

PART V

APPROVED MATERIALS AND MANUFACTURERS LIST AND MATERIAL SPECIFICATIONS CHESTEFIELD COUNTY, VIRGINIA

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**APPROVED MATERIALS AND MANUFACTURERS
INTRODUCTION**

This document represents a listing of specific manufacturers whose products have been approved for use within Chesterfield County's water and sanitary sewer systems. The listing is divided into four sections. Sections 1 and 2 contain lists by type of material and indicate the approved product of each. Section 3 provides a listing of approved manufacturers followed by their addresses and local suppliers. Section 4 provides detailed materials specifications.

This listing is intended to be used as a reference source for the Utilities Department's employees, contractors and vendors. Materials produced by manufacturers not listed herein are not acceptable for use within the County's systems. Manufacturers interested in submitting products for evaluation and possible approval should communicate their interest to the Chairman of the Product and Design Review Committee, Utilities Department, County of Chesterfield, P.O. Box 608, Chesterfield, Virginia 23832-0009.

It should be noted that in some cases manufacturer approval is on a plant-by-plant basis. The Committee reserves the right to perform a comprehensive plant and product evaluation and testing based on Utilities Department's "Producing Plant/Product Evaluation Procedures", and at the sole option of the department, plant evaluations may be required on an on-going basis for new and existing facilities. The Committee also reserves the right to limit the number of approved manufacturers and products as they deem necessary to control parts inventory and maintenance/ training requirements.

Revisions to this publication will be made periodically. Users should inquire with the Utilities Department's Development Section as to availability. Questions concerning the information contained in the listings should be referred to the Product and Design Review Committee. Any errors or omissions should be reported to the committee immediately. Utilities Department will not allow the use of products and materials identified incorrectly in this publication.

A certification letter (sample following) shall be submitted by the manufacturer/supplier prior to the contractor beginning construction. Further details regarding submittal of shop drawings, etc. can be found in Part III and Part IV of this document.

**DEPARTMENT OF PUBLIC UTILITIES
CHESTERFIELD COUNTY
APPROVED
MATERIALS LIST**

**(Minimum Criteria: Meets AWWA and/or ASTM Standards and
Chesterfield County Design Standards, Latest Revisions)**

SECTION 1: WATER SYSTEM

A. Pipes

1. C-900 - P.V.C. (DR-18, CL. 150) (Sizes 6" and 8")
2. a. Class 51 minimum or higher classification depending upon design consideration. (Push-On and Mechanical Joint) (6", 8", 12", 16", 20", 24", 30" & 36")

b. Restrained Joint Pipe (Pipe Application: Use only where mechanical joint pipe is not available or in vertical applications)
 - 1) Griffin Snap-Lok (6" - 48")
 - 2) American D.I. Pipe Flex-Ring (6" - 36")
 - 3) U.S. Pipe TR-FLEX (6" - 36")
 - 4) Clow Super Lock D.I. (6" - 24")
 - 5) McWane/Clow D.I. (6" - 24")

B. Valves

1. Resilient Seated Gate Valves (for main sizes 4"-12" only)
 - a. American Flow Control - Series 500 Gate Valve with Non-Rising Stem (NRS)
 - b. Clow R/W Valve
 - c. U.S. Pipe - Metroseal 250: with non-rising stem (NRS) and outside stem yoke (OSY)
 - d. M&H (Style 3067-NRS; 3068 OSY)
 - e. Kennedy (Model 509 KenSeal II 8571RSGV)
Kennedy (Model 515 KenSeal II 7571RSGV)
 - f. Mueller A-2360 (Resilient Wedge)
 - g. American Flow Control - Series 2500 (Resilient Wedge)

- h. American R/D - Series 2000 (Resilient Wedge)
- 2. Butterfly Valves (For Use on 16" and Larger Lines)
 - a. Mueller - Lineseal III
 - b. DeZurik Baw AWWA
 - c. Pratt's Groundhog Class 150B and Triton HP-250
 - d. M&H Style 4500 (for 16"-24")
and Style 1450 (for 30"-54")
 - e. Mosser Series 810 & 830
 - f. Rodney Hunt Streamseal (24" and Larger)
 - g. ValMatic American BFV (16" and Larger)
 - h. Milliken Models 510 and 511 (16" and Larger)
 - i. Crispin K-Flo Valve Series 500 (16") and Series 47 (24"
and larger)

C. Fire Hydrants

- 1. Mueller Centurion A-421
- 2. Kennedy "K81D" (Dual rotated hydrant)
- 3. M & H Style 929 Reliant
- 4. U.S. Pipe - Metropolitan 250 (Model 94)
- 5. Clow Medallion
- 6. American Darling - Mark 73-5

NOTE: The following applies to brass fittings or items containing brass that is in direct contact with drinking water:

Federal changes are on the horizon governing the acceptable amount of lead in the drinking water system. Chesterfield Utilities wishes to ensure that brass fittings purchased today will meet the Safe Drinking Water Act (SDWA) per NSF 372 that will become effective in January 2014 for the following reasons:

The Utility requires that all water brass fittings purchased and installed be compliant with NSF/ANSI 61 Annexes F & G. Specifically:

- a) All brass fittings furnished shall be made of "lead free" alloy as defined by NSF/ANSI (National Sanitation Foundation/American National Standards Institute) 61 Annexes F & G.*
- b) Brass fittings shall comply with the Safe Drinking Water Act, and the U.S. Environmental Protection Agency.*
- c) All brass fittings shall have the manufacturer's name or trademark and a conspicuous marking (cast) identifying the "no lead" brass allow, such as "EB2".*
- d) The bidder shall provide certification from an independent third party testing organization that the products submitted meet NSF/ANSI Standard 61, Annexes F & G.*
- e) Under NO circumstances will materials that do not comply with the above stated standards be allowed to be installed in Chesterfield County Utilities water distribution system after January 2, 2014.*

D. Meter (Setters) Yokes

- 1. For 5/8" Meters: 5/8" x 7" Riser Meter Yoke with one lockwing ball or plug type, full port angle meter stop, with saddle nuts, 3/4" copper tube flare or compression connection inlet and outlet.
 - a. Ford
 - 1) V71-7W-22-33NL (plug type angle stop with copper flare connections inlet and outlet)
 - 2) V71-7W-44-33GNL (plug type angle stop with compression connections inlet and outlet for copper pipe)
 - 3) VB71-7W-22-33NL (ball type angle stop with copper flare connections inlet and outlet)
 - 4) VB71-7W-44-33GNL (ball type angle stop with compression connections inlet and outlet for copper pipe)

b. McDonald

- 1) 729-107WXCC33 (ball type angle stop with copper flare connections inlet and outlet)
- 2) 721-107WXTT33 (ball type angle stop with compression connections inlet and outlet for copper pipe)

c. Mueller

- * 1) H-1434N (plug type angle stop with plain NPT ends, also requires H-15450 end connections for copper flare inlet and outlet)
- 2) H-1470-5N (plug type angle stop with compression connections inlet and outlet for copper pipe)
- * 3) B-2434N (ball type angle stop with plain NPT ends, also requires H-15450 end connections for copper flare on inlet and outlet)
- 4) B-2470N (ball type angle stop with compression connections inlet and outlet for copper pipe)

* **Note:** County requires manufacturer to supply these connections "completely factory assembled" and tightened to proper torque.

d. Cambridge

- 1) 6020NL-107H3H3-VO

2. For 5/8" Meters: 5/8" x 9" Riser Meter Yoke with one lockwing ball or plug type, full port angle meter stop, with saddle nuts, 3/4" copper tube flare or compression connection inlet and outlet.

a. Cambridge

- 1) 6020NL-109H4H4-VO

3. For 1" Meters:

Commercial - Domestic use by Businesses, Doctors and Dentists Etc.

1" x 12" Riser Meter Yoke with two lockwing, ball or plug type angle stop on inlet and outlet, saddle nuts, copper tube flare or compression inlet and outlet with ball valve bypass.

- a. Ford
 - 1) VV74-12W-22-44NL w/ball valve bypass
 - 2) VVB-74-12W-22-44NL w/plug valve bypass
 - 3) VV74-12W-44-44GNL (with compression connections inlet and outlet for copper pipe)
- b. McDonald
 - 1) 729B412WWCC443
 - 2) 729B412WWT443 (with compression connections inlet and outlet for copper pipe)
- c. Cambridge
 - 1) 6020NL-412H4H4-UO (without bypass)
 - 2) 6020NL-412H4H4-UOB (with bypass)

All Other Users i.e. for Irrigation, Residential, and Residential with Fire Sprinkler System (NFPA 13D), Etc.

1" x 12" Riser Meter Yoke with 1 lockwing ball or plug type angle stop on inlet only, saddle nuts, copper tube flare inlet and outlet. No bypass.

- a. Ford
 - 1) V74-12W-22-44NL
 - 2) V74-12W-44-44GNL (with compression connections inlet and outlet for copper pipe)

4. For 1½" and 2" Meters (Businesses, etc. with bypass):

- *a. Ford - for 1½" Meter - VBB76-7B-11-66NL and for 2" Meter - VBB77-8B-11-77NL
- *b. Mueller (for both) - H-1423N
- *c. A.Y. McDonald - Model 720A609 WWFF 665 for 1½" meter, Model 720A709 WWFF 775 for 2" meter
- *d. Cambridge - 1½" Meter - 6020NL-609F6F6-UUB5 and for 2" Meter - 6020NL-709F7F7-UUB5

For 1½" and 2" Meters (residential and irrigation with no bypass):

- *a. Ford - for 1½" Meter - VBB76-7-11-66NL and for 2" Meter - VBB77-8-11-77NL
- *b. A.Y. McDonald - for 1½" Meter - 720-609 WWFF 660 for 2" Meter - 720-709 WWFF 770
- *c. Mueller (for both 1½" and 2") - #1422-00N
- *d. Cambridge - for 1½" - 6020NL-609F6F6-UU for 2" - 6020NL-709F7F7-UU

*These products are acceptable provided manufacturer makes the necessary modifications to comply with the County's materials specifications for 1½" and 2" water meter setters.

**E. Corporation Stops - Plug Type only for ¾" and 1";
Plug Type or Ball Valves for 1½" and 2"**

(¾" thru 2" with "cc" thread inlet)

1. Mueller
 - a. H-15000N
 - b. H-15008N (¾" and 1" corp stop with compression outlet for copper) or
H-15071N (¾" and 1" connector only to convert a normal H-15000N corp stop to compression, to avoid using special tapping machine adapters)

2. Ford
 - a. F-600NL (Plug type with flare outlet only for ¾" and 1")
 - b. F-1000-3GNL (¾" corp stop with compression connection for copper) or
C04-33GNL (¾" connector only to convert a normal F-600-3 corp stop to compression, to avoid using special tapping machine adapters)
 - c. F-1000-4GNL (1" corp stop with compression connection for copper) or C04-44G (1" connector only to convert a normal F-600-4 corp stop to compression, to avoid using special tapping machine)

3. McDonald
 - a. 74701
 - b. 74701-T (¾" and 1" corp stop with compression outlet for copper) or
74700-T (¾" and 1" connector only to convert a normal #4701 corp stop to compression, to avoid using special tapping machine adapters)

4. JJC #J-1500
5. Ford FB-600NL (Ball valve with flare outlet only for 1½" & 2")
6. Ford FB-1000GNL (Ball valve with compression outlet only for 1½" & 2")

7. Cambridge Brass
 - a. 301NL-A3H3 (Ball valve with compression outlet for ¾")
 - b. 301NL-A4H4 (Ball valve with compression outlet for 1")
 - c. 302NL-A3H3 (Plug type with compression outlet for ¾")
 - d. 302NL-A3C3 (Plug type with flare outlet for ¾")

- e. 302NL-A4H4 (Plug type with compression outlet for 1")
- f. 302NL-A4C4 (Plug type with flare outlet for 1")
- g. 301NL-A6H6 (Ball valve with compression outlet for 1½")
- h. 301NL-A6C6 (Ball valve with flare outlet for 1½")
- i. 301NL-A7H7 (Ball valve with compression outlet for 2")
- j. 301NL-A7C7 (Ball valve with flare outlet for 2")

Compression Fittings - (for 1½" and 2" only)

- 1. Mueller 110
- 2. McDonald T-Compression
- 3. Ford Grip Joint
- 4. Cambridge Compression - CB

Curb Stops - ¾" and 1" copper flare, full port, ball or plug type curb stop, with or without check

	<u>Copper Flare Plug Type</u>	<u>Copper Flare Ball Type</u>
1. Ford ¾"	Z22-333NL	B22-333NL
Ford 1"	Z22-444NL	B22-444NL
2. Mueller ¾" & 1"	H-15300N	N/A
3. McDonald ¾" & 1"	74713	76100
4. Cambridge Brass ¾"	290NL-C3C3	202NL-C3C3
Cambridge Brass 1"	290NL-C4C4	202NL-C4C4

Curb Stops - ¾" and 1" copper compression, full port, ball or plug type curb stop, with or without check.

	<u>Compression Plug Type</u>	<u>Compression Ball Type</u>
1. Ford ¾"	Z44-3336NL	B44-3336NL
Ford 1"	Z44-4446NL	B44-4446NL

2.	Mueller ¾" & 1"	H-15207N	B-25209N
3.	McDonald ¾" & 1"	74713-T	76100-T
4.	Cambridge Brass ¾"	290NL-H3H3	202NL-H3H3
	Cambridge Brass 1"	290NL-H4H4	202NL-H4H4

Curb Stops - 1½" and 2" pipe threaded or compression, full port, ball type curb stop, with or without check

		<u>Compression Ball Type</u>	<u>Pipe Threaded Ball Type</u>
1.	Ford 1½"	B44-6666NL	B11-666 NL
	Ford 2"	B44-7776 NL	B11-777 NL
2.	Mueller 1½" & 2"	B-25209N	B-20283N
3.	McDonald 1½" & 2"	76100-T	76101
4.	Cambridge Brass 1½"	202NL-H6H6	202NL-F6F6
	Cambridge Brass 2"	202NL-H7H7	202NL-F7F7

F. Vaults, Precast Concrete - Requirements and configurations as shown on plans. (See "Water Meter Boxes/Vaults" under Section 1 for approved water meter vaults).

1. Clear Flow by Americast - (Models TJ 2000, TJ 4000, TJ 6x8, and 6060 Utility Vaults)
2. Beasley Concrete, Inc. (Model MB1500)
3. Hanover Precast (Model 596810 and 596810-HS-20)

G. Tapping Sleeve - Sleeves must conform to County's latest application instructions as specified in Section 4 entitled Materials Specifications.

1. **(Fabricated Steel Sleeves)** with Epoxy Coating and Stainless Steel Bolts and Nuts
 - a. Smith Blair Model #622 w/MJ Branch (4"-30")
 - b. J.C.M. Industries #412 ESS (4"-48")
 - c. ROMAC # FTS 420 SS (4"-30")
 - d. Ford FTSC (4"-30") w/SS bolts

2. **(Stainless Steel Sleeves) with stainless steel flange**

- a. Power Seal - Model 3480 AS and 3480 MJ (6"-24")
Model 3490 AS and 3490 MJ (6"-24")
- b. ROMAC SST and SST III (6"-24")
- c. Ford FTSS (6"-24")
- d. Cascade - Model CST-EX (4"- larger)
Model CST-SL (4"-24")
- e. JCM Model 432 (6"-24")
- f. Mueller H304 (6"-24")
- g. Dresser Style 630 (6" - 12")
- h. Smith-Blair Models 663 (4"-20")
- i. Total Piping Solutions Triple Tap Series

3. **(M.J. Steel Sleeve)**

- a. JCM 414 Mechanical Joint
- b. Smith-Blair Model 623 (4"-48")

4. **(M.J. Cast/Ductile Iron Sleeve)**

- a. Mueller (H-615 for 4"-24" on Ductile Pipe and H-619 for 4"-12" C/A Pipe)
- b. Clow (F-5205)
- c. American Flow Control - (Model 2800-A for A/C pipe; Model 2800-C for 4"-12" D.I. and PVC pipes; Model 1004 for PVC pipe and 12" and larger D.I. pipe)
- d. U.S. Pipe D.I. T-9 MJ Sleeve

5. **(Other)**

- a. Mueller H300 (Not to be used on Asbestos Cement and Cast Iron Pipe)

H. Resilient Seated Wedge Tapping Valves

- 1. American Flow Series 500 Resilient Wedge Valve
(for 6"-12" only)

2. Mueller T-2360 Resilient Wedge Valve (for 6"-12" only)
3. American Flow Control - Series 2500 (for 16"-30" only)
4. Kennedy Model #4950 (for 4" thru 24" only)
5. Clow Model F6114 (for 16" thru 36" only)
6. American R/D - Series 2000 (Resilient Wedge)

I. Fittings (Bends, Crosses, Tees and Grade Lok Offset Glands)
Ductile Iron only

1. D.I. Compact AWWA C153 or D.I./C.I. AWWA C110
2. D.I. Special Coated Compact Fittings AWWA 153

J. Couplings (For pipe sizes 16" and smaller)

1. Cast Couplings (transition or straight)
 - a. Romac 501 series (long sleeve coupling)
 - b. Ford #FC2A (long sleeve coupling)
 - c. Smith Blair (Rockwell) #442 (long sleeve coupling)
 - d. Power Seal Model # 3501 (long barrel coupling)
 - e. Ford FC2W (Wide Range)
 - f. Hymax® 2 Long Body
2. Cast D.I. Couplings
 - a. FEHR

K. Air Release or Combination Air Release and Vacuum Valves

(Engineer is responsible for specifying the appropriate type for its designated use)

1. APCO (Product Bulletin No. 600 and/or 601)
2. Golden Anderson Industries Type 1 GH4-150 Type 4 GH 7-K
3. Valmatic
4. Cla Val (Models 34, 35 & 36)

L. Blow Off Valves

1. 2" Bronze Gate Valve
(open to most manufacturers, i.e., Grinell, Epsco, etc.)

M. Line Stopping Valves

1. Hydra-Stop
2. EZ Valve
3. Inserta-Valve
4. Insta-Valve
5. Team Industrial Services InsertValve

N. Water Meter Boxes/Vaults

1. Precast Concrete Box:
 - a. Clear Flow by Amercast Model CFLD6060 (for 3" and 4" water meters and assemblies)
 - b. Beasley Concrete, Inc. - Model MB1500 (for 3" and 4" water meters and assemblies)
 - c. Hanover Precast Vaults (for 3" and larger water meters and assemblies)
2. Hi-Density Polyethylene Plastic Box (for water meters and assemblies only in areas not subject to vehicular traffic):
 - a. Carson Meter Box (for 5/8" water meters) Model MSBC1015-24 with ductile iron or cast iron cover and reader lid.
 - b. Carson Meter Box (for 1" water meters) Model MSBC 1118-26 with ductile iron or cast iron cover and reader lid.
 - c. Carson Meter Box (for 1½" or 2" water meters) Model 1730-24 Carson Spec Grade body with 2 mouse holes and heavy duty plastic cover with cast iron reader lid.
3. Cast Iron Box (for 5/8" water meters and assemblies only in areas subject to vehicular traffic):
 - a. Capitol Foundry Design # MBX-10 and MBX-11

O. Valve Boxes (Slip Type Only)

1. SIGMA
2. Bingham and Taylor
3. Capitol Foundry
4. Star Pipe

P. Copper Tubing - (as manufactured for domestic use)

1. Type "K" (soft) - for ¾" and 1" service lines
2. Type "K" (hard copper only) - for 1½" and 2" service lines

Q. Service Saddles - *Effective February 4, 2019 all service saddles will be required to have a bronze body with double stainless-steel straps.* (bronze with double stainless-steel straps)

1. ROMAC - Style 202BS
2. Smith-Blair (Rockwell) SB 325
3. Ford Style 202BS or 202BSD
4. PowerSeal Model No. 3409
5. Mueller - Model BRS2

R. Pipe Restraints (must be UL Listed and FM Approved)

1. For PVC Pipe (Sizes up to 8")
 - a. EBBA Iron - Megalug Series 2000 PV (PVC Pipe - MJ Fittings)
EBBA Iron - Megalug Series 1500 (PVC Bell and Spigot Joints)
 - b. Romac Style 611 (PVC Bell and Spigot Joints)
 - c. Uni-Flange Series 1390-C (PVC Bell and Spigot Joints)
Uni-Flange Series 1500 (PVC Pipe - MJ Fittings)
 - d. Star Pipe - STARGRIP Series 4000 (PVC Pipe - MJ Fittings)

- e. Mueller - AquaGrip Intergral Restraint System for use on the Centurion Fire Hydrants and Mueller RS Valves
 - f. SIGMA One-Lok Model SLC
 - g. Capital - EZ-PVC
 - h. Tuf Grip MJ Restraint (6"-8")
2. For Ductile Iron Pipe -
- a. EBAA Iron - Megalug 1100 Series (MJ Fittings) All Sizes
 - b. Uni-Flange Series 1400 Block Buster Wedge Action Retainer Glands (MJ Fittings) Sizes 4"-24"
 - c. Uni-Flange Series 1390-C (Bell and Spigot Joints) Sizes 6"-12"
 - d. Star Pipe - STARGRIP Series 3000 (MJ Fittings) Sizes 4"-48
 - e. Romac - RomaGrip Sizes 4"-12"
 - f. SIGMA One-Lok Model SLD (MJ Fittings) Sizes 4"-36"
 - g. Capital - EZ-LOK restraint gland (4"-24")
 - h. Tuf Grip MJ Restraint (6"-24")

S. Markers

1. For All Types of Pipes
- a. 66" Carsonite White Utility Marker Post with two (2) factory applied decals (#CW-112 or #CWV-116, whichever is applicable; and Stock #P-101 decal)
 - b. Greenline Markers - Model #'s FLU1WH66 and DSU1WH66 with factory applied decals 159A, 029A or 094A, whichever is applicable in Chesterfield County.

T. Flushing Hydrants

1. Gil Industries 2" Aquarius "One-O-One" HH (Chesterfield Type)
2. Kupferle 2" Main Guard Model #78 (Chesterfield Type)

U. Double Check and Double Detector Check Devices (U.L. classified or F.M. Approved, AWWA compliant and ASSE listed 1015 for DC's and 1048 for DDC's)

<u>Manufacturer</u>	<u>Model #'s</u>	<u>Size</u>
Ames Co., Inc.	2000SS	2½"-12"
	2000SE	2½", 6" & 8"
	3000B	2"
	3000SS	2½"-12"
	3000SE	2½", 6" & 8"
	200 Colt Series	2½"-10"
	200 Maxim Series	2½"-4"
	300 Maxim Series	2½"-10"
Cla-val Co.	D4	2½"-10"
	DC-45	2½"-10"
	DCDA-45G	2½"-10"
Apollo/Conbraco Industries, Inc.	All 40 series	All sizes
	060C02	6"
	0-10C	6"
	010E02	8"
	010G02	10"
	S100	2½"-6"
	0100	2½"-10"
	DC-4A	2½"-8"
Febco	805 YD	2½"-10"
	850	2½"-10"
	856	2½"-10"
	870 (V)	2½"-10"
	876 (V)	2½"-10"
Watts Regulator Co.	007	½"-3"
	007DCDA	2"-3"
	700	3"-4"
	709	3"-10"
	709DCDA	3"-10"
	757DCA	2½"-10"
	757DCDA	2½"-10"
	767DCA	2½"-10"
	767DCDA	2½"-10"
	770DCA	4"-10"
	770DCDA	4"-10"
	774DCA	4"-10"
	774DCDA	4"-10"

Zurn Industries,	350	2½"-12"
Inc. (Wilkins)	350A	2½"-10"
	350DA	2½"-10"
	950	¾"-10"

V. Reduced-Pressure Principle Zone Devices (U.L. classified or F.M. approved, AWWA compliant and ASSE listed 1013 for RP's and 1047 for RPD's.)

<u>Manufacturer</u>	<u>Model #'s</u>	<u>Size</u>
Ames	400 Maxim Series	2½"-10"
	500 Maxim Series	2½"-10"
	500 Colt Series	2½"-10"
	4000 CIV	2½"-10"
	4000 RP	4"-10"
	4000 SS	3"-10"
	5000 CIV	2½"-6"
	5000 SS	2½"-10"
Cla-val Co.	RP	2½"-10"
	RP-40	2½"-10"
	RPDA-40	2½"-10"
Apollo/Conbraco Industries, Inc.	All 40 series	All sizes
Febco	6C-M	3"-10"
	FRPII	¾"-1½"
	825	2½"-10"
	825 D & YD	2½"-10"
	826	2½"-10"
	860	2½"-10"
	880 (V)	2½"-10"
Watts Regulator Co.	909	3"-10"
	009RP	3"
	994	2½"-6"
	957	2½"-8"
	990	4"-8"
Zurn Industries, Inc. (Wilkins)	375	2½"-10"
	475V	2½"-10"
	575	¾"-6"
	975	¾"-10"

SECTION 2: SANITARY SEWER SYSTEM

A. Pipe - Gravity

1. PVC Sanitary Sewer Pipe SDR35 (ASTM D3034 6" - 15")
2. PVC Sanitary Sewer Pipe Envrio-Tite SDR 35 (ASTM F1760 6"-15")
3. PVC Sanitary Sewer Pipe SDR 35 (ASTM F679, 18"-48"), T1 Wall Thickness
4. Ductile Iron Pipe Class 52 Minimum or higher classification depending upon design consideration. (Push-On and Mechanical Joint) (6", 8", 10", 12", 16", 20", 24", 30" & 36")
5. Vylon H.C. - (42"-54") with minimum wall thickness of .17"
6. Ultra-Corr PVC Pipe (36") with minimum wall thickness of .17"
7. A-2000 PVC Pipe (36") with minimum wall thickness of .17"
8. ADS N-12 HP (30"-60") with minimum wall thickness of .17"
9. Diamond Corr 21 (42" and larger) with minimum wall thickness of .17"
10. Diamond Pro 21 (42" and larger) with minimum wall thickness of .17"

Pipe - Pressure

1. C-900 - P.V.C. (DR-18, CL. 150) (Sizes 6" & 8")
2. a. Class 51 minimum or higher classification depending upon design consideration. (Push-on and Mechanical Joint) (6", 8", 12", 16", 20", 24", 30" & 36")
b. Restrained Joint Pipe (Pipe Application: Use only where mechanical joint pipe is not available or in vertical applications).
 - 1) Griffin Snap-Lok (6" - 30")
 - 2) American D.I. Pipe Flex-Ring (6" - 36")
 - 3) U.S. Pipe TR-FLEX (6" - 36")
 - 4) Clow Super Lock (30" - 36")
 - 5) McWane/Clow D. I. (6" - 24")
3. HDPE - DR 11 (4" - 8" only)

B. Manholes, Precast Concrete (ASTM C478)

1. Hanson Pipe & Products
2. Americast
3. Concrete Specialties, Inc.
4. Tindall Concrete Products, Inc.
5. Nansemond Pre-cast Concrete Co., Inc.
6. Contractor's Precast
7. Winchester Building Supply Co., Inc.

C. Frames and Covers

1. Manhole
 - a. Street Type (MH-1-S)
 - 1) Neenah Foundry
 - 2) Capitol Foundry
 - 3) Sigma Corporation
 - 4) East Jordan Iron Works
 - 5) U.S. Foundry & Manufacturing Corporation
 - b. Watertight
 - 1) Capitol MH 1-S/WT
 - 2) East Jordan Iron Works
 - 3) U.S. Foundry & Manufacturing Corporation

D. Fittings (Gasketed) - Gravity

1. Concrete
 - a. Circular Reinforced (ASTM C76)
 - 1) Hanson Pipe & Products
 - b. Kor-N-Tee
 - c. Inserta Tee

2. PVC Sanitary Sewer Fittings (ASTM D3034 SDR35 6" - 27")
 - a. Certain-Teed Products Corporation
 - b. J-M Manufacturing Co.
 - c. The Harrington Corporation (HARCO)
 - d. GPK Products, Inc.
 - e. Vassallo
 - f. Multi-Fittings
 - g. Scepter-Canron, Inc. (IPEX)
 - h. Plastic Trends, Inc.
 - i. Nyloplast USA, Inc.
 - j. Freedom Plastics, Inc.

Fitting (D.I. Only) Pressure

1. D.I. Compact AWWA C153 or D.I./C.I. AWWA C110
2. D.I. Special Coated Compact Fittings AWWA 153

E. Adaptors

1. Fernco Pipe Adaptors - (Used only when installing 6" connections where 6" connection is of Ductile Iron material)
2. GPK Manhole Adaptors (See MAN-16)
 - a. GPK manhole adaptor adapting PVC pipe to concrete with quick quete for manholes with BUO's.
 - b. GPK PVC drop manhole cross with manhole adaptors (6" and 8" only) strapped to manhole.
3. DFW/HPI Nonshear Coupling (Used only at the direction of the County Inspector where pipe transitioning is necessary due to unlike pipe materials.)

F. Gaskets & Flexible Manhole Connectors

1. Kor-n-seal Connector, NPC Systems, Inc.
2. "O" Ring Gasket
3. Flat Gasket for Watertight Manholes
4. Press-Boot Connector, Press-Seal Gasket Corp.
3. Profile RS or Type 4G Gaskets, Press-Seal Gasket Corp.
6. IPS Adjustable, Cobra, or Toggle styles

G. Saddles

1. The General Engineering Company (GENECO) Sealtite Model H with Bell End for SDR-35 PVC
2. ROMAC CB Sewer Saddle
3. Inserta Tee
4. QUICKSEAL QS-6 (size 21" and above)

H. Steps, Manhole

1. MA Industries, Inc.
Style No. PS1-PF
2. Bowco Industries, Inc.
Model #93810 (48" and 54" Dia. M.H.'s)
Model #93813 (60" Dia. M.H.'s and Larger)
3. Press Seal
Model #P-10938 (48" and 54" Dia. M.H.'s)
Model #P-14850 (60" Dia. M.H.'s and Larger)
4. Cosmos North America
Model #US-10-OH
5. American Step Company
Model #ML-10 (Standard Grade)

I. Stoppers (Plugs)

1. For PVC Sanitary Sewer Pipe (with wing nuts and ears)
 - a. Certain-Teed Products Corporation

- b. Cherne
- c. Lansas Posi-Seal Mechanical Plugs
- 2. For D.I. Pipe (Slip Joint Plug)
 - a. Griffin Pipe Products
 - b. Tyler
 - c. Union Foundry
 - d. Harrington Corporation (HARCO)
 - e. Standard International
 - f. Trinity Valley
 - g. American Cast Iron
 - h. U. S. Pipe and Foundry
 - i. Cherne

J. Valves

- 1. Sewage Air/Vacuum Release Valves
 - a. Vent-O-Mat Series RGX or RGSb - "Anti-Surge"
(Note: Engineer must design project using the appropriate valve.)
 - b. A.R.I. Combination Air Valve - Model D-020 and D-023
 - c. VentTech Combination Air Valve - Model SDG and SWG
- 2. Plug Valves
 - a. DeZurik Series 100 [Figure 118] -
(Non-Lubricated Eccentric)
 - b. Val-Matic Series 5900 or 5800 Cam-Centric
 - c. Milliken - Millcentric (Eccentric Plug Valve)
 - d. Homestead Eccentric Plug Valve - Series 120
 - e. Clow Eccentric Plug Valve (3"-24")

K. Manhole Adjusting Rings

1. Concrete Reinforced
2. LadTech H.D.P.E.

L. Casing Spacers

1. Same as under "Section 1: Water System"

M. Manhole/Structure Rehabilitation

1. Raven 405
2. Sauereisen (Liner: 210, F170 & FF190) (Sub Straight Filer: F120, F121 & 209)
3. Spectra Shield
4. SPRAYROQ
5. Belzona (Light Filer: 5811 & 4141) (Heavy Filer: 4111)
6. Perma Form/Perma Cast/Cor Gard
7. Versaflex 50DM polyurea

N. Manhole Inserts

1. Parsons PMI3SE Manhole Insert w/Valve, Gasket and Strap
2. S.S.I. HDPE Manhole Insert

SECTION 3: MANUFACTURER'S ADDRESS LIST

A. WATER SYSTEMS

PVC PIPE 6" and 8"

MANUFACTURERS:

C-900	1.	Certainteed Corporation P.O. Box 860 Valley Forge, PA 19482	(610) 341-7000 FAX (610) 341-6837
C-900	2.	IPEX, Inc. (frmly Scepter-Canron) 2441 Royal Windsor Drive Mississauga, Ontario Canada L5J4C7	(800) 463-9572 FAX (905) 403-9195
C-900	3.	Diamond Plastics Corporation 1212 Johnstown Road P.O. Box 1608 Grand Island, NE 68802	(308) 384-4400 FAX (308) 384-9345
C-900	4.	North American Pipe Corporation 200 Park Place Booneville, MS 38829	(601) 728-2111 FAX (601) 728-3135
C-900	5.	National Pipe & Plastics, Inc. 9609 Old Highway 421S Colfax, N.C. 27235	(800) 866-0149 FAX (336) 996-1755
C-900	6.	Bristolpipe A Heywood Williams Company 601 County Road 17 P.O. Box 1868 Elkhart, IN 46515	(800) 348-7671 (219) 295-4515 FAX (800) 272-7044

DUCTILE IRON PIPE

MANUFACTURERS:

	1.	Griffin Pipe Products Box 740 Lynchburg, VA 24505	(804) 845-8021
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2. Atlantic States Cast Iron Pipe Co. (908) 454-1161
183 Sitgreaves FAX (908) 454-1026
Phillipsburg, NJ 08865-3052
3. American Ductile Iron Pipe
(MANUFACTURES PUSH-ON & RESTRAINED JOINT PIPES)
A Division of American Cast Iron Pipe Co. (412) 851-1230
2581 Washington Road FAX (412) 851-1243
Suite 220 & 222
Pittsburgh PA 15241
4. U.S. Pipe & Foundry Company (410) 879-3556
1212 Churchville Road, Suite 101 FAX (410) 879-0873
Bel Air, MD 21014

MECHANICAL JOINT FITTINGS

MANUFACTURERS: (Ductile Iron Compact or Non Compact Fittings)

1. Griffin Pipe Products (804) 845-8021
Box 740
Lynchburg, VA 24505
2. Tyler Pipe & Foundry Utilities (800) 527-8478
11910 County Road 492 FAX (800) 248-9537
Tyler, TX 75706
3. Union Foundry (800) 633-2442
P.O. Box 309
Anniston, AL 36202
4. The Harrington Corporation (HARCO) (804) 845-7094
P.O. Box 10335
Lynchburg, VA 24506
5. U.S. Pipe & Foundry Company (410) 879-3556
1212 Churchville Road, Suite 101 FAX (410) 879-0873
Bel Air, MD 21014

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|----|---|--|
| 6. | SIGMA Corporation
700 Goldman Drive, P. O. Box 300
Cream Ridge, NJ 08514 | (609) 758-0800
(800) 999-2550
FAX (609) 758-1158 |
| 7. | Star Pipe Products, Inc.
4018 Westhollow Parkway
Houston, TX 77082 | (713) 558-3000
(800) 999-3009
FAX (713) 558-9000 |
| 8. | Fastner Technologies, Inc. (FASTECH)
3301 Bill Metzger Lane
P.O. Box 15270
Pensacola, FL 32514 | (904) 474-0211
FAX (904) 474-0277 |

MANUFACTURERS (D.I. Special Coated Compact Fittings):

- | | | |
|----|---|--------------------------------------|
| 1. | U.S. Pipe and Foundry Company
P.O. Box 10406
Birmingham, AL 35202 | (205) 254-7442
FAX (205) 754-7494 |
|----|---|--------------------------------------|

COUPLINGS

MANUFACTURERS:

- | | | |
|----|--|--|
| 1. | ROMAC Industries, Inc.
21919 20 th Ave. SE
Bothel, WA 98021 | (800) 426-9341
FAX (425) 951-6201 |
| 2. | Ford Meter Box Company, Inc.
775 Manchester Avenue
P.O. Box 443
Wabash, IN 46992-0443 | (219) 563-3171
FAX (800) 826-3487 |
| 3. | Smith-Blair, Inc., A BTR Company
P.O. Box 5337
Texarkana, TX 75505 | (800) 643-9705 |
| 4. | Power Seal Pipeline Products Corp.
P.O. Box 2014
Wichita Falls, TX 76307 | (817) 767-5566
(800) 800-0932
FAX (817) 732-8378 |
| 5. | Viking Johnson
46-48 Wilbury Way
Hitchin, Hertfordshire SG4 0UD, U.K. | Tel: (01462) 422622
FAX: (01462) 422072 |
| | International Tel: +44 1462 422622
International FAX: +44 1462 422072
E-mail: info@vikingjohnson.co.uk
WWW: http://www.vikingjohnson.co.uk | |

6. Total Piping Solutions, Inc. (716) 372-0160
P.O. Box 525 FAX (716) 372-1767
Olean, NY 14760

OFFSET GLANDS

MANUFACTURERS

1. Assured Flow Sales, Inc. (813) 377-4563
P.O. Box 49633 (800) 388-0678
Sarasota, FL 34230-6633 FAX (813) 377-4049

RESILIENT SEATED GATE VALVES AND FIRE HYDRANTS

MANUFACTURERS:

1. Mueller Company (217) 320-6278
500 West Eldorado Street
P.O. Box 671
Decatur, IL 62525
2. Kennedy Valve Company, (607) 734-2211
A Division of McWane FAX (607) 734-3288
1021 East Water Street
Elmira, NY 14901
3. Clow Valve Company (800) 247-CLOW
P.O. Box 350
Oskaloosa, IA 52577
4. M & H Valve Company, (205) 237-3521
A Division of McWane, Inc. FAX (205) 237-8630
P.O. Box 2088
Anniston, AL 36202
5. American Flow Control, (205) 325-7856
(Formerly American Darling)
2930 N. 16th. Street
P.O. Box 2727
Birmingham, AL 35202-2727
6. U.S. Pipe & Foundry Co. (205) 254-7215
Valve & Hydrant Products
P.O. Box 10406
Birmingham, AL 35202

7. American R/D, LLC (256) 831-2236
 1800 Greenbrier Dear Road FAX (256) 831-2884
 Anniston, AL 36207

BUTTERFLY VALVES

MANUFACTURERS:

1. Mueller Company (804) 320-6278
 500 West Eldorada Street
 P.O. Box 671
 Decatur, IL 62525
2. American Flow Control (205) 325-7856
 2930 N. 16th. Street
 P.O. Box 2727
 Birmingham, AL 35202-2727
- American Flow Control (770) 730-9925
 6900 Roswell Road Apt. P-4 FAX (770) 730-9985
 Atlanta, GA 30362-0700
3. DeZurik Water Controls (320) 259-2000
 250 Riverside Ave. North FAX (320) 259-2227
 Sartell, MN 56377
4. Henry Pratt Company (708) 844-4000
 401 South Highland Avenue FAX (708) 844-4124
 Aurora, IL 60506-5593
5. M & H Valve Company, (205) 237-3521
 A Division of McWane, Inc. FAX (205) 237-8630
 P.O. Box 2088
 Anniston, AL 36202
6. Rodney Hunt Company (508) 544-2511
 Orange, MA 01364 FAX (508) 544-7204
7. Mosser Valve (610) 770-1100
 160 Walnut Street FAX (610) 770-1108
 Allentown, PA 18102
8. ValMatic Valve and Manufacturing Corp. (630) 941-7600
 905 Riverside Drive FAX (630) 941-8042
 Elmhurst, IL 60126

- | | | |
|-----|--|--|
| 9. | Milliken Valve Co.
2625 Brodhead Road Suite 100
Bethlehem, PA 18020-9081 | (610) 861-8803
FAX (610) 861-8094 |
| 10. | Crispin Multiplex Mfg. Co.
600 Fowler Avenue
Berwick, PA 18603 | (800) 247-8258
FAX (570) 752-4962
www.KFlovalves.com |

TAPPING SLEEVES

MANUFACTURERS (Fabricated Steel and Stainless Steel Sleeves):

- | | | |
|----|--|--|
| 1. | JCM Industries, Inc.
P.O. Box 580
Nash, TX 75569 | (800) 527-8482 |
| 2. | Smith-Blair, Inc.
P.O. Box 5337
Texarkana, TX 75505 | (501) 773-5127
(800) 643-9705
FAX (800) 648-6792 |
| 3. | ROMAC Industries, Inc.
21919 20 th Ave SE
Bothell, WA 98021 | (800) 426-9341
FAX (425) 951-6201 |
| 4. | Power Seal Pipeline Products Corp.
P.O. Box 2014
Wichita Falls, TX 76307 | (817) 767-5566
(800) 800-0932
(205) 237-3521 |
| 5. | The Ford Meter Box Company, Inc.
775 Manchester Avenue, P.O. Box 443
Wabash, IN 46992-0443 | (219) 563-3171
FAX (800) 826-3487 |
| 6. | Cascade Waterworks Manufacturing, Inc.
1213 Badger
Yorkville, IL 60560 | (312) 553-0840
(800) 426-4301
FAX (312) 553-0181 |
| 7. | Mueller Company
500 West Eldorado Street, P.O. Box 671
Decatur, IL 62525 | (804) 320-6278 |
| 8. | Dresser Industries, Inc., DMV Division
410 Fisher Avenue
Bradford, PA 16701 | (814) 362-9200
FAX (814) 362-9333 |
| 9. | Total Piping Solutions, Inc.
1760 Haskell Road
Olean, NY 14760 | (716) 372-0160
FAX (716) 372-1767
www.tps.us |

MANUFACTURERS (Mechanical Joint Cast/Ductile Iron and Steel Sleeves)

1. Mueller Company (804) 320-6278
500 West Eldorado Street, P.O. Box 671
Decatur, IL 62525
2. Clow Valve Company (800) 247-CLOW
P.O. Box 350
Oskaloosa, IA 52577
3. JCM Industries (800) 527-8482
P.O. Box 580
Nash, TX 75569
4. American Flow Control (205) 325-7856
(Formerly American-Darling)
2930 N. 16th. Street, P.O. Box 2727
Birmingham, AL 35202-2727
5. U.S. Pipe & Foundry Company (423) 752-3700
Box 6159 FAX (423) 752-3710
Chattanooga, TN 37401

TAPPING VALVES

MANUFACTURERS:

1. Mueller Company (804) 320-6278
500 West Eldorado Street, P.O. Box 671
Decatur, IL 62525
2. Clow Valve Company (800) 247-CLOW
P.O. Box 350
Oskaloosa, IA 52577
3. Kennedy Valve Company, A Div.of McWane (607) 734-2211
1021 East Water Street FAX (607) 734-3288
Elmira, NY 14901
4. American Flow Control (205) 325-7856
(Formerly American-Darling)
P.O. Box 2727
Birmingham, AL 35202-2727

- | | | |
|----|---|--------------------------------------|
| 5. | American Flow Control
6900 Roswell Road Apt. P-4
Atlanta, GA 30362-0700 | (770) 730-9925
FAX (770) 730-9985 |
| 6. | American R/D, LLC
1800 Greenbrier Dear Road
Anniston, AL 36207 | (256) 831-2236
FAX (256) 831-2884 |

LINE STOPPING VALVES

MANUFACTURERS:

- | | | |
|----|---|--------------------------------------|
| 1. | Hydra-Stop Inc.
12601 South Homan Avenue
Blue Island, IL 60406 | (800) 538-5111 |
| 2. | Team Industrial Services
7518 Whitepine Road
Richmond, VA 23237 | (804) 743-5597
FAX (804) 275-5280 |

SERVICE MATERIAL

MANUFACTURERS:

**METER YOKES (MY), CORPORATION STOPS (CS), COMPRESSION FITTINGS (CF),
CURB STOPS (CBS), (See Part V, Section 1 for approved Model #'s)**

- | | | |
|------------------|---|--|
| MY,CS,CF,
CBS | 1. Mueller Company
500 West Eldorado Street
Decatur, IL 62525 | (217) 320-6278 |
| MY,CS,CF,
CBS | 2. Ford Meter Box Co., Inc.
775 Manchester Ave. P.O. Box 443
Wabash, IN 46992 | (219) 563-3171 |
| | Ford Meter Box Co., Inc.
c/o Loyal Butts
1695 Brackets Bend Road
Powhatan, VA 23139 | (804) 747-9955 |
| MY,CS,
CF,CBS | 3. A. Y. McDonald Manufacturing Co.
P.O. Box 508 4800 Chavenelle Road
Dubuque, IA 52001 | (319) 583-7311
or
(800) 292-2737 |
| CS | 4. James Jones Company
1470 South Vintage Avenue
Ontario, CA 91761 | (800) 523-8618
FAX (800) 246-5663 |
| MY,CBS,
CS,CF | 5. Cambridge Brass
P.O. Box 249, 140 Orion Place
Cambridge, Ontario NIR-5V1 | (519) 621-5520
FAX (519) 621-8038 |

COPPER TUBING

MANUFACTURERS:

1. Wolverine Tube (205) 353-1310
P.O. Box 2202
Decatur, AL 35602

2. CERRO Flow Products LLC (618) 337-6000
P.O. Box 66800 (888) 237-7611
St Louis, MO 63166-6800 FAX (618) 337-6958

3. Cambridge Lee Industries (800) 241-3255
P.O. Box 81349
Atlanta, GA 30366

4. Mueller Brass Company (313) 987-4000
1925 Lapeer Avenue FAX (313) 987-6946
Port Huron, MI 48060

5. Kobe Wieland Copper Products LLC (336) 427-6611
3990 U.S. 311 Highway FAX (336) 548-1576
P.O. Box 160
Pine Hall, NC 27042

VAULTS AND/OR METER BOXES [for 1 1/2" and larger water meters and assemblies (WM) and for backflow devices (BF)] - PRECAST CONCRETE

MANUFACTURERS:

- WM, 1. Americast (800) 648-2278
BF 210 Stone Spring Road (540) 434-6979
Harrisonburg, VA 22801 FAX (540) 434-3364
- Americast (800) 999-2278
11352 Virginia Precast Road (804) 798-6068
Ashland, VA 23005 FAX (804) 798-3426
- BF Americast (540) 949-8386
1321 N. Delphine Ave FAX (540) 885-3280
Waynesboro, VA 22980

- | | | | |
|-----------------------|----|---|--|
| WM
(3" & 4")
BF | 2. | Beasley Concrete, Inc.
16090 Aspen Road
Milford, VA 22514 | (804) 633-9626
FAX (804) 529-7507 |
| WM | 3. | Bartow Precast
P.O. Box 20067
Cartersville, GA 30120 | (770) 382-4462
FAX (770) 382-4480
Web Site: www.bartowprecast.com |
| BF | 4. | Hanover Precast, Inc.
P.O. Box 38
Ashland, VA 23005 | (804) 798-2336
FAX (804) 798-2339 |

METER BOXES (for 5/8" and 1" water meters)

MANUFACTURERS:

POLYETHYLENE

- | | | |
|----|---|--|
| 1. | Old Castle Precast, Inc.
3000 New McEver Road
Acworth, GA 30101 | (404) 558-5970
(800) 735-5566
FAX (800) 827-7111 |
|----|---|--|

CAST IRON

- | | | |
|----|---|--|
| 1. | Capitol Foundry of Virginia, Inc.
2856 Crusader Circle
Virginia Beach, VA 23456 | <u>Mailing Address:</u> P.O. Box 2212
Va. Beach, VA 23452
(804) 427-9431 |
|----|---|--|

SERVICE SADDLES - *Effective February 4, 2019 all service saddles will be required to have a bronze body with double stainless-steel straps.*

MANUFACTURERS:

- | | | |
|----|--|--------------------------------------|
| 1. | ROMAC Industries, Inc.
21919 20 th Ave SE
Bothell, WA 98021 | (800) 426-9341
FAX (425) 951-6201 |
|----|--|--------------------------------------|

2. Smith-Blair, Inc. (800) 643-9705
A BTR Company
P.O. Box 5337
Texarkana, TX 75505
3. Ford Meter Box Company (219) 563-3171
775 Manchester Avenue
P.O. Box 443
Wabash, IN 46992
4. Power Seal Pipeline Products Corp. (817) 767-5566
P.O. Box 2014 (800) 800-0932
Wichita Falls, TX 76307 FAX (817) 732-8378
5. Mueller Company (217) 320-6278
500 West Eldorado Street
Decatur, IL 62525

AIR RELEASE VALVES

MANUFACTURERS:

1. APCO Valve & Primer Corporation (708) 529-9000
1420 S. Wright Blvd. FAX (708) 529-9007
Schaumburg, IL 60193-4599
2. G.A. Industries (412) 625-3541
9025 Marshall Road
Mars, PA 16046
3. Cla-Valve Company (703) 721-1923
6911 Richmond Highway, Suite 444 (800) 451-3030
Alexandria, VA 22306 FAX (703) 721-1927
4. Clow Special Products Division (817) 767-5566
P.O. Box 2014
Wichita Falls, TX 76307
5. Val-Matic Valve & Manufacturing Corp. (708) 941-7600
905 Riverside Drive Telex 28-1001
Elmhurst, IL 60126 FAX (708) 941-8042

VALVE BOXES

MANUFACTURERS:

1. SIGMA Corporation (609) 758-0800
700 Goldman Drive, P. O. Box 300 (800) 999-2550
Cream Ridge, NJ 08514 FAX (609) 758-1158
2. Bingham and Taylor
P.O. Box 552
Culpepper, VA 22701
3. Capitol Foundry of Virginia, Inc. (804) 427-9431
2856 Crusader Circle Mailing Address:
Virginia Beach, VA 23456 P.O. Box 2212
Va. Beach, VA 23452
4. Star Pipe Products, Inc. (713) 558-3000
4018 Westhollow Parkway (800) 999-3009
Houston, TX 77082 FAX (713) 558-9000

RESTRAINERS

MANUFACTURERS:

1. EBAA Iron, Inc. (Megalug) (817) 629-1737
P.O. Box 857
Eastland, TX 76448
2. Romac Industries, Inc. (800) 426-9341
21919 20th Ave SE FAX (425) 951-6201
Bothell, WA 98021
3. Uni-Flange (800) 786-3628
5285 Ramona Boulevard FAX (904) 781-3835
Jacksonville, FL 32205
4. Star Pipe Products, Inc. (713) 558-3000
4018 Westhollow Parkway (800) 999-3009
Houston, TX 77082 FAX (713) 558-9000
5. SIGMA Corporation (609) 758-0800
700 Goldman Drive, P. O. Box 300 (800) 999-2550
Cream Ridge, NJ 08514 FAX (609) 758-1158

4. Mueller Co.
Main Office - Decatur, IL
Water Division (800) 423-1323
Canada - Mueller Canada Inc. (905) 878-0541
E-mail: moreinfo@muellercompany.com
www.muellercompany.com

7. Capital Industries, Inc. (800) 385-1102
7780 Wards Road FAX (434) 821-6036
Rustburg, VA 24588

8. Smith-Blair (704) 236-8176
30 Globe Avenue FAX (704) 583-0383
Texarkana, AR 71854 www.smith-blair.com

MARKERS

MANUFACTURERS:

1. Carsonite International (702) 883-5104
2900 Lockheed Way (800) 648-7974
Carson City, NV 89701

2. Greenline (800) 438-4733
1616 Commerce Drive FAX (800) 232-9872
Stowe, OH 44224-1731

FLUSHING HYDRANTS

MANUFACTURERS:

1. GIL Industries, Inc. (800) 245-3007
P.O. Box 490 FAX (800) 544-2445
Gonzalez, FL 32560

2. The Kupferle Foundry Company (314) 231-8738
813 Hemstead Place (800) 231-3990
St. Louis, MO 63102 FAX (314) 231-2820

CASING SPACERS

MANUFACTURERS:

1. Cascade Waterworks Manufacturing, Inc. (312) 553-0840
1213 Badger (800) 426-4301
Yorkville, IL 60560 FAX (312) 553-0181

- | | | |
|----|--|--|
| 2. | Advance Products & Systems, Inc.
P.O. Box 53096
Lafayette, LA 70505-3096 | (318) 233-6116
FAX (318) 232-3860 |
| 3. | PSI Pipeline Seal and Insulator, Inc.
6525 Goforth Street
Houston, TX 77021 | (713) 747-6948
FAX (713) 747-6029 |
| 4. | Power Seal Pipeline Products Corp.
P.O. Box 2014
Wichita Falls, TX 76307 | (817) 767-5566
(800) 800-0932
FAX (817) 732-8378 |
| 5. | BWM Company (866) 577-2237
P.O. Box 414 FAX (838) 245-5494
Forest City, NC 28043 | |
| 6. | CCI Pipeline Systems, LLC
P.O. Box 9365
The Woodlands, TX 77387 | (281) 350-2100
(800) 867-2772
FAX (281) 288-6261 |

LUBRICANTS

MANUFACTURERS:

- | | | |
|----|---|--|
| 1. | J. C. Whitlam Manufacturing Company
200 West Walnut Street
P.O. Box 380
Wadsworth, Ohio 44282-0380 | (800) 321-8358
(330) 334-2524
FAX (800) 537-0588
FAX (330) 334-3005 |
| 2. | Future Tools, Inc.
13591 Cable Road
Pataskala, Ohio 43062 | (740) 927-7712
FAX (740) 927-9929 |

WATER SAMPLING STATIONS

MANUFACTURERS:

- | | | |
|----|--|--------------------------------------|
| 1. | GIL Industries, Inc.
P.O. Box 490
Gonzalez, FL 32560 | (800) 245-3007
FAX (800) 544-2445 |
|----|--|--------------------------------------|

VALVE KEY EXTENSIONS

MANUFACTURERS:

- | | | |
|----|--|--------------------------------------|
| 1. | West End Machine and Welding, Inc.
6804 School Avenue
P.O. Box 9444
Richmond, VA 23228
Attn: Dan Heath | (804) 266-9631
FAX (804) 264-0747 |
|----|--|--------------------------------------|

B. SANITARY SEWER SYSTEMS

PVC SDR-35 GRAVITY SEWER PIPE (SIZES 6", 8", 10" 12" & 15") ASTM D3034

MANUFACTURERS:

- | | | | |
|--------------------------------|----|--|--|
| ASTM
D3034 | 1. | Certainteed Corporation
P.O. Box 860
Valley Forge, PA 19482 | (610) 341-7000
FAX (610) 341-6837 |
| ASTM
D3034 | 2. | JM Eagle
9 Peach Tree Hill Road
Livingston, NJ 07039 | (973) 535-1633
FAX (973) 535-1632 |
| ASTM
D3034
ASTM
F1760 | 3. | IPEX, Inc. (frmly Scepter-Canron)
2441 Royal Windsor Drive
Mississauga, Ontario, Canada L5J4C7 | (800) 463-9572
FAX (905) 401-9195 |
| ASTM
D3034 | 4. | Diamond Plastics Corporation
1212 Johnstown Road
P.O. Box 1608
Grand Island, NE 68802 | (308) 384-4400
FAX (308) 384-9345 |
| ASTM
D3034 | 5. | North American Pipe Corporation
(NAPCo)
200 Park Place
Booneville, MS 38829 | (601) 728-2111
FAX (601) 728-3135 |
| ASTM
D3034 | 6. | North American Pipe Corporation
2801 Post Oak Blvd, Suite 600
Houston, TX 77056 | (800) 999-7473
(713) 840-7473
FAX (713) 552-0087 |
| ASTM
D3034 | 7. | National Pipe & Plastics, Inc.
9609 Old Highway 421S
Colfax, NC 27235 | (800) 866-0149
FAX (336) 996-1755 |

PVC SDR-35 GRAVITY SEWER PIPE (Sizes 18"-48") ASTM F679

MANUFACTURERS:

1. Certainteed Corporation (610) 341-7000
P.O. Box 860 FAX (610) 341-6837
Valley Forge, PA 19482
2. J-M Manufacturing Co., Inc. (201) 535-1633
9 Peach Tree Hill Road
Livingston, NJ 07039
3. North American Pipe Corp. (601) 728-2111
200 Park Place FAX (601) 728-3135
Booneville, MS 38829
4. National Pipe & Plastics, Inc. (800) 866-0149
9609 Old Highway 421S FAX (336) 996-1755
Colfax, N. C. 27235

VYLON H.C. GRAVITY SEWER PIPE (21"-54") ASTM F794

MANUFACTURERS:

1. Prime Conduit, Inc. (216) 464-3400
25701 Science Park Drive (800) 321-1970
Cleveland, OH 44122 FAX (216) 831-3208

ULTRA-CORR GRAVITY SEWER PIPE (24"-36") ASTM F794

MANUFACTURERS:

1. JM Eagle (973) 535-1633
9 Peach Tree Hill Road FAX (973) 535-1632
Livingston, NJ 07039

A-2000 GRAVITY SEWER PIPE (24"-36") ASTM F949 or F794

MANUFACTURERS:

1. Contech Construction Products Inc. (513) 645-7000
9025 Centre Pointe Drive, Suite 400
West Chester, Ohio 45069

ADS N-12 HP GRAVITY SEWER PIPE (30"-60") ASTM D4101

MANUFACTURERS:

1. Advanced Drainage Systems, Inc. (800) 821-6710
4640 Trueman Boulevard
Hilliard, OH 43026

DIAMOND CORR 21 ASTM F794 & DIAMOND PRO 21 ASTM F1803 (42" & larger)

MANUFACTURERS:

1. Diamond Plastics Company (800) PVC-PIPE
1212 Johnstown Road
Grand Island, NE 68803

DUCTILE IRON GRAVITY SEWER PIPE

MANUFACTURERS:

1. Same as for Approved Water Pipe Manufacturers for PVC and Ductile Iron

PRESSURE SEWER PIPE

MANUFACTURERS:

1. Same as for Approved Water Pipe Manufacturers
2. For HDPE:
DriscoPlex Performance Pipe, a Div. of (800) 527-0662
Chevron Phillips Chemical Company LP FAX (972) 599-7348
PO Box 269006
Plano, TX 75026-9006

PVC SDR-35 GASKETED GRAVITY SEWER FITTINGS

MANUFACTURERS:

1. Head Manufacturing, Inc. (208) 852-2000
640 South Highway 91 FAX (208) 852-2003
Preston, ID 83263-9738
(Formerly Certainteed Corp. Fittings)
2. J-M Manufacturing Co., Inc. (201) 535-1633
9 Peach Tree Hill Road
Livingston, NJ 07039

- | | | |
|-----|--|--------------------------------------|
| 3. | Vassallo Industries
P.O. Box 800473
Coto Laurel, Puerto Rico 00780-473 | (787) 848-1515
(800) 927-1560 |
| 4. | The Harrington Corporation (HARCO)
P.O. Box 10335
Lynchburg, VA 24506 | (804) 845-7094 |
| 5. | Multi-Fittings, Inc.
731 Langco, Suite 101
Richardson, TX 75281 | (800) 344-5819 |
| 7. | GPK Products, Inc.
1601 43rd. Street NW
Fargo, ND 58102 | (800) 437-4670
FAX (800) 822-6989 |
| 8. | Plastic Trends, Inc.
3718 Golf Course Drive
Norton, OH 44203 | (216) 825-4053
FAX (216) 825-7357 |
| 9. | Nyloplast USA, Inc.
3130 Verona Avenue
Buford, GA 30518 | (404) 932-2443
FAX (404) 932-2490 |
| 10. | Freedom Plastics, Inc.
215 S. Arch Street
Janesville, WI 53548-4418 | (608) 754-2710 |

CONCRETE GRAVITY SEWER FITTINGS

MANUFACTURERS:

- | | | |
|----|---|--|
| 1. | Hanson Pipe & Products, Inc.
2900 Terminal Avenue
Richmond, VA 23234-1632 | (800) 309-1202
(804) 233-5471
FAX (804) 232-1213 |
|----|---|--|

PRESSURE SEWER FITTINGS

MANUFACTURERS:

1. Same as approved for water pipe.

MANHOLE RISERS (R), CONES (C) and ADJUSTING RINGS (AR)

MANUFACTURERS:

- | | | | |
|--------|----|---|--|
| R,C,AR | 1. | Hanson Pipe & Products, Inc.
2900 Terminal Avenue
Richmond, VA 23234-1632 | (800) 309-1202
(804) 233-5471
FAX (804) 232-1213 |
|--------|----|---|--|

- | | | | |
|--------|----|--|--|
| R,C,AR | 2. | Americast
210 Stone Spring Road
Harrisonburg, VA 22801 | (800) 648-2278
(540) 434-6979
FAX (540) 434-3364 |
| | | Americast
11352 Virginia Precast Road
Ashland, VA 23005 | (804) 798-6068 |
| R,C,AR | 3. | Concrete Specialties, Inc.
1420 16th. Street S.E.
Roanoke, VA 24014 | (540) 982-0777
FAX (703) 982-0775 |
| AR | 4. | LADTECH, Inc.
6704 Meadowlark Court
Lino Lakes, MN 55038 | (651) 415-1252
FAX (651) 415-1090
Toll Free (877) 235-7464
Toll Free FAX (866) 397-7571 |
| R,C,AR | 5. | Tindall Corporation
P.O. Box 361
Washington, NC 27889 | |
| R,C,AR | 6. | Nansemond Pre-Cast Concrete Co., Inc.
3737 Nansemond Parkway
Suffolk, VA 23435 | (757) 538-2761
FAX (757) 538-8342 |
| R,C,AR | 7. | Contractors Precast Corp.
3200 Patuxent River Road
Davidsonville, MD | (301) 261-4730
FAX (410) 798-7248 |
| R,C,AR | 8. | Winchester Building Supply Co., Inc.
2001 Millwood Pike
Winchester, VA 22602 | (540) 667-2301 |

MANHOLE FRAMES AND COVERS

MANUFACTURERS:

- | | | | |
|--|----|--|--|
| | 1. | Capitol Foundry
2856 Crusader Circle
Virginia Beach, VA | (804) 427-9431 |
| | 2. | Neenah Foundry
P.O. Box 729
Neenah, WI 54959 | (414) 725-7000
FAX (414) 729-3682 |
| | 3. | SIGMA Corporation
700 Goldman Drive, P. O. Box 300
Cream Ridge, NJ 08514 | (609) 758-0800
(800) 999-2550
FAX (609) 758-1158 |
| | 4. | East Jordan Iron Works, Inc.
P.O. Box 245
Finksburg, MD 21048 | (800) 418-3549 |

- | | | |
|----|---|--------------------------------------|
| 5. | U.S. Foundry & Manufacturing Corp.
8351 N.W. 93 rd . Street
Medley, FL 33166 | (800) 527-8380
FAX (336) 656-9724 |
|----|---|--------------------------------------|

MISCELLANEOUS ITEMS

MANUFACTURERS:

ADAPTORS

- | | | |
|----|--|--|
| 1. | GENECO (The General Engineering Co.)
Box 609
Frederick, MD 21701 | (301) 663-9282
(800) 345-6454
FAX (301) 695-5612 |
| 2. | GPK Products, Inc.
1601 43rd. Street NW
Fargo, ND 58102 | (800) 437-4670
FAX (800) 822-6989 |
| 3. | DFW/HPI
P.O. Box 648
Bedford, TX 76095 | (800) 255-7633
FAX (817) 488-4412 |

6" OR 8" PLASTIC END PLUGS (WITH WING NUT AND EARS)

- | | | |
|----|---|--|
| 1. | Certainteed Corporation
P.O. Box 860
Valley Forge, PA 19482 | (215) 341-7000 |
| 2. | Cherne Industries, Inc.
5701 South County Road 18
Minneapolis, MN 55436 | (800) 843-7584
(612) 933-5501
FAX (612) 938-6601 |
| 3. | Lansas Products
1320 South Sacramento Street
Lodi, CA 95240 | (209) 334-4115
(800) 452-4902
FAX (209) 339-8260 |

GASKETS (G) and Flexible Manhole Connectors (FMC)

- | | | | |
|-----------|----|---|--------------------------------------|
| (FMC) | 1. | NPC Systems, Inc.
Elm Street, Box 301
Milford, NH 03055 | (603) 673-8680 |
| (G) (FMC) | 2. | Press-Seal Gasket Corporation
P.O. Box 10482
Fort Wayne, IN 46852 | (800) 348-7325
FAX (219) 436-1908 |
| (G) | 3. | Fowler Manufacturing Company
P.O. Box 767
Hillsboro, OR 97123 | (503) 357-2110 |

(FMC) 4. International Precast Supply (800) 845-3537
60 Railroad Street FAX (978) 372-2831
Haverhill, MA 01835

SEWER SADDLES with approved gaskets

1. ROMAC Industries, Inc. (800) 426-9341
21919 20th Ave SE FAX (425) 951-6201
Bothell, WA 98021
2. GENECO (The General Engineering Co.) (301) 663-9282
Box 609 (800) 345-6454
Frederick, MD 21701 FAX (301) 695-5612
3. INSERTA Fittings Company (503) 357-2110
P.O. Box 767 FAX (503) 359-5417
Hillsboro, OR 97123
4. Fernco, Inc. (810) 653-9626
300 S. Dayton Street FAX (810) 653-8714
Davison, MI 48423

AIR/VAC AND COMBINATION VALVES

1. Mulric Hydro Projects (027 11 International) 748-0287
(VENT-O-MAT) FAX (027 11 International) 422-3078
P.O. Box 16091
Atlasville, 1465 South Africa
2. A.R.I. Flow Control Accessories 972-4-6761988
KFAR CHARUV FAX 972-4-6763402
12932 ISRAEL www.arivalves.com

PLUG VALVES

1. Dezurik (612) 259-2000
250 Riverside Avenue North
Sartell, MN 56377
2. Val-Matic Valve and Manufacturing Corp. (708) 941-7600
905 Riverside Drive FAX (708) 941-8042
Elmhurst, IL 60126
3. Milliken Valve Company, Inc. (215) 861-8803
3864 Courtney Street, Suite 100 FAX (215) 861-8094
Bethlehem, PA 18017

- | | | |
|----|---|--------------------------------------|
| 4. | Homestead
160 Walnut Street
Allentown, PA 18102 | (215) 770-1100
FAX (215) 770-1108 |
| 5. | Clow Valve Company, A Div of McWane, Inc.
1375 Magnolia Avenue
Corona, CA 92879 | (888) 889-2411
FAX (951) 735-0837 |

MANHOLE STEPS

- | | | |
|----|---|--|
| 1. | MA Industries, Inc.
P.O. Box 2322
Peachtree City, GA 30269 | (404) 487-7761
FAX (404) 631-4679 |
| 2. | BOWCO Industries, Inc.
155 SE Hazel Dell Way
Canby, OR 97013 | (888) 232-9991
(503) 266-9405
FAX (503) 266-8934 |
| 3. | Press-Seal Gasket Corporation
P.O. Box 10482
Fort Wayne, IN 46852 | (800) 348-7325
FAX (219) 436-1908 |
| 4. | Cosmos North America
P.O. Box 25532
Washington, DC 20007 | (202) 333-3955
FAX (202) 333-6427 |
| 5. | American Step Company
P.O. Box 137
Griffin, GA 30224-0137 | (800) 988-STEP
FAX (770) 467-8011 |

MANHOLE INSERTS

- | | | |
|----|---|--------------------------------------|
| 1. | Parson Environmental Products
P.O. Box 4474
Reading, PA 19606 | (800) 356-9023
FAX (610) 582-6064 |
|----|---|--------------------------------------|

C. MANUFACTURERS' REPRESENTATIVES AND/OR SUPPLIERS

1. Mainline Supply Company (804) 743-1980
5500 Jefferson Davis Highway FAX (804) 743-3380
Richmond, VA 23234
2. A.E.W. Enterprises Utility Pipeline Supplies (215) 489-7007
480 Collegeville Road FAX (215) 454-9528
Collegeville, PA 19426
3. AVS Associates, Inc. (301) 833-7676
P.O. Box 270 (800) 537-0761
Glyndon, MD 21071
4. Americast (800) 648-2278
210 Stone Spring Road (540) 434-6979
Harrisonburg, VA 22801 FAX (540) 434-3364

Americast (804) 798-6068
11352 Virginia Precast Road
Ashland, VA 23005
5. Aqueous Sales, Inc. (804) 379-0019
13630 Hailsham Circle FAX (804) 794-7499
Midlothian, VA 23113
6. Charles Morrow and Associates (804) 221-2188
6106 Langgate Road FAX (804) 739-9752
Midlothian, VA 23112 tyebabb@verizon.net
7. Atlantic Valve & Equipment #40 (804) 980-6311
P.O. Box 18423 FAX (888) 576-1262
Richmond, VA 23226
8. Chowning Sales Company (804) 270-2349
9503 Bonnie Dale Road
Richmond, VA 23229
9. Coastal Products Company, Inc. (804) 769-8820
7840 Richmond-Tappahannock Hwy FAX (804) 769-8910
P.O. Box 498
Aylett, VA 23009 E-Mail: Sales@coastalproducts.net
Attn: Les Thorpe www.coastalproducts.net
10. Concrete Specialities, Inc. (703) 982-0777
1420 16th Street N.E. FAX (703) 982-0775
Roanoke, VA 24014

C. MANUFACTURERS' REPRESENTATIVES AND/OR SUPPLIERS (Continued)

11. Ferguson Waterworks (804) 594-1840
1895 A South Creek ONE FAX (804) 378-8643
Powhatan, VA 23139
12. Flomec, Inc. (804) 794-6300
10815 Trade Road FAX (804) 794-3564
P.O. Box 73510
Richmond, VA 23235-0610
13. HD Supply (804) 743-8010
2101 Pine Forest Drive FAX (804) 520-5496
Colonial Heights, VA 23834
(formerly Hughes Supply)
- or
- HD Supply (804) 749-8281
2388 Lanier Road FAX (804) 749-4023
Rockville, VA 23146 Toll Free (800) 474-3878
(formerly National Waterworks, A & P, WaterPro, and U.S. Filter)
14. Hanson Pipe and Products, Inc. (804) 233-5471
2900 Terminal Avenue
Richmond, VA 23234
15. Hockett and Associates, Inc. (800) 666-1423
703 Swan View Lane
Urbanna, VA 23175
16. Jepco Sales (610) 948-7867
271 Hafner Road FAX (610) 948-6757
Royersford, PA 19468 www.jepcosales.com
17. Kobe Wieland Copper Products LLC (336) 427-6611
3990 US 311 Highway N FAX (336) 548-1576
Pine Hall, NC 27042
18. Lewis Supply Co., Inc. (804) 232-7801
101 E. 7th. Street
Richmond, VA 23234
19. MAS Sales, Inc. (919) 996-7770
P.O. Box 1308
Kernersville, N.C. 27285-1308

C. MANUFACTURERS' REPRESENTATIVES AND/OR SUPPLIERS (Continued)

- | | | |
|-----|--|---|
| 20. | Nansemond Pre-Cast Concrete Co., Inc.
3737 Nansemond Parkway
Suffolk, VA 23435 | (757) 538-2761
FAX (757) 538-8342 |
| 21. | Paramount Agency
397 W. Farmington Road
Virginia Beach, VA 23454 | (757) 498-9029
FAX (757) 431-9132 |
| 22. | Preferred Sources, Inc.
1650A Mountain Road
Glen Allen, VA 23060 | (804) 266-9280
FAX (804) 266-9282 |
| 23. | Reams & Associates
1220 Sarah lynch Place
Lynchburg, VA 24503-1942 | (434) 384-7207 |
| 24. | Smith-Blair
30 Globe Avenue
Texarkana, AR 71854 | (704) 236-8176
FAX (704) 583-0383
www.smith-blair.com |
| 25. | Soter-Martin & Assoc., Inc.
P.O. Box 15233
Richmond, VA 23227 | (804) 798-1423 |
| 26. | RFS & Associates, Inc.
5401 Flycatchers Court
Warrenton, VA 20187 | (540) 428-4440
FAX (540) 428-4442 |
| 27. | SPC Marketing
P.O. Box 675
Monroe, NC 28111 | (704) 283-8554
FAX (704) 283-8010 |
| 28. | Tindall Concrete Products, Inc.
3076 N. Blackstock Road
P.O. Box 1778
Spartanburg, SC 29304 | (800) 849-4521
(864) 576-3230
FAX (864) 587-8828 |
| 29. | USA - Utility Sales Associates
P.O. Box 1168
Midlothian, VA 23113 | (804) 794-4710
FAX (804) 794-1397 |
| 30. | Water Works Supply
8338 Old Richfood Road
Mechanicsville, VA 23111 | (804) 730-9050 |

SECTION 4: MATERIALS SPECIFICATIONS

All products must comply with the Materials Specifications as referenced in Part IV herein, and the Standard Details as reflected in the Department of Public Utilities' Standard Design Specifications and Details Manual. All references to ASTM, AWWA, and other standards shall include latest revisions. In addition, all products must have the approval of the State Health Department prior to the submittal to the PDRC for consideration.

A. WATER SYSTEMS

1. Water Pipe and Fittings:

- a. Ductile iron pipe shall meet the requirements of AWWA C151. Pipe shall be thickness Class 51. Pipe shall have cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA Standard C104. Thickness class shall meet the requirements of AWWA C150. Minimum wall thickness for pipe shall be as follows: 6"-0.28", 8"-0.30", 12"-0.34", 16"-0.37", 20"-0.39", 24"-0.41", 30"-0.47". A minimum of 5% of the pipe furnished shall be gauged for roundness full length and so marked.
- b. Pipe fittings shall meet the requirements of AWWA C110 (ductile iron or cast iron) or AWWA C153 (ductile iron compact). All fittings shall be Pressure Class 250. Fittings shall have a cement-mortar lining and a bituminous seal coating or a 6-8 mil (nominal thickness) fusion bond epoxy lining/coating in compliance with AWWA C550.
- c. Pipe and fittings shall have either mechanical joint or push-on joint, both conforming to the requirements of AWWA C111. Bolts shall be high strength cast iron having an ultimate tensile strength of 75,000 psi and a minimum yield point of 45,000 psi.
- d. Polyvinyl chloride pipe (PVC) 6" and 8" in size shall conform to the requirements of AWWA Specification C-900, with gasket joints, DR-18 Class 150 with iron pipe O.D. Fittings shall be ductile iron or cast iron, Pressure Class 250, with mechanical joints. Additional criteria as set forth by the County of Chesterfield is outlined in Section 4.C.1. entitled "Supplemental Specifications - Additional Criteria for Polyvinyl Chloride Piping for Water and Sanitary Sewer Systems".

- e. Gaskets - Gaskets for mechanical and push-on joints shall meet the latest AWWA Specifications. Hemp or jute shall not be used. Gaskets for 8" I.D. pipe and smaller shall be 1/16" thick and gaskets for installation on larger size pipe shall be 3/32" thick.
- f. Flange Bolts and Nuts - Flange bolts shall be of the length required for various connections. Bolts shall be of steel and have rough square heads made to American Standard rough dimensions and shall be chamfered and trimmed. Bolts and nuts shall be threaded in accordance with American Standard ASA B1.1-1935 coarse thread series, Class 2 fit.
- g. Tracing wire shall be 14 gauge copper wire and used with all waterline pipe.

2. Valves:

- a. Resilient Seated Gate Valves
 - 1) All resilient gate valves shall fully comply with AWWA C-509 (3"-12") or C-515 (4"-12"), latest revision.
 - 2) All valves shall be manually operated non-rising stem, equipped with operating nut, for installation in a vertical position, unless otherwise specified, and the valve body shall be ductile iron with reinforced flanges.
 - 3) All iron surfaces, internal and external must be coated with a minimum 8 mils thickness of hand applied epoxy or 3-5 mils thickness fusion bonded epoxy.
 - 4) The valve stem shall have an independent stem nut (not rigidly attached to the gate) which allows the gate to flex without stressing the stem.
 - 5) All valves shall have either a bronze stem collar bushing with two O-rings above the stem or a stem collar with one O-ring below and one O-ring above the stem collar.

- 6) Seating shall use compression closure. The gate shall be of a true bi-directional, mirror image design.
- 7) Valves shall have a smooth bottom design.
- 8) Valves shall have a port in the bottom of the gate to allow purging of the gate.
- 9) All valves shall open left and have end connections of Mechanical Joint, or as specified by the Department of Public Utilities.
- 10) All castings shall be clean and sound without defects. The castings shall be clean and perfect without blow or sand holes or defects of any kind. No plugging, welding or repairing of cosmetic defects will be allowed.
- 11) Valves 3" through 12" must have a minimum 200 psi working and 400 psi test pressure.
- 12) If the standard valve provided by a Manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each valve must be permanently marked to indicate the option or options that have been provided. The method of marking valves to indicate that options are included must be approved by the Product and Design Review Committee.
- 13) All bonnet bolts must be stainless steel.
- 14) All internal and external bolts shall be a minimum Type 304 stainless steel.

b. Resilient Seated Wedge Tapping Valves:

- 1) Tapping valves shall meet above specifications as referenced in 2.a. above. The outlet end shall be suitable for use with the type of pipe specified, either M.J. or Hub end.
- 2) Tapping valves will be suitable for use with all approved manufactured tapping sleeves without modification.

3. Butterfly Valves - 16" - 72" - All butterfly valves shall conform to the latest revision of AWWA Standard C-504, Class 150-B unless otherwise indicated and meet the following:

- a. Valve bodies shall be ductile iron per ASTM A-536 grade 65-45-12. Body ends shall be flanged with facing and drilling in accordance with ANSI B16.1, Class 125 or mechanical joint in accordance with AWWA Standard C-111 or ANSI A21.11. All mechanical joint end valves shall be furnished complete with joint accessories (bolts, nuts, gaskets and glands), and is for underground use only. All valves shall conform with AWWA C-504, Table 3, Laying Lengths For Flanged Valves and Minimum Body Shell Thickness for all Body Types.
- b. Valve disc shall be ductile iron ASTM A-536, grade 65-45-12. Valve disc shall be of the offset or symmetrical design providing 360 degree uninterrupted seating, and for sizes 24" and larger shall be of the flow through type, cored, or domed.
- c. The resilient seat shall be natural rubber or BUNA-N located on the disc or the body retained by an epoxy backing ring or 18-8, Type 304 stainless steel retaining ring secured to the disc by 18-8, Type 304 stainless steel screws. The seat shall be capable of mechanical adjustment in the field and field replaceable without the need for special tools on 24" and larger valves. Valve body seat shall be 18-8, Type 304 Stainless Steel.
- d. Valve shaft shall be 18-8, Type 304 stainless steel. Valves shall have either one piece (through shaft) or two piece (stub shaft). The shaft should be attached to the disc by means of O-ring sealed taper pins with lock nuts on 30" and larger valves. Taper pins should be either 304S.S or 416S.S heat treated for added strength or shaft is attached with stainless steel shaft journals hexmated to drive shaft.
- e. The valve assembly shall be furnished with a non-adjustable factory set thrust bearing designed to center the valve disc at all times.
- f. Shaft bearing shall be contained in the integral hubs of the valve body and shall be of non-cold flowing phenolic backed, PTFE or corrosion resistant self-lubricated sleeve type.

- g. Valve shaft seal shall consist of O-rings or Split-V ring. Where the valve shaft projects through the valve body for the actuator connection, the O-ring or Split-V ring packing seal shall be field replaceable as a part of a removable bronze cartridge, without valve disassembly. Connection to the actuator shall be provided by means of at least 2 bolts for 16" - 24" valves and at least 4 bolts for 30" and larger valves.
- h. When manual actuators are required they shall be amply sized for line conditions. All manual actuators should be traveling nut or wormgear type. All 16" through 24" butterfly valve manual actuators shall be capable of withstanding 300-450 foot pounds of input torque against the open or closed stops. All actuators shall have adjustable mechanical stop limits. The closed position stop may or may not be externally adjustable.
- i. All valves shall be coated with AWWA Standard Epoxy Coatings, in conformance to AWWA Standard C-550, latest revision. All interior ferrous surfaces, including disc, shall be coated a nominal 10 mils thick for long life; and body exterior shall have a minimum 8 mils thickness of hand applied epoxy or 3-5 mils thickness fusion bonded epoxy coating in order to provide protection in shipment and storage, and to afford a superior base for field-applied finish coats.
- j. All internal and external bolts shall be a minimum Type 304 stainless steel.

4. Valve Key Extensions:

- a. The extension shall be one and one half inches (1½") solid core steel with the upper operating nut and bottom coupling welded to the stem.
- b. The 2" square operating nut on top shall be welded to form a complete box with no openings.
- c. 2½" square socket section on bottom shall be tapped on 4 sides for minimum 5/16" N.C. socket head set screws and screws shall be provided.
- d. Valve extensions shall be coated with oil-based enamel or other rust preventative coating.
- e. The operating nut of the valve shall be drilled on opposite sides to allow insertion of the setscrews.
- h. A four and one half inch (4½") diameter steel plate, ¼" thick rock shield, shall be welded to the stem two inches (2") below the bottom of the top operating nut.

5. Tapping Sleeves:

Fabricated Steel:

- a. The body of the tapping sleeve shall be of 3/8" carbon steel, ASTM grade A285.
- b. Flange to be AWWA C207 Class D ANSI, 150 lb. drilling.
- c. The carbon steel body shall have a 12 mil thick coating of fusion-bonded epoxy. Bolts shall be 18-8, Type 304 stainless steel.
- d. Gaskets shall be Grade 60 compounded for use with water, alkalies, mild acids and most hydro-carbon fluids, up to 212° F.

Stainless Steel:

- a. The body of the tapping sleeve shall be of 18-8 type 304 stainless steel.
- b. Branch/flange to be 304 stainless steel, 150 lb. drilling.
- c. MJ Gland shall be permanently affixed to the outlet branch and be 304 stainless steel.
- d. Gaskets shall be Grade 60 compounded for use with water, alkalies, mild acids and most hydro-carbon fluids, up to 212° F.
- e. Clamping hardware (nuts, bolts and washers) shall be 18-8 type 304 stainless steel, with plastic anti-gall washers. Drop-in bolts or welded-on studs are acceptable.

Fabricated Steel with Mechanical Joint Ends

- a. Sleeve body, valve flange, gaskets, hardware and coating to be the same as the fabricated steel tapping sleeve.
- b. The mechanical joint glands to be ASTMA-36 iron or ductile iron.
- c. The gland retaining hardware (nuts, bolts and washers) to be 18-8 type 304 stainless steel.

Cast Iron with Mechanical Joint Ends:

- a. The body and glands of the tapping sleeve shall be of ASTM-126, Class B cast or ductile iron. Sleeve shall be furnished complete with all mechanical joint accessories (bolts, nuts, gaskets and glands), and shall have a bituminous seal coating.
- b. Valve flange, body gaskets and clamping hardware (bolts, nuts and washers) shall be as specified for the fabricated steel tapping sleeve.

Tapping Sleeve Applications

- a. The use of tapping sleeves and valves on the County water system will be considered where it can be shown that installation of a tee and line valve on the existing water main will not be beneficial to the County.
- b. The stainless steel, fabricated steel (with mechanical joint ends), or cast/ductile iron (with mechanical joint ends) tapping sleeves may be used for any approved tap on C-900 PVC or ductile iron water main.
- c. The stainless steel, fabricated steel (with mechanical joint ends), or cast/ductile iron (with mechanical joint ends) tapping sleeves may be used for all approved taps on asbestos-cement pipe (except 16" size) and for size-one size or one size down taps on all other pipe material.
- d. Due to the non-availability of the mechanical joint tapping sleeve for 16" asbestos-cement pipe, the stainless steel sleeve must be used for taps on this pipe.
- e. The fabricated steel tapping sleeve may be used for approved two (or more) size down taps on C-900 PVC, cast iron or ductile iron water main.
- f. Application Chart:

Taps	Size on Size	Cast Iron, Asbestos Cement, Transite	P.V.C	Ductile Iron
		Type of Sleeve	Stainless Steel	***Stainless Steel
	Mechanical Joint	*Mechanical Joint	Mechanical Joint	Mechanical Joint
			**Fabricated Steel	**Fabricated Steel

* Except on 16" A/C pipe.
 ** Approved for use on 2 or more downsize taps only.
 *** Mueller H300 can not be used on A/C and C.I. pipe.

Certification, Testing and Installation:

- a. All tapping sleeves must be crated for shipment with a signed manufacturer's tag certifying that the sleeve meets Chesterfield County specifications. The County inspector shall turn this tag in to the contract file with the location of installation noted on the tag.
- b. Rigorous testing and conditions relating to tapping sleeves, applied to all manufacturers, is standard operating procedure. These conditions are as follows:
 - 1) The tapping sleeve shall be tested in place to a minimum of 200 psi. It is the contractor's responsibility to order the correct pressure rated tapping sleeve. However, for pre-stressed concrete steel cylinder pipe, taps 12" or less shall be tested to 150 psi and taps larger than 12" shall be tested at 10% above the line pressure of the main being tapped.
 - 2) If the sleeve fails the 200 psi pressure test, the original failed sleeve shall be replaced with an entirely new sleeve.
 - 3) The concrete thrust block shall be poured to also support the tapping sleeve from beneath. The tapping sleeve, valve and tapping machine assembly is to be adequately supported during the tapping operation to prevent movement or rotation of the tapping sleeve.
 - 4) Installation instructions must be followed in strict accordance with the latest County's procedures.

6. Double Check Assembly

- a. Vaults

The materials used to construct the vaults privately owned and maintained for backflow prevention assemblies for use in Chesterfield County, Virginia shall conform and adhere to the following supplemental specifications. Vaults shall be cast with an access point and conform to the supplemental specification as outlined below. The vault as a whole, and the individual components, i.e., the lid, walls and base slab shall be adequately designed to handle all applicable loads.

Unless approved through the Utilities Department's Product Review Design Committee in conjunction with Fire Life Safety Division approval, no vault shall be installed without first acquiring the necessary approvals.

1) Description

The Contractor shall provide all labor, materials, tools and equipment necessary for the furnishing and installing of all precast/cast concrete vaults as shown on the approved drawings.

Precast concrete work shall be supplied by an approved manufacturer as listed in the Chesterfield County Water and Sewer Specifications and Procedures.

Reinforced concrete shall be in accordance with ASTM C857, C858 and ACI-318.

2) Design Requirements

Structural design for precast vaults shall be prepared by a Professional Engineer registered in Commonwealth of Virginia meeting the requirements of these specifications. Any vaults within roadway shall be designed for occasional loading AASHTO H20 vehicular loading.

Distribution of earth loading and live load shall be in accordance with ASTM C890.

All vaults shall be designed for flotation with the water level at the ground surface. The pre-cast vaults shall also be designed to resist all stress encountered during casting, handling, erecting and installation.

All pre-cast design and testing shall be under the supervision of a registered Professional Engineer. Precast concrete vaults shall be manufactured in accordance with the applicable requirements of ASTM C913, "Precast Concrete Water and Wastewater Structures", and as modified herein.

All vaults shall be equipped with a sump pump and applicable piping and valves, 120 v single phase capable of pumping 20gpm@15 ft TDH.

3) Minimum Submittal Requirements:

Shop drawings and design calculations shall be submitted to the Chesterfield Utilities Department's Principal Engineer in responsible charge position in the Development Section for each model for approval for all vaults to be approved. The calculations shall be prepared by a Professional Engineer registered in Commonwealth of Virginia.

Calculations shall be provided, signed and sealed and be designed for lateral earth pressures, sizing rebar, live load, dead load, buoyancy and Ultimate moments for top, bottom, and sides of the vault. Calculations not prepared or meeting this specification will be rejected.

Poured-in-place: vaults having job specific requirements being required to cast in place, shall meet the specifications herein.

All drawings shall be fully dimensioned and to show all opening reinforcing steel details, joint details, lifting and erection inserts.

Plan view drawings shall indicate the required minimum clearance for link seals of 1" to 3" inches at the entry and exit points of the pipe at the vault walls.

Approved backflow assemblies shall meet the following specifications and/or drawing shall indicate:

The petcocks are plugged and watertight during non-test periods to prevent potential contamination in the event of flooding.

Clearances on the test petcock side of the assembly (if located on the sides and not the top of the assembly) shall be not less than 18-inches.

Clearances below the assembly shall be a minimum of 12-inches and maximum of 24-inches, measured from the lowest point of the assembly to the finished floor.

Provide dimensions of the assembly (including influent and effluent valves) if only one particular manufacturer and model of the assembly is to be included within the vault.

Indicate on drawing or labeled on plan, that the backflow assembly must be tested at the time of installation and annually thereafter in accordance with the standard procedures accepted, on the required forms, and by a certified tester in accordance with the Chesterfield County Cross Connection program.

4) Fabrication

Concrete strength of all vaults will be 28 days at 5,000 psi minimum. It shall be the signing engineer or precast vaults manufacturer's responsibility to insure the specified strength is maintained throughout production of the vault. Mix design shall be those, previously used by the manufacturer or signing engineer, which have proven satisfactory for casting vaults similar to those specified and producing the required strength as mentioned above. All precast concrete shall be air entrained (4-8%). The use of Fiber in concrete is optional and shall not be used in place of rebar reinforcement. Concrete shall not contain water soluble chloride ions. Accelerators containing calcium chloride shall not be used in precast concrete containing reinforcing steel or other embedded metals.

Sump pumps shall meet the WAT-19 detail of the Chesterfield County Water and Sewer Specification and Procedures.

All rebar shall be minimum Grade 60. A minimum size #4(1/2 inch) rebar unless otherwise designed by a professional engineer registered in the Commonwealth of Virginia and approved by Chesterfield County.

5) Vault Components

- a. Non-traffic bearing lids: The lift holes shall not displace any of the required reinforcement nor should it protrude from face of concrete maintaining 1-inch cover. If H20 Loading is required: All traffic lids shall be designed for H20 loading in accordance with AASHTO Standards and be designed by a Professional Engineer registered in Commonwealth of Virginia.
- b. Walls: If poured-in-place, all four (4) walls on cast in place vaults shall be cast in one continuous placement. All corners shall have added reinforcement.
- c. Thickness: Designed by a Professional Engineer registered in Commonwealth of Virginia and approved by Product Design Review Committee (PDRC).
- d. Electrical: Conduit entrances shall be supplied per job requirements and will be made available in any size and configuration.
- e. Piping: Pipe entry and exit points shall be sealed using an approved link-seal. Piping must not support the vault nor shall the vault support the pipe at entry and/or exit points.
- f. Hatches: Aluminum access hatch shall consist of a double leaf hinged doors, diamond plate surface, and locking mechanism and be not less than 48-inches x 48-inches. Hatch opening shall be to the ladder side of the vault at the center point of the wall or as otherwise approved.

- g. Ladder: An offset Aluminum access ladder shall consist of heavy duty aluminum with a configuration that is VOSHA-OSHA approved. The ladder shall have provisions for bolting (doweled) into the wall, ceiling and the floor of the vault using Stainless steel anchors. Ladder shall be centered at hatch opening. All ladders shall be supplied with an approved ladder up safety post when required to meet VOSHA-OSHA law.
- h. Clearance Horizontal: Shall be accordance with detail FIR-3 of the Chesterfield Water and Sewer Specifications and Procedures.
- i. Clearance Vertical: 10-inches minimum shall be required above the OS&Y valves fully opened. This measurement shall be between the top of the fully opened OS&Y stem and the underside of the vault top.

6) Accessories

- a. Strap Anchors: Stainless steel capable of supporting pipe or accessories indicated and has a minimum 1 inch wide x 1/8 inch thick.
- b. Steel pipe supports shall be made of ASTM A36 steel pipe and plates that are coated with red-oxide primer and a black enamel finish coat acceptable to the county. The supports shall be adjustable and shall be anchored to the floor of the vault with Stainless steel anchors.
- c. All manufactures of double check valve assemblies (fire protections) will be an approved supplier as listed in the Chesterfield County Water and Sewer Specifications and Procedures and approved by the Utilities Product Design Review Committee.
- d. 6-inch Bollards shall be required and is at the discretion of the Fire Life Safety Division's approval for placement, color and number.

6) Inspection and Certification

Precast: Prior to the delivery of a structure, the manufacturer shall be pre-approved and have presented a vault model and/or number meeting the requirements of this specification herein to the Product Design Review Committee of the Chesterfield County Department of Utilities, in conjunction with the Fire Life Safety Division, for approval. Approved manufacturer shall be listed in the Chesterfield County Water and Sewer Specifications and Procedures or be provided a temporary approval letter until such time that the Utilities specifications are updated.

Poured-in-place: See Section 1.03 Design Requirements.

8) Sealants

Joint sealing material shall be pre-formed, flexible joint sealing compound conforming to ASTM C923.1 and be approved for use in Chesterfield County. On all vaults where the vault is installed using more than one piece, an approved gasket material such as ConSeal CS-102 Butyl Rubber Sealant or equal shall be used for the seam joint. O-Ring rubber gaskets in accordance with ASTM C443. Butyl rubber gaskets in accordance with ASTM C990.

All sealants must be approved by the Product Design Review Committee.

9) Use of Material

Brick, Concrete block, and knockdown boxes shall not be used in the permanent installation.

10) Product Handling

Precast sections shall be transported and handled with proper equipment to protect the elements from damage. Sections shall be handled by means of lifting inserts embedded in the concrete.

Safety measures are to be in place to meet local, state, and federal regulations for job safety. This is to include hard hats, steel toe boots and vests notwithstanding other requirements.

11) Installation

Vaults shall be provided as shown on the drawings. Vaults shall be set so as to be vertical, true and plumb and with sections in alignment within a ¼ inch maximum tolerance to be allowed. The Contractor shall install all precast sections with an approved joint sealing compound in a manner that will result in a watertight joint.

12) Excavation, Bedding and Backfill

- a. Excavate and backfill for vaults to specified depths as designed. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides and be compacted to an acceptable manner to the inspector or county representative. Provide clearances around sidewalls of structure for construction operation, backfill, and placement of stone as specified, meeting the requirements of Section 1.06 VAULT COMPONENTS.
- b. When ground water is encountered, structure is to be place in a dry trench. Pumping is required.
- c. Where possibility exists of watertight structure becoming buoyant in flooded excavation that cannot be pumped, design elements approved by the engineer are to be in place to prevent flotation. Structure must be watertight.
- d. Place bedding and foundation slab: trowel top surface level if cast-in-place. Twelve (12) inches of number #57 stone is to be use extending 1 foot beyond the vault perimeter. Stone is to be level and inspected before placement of the vault.
- e. Precast vaults and structures are to be lifted at the lifting points as designed.
- f. When lowering vaults and structures into excavation and joining pipe to vault, take precaution to ensure interior of pipeline remains clear and free of debris.

g. Bedding: Clean coarse aggregate Gradation No. 57 in accordance with Part IV, Section 1 of the Chesterfield County Water and Sewer Specifications and Procedures.

13) Configuration

Configuration shall be Rectangular in shape with a general depth/length ratio of 2:1 or more. Vault shall be place so that piping to mainline is perpendicular.

14) References

ASTM A536 - Standard Specification for Ductile Iron Castings

ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.

ASTM C891 - Standard Practice for Installation of Underground Precast Utility Structures

ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.

ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.

ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.

ASTM C443

ASTM C923

ACI-301

ACI-318

ACI-350

Latest Addition of the Chesterfield County Water and Sewer Specifications and Procedures - WAT-19.

b. Valving:

- 1) The double check valve assembly shall be a Watts No. 709 or equal surrounded by an OS&Y gate valve on both the inlet and outlet side of the assembly.
- 2) The Fire Life Safety Division connection may or may not be located in the vault. The use of post indicating valves, location of the Fire Life Safety Division connection, and other related fire questions will be addressed by the Fire Life Safety Division.
- 3) Pipe stands such as poured concrete or fabricated metal shall be provided to support the entire assembly. Metal Pipe stands shall be galvanized or be coated with an acceptable paint to prevent rust. Concrete block or brick is not an acceptable support material.

7. Fire Hydrants:

- a. Fire hydrants shall be manufactured in full compliance with this specification and shall also comply with the American Water Works Association Fire Hydrant Specification C-502, latest revision and the following:
- 1) Type: Compression - Dry Standpipe: Valve shall open against and close with the pressure. The design shall be such that all internal operating parts can be removed through the standpipe and main valve rod extended without excavating.
 - 2) Size: Internal valve diameter shall be a minimum 4½".
 - 3) Inlet Size and Type: 6" mechanical joint end with accessories.
 - 4) Hose Nozzles: Each hydrant shall be equipped with two 2½" I.D. hose nozzles with National Standard threads, one quarter turn bayonet lock or threaded in with O-ring seal and suitable locking arrangement.
 - 5) Steamer Nozzle: Each hydrant shall be equipped with one 4½" Steamer Nozzle having National Standard Threads, one quarter turn bayonet lock, or threaded in with O-ring seal and suitable locking arrangement.

- 6) Direction of Open: Left, counter-clockwise.
- 7) Size and Shape of Operating Nut and Cap Nuts: to be 1½" point to flat pentagon. Each hydrant shall be equipped with a weather cap or weather seal.
- 8) Seal Plate: The hydrant shall be so constructed that a moisture-proof lubricant chamber is provided which encloses the operating threads, thereby automatically lubricating the threads each time the hydrant is operated. The lubricant chamber shall be enclosed with at least three O-rings. The two lower O-rings will serve as pressure seals; the third O-ring will serve as a combined dirt and moisture seal to prevent foreign matter from entering the lubricant chamber. The hydrant shall be equipped with either an anti-friction washer or bronze bushing to reduce operating torque. The bonnet will be secured to the hydrant using bolts and nuts.
- 9) Standpipe - Groundline Safety Construction: The standpipe sections shall be connected at the groundline by a two part, bolted safety flange or breakable lugs. The main valve rod sections shall be connected at the groundline by a frangible coupling. The standpipe and groundline safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling and removing the top operating components and the top section of the standpipe. The minimum inside diameter of the standpipe shall be 6".
- 10) Main Valve, Rod Assembly: The main valve rod assembly shall be so constructed to allow removal of all operating parts through the standpipe regardless of depth of bury, using a removal wrench which does not extend below the groundline of the hydrant. The main valve seat ring shall be bronze and its assembly into the hydrant shall involve bronze to bronze thread engagement, and the valve assembly pressure seals shall be obtained without the employment of torque compressed gaskets. The design of the main valve rod shall be such that the operating threads at the top of the rod and the valve assembly threads at the bottom of the rod are isolated from contact with water in the standpipe or in the hydrant inlet shoe.

- 11) Drain Valve: The operation of the drain mechanism shall be correlated with the operation of the main valve and shall involve a momentary flushing of the drain ports each time the hydrant is opened. The drain ports shall be fully closed when the hydrant valve is more than 2½ turns open and the drainage channel in the bronze valve seat ring shall connect to two or more outlet drain ports. Springs may be employed in the hydrant valve or drain valve mechanism.
- 12) Depth of Bury: Hydrant shall be suitable for installation in trenches 4½' deep, unless otherwise specified.
- 13) Painting Instruction: Two prime coats and one aluminum finish coat shall be used, unless otherwise specified. Exposed area of fire hydrant shall receive one field coat of aluminum after installation. The wetted surface of the hydrant shoe shall be epoxy coated to prevent corrosion of the waterway.
- 14) Pressure Rating: Test pressure 300 psi, working pressure 150 psi.
 - a. If the standard hydrant provided by a manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each hydrant must be permanently marked to indicate the option or options that have been provided. The method of marking hydrants to indicate that options are included must be approved by the Product and Design Review Committee.

8. Check Valves:

Check valves shall be of the horizontal swing type; iron body bronze mounted, equipped with weighted lever or spring as specified or shown on the plans.

9. Water Service Assembly for 5/8" Water Meters: All materials for the installation of water services shall be as follows or approved equal:

- a. Water meter boxes (for use with all 5/8" meters) shall be as manufactured by Carson for high density polyethylene boxes or approved equal.

The meter box shall be 24" high (1" box is 26" high) with a cover and reader lid. The box shall have a 1¼" anti-settling flange on the bottom edge. It shall be made of hi-density polyethylene plastic of one piece, molded construction for durability with dimensions as shown on the standard detail in Part II of this document. The box must have solid walls with an average thickness of no less than .550" and have been tested to withstand a 15,000 lb. vertical load freestanding. The inside color shall be white to reflect light for ease of meter reading and the outside shall be black to protect against UV degradation during prolonged exposure to sunlight i.e. during outside storage. All edges shall be clean and smooth for safety during handling.

The meter box cover shall be one-piece, with reader lid made of cast iron or ductile iron for 5/8" and 1" boxes. One piece cover designed to fit the corresponding opening in the meter box frame and have a square treadplate surface design. "WATER METER" shall be on the reader lid.

The lid dimensions shall be: for 5/8" box - 15.437" x 10.125" with a minimum weight of 17 lbs. and for 1" box - 11.125" x 18" with a minimum weight of 21 lbs. It shall have a minimum thickness of .25", with tensile strength 65,000 psi, yield strength 45,000 psi. The castings shall be made of cast iron or ductile iron.

- b. Water meter boxes used in traveled areas shall be made of cast iron as manufactured by Capitol Foundry or approved equal. Material shall consist of gray iron per ASTM A-48 (latest revision) Class 30.
- c. Meter yokes/setters shall be 3/4" for 5/8" meter with saddle nut. Inlet and outlet sides of meter setter shall be equipped with 3/4" flare or compression copper coupling.
- d. 3/4" Corporation stop with corporation cock thread inlet shall be those as specified in the approved materials list shown in Section 1 entitled Water System.
- e. Pipe shall be 3/4" type "K" copper domestic manufactured.
- f. Tail piece on yoke shall be 3/4" type "K" copper and be long enough to extend 18" outside of meter box.

g. Service Saddles: **Effective February 4, 2019 all service saddles will be required to have a bronze body with double stainless-steel straps.**

- 1) All saddle castings must be bronze and meet the requirements of ASTM B584 and AWWA C800.
- 2) All saddles must have a minimum of two (2) 1 1/2" wide (including bolts) stainless steel straps type 304 (18-8) where welds are passivated for resistance to corrosion.
- 3) Gaskets must be made of Virgin NBR compound.
- 4) Service saddles are required on all taps made onto PVC and asbestos cement pipe.

10. **Water Service Setter for 1", 1 1/2" and 2" Water Meters:** All Materials for the installation of water services shall be as follows or approved equal:

- a. The water meter box and cover (for use with all 1", 1 1/2" and 2" water meters) shall be as manufactured by Carson. The boxes shall conform to the specifications as outlined under the "Water Meter Assembly for 5/8" Water Meters" and the dimensions as specified in the standard detail shown in Part II of this documents for 1", 1 1/2" and 2" water meters.
- b. **General:** All 1", 1 1/2" and 2" meter setters for domestic use at residential homes, condominiums, apartments, townhomes, etc. shall NOT be equipped with a bypass valve. Setters for irrigation uses shall NOT be equipped with a bypass valve. All other 1", 1 1/2" and 2" meter setters SHALL be equipped with a bypass.

Meter setters for 1" meters shall be 1" x 12" riser meter yokes with copper tube flare nut or compression on the inlet and outlet sides.

All 1 1/2" and 2" meter setters shall be constructed of seamless threaded red brass pipe, standard Type K hard copper tube (per ASTM B-88-62,) high quality brass (per AWWA C-800,) and leadless solder, and provide horizontal female pipe threads on both front and rear connections.

- c. **Bypass:** Meter setters that are equipped with a bypass line and valve shall be appropriately sized with an

inverted key or ball type stop threaded directly into the inlet bypass tee fitting. This bypass valve shall have a solid tee head and be either lock wing type or provide a bracket or other device to lock this valve in the "off" position upon installation. If copper tube is used for the bypass line, the compression connection for the copper side of the bypass valve must be as produced by the following manufacturers:

Mueller Co., "110" compression connection for copper pipe; or

Ford Meter Box Co., "Grip Joint" connection or copper pipe; or

A. Y. McDonald, "T" compression connection for copper pipe.

Otherwise, a tee head inverted plug or ball type bypass valve is required with a threaded connection. Both of the bypass tee fittings, (inlet and outlet,) shall have brace pipe eyelets cast within them to stabilize setter upon installation, if necessary.

d. **Angle Valves:** Flanged, inverted key or ball-type "tee head" angle valves are required on both meter connections, and will include lock wings and meter support bracket to aid in meter installation. Pack Joint or Compression connections are NOT allowed on the vertical riser pipe; these connections must be threaded or soldered copper. Valves shall be double drilled, (2" size only,) to accommodate both 1 1/2" and 2" meters. Angle or ball valves shall provide a stop or check to limit movement of tee head at 90° Maximum, (from fully open to completely off.) Arrows cast within the inlet valve shall indicate direction of flow while in service.

e. **Dimensions:** Meter setters shall accommodate the following meter dimensions:

1" Male x male pipe thread laying length: 10 3/4"± 1/16"

1 1/2" Flanged meter laying length: 13", plus gaskets

2" Flanged meter laying length: 17", plus gaskets

The rise or height of meter setter, measured vertically from center line of inlet pipe thread to center line of meter flange bolt shall be:

1" Meter setter, maximum height of 12"

1 1/2" Meter setter, maximum height of 8 1/2"

2" Meter setter, maximum height of 9 1/2"

The copper used on the bypass and vertical riser pipe, if so equipped,) shall be Type K and comply with ASTM B-88-62, which states outside diameters as shown here:

3/4" Nominal pipe size, .875" outside diameter, .065" wall

1" Nominal pipe size, 1.13" outside diameter, .065" wall

1 1/4" Nominal pipe size, 1.38" outside diameter, .065" wall

1 1/2" Nominal size pipe, 1.63" outside diameter, .072" wall

2" Nominal size pipe, 2.13" outside diameter, .083" wall

The bypass assembly shall be sized as follows:

1" Meter setter requires minimum 3/4"

1 1/2" Meter setter requires minimum 1 1/4" bypass pipe & valve

2" Meter setter requires minimum 1 1/4" bypass pipe & valve

11. **Valve Boxes:** All underground valves shall be installed in approved cast iron valve boxes, having suitable base and shaft sections and covers to protect the valve and permit easy access and operation. Box assemblies shall have slip adjustment (two-piece sliding type adjustable valve box).

12. Air Release Valves: All valves shall be designed in accordance with the following standard and/or by the Engineer as required.

- a. Type 1: Small orifice valves shall be either of the kinetic design type, employing only one moving part, a stainless steel float ball or of the stainless steel float and lever type. It shall maintain closed position to prevent the loss of water by positive seating of the float ball against a smoothly ground contact surface of the exhaust orifice.

It shall automatically provide for the escape of air to atmosphere without the loss of water when the float ball moves away from the orifice seat. The body of the valve shall be cast iron and shall be coated to withstand moist environment.

Valve shall have a minimum of a one-inch N.P.T. inlet for 6", 8" and 12" pipe sizes and a two-inch N.P.T. inlet for pipes 16" and larger; and shall have a minimum of a 3/32" outlet orifice for 6", 8" and 12" pipe sizes and a 3/16" outlet orifice with 16" and larger pipes.

Valve shall be suitable for 150 psi working pressure.

- b. Type 2: Shall be a combination, dual unit valve, combining one (1) small and one (1) large unit, both employing the kinetic operating principal or of the stainless steel and lever type. For the Kinetic type, the only moving parts shall be two (2) stainless steel balls (one for each unit) which will remain in the respective throat areas when discharging air without blowing shut or collapsing the float ball(s).

In the closed position, resulting from water filled line, the valve shall prevent leakage.

The large orifice seat shall be of composition material and replaceable.

The body of the valve shall be cast iron and shall be coated to withstand moist environment.

Valve size shall be six (6) inch with 3/8" orifice for small unit and shall be suitable for 150 psi working pressure.

13. Manholes:

- a. Gate Valve Manhole and Air Release Manhole: Shall be concrete, ASTM C-478 and diameters shall be as shown on plans and meets the specifications as described in Part V, Section B of this document entitled "Sanitary Sewer Systems".

14. Joint Restraint Devices:

All restraint devices must be UL listed and FM approved. Restraints are acceptable for PVC and D.I. pipe under the following conditions:

- a. For PVC Pipe

Where PVC pipe is connected to fittings, mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility and minimal deflection of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536-80. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. There shall be no dissimilar metals allowed. Dimensions of the gland shall be such that it can be used with all AWWA approved standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and ANSI/AWWA C153.53/A21.53 of latest revision. The mechanical joint restraint device shall have a working pressure of at least twice the working pressure of the pipe with a minimum of 150 psi. Twist-off nuts shall be used to insure proper actuating of the restraining devices.

As part of a joint restraint system, all bell and spigot end joints within this length shall be restrained with a clamping ring and an additional ring designed to fit behind the bell end of the PVC pipe. The rings shall be connected with T-Head Bolts or Rods.

All clamping rings shall incorporate serrations on the inside surface to provide positive restraint on the outside surface of the pipe and shall provide full support around the circumference of the pipe to maintain roundness.

Restraining devices shall have a pressure rating equal to or greater than the PVC pipe, and shall be capable of withstanding a minimum test pressure of 2 times the pressure rating of the device.

Restraining devices and T-bolts shall be manufactured from high strength ductile iron, ASTM A536, Grade 65-45-12. Clamping bolts and nuts shall be manufactured from completely corrosion resistant COR-TEN STEEL or equal.

Restraining devices shall be as approved by Chesterfield County's Product and Design Review Committee.

b. For Ductile Iron Pipe

Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility and minimal deflection of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536-80. Twist-off nuts shall be used to insure proper actuating of the restraining devices.

Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. There shall be no dissimilar metals allowed. Dimensions of the gland shall be such that it can be used with all AWWA approved standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and ANSI/AWWA C153.53/A21.53 of latest revision. The mechanical joint restraint device shall have a working pressure of at least twice the working pressure of the pipe, with a minimum of 150 psi.

As part of a joint restraint system, all bell and spigot end joints within this length shall be restrained with an approved bell and spigot restraint device. Clamping ring restraint devices require an additional ring be designed to fit behind the bell end of the D.I. pipe. The rings shall be connected with T-Head Bolts or Rods. Rods must be protected from corrosion either by rod material or coating.

15. Markers:

a. All markers shall have one of the applicable decal description to reflect the following:

1) Upper decal, white and blue 2 7/8" x 11" standard, worded "CAUTION WATER PIPELINE".

or

2) Upper decal, white and blue 2 7/8" x 11" standard, worded "CAUTION WATER VALVE".

- b. In addition, the lower decal shall contain the following:
 - 1) Lower decal, white and blue 2 7/8" x 1 3/4" standard, worded "MISS UTILITY - 1-800-552-7001, CHESTERFIELD UTILITIES".
- c. Total height shall be 66".
- d. Basic marker shall be white in color.

16. Flushing Hydrants - (Chesterfield Model): Flushing hydrants shall be manufactured in full compliance with the following specifications and shall also comply with AWWA's latest specifications on flushing hydrants:

- a. The flushing hydrant shall offer a 360-degree directional discharge and shall have easy above ground accessibility at all times. It shall be capable of being locked and shall be freeze-proof. It shall be equipped with National Standard fire thread connections and a breakaway union for high traffic areas.
- b. It shall be of size 2".
- c. The hydrant barrel shall be 2" iron pipe. The exterior shall be painted with approved coating for durability. The overall length of hydrants can vary according to the depth of water systems.
- d. The barrel and the standpipe shall be joined with a breakable malleable union. A brass hose connection, 2 1/2" NSFT with attached cap and chain, shall be provided for convenience in flushing.
- e. The body valve shall have bronze body with automatic weep, such that when the valve is in OFF position the hydrant barrel shall automatically drain. The valve stem shall be above ground and shall be lockable to prevent tampering. Its operating device shall be of key type design, with permanent attachment to the valve stem.

17. Cast Couplings:

Center Sleeve: Made of ductile iron, Spec ASTM-A536, and coated with an enamel shop coat, sized to accommodate all AWWA pipes of the same nominal size. The center sleeve length of long barrel (sleeve)_couplings shall be a minimum of 10".

End Ring: Made of ductile iron Spec ASTM-A536, and color coded with an enamel shop coat to easily identify its use on various types of pipe.

Gaskets: SBR rubber compound, Grade 30 per Spec ASTM D-2000 for normal water service and an extended shelf life.

Bolts: High strength low alloy steel bolts with heavy hex nuts, per AWWA C-111.

18. Casing Spacers:

Casing Spacers shall be bolt on style with a shell made in two sections of heavy T-304 stainless steel. Connecting flanges shall be ribbed for extra strength. The shell shall be lined with a PVC liner .090" thick with 85-90 durometer or neoprene rubber. All nuts and bolts are to be 18-8 stainless steel. Runners shall be made of ultra high molecular weight polymer (UHMW) or glass reinforced plaster. Runners shall be supported by risers made of heavy T-304 stainless steel or 10 gauge welded steel. The supports shall be mig welded to the shell and all welds shall be passivated or 3/8" diameter stud welded to band and locked with a locking fastener. The height of the supports and runners combined shall be sufficient to keep the carrier pipe at least .75" from the casing pipe wall at all times.

B. SANITARY SEWER SYSTEMS

1. Gravity Sewer and Force Main Pipe and Fittings:

- a. Reinforced concrete (non-pressure) pipe, fittings and specials shall meet requirements of ASTM C76 minimum Class II unless stronger pipe is required by the plans and specifications. Pipe ends shall have O-ring gasket groove provided during manufacturing process.

Rubber gaskets and joints of concrete pipe shall meet requirements of ASTM C361.

Pipe and joints shall be tested in accordance with Section 11 of ASTM C76 and ASTM C443. If requested by Department of Public Utilities or Engineer, test reports shall be submitted to the Engineer.

- b. Polyvinyl chloride (PVC) (non-pressure) pipe (6"-15") and fittings shall meet requirements of ASTM D3034 Type PSM SDR-35 or ASTM F1760 SDR-35 with elastometric gasket joints meeting requirements of ASTM D3212. Bedding shall be as required by the County for plastic pipes as shown in the County's Standard of Details. Additional criteria as set forth by the County of Chesterfield is outlined in Section 4.C.1. entitled "Supplemental Specifications - Additional Criteria for Polyvinyl Chloride Piping for Water and Sanitary Sewer Systems".
- c. Polyvinyl Chloride (PVC) (non-pressure) pipe (18"-48") and fittings shall meet requirements of ASTM F679, Table I Type SDR-35 for large diameter solid wall PVC pipe with elastometric gasket joints meeting requirements of ASTM D3212. Bedding shall be as required by the County for plastic pipes as shown in the County's Standard of Details.
- d. Vylon H.C. PVC Gravity (non-pressure) sewer pipe (21"-54") shall meet requirements of ASTM F1803 and fittings shall meet the requirements of ASTM 3034-35 PVC sewer pipe with elastomeric gasket joints meeting requirements of ASTM D3212. Bedding shall be as required by the County for plastic pipes as shown in the County's Standard Details.

- e. Ultra-Corr PVC sewer (non-pressure) pipe (24"-36") shall be seamless profile wall and meet the requirements of ASTM F1803 and fittings shall meet the requirements of ASTM 3034-35 PVC sewer pipe with elastomeric gasket joints meeting requirements of ASTM D3212. Bedding shall be as required by the County for plastic pipes as shown in the County's standard details. Pipe shall have a smooth interior with a corrugated cross-sectional rib exterior. Exterior corrugations shall be perpendicular to the axis of the pipe to allow placement of the sealing gasket without field marking, beveling, sealing channels, gluing, welding, additional cutting or machining. The pipe stiffness shall be a minimum of 50 psi when tested at 5% deflection in accordance with D2412. Pipe shall be green in color.
- f. Ductile iron (gravity or pressure) pipe shall meet requirements of AWWA C151. Pipe shall be thickness Class 52. Pipe shall have cement-mortar lining and a bituminous seal coat. Thickness classes shall meet requirement of AWWA C150.
- g. Pressure Pipe and fittings shall have either mechanical joint or push-on joint, both conforming to the requirements of AWWA C111. Bolts shall be high strength cast iron having an ultimate tensile strength of 75,000 psi and a minimum yield point of 45,000 psi.
- h. Pressure Pipe fittings shall meet the requirements of AWWA C110 (ductile iron or cast iron) or AWWA C153 (ductile iron compact). All fittings shall be Pressure Class 250. Fittings shall have a cement-mortar lining and a bituminous seal coating or a 6-8 mil (nominal thickness) fusion bond epoxy lining/coating in compliance with AWWA C550.
- i. Pressure Polyvinyl chloride pipe (PVC) 6", 8", and 12" in size shall conform to the requirements of AWWA Specification C-900, with gasket joints, DR-18 Class 150 with iron pipe O.D. Fittings shall be ductile iron or cast iron, Pressure Class 250, with mechanical joints. Additional criteria as set forth by the County of Chesterfield is outlined in Section 4.C.1. entitled "Supplemental Specifications - Additional Criteria for Polyvinyl Chloride Piping for Water and Sanitary Sewer Systems".

j. Push-on-joint and rubber gasket shall meet requirements of AWWA C111.

k. Cement mortar lining with bituminous seal coat for ductile iron pipe and fittings shall meet requirements of AWWA/ANSI C104/A21.4.

Cement mortar lining shall be standard thickness.

l. Exterior bituminous coating for cast iron fittings and ductile iron pipe shall meet requirements of AWWA/ANSI C106/A21.6 or AWWA/ANSI C151/A21.51 as applicable.

2. Sanitary Sewer Manholes:

a. Manholes shall be constructed of precast reinforced concrete manhole sections in accordance with requirements of ASTM C478 and as shown on the Standard Details.

b. A maximum of two lift holes per manhole section may be provided.

c. Provide tongue and groove joints in manhole sections with a preformed groove in the tongue for placement of an O-ring type round, rubber gasket or Press Seal, Inc's Profile RS gasket.

Gasket shall comply with requirements of ASTM C361.

Gasket shall provide the sole element in sealing the joint from either internal or external hydrostatic pressure.

d. Provide flexible pipe connections to manholes for pipes 21 inches in diameter and smaller in size.

Materials shall consist of EPDM and elastomers designed to be resistant to water, sewage, acids, ozone, weathering and aging. Use neoprene conforming to ASTM C443 and ASTM C923 and all stainless steel elements of the connector shall be totally non-magnetic Series 304 Stainless, excluding the worm screw for tightening the steel band around the pipe which shall be Series 305 Stainless. The worm screw for tightening the steel band shall be torqued by a break-away torque wrench available from the precast manhole supplier, and set for 60 - 70 inch/lbs.

Cast or core drill openings in manholes to receive connectors. Connectors shall be suitable for field repair or replacements. Connectors not suitable for field replacement are unacceptable.

The assembled connectors shall allow at least an 11° angular deflection of the pipe and at least one inch of lateral misalignment in any direction and be suitable for a normal variation in diameter or roundness for the pipe material used.

Connectors shall be Kor-N-Seal as manufactured by National Pollution Control Systems, Inc. or approved equal.

- e. Manhole steps shall be corrosion-resistant and shall be one-half inch grade 60 steel reinforcing rod encapsulated in a copolymer polypropylene. The steps shall conform with ASTM C478 paragraph 11 and to the dimensions shown on the Standard Details.
- f. Manhole frames and covers shall be molded of gray cast iron conforming to ASTM A48, Class 30. Castings shall not be coated. Seating surfaces between frame and cover shall be machined. The dimensions and weights shall conform to the requirements shown on the Standard Details.
- g. Sealant for manhole frames shall be a one-component polyurethane sealant similar to Sika "Sikaflex" type 430.
- h. Sealant for flexible pipe connections shall be a two-component polysulfide sealant similar to Sika "Sikaflex" type 412 with primer type 419.
- i. All manholes shall be watertight.

- 3. Sewage Air/Vacuum Break Valves without Bias Mechanism** - All valves shall be designed in accordance with the following standard and/or by the Engineer as required:

The Sewage Air Release and Vacuum Break Valve shall consist of a compact tubular or conical all stainless steel fabricated body, hollow direct acting float and solid large orifice float in H.D.P.E. - stainless steel nozzle and woven dirt inhibitor screen, nitrile rubber seals and natural rubber seat.

The valve shall have an integral "Anti-Surge" Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to less than 1.5x valve rated working pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 6" valve shall have a 6" intake orifice.

Large orifice sealing shall be effected by the flat face of the control float seating against a nitrile rubber 'O' ring housed in a dovetail groove circumferentially surrounding the orifice.

Discharge of pressurized air shall be controlled by the seating and unseating of a small orifice nozzle on a natural rubber seal affixed into the control float. The nozzle shall have a flat seating land surrounding the orifice so that damage to the rubber seal is prevented.

The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designed working pressure.

Connection to the valve inlet shall be facilitated by flanged ends conforming to ANSI B16.1 Class 125 or Class 250 Standards.

Flanged ends shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts, washers, or jointing gaskets shall be excluded.**

4. Sewage Air/Vacuum Break Release Valves with Bias Mechanism

All valves shall be designed in accordance with the following standard and/or by the Engineer as required:

The Sewage Air Release and Vacuum Break Valve shall consist of a compact tubular all stainless steel fabricated body, hollow direct acting float and solid large orifice float in H.D.P.E. - stainless steel nozzle and woven dirt inhibitor screen, nitrile/E.P.D.M. rubber seals and natural/E.P.D.M. rubber seat.

The valve shall have an integral 'Anti-Surge' Orifice mechanism which shall operate automatically to limit surge pressures or shock induced by liquid oscillation and/or rapid air/gas discharge to less than 1.5x valve rated working pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 6" valve shall have a 6" intake orifice. Large orifice sealing shall be effected by the flat face of the control float seating against a nitrile/E.P.D.M. rubber 'O' ring housed in a dovetail groove circumferentially surrounding the orifice.

Discharge of pressurized air shall be controlled by the seating and unseating of a small orifice nozzle on a natural/E.P.D.M. rubber seal affixed into the control float. The nozzle shall have a flat seating land surrounding the orifice so that damage to the rubber seal is prevented.

The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designed working pressure.

Connection to the valve inlet shall be facilitated by flanged ends conforming to ANSI B16.1 Class 125 and Class 250 and ANSI B16.5 Class 150 and Class 300 Standards.

Flanged ends shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts, washers, or jointing gaskets shall be excluded.**

5. Sewage Plug Valves

- a. All plug valves shall be of the non-lubricated, eccentric type with resilient faced plug and round ports of no less than 90%, or rectangular ports of no less than 80%, of the connecting pipe area, except valves of 24" or larger size shall have port areas of no less than 70% of the connecting pipe area.

- b. Valves shall be for buried underground service as well as plant service and shall be rated for 175 psi up to 12" and 150 psi for sizes 14" and larger. Drop-tight shut off shall be provided at full rated working pressure in the standard flow direction and 50 psi in the reverse direction, except when full-rated sealing is required in both directions.
- c. Valves 6" and larger shall be equipped with geared actuators with a 2" square operating nut. Handwheel and power actuated valves shall also include a 2" square operating nut for emergency operation.

All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque and to provide seat adjustment to compensate for change in pressure differential or flow direction change. All exposed nuts, bolts and washers shall be zinc plated.

Valves and gear actuators for buried or submerged service shall have seals on all shafts and gaskets on the valve and actuator covers to prevent the entry of water. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. All exposed nuts, bolts, springs and washers shall be stainless steel.

- d. Valves shall open left (counterclockwise) and shall have mechanical joint end connections, or as specified by the Department of Public Utilities.
- e. Valve bodies and all other cast iron parts shall conform in all respects to the American Society for Testing Materials' Standard Specifications of Gray Iron Castings, ASTM Specification Designation A-126, Class B. The castings shall be clean and perfect without blow or sand holes or defects of any kind. No plugging or stopping of holes will be allowed.

Body ends shall be flanged with facing and drilling in accordance with ANSI B16.1, Class 125 or mechanical joint in accordance with AWWA Standard C-111 or ANSI A21.11. All mechanical joint end valves shall be furnished complete with joint accessories (bolts, nuts, gaskets and glands).

- f. Valve bodies shall be furnished with a raised seat surface completely covered with 90% pure nickel to insure that the resilient plug face contacts only nickel, or a one-piece 304 stainless steel seat ring threaded to the body. The nickel seat must be welded to the valve body or the body seat ring to produce a metallurgical bond with interpenetration to the base metal with a bond strength equal to or greater than the valve body or seat ring material. The nickel or stainless steel seat must be machined to a finish of not more than 16 micro-inches to achieve minimal friction and wear to the resilient plug face during valve operation. Whether welded or screwed, the valve seat shall be designed to provide uniform contact with the resilient plug face and to prevent the plug face from contacting any cast iron surface. Resilient seats or seats attached to the body by screws or any other method not specified herein are not acceptable. Plated or sprayed nickel seats or epoxy seats are not acceptable.
- g. Valve bodies shall be furnished with an adjustable closed position stop. The seat end and standard flow direction shall be cast onto the valve body.
- h. Resilient faced plug/operating shaft shall be of a one piece design of ASTM A126 Class B cast iron with a seating surface eccentrically offset from the center of the plug shaft, and shall have a precision molded resilient facing of chloroprene (Neoprene), Buna-N (nitrile) or nitrile-butadiene (Hycar). With the valve in the open position, all surfaces of the plug/shaft shall be substantially out of the fluid flow path.
- i. Valve shaft journal bearings shall be sleeve type, sintered, oil impregnated, permanently lubricated, type 316 ASTM A743 grade CF-8M or AISI type 317 L stainless steel, or phenolic backed Teflon. Thrust bearings shall be located in the upper and lower journal areas and shall consist of stainless steel, Teflon, or a combination of those materials. Grit seals shall be provided in the upper and lower journals to prevent abrasive material from entering the bearing and seal areas.
- j. Valve shaft seals shall conform to AWWA Standard C504-87, Section 3.7 and shall be of the bronze cartridge type utilizing O-rings, or the adjustable multiple V-ring type and shall be replaceable without disassembling the valve, while the valve is under system pressure.

- k. Valve interiors and exteriors shall be coated according to AWWA Standard C550-90 with a two-component high build epoxy suitable for potable water service, with interior surfaces receiving 8 - 10 mils (dry film thickness) and exterior surfaces receiving 3 - 5 mils (dft) or 8 - 10 mils (dft) hand-applied epoxy coating. For buried or submerged service, 8 - 10 mils (dft) of asphalt varnish may be substituted for the exterior coating.
- l. Valve testing shall be conducted per AWWA C504-87 Section 5, covering rubber seated butterfly valves. Each valve shall be performance tested per paragraph 5.2 assuring valve operation.

Body seat and shell leakage testing is to be conducted on each valve as per paragraphs 5.3 and 5.4.

Proof of design testing shall be conducted per paragraph 5.5 and witnessed by a third party inspection agency. Certified copies of this report shall be available upon request.

- m. Eccentric plug valves for wastewater service shall be as approved by Chesterfield County's Product and Design Review Committee.
- n. If the standard valve provided by a manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each valve must be permanently marked to indicate the option or options that have been provided. The method of marking valves to indicate that options are included must be approved by the Product and Design Review Committee.

C. SUPPLEMENTAL SPECIFICATIONS

1. **Additional Criteria for Polyvinyl Chloride Piping for Water and Sanitary Sewer Systems: Effective September 1, 1991, all PVC piping must meet the following criteria:**
 - a. Cell Classification for Water Pipe shall be 12454-B.
 - b. Cell Classification for Sewer Pipe shall be 12454-B or 12364-C.
 - c. Water Pipe (C-900) shall meet the specification requirements and have the following certifications from:

- 1) FM (Factory Mutual)
 - 2) UL (Underwriters Laboratory)
 - 3) NSF (National Sanitation Foundation)
- d. All pipe (sizes - 16" and smaller) shall be furnished with standard industry color coding:
- Water - Blue
Gravity Sewer - Green
Force Main Sewer - Brown
- e. Manufacturer's Certification of ASTM and AWWA testing requirements will include the following:
- 1) For Water and Force Main Sewer Pipes (C-900) (4", 6", 8" and 12")
 - a) Each piece has been hydrostatically proof tested to AWWA C-900 Requirements
 - b) Pipe meets all other applicable ASTM & AWWA C-900 Requirements
 - 2) For Gravity Sewer Pipe (SDR 35) (4"-15")
 - a) Pipe meets all ASTM D3034 Requirements
 - b) Pipe meets cell classifications as established by ASTM standards, the County's minimum criteria for plastic pipe, and the certification shall state what the cell classification is.
 - 3) Manufacturer's certification will be signed by an officer of the company and will be furnished to the contractor and/or supplier before pipe is delivered to a project site. Certifications from supplier shall include:
 - a) County Contract Number
 - b) Location - Project Name
 - c) Utilities Contractor Name
 - d) Pipe type class
 - e) Manufacturer's name