Town of Brookline

Department of Public Works

Water & Sewer Division

Instructions to Contractors and Engineers for the Installation of Water System Components

Andrew M. Pappastergion, Commissioner of Public Works
Frederick W. Russell PE, Director – Water & Sewer Division

September 2014

TOWN OF BROOKLINE
Massachusetts

DEPARTMENT OF PUBLIC WORKS
WATER & SEWER DIVISION

Andrew M. Pappastergion
Commissioner
Frederick W Russell PE
Director

PROCEDURES FOR PRESSURE TESTING AND DISINFECTING WATER MAINS

Filling & Flushing

Prior to any testing of newly installed ductile iron water pipe or disinfection of existing cast iron or ductile iron water pipe, the mains shall be filled slowly at a rate no greater than 1 foot per second (fps). Where possible, the water shall be introduced at the lowest point of the installation and allowed to vent at either a hydrant or tap installed at the highest point of the pipe. Any lateral connections, other than hydrants, shall be closed off by means of a valve so that the connection is not subjected to testing. Once all the trapped air is expelled, the new pipe shall be flushed with sufficient velocity to remove any debris from within the pipe using a hydrant steamer nozzle located at the end of the installation. If no hydrant exists, adequately sized tap(s) shall be installed and used for flushing.

Pressure Testing – New Installations (AWWA C600-99)

After the entire pipe has been thoroughly flushed, the pipe shall be isolated for hydrostatic testing in accordance with AWWA C600-99. By means of a power driven, high pressure pump and a suitable calibrated vessel, water shall be introduced to the pipe until the test pressure at the lowest point of the pipe reaches 1.5 times the normal operating pressure or 200 psi whichever is greater. The duration of the test shall be a minimum of 2 hours. During the test, the pump shall be activated as necessary to maintain the test pressure within 5 psi and all pipe joints, if accessible, shall be examined for any visible leaks. After the testing time, the amount of water used to maintain the test pressure during the test shall be measured from the calibrated vessel.

No pipe installation will be accepted until the amount of make up water measured during the test is less than the number of gallons per hour calculated using the following formula:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = test pressure, in pounds per square inch

333 Washington Street ◆ Brookline, Massachusetts 02445-6863
Telephone: (617) 730-2170 Facsimile: (617) 713-3727
www.brooklinema.gov

Disinfection of New and Existing Pipe (AWWA C651-99)

Immediately following a successful pressure test for new pipe, or when placing an existing pipe back into service, the pipe shall be disinfected in accordance with AWWA C651-99. All testing and disinfection shall be done in the presence of a Water and Sewer Division inspector or designee. The Town will require the laboratory analysis of a water sample from the pipe at the completion of the disinfection procedure for the presence of bacteria.

Chlorination shall be done using the continuous feed method. Water supplied from the existing distribution system shall flow at a constant, measured rate into the pipe as measured using a pitot gauge at a hydrant farthest from the source. A chlorine solution shall be introduced into the pipe using a metering pump at a rate that will yield a concentration of 50 mg/l (ppm) at the discharge hydrant. The pipe shall then be isolated from the distribution system and allowed to remain undisturbed for a period of 24 hours.

At the end of the test period the chlorine residual concentration shall be measured using an approved test kit. No installation will be accepted unless the measured chlorine residual is greater than 25 mg/l (ppm). Documentation shall be provided that the chlorine residual was within the accepted range and that the proper contact time was achieved.

At the end of the retention period, all chlorinated water shall be flushed from the mains and discharged using proper methods for de-chlorinating the water. The chlorine residual of the discharged water shall be neutralized using sodium bisulfite, sodium sulfite or sodium thiosulfate.

General Notes

Water mains and appurtenances must be completely installed, flushed, pressure tested, disinfected, re-flushed and sampled for bacteria prior to being placed into service.

The Brookline Water & Sewer Division shall operate all valves and hydrants to place the main into service. Installation of service taps for permanent service connections and venting outlets shall be completed by the Water & Sewer Division.

Care shall be given to protect the existing distribution system from backflow caused by pressure testing and disinfection procedures.

The Brookline Water & Sewer Division shall inspect all pressure testing and disinfecting procedures. For all procedures, appointments for inspection must be scheduled (at least 48 hours in advance) through the Brookline Water and Sewer Division (617-730-2170).

TOWN OF BROOKLINE
Massachusetts

DEPARTMENT OF PUBLIC WORKS
WATER & SEWER DIVISION
2014

Andrew M. Pappastergion
Commissioner
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MATERIALS SPECIFICATIONS FOR WATER SYSTEM INSTALLATIONS

The attached material specifications shall be used for all water system installations in the Town of Brookline and include the following:

- Mechanical Joint Tapping Sleeves (Stainless Steel, Flange End) — Mueller H-304SS
- Tapping Valves -Mechanical Joint x Flange End — Mueller T-2361-16
- Resilient Seat Gate Valves -Mechanical Joint x Mechanical Joint. — Mueller A-2361-20
- Fire Hydrants -5 1/2 Foot Depth of Bury, — Mueller Super Centurion 250 A-423
- Fire Hydrants 5 1/2 Foot Depth of Bury, — American Darling 5-1/4" B-84-B-5
- Joint Restraint Systems — Star
- Cast Iron Curb Boxes — Buffalo 100E
- Cast Iron Gate Boxes — Buffalo 5668S

All water pipe 4" and larger shall be Cement Lined Ductile Iron Class 56.

All service pipes 2" or less shall be Type "K" Copper.

All service fittings 2" or less shall be Mueller 110 Compression Type.

All Hydrants, Valves and Curb Stops shall be Open Right.

All Fittings 4" and larger shall be Mechanical Joint, Cement Lined (Double Thickness), Ductile Iron, with Asphaltic Seal Coat inside and out and 250 PSI rated.

The Water and Sewer Division installs all taps on all water mains. Labor, Materials and Equipment are billed to contractor.

Only the Water and Sewer Division Personnel are allowed to operate Water System Valves, Curb Stops and Hydrants.

Substitutions for these specifications shall not be allowed without the approval of the Water & Sewer Division.

Inspections are required for all installations prior to backfilling
Contact the Water & Sewer Division at 617-730-2170 or 2175

333 Washington Street ◆ Brookline, Massachusetts 02445-6863
Telephone: (617) 730-2170 Facsimile: (617) 713-3727
www.brooklinema.gov

Mueller Co.

STAINLESS STEEL TAPPING SLEEVE 4" - 24"

Rev. 4-14 Shaded area indicates change

H-304SS
BROOKLINE STANDARD

- 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 (1725 kPa/17 barg) maximum working pressure.
- 14"-24" sizes--200 psig (1300 kPa/13 barg) maximum working pressure.

H-304MJ

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**

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

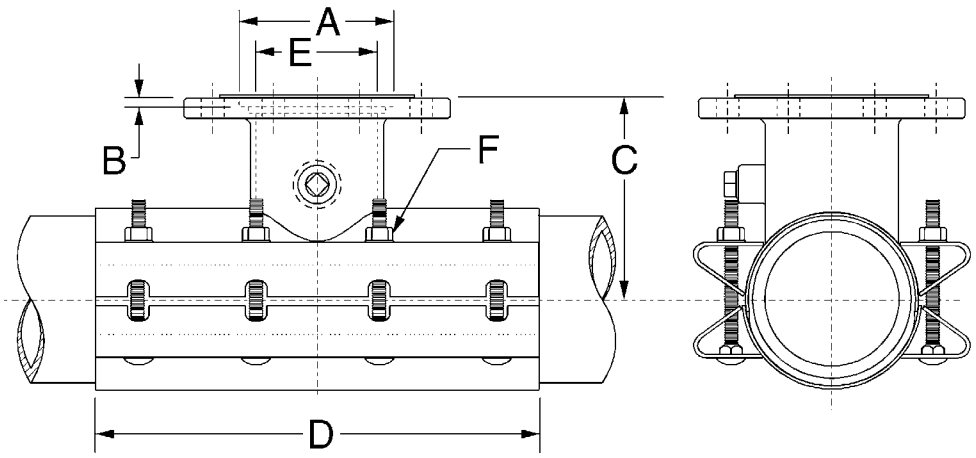
**3" outlet flange only available in stainless steel*
*** H-304 is constant for all Mueller Stainless Steel Tapping Sleeves listed here*
*** SS = stainless steel flange, CS = carbon steel flange, DI = ductile iron flange, MJ=integral mechanical joint outlet.**

Tapping Sleeve pipe information

Size of main	Size of outlet glange	Available sleeve O.D. ranges		Class and type of pipe
4"	3", 4"	4.50-4.90	114.30-124.46	Iron pipe size PVC; C900 Cast Iron OD PVC 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	
		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	
	4", 6", 8"	8.62-9.06	218.95-230.12	
		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	
	4", 6", 8", 10"	10.73-11.13	272.54-282.70	
		11.05-11.45	280.67-290.83	
		11.70-12.10	297.18-307.34	
		12.00-12.40	304.80-314.96	
12"	4", 6", 8", 10", 12"	12.50-12.90	317.50-327.66	C900 Cast Iron OD PVC; Cast Iron 100-250, Ductile Iron; AC 100, 150, 200; C905 IPS
		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	
		15.60-16.00	396.24-406.40	
		16.38-16.73	416.05-424.90	
		16.48-16.88	418.59-428.75	
16	4", 6", 8", 10", 12"	17.40-17.80	441.96-452.12	
		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	
		19.70-20.10	500.38-510.54	
20"	4", 6", 8", 10", 12"	21.40-21.80	543.56-553.72	
		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	
		23.80-24.10	604.52-612.14	
		25.60-26.00	650.24-660.40	

STAINLESS STEEL
TAPPING SLEEVE 4" - 24"

Mueller Co.



Nominal Size		Dimensions*					Bolts Per Side
		Outlet Flange†		Sleeve			
Main	Outlet	A	B	C	D	E	F
4"	4"	5.0315	.25	7.00	15	4.50	4
6"	4"	5.0315	.25	7.50	15	4.50	4
6"	6"	7.0315	.31	8.00	15	6.50	4
8"	4"	5.0315	.25	8.50	15	4.50	4
8"	6"	7.0315	.31	9.00	15	6.50	4
8"	8"	9.0315	.31	9.50	18	8.50	6
10"	4"	5.0315	.25	10.00	15	4.50	4
10"	6"	7.0315	.31	10.50	15	6.50	4
10"	8"	9.0315	.31	11.00	18	8.50	6
10"	10"	11.0315	.31	11.50	24	10.50	8
12"	4"	5.0315	.25	12.00	15	4.50	4
12"	6"	7.0315	.31	12.00	15	6.50	4
12"	8"	9.0315	.31	12.00	18	8.50	6
12"	10"	11.0315	.31	12.00	24	10.50	8
12"	12"	13.0315	.31	12.00	30	12.50	8
14"	4"	5.0315	.25	13.63	15	4.50	4
14"	6"	7.0315	.31	13.63	15	6.50	4
14"	8"	9.0315	.31	13.63	18	8.50	6
14"	10"	11.0315	.31	13.63	24	10.50	8
14"	12"	13.0315	.31	13.63	30	12.50	8
16"	4"	5.0315	.25	14.59	15	4.50	4
16"	6"	7.0315	.31	14.59	15	6.50	4
16"	8"	9.0315	.31	14.59	18	8.50	6
16"	10"	11.0315	.31	14.59	24	10.50	8
16"	12"	13.0315	.31	14.59	30	12.50	8
18"	4"	5.0315	.25	16.00	15	4.50	4
18"	6"	7.0315	.31	16.00	15	6.50	4
18"	8"	9.0315	.31	16.00	18	8.50	6
18"	10"	11.0315	.31	16.00	24	10.50	8
18"	12"	13.015	.31	16.00	30	12.50	8
20"	4"	5.0315	.25	16.88	15	4.50	4
20"	6"	7.0315	.31	16.88	15	6.50	4
20"	8"	9.0315	.31	16.88	18	8.50	6
20"	10"	11.0315	.31	16.88	24	10.50	8
20"	12"	13.0315	.31	16.88	30	12.50	8
24"	4"	5.0315	.25	19.00	24	4.50	8
24"	6"	7.0315	.31	19.00	24	6.50	8
24"	8"	9.0315	.31	19.00	24	8.50	8
24"	10"	11.0315	.31	19.00	24	10.50	8
24"	12"	13.0315	.31	19.00	30	12.50	10

** All dimensions are in inches.*
†With MJ option, this flange is replaced by an integral SS outlet pipe extension and MJ gland welded permanently in place allowing the sleeve to bolt directly to the outlet of any standard MJ valve. Dimensions for MJ option are compatible with standard connections, and A and B dimensions in chart do not apply.

ROMAC INDUSTRIES, INC.
1-800-426-9341
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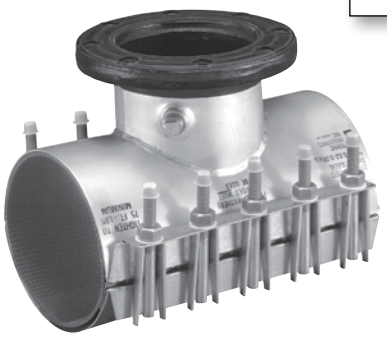
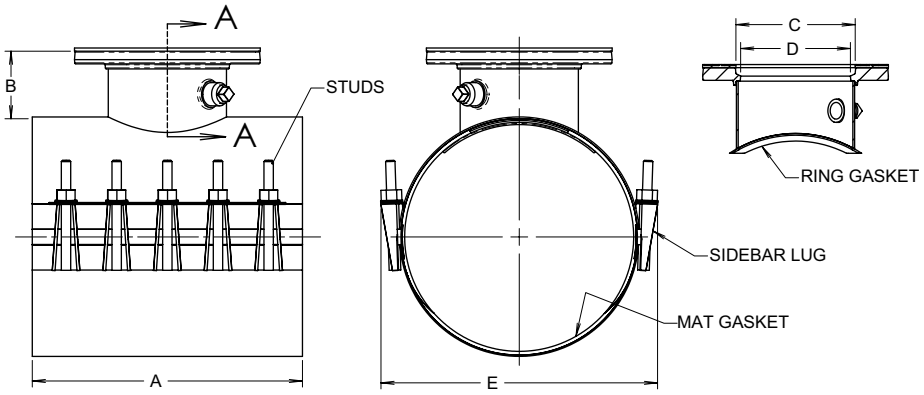
MADE IN U.S.A

"SST" & SSTIII Dimensions

A ROMAC ORIGINAL

1980 - **Stainless Steel Tapping Sleeve**
Corrosion resistant, provides full circumferential seal





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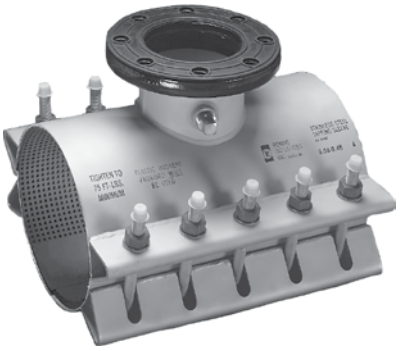
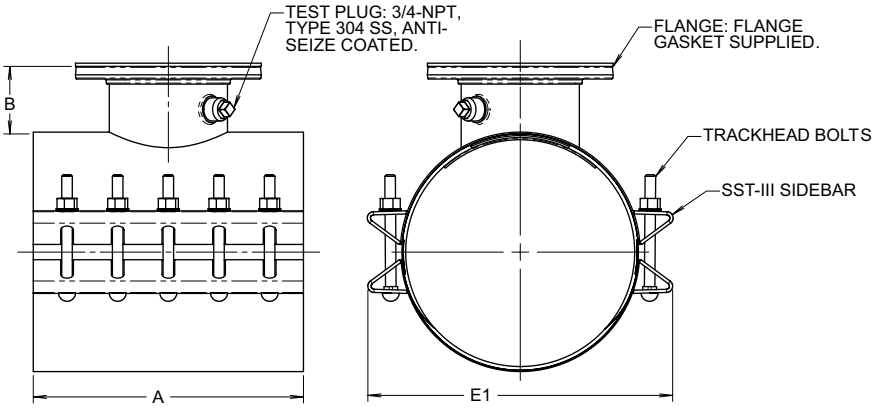




SSTIII

DIMENSIONS								
FLANGE SIZE	**CATALOG NUMBER**	**NO. OF BOLTS**	**A**	**B**	**C**	**D**	**E**	**E1**
3"	4.60 - 5.30	8	12.0	4.00	4.03	3 1/2	PIPE OD + 3.0	PIPE OD + 4.6
	5.60 - 19.30	10	16.0					
	19.70 - 26.50	14	20.0					
	27.80 - 32.00[1]	21	20.0					
4"	4.60 - 5.30	8	12.0	4.00	5.03	4 1/2	PIPE OD + 3.0	PIPE OD + 4.6
	5.60 - 19.30	10	16.0					
	19.70 - 26.50	14	20.0					
	27.80 - 32.00[1]	21	20.0					
6"	6.25 - 17.95	10	16.0	4.5	7.03	6 1/2	PIPE OD + 3.0	PIPE OD + 4.6
	18.25 - 26.50	14	20.0					
	27.80 - 32.00[1]	21	20.0					
8"	8.30 - 26.50	14	20.0	5	9.03	8 1/2	PIPE OD + 3.0	PIPE OD + 4.6
	27.80 - 32.00[1]	21	20.0					
10"	10.73 - 26.50	16	24.0	5.5	11.03	10 1/2	PIPE OD + 3.0	PIPE OD + 4.6
	27.80 - 32.00[1]	24	24.0					
12"	12.75 - 16.78	20	30.0	5.75	13.03	12 1/2	PIPE OD + 3.0	PIPE OD + 4.6
	17.55 - 26.50	30 [2]	30.0					
	27.80 - 32.00[1]	30	30.0					

1 SSTIII Only **2 SSTIII: 20**

- 6.25 & 6.60 sizes not available with 6" branch.
- 8.30 size not available with 8" branch.
- 10.73 size not available with 10" branch
- 12.75 - 12.90 sizes: 1/2" undersize cutter recommended.

ROMAC INDUSTRIES, INC.
STAINLESS STEEL TAPPING SLEEVE (SST™)
WITH STAINLESS STEEL FLANGE
SUBMITTAL INFORMATION

Note: Sleeve meets the requirements of MSS SP-60 and AWWAC223

MATERIALS

Flange	304 Stainless Steel Flange per AWWA C228-08. ANSI class 125 and 150 drillings and recessed to accept tapping valve. GMAW welded to neck.
Stainless Steel	Meets or exceeds ASTM A 240 type 304 UNS designated S30400.
Outlet	Heavy gauge 304L Stainless Steel. Fused to shell by GMAW weld on the outside and GTAW weld on the inside.
Shell	Heavy gauge Stainless Steel top half 304L back half 304.
Sidebars	Heavy gauge 304 Stainless Steel, GTAW welded to form permanent fusion with shell.
Lugs	304 Stainless Steel, fused to sidebars by GMAW welding.
Bolts	304 Stainless Steel, 4 inch sleeves use 1/2" UNC rolled thread, 6 - 12 inch sleeves use 5/8" UNC rolled thread. Bolts are GMAW welded to sidebar.
Nuts	Heavy hex, 304 Stainless Steel, 4 inch nominal size sleeves uses 1/2" UNC threads, 6 inch nominal size and larger sleeves uses 5/8" UNC thread. Nuts coated to prevent galling.
Washers	½" or 5/8" 304 Stainless Steel flat washers. 1/2" or 5/8" Plastic washer prevents galling between nut or stainless steel washer and lifter bar on all sizes.
Armors	Heavy gauge 304 Stainless Steel.
Lifter Bars	304 Stainless Steel, lip curved to hold position while tightening. Heavy gauge serves as bearing surface for nuts.
Gaskets	Virgin SBR rubber compounded for water and sewer service in accordance with ASTM D 2000 MAA 610. Specially designed grid pattern and tapered ends to assure seal around full circumference of pipe. Reinforced ring at outlet provides hydrodynamic seal. Other compounds available for petroleum or high temperature service, or other special applications.
WELDS	GMAW and GTAW weld processes. 308L Stainless Steel filler wire used as appropriate. All welds fully passivated for enhanced corrosion resistance.

Pressure When properly installed, the Romac Style SST Tapping Sleeve can work at these pressures ratings:

Pipe Size	Working Pressure	Test Pressure
4"- 8"	250 psi	312 psi
10" - 24"	200 psi	300 psi

SIZES AND RANGES, SEE CATALOG. 7/11

This information is based on the best data available at the date printed above, please check with Romac Engineering Department for any updates or changes. Romac Document Number 15-8-0005

12.14 Mueller Co.

4"- 12" MUELLER T-2361 RESILIENT WEDGE TAPPING VALVES - M.J. x FL. ENDS

Rev. 4-14 Shaded area indicates change

- Catalog number-- **BROOKLINE STANDARD**
  T-2361-16 mechanical joint x flanged ends (with mechanical joint unassembled accessories)
  T-2361-19 mechanical joint x flanged ends (less mechanical joint accessories)
- Sizes - 4", 6", 8", 10", 12"
- Meets or exceeds all applicable requirements of ANSI/AWWA C515 Standard, certified to ANSI/NSF 61 standard, listed by Underwriters Laboratories Inc. and ULC, approved by Factory Mutual Corp.
- Inlet flange complies with ANSI B16.1, class 125 drilling and with MSS SP-60.
- Mechanical joint outlet complies with ANSI/AWWA C111 Standard.
- Iron body with nominal 10 mils MUELLER® Pro-Gard™ Epoxy Fusion Coated interior and exterior surfaces.
- Epoxy coating meets or exceeds all applicable requirements of ANSI/AWWA C550 Standard
- 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-ring), with fourth O-ring serving as dirt seal
- 2" square wrench nut (optional handwheel available)--open left or open right.
- 4"-12" sizes--350 psig (2400 kPa/24 barg) maximum working pressure, 700 psig (4800 kPa/48 barg) static test pressure
- Mueller valves are designed for potable water applications.

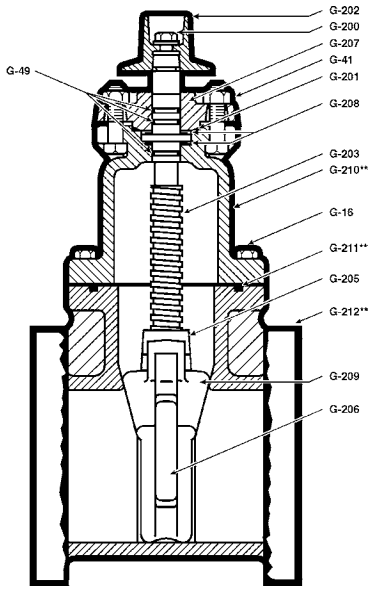
T-2361-16
M.J. accessories shipped unassembled

Options

- Position indicators
- Stainless steel fasteners: Type 316
- Stainless steel stem: type 304 and type 316
- ASTM B98-C66100/H02 stem
- Handwheel
- EPDM disc and o-rings

Resilient wedge gate valve parts

Catalog Part Number	Description	Material	Material standard
G-16	Bonnet bolts and nuts	304 Stainless steel	ASTM F593 (bolt) ASTM F594 (nut)
G-41	Stuffing box bolts and nuts	304 Stainless steel	ASTM F593 (bolt) ASTM F594 (nut)
G-49	Stem o-rings (3)	Nitrile	ASTM D2000
G-79	Inlet flange gasket	Nitrile	ASTM D2000
G-80	Inlet flange bolts and nuts	Steel	ASTM D242
G-200	Wrench nut cap screw	Stainless steel	ASTM F593
G-201	Stuffing box seal	Nitrile	ASTM D2000
G-202	Wrench nut	Cast Iron+	ASTM A126 CL.B
G-203	Stem	Bronze	ASTM B138
G-204	Handwheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem nut	Bronze	ASTM B62
G-206	Guide cap bearings	Acetal	-
G-207	Stuffing box	Cast Iron Rubber	ASTM A126 CL.B ASTM D2000
G-208	Anti-friction washer (2)	Acetal	-
G-209	Wedge Rubber encapsulated	Ductile Iron* SBR	ASTM A536 ▼ ASTM D2000
G-210**	Bonnet	Ductile Iron	ASTM A536 ▼
G-211**	Bonnet gasket	Nitrile	ASTM D2000
G-212**	Body	Ductile Iron	ASTM A536 ▼

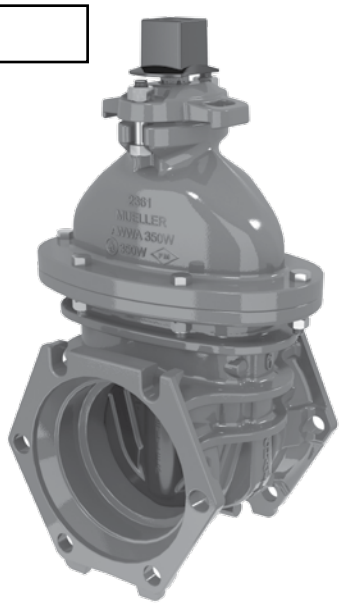


** Fully encapsulated in molded rubber with no iron exposed*
*** Previous to 1999 these parts on 4"-12" valves were designed with a gasket instead of an O-ring and with additional bolts. Confirm the type of seal when ordering a replacement gasket or O-ring.*
+ Manufacturers option to change material to Ductile Iron ASTM A536
▼ Material strength ASTM A536 65-45-12 minimum

4"- 12" A-2361 RESILIENT WEDGE GATE VALVES - M.J. x M.J.

Rev. 4-14

- Catalog number– **BROOKLINE STANDARD**
  A-2361-20 Mechanical joint ends (with accessories unassembled)
  A-2361-23 Mechanical joint ends (less accessories)
  A-2361-25 Mechanical joint ends (with transition gaskets accessories unassembled)
- Sizes – 4", 6", 8", 10", 12"
- Meets or exceeds all applicable requirements of ANSI/AWWA C515 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.
- 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
- 350 psig (2400 kPa/24 barg) maximum working pressure, 700 psig (4800 kPa/48 barg) static test pressure
- UL Listed, FM Approved: 350 psig (2400 kPa/24 barg)
- Mueller valves are designed for potable water application



A-2361-20

Options

See page 10.46 for more information on Resilient Wedge Gate Valve options

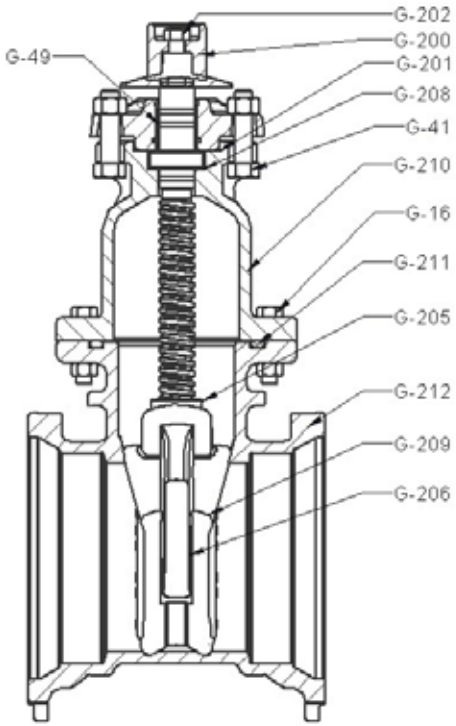
- Position indicators
- Stainless steel fasteners: Type 316
- Stainless steel stem: Type 304, Type 316
- ASTM B98-C66100/H02 stem
- Handwheel
- EPDM Disc and o-rings

Resilient wedge gate valve parts

Catalog Part No.	Description	Material	Material Standard
G-16	Bonnet Bolts & Nuts	304 Stainless Steel	ASTM F593 (bolt) ASTM F594 (nut)
G-41	Stuffing Box Bolts & Nuts	304 Stainless Steel	ASTM F593 (bolt) ASTM F594 (nut)
G-49	Stem O-rings (3)	Nitrile	ASTM D2000
G-200	Wrench Nut Cap Screw	304 Stainless Steel	ASTM F593
G-201	Stuffing Box O-ring	Nitrile	ASTM D2000
G-202	Wrench Nut	Ductile Iron	ASTM A536 ▼
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B584
G-206	Guide Cap Bearings	Acetal	-
G-207	Stuffing Box with dirt seal	Ductile Iron Nitrile	ASTM A536 ▼ ASTM D200
G-208	Anti-friction Washers (2)	Acetal	-
G-209	Wedge, Rubber Encapsulation	Ductile Iron* SBR	ASTM A536 ▼ ASTM D2000
G-210**	Bonnet	Ductile Iron	ASTM A536 ▼
G-211**	Bonnet gasket	Nitrile	ASTM D2000
G-212**	Body	Ductile Iron	ASTM A536 ▼

**Fully encapsulated in molded rubber with no iron exposed*

▼ Material strength ASTM A536 65-45-12 minimum



SEE PAGE 10.53 FOR ORDERING INSTRUCTIONS

MUELLER® SUPER CENTURION® FIRE HYDRANT

Rev. 4-14 Shaded area indicates changes

☒ **Super Centurion 250™ catalog numbers**
- UL 246, FM 1510 ANSI/AWWA C502 250 psi rated
A421 4-1/2" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle)
A423 5-1/4" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle) **BROOKLINE STANDARD**
A454 5-1/4" main valve opening 3-way (3 hose nozzle) *
A455 5-1/4" main valve opening 4-way (4 hose nozzle) *
A458 5-1/4" main valve opening 4-way (3 hose nozzle / 1 pumper nozzle) *
A459 5-1/4" main valve opening 4-way (2 hose nozzle / 1 pumper nozzle)**
* Hose Gate Valves required on FM Approved Models
** A459 is UL Listed and ANSI/AWWA C502

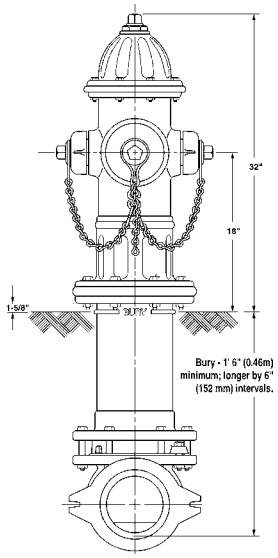
☐ **Super Centurion 350™ catalog number**
- UL 246, FM 1510 ANSI/AWWA C502 350 psi rated
A423 5-1/4" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle)

☐ **Super Centurion 200™ catalog numbers**
- UL 246, FM 1510 ANSI/AWWA C502 200 psi rated
A-433 4-1/2" main valve opening 2-way (2 hose nozzle)
A-435 5-1/4" main valve opening 2-way (2 hose nozzle)

- ANSI/AWWA C502 200 psi rated
A-420 4-1/2" main valve opening 2-way (2 hose nozzle)
A-424 4-1/2" main valve opening 1-way (1 pumper nozzle)
A-422 5-1/4" main valve opening 2-way (2 hose nozzle)
A-425 5-1/4" main valve opening 2-way (2 hose nozzle)
A-423 5-1/4" main valve opening 3-way (2 hose nozzle / 2 pumper nozzle)

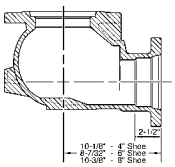
- ☐ 10 year limited warranty on material and workmanship
- ☐ Meets all applicable parts of ANSI/AWWA C502 Standard
- ☐ Post type dry barrel design
- ☐ Dry top design with O-ring sealed oil reservoir
- ☐ Traffic feature with stainless steel safety stem coupling
- ☐ Compression-type main valve closes with 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
- ☐ 350 psig (2400 kPa/24 barg) maximum working pressure, 700 psig (4800 kPa/48 barg) static test pressure;
250 psig (1725 kPa/17 barg) maximum working pressure, 500 psig (3450 kPa/35 barg) static test pressure;
200 psig (1400 kPa/14 barg) maximum working pressure, 400 psig (2800 kPa/28 barg) static test pressure

Dimensions



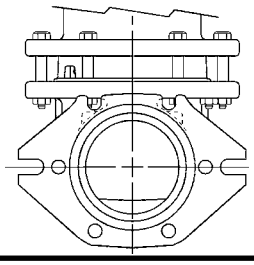
Mechanical joint standard and D-150

BROOKLINE STANDARD

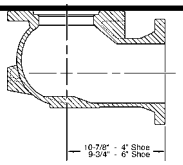


Non-rotating bolt design: cast-in pads eliminate need for anti-rotation bolts.

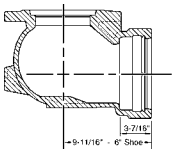
Front view detail of Mechanical joint (Standard only)



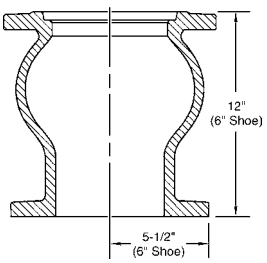
Flange
ASME B16.1 Class 125
PN 10/16 Drilling



Slip-on



Vertical Flange
ASME B16.1 Class 125
PN 10/16 Drilling



SEE PAGE 9.28 FOR ORDERING INSTRUCTIONS

MUELLER® FIRE HYDRANT ORDERING INSTRUCTIONS

When ordering Fire Hydrants, specify the following:

1. Quantity
If more than one size, quantity of each.

2. Size of main valve opening — 5 1/4"

3. Catalog number of Fire Hydrant — A423-SUPER CENTURION 250

4. Nozzle arrangement
The catalog number indicates the normal arrangements of hose and pumper nozzles. If a different arrangement is desired, specify the size and number of hose and pumper nozzles required. — NORMAL

5. Depth of trench or bury
Distance from ground line to bottom of connecting pipe. "Trench" and "ditch" are the same as "bury". "Cover" is the distance from the ground to the top of the connecting pipe. — 5-1/2' OR AS REQUIRED

6. Size of inlet connection — 6" DI

7. Type of inlet connection — MJ STANDARD

8. Size and shape of operating nut
National Standard is 1-1/2" pentagon, measured from point to opposite flat. Square and hexagon or other sizes of pentagon can also be furnished. Size is determined by measuring from flat to opposite flat on square and hexagon, and from point to opposite flat on pentagon. Measurements must be taken at base of nut.

9. Direction of opening
Open left (counter-clockwise) or open right (clockwise).

10. Hose nozzle threading
Send a sample of the male coupling on hydrant nozzle to show threads desired, **EXCEPT** in the following cases **(a)** if using National Standard, specify accordingly **(b)** if we have previously furnished hydrants to the same location and there is no change (complete records are kept on file in our Engineering Department for reference).

11. Pumper nozzle threading
Same instructions as 10 above. — NATIONAL STANDARD

12. Color
Unless otherwise specified, the hydrant will be enameled above ground with fire hydrant red. When so ordered, we will enamel any color (or colors) specified to match your existing standards.

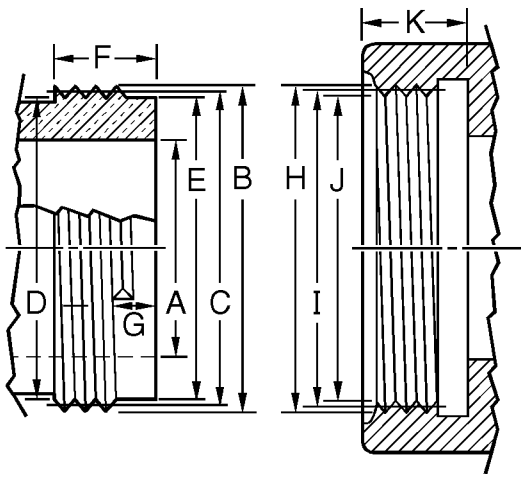
When ordering parts, specify the following:

1. **Year date shown on hydrant barrel**
2. Part number and name
3. Size and catalog number of hydrant
4. Direction of opening
5. Depth of bury
6. Bonnet markings
7. Type of inlet connection
8. Nozzle specifications (see steps 10 and 11 above)

Contact your MUELLER Distributor or MUELLER Customer Service Center for repair parts for discontinued MUELLER Fire Hydrants.

National Standard hose coupling thread specifications

A. Nominal inside diameter of nozzle		2-1/2"	3"	3-1/2"	4"	4-1/2"
Number of threads per inch		7-1/2	6	6	4	4
B. Major diameter nozzle thread	Max.	3.0686	3.6239	4.2439	5.0109	5.7609
	Min.	3.0366	3.5879	4.3079	4.9609	5.7109
C. Pitch diameter nozzle thread	Max.	2.9820	3.5156	4.1356	4.8485	5.5985
	Min.	2.9660	3.4976	4.1176	4.8235	5.5735
D. Minor diameter nozzle thread	Max.	2.8954	3.4073	4.0273	4.6861	5.4361
E. Diameter pilot nozzle		2.850	3.354	3.973	4.610	5.357
F. Length of thread-nozzle*		1"	1-1/8"	1-1/8"	1-1/4"	1-1/4"
G. Face to start of second turn		1/4"	5/16"	5/16"	7/16"	7/16"
H. Major diameter coupling thread	Min.	3.0836	3.6389	4.2639	5.0359	5.7859
I. Pitch diameter coupling thread	Max.	3.0130	3.5486	4.1736	4.8985	5.6485
	Min.	2.9970	3.5306	4.1556	4.8735	5.6235
J. Minor diameter coupling thread	Max.	2.9424	3.4583	4.0833	4.7611	5.5111
	Min.	2.9104	3.4223	4.0473	4.7111	5.4611
K. Depth of coupling		15/16"	1-1/16"	1-1/16"	1-3/16"	1-3/16"



** Manufacturers standard*
NOTE: All dimensions are in inches and all dimensional data and tolerances are in accord with ANSI B26.

AMERICAN-DARLING 5-1/4” B-84-B-5 FIRE HYDRANT

The American-Darling B-84-B-5 hydrant incorporates over 100 years of experience in design, manufacture and field experience. This means dependable and efficient operation when needed.

Introduced in 1984, the **B-84-B-5** hydrant is rated at 250 psig and is seat tested at 500 psig. The hydrant meets or exceeds all requirements of ANSI/AWWA C502 for dry barrel hydrants.

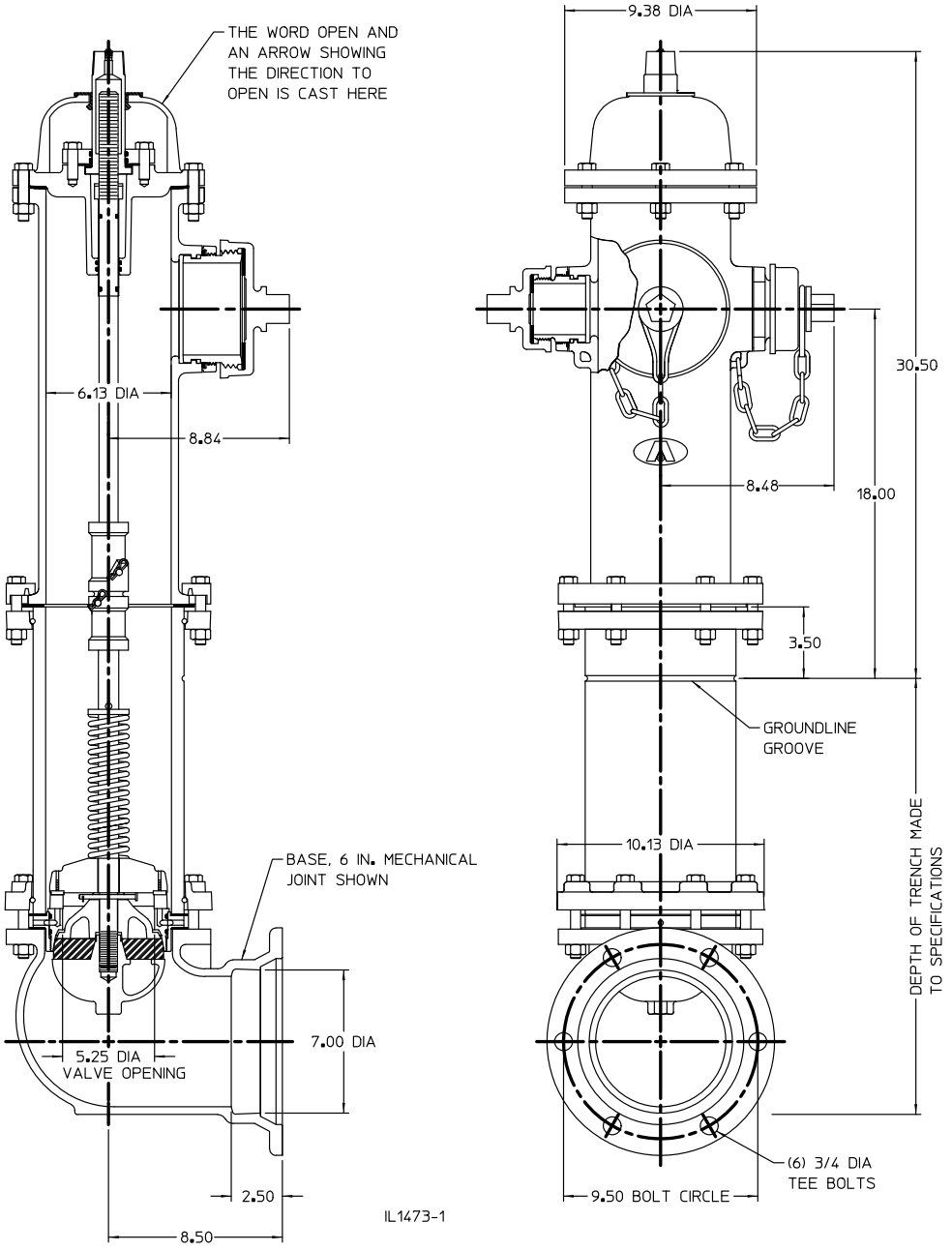
The **B-84-B-5** hydrant has all the features you expect from a high quality fire hydrant. The epoxy primer and polyurethane top coat system on external surfaces of the upper barrel provide a durable, high-gloss finish that will continue to look good for years without repainting. The all bronze seat and bronze drain ring assure that the **B-84-B-5** hydrant is easily repaired.

Optional UL-FM in Allowable Configurations

The **B-84-B-5** hydrant is Listed by Underwriters Laboratories, Inc. as meeting their standard UL 246, latest edition. FM Approvals has Approved the **B-84-B-5**. Both Underwriters Laboratories, Inc. and FM Approvals require that we consistently manufacture and test our hydrants in compliance with their stringent requirements. Our facilities are subject to periodic inspections to assure we are in compliance with their standards.

B-84B-5 DIMENSIONS

Depth of Trench	Length of Lower Rod
2' -0"	21.50"
2' -6"	27.50"
3' -0"	33.50"
3" -6"	39.50"
4' -0"	45.50"
4' -6"	51.50"
5' -0"	57.50"
5' -6"	63.50"
6' -0"	69.50"
6' -6"	75.50"
7' -0"	81.50"
7' -6"	87.50"
8' -0"	93.50"
8' -6"	99.50"
9' -0"	105.50"
9' -6"	111.50"
10' - 0"	117.50"
10' -6"	123.50"
11' -0"	129.50"
11' -6"	135.50"
12' -0"	141.50"
12' -6"	147.50"
13' -0"	153.50"
13' -6"	159.50"
14' -0"	165.50"
14' -6"	171.50"
15' -0"	177.50"
15' -6"	183.50"
16' -0"	189.50"
16' -6"	195.50"
17' -0"	201.50"
17' -6"	207.50"
18' -0"	213.50"
18' -6"	219.50"
19' -0"	225.50"
19' -6"	231.50"



NOTES:

1. Depth of trench is the nominal distance from ground line to bottom of connecting pipe.
2. Size and shape of nut on operating nut and cap, threading on nozzles and caps, and the direction of opening made to specifications.
3. Cap chains are not furnished unless specified.
4. Working pressure 250 psig, test pressure 500 psig.
5. Hydrant meets or exceeds the ANSI/AWWA C502 standard.
6. Upper barrel can be rotated 360 degrees.
7. Listed by Underwriters Laboratories Inc. and Approved by FM Approvals at 200 psig in allowable configurations.
8. Certified to NSF/ANSI Standard 61-G.

AMERICAN Flow Control®
AMERICAN-DARLING 5-1/4" B-84-B-5 FIRE HYDRANT
SUBMITTAL SHEET

City Specification: TOWN OF BROOKLINE, MA_____ Quantity: _____		
Direction to Open: ☐ Left (C.C.W.) ☒ Right (C.W.)		
Operating Nut Size: 1 1/2"_____ Shape PENTAGON_____ American Darling No. (If Known) _____		
Nozzles		
Configuration: (Check One)	**Pumper Nozzle:**	**Hose Nozzle:**
☒ Two Hose, One Pumper ☐ Two Hose ☐ Other	National Std ☒ Yes ☐ No Size ___ _____ _____ _____ O. D. x T.P.I. _____ _____ _____ American-Darling Thread (If Known) _____ _____ _____ _____	National Std ☒ Yes ☐ No Size ___ _____ _____ _____ _____ O.D. x TPI _____ _____ _____ _____ American -Darling Thread (If Known) _____ _____ _____ _____
Nozzle Cap Chains: ☒ Yes ☐ No		
Depth of Trench: 5-1/2 FEET		
Base Connection: (Check One) ☐ 4" MJ ☒ 6" MJ ☐ 8" MJ ☐ 4" Flanged ☐ 6" Flanged ☐ 6" Tyton ☐ 6" Plain End with Intergral MJ Gland ☐ 6" Vertical Entry		
Paint Color: __HYDRANT NAVY BLUE _____		
UL Listed, FM Approved: ☒ Yes ☐ No		
Other Requirements: (List)		

AMERICAN Flow Control
American-Darling Valve & Waterous
A Division of AMERICAN

NOTES:
1. Meets or exceeds requirements of ANSI/AWWA C502, latest revision, with 250 psig rated working pressure.
2. May be furnished in configurations that are Listed by Underwriters Laboratories Inc. and Approved by FM Approvals with 200 psig rated working pressure.
3. Certified to NSF/ANSI Standard 61-G.

Visit our website at http://www.american-usa.com/afc

Stargrip® series 3000

Mechanical Joint Wedge Action Restraint
for Ductile Iron Pipe
Patent #5,772,252

Stargrip® series 3000 for Ductile Iron Pipe

INFORMATION

The Stargrip® Mechanical Joint Restraint System is a unique product with a proven design that provides an exceptional restraining system for mechanical joint fittings (AWWA C153 or C110), valves, fire hydrants and all classes of ductile iron pipe.

More Adaptable for Field Use

FEATURES & ADVANTAGES

- Gland is made from high strength Ductile Iron per ASTM A536, Grade 65-45-12 and is compatible with all Mechanical Joints conforming to ANSI/AWWA C111/A21.11.
- The Wedge Assembly is designed with a Break-Off Torque Control Nut that will only break off in one direction, ensuring proper installation.
- The Stargrip® offers a full 5° deflection through 12" size, 3° on 14"-24", 2° on 30"-36" and 1° on 42"-48".
- Minimum safety factor of 2:1
- Stargrip® sizes 3"-36" are listed with Underwriters Laboratories Inc. and sizes 3"-12" are approved by Factory Mutual Research.
- The Wedges are heat treated to a minimum of 370 BHN.
- The Wedge Assembly is designed to fit specific pipe sizes and is field repairable.
- No special tools are required for installation of the Stargrip®.
- Stargrip® eliminates tie rods and thrust blocks.
- Standard gland color is Graphite Black (RAL 9011).
- Stargrip® may also be used on steel pipe* up to 12" (***transition gasket required on 12" and under**). For 14" and larger steel applications, contact Star Pipe.

SAMPLE SPECIFICATIONS

Restrainer mechanism shall be integrated into the design of the follower gland. As the mechanism is activated, multiple wedging action shall be imparted against the pipe increasing its resistance as internal pressure increases. After burial of the restraining mechanism, joint flexibility shall be maintained.

The actuating bolt shall be threaded into the restraining wedge and have a 1-1/4" hex operating nut. The operating nut shall be threaded onto the actuating bolt, not swaged or riveted. The restraining twist off nut bolt system shall have a torque-limiting feature designed to break off at preset torque levels, thus insuring proper action of restraining device. Glands shall be manufactured of high strength ductile iron in accordance with ASTM A536 Grade 65-45-12 requirements. The wedge shall be manufactured of high strength ductile iron and be heat treated to a minimum hardness of 370 BHN. Applicable dimensions shall conform to ANSI/AWWA C111/A21.11 and shall be incorporated into the mechanical joint restraint so that the device facilitates use with standard mechanical joint bells.

The mechanical joint restraint mechanism shall have a maximum water working pressure of 350 PSI for sizes 3"-16" and 250 PSI for sizes 18" and above. All sizes shall have a minimum safety factor of 2:1 (i.e. twice the maximum pressure rating of the restraint). The mechanical joint restraint mechanism shall be Underwriters Laboratories listed on size 3" through 36" and Factory Mutual Research Approved on size 3"-12". The restraint mechanism shall be Star® Pipe Products Stargrip® series 3000 or an approved equal.

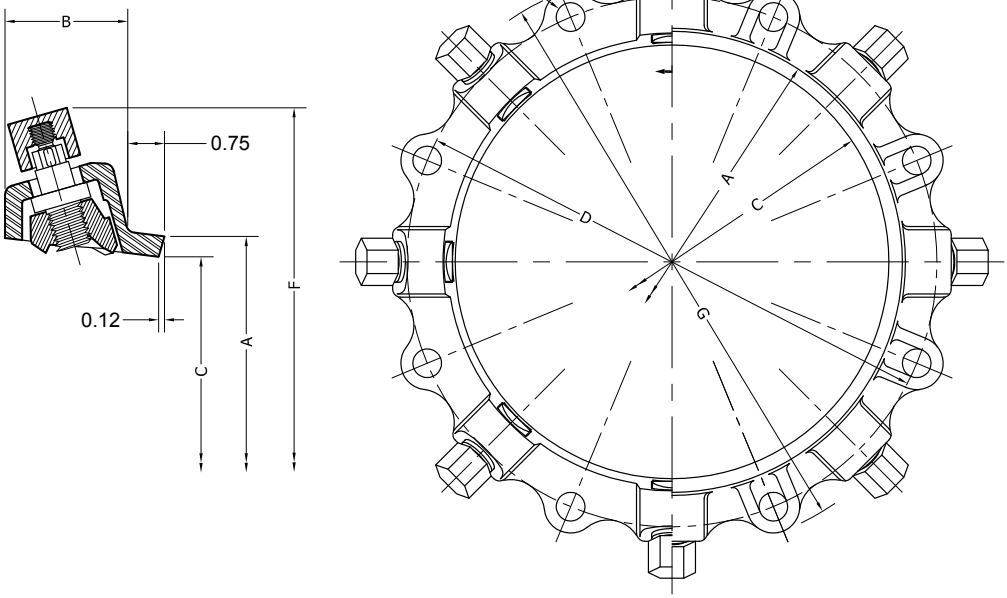
STAR® PIPE PRODUCTS

STAR® PIPE PRODUCTS
HOUSTON **CORPORATE** | TOLL FREE 1-800-999-3009 | FAX 281-558-9000
www.starpipeproducts.com

Stargrip® series 3000

Mechanical Joint Wedge Action Restraint
for Ductile Iron Pipe
Patent #5,772,252

TECHNICAL INFORMATION



STARGRIP® 3000 SPECIFICATIONS*

NOM. SIZE	MAX PRESSURE RATING (PSI)	A	B	C	D	E	F	F W/NUTS TWISTED OFF	G	NO. OF WEDGES	NO. OF T-BOLTS	APPROX WT. (LBS)
3	350	4.84	2.40	4.06	6.19	3/4	9.85	8.78	8.13	2	4	7
4	350	5.92	2.40	4.90	7.50	7/8	11.06	9.62	9.12	2	4	9
6	350	8.02	2.40	7.00	9.50	7/8	13.06	11.72	11.12	3	6	13
8	350	10.17	2.51	9.15	11.75	7/8	15.25	13.84	13.37	4	6	17
10	350	12.22	2.51	11.20	14.00	7/8	17.25	15.88	15.62	6	8	23
12	350	14.32	2.51	13.30	16.25	7/8	19.50	17.98	17.88	8	8	31
14	350	16.40	2.91	15.44	18.75	7/8	21.25	20.12	20.90	10	10	54
16	350	18.50	2.91	17.54	21.00	7/8	23.34	22.22	23.00	12	12	60
18	250	20.60	2.91	19.64	23.25	7/8	26.40	24.90	25.25	12	12	69
20	250	22.70	2.67	21.74	25.50	7/8	28.56	27.00	27.50	14	14	72
24	250	26.90	3.50	25.94	30.00	7/8	33.86	32.34	31.54	16	16	170
30	250	33.29	3.49	32.17	36.88	1-1/8	40.12	38.62	39.12	20	20	197
36	250	39.59	3.49	38.47	43.75	1-1/8	46.42	44.92	46.00	24	24	242
42	250	45.79	5.15	44.75	50.62	1-3/8	54.86	53.32	53.12	28	28	425
48	250	52.09	5.15	51.05	57.50	1-3/8	61.16	59.62	60.00	32	32	500

**All dimensions in inches except where indicated.*

Notes:

- *Stargrips® must be adequately wrapped or protected if they are covered by concrete to ensure that concrete does not enter the wedge pocket.*
- *For applications exceeding the maximum pressure ratings listed, please contact Star Pipe Products for recommendations (see Tandem Stargrip® on page 10).*
- *For applications on existing pipe, the pipe needs to be structurally sound and the surface needs to be relatively free of any corrosive by-products in order for the wedges to function properly. Please contact Star Pipe Products for technical assistance.*
- *Sizes 42" & 48" require extra long 1 ¼" x 8 ½" T-bolts.*

STAR® PIPE PRODUCTS
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www.starpipeproducts.com

Oversized Stargrip® series 3000OS

Mechanical Joint Wedge Action Restraint
for A, B, C & D Pit Cast Pipe
Patent #5,772,252

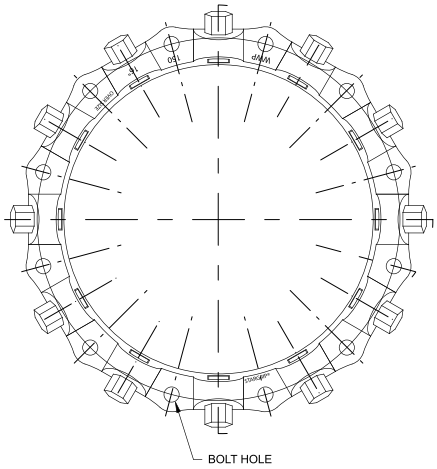
Stargrip® series 3000OS

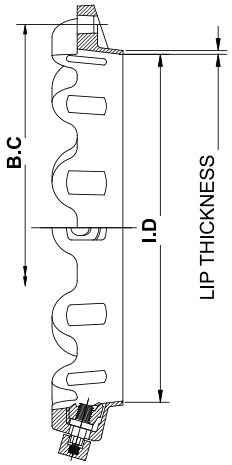
INFORMATION

The oversized Stargrip® series 3000OS has the same features as the series 3000 except the bore (ID) has been increased to accomodate Class A, B, C, & D pit cast pipe.

Oversized Accomodates Class A,B,C & D Pit Cast Pipe

TECHNICAL INFORMATION





STARGRIP® 3000OS SPECIFICATIONS*

NOM. SIZE	MAX PRESSURE RATING (PSI)	B.C. DIAMETER	BOLT HOLES	NOMINAL GLAND I.D.	LIP THICKNESS	APPROX WT. (LBS)
4	250	7.50	4 x 7/8	5.10	0.32	9
6	250	9.50	6 x 7/8	7.20	0.32	13
8	250	11.75	6 x 7/8	9.40	0.29	18
10	250	14.00	8 x 7/8	11.50	0.27	23
12	250	16.25	8 x 7/8	13.60	0.27	31
14	150	18.75	10 x 7/8	15.75	0.23	54
16	150	21.00	12 x 7/8	17.90	0.21	60

**All dimensions in inches except where indicated.*

JRCAT14.01

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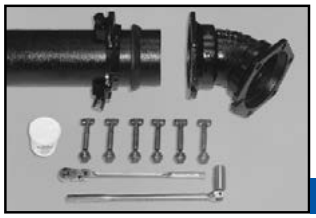
Stargrip® series 3000 & 3000OS

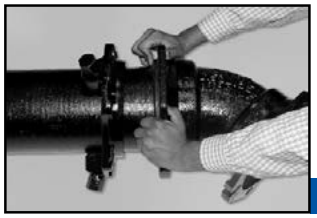
Mechanical Joint Wedge Action Restraint
for Ductile Iron Pipe
Patent #5,772,252

INSTALLATION INSTRUCTIONS - SIZES 3"- 48"



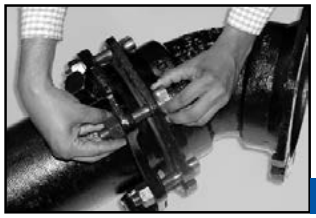
STEP 1

To ensure the rubber gasket will seal more effectively, clean and remove all loose materials and rust from the mating surfaces. Lubricate the gasket and plain end by brushing either soapy water or pipe lubricant. Slide the Stargrip® on the plain end with lip extension towards the plain end, followed by the MJ gasket. Do not remove rubber washers prior to installation. Washers have been provided for proper wedge placement during shipment and installation.



STEP 2

After insertion of the pipe into the bell of the fitting, firmly press the gasket into the gasket recess. During this process the joint should be kept straight.



STEP 3

Slide the Stargrip® toward the MJ bell with the gland lip against the gasket. Insert T-bolts and hand tighten nuts.

IMPORTANT: Make deflection after joint is assembled but before tightening T-bolts.

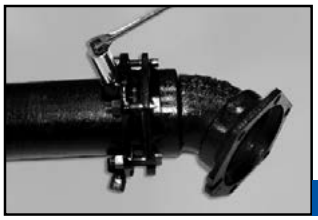
STEP 4

When tightening bolts, it is essential that the gland be brought up toward the bell flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. All T-bolts should be tightened until they are in within the torque range per ANSI/AWWA C600 (See Table A). T-Bolts should be tightened alternately on the opposite sides (Star Pattern).

STEP 5

Tighten the torque limiting twist off nuts in a clockwise direction until all wedges are in firm contact with the pipe surface.

Continue tightening in an alternative manner going on the opposite sides [Star Pattern], until all of nuts have been twisted off. Never turn a single nut over 180 degrees without alternating to another nut.



STEP 6

If removal is necessary, utilize the 5/8″ hex head provided. [If reassembly is required, assemble the joint in the same manner as above and tighten the wedge bolt to 90 ft-lbs on sizes 3"-20", 120 ft-lbs on sizes 24"-36" & 130 ft-lbs on sizes 42"-48"].

(TABLE A) T-HEAD BOLT & NUT DETAILS		
PIPE SIZE (IN)	BOLT SIZE (IN)	RANGE[1] OF TORQUE (FT-LBS)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1 1/4	120-150

[1]These torque ranges are requirements of AWWA C600

Notes:

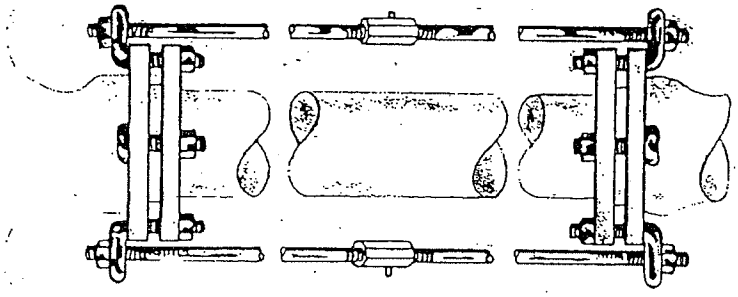
- *If effective sealing is not attained at the maximum torque indicated, then the joint should be disassembled, thoroughly cleaned, and reassembled.* ***Overstressing the bolts to compensate for poor installation practice is not acceptable.***
- *Not to be used on plain end fittings or PVC or HDPE pipe.*
- *Stargrip® may also be used on steel pipe* up to 12"* ***(*transition gasket required on 12" and under)****. For 14" and larger steel applications, contact Star Pipe.*
- *Stargrips® must be adequately wrapped or protected if they are covered by concrete to ensure that concrete does not enter the wedge pocket.*
- *For applications exceeding the maximum pressure ratings listed, please contact Star Pipe Products for recommendations (see Tandem Stargrip® on page 10).*
- *For applications on existing pipe, the pipe needs to be structurally sound and the surface needs to be relatively free of any corrosive by-products in order for the wedges to function properly. Please contact Star Pipe Products for technical assistance.*

STAR® PIPE PRODUCTS
HOUSTON **CORPORATE** | TOLL FREE 1-800-999-3009 | FAX 281-558-9000
www.starpipeproducts.com

Star™ JOINT RESTRAINT SYSTEM

These are the *Star Products* used in conjunction with pipe, valves, and fittings. They may be used on mechanical, push-on, asbestos-cement, and most types of PVC joints. Usually it requires a combination of *Star Products* to make a completely restrained joint.

Let us start with some of our products and follow through with an example using the illustration below.



In restraining mechanical joint fittings the procedure is as follows:

1. One tee bolt on each side of the mechanical joint opening is removed and is replaced with a *SuperStar Tiebolt*™ *(SST 7*™*)* joint restrainer. The eye is on the bell side.

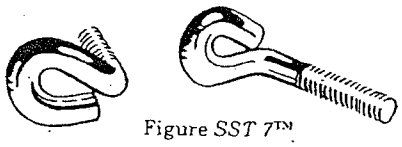


Figure *SST 7*™

2. A *SuperStar Tienut*™ *(SS 8*™*)* joint restrainer is screwed onto the threaded portion of the *SuperStar Tiebolt*™ joint restrainer. This fully retains the gland and secures the *SuperStar Tiebolt*™ joint restrainer. The eye is now out to the side and ready for the next step.

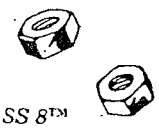


Figure *SS 8*™

3. Two *SuperStar Tierod*™ *(SS 12*™*)* joint restrainers are placed through the eyes of the *SuperStar Tiebolt*™ joint restrainers and secured firmly by four *SuperStar Tienut*™ joint restrainers.

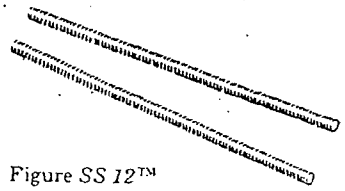


Figure *SS 12*™

4. If the distance between fittings exceeds ten feet the *SuperStar Tierod*™ joint restrainers are lengthened by using *SuperStar Tiecoupling*™ *(SS 10*™*)* joint restrainers. Note that *SuperStar Tiecoupling*™ joint restrainers have *Tiestop*™ pins to assure positive centering.

Figure *SS 10*™

5. As an alternate arrangement, one joint could be restrained by *SuperStar Tiebolt*™ joint restrainers and the other by a *SuperStar Tieclamp*™ *(S 11)* joint restrainer placed in front of a pipe or fitting bell. (See illustrations further in catalogue.)

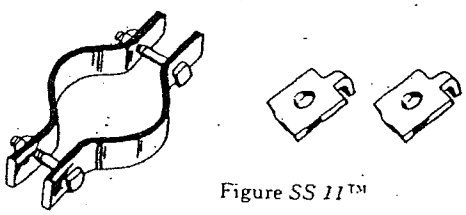
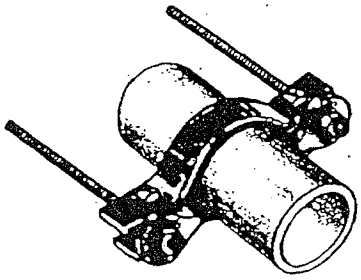
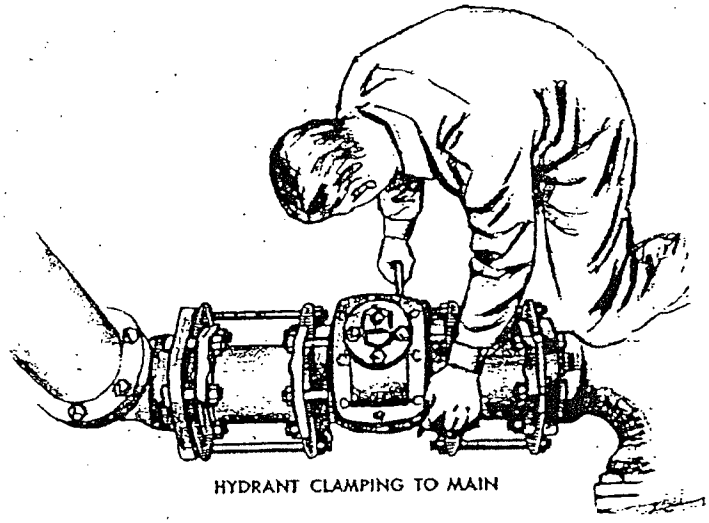


Figure *SS 11*™

examples of clamping

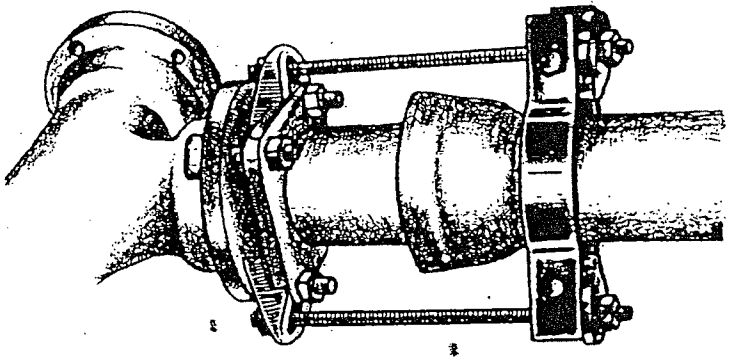
Underground Clamps may be used on runs and behind bell on cast iron pipe.



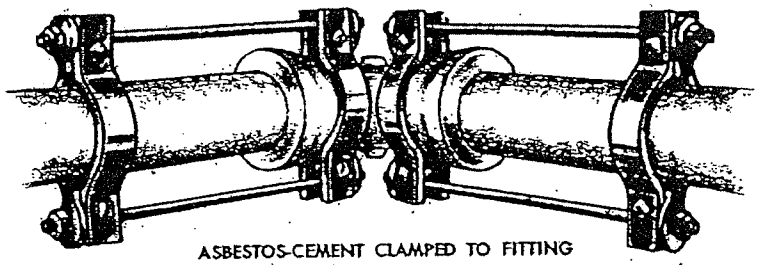


HYDRANT CLAMPING TO MAIN

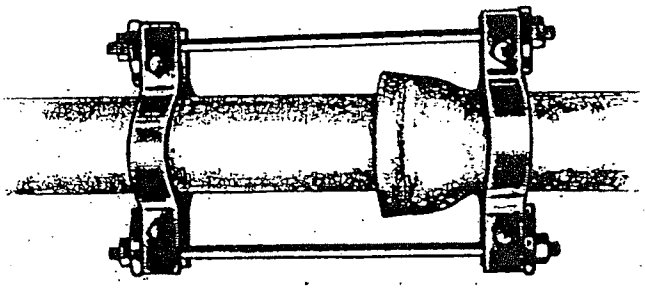
Tie Rods to connect may be all-thread steel rod or round iron threaded on both ends.



SLIP JOINT BELL CLAMPED TO M.J. OPENING

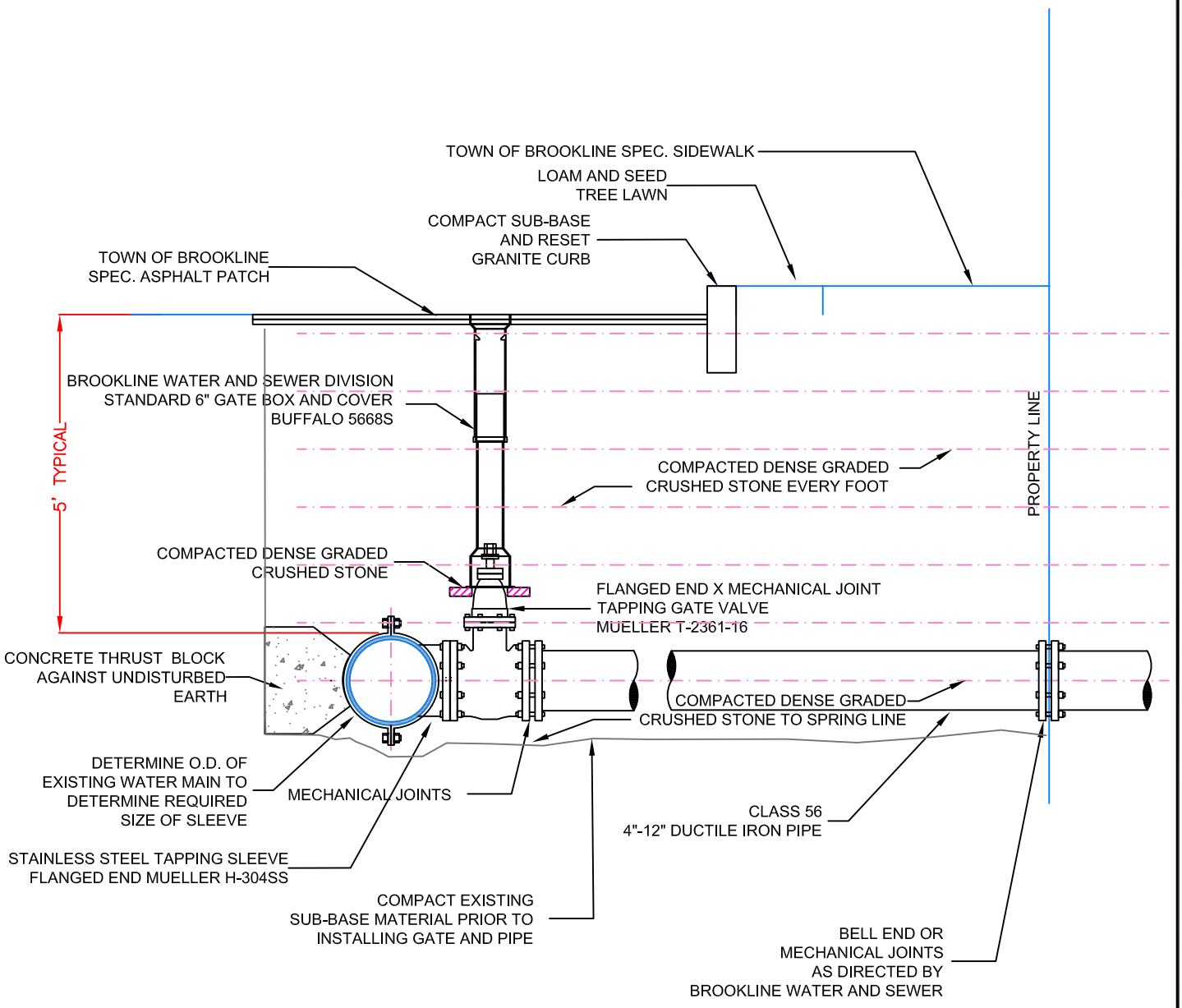


ASBESTOS-CEMENT CLAMPED TO FITTING



PIPE CLAMPED TO SLIP ON BELL

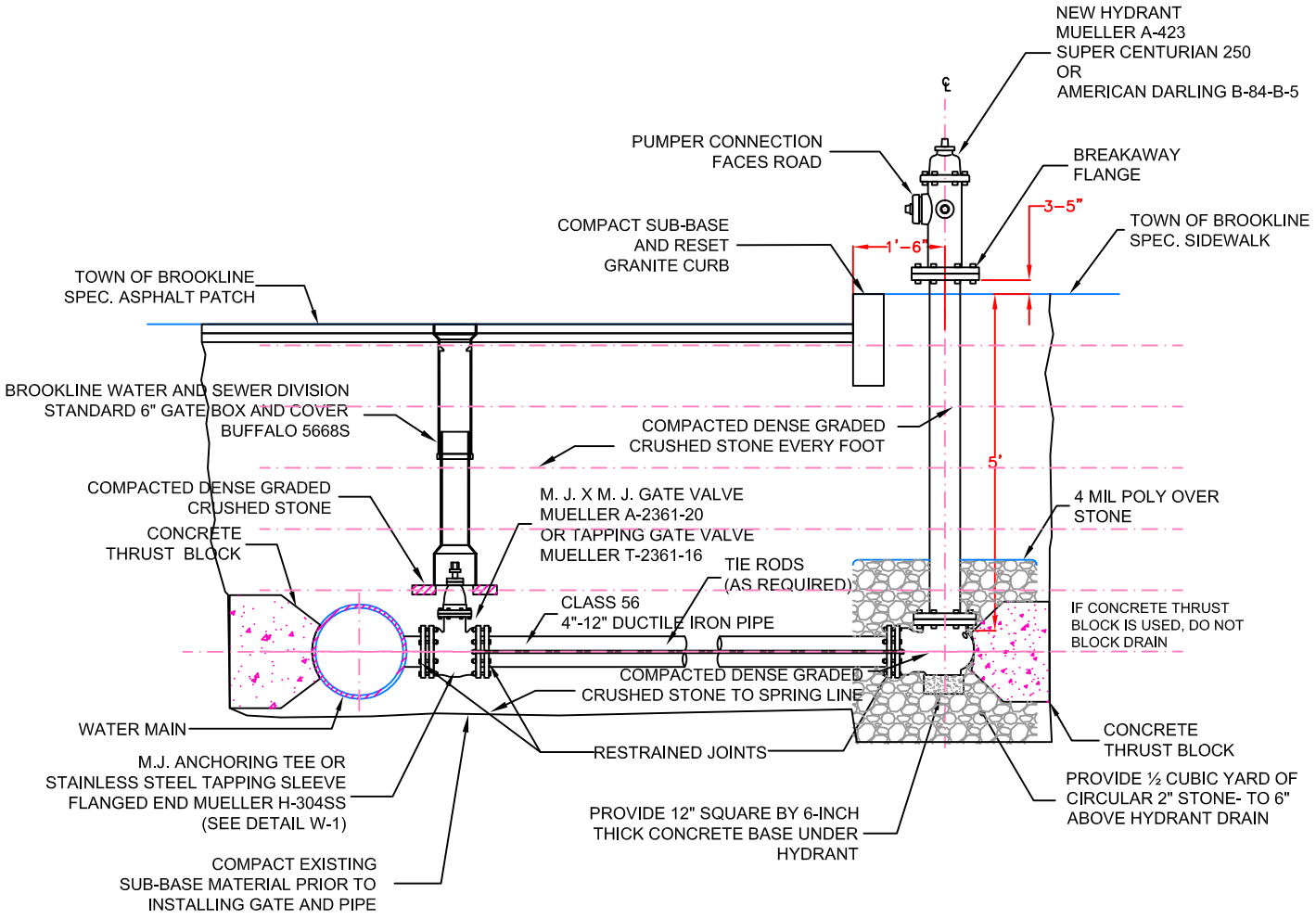
NOTES:
- CONCRETE THRUST BLOCK TO BE INSTALLED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.
- USE RESTRAINED JOINT FITTINGS OR TIE RODS IN ADDITION TO CONCRETE THRUST BLOCK.
- SIZE OF BLOCK AND MECHANICAL JOINT RESTRAINT SYSTEM TO BE DESIGNED FOR ACTUAL FIELD CONDITIONS.
-ALL WORK MUST BE SCHEDULED AND INSPECTED BY BROOKLINE WATER & SEWER DIVISION PRIOR TO BACK FILL



W-1

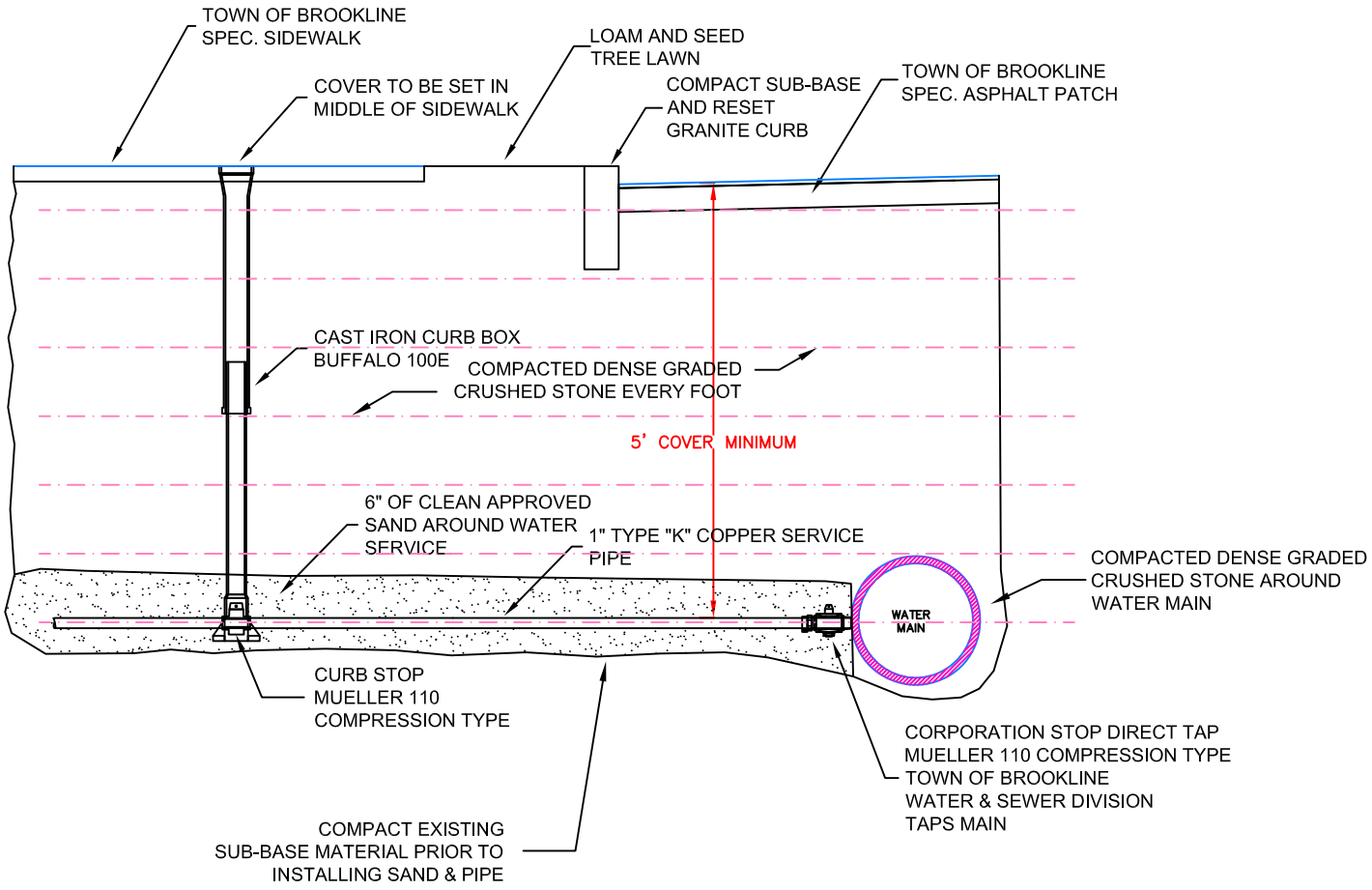
BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	**TAPPING SLEEVE AND GATE VALVE WATER PIPE CONNECTION** **SCALE: NOT TO SCALE**	**DATE:** **SEPT. 16, 2014**	**DETAIL NUMBER** **W-1**

NOTES:
- CONCRETE THRUST BLOCK TO BE INSTALLED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.
- USE RESTRAINED JOINT FITTINGS OR TIE RODS IN ADDITION TO CONCRETE THRUST BLOCK.
- SIZE OF BLOCK AND MECHANICAL JOINT RESTRAINT SYSTEM TO BE DESIGNED FOR ACTUAL FIELD CONDITIONS.
-ALL WORK MUST BE SCHEDULED AND INSPECTED BY BROOKLINE WATER & SEWER DIVISION PRIOR TO BACK FILL



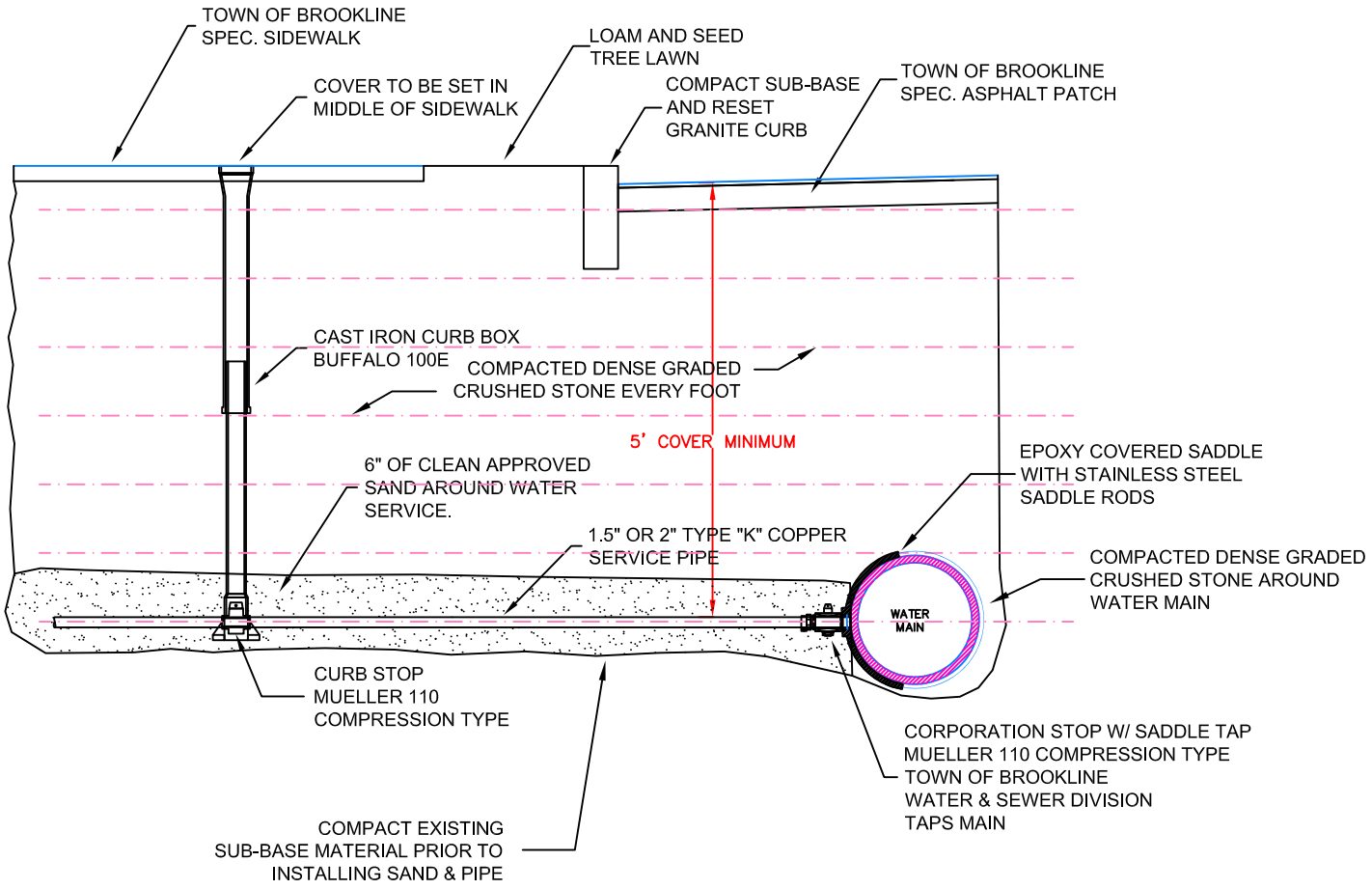
W-2

BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	**NEW HYDRANT DETAIL** **SCALE: NOT TO SCALE**	**DATE:** **SEPT. 16, 2014**	**DETAIL NUMBER** **W-2**



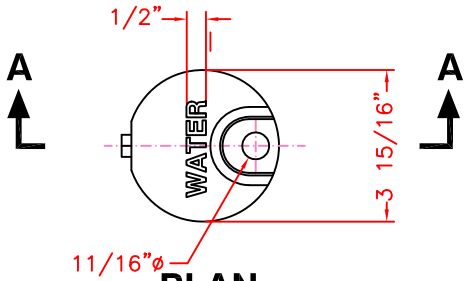
W-3

	BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	**NEW "K" TYPE 1" WATER SERVICE** **SCALE: NOT TO SCALE**	**DATE:** **SEPT. 16, 2014**	**DETAIL NUMBER** **W-3**



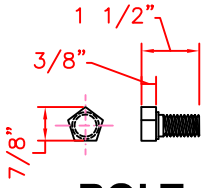
W-4

	BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	**NEW "K" TYPE 1-1/2" OR 2" WATER SERVICE** **SCALE: NOT TO SCALE**	**DATE:** **SEPT. 16, 2014**	**DETAIL NUMBER** **W-4**

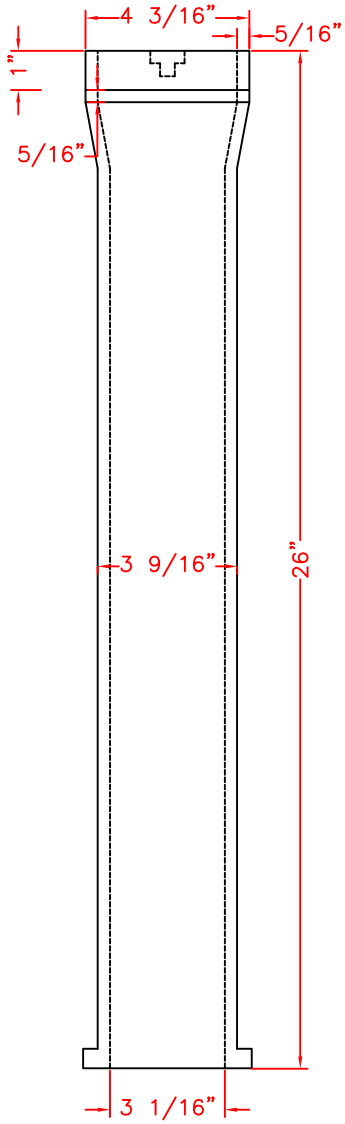


PLAN

SECTION A-A
COVER

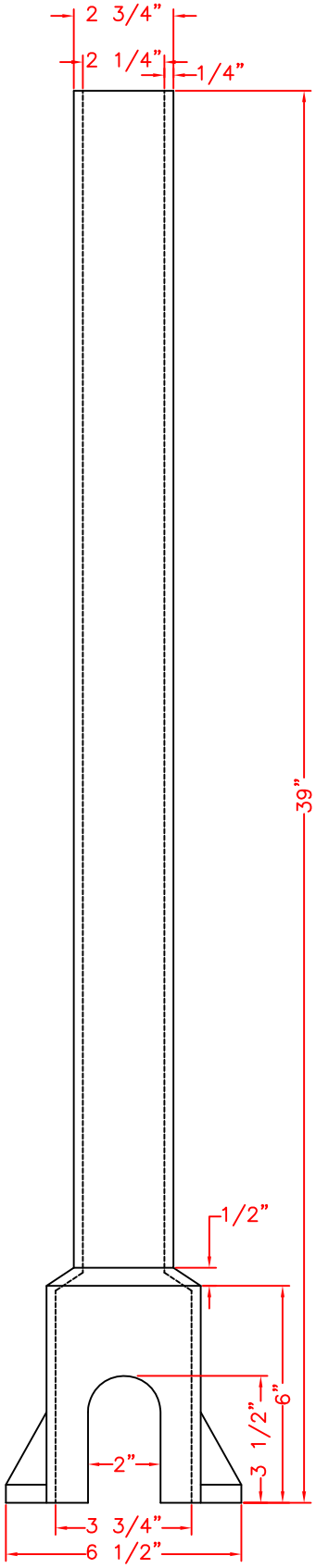


BOLT



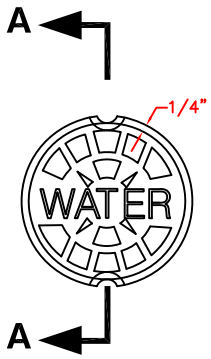
TOP SECTION

W-5

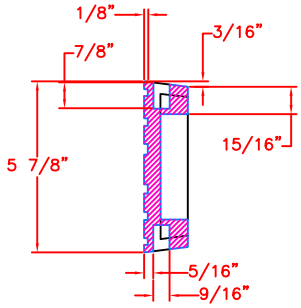


BOTTOM SECTION

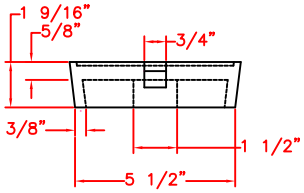
BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	CAST IRON CURB BOX FOR 1" AND 1.5" WATER SERVICES SCALE: NOT TO SCALE	DATE: SEPT. 16, 2014	DETAIL NUMBER W-5



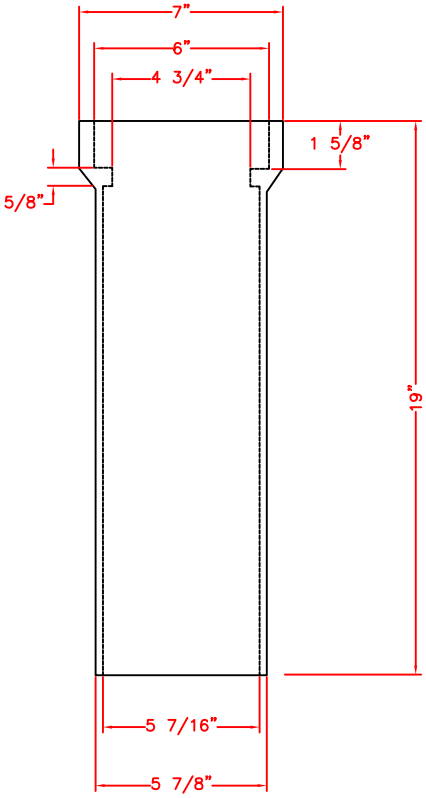
PLAN



SECTION A-A

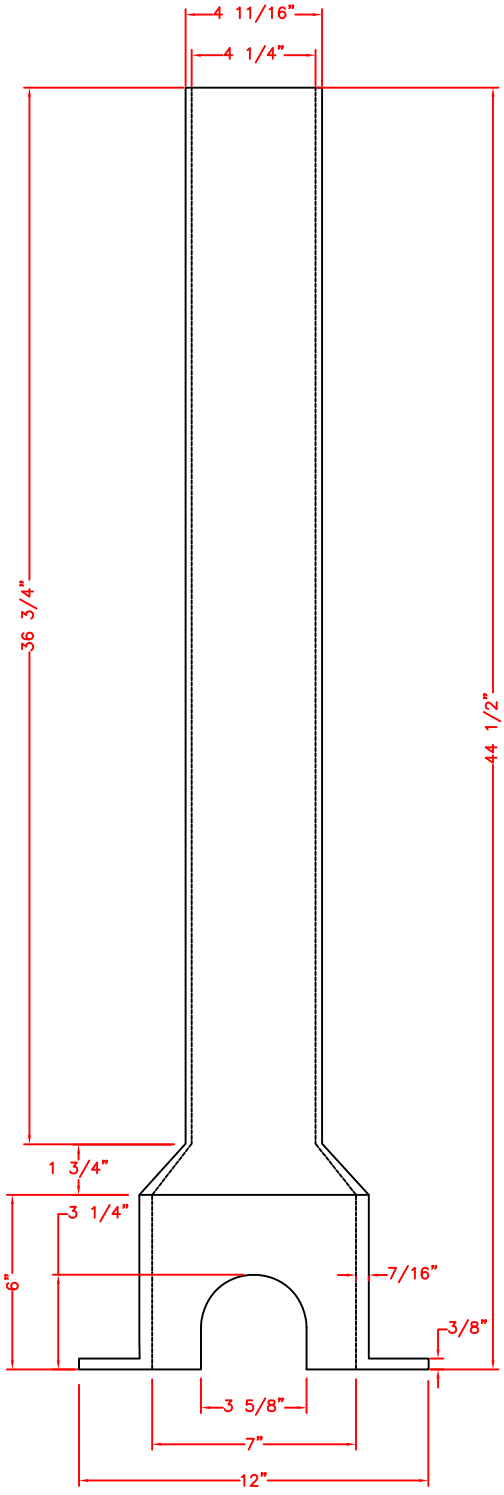


COVER



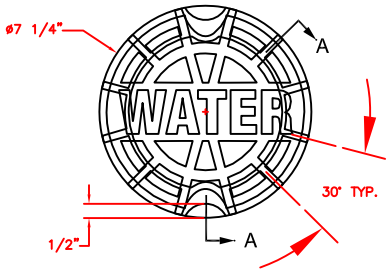
TOP SECTION

W-6

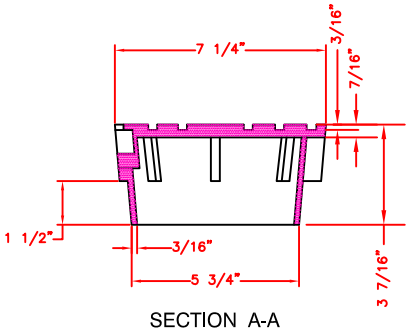


BOTTOM SECTION

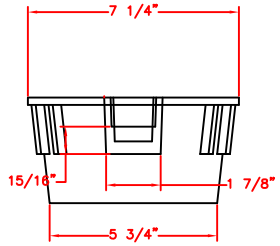
BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	4 1/2" ROADWAY BOX FOR 2" WATER SERVICE SCALE: NOT TO SCALE	DATE: SEPT. 16, 2014	DETAIL NUMBER W-6

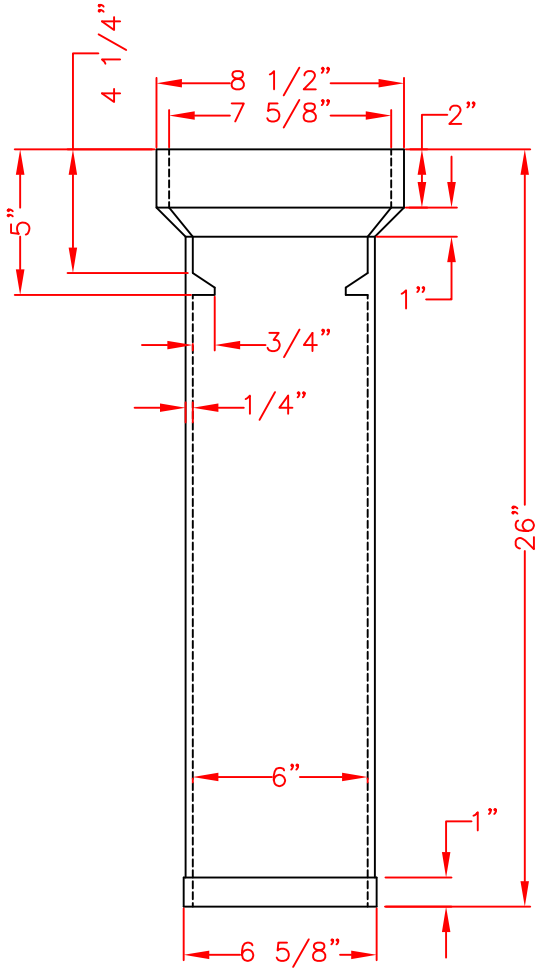


COVER



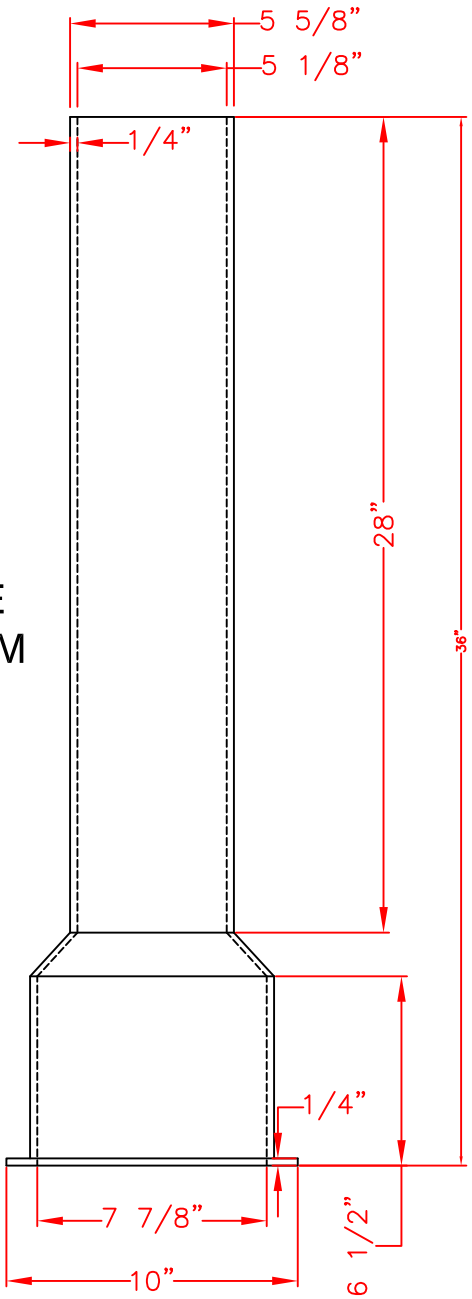
SECTION A-A





TOP SECTION

ACCESS TUBE
TOP & BOTTOM



BOTTOM SECTION

W-7

BROOKLINE WATER AND SEWER DIVISION 333 WASHINGTON STREET BROOKLINE, MA 02445 617-730-2170 (OFFICE) 617-730-2175 (SHOP)	**CAST IRON 6" GATE BOX FOR 4", 6", 8", 10", 12" GATE VALVES** SCALE: NOT TO SCALE	DATE: SEPT. 16, 2014	DETAIL NUMBER W-7

TOWN OF BROOKLINE, MA

Portland Cement Concrete Sidewalk Specifications

All cement concrete walks to be placed in the Public Ways of the Town of Brookline shall conform to the following:

1. Concrete shall be formed, placed on an approved base, properly finished and cured by experienced concrete finishers under the inspection of the Department of Public Works.

2. Concrete shall be "Class D" (4,000 p.s.i.) in accordance with Section M4.02.00 of the "Standard Specifications for Highways and Bridges" of the Massachusetts Highway Department with 610 lbs. of portland cement, maximum aggregate size of ¾" and 0.20 gallons of Carbo Jet Dispersed Carbon Black or 2.0 pounds of Lamp Black color admixture per cubic yard of concrete with 6% ± 1% entrained air in place.

3. Concrete slump shall not exceed five (5) inches

4. Thickness of concrete sidewalks shall be four (4) inches, (six (6) inches at driveways.)

5. Concrete walks shall be **non**-reinforced.

6. Control joints shall be straight and to a depth equal to one-quarter of the finished depth. Spacing of control joints will depend on the width of the sidewalk and shall form square or nearly square panels.

7. The concrete shall be screeded and darbied or bull floated (not to excess). A proper waiting period shall be allowed for settlement and bleeding before final finishing. A transverse soft broom finish is required.

8. Concrete shall be sprayed in two directions with an adequate amount of impervious membrane curing compound according to Subsection 476.71C of the "Standard Specifications for Highways and Bridges".

9. Expansion joints shall be to the **full** depth and width of the concrete slab and shall be placed at vertical or horizontal direction changes, where pavement thickness changes, at each end of tree pits, and around all poles.

10. Bond breaking material shall be used where concrete is placed against walls, etc.

11. All concrete walk layout and design shall be reviewed with the Engineering Division representatives well in advance of construction and shall be inspected by this Division during construction. Air tests and strength cylinders may be taken by the Division to verify proper materials and compliance with the specifications.

12. All equipment, materials and tools shall be on the job before placing concrete.

13. All Concrete sidewalks and driveways shall be installed in accordance with the **latest A.D.A. requirements**.

TOWN OF BROOKLINE

BITUMINOUS CONCRETE FOR PERMANENT PATCHING OF ROADWAYS & SIDEWALKS

Description

General

The present surface shall be excavated to a line and grade as directed. The edges of all excavated areas shall be cut on straight lines with vertical faces to a sufficient depth to allow a minimum depth of three (3) inches of bituminous concrete binder and one and one-half inches of bituminous concrete top for roadways and two (2) inches of binder and one (1) inch of top for sidewalks. **The depth of mix shall be equal to the adjoining pavement.**

Materials

General

Materials for bituminous concrete for permanent patching of roadways and sidewalks shall meet the requirements specified in Subsection 460.40.

Construction of Methods

Preparation of Area to be Patched

The area to be patched shall be a minimum one (1) foot cut back beyond the outer extremities, cut on a straight line with vertical faces and to a depth as directed by the Engineer. The cutting shall be my means of a pneumatic cutting tool. The depth of material excavated shall be determined by the Engineer. The excavated material will be disposed of by the Contractor at an off-site disposal area supplied by the Contractor. All subgrade areas shall be thoroughly compacted, by rolling or other Engineer approved methods before any new pavement courses are applied.

The exposed vertical edges of the cut shall be painted with a thin coat of bitumen (Department specification RC-70 or RS-1), during each pavement course (Binder and Top).

Transportation and Delivery of Mixtures

Transportation and Delivery of Mixtures for permanent patching of roadways shall meet the requirements specified in Subsection 460.61.

Placing and Compacting Mixtures

The mixtures shall be placed and compacted only at such times as to permit the proper inspection and checking by the Engineer.

The mixtures shall be placed only upon approved clean and dry surfaces; and when weather conditions are suitable. The engineer may however, at the entire responsibility of the Contractor, permit work to continue when over-taken by sudden rain, up to and only the amount of material which may be in transit from the plant at the time and then only when the temperature of the mixture is within the temperature limits specified and the existing surface on the roadway is not excessively wet.

The bituminous concrete shall be placed in courses as specified and as directed by the Engineer.

When an existing surface or new base upon which the bottom course is to be placed contains unsatisfactory irregularities, in the Engineer's judgement, such irregularities shall be eliminated by an adequate placing and compaction of mixture so as to furnish a surface with true contour and grade before placing any actual set course of mixture.

Any surface upon which new mixture is placed shall be clean from foreign materials of any nature, dry, at the required temperature and prime coated as may be necessary.

After the paving mixture has been spread initial compaction shall be obtained by the use of power rollers weighing not less than 3 to 5 tons for roadways and not less than 1 to 3 tons for sidewalks.

Each roller shall be operated by a competent, experienced roller operator. The mixture shall be rolled longitudinally, diagonally and transversely as may be necessary to produce the required contour for surface. Longitudinal rolling shall start at the side and proceed toward the center of the pavement, except on super elevated curves where the rolling shall begin on the low side and progress to the high side, overlapping on successive trips by at least 12 inches. The rolling shall be continued and so executed that all roller marks, ridges, porous spots and impressions are eliminated and the resulting surface has the required grade and contour. The motion of the rollers shall at all times be slow enough to avoid any displacement of the hot mixtures; and any displacement or marring of the surface occurring as a result of reversing the direction of the rollers, or from any other cause, shall be corrected. To prevent adhesion with the mixture, the wheels of the rollers shall be kept lightly moistened with water but excess water will not be permitted. The use of oil for this purpose will not be allowed.

Along curbs, structures and all places not accessible with a roller, the mixture shall be thoroughly compacted with tampers. Such tampers shall weigh not less than 25 pounds and shall have a tamping face of not more than 50 square inches. The surface of the mixture after compaction shall be smooth and true to the established line and grade.

Any mixture which becomes loose or broken, mixed with dirt, or in any way defective shall be removed and replaced with new mixture which shall be compacted to conform with the surrounding area. Areas of one square foot or more showing an excess of bitumen shall be removed and replaced.

All joints (including the vertical edges) shall be completely painted with emulsion and the top surface sanded immediately after compacting has been completed.

If, at any time before the final acceptance of the work, any soft, imperfect places or spots shall develop in the surface all such places shall be removed and replaced with new materials and then compacted until the edges at which the new work connects with the old become invisible.

All such removal and replacement of unsatisfactory surfacing shall be done by the contractor as part of the payment made to him for the relevant contract items.

No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climate or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.

Special Note: All roadways with a P.C.I. of " 95" or better, will also be infrared with-in thirty (30) days.