

5.2 SANITARY SEWER SYSTEM

5.2.01 General

- A. This section provides specifications for the materials and products which must be used to construct public sewer facilities in Goochland County, Virginia.
- B. Reference Specifications are referred to by abbreviation as follows:
 - 1. American National Standards Institute ----- ANSI
 - 2. American Society for Testing and Materials ----- ASTM
 - 3. American Water Works Association ----- AWWA
 - 4. American Railway Engineering Association ----- AREA

5.2.02 Underground Pressure Pipe

- A. Ductile Iron Pipe
 - 1. Ductile iron pipe shall meet the requirements of AWWA Class 52 and rubber-gasket joints shall meet the requirements of AWWA C111 3- through 24-inch pipe shall be, at a minimum, class 52 with a working pressure of 350 psi. Pipe shall have a single cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA C104.
 - 2. Pipe subject to hydrogen sulfide attack shall have an interior lining of Protecto 401 ceramic epoxy or approved equal.
 - 3. A minimum of 5% of the pipe furnished shall be gauged for roundness full length and so marked.
 - 4. Pressure class of pipe shall be increased if the specific installation warrants it.
- B. Ductile Iron Restrained Joint Pipe
 - 1. Ductile iron restrained joint pipe shall meet the requirements of AWWA C151 and AWWA C150. Minimum thickness shall be Class 52 with a working pressure of 350 psi.
 - 2. Rubber-gasket joints shall meet the requirements of AWWA C111.
 - 3. Pipe shall have a single cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA C104.
 - 4. Pipe subject to hydrogen sulfide attack shall have an interior lining of Protecto 401 ceramic epoxy or approved equal.

5. Restrained push-on joints shall utilize a gripper ring, field weldments, or approved equal and shall be designed for a working pressure of 350 psi for sizes 4” through 24”.
6. A minimum of 5% of the pipe furnished for a project shall be gauged for roundness full length and so marked.
7. Pressure class of pipe shall be increased if the specific installation warrants it.

C. Polyvinylchloride (PVC) Pipe

1. PVC pipe shall meet requirements of AWWA C900 (DR-14, CL. 305) for sizes 8 inches and smaller. Joints shall be in accordance with manufacturer’s instructions and ASTM D2564, D2464, D2467, D319, and F477.
2. Where working pressures over 150 psi are anticipated ductile iron pipe shall be used. Cell classification shall be 12454-B.

D. High Density Polyethylene (HDPE) Pipe

1. 3-Inches and Smaller Pipe: Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350 with a cell classification of 445574C/E and is formulated with carbon black and/or ultraviolet stabilizer. Pipe shall have a manufacturing standard of ASTM D2737 (copper tubing size), ASTM D2239 (iron pipe size, controlled inside diameter) and ASTM D 3035 (iron pipe size, controlled outside diameter). Pipe shall have a pressure class as specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipes shall be suitable for use as pressure conduits, and per AWWA C901, have nominal burst values of three times the Working Pressure Rating (WPR) of the pipe.
2. 4-Inches and Larger Pipe: Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material will meet the specifications of ASTM D3350 with a cell classification of 445574C/E and is formulated with carbon black and/or ultraviolet stabilizer. Pipe shall have a manufacturing standard of ASTM F714. Pipe O.D. size shall be ductile iron pipe size (DIPS). Pipe shall be minimum pressure class 250 psi (DR-9). Pipe larger than 24” nominal diameter shall have the lowest DR, and the highest PR, available for the size of pipe being used. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification

from the same raw material. All pipes shall be suitable for use as pressure conduits per AWWA C906. Pipe shall have a nominal burst value of three and one-half times the Working Pressure Rating (WPR) of the pipe.

3. HDPE pipe shall be continuously marked by the manufacturer with permanent printing indicating the following:
 - a. Nominal size (inches)
 - b. Dimension ratio (DR)
 - c. Pressure rating (psi)
 - d. Material classification (PE 4710)
 - e. Plant, extruder, and operator codes
 - f. Resin supplier code
 - g. Date produced
4. HDPE pipe used for sewer shall be black in color with permanent green stripes extruded into the pipe along its entire length or shall be solid green.

5.2.03 Gravity Pipe

- A. Polyvinylchloride (PVC)
 1. For pipe sizes 4 through 15 inches, pipe shall meet requirements of ASTM D3034 type PSM SDR-26 or of ASTM F1760 DR-26 having reprocessed-recycled content.
 2. For pipe sizes 18 through 36 inches, pipe shall meet requirements of ASTM F679, PS115.
 3. Where C900 PVC pipe is specified for use as gravity sewer, it shall meet the requirements in these Standards for PVC waterline.
- B. Ductile Iron
 1. Ductile iron gravity pipe shall meet the requirements of this Section for ductile iron pressure pipe. Thickness class shall be increased for the specific installation conditions, as determined by the Engineer.
- C. Service Connections on Existing Sewer Mains

1. Existing 12” and Smaller Sewer Mains: Compression type wye cast iron saddle with 24-gauge with stainless steel strap, two nickel-bronze T-bolts, and O-ring type gasket.
2. Individual service connections are typically not allowed to gravity sewer lines larger than 12” However, when permitted, a straight cast iron saddle shall be used.

5.2.04 Underground Pressure Pipe Fittings

A. Ductile Iron Fittings

1. Fittings for PVC pipe and DI pipe shall be ductile iron. Ductile iron fittings shall be in accordance with AWWA C110 or AWWA C153. Pressure ratings shall be a minimum of 350 psi for fittings 24-inch and smaller and 250 psi for 30-inch. All fittings shall have a single cement mortar lining on the interior and a bituminous seal coating on the exterior.
2. Fittings subject to hydrogen sulfide attack shall have an interior lining of Protecto 401 ceramic epoxy or approved equal.
3. Fittings shall have mechanical joints conforming to the requirements of AWWA C111. Bolts for mechanical joint fittings shall be high strength, corrosion resistant low alloy steel with hexagon nuts having a minimum yield point of 45,000 psi in accordance with AWWA C111. Mechanical joint bolts shall be torqued with a torque wrench as per manufacturer’s recommendations.
4. Couplings for underground or buried service lines shall be ductile iron restrained mechanical joint in accordance with the requirements for underground ductile iron fittings in this section.

B. Polyethylene Pipe Fittings

1. Fittings for polyethylene pipe shall be manufactured specifically for the intended use and be approved by the piping manufacturer to be compatible with their product. All fittings shall have a working pressure rating equal to or greater than the pipe.
2. Butt Fusion Fittings: Butt fusion fittings shall be PE4710 HDPE, Cell Classification of 445574C/E as determined by ASTM D3350 and approved for AWWA use. Fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using data loggers. Temperature, fusion pressure, and a graphic representation of the

fusion cycle shall be part of the quality control records. All fittings shall be suitable for use as pressure conduits and, per AWWA C901 and C906, shall have a nominal burst value of three and one-half times the Working Pressure Rating (WPR).

3. Electro-fusion Fittings: Electro-fusion fittings shall be PE4710 HDPE, Cell Classification of 445574C/E as determined by ASTM D3350. Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C901 and C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR).
4. Flanged and Mechanical Joint Adapters: Flanged and mechanical joint adapters shall be PE4710 HDPE, Cell Classification of 445574C/E as determined by ASTM D3350. Flanged and mechanical joint adapters shall have a manufacturing standard of ASTM D3261.

C. Thrust Restraint

1. Contractor shall install concrete thrust blocks at all tie in points and as indicated on the contract drawings or as directed by the Inspector based upon field conditions. Thrust blocks shall be sized as indicated on the appropriate Standard Detail(s). Concrete shall have 3,000 psi strength at 28 days and shall meet the requirements of ASTM C94.
2. All pipe fittings, plugs, caps, tees, and bends in underground pressure piping shall be restrained. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and C153/A21.53. Twist-off nuts shall be used to insure proper actuating of the restraining devices. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2.
3. Ductile iron bell and spigot pipe joints shall be restrained on both sides of valves and fittings for the lengths specified on the applicable Standard Detail or as indicated on the drawings, whichever is greater. Approved push-on restraining gaskets or harness type restraints shall be used. Gaskets shall be manufactured by the pipe manufacturer to be compatible with their pipe.

5.2.05 Above Ground or Exposed Pressure Pipe

A. Ductile Iron Pipe

1. Ductile iron pipe installed above ground, inside buildings or underground vaults, shall be flanged ductile iron pipe class 53 in accordance with AWWA C115 (ANSI A21.15). Unless indicated otherwise on the drawings, pipe shall have Class 125 flanged joints utilizing factory installed screwed flanges (no uniflange type flanges are permitted) meeting the requirements of ANSI B 16.1, outside coating shall be red primer, and gaskets for flanged pipe shall be 1/8-inch-thick full face red rubber. All steel flanges mating to flat face flanges shall have the raised face machined off. Pipe shall have a single cement mortar lining with asphaltic seal coat meeting the requirements for AWWA C104.
2. Pipe subject to hydrogen sulfide attack shall have an interior lining of Protecto 401 ceramic epoxy or approved equal.

B. Ductile Iron Fittings

1. Fittings for ductile iron pipe shall be flanged ductile iron in accordance with AWWA C110. Fittings up to 30 inches in diameter shall have a minimum working pressure rating of 250 psi. Unless indicated otherwise on the drawings, pipe shall have Class 125 flanged joints meeting the requirements of ANSI B 16.1, outside coating shall be red primer, and gaskets for flanged pipe shall be 1/8-inch-thick full face red rubber. Fittings shall have a single cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA C104.
2. Fittings subject to hydrogen sulfide attack shall have an interior lining of Protecto 401 ceramic epoxy or approved equal.

- C. Flange Adaptors: Flange adaptors shall only be used for final connections to equipment or to allow for disassembly of pipe for equipment maintenance in approved locations. Flange adaptors are not to be used to make up for misaligned pipe. Uniflanges are not permitted.

D. PVC Pipe and Fittings

1. Without special approval from the Department, above ground PVC pipe shall only be used for chemical piping in sizes 1 inch and smaller.
2. Small diameter PVC pipe and fittings shall be socket weld schedule 80.

3. When transitioning from metal to PVC, the PVC adaptor shall always be a male NPT PVC fitting inside of a female NPT metal fitting. Should the metal fitting be a male thread, a metal coupling shall be installed to provide a female thread for the PVC adaptor.

E. Stainless Steel Pipe and Fittings

1. All stainless steel pipe shall be Schedule 40 type 304 unless otherwise specified by equipment manufacturers or for chemical compatibility to be 316.
2. Stainless steel pipe shall be threaded with threaded fittings.

5.2.06 Plug Valves

- A. Plug Valves shall be the non-lubricated eccentric type with resilient faced plugs. Port area shall be at least 80 percent of the full pipe area for gravity applications and 100 percent of the full pipe area for pumped applications. Bodies shall be cast iron with welded nickel, raised seats. Valves shall have permanently lubricated corrosion resistant bearings in the bonnet and body.
- B. Packing and packing glands shall be accessible without having to disassemble the valve. Packing shall be adjustable.
- C. Valves shall have resilient plug facings suitable for the service intended and shall provide dead-tight shutoff. Opening the valve shall cause the plug to be raised off the seat without scraping the seat or body walls.
- D. Plug valves shall be gear operated unless otherwise shown or specified and shall open counterclockwise. Exposed plug valves (located above ground, inside buildings, valve vaults, etc.) shall be flanged and provided with gear operated hand wheel actuators complete with valve position indicators.
- E. Plug valves for direct burial service shall be provided with right angle worm gear operators. Buried valves shall be provided with adjustable valve boxes with extension stems to within 12" of grade.
- F. Valve boxes shall meet the requirements of the Standard Details.
- G. Inside iron or steel surfaces of valves and exterior surfaces of valves which are to be buried in the ground shall be given two coats of asphalt varnish meeting the requirements of Federal Specification TT-V-51a. Exterior iron or steel surfaces of other valves shall be painted as specified for the pipelines in which they are installed.
- H. 4-inch and larger plug valves must pass a 3-inch spherical solid.

5.2.07 Check Valves

A. Swing check valves

1. 3 Inches and Larger:

- a. Check valves 3 inches and larger shall be Class 125 flanged ends ductile iron body bronze mounted, bronze disc facing, swing type lever, and weight check valves in accordance with AWWA C508. Flanged end dimension and drilling shall comply with ANSI B 16.1, Class 125.
- b. Check valves 3 through 24 inches shall have a 250-psig maximum working pressure.
- c. Check valves larger than 24 inches shall be designed and specified on a case-by-case basis.
- d. Check valves shall have an adjustable air decelerator (air cushion) installed on the outside of the valve to control valve closing.
- e. All check valves shall have a factory installed limit switch to indicate closed position for flow confirmation.

- ##### 2. Smaller than 3 inches: : Check valves smaller than 3 inches shall be class 150 bronze or stainless-steel y-pattern swing check valves with threaded ends.

5.2.08 Tracer Wire

- A. Tracer wire for open cut pipe installations shall be High Strength, High Flexibility 12 AWG Copper Clad Steel (CCS) wire with minimum 0.030" thickness green-colored insulation of High Molecular Weight Polyethylene (HMW-PE) and shall be specifically manufactured for use as tracer wire.
- B. Tracer wire for HDD pipe installations shall be Extra High Strength 10AWG Copper Clad Steel (CSS) polyethylene insulated with 0.045" thickness green-colored insulation of High Molecular Weight Polyethylene (HMW-PE) and shall be specifically manufactured for use as tracer wire.

5.2.09 Connectors for Tracer Wire

- A. Wire connectors for tracer wire on open cut pipe installations shall be Set Screw Pressure type for use with 12AWG wire.

- B. Wire connectors for splicing tracer wire on HDD pipe installations shall be In-line splice type with set screws, a solid brass lug, and a heat-shrink cover, for use on 10AWG wire.
- C. Wire nuts shall not be used on tracer wire.

5.2.10 Tracer Wire Access Boxes

- A. Tracer wire access boxes shall be made of cast iron with a permanently attached 3-inch by 12-inch ABS tube with a flared end to secure it in the ground.
- B. Tracer wire access boxes shall have tamper-resistant cast iron locking lids with stainless steel terminal connectors on the bottom side to which tracer wires are attached.
- C. Tracer wire access box lids shall utilize an AWWA pentagon key for opening.
- D. Sufficient slack shall be coiled inside boxes to allow the removal of the lid and full access to the interior of the box without disconnecting wires.
- E. Lids shall be marked "SEWER".

5.2.11 Marking Tape

- A. Tape shall be 3.5 mill polyethylene tape, 3 inches in width, with a 14-gauge metallic core, and the continuous printed message, "Caution – Sewer Line Buried Below". Tape shall be primarily green in color.

5.2.12 Steel Casing Pipe

- A. Steel casing pipe shall be welded or seamless or smooth wall, consisting of Grade "B" steel as specified in ASTM A-139. Minimum yield strength shall be 35,000 psi, and pipe thickness shall be as specified on the construction plans. All pipe shall be furnished with beveled ends prepared for field welding of circumferential joints. Welds shall be a full penetration welds subject to visual inspection. All burrs at pipe ends shall be removed. Encasement pipe must be approved by the appropriate controlling agency (VDOT, railroad, etc.) and the Engineer prior to ordering. Spiral weld casing pipe will not be allowed.

5.2.13 Manholes

- A. Precast reinforced concrete manholes shall be constructed in accordance with Standard Drawings for the type and size of manhole indicated on the drawings.

- B. Manhole joint types shall comply with one of the following:
1. Provide tongue and groove joints in manhole sections with a preformed groove in the tongue for placement of an O-ring-type rubber gasket in accordance with the requirements of ASTM C443; or,
 2. Provide butyl-rubber-based preformed flexible sealant at each manhole joint. Butyl rubber sealant shall conform to ASTM C990, paragraph 6.2, and AASHTO M-198.
- C. Acid-resistant liners for new manholes shall be of fiberglass reinforced polyester (FRP) or polyvinylchloride (PVC) or high-density polyethylene (HDPE) construction and shall be installed to protect the precast manhole sections from the inside base of the manhole to the base of the manhole frame. All connections of pipe to the manhole shall be sealed with the liner in a manner which will eliminate any exposed concrete surfaces that could be subject to damage by corrosive gases.
1. FRP liners shall consist of a 3/16-inch thick fiberglass reinforced polyester with a 15 mil gel coat interior surface. Joints between sections of the liner shall be sealed with joint sealant.
 2. PVC liners shall consist of polyvinylchloride plates, not less than 0.060 inch thick, with integral bonding ribs. Joints between sections of liner shall be welded in accordance with the manufacturer's instructions.
 3. HDPE liners: Joints between sections of the liner shall be welded in accordance with the manufacturer's instructions by certified welders. Minimum liner thickness shall be 0.078 inches (2 mm).
- D. Acid-resistant liners for existing manholes shall be 100% solids high-build epoxy.
1. Sewer flow shall be bypassed around or through the existing manhole during preparation, coating, curing, and finishing operations.
 2. The epoxy coating system shall be a minimum of 120 mils thickness.
 3. Re-grout all inlet and outlet lines and benches as required.
 4. The installation of the epoxy coating system shall be in strict accordance with the manufacturer's written instructions.
- E. Manhole steps shall be corrosion-resistant and shall be 1-inch square cast iron, rubber-covered steel or aluminum. The steps shall conform to the dimensions shown in Standard Drawings. Manhole steps shall be aligned to

minimize conflicts with current and potential future connections to the manhole. For sewers up to 15 inches in diameter, steps should be placed over the bench. Manhole steps shall not be placed on the downstream side of the manhole. Steps shall be installed at a maximum spacing of 12 inches.

- F. Manhole frames and covers shall be molded of gray cast iron conforming to ASTM A48, Class 30. Castings shall be coated with a coal tar pitch varnish, to which sufficient oil has been added to make a smooth coating, tough and tenacious when cold, but not tacky or brittle. Seating surfaces between frame and cover shall be machined. The dimensions and weights shall conform to the requirements shown in the Standard Details. Manhole covers shall be labeled "SEWER".
- G. Manholes shall be supplied with flexible connectors to allow connection of sewer pipes to the manholes. The manholes shall be cored at the factory as shown on the approved drawings, and shall be supplied with the appropriate flexible connectors.
- H. Sealant for manhole frames shall be a one-component polyurethane sealant.
- I. An external wrap of extruded butyl-rubber-based adhesive tape shall be applied around the full circumference of the manhole at all joints between precast sections. Tape shall be at least 6 inches in width, with minimum 50 mil (1.3 mm) thickness, and shall be overlapped at least twice its width. Backing component shall be HDPE. A release paper may be used. The tape shall meet or exceed the requirements of ASTM C877 Type III and ASTM C990.

5.2.14 Pressure Gauges

- A. Pressure gauges shall be mounted on a wafer pressure isolator ring (sensor ring) by the sensor ring manufacturer.
- B. Pressure gauges shall be of all stainless-steel construction, liquid filled, 3.5 to 4-inch diameter case size, accuracy of 1% over the entire dial arc, with a ¼-inch NPT bottom connection. Pressure range shall be as indicated on the drawings.
- C. Gauges shall be graduated so the normal range of operating pressures are in the middle third of the scale.

5.2.15 Wafer Pressure Isolators Ring (Sensor Ring)

- A. Wafer pressure isolator rings shall be designed to permit pressure measurement on slurries and other hard-to-handle fluids without compromising gauge function. Isolation ring shall consist of a metal ring with an elastomer inner tube filled with silicone instrument oil. Center section of isolator ring shall be carbon steel. End plates shall be Acetal

Homo Polymer (or 316 stainless steel, Kynar, Teflon) and elastomeric sleeve shall be Nitrile (or EPDM, Viton).

- B. Wafer pressure isolator rings shall fit inside the bolt circle of 150# ANSI flanges (or shall be provided with appropriate spacers for 300# or 600# flanges). Face to face length of the wafer pressure isolator ring shall conform to specification MSS-SP67. Wafer pressure isolator ring shall be flow through design with flexible rubber sleeve around full circumference. The center section shall have a cavity behind the rubber sleeve filled with silicone fluid to transfer pressure to the gauge.
- C. All pressure instruments attached to the wafer pressure isolator ring shall be rigidly supported by a post at least 0.875 inch in diameter welded to the isolator. On wafer pressure isolator rings with more than one instrument, all connections shall be ½-inch NPT as a minimum. ¼-inch NPT fittings are not acceptable. The wafer pressure isolator ring shall not have a fill plug that can be inadvertently removed with the resultant loss of fill fluid.
- D. The wafer pressure isolator ring shall be vacuum filled and permanently sealed at the factory with a modular seal consisting of a rubber membrane and needle fitting to allow removal and replacement of pressure instruments without compromising the vacuum fill. The needle fitting shall have both ¼-inch NPT(F) thread and 1/2 NPT(M) threads. The wafer pressure isolator ring shall be capable of operating under pressure with all instruments removed with no loss of fill fluid, without isolating valves. Pressure instruments shall be attached to the wafer pressure isolator ring with a hand tightened lock ring. It shall be possible to remove, rotate or attach pressure instruments to the wafer pressure isolator ring without requiring the use of any tools. The wafer pressure isolator ring shall be permanently filled with high viscosity silicone instrument oil to damp out surges or pressure spikes without a separate snubber.
- E. Max operating pressure without leakage: 1,000 psig

5.2.16 Pipe Supports

- A. Pipes shall be supported by steel pipe hangers, clamps, brackets, rods, and inserts as required to support the imposed pipe loads. Hangers in general shall be new, manufactured of carbon steel and hot dipped galvanized after fabrication or 304 stainless steel. In corrosive environments, 316 stainless steel pipe hangers may be required at the discretion of the Director.
- B. Pipes 2-½ inches and larger shall be supported with adjustable floor stand type pipe supports as detailed on the drawings.
- C. Pipes 2 inches and smaller shall be supported from the floor, walls, or ceiling depending on the type of building construction. Supports shall consist of floor stands, wall brackets, or clevis type hangers. Strut and

appurtenances shall be stainless steel. Minimum threaded rod size shall be 3/8 inch.

- D. Ductile iron and steel pipe supports shall be spaced in accordance with the following schedule:

| | | | | |
|---------------------|-------|---------|---------|-------|
| Pipe sizes (inches) | ½ - ¾ | 1 - 1 ¼ | 1 ½ - 2 | 3 - 4 |
| Max spacing (feet) | 4 | 6 | 8 | 10 |

- E. PVC pipe supports shall be spaced in accordance with the following schedule:

| | | | | |
|----------------------------|-------|---------|---------|-------|
| Nominal pipe size (inches) | ½ - ¾ | 1 - 1 ¼ | 1 ½ - 2 | 3 - 4 |
| Max spacing (feet) | 2.5 | 3 | 4 | 6 |

- F. Maximum spacing between pipe supports shall be 10 feet for all pipes 6 inches and larger.
- G. Additional supports shall be placed at the locations of valves, fittings, flow meters, risers, drops and other devices. additional supports.
- H. In addition to the above, pipe supports shall be located as per the following:
1. Maximum of 12 inches from all horizontal and vertical changes in direction.
 2. On the suction and discharge of pump piping to eliminate pipe stresses on the pump flanges.
 3. On the connections to all equipment to eliminate pipe stresses on the equipment connections and allow equipment removal.
 4. On the inlet and outlet piping to the water meter to allow the removal of the water meter.
 5. At the location of valves, fittings or other devices that add additional weight to the piping.
 6. Additional pipe supports as indicated on the drawings.

5.2.17 Combination Air Valves

- A. Air and vacuum valves shall be specifically designed for operation on sewage or waste media, constructed with cast iron or stainless-steel bodies, type 304 stainless steel floats, bronze trim, and Buna-N seats.
- B. Valves shall be of the size and at the locations indicated on the drawings. Valves shall be of the combination type to relieve large volumes of air as the lines are filled or emptied and also release small quantities of entrained air under pressure.
- C. Valves shall be rated for the maximum working pressure of the pressure pipe system.
- D. Valves shall be installed with a full-size gooseneck on the outlet.

END OF SECTION 5.2