

**WATER & SEWER PIPE STANDARDS
OF BURTON UTILITIES**



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WATER - GENERAL PIPE REGULATIONS

1. All Iron and steel products use for the construction alteration maintenance for repair of water systems or treatment works are to be AIS compliant and products that are produced in the United States. The American Iron and Steel (AIS) provision of the 2014 Consolidated Appropriations Act requires Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States. This requirement applies to projects for the construction, alteration, maintenance, or repair of a public water system or public treatment works, unless a waiver is granted or 1 of 3 of the following exceptions applies (non-availability, unreasonable cost or inconsistent with the public interest).”
2. All water lines shall be installed with a minimum of four (4) feet of cover.
3. Sizing of water mains to accommodate future growth shall be determined by Burton Utilities.
4. All costs for water improvements, including necessary over-sizing, shall be borne by the developer.
5. All water mains shall be extended to the farthest property line of the developer to accommodate future growth. Water mains shall be looped/connected with other existing mains when possible to maintain water quality. All water mains that are not looped/connected with other existing mains shall end with an “in line valve”, a fire hydrant and watch valve, and have at least two (2) full lengths of pipe of proper diameter beyond the valve. The end of the line shall be plugged and blocked and marked. Said main extensions shall be at the expense of the developer.
6. All water installations shall be bedded in, and backfilled to 12 inches above the pipe with #57 bank run wash gravel. All trenches under paved areas shall be backfilled and properly compacted to finished grade with #411/304 limestone.
7. All water pipes, fittings, hydrants, manholes, manhole castings and lids, meter pits and other appurtenances and incidentals shall conform to specifications and standards as specified in the “WATER & SEWER PIPE STANDARDS” for the Burton Utilities.
8. All water service taps shall be a minimum of one (3/4) inch diameter.
9. Flared or compression fittings are required on all copper service connections to be maintained by the Village.
10. All water service lines from the main to the curb valve shall be Type “K” soft copper tube or Class 52 cement lined ductile iron pipe as specified herein.
11. All water service lines from the curb valve to the building may be Type K soft copper tube, Class 52 cement lined ductile iron pipe or approved plastic pipe as specified in Table 2. All water mains to be maintained by the Village shall be Class 52 cement lined ductile iron pipe and fittings shall be a minimum of eight (8) inches in diameter.
12. All CTS water pipes and fittings must be accompanied by a manufacturer certificate that the pipe and fittings were manufactured and tested in accordance with the appropriate ASTM or AWWA specification. Said certificate shall be submitted to the Burton Utilities prior to the installation of the pipe.

13. All fire hydrants to be maintained by the Village shall be approved by Burton Village and meet the specifications contained herein. Hydrants shall be installed at a maximum spacing of 300 feet in all areas, except that a hydrant shall be installed at the end of all lines. All hydrants shall be equipped with a watch valve.

SECTION I – Potable Water Service Pipe

A. TYPE “K” SOFT COPPER TUBE (ASTM B88)

Nominal Size (inches)	Minimum Wall Thickness	Safe Working Pressure	O.D.
¾”	.065	680	.875
1”	.065	680	1.125
1 ¼”	.065	550	1.375
1 ½”	.072	520	1.625
2”	.083	450	2.125
2 ½”	.095	420	2.625
3”	.109	410	3.125
3 ½”	.120	380	3.625
4”	.134	370	4.125
5”	.160	360	5.125

Table 1 – Type “K” Soft Copper Tube Specs

C. PE 3408 CTS WATER SERVICE TUBING – BLACK WITH BLUE STRIPES (ASTM D 2737, NFS #14) SDR 9, 200 PSI

	Size	O.D.	Minimum Wall	Weight Per 100’
200 PSI DR-9	¾”	.875	.0097	10.3
	1”	1.125	.125	16.8
	1 ¼”	1.375	.153	24.9
	1 ½”	1.625	.181	34.9
	2”	2.125	.236	59.7

Table 2a – CTS Water Service Tubing – Black w/blue stripes

PRESSURE RATINGS: All pressure ratings are a maximum PSI @ 73.4°F. If temperatures exceed 80°F, contact Charter Plastics for a working pressure derating.

INSTALLATION: All Charter PE 3408 CTS Tubing can be direct buried, plowed or pulled. This pipe is not designed for in-house or hot water applications. Buried pipe must be supported by embedment material like sand or gravel. Refer to ASTM D2774 as well as all local, state or federal guidelines.

JOINING: Charter Plastics CTS Tubing is made to ASTM D2737 and AWWA C901 Standards. It can be joined with heat fusion, or mechanical fittings designed for CTS Tubing.

TESTING: All pipe should be hydrostatically tested after installation. Do not exceed 150% of the pipes working pressure Pneumatic testing is prohibited.

- K. TRACER WIRE – 12 AWG SOC 10 PE (COLOR-BLUE) or LARGER.

SECTION II – Potable Water Main Pipe

- A. CLASS 52 CEMENT LINE DUCTILE CAST IRON PIPE WITH PUSH ON JOINT – (ANSI A21.51, AWWA C151)

Minimum Wall Thickness

6" - 0.31	20" - 0.42
8" - 0.33	24" - 0.44
10" - 0.35	30" - 0.47
12" - 0.37	36" - 0.53
14" - 0.39	42" - 0.59
16" - 0.40	44" - 0.65
18" - 0.41	

Table 2 – Class 52 Cement Line Cast Iron Pipe w/Push On Joint, Minimum Wall Thickness

SECTION III – Water Line Components

- A. **DUCTILE IRON PIPE**
All ductile iron pipes shall meet the physical property recommendations of ASTM A536, "Ductile Iron Castings" with bell and spigot push on joints, complete with gaskets, and lubricants. Unless otherwise approved, the minimum thickness for the barrel of the pipe shall be thickness Class 52 for all trench installations and thickness Class 56 for railroad bore and jack installations. Pipe shall be cement lined inside with a bituminous coating in accordance with ANSI/AWWA A21.4/C104 and the outside shall be coated with a bituminous coating. The pipe shall be manufactured in strict accordance with ANSI/AWWA A21.51/C151. (Drawing PST 101)
- B. **JOINTS**
Push-on and mechanical joints, including accessories shall conform to ANSI/AWWA A21.11/C111 "Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings". Bolts shall be stainless steel Type 316. Flanged joints shall not be used in underground installations without prior approval. (Drawing PST 101)
- C. **DUCTILE IRON FITTINGS**
Ductile iron standard and special fittings shall conform to ANSI/AWWA A21.53/C153, "Ductile Iron Compact Fittings, 3 inches through 24 inches and 54 inches through 64 inches. "Fittings for 3 inch through 24 inch shall be suitable for 350 psi of pressure. The fittings shall be coated outside with a bituminous coating in accordance with ANSI/AWWA A21.53/C153 and lined inside with cement mortar and sealed coated in accordance with ANSI/AWWA A21.4/C104. (Drawing PST 501A)
- D. **NUTS AND BOLTS**
All nuts and bolts added are required to be Stainless Steel Type # 316.
- E. **TAPPING VALVE**
Tapping valves shall be all areas with MUELLER T-2360-16, BRONZE or equ, conforming to AWWA C509 Standard. Tapping valve shall be of a cast ductile iron body and have an inlet flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection. Tapping valve shall have a

full sized resilient wedge, open left (counter clockwise), non-rising stem (NRS) and designed for a working pressure of 150 P.S.I.

- F. **TAPPING SLEEVE**
Tapping sleeves shall be MUELLER H-615 (4" to 12" sizes 200PSI/14"-24" sizes-150PSI), ductile cast iron, AWWA approved, "mechanical joint ends ANSI/AWWA C111 or and stainless steel tapping sleeve (PST 601) to assure uniform gasket pressure and permit centering of the sleeve on the pipe. Flange dimensions and drilling comply with ANSI B16.1 and MSS SP-60. (Drawings s PST 601 & PST 602)
- G. **CORPORATION STOPS AND VALVES (3/4 " , 1")**
Corporation stops and valves shall be Mueller H-15008, Ground Key Corporation Stop, 3/4" to 1" with a conductive compression connection for CTS OD tubing pt Mueller H-15013 ORI-CORP Corporation Valve, 1 1/2" to 2" with a conductive compression outlet connection for CTS OD tubing or Mueller H-15000 Ground Key Corporation Stop with a copper flare straight outlet connection. (Drawings PST 701 & PST801)
- H. **CURB STOPS AND VALVES**
Curb stops and valves shall be Mueller H-15209 with a conductive compression outlet connection for CTS OD tubing-all valves shall be left opening (counter- clockwise)-both ends Quarter turn check or Mueller H-15204 copper flare nut-both ends Quarter turn check (Drawings PST 701 & PST801)
- I. **CURB VALVE BOX WITH ROD**
Curb valve boxes shall be Mueller H-10314 extension type with arch pattern base and shall be adjustable in height from 42 inches to 60 inches. Curb boxes shall have one piece lids with two holes for 1" services or two piece lids with brass pentagon plug for 2" services and shall have the word "WATER" cast neatly on the lid (Drawings PST 1101 and PST 1201)
- J. **ROADWAY VALVE BOX**
Valve boxes shall be genuine buffalo style cast iron, size No. 22 (Series 6850), adjustable screw type with 5 1/2 "shaft and of such length to extend from valve to finished grade, five foot bury. Valve box covers shall be marked "WATER". (Drawing PST 1301)
- K. **GATE VALVE**
Gate valves shall be either double disc Mueller A-2380-20 or resilient seat wedge Mueller A2360-20 complying with AWWA C509. All gate valves shall have a non-rising stem (NRS) with rubber "O" ring packing seals and shall be furnished with mechanical joints unless otherwise specified. All resilient seated gate valves shall be designed for 400 P.S.I. test pressure and a maximum working pressure of 200 psi with no leakage, unless otherwise noted. All valves shall be installed in a vertical position and open by turning to the left (counterclockwise). Stainless steel Type 316 bolts and nuts shall be used. (PST 1501-PST 2001).
- L. **FIRE HYDRANTS**
Fire hydrants shall be first line hydrants and shall conform as a minimum to the American Water Works Association standard C502, latest revision thereof. Hydrants shall be Mueller Super Centurion No. A-423. Hydrants shall be compression main valve type of the center stem construction, closing with the line pressure and shall be designed for a working pressure of 150 PSI in ordinary water works service. Fire Hydrants shall meet the following specifications (Drawings #PST 2010 and PST 2201):
1. *Inlet Connection*
The inlet shall be a 6-inch bell end connection suitable for a mechanical or push-on joint of Class 52 ductile iron spigot end pipe.

2. *Hoses and Nozzles*

Each hydrant shall have two 2 ½ inch hose nozzles and one 4 ½ inch bronze pumper nozzle. Hydrants shall be furnished with a five foot bury line and shall be self-draining. The hydrants shall open by turning left (counterclockwise). The equipment shall be new and all applicable warranties shall be submitted to the Village upon delivery.

3. *Mueller No. A-423 Centurion Fire Hydrant Main Valve and Seat Ring*

All hydrants shall have a main valve opening of at least 5 ¼ inches in diameter. The valve gasket shall be of synthetic rubber at least 1 inch thick. The design of the main valve assembly shall be such that, the main valve and seat ring may be removed from above ground by a wrench through the upper barrel without excavation. The bronze seat ring shall thread directly into a bronze drain ring forming an all bronze waterway. All bronze internal parts shall be ASTM B-62 grade. All pressure seals shall be accomplished by the use of "O" ring seals.

3a. *Hydrant Barrel*

The lower barrel shall be a one piece casting with integrally cast lower and upper flanges.

The design of the hydrant shoe shall be such that it may be removed from the lower barrel without disturbing the main valve seal. The lower barrel shall also be removable from the shoe without disturbing the main valve seal. The shoe shall be contoured smoothly to assure maximum flow. The interior of the shoe shall be coated with a two-part, non-toxic, thermo-setting epoxy. The coating shall be formulated from materials deemed acceptable per Food and Drug Administration Document Title 21, Section 121.2514, resins and polymeric coatings. The inlet connection of the hydrant shoe shall be six (6) inch mechanical joint.

A two-part safety flange shall accomplish the connection of the upper barrel to the lower barrel. The upper barrel shall be capable of rotating a full 360° without full disassembly at the ground line.

3b. *Valve and Drain Stem*

The main valve stem shall be a two-piece design joined at the safety flange area by a steel torque-diverting coupling. The coupling shall be affixed to the main valve stem by means of stainless steel clevis pins and stainless steel cotter pins. The main valve stem in the lower barrel shall be coated with a two-part, non-toxic epoxy. The coating shall be formulated from materials deemed acceptable per Food and Drug Administration Document Title 21, Section 121.2514, resins and polymeric coatings. The hydrants shall have double drain valves to facilitate complete drainage of the barrel.

The bonnet section shall be constructed of a one-piece casting and shall have a seal oil reservoir as an integral part. The oil reservoir will be such that it has two "O" ring seals at the bottom, one serving as a pressure seal, the other as a dirt seal. There shall also be "O" ring seals between the bronze hold down nut and the bonnet, between the hold down nut and the operating nut. The oil reservoir will be such that the oil is recycled and all working parts in the bonnet section are lubricated each time the hydrants is fully opened and closed. The one piece operating nut will be such that there is an anti-friction washer above

the thrust collar to reduce operating torque and decrease wear. Attached to the operating nut there shall be a ductile iron weather cap.

4. Detailed Specifications

One 2 ½ inch hose nozzle rated at 250 GPM (0.25 P.S.I. Pressure Loss)

Two 2 ½ inch hose nozzle rated at 500 GPM (1.00 P.S.I. Pressure Loss)

One 4 ½ inch steamer nozzle rate at 1,000 GPM (2.20 P.S.I. Pressure Loss)

Size of main valve opening 5 ¼ inches

Size of inlet 6 inches

Type of inlet Mechanical joint with accessories

Hose nozzles 2 – 2 ½ inches

Steamer nozzles 1 – 4 ½ inches

Hose nozzle threads National Standard 3.0686 O.D. & 7 ½ T.P.I.

Steamer nozzle threads National Standard 5.7609 O.D. X 4 T.P.I.

Size and shape of operating nut 1 ½ inch pentagon

Direction of opening Left

Depth of bury 5 feet

M. APPROVAL

All products shall be approved by the Village of Burton prior to installation.

Mechanical Joint Fittings

Valve and Hydrant Connecting Pieces

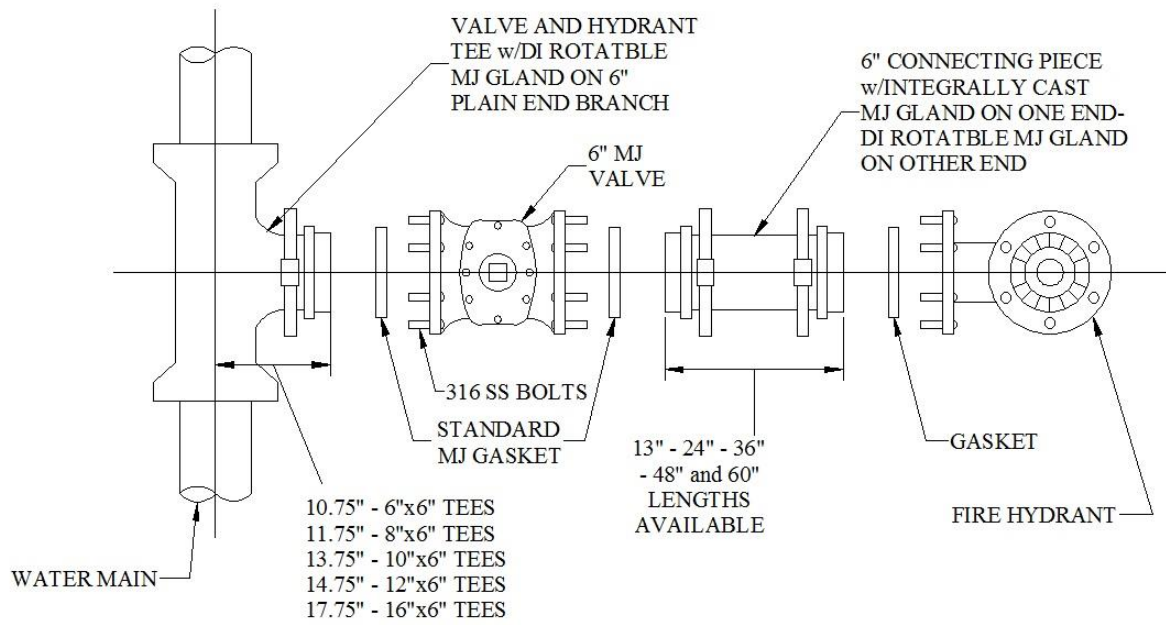


Figure 1- Mechanical Joint Fittings # PST 501A



MECHANICAL JOINT TAPPING SLEEVE FOR CENTRIFUGAL C.I., D.I., & PVC PIPE

Rev. 9-09

- ❑ Catalog number--
H-615 Mechanical Joint Tapping Sleeve
- ❑ Sizes-- 4"-24" main and outlet (see chart below for available size combinations)
- ❑ Outlet flange dimensions and drilling comply with ANSI B16.1, class 125 and with MSS SP-60.
- ❑ Certified to ANSI/NSF 61.
- ❑ Ductile Iron body with 3/4" NPT test plug.
- ❑ 4"-24" sizes--250 psig (1723 kPa) maximum working pressure.



H-615

Tapping Sleeve pipe information

Nominal size of main	O.D. range of sleeve		Class and type of pipe	End Gasket part numbers
	Inch	mm		
4"	4.74"-4.86"	120.5-123.3	Cast iron classes 100, 150, 200 and A - all classes ductile iron - cast iron O.D. PVC plastic pipe classes 150 and 200	195824
	4.87"-5.32	123.8-135.0	Cast iron classes B, C, and D - A-C classes 100 and 150	195653
6"	6.84"-6.96"	173.8-176.7	Cast iron classes 100, 150, 200, and A - all classes ductile iron - cast iron O.D. PVC plastic pipe classes 150 and 200	195825
	6.97"-7.40"	177.1-187.9	Cast iron classes B, C, and D - A-C classes 100 and 150	195654
8"	8.99"-9.11"	228.4-231.3	Cast iron classes 100, 150, 200, A and B - all classes ductile iron - cast iron O.D. PVC plastic pipe classes 150 and 200	195826
	9.12"-9.62"	231.7-244.2	Cast iron classes B, C, and D - A-C classes 100 and 150	195655
10"	11.04"-11.16"	280.5-283.4	Cast iron classes 150, 200, 250, A and B -all classes ductile iron - cast iron O.D. PVC plastic pipe classes 150 and 200	194680
12"	13.14"-13.26"	333.9-336.7	Cast iron classes 150, 200, 250, A and B - all classes ductile iron - cast iron O.D. PVC plastic pipe classes 150 and 200	194638
14"	15.22"-15.35"	386.7-389.8	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195127
16"	17.32"-17.45"	440.0-443.1	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195128
18"	19.42"-19.55"	493.4-496.5	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195266
20"	21.52"-21.65"	546.7-549.8	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195129
24"	25.72"-25.85"	653.4-656.5	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195130

Sizes available

Nominal size of main	Outlet size									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
4"	X	-	-	-	-	-	-	-	-	-
6"	X	X	-	-	-	-	-	-	-	-
8"	X	X	X	-	-	-	-	-	-	-
10"	X	X	X	X	-	-	-	-	-	-
12"	X	X	X	X	X	-	-	-	-	-
14"	-	X	X	X	X	X	-	-	-	-
16"	X	X	X	X	X	X	X	-	-	-
18"	X	X	X	X	X	-	X	X	-	-
20"	X	X	X	X	X	X	X	X	X	-
24"	X	X	X	X	X	X	X	X	X	X

WARNING: Use on A-C pipe, which contains a known carcinogen, requires appropriate protective equipment and procedures be employed.

Figure 2- Joint Tapping Sleeve # PST601

12.8 **Mueller Co.**

STAINLESS STEEL TAPPING SLEEVE 4" - 24"

Rev. 9-09



- Catalog number-- **H-304** Stainless Steel Tapping Sleeve
- Sizes-4"*-24" main and outlet (see chart below for available size combinations).
- Outlet choices: flange or integral MJ outlet.
- Outlet flange material options: 304L Stainless steel, carbon steel, or ductile iron outlet flange which meets or exceeds all applicable requirements of ANSI B16.1, class 125 and in accordance with MSS-SP60.
- Integral MJ flange is 304L stainless steel.
- Certified to ANSI/NSF 61.
- 3/4" NPT brass test plug (Stainless Steel optional).
- 4"-12" sizes--250 psig (1723 kPa) maximum working pressure.
- 14"-24" sizes--200 psig (1379 kPa) maximum working pressure.

How to determine a Mueller Tapping Sleeve Part Number

Select the appropriate numbers from the pipe information chart that follows.

Example: For 6"x6" with 7.30-7.50 O.D. Range and stainless steel flange

Resulting Part No. **0606H304SS0750**

*3" outlet flange only available in stainless steel

** H-304 is constant for all Mueller Stainless Steel Tapping Sleeves listed here

** SS = stainless steel flange, CS = carbon steel flange.

DI = ductile iron flange, MJ=integral mechanical joint outlet.*

Main Size	Outlet Size	Model No.	Flange Material	Maximum O.D.
06	06	H-304*	SS**	0750

Tapping Sleeve pipe information

Size of main	Size of outlet flange	Available sleeve O.D. ranges		Class and type of pipe
		Inch	mm	
4"	3", 4"	4.50 - 4.90	114.30 - 124.46	Iron Pipe Size PVC; C900 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100
		4.80 - 5.00		
6"	4", 6"	6.59 - 6.99	167.39 - 177.55	Iron Pipe Size PVC; C900 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100, 150
		6.89 - 7.30	175.00 - 185.42	
		7.10 - 7.50	180.34 - 190.50	
		7.40 - 7.80	187.96 - 198.12	
8"	4", 6"	7.90 - 8.30	200.66 - 210.82	Iron Pipe Size PVC; C900 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100, 150, 200
		8.62 - 9.06	218.95 - 230.12	
	4", 6", 8"	9.04 - 9.45	229.62 - 240.03	
		9.20 - 9.60	233.68 - 243.84	
		9.60 - 10.00	243.84 - 254.00	
10"	4", 6", 8"	9.90 - 10.30	251.46 - 261.62	Iron Pipe Size PVC; C900 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100, 150, 200
		10.73 - 11.13	272.54 - 282.70	
	4", 6", 8", 10"	11.05 - 11.45	280.67 - 290.83	
		11.70 - 12.10	297.18 - 307.34	
12"	4", 6", 8", 10", 12	12.50 - 12.90	317.50 - 327.66	C900 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100, 150, 200; C905 IPS O.D. PVC (14")
		13.16 - 13.56	334.26 - 344.42	
		13.60 - 14.09	345.44 - 378.46	
		14.10 - 14.58	358.14 - 370.33	
14"	4", 6", 8", 10", 12	15.25 - 15.65	387.35 - 397.51	C905 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100, 150, 200; C905 IPS O.D. PVC (16")
		15.60 - 16.00	396.24 - 406.40	
		16.38 - 16.73	416.05 - 424.94	
		16.48 - 16.88	418.59 - 428.75	
16"	4", 6", 8", 10", 12	17.40 - 17.80	441.96 - 452.12	C905 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; AC 100, 150, 200; C905 IPS O.D. PVC (18")
		17.54 - 17.94	334.26 - 344.42	
		17.85 - 18.25	445.52 - 463.55	
		18.15 - 18.55	461.01 - 471.17	
		18.60 - 19.00	472.44 - 482.60	
18"	4", 6", 8", 10", 12	19.30 - 19.70	490.22 - 500.38	C905 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron; C905 IPS O.D. PVC (20")
		19.70 - 20.10	500.38 - 510.54	
20"	4", 6", 8", 10", 12	21.40 - 21.80	543.56 - 553.72	C905 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron
		21.90 - 22.30	556.26 - 566.42	
		22.30 - 22.70	566.42 - 576.58	
24"	4", 6", 8", 10", 12	23.30 - 23.70	591.82 - 601.98	C905 Cast Iron OD PVC; Cast Iron 100-250, A, B, C, D; Ductile iron
		23.80 - 24.10	604.52 - 612.14	
		25.60 - 26.00	650.24 - 660.40	

Figure 3-Stainless Steel Tapping Sleeve 4" - 24", PST # 601A

MUELLER® MARK II ORISEAL CURB VALVES WITH MUELLER 110



MUELLER MARK II ORISEAL
Curb Valve. MUELLER 110
Conductive Compression
Connection for CTS O.D.*
tubing-both ends Quarter turn check

H-15209

3/4"	1"	1-1/2"	2"
------	----	--------	----

1/2" - 2" GROUND KEY DESIGN CORPORATION VALVES



Ground Key Corporation Valve
Inlet: AWWA taper
(MUELLER "CC") thread
Outlet: Copper flare straight
connection

H-15000

5/8"	1/2"‡	5/8" x 3/4"	3/4"	3/4" x 1"	1"
1" x 1-1/4" ‡		1-1/4"	1-1/2"	1-1/2" x 2"	2"

1/2" - 1" GROUND KEY DESIGN CORPORATION VALVES



Ground Key Corporation Valve
Inlet: AWWA taper
(MUELLER "CC") thread
Outlet: MUELLER® Pack Joint
Connection for CTS O.D.* tubing

P-15008

3/4"	3/4" x 1"	1"
------	-----------	----

1-1/2" & 2" MUELLER® ORI-CORP CORPORATION VALVES



MUELLER ORI-CORP Corpo-
ration Valve
Inlet: AWWA taper
(MUELLER "CC") thread
Outlet: MUELLER Pack Joint
Connection for CTS O.D.* tubing

P-15013

1-1/2"	2"
--------	----

Figure 4 - Curb and Corporation Valves . PST # 701

MUELLER® MARK II ORISEAL® CURB VALVES WITH COPPER FLARE CONNECTION



MUELLER MARK II
ORISEAL Curb Valve
Copper flare nut - **both ends**
Quarter turn check

H-15204

3/4"	1"	1-1/4"	1-1/2"	2"
------	----	--------	--------	----

NOTE: 3/4" and 1" sizes are bi-directional and can be installed with flow from either direction. Sizes larger than 1" are one way flow and must be installed with flow as indicated by arrow and in/out lettering cast on valve body.

Figure 5 - Curb Valves w/Copper Flare Connection, PST # 801



Improved extension type curb box with arch pattern base - for 1/2" through 2" curb valves

The arch extends around the curb valve and has a large foot surface to transmit loads into the ground beneath the curb valve, rather than to the curb valve itself. The box is cast iron and is furnished with a cast iron lid and brass pentagon plug. The upper part of the box is spring loaded and telescopes into the base to allow for grade adjustment within the range given in the dimensions charts. Stationary rods, shut-off rods and pentagon keys are optional and are ordered separately.



Foot piece
(valve not included)

Optional foot pieces

Optional foot pieces provide a firm base for the curb valve and helps to prevent the curb valve from moving when the valve is operated. This is especially important when a plastic service line is used.

Box Selection

Curb Valve & Size	Box		Optional Foot Piece
	Catalog Number	Inside Diameter	
300™ Ball			
3/4"	H-10385	1-1/4"	H-10396
	H-10316	2"	H-10391
1"	H-10385	1-1/4"	H-10397
	H-10316	2"	H-10401**
1-1/2"	H-10386	1-1/4"	H-10400
	H-10336	2"	—
2"	H-10336	2"	—
MARKII®			
3/4"	H-10385	1-1/4"	H-10396
	H-10316	2"	H-10391
1"	H-10385	1-1/4"	H-10397
	H-10316	2"	H-10401**
1-1/4"	H-10336	2"	—
1-1/2"	H-10386	1-1/4"	H-10400
	H-10336	2"	—
2"	H-10336	2"	—
ORISEALIII®			
3/4"	H-10385	1-1/4"	H-10396
	H-10316	2"	H-10391
1"	H-10385	1-1/4"	H-10397
	H-10316	2"	H-10401**
ORISEAL® (GreenKey)			
3/4"	H-10385	1-1/4"	H-10396
1"	H-10385	1-1/4"	H-10397
1-1/2"	H-10386	1-1/4"	H-10400
2"	H-10386	1-1/4"	H-10400

** Foot piece not useable with valves having IPS PE MUELLER 110® Compression connections.

Figure 6- Curb Boxes-Improved Ext Type with Arch, PST # 1101

CURB BOXES - EXTENSION TYPE WITH ARCH PATTERN BASE



7.27

Rev. 9-09

Dimensions and Optional Stationary Rod

H-10306 and H-10308 Curb Boxes

H-10310, H-10314 and H-10334 Curb boxes

Curb box catalog number	Box length extended		Box length fully retracted		Weight		Optional stationary rod	
	Inch	mm	Inch	mm	lbs.	kg.	Part No.	L'gth inch
H-10306 1-1/4" upper section	24	610	18.00	457.0	12.0	5.4	84774	12.75
	30	762	18.00	457.0	14.0	6.4	84346	15.0
	36	914	24.00	610.0	15.0	6.8	84275	21.0
	42	1067	30.00	762.0	16.0	7.3	84233	27.0
	48	1219	36.00	914.0	17.0	7.7	84245	33.0
	54	1372	42.00	1067.0	18.0	8.2	84247	39.0
	60	1524	48.00	1219.0	19.0	8.6	84154	45.0
	66	1676	54.00	1372.0	20.0	9.1	84261	51.0
	72	1829	60.00	1524.0	22.0	10.0	84341	57.0
	78	1981	66.00	1676.0	23.0	10.4	84297	63.0
H-10308 1-1/2" upper section	24	610	20.44	519.2	13.0	5.9		
	30	762	20.44	519.2	15.0	6.8	84742	15.0
	36	914	24.00	610.0	16.0	7.3	84256	21.0
	42	1067	30.00	762.0	17.0	7.7	84326	27.0
	48	1219	36.00	914.0	18.0	8.2	84305	33.0
	54	1372	42.00	1067.0	20.0	9.1	84338	39.0
	60	1524	48.00	1219.0	21.0	9.5	84353	45.0
	66	1676	54.00	1372.0	22.0	10.0	88702	51.0
	72	1829	60.00	1524.0	23.0	10.4	84255	57.0
	78	1981	66.00	1676.0	25.0	11.3	83299	63.0
H-10314** H-10334** 1" upper section	24	610	18.00	457.0	10.0	4.5	82892	16.75
	30	762	24.00	610.0	11.0	5.0	82862	21.0
	36	914	30.00	762.0	12.0	5.4	82863	27.0
	42	1067	36.00	914.0	14.0	6.4	82864	33.0
	48	1219	42.00	1067.0	15.0	6.8	82865	39.0
	54	1372	48.00	1219.0	16.0	7.3	82866	45.0
	60	1524	54.00	1372.0	17.0	7.7	82867	51.0
H-10310 2" upper section	24	610	21.44	544.5	21.0	9.5		
	30	762	21.44	544.5	23.0	10.4	84146	15.0
	36	914	24.00	610.0	25.0	11.3	84162	21.0
	42	1067	30.00	762.0	27.0	12.2	84147	27.0
	48	1219	36.00	914.0	28.0	12.7	84176	33.0
	54	1372	42.00	1067.0	30.0	13.6	84139	39.0
	60	1524	48.00	1219.0	32.0	14.5	84140	45.0
	66	1676	54.00	1372.0	34.0	15.4	84128	51.0
	72	1829	60.00	1524.0	35.0	15.9	84143	57.0
	78	1981	66.00	1676.0	37.0	16.8	84222	63.0
H-10334** 1" upper section	84	2134	72.00	1829.0	39.0	17.7	84169	69.0
	90	2286	78.00	1981.0	41.0	18.6		
	96	2438	84.00	2134.0	43.0	19.5		
	24	610	18.00	457.0	9.5	4.3	82875	11.25
	30	762	24.00	610.0	10.0	4.5	82892	16.75
	36	914	30.00	762.0	11.0	5.0	82862	21.0
	42	1067	36.00	914.0	12.0	5.4	82863	27.0
48	1219	42.00	1067.0	14.0	6.4	82864	33.0	
54	1372	48.00	1219.0	15.0	6.8	82865	39.0	
60	1524	54.00	1372.0	16.0	7.3	82866	45.0	
66	1676	60.00	1524.0	17.0	7.7	82867	51.0	
72	1829	66.00	1676.0	18.0	8.2	82868	57.0	
78	1981	72.00	1829.0	19.0	8.6	82869	63.0	
84	2134	78.00	1981.0	20.0	9.1	82870	69.0	
90	2286	84.00	2134.0	21.0	9.5	82871	75.0	

Curb box catalog number	Box length extended		Box length fully retracted		Weight		Optional stationary rod*	
	Inch	mm	Inch	mm	lbs.	kg.	Part No	L'gth inches
H-10310 2" upper section	24	610	21.44	544.5	21.0	9.5		
	30	762	21.44	544.5	23.0	10.4	84146	15.0
	36	914	24.00	610.0	25.0	11.3	84162	21.0
	42	1067	30.00	762.0	27.0	12.2	84147	27.0
	48	1219	36.00	914.0	28.0	12.7	84176	33.0
	54	1372	42.00	1067.0	30.0	13.6	84139	39.0
	60	1524	48.00	1219.0	32.0	14.5	84140	45.0
	66	1676	54.00	1372.0	34.0	15.4	84128	51.0
	72	1829	60.00	1524.0	35.0	15.9	84143	57.0
	78	1981	66.00	1676.0	37.0	16.8	84222	63.0
H-10314** H-10334** 1" upper section	84	2134	72.00	1829.0	39.0	17.7	84169	69.0
	90	2286	78.00	1981.0	41.0	18.6		
	96	2438	84.00	2134.0	43.0	19.5		
	24	610	18.00	457.0	9.5	4.3	82875	11.25
	30	762	24.00	610.0	10.0	4.5	82892	16.75
	36	914	30.00	762.0	11.0	5.0	82862	21.0
	42	1067	36.00	914.0	12.0	5.4	82863	27.0
48	1219	42.00	1067.0	14.0	6.4	82864	33.0	
54	1372	48.00	1219.0	15.0	6.8	82865	39.0	
60	1524	54.00	1372.0	16.0	7.3	82866	45.0	
66	1676	60.00	1524.0	17.0	7.7	82867	51.0	
72	1829	66.00	1676.0	18.0	8.2	82868	57.0	
78	1981	72.00	1829.0	19.0	8.6	82869	63.0	
84	2134	78.00	1981.0	20.0	9.1	82870	69.0	
90	2286	84.00	2134.0	21.0	9.5	82871	75.0	

Extra lids and plug

Lids are cast iron with an integrally cast brass bushing which allows for easy removal of pentagon plug.



Curb Box Catalog number	One piece lid part number	Lid with brass pentagon plug - part number	Lid with brass bushing and cast iron plug	Plug only part number	
				Cast Iron	Brass
H-10306	-	89369	89375	58039	63670
H-10308	-	581642	89980	58116	63683
H-10310	89982	681714	89981	59478	63684
H-10314	-	-	-	-	-
H-10334		89376	89376	-	36571

* Stationary rods are supplied with H-10314 and H-10334 only. Stationary rods are optional with all other boxes shown on this page and must be ordered separately.

** The H-10314 and H-10334 boxes are the same except the H-10314 is furnished with a one piece lid, the H-10334 has a combination lid and pentagon plug.

Figure 7 - Cub Boxes - Extension Type with Arch, PST 1201

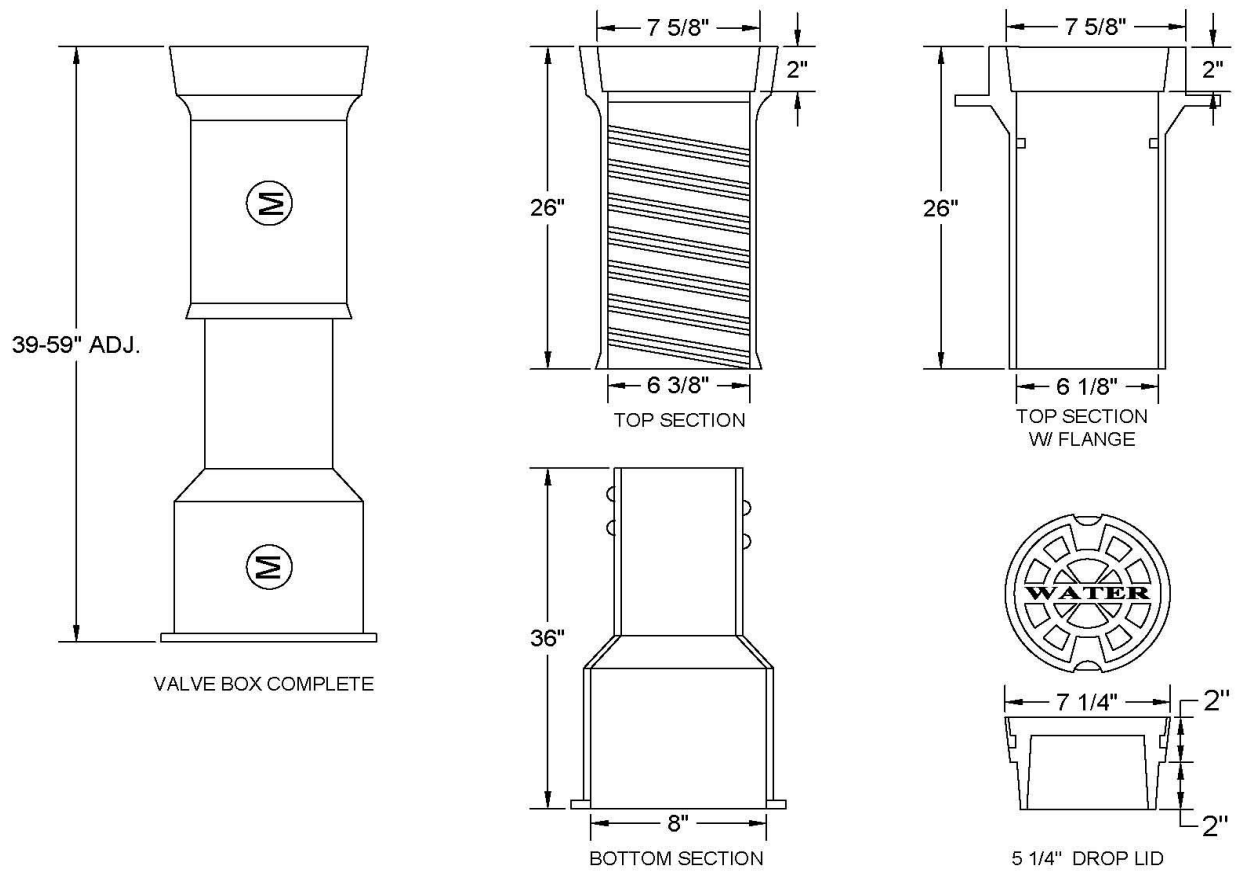
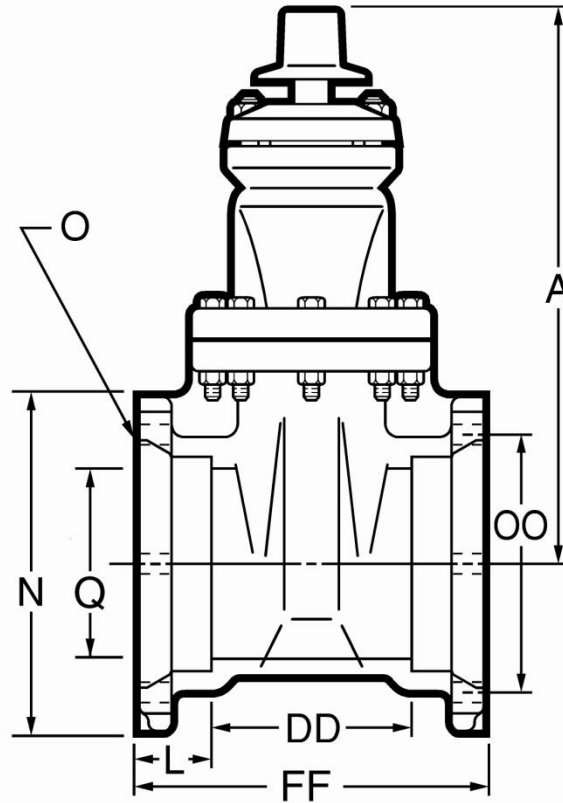


Figure 8 - Screw Type Valve Box Detail, PST 1301

2"-12" A-2360 RESILIENT WEDGE GATE VALVE - M.J. x M.J.

Mueller Co. 10.15

Rev. 2-06



Dimensions

Dimension*	Nominal size						
	2"	3"	4"	6"	8"	10"	12"
A	9.88	12.38	14.19	18.00	21.50	25.50	28.62
FF [†]	8.50	9.00	10.00	11.50	12.50	14.75	14.88
L	2.50	2.50	2.50	2.50	2.50	2.50	2.50
N	4.62	7.50	9.12	11.12	13.37	15.62	17.88
O (number and size of holes)	4--.88	4--.88	4--.88	6--.88	6--.88	8--.88	8--.88
DD	3.50	4.00	5.00	6.50	7.50	9.75	9.88
Q (bore)	2.30	3.30	4.30	6.30	8.30	10.30	12.30
OO (bolt circle diameter)	5.00	6.19	7.50	9.50	11.75	14.00	16.25
*Turns to open	8	11	14	20.5	26.5	33	38.5
Weight*	40	83	120	186	280	405	540

*All dimensions are in inches. All weights include accessories are in pounds and are approximate.

Figure 9 - A-2360 2" - 12" Resilient Wedge Gate Valve- M.J. X M.J. , PST # 1601

MUELLER® 2360 SERIES™ RESILIENT WEDGE GATE VALVE

Mueller Co.

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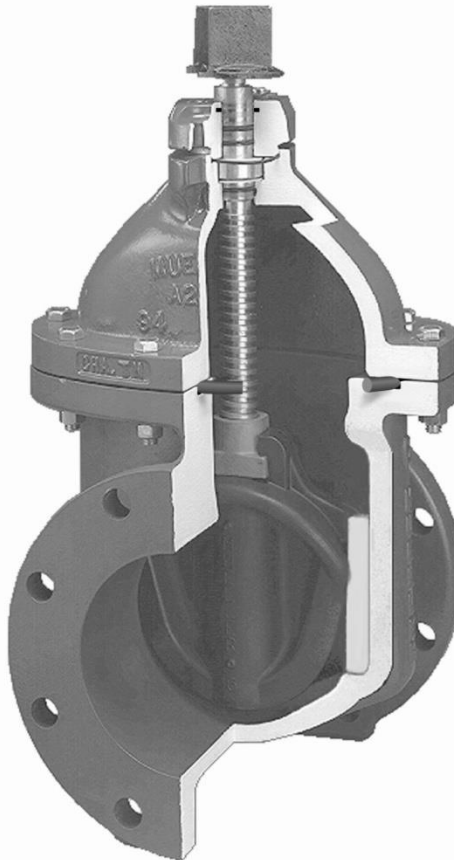
Rev. 2-06

MUELLER® 2300 Series Resilient Wedge Gate Valves

Mueller® Resilient Wedge Gate Valves have features to make them easier to operate and to preserve the sealing capability and interior coating integrity for many years of reliable service. In addition to popular end connection options, Mueller brand RW valves can be ordered with Mueller's exclusive Aqua-Grip™ System that incorporates an O-ring sealed compression connection and integral pipe restraint in one "ready to use" easy and quick to install package.

Mueller 2" – 12" 2360 Series Resilient Wedge Gate Valve Features

- ❑ TRIPLE O-RING SEALS PLUS DIRT SEAL – two above thrust collar and one below, retain lubricant in this critical area. Top two are replaceable with valve fully open and under pressure. Fourth seal at top serves as dirt seal†.
- ❑ TWO ANTI-FRICTION WASHERS WITH LUBRICATION – made of polymer, one above and one below the thrust collar, reduce operating torque to open or close valve.
- ❑ STEM – forged manganese bronze bar stock is upset, then machined to form a thrust collar for superior strength in this critical area.
- ❑ WEDGE – cast iron, fully encapsulated in molded rubber - no exposed iron.
- ❑ EXTENDED WEDGE GUIDES – molded as part of wedge, ride inside body channels to maintain wedge alignment throughout its travel.
- ❑ GUIDE CAP BEARINGS – made of polymer and snapped over rubber covered wedge guides, provide bearing surfaces that protect both wedge and interior body coating from wear and aid in easy operation – even the largest valves installed horizontally. Rollers, tracks or scrapers are not needed.



- ❑ SMOOTH, OVERSIZED FLOW WAY – full, round, unobstructed flow way accommodates full size cutters, provides superior flow characteristics and reduces pumping costs.**
- ❑ MUELLER® PRO-GARD™ FUSION EPOXY COATING – 10 mils* thick protects all inside and outside iron surfaces, and complies with AWWA C550 and certified to ANSI/NSF 61.
- ❑ 250 PSIG MAXIMUM WORKING PRESSURE – Hydrostatically tested at 500 psig. Surpasses ANSI/AWWA Standard C509 by 25%. UL/FM: 200 psig MWP.***
- ❑ AMERICAN MADE QUALITY – factory in Chattanooga, TN with ISO 9001:2000 certification, and UL 262, FM 1120/1130. Certified to ANSI/NSF 61. Manufactured and tested in compliance with ANSI/AWWA Standard C509. UL Listed and FM Approved.
- ❑ BI-DIRECTIONAL FLOW
- ❑ FLAT BOTTOM SURFACES – stands upright for easier handling and storage.
- ❑ 10-YEAR LIMITED WARRANTY – assured reliability (see separate Mueller Warranty document for terms).

Mueller 14" – 48" 2361 Series Resilient Wedge Gate Valve Features

In addition to all the features of the smaller 2360 series valves, large size Mueller 2361 series RW valves offer these features:

- ❑ STEM – Manganese bronze casting with integral thrust collar.
- ❑ WEDGE – Ductile iron, fully encapsulated in molded rubber.
- ❑ BODY AND BONNET – Ductile iron.



- ❑ COMPLIANCE – In addition to those above: ANSI/AWWA Standard C515.
- ❑ MAXIMUM WORKING PRESSURE – 14"-48" AWWA valves rated at 250 psig – tested at 500 psig. UL/FM valves 200 psig MWP (14"-16" 250 psig MWP).***

*Nominal
 **16" valve requires 1/2" undersized cutter.
 ***250 psi UL/FM rating available as an option.
 †Dirt seal on 4"-12" valves.

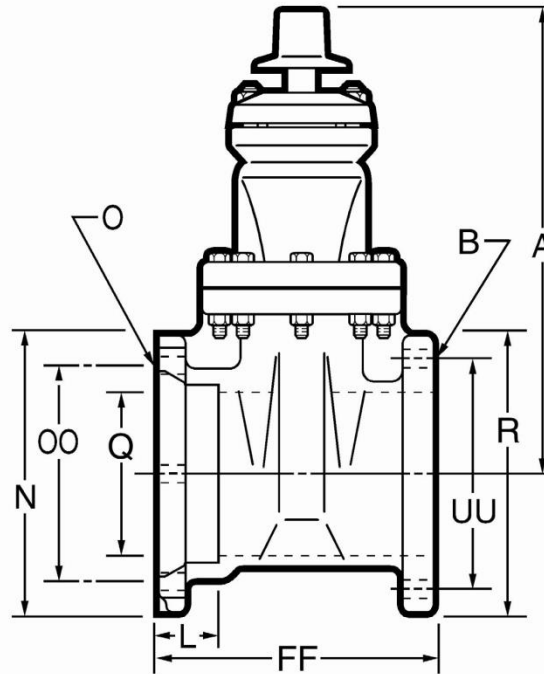
Double-Disc Style gate valves follow the RW valve pages

Figure 10 - Mueller 260 Series Resilient Wedge Gate Valve, PST # 1701

4"-12" A-2360 RESILIENT WEDGE GATE VALVE - M.J. x FL.

Mueller Co. 10.13

Rev. 2-06



Dimensions

Dimension*	Nominal size				
	4"	6"	8"	10"	12"
A	14.19	18.00	21.50	25.50	28.62
L	2.50	2.50	2.50	2.50	2.50
N	9.12	11.12	13.37	15.62	17.88
O (number and size of holes for MJ)	4--.88	6--.88	6--.88	8--.88	8--.88
Q (bore)	4.30	6.30	8.30	10.30	12.30
OO (bolt circle diameter for MJ)	7.50	9.50	11.75	14.00	16.25
R	9.00	11.00	13.50	16.00	19.00
UU (bolt circle diameter for FL)	7.50	9.50	11.75	14.25	17.00
FF	9.50	11.00	12.00	13.88	14.44
B (number and size of holes for FL)	8--.75	8--.88	8--.88	12--1.00	12--1.00
Turns to open	14	20.5	26.5	33	38.5
Weight*	115	168	275	400	570

* All dimensions are in inches. All weights include accessories are in pounds and are approximate.

Figure 11 - A-2360 , 4"-12" Resilient Wedge Gate Valve - M.J. X FL., PST 1801

10.14 **Mueller Co.**

2"-12" A-2360 RESILIENT WEDGE GATE VALVES - M.J. x M.J.

Rev. 9-09 Shaded area indicates change.

- ❑ Catalog number–
 - A-2360-20 Mechanical joint ends (with accessories unassembled)
 - A-2360-23 Mechanical joint ends (less accessories)
 - A-2360-25 Mechanical joint ends (with transition gaskets accessories unassembled)
- ❑ Sizes – 2", 3", 4", 6", 8", 10", 12"
- ❑ Meets or exceeds all applicable requirements of ANSI/AWWA C509 Standard, UL Listed, FM Approved, and certified to ANSI/NSF 61.
- ❑ Standard mechanical joint ends comply with ANSI/AWWA C111
- ❑ Iron body with nominal 10 mils MUELLER® Pro-Gard™ Fusion Epoxy Coated interior and exterior surfaces
- ❑ Epoxy coating meets or exceeds all applicable requirements of ANSI/AWWA C550 Standard and is certified to ANSI/NSF 61
- ❑ Iron wedge, symmetrical & fully encapsulated with molded rubber; no exposed iron
- ❑ Non-rising stem (NRS)
- ❑ Triple O-ring seal stuffing box (2 upper & 1 lower O-rings), with fourth O-ring serving as dirt seal††
- ❑ 2" square wrench nut (optional handwheel available)—open left or open right
- ❑ 250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure
- ❑ 3"-12" sizes – UL Listed, FM Approved: 200 psig (1379 kPa)

††Dirt seal on 4"-12" valves



A-2360-20 M.J. accessories shipped unassembled

Options

See page 10.40 for more information on Resilient Wedge Gate Valve options

- ❑ Position indicators
- ❑ Stainless steel fasteners: Type 316
- ❑ ASTM B98-C66100/H02 stem
- ❑ Handwheel

Resilient wedge gate valve parts

Catalog Part No.	Description	Material	Material Standard
G-16	Bonnet Bolts & Nuts	Stainless Steel	Type 304
G-41	Stuffing Box Bolts & Nuts	Stainless Steel	Type 304
G-49	Stem O-rings (3)	Rubber	
G-200	Wrench Nut Cap Screw	Stainless Steel	Type 304
G-201	Stuffing Box Seal	Rubber	
G-202	Wrench Nut	Cast Iron	ASTM A126 CL.B
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B62
G-206	Guide Cap Bearings	Celcon	
G-207	Stuffing Box with dirt seal††	Cast Iron, Rubber	ASTM A126 CL.B
G-208	Anti-fiction Washer (2)	Celcon	
G-209	Wedge, Rubber Encapsulation	Cast Iron* Rubber	ASTM A126 CL.B
G-210**	Bonnet	Cast Iron ♦	ASTM A126 CL.B
G-211**	Bonnet O-ring	Nitrite	
G-212**	Body	Cast Iron ♦	ASTM A126 CL.B

* Fully encapsulated in molded rubber with no iron exposed

**Previous to 1999 these parts on 4"-12" valves were designed with a gasket instead of an O-ring and with additional bolts (2"-3" sizes retain neoprene gasket design affecting these parts). Confirm the type of seal when ordering a replacement gasket or O-ring.

††Dirt seal on 4"-12" valves

♦Body and bonnet of 12" valves are ductile iron standard wall thickness in compliance with C509.

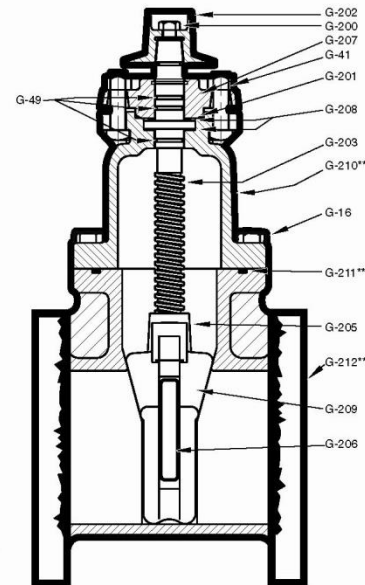


Figure 12 - A-2360, 2"-12" Resilient Wedge Gate Valves - M.J. X M.J., PST # 2001

MUELLER® SUPER CENTURION® FIRE HYDRANT

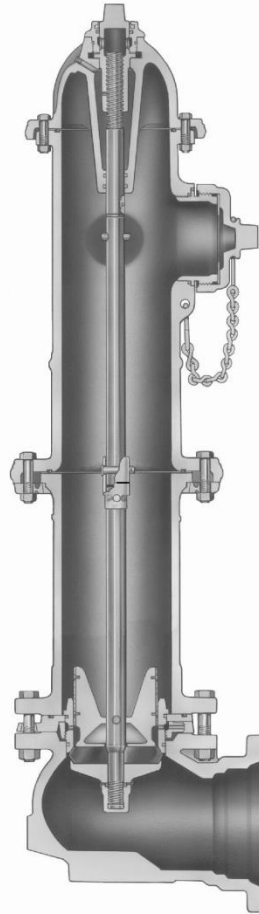
Mueller Co.

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Rev. 9-09

MUELLER SUPER CENTURION 250™ 3-Way Fire Hydrant Features

- ❑ **ANTI-FRICTION WASHER** helps assure easy turning operation for the life of the hydrant.
- ❑ **OIL FILLER PLUG** permits quick check of oil level. Lets you add oil without removing bonnet.
- ❑ **OIL RESERVOIR O-RING SEALS** seal oil in, water out.
- ❑ **STAINLESS STEEL SAFETY STEM COUPLING** - pulls free if hydrant is hit by a vehicle preventing damage to the stem and main valve. Coupling will not break into pieces that could drop into lower barrel and affect valve operation. Top of lower stem is below the top of the lower barrel so that a tire cannot depress the stem and open the main valve. Repair is easy and economical.
- ❑ **SAFETY FLANGE** - breaks cleanly to help prevent barrel damage, yet is strong enough to withstand normal handling. Allows economical repair, adding of extension section, rotation or changing of upper barrel without digging or water shut-off.
- ❑ **BRONZE UPPER VALVE PLATE** conical design for smooth flow.
- ❑ **DRAIN VALVE FACINGS** specially designed, long-life facings provide effective sealing.
- ❑ **DUCTILE IRON CAP NUT** retains main valve. Seats against cap nut gasket to prevent corrosion of stem threads. Locked in place by a stainless steel lock washer. Mueller HP Epoxy coated for durability.
- ❑ **250 PSIG** - 3-way hydrant: 250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa)
- ❑ **SHOE DESIGNED FOR MAXIMUM FLOW AND EASY CONNECTION** with its smooth transitional contours, extended neck and integral anti-rotation pads, allowing use of standard tee-head bolts. The inside of the shoe is covered with MUELLER HP® Epoxy Coating. This thermosetting epoxy forms a tough corrosion-resistant barrier to chemicals, physical impact and electrical currents.
- ❑ **HOLD-DOWN NUT** - with integral weather seal. Design discourages unauthorized removal of the hold-down nut or bronze operating nut. Resilient wiper seal between hold-down nut and operating nut prevents water entry to protect operating nut from freezing. Wiper seal material is resistant to ultra-violet ray deterioration. O-ring seal provides second level of protection.
- ❑ **MEETS OR EXCEEDS** all applicable requirements of ANSI/AWWA C502 Standard and UL 246 and FM 1510 specifications.
- ❑ **O-RING SEALS AT BONNET, GROUND, AND SHOE FLANGES** for better leak resistance, easier maintenance.
- ❑ **SEALED OIL RESERVOIR** - O-ring sealed to prevent leakage. Provides positive lubrication of stem threads and bearing surfaces each time the hydrant is operated. Filled at the factory.
- ❑ **FULL FLOW OPENINGS** large radius hose and pumper openings produce low friction loss.
- ❑ **FIELD REPLACEABLE HOSE AND PUMPER NOZZLES** - O-ring sealed. Threaded in place and retained by stainless steel locks. Nozzles are easily replaced.
- ❑ **ELECTRO-GALVANIZED BOLTS AND NUTS** - provide corrosion protection.
- ❑ **NON-KINKING CHAINS** heavy-duty chains are securely attached to the hydrant. Special chain loop permits free turning of the cap.
- ❑ **BRONZE SEAT RING** - threaded into drain ring and O-ring sealed. Seat ring is easily removed or installed from above ground. Each time main valve is opened or closed, double drain valves force-flush both drain valve openings to keep them open for effective barrel drainage. Bronze drain valves are integral parts of main valve assembly.
- ❑ **REVERSIBLE, COMPRESSION TYPE MAIN VALVE** - closes with pressure for positive seal. Rubber material has long service life, yet is reversible providing a convenient spare in place.



Manufactured under one or more of the following: U.S. Patent No. 4,717,178; 4,842,246.

Figure 13 – Mueller Super Centurion Fire Hydrant, PST # 2101

9.8



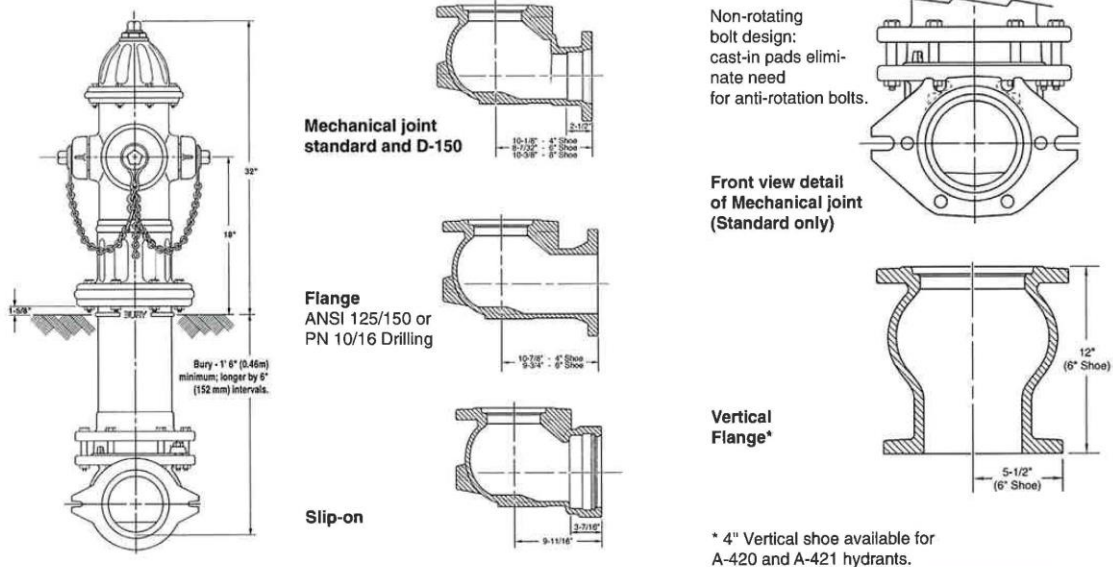
MUELLER® SUPER CENTURION® FIRE HYDRANT

Rev. 8-04 Shaded area indicates changes

- ❑ Super Centurion 250™ 3-way catalog numbers
(approved to UL 246, FM 1510, ANSI/AWWA C502 Standards) -
A-421 4-1/2" main valve opening three way (two hose nozzles and one pumper nozzle)
A-423 5-1/4" main valve opening three way (two hose nozzles and one pumper nozzle)
- Super Centurion 200™ 2-way catalog numbers
(approved to ANSI/AWWA C502 Standards) -
A-420 4-1/2" main valve opening two way (two hose nozzles)
A-422 5-1/4" main valve opening two way (two hose nozzles)
A-425 5-1/4" main valve opening two way (two pumper nozzles)
- Super Centurion 200™ 1-way catalog number
(approved to ANSI/AWWA C502 Standards)-
A-424 4-1/2" main valve opening one way (one pumper nozzle)
- ❑ 10 year limited warranty on material and workmanship
- ❑ Meets all applicable parts of ANSI/AWWA C502 Standard
- ❑ Post type dry barrel design
- ❑ Dry top design with O-ring sealed oil reservoir
- ❑ Traffic feature with stainless steel safety stem coupling
- ❑ Compression-type main valve closes with pressure for positive seal; it is made of rubber and is conveniently reversible providing a spare for long service life
- ❑ Operating nut available in wide variety of shapes and sizes-open left or right
- ❑ Field replaceable hose and pumper nozzles
- ❑ Hose and pumper nozzles have large radius, full flow openings for low friction loss
- ❑ Contoured shoe is designed for full flow
- ❑ Dual bronze drain valves provide effective barrel drainage
- ❑ 250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure for 3-way hydrants;
200 psig (1379 kPa) maximum working pressure, 400 psig (2758 kPa) static test pressure for 2-way and 1-way hydrants



Dimensions



SEE PAGE 9.28 FOR ORDERING INSTRUCTIONS

Figure 14 - Mueller Super Centurion Fire Hydrant, PST # 2201

SECTION IV – Remote Water Meter Installation

This specification is the installation of residential 5/8-inch X ¾ inch remote water meters. All commercial and industrial meters must be approved on an individual basis as per the General Rules and Regulations of the Water Division. All meter installations shall be planned and constructed for remote reading devices. The owner or contractor is responsible for contacting the Burton Utilities so that the remote wire installation can be made prior to enclosing walls, ceilings, etc.

A. GENERAL SPECIFICATIONS

(a) Meter installation, location and maintenance.

- i. All meters are to be kept free from rubbish, debris or anything else preventing reasonable access by the Village or its agents.
- ii. All water meters are to be installed and maintained in an area free of temperature extremes, to specifically include insulation from frost or possible freezing damage. Owner shall provide notice to the Board of any damaged or inoperable water meter. If it is necessary to repair or replace a water meter due to damage caused by Owner, its tenants, or agents, then the Owner shall bear all expenses for the repair or replacement, including all labor and material expended by the Village at a rate of one hundred thirty percent (130%) of the Utilities Operator's hourly rate based upon the maximum salary of the position, with a minimum of one-half hour charge.
- iii. The Village may install remote water meters for the purpose of facilitating water meter readings by Village personnel. The remote water meters shall be installed at the Village's expense and all remote reading technology (including software licenses) and remote reading equipment shall be maintained by the Village at its sole cost.

Meter pits, if permitted, are required to have approval of the Director. If approved, meter pits shall meet the specifications of the utility and be furnished, owned and maintained by the consumer. Water meters shall be installed as follows:

*Reference next page for Meter Instruction Drawing (# PST 2301)

B. WATER METER INSTALLATION IN OUTSIDE PIT

1. Meter pit cannot be under trailer.
2. Meter pit must be accessible at all times.
3. Box must be kept in good repair at all times.
4. Meter pit may be made of treated wood or equivalent wood with minimum thickness of 1 inch and insulate with 2-inch-thick Styrofoam or a manufactured Mueller/McCullough meter vault (for approved equal). Lid must be a removable cover with an opening size no smaller than 20 inches by 28 inches. (Drawing # PST 2250)

5. Meter pits located in low or wet areas must be designed to prevent water from filling pit.
6. Pipe from pit should be at least 34 inches underground or if above ground must be insulated so as not to freeze. That part of the service line that will be outside shall have heat tape running from the "in" side of the meter to the trailer with a fiberglass wrap (with windbreaker wrap on outside) from inside the box to the point of attachment to trailer.
7. Pit must have enough heat either from soil or heat tape (with thermostat or limit so as not to damage meter) to keep from freezing in winter. All meters damaged by freezing will be repaired or replaced at customer's expense.
8. All water meters shall have a solid electrical bonding "jumper" placed around them, conforming to the National Electric Code (N.E.C.) and all other applicable standards and regulations, unless the structure is served by a non-metallic water line.

*for Meter Pit reference (Drawer # PST 2401)

FEATURES

1. Rigid PVC material
2. Round styles
3. Setter anchored in place for stability
4. Aluminum bottom optional

Two diameters - 24" for single 1-1/2" displacement meter (13" length) - 27" for single 2" displacement meter (17" length).

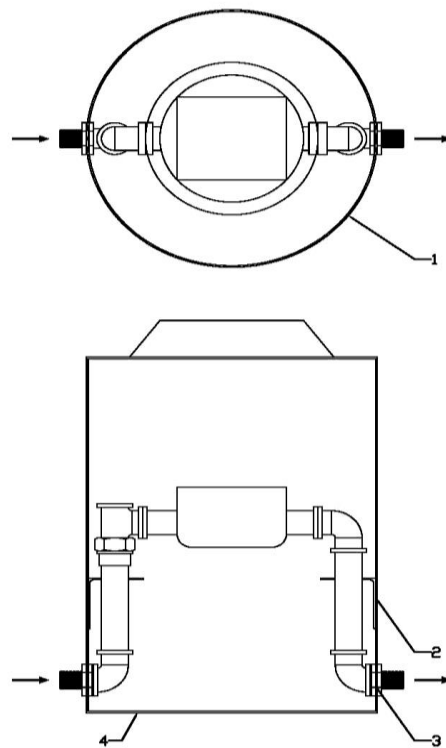


Figure 15 – Meter Pit Drawing, PST # 2250

THIS SPECIFICATION IS FOR THE INSTALLATION OF RESIDENTIAL 5/8 x 3/4 WATER METERS WITH REMOTE READER HEAD. ALL COMMERCIAL AND INDUSTRIAL INSTALLATIONS MUST BE APPROVED ON AN INDIVIDUAL BASIS AS PER THE GENERAL RULES AND REGULATIONS OF THE WATER DIVISION.

GENERAL SPECIFICATIONS

1. WATER METERS SHALL BE INSTALLED HORIZONTALLY.
 - A. NO LESS THAN FOURTEEN (14") IN. FROM THE FLOOR TO C/I OF METER.
 - B. NO MORE THAN FOURTY-EIGHT (48") IN. FROM THE FLOOR TO THE C/I OF METER.
 - C. NO LESS THAN SIX (6") IN. FROM THE ENTRANCE WALL TO C/I OF METER.
 - D. NO MORE THAN TWO (2') FT. FROM THE POINT OF ENTRANCE IN ANY DIRECTION.
 - E. NO LESS THAN TWENTY-FOUR (24") IN. OF ACCESSIBLE WORKING SPACE IN FRONT OF THE METER.
 - F. NO LESS THAN TWENTY-FOUR (24") IN. OF WORKING SPACE ABOVE THE METER.
 - G. NO LESS THAN SIX (6") IN. OF WORKING SPACE BELOW THE METER.
2. A VALVE SHALL BE INSTALLED ON BOTH SIDES OF THE METER.
3. REMOTE WATER METER HEAD TO BE LOCATED BESIDE ELECTRIC METER, A MINIMUM OF SIX (6") INCHES, AND A MAXIMUM OF TWENTY-FOUR (24") INCHES. (SEE ILLUSTRATION. LOCATION W, X, Y, OR Z.
4. ALL METER INSTALLATIONS SHALL BE PLANNED & CONSTRUCTED FOR REMOTE READING DEVICES. THE OWNER/OPERATOR IS RESPONSIBLE FOR CONTACTING THE DEPT. OF PUBLIC UTILITIES FOR LOCATION APPROVAL SO THAT THE REMOTE WIRE CONDUIT INSTALLATION CAN BE MADE PRIOR TO ENCLOSING WALLS, CEILINGS, ETC.

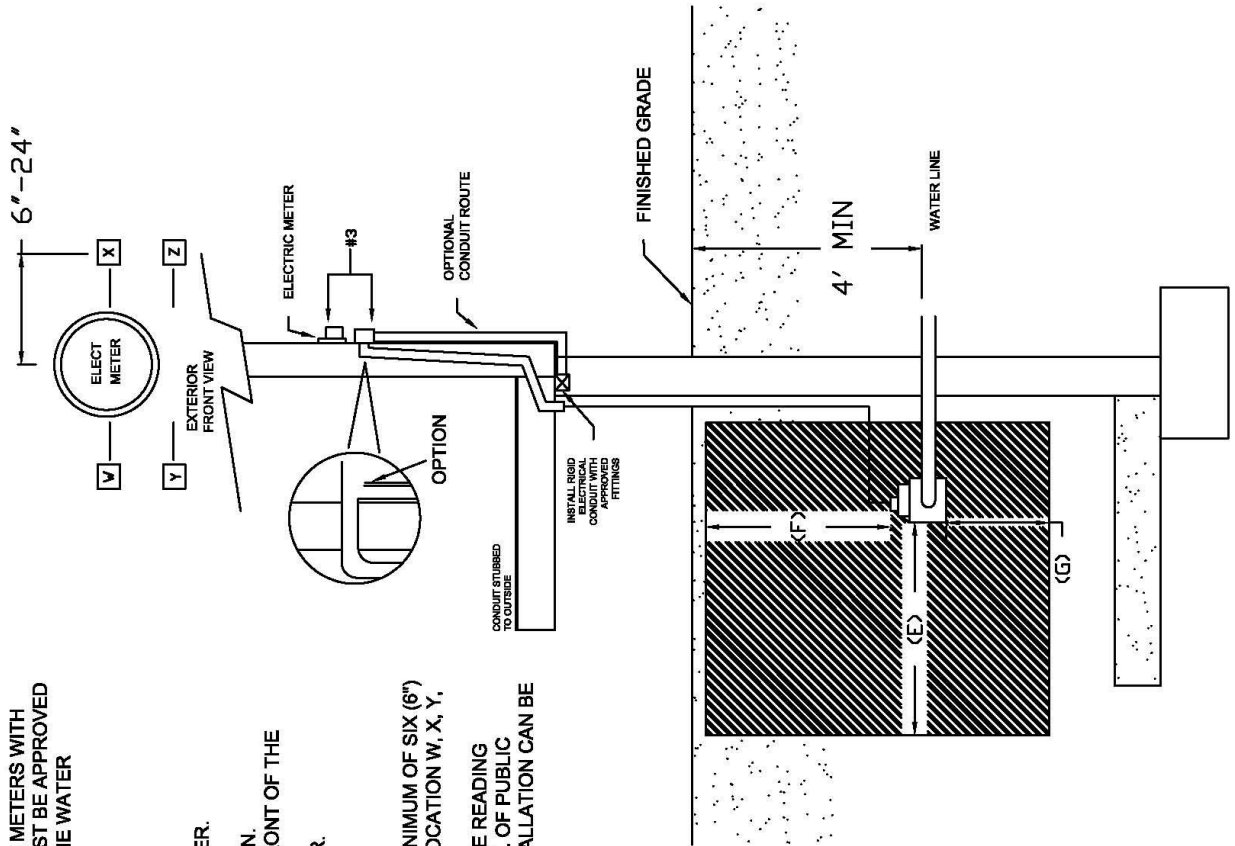
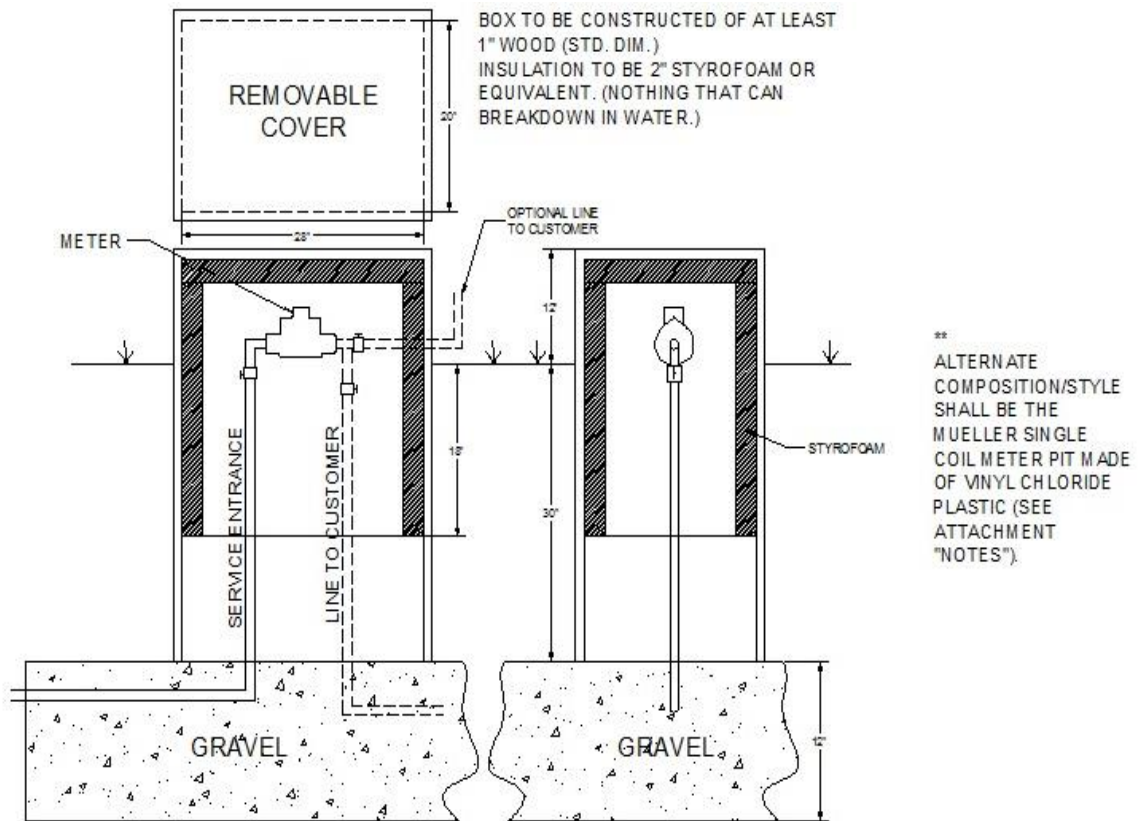


Figure 16 - Meter Instruction Drawing, PST # 2301



- NOTES:
1. METER PIT CANNOT BE UNDER TRAILER.
 2. METER PIT MUST BE ACCESSIBLE AT ALL TIMES.
 3. PIT MUST HAVE ENOUGH HEAT EITHER FROM SOIL OR HEAT TAPE (WITH THERMOSTAT OR LIMIT SO AS NOT TO DAMAGE METER) TO KEEP FROM FREEZING IN WINTER.
 4. BOX MUST BE KEPT IN GOOD REPAIR AT ALL TIMES.
 5. BOX SHOULD BE MADE OF TREATED WOOD OR EQUIVALENT.
 6. IN VERY WET SOIL OR LOW PLACES WHERE WATER IN PIT IS A PROBLEM, ALL DUE CARE MUST BE TAKEN TO LIMIT WATER PROBLEM.
 7. PIPE FROM PIT SHOULD BE AT LEAST 34" UNDERGROUND OR IF ABOVE GROUND, MUST BE PROPERLY (I.E. WELL) INSULATED SO AS NOT TO FREEZE. THE SECTION OF THE SERVICE LINE THAT WILL BE OUTSIDE, SHOULD HAVE THE HEAT TAPE RUN FROM THE "IN" SIDE OF THE METER TO THE TRAILER WITH A FIBERGLASS WRAP (WITH WIND BREAKER WRAP IN OUTSIDE) FROM INSIDE THE BOX TO THE POINT OF ATTACHMENT TO THE TRAILER.
 8. ALL METERS DAMAGED BY FREEZING WILL BE REPAIRED OR REPLACED AT CUSTOMER'S EXPENSE.
 9. INSULATION AROUND THE METER AND HEAT TAPE ARE PROPERTY OWNER'S RESPONSIBILITY. WATER DEPT. WILL NOT BE LIABLE FOR DAMAGE OF SUCH.

Figure 17 - Meter Pit Drawing with Detail, PST # 2401

SECTION V – Hydrostatic Water Line Testing

Ref: AWWA C-600-82, AWWA C-601

The developer or his contractor shall perform hydrostatic water line testing in accordance with A.W.W.A. Standard C-600-82 specified herein. Air pressure testing may be used to isolate problems but is not acceptable for final approval of water lines by the Burton Utilities. The developer or his contractor shall provide gauges for pressure tests. All water used for water line testing supplied from the Village water supply is at the expense of the developer.

A. PRESSURE TEST

1. Test Pressure

All newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the working pressure at the point of testing.

2. Restrictions

Test pressures shall:

2a. Not be less than 1.25 times the working pressure at the highest point along the test section.

2b. Not exceed pipe or thrust-restraint design pressures.

2c. Be of at least a 2-hour duration.

2d. Not vary by more than ± 5 psi (0.35 Bar) for the duration of the test.

2e. Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants. Note: Valves shall not be operated in either direction or differential pressure exceeding the rated pressure.

2f. Not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed resilient-seated gate valves or butterfly valves.

3. Pressurization

Each valved section of pipe shall be filled slowly with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the owner. The test pressure shall be based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. It is good practice to allow the system to stabilize at the test pressure before conducting the leakage test.

4. Air Removal

Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Village.

B. LEAKAGE TEST

The leakage test shall be conducted concurrently with the pressure test.

1. Leakage Defined

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within five (5) psi (0.35 Bar) of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

2. Allowable Leakage

No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{133200}$$

133200

In which L is the allowable leakage, in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge. In metric units.

$$L_m = \frac{SD\sqrt{P}}{2816}$$

2816

In which Lm is the allowable leakage, in liters per hour; S is the length of the pipe tested, in meters; D is the nominal diameter of the pipe in inches; and P is the test pressure in Bars. These formulas are based on an allowable leakage of 11.65 gpd, per mile, per inch nominal diameter at a pressure of 150 psi.

3. Allowable Leakage at Various Pressures

Allowable leakage at various pressures is shown in Table 6.

Allowable Leakage per 1000 ft (305 m) of Pipeline

Nominal Pipe Diameter - Inches

Average Test Pressure PSI (Bar)	3	4	6	8	10	12	14	16	18	20	24
250 (17)	.36	.47	.71	.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85
225 (16)	.34	.45	.68	.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70
200 (14)	.32	.43	.64	.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55
175 (12)	.30	.40	.59	.80	.99	1.19	1.39	1.59	1.79	1.98	2.38
150 (10)	.28	.37	.55	.74	.92	1.10	1.29	1.47	1.66	1.84	2.21
125 (9)	.25	.34	.50	.67	.84	1.01	1.18	1.34	1.51	1.68	2.01
100 (7)	.23	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50	1.80

Table 3 - Nominal Pipe Diameter

*-If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

- To obtain leakage in liters/hour, multiply the values in the table by 3.785.

4. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078gal/h/in. (0.0012 L/h/mm) of nominal valve size shall be allowed.
5. When hydrants are in the test section, the test shall be made against the closed hydrant.
6. Acceptance of installation: Acceptance shall be determined on the basis of allowable leakage. If any pipe laid discloses leakage greater than that specified in Section II.B., the contractor shall, at this own expense, locate and make repairs as necessary until the leakage is within the specified allowance.
7. All visible leaks are to be repaired regardless of the amount of leakage.

C. DISINFECTION

1. Newly installed or repaired water main shall be disinfected in accordance with AWWA C651 Standards. The forms of chlorine that may be used are liquid chlorine, sodium hypochlorite and calcium hypochlorite granules or tablets using the continuous feed, slug or tablet method. The continuous feed method is the most suitable for general applications. Following chlorination, the main should be flushed as soon as possible since prolonged exposure to high concentrations of chlorine might damage the asphaltic seal coat.

BASIC DISINFECTION PROCEDURE

The basic disinfection procedure consists of:

- a. Inspecting all materials to be used to ensure the integrity of the materials.
- b. Preventing contaminating materials from entering the water main during storage, construction or repair and noting potential contamination at the construction site.
- c. Removing by flushing or other means, those materials that may have entered the water main.
- d. Chlorinating any residual contamination that may remain and flushing the chlorinated water from the main.
- e. Protecting the existing distribution system from backflow caused by hydrostatic pressure test and disinfection procedures.
- f. Documenting that an adequate level of chlorine contacted each pipe to provide disinfection.
- g. Determining the bacteriological quality by laboratory test after disinfection.
- h. Final connection of the approved new water main to the active distribution system.

Upon filling of the water mains, the potable water shall be chlorinated so that after a 24 hours holding period in the main there will be a free chlorine residual of not less than 10 mg/l. After the holding period the heavily chlorinated water shall be flushed from the main until chlorine measurements show the concentration in the water leaving the main is below 2 mg/l. After flushing and before the new water is connected to the distributions system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from a sampling tap. No hose or fire hydrant shall be used in the collection of samples.

All samples shall be tested for bacteriological quality in accordance with Standard Methods for Examination of Water and Wastewater; and shall show the absence of coliform organisms. If the initial disinfection fails to produce satisfactory bacteriological results, the new main may be reflashed and shall be resampled. If check samples also fail, the main shall be rechlorinated by the continuous feed or slug method until satisfactory results are obtained. (You may use the above method or other AWWA approved disinfection methods).

SEWER SECTION

SEWER - GENERAL PIPE REGULATIONS

1. All Iron and steel products use for the construction alteration maintenance for repair of water systems or treatment works are to be AIS compliant and products that are produced in the United States. The American Iron and Steel (AIS) provision of the 2014 Consolidated Appropriations Act requires Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States. This requirement applies to projects for the construction, alteration, maintenance, or repair of a public water system or public treatment works, unless a waiver is granted or 1 of 3 of the following exceptions applies (non-availability, unreasonable cost or inconsistent with the public interest)."
2. All sewer lines shall be installed with a minimum of four (4) feet of cover.
3. Sizing of sanitary sewer mains to accommodate future growth shall be determined by Burton Utilities.
4. All costs for sewer system improvements, including necessary over-sizing, shall be borne by the developer.
5. All sewer mains shall be extended to the farthest property line of the developer to accommodate future growth. Said main extensions shall be at the expense of the developer.
6. All sewer installations shall be bedded in, and backfilled to 12 inches above the pipe with #57 bank run wash gravel or crushed stone. All trenches under paved areas shall be backfilled and properly compacted to finished grade with #411/304 limestone.
7. All sewer pipes, fittings, manholes, manhole castings, and lids, meter pits and other appurtenances and incidentals shall conform to specifications and standards as specified in the "WATER & SEWER PIPE STANDARDS" for the Burton Utilities.
8. All sanitary sewer service laterals from the main to the building shall be SDR 35 pipe conforming to ASTM D3034 material specification and ASTM D 3212 joint specification. Said sanitary sewer shall be a minimum of six (6) inches in diameter and installed with a minimum slope of one (1) percent. Where an existing four (4) inch "Y" branch is found, and deemed serviceable by the Village, the building sewer may be four (4) inches in diameter and installed with a minimum slope of two (2) percent.
9. All gravity sanitary sewer mains to be maintained by the Village shall be a minimum of eight (8) inches in diameter and be PVC pipe conforming to ASTM D3034 material specification and ASTM D 3212 joint specification of ASTM F 1803 and F949.

PVC gravity sanitary sewer pipe and fittings conforming to ASTM D3034 shall be allowed for sanitary sewers when the depth of cover is greater than four (4) feet and no more than twenty (20) feet and when the internal pipe diameter is less than or equal to ten (10) inches.

PVC gravity sanitary sewer pipe and fittings conforming to ASTM F 1803 and F949 shall be allowed for sanitary sewers greater than ten (10) inches in internal diameter and greater than twenty feet (20) in depth.

10. Force main sanitary sewers shall be constructed of Class 52 cement lined ductile cast iron pipe or PVC pipe and fittings, which shall conform to ASTM D2241, SDR21, 200 psi. They shall be a minimum of two (2) inches in diameter and have a minimum of four (4) feet of cover.
11. A manufacturer certificate that the pipe and fittings were manufactured and tested in accordance with the appropriate ASTM specification must accompany all PVC pipes and fittings. Said certificate shall be submitted to the Burton Utilities prior to the installation of said pipe.
12. All sanitary sewer manholes installed in, or tributary to, the Village of Burton sanitary sewer system shall be precast concrete meeting ASTM C-478 material specification and ASTM C-443 joint specification. They shall be installed at a maximum of 300 feet apart and at the end of all sewer mains and in changes in sewer line direction greater than 15 degrees.
13. All sanitary sewer manholes to be maintained by the Burton shall be covered with Neenah R-1787 or 1785 manhole frame and lid as per Section VI herein. (TABLE 11).
14. Grease traps must be installed according to Geauga County Health Department specifications when required. Detailed drawing of minimum design requirements attached. (Reference next page for drawing # PST 2401A).

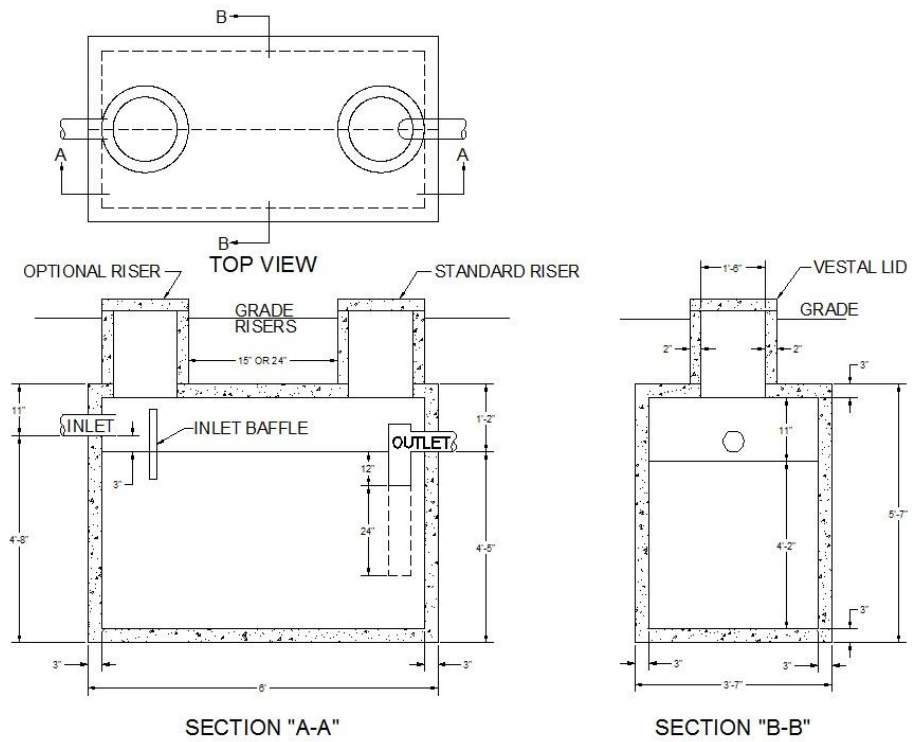


Figure 18- 500 Gallon Grease Trap, PST # 2401A (1 of 2)

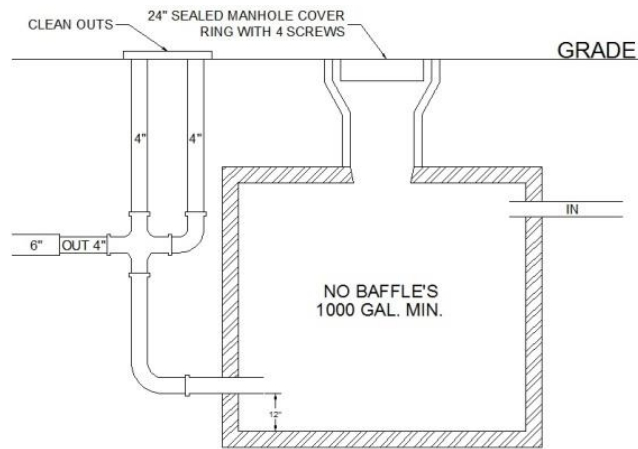


Figure 19 – Grease Trap Interceptor, PST # 2401 A (2 of 2)

SECTION VI – Sanitary Sewer Pipe

SANITARY SEWER PIPE (GRAVITY)

	MATERIAL SPECIFICATION	JOINT SPECIFICATION
A. VITIRIFIED CLAY SEWER MAINS AND LATERALS	ASTM C- 700	ASTM C – 425
B. TYPE PSM POLYVINYL CHLORIDE (PVC)	ASTM D – 3034	ASTM D – 3212
C. MAIN LATERAL SEWER PIPE < 18 INCHES		
D. PVC SANITARY SEWER & FITTINGS > 18 INCHES	ASTM F – 1803 ASTM F - 949	

Table 4 - Sanitary Sewer Pipe (Gravity)

Minimum Wall Thickness
4 " - .120
6" - .180
8" - .240
10" - .300
12" - .360
15" - .437

Table 5 - Minimum Wall Thickness - Sanitary Sewer Pipe

SANITARY SEWER FORCE MAIN PIPE

A. POLYVINYL CHLORIDE (PVC) PIPE, SDR – 21	ASTM D – 2241
B. POLYVINYL CHLORIDE PRESSURE PIPE	AWWA C – 900
C. CLASS 52 DUCTILE CAST IRON PIPE	ANSI – A21.51

Table 6 - Sanitary Sewer Force Main Pipes

SANITARY SEWER MANHOLES, CASTINGS & LIDS

	MATERIAL SPECIFICATION	JOINT SPECIFICATION
A. PRECAST CONCRETE SANITARY SEWER MANHOLES	ASTM C – 478	ASTM C - 443
B. MANHOLE FRAMES & LIDS, NEENAH R-1762 WITH SOLID LID, TOTAL WEIGHT 350 LBS.		

Table 7 - Sanitary Sewer Manholes, Castings & Lids

SECTION VII – Specifications for Manhole Frames, Lids and Adjusting Rings

This specification is for Ferrous Castings. Materials used in the manufacture of castings shall conform to ASTM, AASHTO, ASA, MIL, AMS or Federal Specifications for Gray Iron or other applicable standards. They shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion or other defects. They shall be smooth and well cleaned by shot blasting. They shall be coated with asphalt paint, which shall result in a smooth coating, tough and tenacious when cold, not tacky and brittle.

A. GENERAL SPECIFICATIONS

All castings shall be manufactured true to pattern; component parts shall fit together in a satisfactory manner. Round frames and covers shall have machined bearing surfaces to prevent rocking and rattling under traffic. As a minimum, the castings shall conform to ASTM A 48, Class 30 with tensile strength 30,000 pounds per square inch.

The lids shall have cast in them for identification, the words SANITARY SEWER.

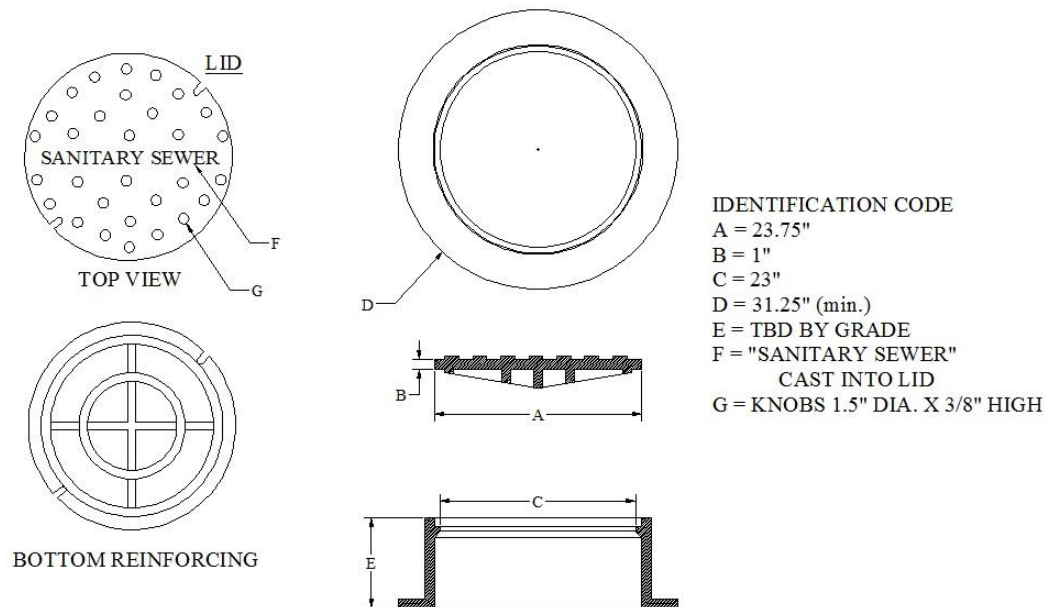


Figure 20 - Sanitary Cast Iron Lids, PST # 2501

B. SUPPLIERS OF MANHOLE FRAMES AND LIDS

Suppliers include the following:

NAMES OF SUPPLIER	NUMBER -	FRAME AND LID
Nennah Foundry	R-1787	4 ½" rise
East Jordan Iron Works	R-1785	9" rise
Item 1 – Manhole Frame with Solid Lid, Total Weight 350 lbs.		

Table 8 - Suppliers of Manhole Frames and Lids

C. MANHOLE RISERS

Manhole risers shall be one of the adjustable type or solid type and must be fitted properly to the existing casting and lid. Riser rings shall consist of domestic A-36 steel ¾" thickness steel inner and domestic A-36 steel ½" thickness outer ring. Certified welders shall perform all welds in accordance with AWS D1.5 Bridge Code. The riser ring shall be anchored to the manhole frame to prevent any movement from traffic loads with (3) 1/2" # 5 cone head set screws or bolts. The adjustment device shall be fabricated from stainless steel, shall be capable of adjustment +/-3/8" from nominal. The manhole adjustment ring shall fit within the existing casting without interference and the manhole lid shall have bearing on all the surface of the inner ring to prevent rocking from occurring. The lid shall be removable without binding. The inner and outer ring shall be securely welded to prevent any differential movement between the inner and outer rings under traffic loads and shall be fabricated to +/- 1/16" concentricity. The outer riser shall have an inside diameter no greater than 3/16" larger than the outside diameter of the manhole lid and shall not be greater than 4" in height. All materials shall be bituminous asphalt coated. (See Next Page for Drawing # PST 2601).

All grade adjustments using riser rings shall be approved by the Village and fit properly. No more than 2 adjusting rings may be used per manhole frame.

SECTION VIII – Specification for Sanitary Sewer Drop Manholes

This specification is for sanitary sewer drop manholes. Drop manholes may be installed in, or tributary to, the Village of Burton sanitary sewer system, only when approved by the Department of Public Utilities. They shall conform to design criteria contained therein.

Drop manholes shall not be utilized for immediate changes in sewer elevation of less than two (2) feet. The drop pipe shall be, as a minimum, 8" in diameter but it shall not be of lesser diameter than the influent line, which it serves.

For manholes constructed prior to January 1, 1981, which are served an effluent line with a diameter smaller than 8", the Burton Utilities may consider influent lines and drop pipes of less than 8" diameter but not less than the diameter of the effluent line.

Installation of drop manhole installations shall be in the presence of a qualified inspector designated by the Department of Public Utilities.

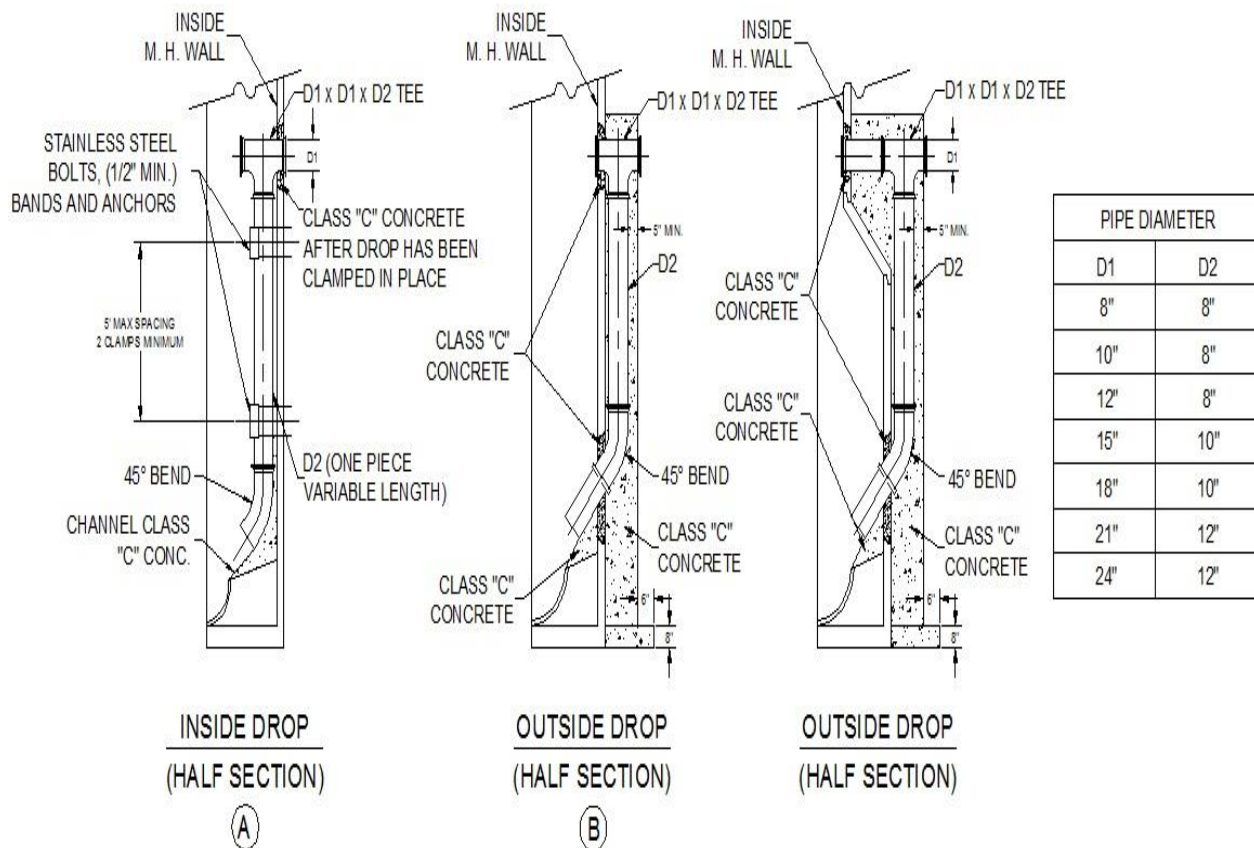
Drop manholes are used to provide for significant changes in grade or elevation resulting from the topography of the area. These structures should be used as infrequently as possible since they are a source of high

turbulence in sewage flow. Where hydrogen sulfide gas (H₂S) is present in sewage, agitation turbulence developed by drop manhole can cause the H₂S gas to be released, resulting in severe odor problems and corrosion of the manhole structure.

Two types of drop manholes are currently accepted.

- 1) Inside drop manholes (Drawing # PST 2701, item A)
- 2) Outside drop manholes (Drawing # PST 2701, item B)

The inside drop is the preferred method because of its economic and maintenance benefits. Reference Drawing # PST 2701



1. DROP IS REQUIRED WHEN INVERT DIFFERENTIAL IS 24" OR GREATER.
2. HEIGHT OF DROP PIPE IS TO BE SHOWN ON THE PLANS OR WILL BE DETERMINED AT THE TIME OF CONSTRUCTION.
3. WHERE CALLED FOR, AND UNLESS OTHERWISE REQUIRED BY THE PLANS, THE OUTSIDE DROP WILL BE CONSTRUCTED WITH NEW MANHOLES.
4. MATERIALS FOR THE TEE, DROP PIPE, AND THE BEND SHALL BE OF ONE TYPE AND BE ONE OF THE FOLLOWING- INSIDE DROP: CAST IRON OR PVC; OUTSIDE DROP: C.I. SOIL, VIT. SEWER, OR PVC.
5. OUTSIDE DROP PIPES REQUIRE A 5" THICK (MINIMUM) CLASS "C" CONCRETE ENCASUREMENT ON THREE SIDES OF PIPE AND TIED TO MANHOLE WALL WITH 5/8" - "U" RODS X 6" LONG @12".
6. INSIDE DROP MAY BE USED ON NEW CONSTRUCTION PROVIDED THAT 60" BASE AND RISER SECTIONS ARE USED.

Figure 21 - Sanitary Sewer Drop Manholes, PST # 2701

SECTION IX – Service Connections

A. PLANNED SERVICE CONNECTIONS

All service connections, installed as a part of new sanitary sewer main installation, shall be by means of an approved tee, a minimum of six (6) inches in internal diameter. Said service connection shall be extended a minimum of three (3) feet into the property to be served, capped watertight, and the termination location indicated by a treated 2 X 2 marker extended a minimum of one foot above finished grade.

B. UNPLANNED SERVICE CONNECTIONS

All unplanned service connection methods must be approved by the Inspector and are at the expense of the Contractor. They shall be made in the field under observation of the Inspector. Service saddles may be installed, either gasketed and clamped or solvent cemented. When a field cut-in service connection is required, the following precautions should be observed.

1. Carefully cut the opening for the type of fitting to be used.
2. Prevent entrance of foreign material into cut-in pipe opening.
3. Use proper fitting and procedure for installing the field connection.
4. After curing for 24 hours, bed and backfill properly all pipe and fittings. (Note: Solvent welded fittings will gain 50% of full strength after 24 hours of curing time.)
5. Be sure and use ASTM D3034 saddles. Do not confuse with D3033.

C. CONNECTIONS

Connections to pipe of different materials shall be made with approved adapters. For taps into all known approved solid wall, profile and closed profile pipe. INSERTA TEE fittings, shall be used. Installation must be made according to INSERTA FITTINGS CO. installation procedures and using approved lubricants. (Reference next Drawing # PST 2801).

D. INSERTA-TEE INSTALLATION PROCEDURE

Use Hole Saw Core Bits for PVC, Ribbed, and Polyethylene pipe. Use Diamond Core Bits for Concrete, Clay, D.I. and Fiberglass Pipe.

TOOLS REQUIRED

1. Hand held drill with hole saws recommended for 4", 6", & 8" INSERTA TEES. Tie down coring machine recommended for 10" X 12" INSERTA TEES and all diamond bits.
2.

BITS	INSERTA TEE size	Bit (hole) Diameter
	4"	4 1/2"
	6"	6 1/2"
	8"	8 3/4"
	10"	10 7/8"
	12"	12 7/8"
	15"	15 13/16"
3. 6 lb. Hammer and 2" X 4" board.
4. Bottle of INSERTA TEE solution supplied with order.

INSTALLATION PROCEDURE

1. Core the proper size hole. See bit diameters above.
2. Insert the rubber sleeve into the cored hole with the GOLD VERTICAL LINE ON THE RUBBER SLEEVE facing to the side of the mainline. The upper segment should be on top of the wall or rib and the lower segment (PVC, Ribbed, or Polyethylene pipe only) should be on the inside of the pipe.
3. Apply the INSERTA TEE solution supplied to the inside of the rubber sleeve and outside of the PVC hub adapter. CAUTION! DO NOT use on oil based lubricant.
4. Place the PVC hub adapter into the rubber sleeve. Make sure that the RED VERTICAL LINE ON THE PVC HUB ADAPTER IS IN LINE WITH THE GOLD VERTICAL LINE ON THE RUBBER SLEEVE.
5. Place the 2" X 4" board on top of the PVC hub adapter.
6. The RED HORIZONTAL LINE AT THE TOP OF THE HUB ADAPTER is a depth mark. This tells the installer just how far to drive the adapter into the rubber sleeve. Using the board and the hammer drive the PVC hub adapter into the rubber sleeve to where the HORIZONTAL RED LINE ON THE PVC HUB ADAPTER MEETS THE TOP OF THE RUBBER SLEEVE.
7. Install the stainless band around the top of the rubber sleeve and tighten down.
8. Install side service pipe in normal manner.

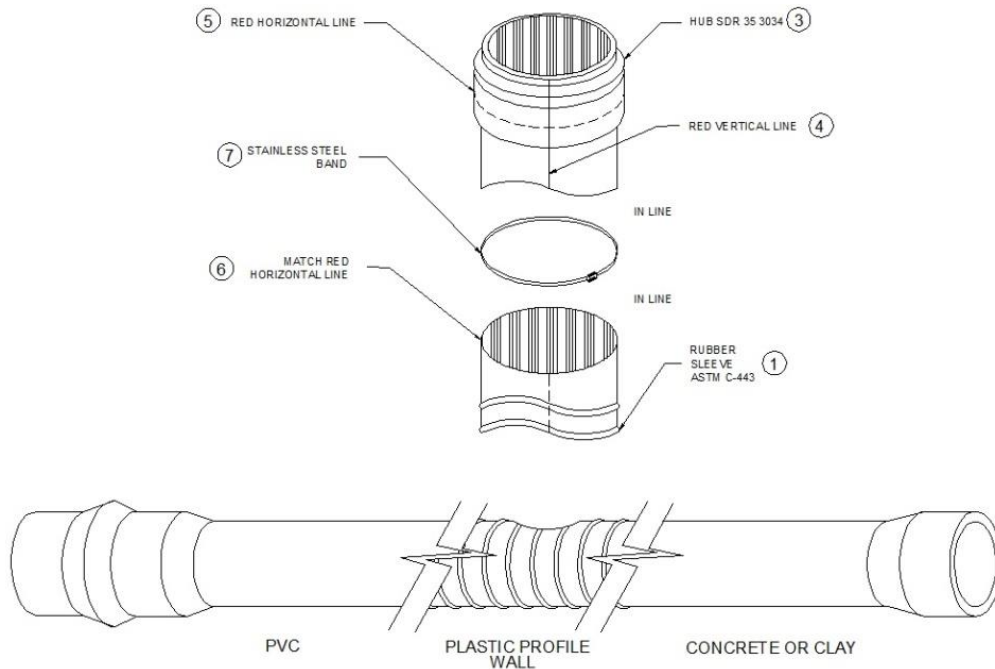


Figure 22 –Sewer Pipe Inserta-Tee, PST # 2801

SECTION X –Specification for Polyvinyl Chloride (PVC) Sewer Pipe and Fittings for Sanitary Sewer Installations

A. POLYVINYL CHLORIDE (PVC) PIPE

PVC sanitary sewer pipe and fittings conforming to ASTM D3034 shall be allowed for sanitary sewers when the depth of cover is greater than four (4) feet and no more than twenty (20) feet and when the internal pipe diameter is less than or equal to ten (10) inches.

PVC sanitary sewer pipe and fittings conforming to ASTM F 1803 and F 949 shall be allowed for sanitary sewers greater than ten (10) inches in internal diameter and greater than twenty feet (20) in depth.

1. **Home Mark**
All pipe spigots shall have a “home” mark to facilitate joint closure.
2. **Fittings**
PVC fittings shall be factory made and provided with joints of proper design to connect to the pipe or approved adapters shall be furnished to connect the pipe to the fittings. Approved adapters shall be provided for connection to pipes of different materials. All joints and fittings shall be formed to provide a leak-free and easily assembled system.
3. **Lubricant**
The proper lubricant recommended by the manufacturer shall be used. Lubricants that contain petroleum oils or vegetable oils may promote bacterial growth causing damage to the gaskets or pipe and are not approved.
4. **Certificate**
A manufacturer’s certificate that the PVC material and pipe was manufactured and tested in accordance with the appropriate ASTM specification shall be provided to the inspector prior to installation of the pipe.
5. **Manufacturer’s Installation Instructions**
All PVC pipes delivered to the job site must be accompanied by the manufacturer’s installation instructions and guidelines.
6. **Straightness**
Pipe intended to be straight shall have a maximum deviation from straightness of 1/16 inch per lineal foot when measured in accordance with ASTM D2122.
7. **Prior Inspection**
No pipe and fittings may be installed unless approved by the Inspector immediately prior to installation and all rejected pieces must be completely removed from the work site. Pipe acceptable to the Inspector shall be substituted for rejected pieces at the developers or owners expense. No repairs of pipe or fittings will be allowed; undamaged lengths of straight pipe may be salvaged by neatly sawing off the damaged portion of the pipe and re-beveling as described in Section XI.
8. **Exposure to Sunlight**
The contractor shall take measures to protect the pipe from prolonged exposure to heat or direct sunlight (ultraviolet rays).

B. PIPE JOINTS

PVC sanitary sewer pipe joints shall be elastomerically gasketed conforming to ASTM D3212 push-on type.

1. *Joint Testing*

Testing of PVC sanitary sewer pipe joints, when so directed by the inspector, shall be performed in accordance with ASTM D3212 for gasketed joints, with modification as specified below. The Contractor shall provide all equipment necessary to conduct the pipe joint test.

2. *Test Specimens*

The inspector may initially and periodically select random sewer pipe for test purposes. The tests shall be performed on not less than two specimens and not less than one (1) percent of the total pipe length of each size and joint type required for the project.

SECTION XI – Isolation of Sanitary Sewer Extensions

A watertight plug approved by the Burton Utilities shall be installed by the Owner or his contractor at his point of connection to the existing sanitary sewer system. The plug shall be put in place as soon as the sewer extension work commences and shall remain in place until all improvements are approved by the Burton Utilities and said development is formally accepted. Approval by the Burton Utilities consists of the following various stages and/or items as follows:

- Plan submittal to Village of Burton for review and approval.
- Payment of all applicable deposits, fees, etc.
- Construction inspection and approval prior to backfilling trench.
- Sewer line cleaning, testing and approval.
- All manholes brought to finished grade and properly sealed and grouted.
- All sewer improvements have been constructed as per the requirements of the approved construction plans and specifications and have passed inspection and testing. Refer to Section XII, Inspection & Testing.

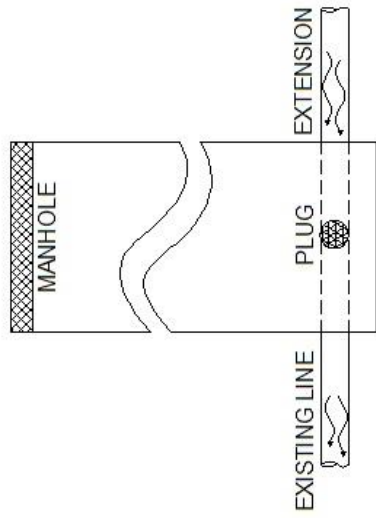
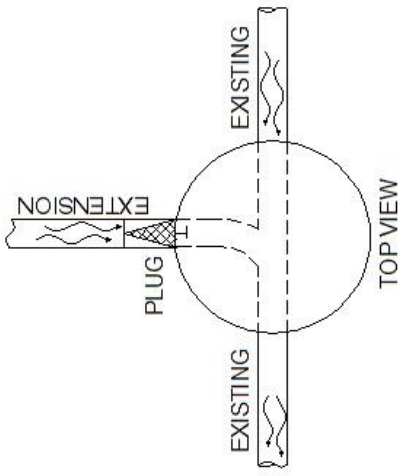


EXHIBIT B PLAN
(UPSTREAM SIDE PLUGGED)



Figure 23 - Sewer Line Plug Installation, PST # 2901

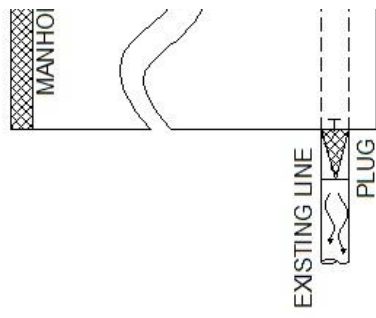
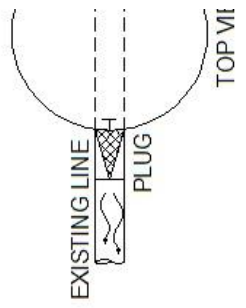


EXHIBIT A
(DOWNSTREAM SIDE PLUGGED)

SECTION XII – Sanitary Sewer Pipe Installation

A. SAFETY

For the security and safety of persons in and adjacent to trenches or construction operations, the safety regulations of the appropriate federal, state and local agency(s) shall be adhered to.

B. HANDLING

Pipe, fittings, manhole sections, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe and fittings shall be lowered gently into the trench. The inspector will reject any pipe or fittings dropped into the trench.

C. PROTECTION OF TREES

Special care shall be taken to avoid damage to trees and their root systems. Any damage incurred by trees, shrubs or lawns are the sole responsibility of the contractor.

D. DE-WATERING

Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage in accordance with the Ohio Environmental Protection Agency's (OEPA) requirements contained in the National Pollutant Discharge Elimination System (NPDES) program. Trench water may not be conveyed to a sanitary sewer at any time and shall be conveyed without causing any property damage.

E. CONSTRUCTION EQUIPMENT

Where sewers are located in or adjacent to pavements, all digging, backfilling and materials handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavements or walkways. Any damages incurred to pavements, sidewalks, etc., is the sole responsibility of the contractor.

F. EXCAVATION AND CONSTRUCTION MATERIALS

All excavated material and all construction materials used in prosecution of the work shall be deposited so as not to endanger the work or workers, create unnecessary annoyance to the public or interfere with natural drainage courses. During the progress of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner.

G. TRENCH SUPPORTS

Unsupported open cuts for sanitary sewers shall not be permitted where trenching may cause unnecessary damage to street or sidewalk pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the Contractor shall, as his expenses, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property. In lieu of removing all the sheeting, the Contractor may cut off the sheet two (2) feet above the top of the pipe and remove the upper portion. If all the sheeting is to be removed, it shall be removed without causing damage to the pipe.

H. NOISE DUST AND ODOR CONTROL

The Contractor's construction activities shall be conducted so as to eliminate all unnecessary noise, dust and odors.

I. ALIGNMENT AND GRADE

Proper alignment and grade is the responsibility of the Contractor and he shall control his line and grade by use of:

1. Batter Boards

If batter boards are utilized, line and grade stakes shall be placed at regular intervals, not to exceed 25 feet, at some convenient offset from the centerline of the pipe. Batter boards shall be carefully placed immediately following the excavating equipment and a continuous check on trench depth shall be maintained. Suitable equipment, supplied by the contractor, for measuring from a line drawn taut over the batter boards shall be utilized. Such line shall be carefully located on the batter boards on the centerline of the pipe. In no event will pipe be laid unless a minimum of three batter boards are in place and checked.

2. Laser Beam

Prior to the use of a laser beam, the contractor shall furnish a complete description of all equipment to be used, methods of use and proof of competency of the operator. If approved by the inspector, the Contractor may elect to use a laser beam as an alternative to utilizing batter boards for horizontal and vertical control of the sewer. If a laser beam is to be utilized, line and grade stakes shall be placed at 25 feet and 50 feet from the downstream manhole and then placed at every 100-foot station to the next manhole. The laser beam shall be set up in such a manner that the alignment of the beam is through the pipe directly on the centerline of the pipe or outside the pipe directly above and parallel to the centerline of the pipe.

If the laser unit is set up on the centerline of the pipe, a blower shall be used to provide positive continuous air circulation within the pipe. A target shall be established on line and grade to provide a method of checking the setting of the laser beam as construction progresses. The Contractor shall provide means to ensure the grade pole is plumb when checking pipe grade. The grade pole shall be set on the invert of the pipe when checking alignment and grade. Should, in the opinion of the inspector, the laser method be found to be unsatisfactory, the contractor shall discontinue its use and complete the job using batter boards.

J. PIPE JOINT INSTALLATION

The preparation and assembly of the gasketed joint shall be performed as recommended by the pipe manufacturer. The elastomeric gaskets may be supplied separately in cartons or pre-positioned in the bell joint at the factory. When gaskets are color coded, be sure to consult the pipe manufacturers literature for the significance.

Prior to assembly, clean the gasket and bell interior, especially the groove area and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation. Use on gaskets which are designed for and supplied with the pipe. Insert them as instructed by the manufacturers literature.

Good alignment of the pipes is essential for ease of assembly. Align the spigot to the bell and then insert the spigot into the bell until it contracts the gasket uniformly. Do not swing or “stab” the joint; that is, do not suspend the pipe and swing it into the bell. If undue resistance to insertion of the pipe end is encountered, or the “home” mark does not position properly, disassemble the joint and check the position and condition of the gasket. If it is twisted or pushed out of its seat (fish mouthed), inspect components, repair or replace damaged items, clean the components, and repeat the assembly steps. Be sure both pipes are in concentric alignment. If the gasket was not twisted or out of position, verify proper location of the “home” mark. If not in the proper location, relocate the position of the “home” mark.

K. FIELD CUTTING

To join field-cut pipe, it is necessary to first prepare the pipe ends. Square cuts are essential for proper assembly. Cut the pipes with a hacksaw, handsaw or a power handsaw with a steel blade or abrasive disc. The pipe should be marked around its entire circumference to assure a square cut. Use a factory furnished beveled end as a guide for proper bevel angle, and depth plus the distance to the “home” mark. The pipe can be beveled using a pipe beveling tool, wood rasp, portable sander or abrasive disc. Round off any sharp edges on the leading edge of the bevel with a pocketknife or file.

L. TRENCH EXCAVATION AND BOTTOM PREPARATION

1. Trench Bottom

The trench bottom shall be constructed to provide a firm, stable and uniform support for the full length of pipe. Bell holes shall be provided at each joint to permit proper joint assembly and alignment. The trench shall be excavated not less than six (6) inches or more than 12 inches below the barrel of the pipe. All loose material shall be removed from the trench bottom. Any part of the trench bottom excavated below grade shall be backfilled to grade and should be compacted as required to provide firm pipe support. When an unstable subgrade condition is encountered which will provide inadequate pipe support, additional trench depth shall be excavated and refilled with suitable foundation material. Ledge rock, boulders and large stones should be removed to provide a minimum of six (6) inches of suitable material on all sides of the pipe and fittings.

2. Trench Width

Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

2a. Earth excavation

Minimum Outside diameter of pipe barrel plus 8 inches, i.e. 4 inches on each side.

Maximum Nominal pipe diameter plus 24 inches.

2b. *Rock excavation*

Minimum 24 inches or less; outside diameter plus 12 inches larger than 24" outside diameter plus 18 inches.

Maximum Nominal pipe diameter plus 24 inches.

3. Foundation

All sanitary sewers are to be built on a good foundation. If, in the inspector's opinion, the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and the same filled with suitable material. Any excavation and the restoration of the foundation below the trench bottom shall be at the expense of the Contractor.

M. PIPE BEDDING AND INSTALLATION

1. Pipe Bedding

Bedding is required primarily to bring the trench bottom up to grade. After preparation of the trench bottom, a pipe bed shall be prepared using crushed stone or crushed gravel meeting the following requirements:

Nominal Pipe Size	AASHTO M43 SIZE
Less than 15 inches	67, 7 or 8
15 inches to 30 inches	6 or 67
Greater than 30 inches	57 or 67

Table 9 - Pipe Bedding

The bedding material shall be placed to provide uniform and adequate longitudinal support under all surfaces of the pipe and spread the full width of the trench bottom. A compacted depth of at least six (6) inches is required. The pipe installer shall carefully prepare the bed for the pipe both from a line and grade standpoint.

2. Haunching

The most important factor affecting pipe performance and deflection is the haunching material and its density. The bedding material shall be placed so as to fill the space under the lowest part of the pipe by slicing under the haunches with a shovel. Where coarse materials have been used for bedding, the same coarse material shall also be used for haunching. After the pipe is laid, aligned and graded, the bedding material shall be brought halfway on the pipe (springline) for the full width of the trench.

3. Pipe Laying

The laying of the pipe on the prepared bed shall commence from the lowest point, with spigot ends pointing in the direction of flow. All pipes shall be laid true to line and grade. They shall be carefully centered so that when laid, they will form a sewer with a uniform invert. A pipe plug shall be used to prevent the entrance of foreign material whenever pipe-laying operations are not in progress.

N. TRENCH BACKFILL

1. Initial Backfill

All trench excavations shall be backfilled immediately after the pipe has been laid and inspected. Initial backfill shall be completed to a point twelve (12) inches over the top of the

pipe. No tamping of the initial backfill directly over the top of the pipe is permitted as it could disturb the embedded pipe.

2. Initial Backfill Material

Shall be #304 gravel, crushed gravel, or crushed stone meeting the following grading indicated in Table 12 below:

INITIAL BACKFILL MATERIAL: 310	
Sieve	Total Percent Passing
2 ½	100
1 inch	70% to 100%
No. 4 (3/16 inch)	25% to 100%
No. 40	10% to 50%
No. 200	5% to 15%

Table 10- Initial Back fill Material: 310

The fraction passing a no. 40 sieve shall have a liquid limit not great than 30 and a plasticity index not greater than six (6).

3. Final Backfill

Unless under paved areas, from 12 inches above the pipe barrel to the surface, excavated trench material may be used as backfill material. The material used in the final backfilling operation need not be as carefully selected as the bedding, haunching and initial backfill but no material shall be used for backfill that contains frozen earth. Debris, large stones, or rocks, or earth with an exceptionally high void content. The Contractor may use mechanical equipment to place the backfill but this shall be done in such a manner that the material does not free fall, but shall be so placed that it will flow onto the previously placed material. The Contractor shall consolidate the backfill in such a manner as will insure the minimum possible settlement and the least interference with traffic. No compacting of the backfill with mechanical equipment such as wheeled vehicles will be permitted unless sufficient cover (minimum of four (4) feet is provided over the pipe to prevent damage to the pipe.

4. Backfilling Under pavements Driveways, etc

When backfilling under pavements, driveways, sidewalks, etc., granular material meeting the requirements of table 13, page 58, shall be used all the way to the surface. The trench shall be backfilled with granular material so placed and compacted as to make a satisfactory pavement subgrade and prevent further settlement. Granular material shall be placed in layers of approximately six (6) inches in thickness and compacted with mechanical tampers. It may be compacted with water if satisfactory drainage is provided for the free water. All backfilling under Village streets must be approved by the Village.

5. Casings

PVC sanitary sewer pipe installed under highways, etc., may be installed in casings if required by the Director. Such installations may be necessary to:

- 5a. Prevent damage to structures caused by soil erosion or settlement in the line installation effected by line failure or leakage.
- 5b. Permit economical pipe removal and replacement in the future.
- 5c. Accommodate regulations or requirements imposed by public or private owners of property under which the pipe is installed.
- 5d. Permit boring rather than excavation where open cutting would be impractical or prohibitively expensive.

CASING SIZES				
Nominal Pipe Size (Diameter in inches)	Casing Size (Inside Diameter)		Maximum Skid Support Spacing	
	inches	millimeters	feet	meters
4	8-10	203-254	4.7	1.4
6	10-12	254-305	6.3	1.9
8	14-16	356-406	7.4	2.3
10	16-18	406-457	8.5	2.6

The required spacing of support skids for various sizes of pipe is indicated below in Table 14: **Table 11 - Casing Sizes**

When PVC pipe is installed in casings, skids must be used to prevent damage to pipe and bell joints during installation and to provide proper long-term line support. PVC pipe in casings should not rest on bells. Skids should properly position the pipe in the casing. Skids may extend the full length of the pipe, with the exception of the bell and shall be p

ressure treated lumber and be fastened securely to the pipe with stainless steel strapping or clamps.

Below Drawing # PST 3001 shows a typical skid arrangement.

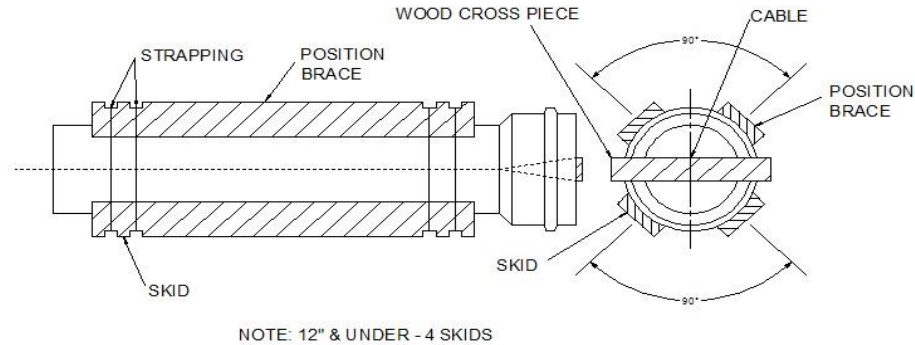


Figure 24- Typical Skid Arrangement, PST # 3001

6. **Bulkheads**
The Contractor shall place bulkheads of clay soil across the trench at 100-foot intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately three (3) feet in a direction parallel to the pipe and shall extend from the bottom of the trench to a height of 12 inches above the top of the pipe barrel.
7. **Surface Conditions**
The trench surface shall be periodically attended to during the course of the project. The trench shall be maintained in a safe condition and shall not interfere with natural drainage.
0. **CONSTRUCTION AREA**
The Contractor shall be responsible for the maintenance of all areas disturbed by construction for a period of one (1) year from the date of acceptance by the Village.

SECTION XIII – Inspection and Testing

Reference – Ten State Standards, 1990

- A. **CLEANING**
Prior to the plug being pulled, the contractor shall pump as much of the accumulated water as possible from the new sanitary sewers. A high velocity sewer-cleaning machine shall then be used to clean the new sewers. Following the cleaning the sewer shall be tested by the appropriate method. (Note: Clean water shall be used for the exfiltration test at the expense of the contractor).

B. LEAKAGE TEST PROCEDURE

1. Infiltration Test

The contractor must use an infiltration test when the height of the groundwater table is two (2) feet or more above the top of the pipe barrel, including house services, at the highest point of the section being tested. The amount of infiltration may be measured by means of a weir located in the downstream manhole and shall not exceed the allowable leakage. The inlet end of the upstream manhole shall be securely sealed. The test head shall be maintained for a period of not less than 24 hours before the weir measurement is made.

2. Exfiltration Test

The contractor must use an exfiltration test when the groundwater conditions defined in Section XII, B 1 (preceding paragraph) are not present. The inlet ends of the upstream and downstream manholes shall be closed with a watertight plug. The sewer along with the upstream manhole shall be filled with clean water until the elevation of the water in the upstream manhole is two (2) feet higher than the top of the pipe barrel, including house services or two (2) feet above the existing groundwater in the trench, whichever is the higher elevation. The entire length of section to be tested shall be filled and maintained full of water for a period of 24 hours prior to the start of the test. If the water level in the upper manhole has dropped during this 24-hour period, the level shall be raised to the test elevation mark prior to the measurement of leakage. The exfiltration will be determined by measuring the amount of water required to maintain the above stated water elevation for a period of one (1) hour from the start of the test. The allowable leakage is based on a maximum difference in elevation of eight (8) feet between the level of water at the upper manhole and the invert of the pipe being tested in the lower manhole. If the difference in elevation exceeds eight (8) feet, the allowable leakage shall be increased 5% for each one (1) foot in excess of eight (8) feet.

3. Sanitary Force Mains

A force main leakage test section shall be any length the contractor elects to test. The section of force main to be tested shall be backfilled prior to testing. Each valved section of force main shall be slowly filled with clean water and the specified test pressure shall be applied by means of a pump connected to the force main in a manner satisfactory to the inspector. Before applying the specified test pressure, all air shall be expelled from the force main. The water pressure shall be brought up to 100 pounds per square inch unless otherwise noted on the plans or in the specifications and maintained for at least two (2) hours. Leakage will be determined by measuring the quantity of water to be supplied to maintain the specified test pressure.

4. Water

The developer or his contractor shall perform water leakage tests as specified herein. Air leakage tests may be used to isolate problems but are not acceptable for final approval of sewer lines by the Department of Public Utilities. The developer or his contractor shall provide gauges for force main tests. All water used for sanitary sewer testing supplied from the Village water supply is at the expense of the developer. A leakage test section for sanitary sewers shall be from the inlet end of the downstream manhole to the inlet end of the upstream manhole, including the upstream manhole and all house services.

C. LEAKAGE ALLOWANCE

1. Gravity Sewers

The maximum leakage allowance for all gravity sanitary sewers shall be 100 gallons per inch diameter per mile of pipe per 24 hours.

2. Force Mains

The maximum leakage allowance for all force mains is 25 gallons per inch diameter per miles of pipe per 24 hours.

D. DEFLECTION TEST

Deflection of the pipe diameter shall not exceed five (5) percent. All installed pipe shall be tested for deflection 30 days or more after the trench has been backfilled properly to finished grade. The method of testing shall be subject to the approval of the Director. If rigid balls or mandrels are used to test for excessive pipe deflection, no mechanical pulling devices shall be used. Failure of free passage of the testing device shall be cause for rejection of the sewer, and "recleaning", "rebidding" or "replacement" is at the expense of the Contractor.

All construction related costs such as inspection, testing, cleaning, approvals, etc. are at the expense of the Owner. A final inspection of all utility improvements will be performed by the Burton Utilities prior to the end of the one-year warranty period. Any deviations and/or problems, which develop during the warranty period, shall be corrected by the Owner as ordered by the BPA prior to the release of the Owner's bond.

All tests performed for each test section shall be witnessed and approved by the sewer inspector prior to acceptance. In the event the developer or his contractor performs any test without witness by the sewer inspector, the developer will be required to test the section again in conformance with this specification.

DIRECTORY of BURTON VILLAGE UTILITIES CONTACTS

*In an effort to enable you to quickly reach our different utility departments, Burton Utilities has included this directory for your use. **For all after business hour emergencies, please call 440-834-1234***

Inspections of Water & Sewer	440-834-1408	Utility Department
New Utility Service	440-834-4474	Village Office
OUPS – Ohio Utility Protection Service	800.362-.2764 or 811	

Questions on Rules & Regulations

Village Office	440-834-4474
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DEPARTMENT LOCATIONS

Village Office, 14588 West Park Street

All Departments located in Burton, Ohio 44021.