL BE GRANTED BY THE BOARD BY CONTACTING THE WATER BOARD INSPECTORS AT (205) 244-4251 OR (205) 244-4254.

WHEN READY FOR PERMANENT ACTIVATION OF THE FIRE SERVICE, THE APPLICANT OR AGENT MUST CONTACT THE WATER BOARD INSPECTORS AT (205) 244-4251 OR (205) 244-4254 FOR APPROVAL.

WATER SERVICE CUSTOMERS:

YOU ARE REQUIRED BY THE BIRMINGHAM WATER WORKS BOARD TO HAVE A BACKFLOW PREVENTION ASSEMBLY INSTALLED ON YOUR SERVICE PIPING AS CLOSE TO THE SERVICE CONNECTION AND PROPERTY LINE AS PRACTICABLE, GENERALLY WITHIN 6 – 10 FEET OF THE METER SETTING.

PLEASE REFER TO YOUR COPY OF THE TAP ORDER FOR THE REQUIRED BACKFLOW ASSEMBLY. DRAWINGS AND DESCRIPTIONS OF PROPER INSTALLATION FOR EACH TYPE OF BACKFLOW ASSEMBLY ARE ATTACHED AT THE END OF THIS DOCUMENT.

ALL ASSEMBLIES MUST BE TESTED WITHIN 30 DAYS OF INSTALLATION AND ANNUALLY THEREAFTER BY ONE OF THE CERTIFIED TESTERS APPROVED BY THE BIRMINGHAM WATER WORKS BOARD. THE CUSTOMER WILL BE NOTIFIED WHEN THE PREVIOUS TEST DATE HAS EXPIRED. FOR AN UPDATED LIST OF CERTIFIED TESTERS PLEASE CONTACT OUR CROSS-CONNECTION CONTROL DEPARTMENT AT (205) 244-4251 OR (205) 244-4254.

THE CERTIFIED TESTER HAS THE RESPONSIBILITY TO GET THE TEST AND MAINTENANCE REPORT TO THE CUSTOMER. THE TESTER MUST ALSO SEND A COPY OF THE REPORT TO THE CROSS-CONNECTION CONTROL DEPARTMENT AT THE FOLLOWING EMAIL ADDRESS:

backflow@bwwb.org

INSTALLATION OF 2" AND SMALLER BACKFLOW PREVENTERS

INSTALLATION OF BACKFLOW PREVENTERS FOR FIRE AND DOMESTIC SERVICES

Backflow prevention and detector assemblies as required by the Water Board shall be installed on the customer's service piping and situated on the premises as close to the meter setting and property line as practicable, generally within 6 – 10 feet of the meter. They shall be installing in the position as recommended by the manufacturer and should be protected from freezing. No intervening connections or by-passes shall be between the service connection and outlet side of the assembly except for by-pass meter piping on detector assemblies.

DUAL CHECK VALVE BACKFLOW PREVENTER: The term shall mean a device composed of two in-line independently acting, approved check valves. This device is not testable and does not have shut-off valves at each end of the device or fitted with test cocks (see Section 9.3 for additional details). This device shall only be used for residential service and to protect against a non-health hazard (i.e., pollutant).

DOUBLE CHECK VALVE - DETECTOR ASSEMBLY: The term shall mean a specifically designed assembly composed of a line-size approved double check valve assembly with a specific by-pass water meter and a meter-sized approved double check valve assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. (see Section 9.7 for additional details) This assembly shall only be used on a fire protection service to protect against a non-health hazard (i.e., pollutant).

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER DEVICE (ASSEMBLY): The term shall mean an assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valve. The unit shall include properly located test cocks and tightly closing shut-off valves at each end of the assembly (see Section 9.5 for additional details). This assembly is designed to protect against a health hazard (i.e., contaminant).

PRESSURE VACUUM BREAKER (PVB): An assembly consisting of an independently operating, internally loaded check valve, an independently operating, loaded air-inlet valve located on the discharge side of the check valve, with properly located resilient-seated test cocks and tightly closing resilient-seated shutoff valves attached at each end of the assembly designed to be operated under pressure for prolonged periods of time to prevent backsiphonage. The pressure vacuum breaker may not be subjected to any backpressure.

SPECIFICATIONS FOR BACKFLOW PREVENTER VAULTS

1.0 - GENERAL REQUIREMENTS

1.1 - DESCRIPTION/SCOPE

This specification applies to reinforced concrete (pre-cast or cast in place) and reinforced concrete block underground vaults to be used for housing backflow preventers 2" and smaller.

1.2 - QUALITY ASSURANCE

The manufacturer shall furnish a notarized certification to The Birmingham Water Works Board that all items were manufactured in full compliance with these specifications.

Any and each future change in the design of the vault **MUST** be resubmitted with another notarized certification and new design drawing per Section 1.3 of this specification.

The entire process of the manufacture of items to be furnished under this specification shall be open at all times to the inspection of The Birmingham Water Works Board Engineer or his/her designated alternate. All defects shall be corrected to his/her satisfaction or the material will be rejected. Approval at time of plant inspection shall not prevent rejection if defects are subsequently discovered.

1.2.1 - REFERENCES, STANDARDS, AND SPECIFICATIONS

American Society for Testing and Materials (ASTM):

➤ **C858**

Underground Pre-cast Concrete Utility Structures

➤ **C890**

Practice for Minimum Structural Design Loading for Monolithic or Sectional Pre-cast Concrete Water and Wastewater Structures

➤ **C913**

Pre-cast Concrete Water and Wastewater Structures

➤ **C478**

Pre-cast Reinforced Concrete Manhole Sections

➤ **C15**

Deformed and Plain Fillet-Steel Bars for Concrete Reinforcement

➤ **C31**

Making and Curing Concrete Test Specimens in the field

➤ **C33**

Concrete Aggregates

➤ **C39**

Compressive Strength of Cylindrical Concrete Specimens

➤ **C150**

Portland Cement

➤ **C260**

Air-Entraining Admixture for Concrete

➤ **C494**

Chemical Admixtures for Concrete

American Welding Society (AWS):

➤ **AWS-D1.4**

Structural Welding Code (Reinforcing Steel)

American Concrete Institute (ACI):

➤ **ACI 318**

Building Code Requirements for Reinforced Concrete

American Association of State Highway and Transportation Officials (AASHTO)

(Or specify the loading that the boxes are tested at)

When reference is made in this specification to the above references, standards, and specifications, it is understood that the latest revision thereof shall apply. The manufacturer should especially note that this part of the specifications applies to all items with additional requirements set forth for each type.

1.2.2 – **DEFINITIONS**

➤ **Manufacturer**

Producer and/or designer of underground pre-cast concrete vaults

➤ **Contractor**

Installer of underground pre-cast concrete vaults or constructor of cast-in-place concrete and/or concrete block vaults

➤ **Owner**

Purchaser of underground pre-cast concrete, cast-in-place concrete, and/or concrete block vaults

1.3 - **SUBMITTALS**

The manufacturer shall submit a design drawing for the specified vaults which shall contain the following:

- Signature and dated stamp of a Professional Engineer registered in the State of Alabama
- Design loads used (i.e. AASHTO H-10 traffic loading, etc.)
- Concrete compressive strength (i.e. 4,000 psi @ 28 days, etc.)
- Grade of reinforced steel (i.e. ASTM A-615 Grade 60, etc.)
- Number, size, and placement of ALL reinforcement used to include corners and openings
- Standard Design (i.e. assumed depth below grade of top of slab, depth below grade of water table, etc.)
- Location of all associated components (i.e. manhole steps, sump, door, etc.)

1.4 – **PRODUCT DELIVERY**

The manufacturer shall coordinate with the owner/contractor concerning delivery and schedule. The manufacturer of pre-cast concrete vaults shall also coordinate the installation of their product with the owner/contractor.

1.5 – **GUARANTEE/WARRANTY**

Each vault shall be warranted against defects in material and workmanship for a period of one (1) year after construction.

2.0 – PRODUCTS

2.1 – SERVICE CONDITIONS/DESIGN CRITERIA

- The underground vaults shall be used to house 2" and smaller backflow preventers and shall be constructed of reinforced concrete or reinforced concrete block. The purpose of the vault is to protect the backflow preventer assembly. The vault shall also provide adequate clearance for easy access for maintenance and testing.
- The top of the box shall be at grade.
- The box shall be constructed to resist settling.
- The minimum interior dimensions required for the box are as follows:
 - 2" Box: Length – 28" / Width – 15" / Height – 28" - 30"
 - 1" Box: Length – 20" / Width – 14" / Height – 16" - 18"
- The box shall utilize a solid cast gray iron lid and shall be able to withstand low speed, incidental traffic.
- Concrete boxes shall be wet cast only in a steel form with Portland Cement per ASTM C-150 Type II. The cement will reach 4,000 psi minimum compressive strength at twenty-eight (28) days. Written manufacturers certification of concrete mix test results shall be available upon request.
- Each box shall be designed and construction to meet the applicable requirements of the references listed in Section 1.2 of this specification.

Minimum clearances/dimensions are shown on the attached sketch.

The loads used for design shall consist of "Dead" and "Live" Loads.

These loads are described as follows:

Dead Load:

The "Dead" load shall consist of soil loads. Soil parameters used shall be a density of 100 pcf and an "active" pressure coefficient of 0.3.

Live Load:

The "Live" load shall consist of a pedestrian load of 350 psf. If a traffic loading is specified, then an AASHTO loading of H-10 will apply.

2.2 – **DETAILS OF CONSTRUCTION**

- Cast Iron coverings shall be made available without flip readers.
- The walls of the box shall be vertical.
- Pipe entry and exit areas will be field cut by owner/contractor.
- The backflow assembly shall be centered with the rectangular box.
- The minimum of stone required in the bottom of the box is:
 - 2" box: 12 inches of clearance
 - 1" box: 4 inches of clearance
- A minimum of 4" of clearance shall be provided between the top of the box and the highest point of the backflow preventer assembly.
- Reference the attached drawing titled "Double Check Valve Backflow Preventer Typical Installation for 2" and Smaller" for the minimum clearances required for the boxes.
- All fittings shall be exposed within the box.
- Mastic Sealing shall be applied to ALL openings or joints in order to prevent infiltration of soil or water.
- A copy of the **Cross-Connection Control and Backflow Prevention Policy Manual** can be obtained from the Cross-Connection Control Department and may also be viewed on the BWB website at www.bwwb.org.

APPROVED MANUFACTURERS OF

BACKFLOW PREVENTER ASSEMBLY STRUCTURES

Prefabricated Concrete Vault Manufacturers:

(To be used for 2" and smaller backflow preventers)

- | | |
|---------------------------------|-------------------------------------------------|
| a. BARTOW PRECAST | approved for submitted vaults with inside clear |
| Phone: (770) 382-4462 | 4'x6'x4½', 5'x8'x5½', and 6'x10'x7' |
| Contact: Josh Gaines | |
| b. Eagle Wholesale Supply, Inc. | approved for submitted vaults with inside clear |
| Phone: (256) 232-2100 | 4'x6'x5½', and 5'x8'x4½' |
| Contact: Curtis Anderson | |

Prefabricated Insulated Cover Manufacturer

(To be used for RP backflow preventers)

- | | |
|-----------------------|-----------------------|
| a. HOTBOX | c. AQUA SHEILD |
| Phone: (800) 346-3062 | Phone: (800) 613-3339 |
| b. SAFE-T-COVER, INC. | d. G&C ENCLOSURES |
| Phone: (800) 245-6333 | Phone: (888) 753-6565 |

Backflow Preventer Box Manufacturer

(To be used for 2 inch and smaller backflow preventers)

- | | |
|---------------------------|---------------------------------------|
| a. Old Castle Precast | Approved for BCF Series Meter Boxes |
| Phone: (888) 965-3227 | |
| Supplied by Core and Main | |
| Phone: (205) 621-4561 | |
| b. Hubbell | Approved for Quazite PG1730BA30 Boxes |
| Phone: (800) 346-3062 | |

BWWB SERVING AREA:
Contractor Punch List

Fire Service

- ☐ BFP Type (Refer to tap order) meets ASSE, AWWA, FM, UL, and USC standards
- ☐ No water in vault. Vault floor sloped 1/8" per foot toward sump and drain. (Do not grout floor)
- ☐ O.S.&Y. or Butterfly Valves meet USC, UL and FM fire protection approval.
- ☐ No. One Test Cock on inlet side of No. One Shut Off Valve. Brass plugs installed in all test cocks.
- ☐ By-pass Assembly installed correctly (Detector Double Check Only)
- ☐ Mag Meter or By-Pass Meter installed correctly (meter furnished and installed by BWWB)
- ☐ Minimum clearance of assembly in vault. Vault constructed correctly per BWWB BFP specifications.
- ☐ Manhole steps 15" on center and centered under sidewalk door.
- ☐ Sidewalk door. (BWWSB approved 36" x 36" access hatch)
- ☐ Adjustable pipe jacks installed under Backflow Preventer Assembly
- ☐ Drain installed correctly (PVC pipe extending 6' from vault into no less than 1 cy yard of crushed stone)
- ☐ Sump pump installed and working properly. Sump pit 12 inches in diameter and 4 inches deep
- ☐ The interior of each pre-cast vault shall contain the printed name of both the manufacturer & vendor
- ☐ The opening for the Fire Department connection shall be grouted with Portland Cement

Domestic Service

- ☐ BFP Type (Refer to tap order) meets ASSE, AWWA, FM, UL, and USC standards
- ☐ No water in vault. Vault floor sloped 1/8" per foot toward sump and drain. (Do not grout floor)
- ☐ O.S.&Y. or Butterfly Valves meet USC standards (3" and larger)
- ☐ Ball valves for 2" and smaller
- ☐ No. One Test Cock on inlet side of No. One Shut-Off Valve. Brass plugs installed in all test cocks
- ☐ Minimum clearances of assembly in vault or in approved enclosure
- ☐ Manhole steps 15" on center and centered under sidewalk door.
- ☐ Sidewalk door. (BWWSB approved 36" x 36" access hatch)
- ☐ Minimum drain opening in above ground enclosure; 4 times area of discharge opening
- ☐ Adjustable pipe jacks installed under Backflow Preventer Assembly.
- ☐ Drain installed correctly (PVC pipe extending 6' from vault into no less than 1 cy yard of crushed stone)
- ☐ Sump pump installed and working properly. Sump pit 12 inches in diameter and 4 inches deep
- ☐ The interior of each pre-cast vault shall contain the printed name of both the manufacturer & vendor
- ☐ The RPZ must be installed 12" – 36" above final grade and CANNOT be installed in a basement
- ☐ RPZ minimum drain opening must be 4 times the area of the relief valve opening

The Water Works Board of the City of Birmingham

* For inquiries contact the Backflow Department at (205) 244-4251, (205) 244-4254, or (205) 244-4256.

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SECTION 9 (CONTINUED)

TYPICAL BACKFLOW PREVENTION DEVICE INSTALLATIONS

DOUBLE CHECK VALVE ASSEMBLY (DC) INSTALLATION

SEE SEC. 9.4

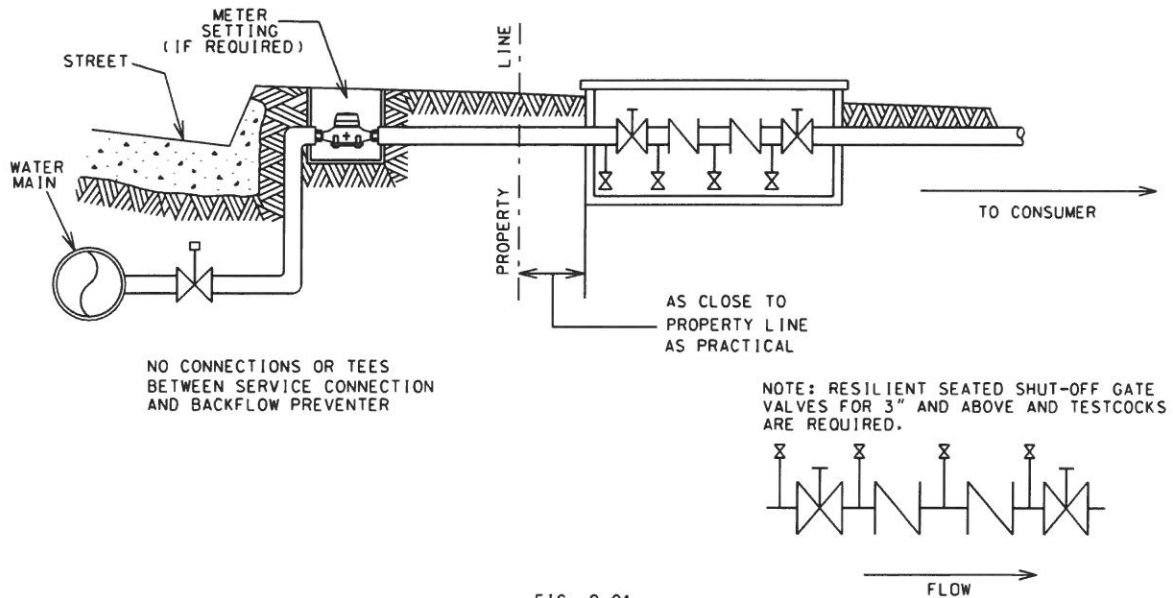


FIG. 9.01

REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY (RP) INSTALLATION

SEE SEC. 9.5

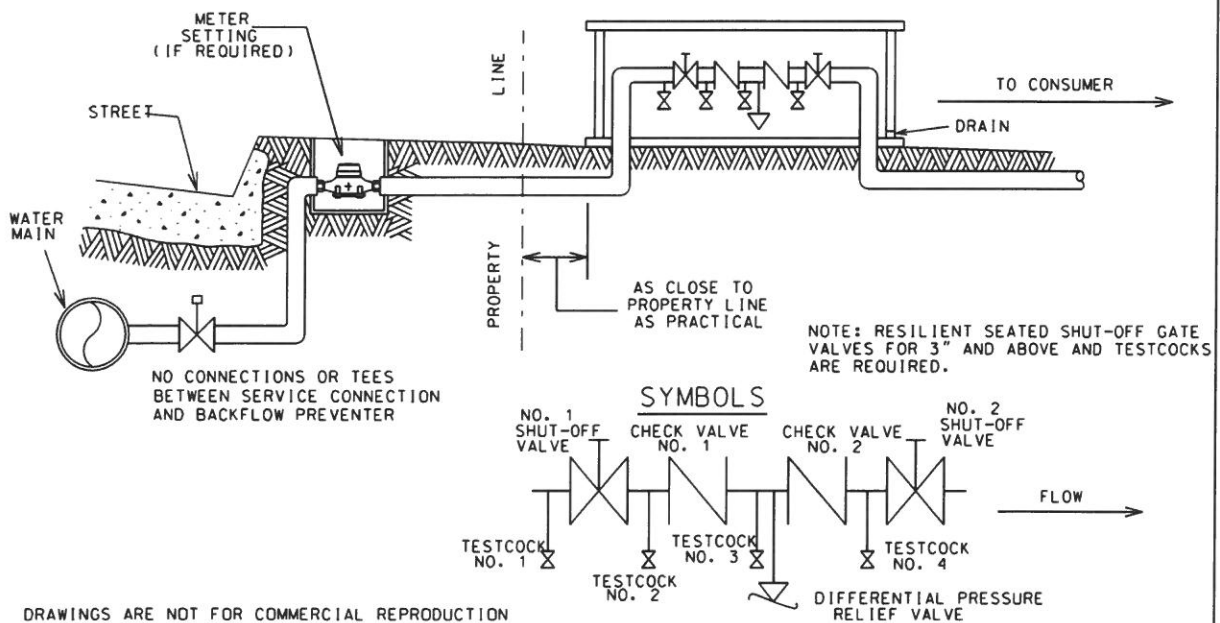


FIG. 9.11

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THE BIRMINGHAM WATER WORKS BOARD

DRAWN BY VLD

NOVEMBER 1993
REV. JUNE 2000

SECTION 9 (CONTINUED)
PARALLEL INSTALLATION

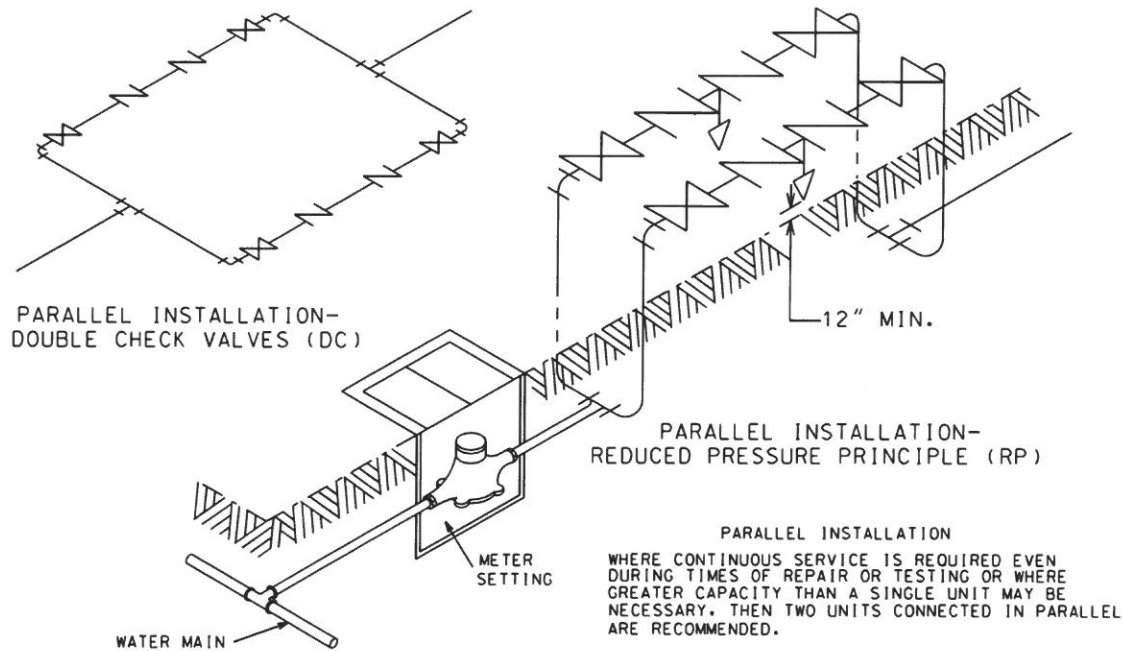


FIG. 9.1.2

AIR-GAP SEPARATION (AG)

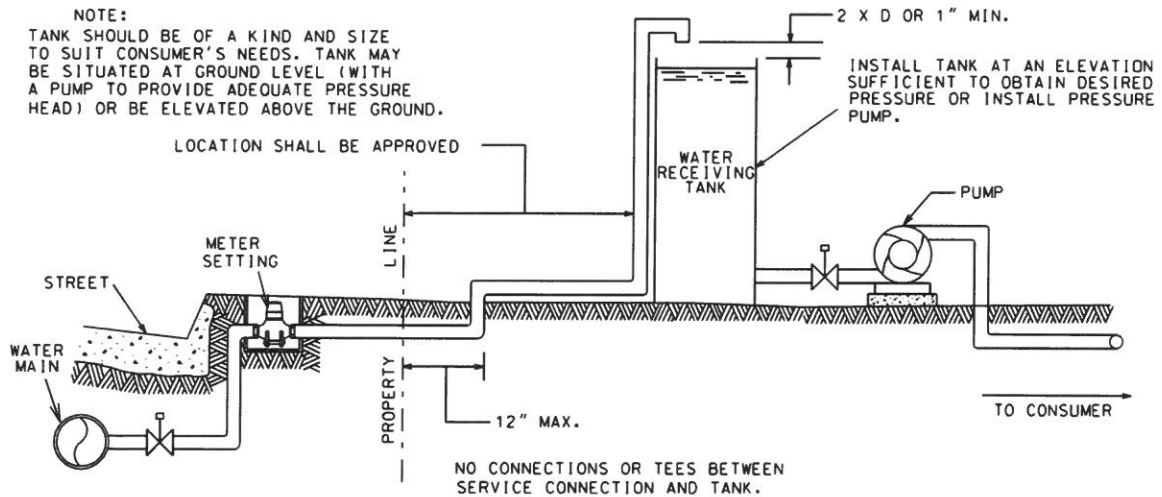
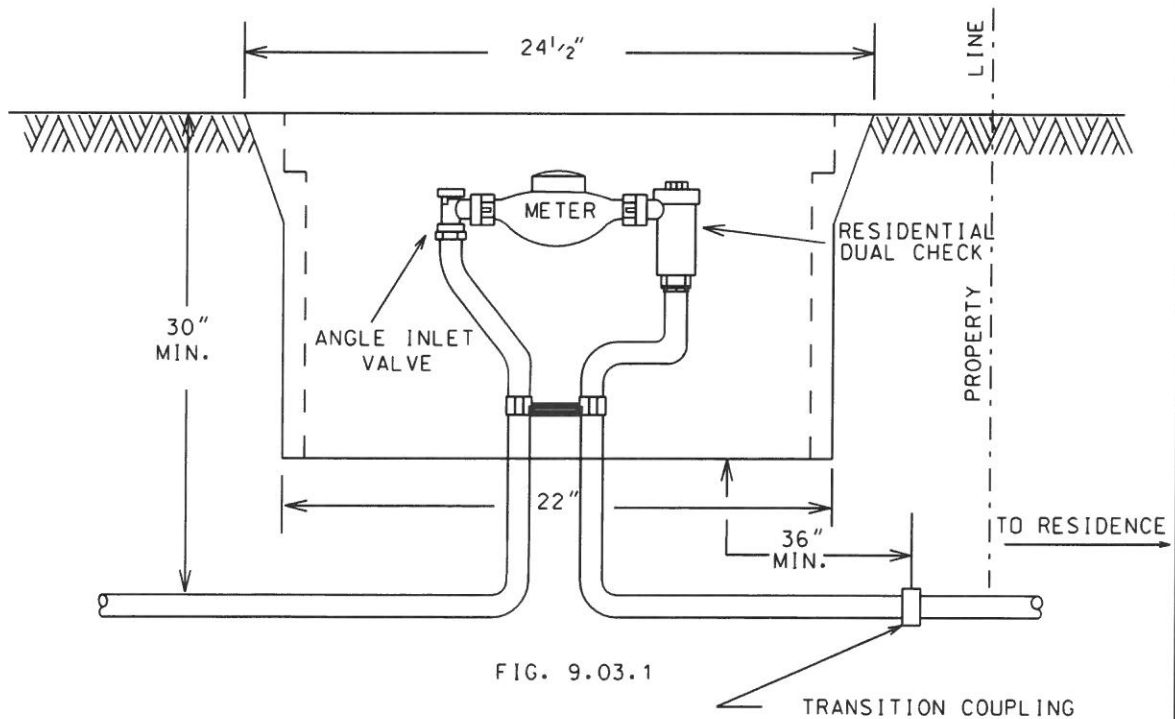
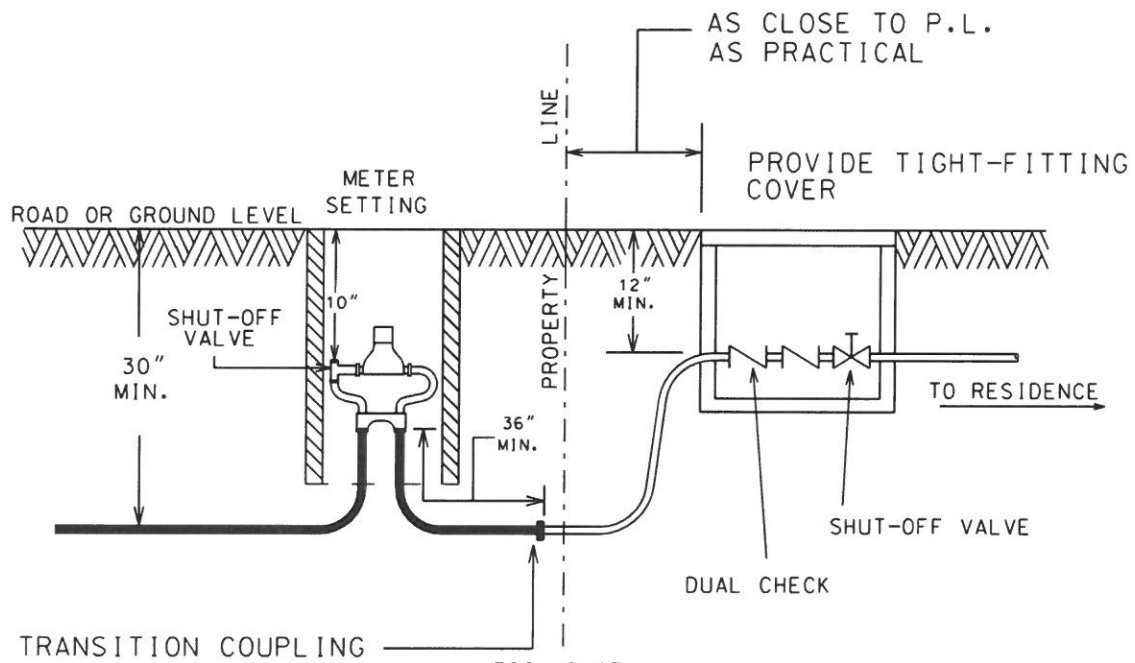


FIG. 9.02

SECTION 9 (CONTINUED)
DUAL CHECK VALVE (DUC) BACKFLOW PREVENTER INSTALLATION

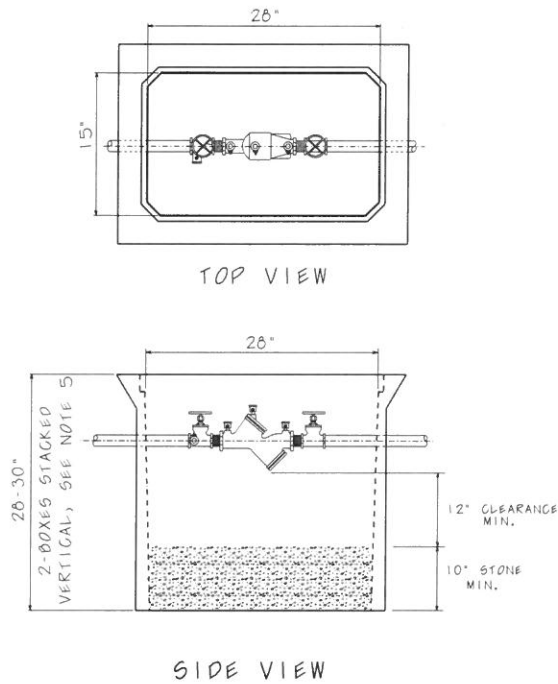
NOTE:
FOR RESIDENTIAL USE ONLY



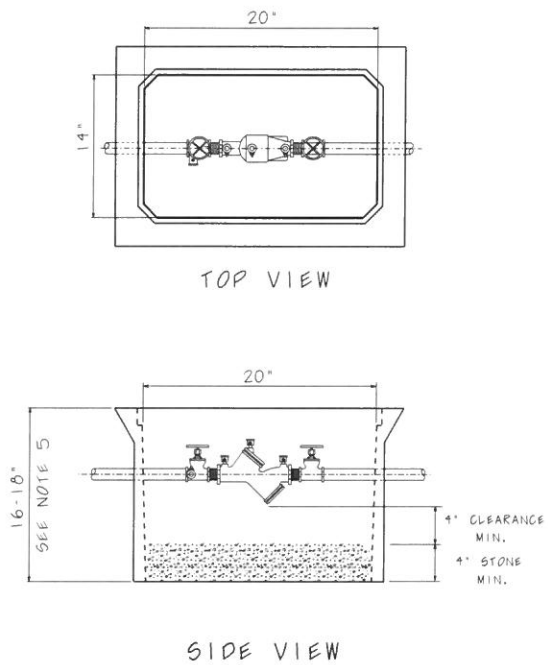
REVISED 2-18-00
REVISED 6-29-00

DOUBLE CHECK VALVE BACKFLOW PREVENTER TYPICAL INSTALLATION FOR 2" AND SMALLER

2" AND SMALLER



1" AND SMALLER



1. THE TYPE OF BOX IS OPTIONAL WITH OWNER. THE OBJECTIVES ARE PROTECTION FOR THE ASSEMBLY, ADEQUATE CLEARANCE, AND EASY ACCESS FOR MAINTENANCE AND TESTING.
2. THE BACKFLOW ASSEMBLY SHALL BE CENTERED HORIZONTALLY WITHIN THE BOX.
3. THIS DRAWING IS STRICTLY TO ILLUSTRATE MINIMUM CLEARANCES AND DIMENSIONS OF THE BOX. FOR SPECIFIC DESIGN DETAILS, REFERENCE ATTACHED SPECIFICATION.

4. REFER TO APPROVED MANUFACTURERS OF BACKFLOW PREVENTER ASSEMBLY STRUCTURES ON PAGE 6 OF THE ATTACHED SPECIFICATIONS.
5. TWO BOXES MAY BE STACKED IN ORDER TO OBTAIN THE REQUIRED VERTICAL DIMENSION. ASSEMBLY INSTRUCTIONS AND/OR RECOMMENDATIONS MAY BE OBTAINED FROM THE MANUFACTURER OR DEPT. 816 AT THE BIRMINGHAM WATER WORKS BOARD PHONE: 251-3261 EXT. 444

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FIGURE 9.04.1

FEBRUARY 2000
JUNE 2000