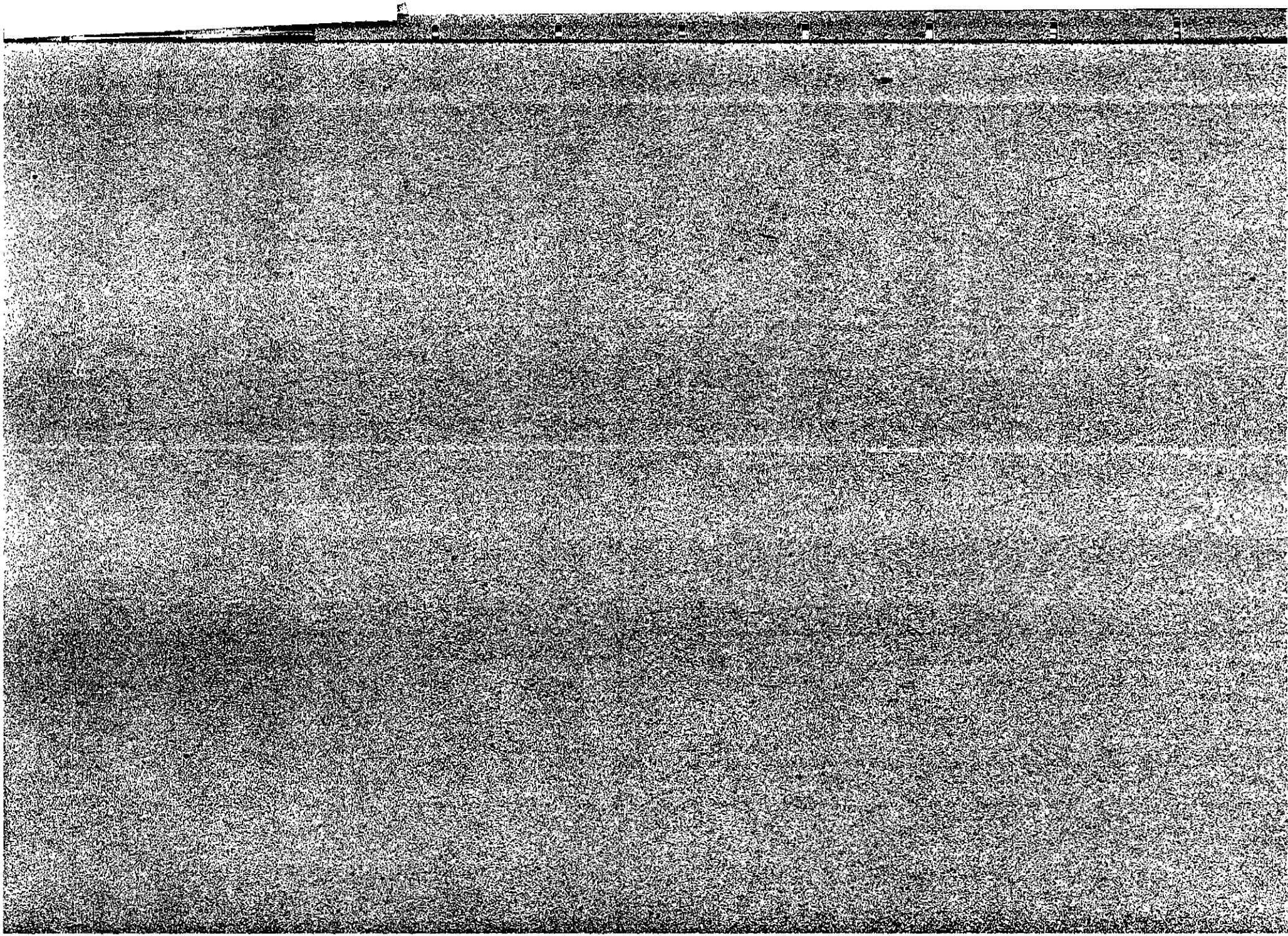
Rycon, INC. - Marsh Water Line Replacement



RYCON, INC.
MARSH LANE WATER LINE REPLACEMENT
ADDISON, TEXAS

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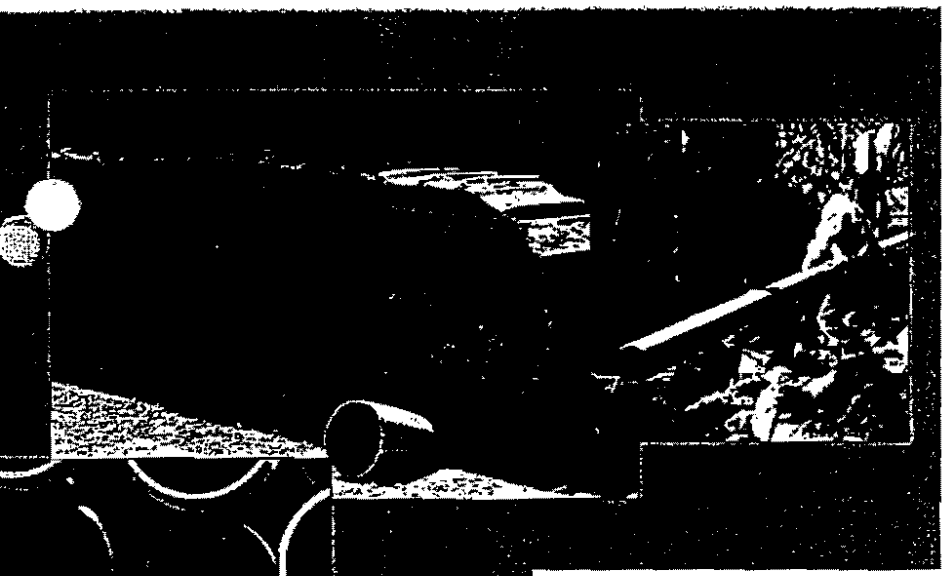
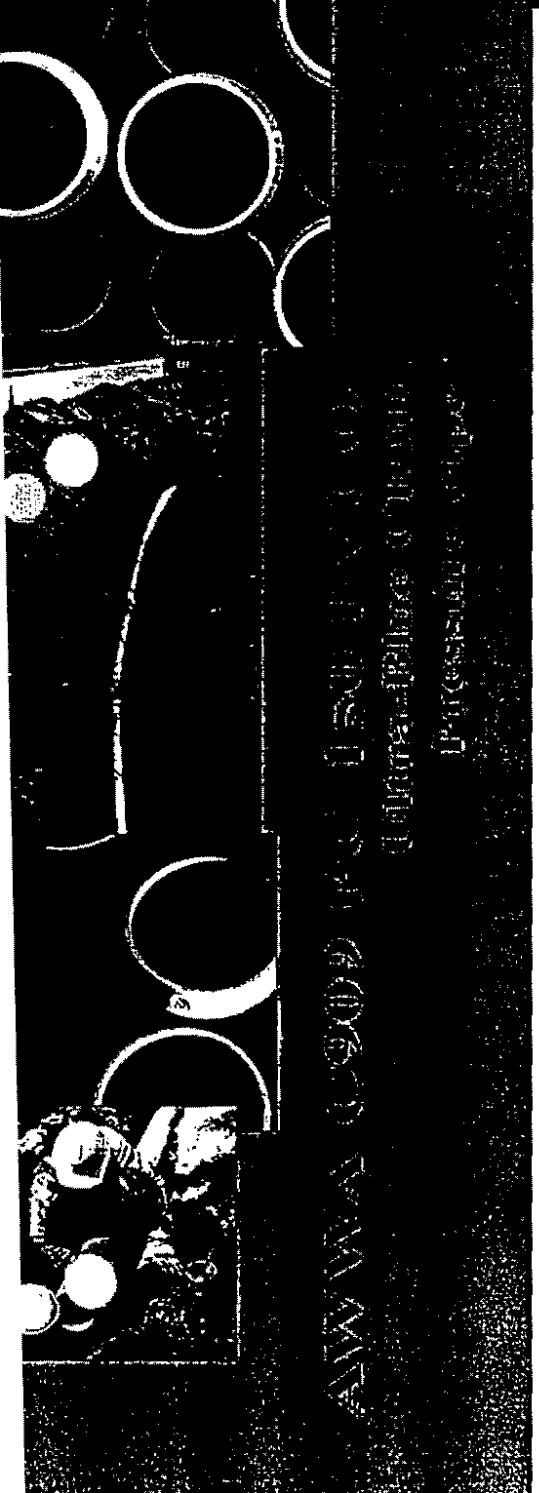
I. PIPE-C909 ULTRA BLUE PVC WATER PIPE





Uponor

Uponor ETI Company

Ultra-Blue CIOD

Molecularly Oriented for High Strength and Superior Performance

Ultra-Blue CIOD
AWWA C909 Class 150 PVC Molecularly Oriented Pressure Pipe with Cast Iron O.D.s

Non-Corroding

Ductile Iron Pipe O.D.s
No transition gaskets or special fittings required

Larger I.D. than Ductile Iron or Conventional PVC
Superior flow capacity and less head loss

Lighter Weight than Ductile Iron or Conventional PVC
43% lighter than C900-DR-18, safer and easier to handle, lower installed cost and more footage installed per day

Higher Impact Strength
Four times regular PVC and no linings to crack or flake off

Greater Cyclic and Hoop Strength

Higher Design Basis Compared to Conventional PVC Pipe
HDB of 7100 psi versus 4000 psi

Superior Notch Resistance
Resists splitting and crack propagation
Pipe will not split from end to end

One of the Safest and Easiest Pressure Pipes to Tap

Go with the flow...
Go Ultra-Blue CIOD

Introduction

Ultra-Blue PVCO Pressure Pipe manufactured by Uponor ETI combines innovative engineering design with years of experience in PVC pipe manufacturing. The result is a higher performance, lighter weight, more cost effective pressure pipe for potable water and force main systems.

PVCO stands for Molecular Oriented Poly(Vinyl Chloride) (PVC). The process of molecular orientation has long been used to strengthen many materials. Ultra-Blue is manufactured by a process that reorients the molecules of conventionally extruded PVC pipe. The pipe, approximately half the diameter and twice the wall thickness of the finished Ultra-Blue product, is placed inside a mold sized to the proper outside diameter of the finished product. The temperature of the pipe is raised to the appropriate level for expansion and internal pressure is applied. This internal pressure causes the pipe to uniformly expand to the inside dimensions of the mold. The mold is designed so that during the process, the bell and gasket groove are also formed, producing a high quality bell.

During the pipe expansion process, the molecular orientation is changed and the physical properties of the finished pipe product are established. Improvements in design and physical properties include:

- **Greater Hoop Strength**
- **Greater Impact Strength**
- **Enhanced Cyclic Fatigue Resistance**
- **Lighter Weight**
- **Larger Inside Diameter**
- **Greater Flow Capacity**

Ultra-Blue meets all the requirements of AWWA C909 Class 150 psi with a 2.5 to 1 safety factor. Manufactured with ductile iron pipe diameters, coventional ductile iron fittings can be used without the need for transition gaskets.

Features

Greater Hoop Strength

The unique material structure of Ultra-Blue gives it a burst strength greatly in excess of conventional PVC pressure pipe with the same wall thickness. Long term hydrostatic pressure tests show Ultra-Blue has a Hydrostatic Design Basis (HDB) of 7100 psi. Conventional PVC pressure pipe has an HDB of 4000 psi. With equivalent safety factors, the wall thickness of Ultra-Blue can be reduced to approximately half that of conventional PVC pipe and still maintain the same pressure rating.

Lighter Weight

Ultra-Blue is lighter weight than ductile iron and conventional PVC pipe. The table below compares the weight of Ultra-Blue, ductile iron and conventional PVC pipe. The difference results in easier handling and installation.

AWWA C909 - Class 150 psi

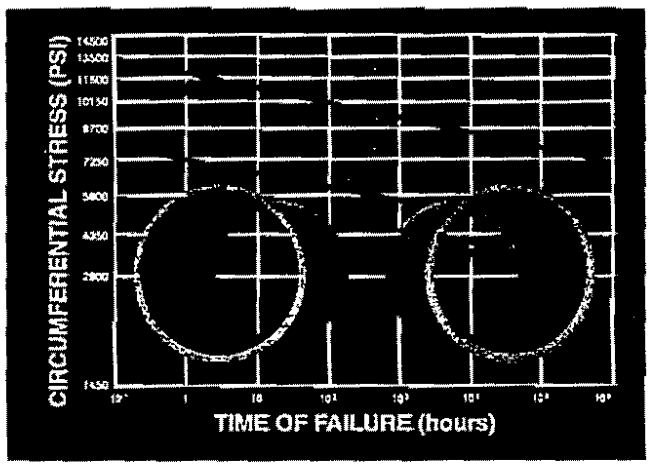
Nominal Pipe Size	SDR18Approx. Wght. (lbs./ft.)	DI Approx. Wght. (lbs./ft.)	UB Approx. Wght. (lbs./ft.)
6"	5.12	16.50	2.80
8"	8.89	22.00	4.82
10"	13.47	28.25	7.70
12"	19.00	36.25	10.45

Greater Impact Strength

Impact tests per ASTM D2444 demonstrate Ultra-Blue's superior impact resistance when compared to conventional PVC pressure pipe. Ultra-Blue has an impact strength three to four times greater than conventional PVC pipe of the same class.

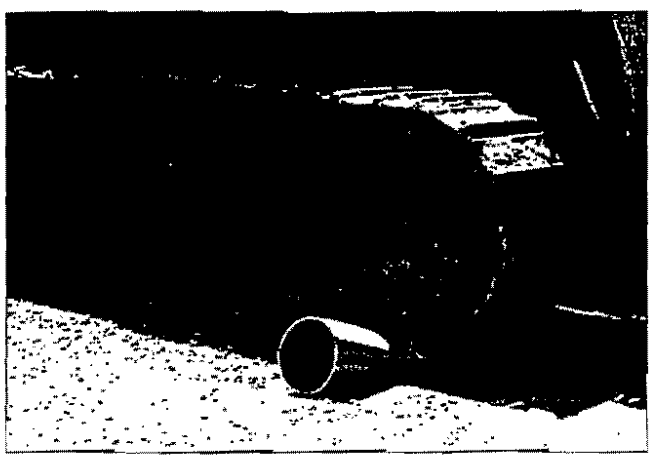
Stress Regression Line

As shown above, by orienting conventionally extruded PVC pipe, actual pressure capability is dramatically increased.



Non-Corrosive

Ultra-Blue, because it is non-metallic, will not corrode.

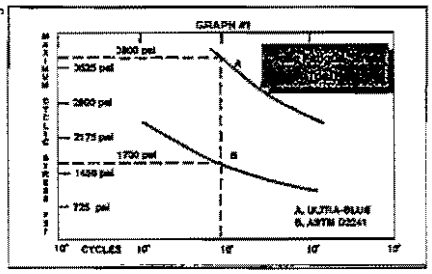


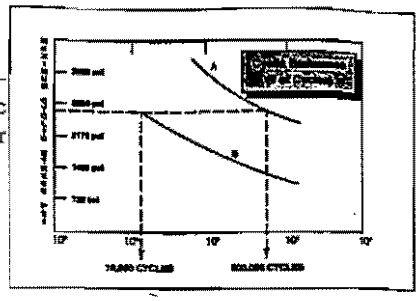
Performance & Installation

Performance

Enhanced Cyclic Fatigue Resistance

Abrupt pressure changes in a pipe line contribute to cyclic stresses and expansion and contraction of the pipe. Ultra-Blue's oriented configuration contributes to exceptional cyclic fatigue resistance, which is much greater than conventional PVC pipe. Ultra-Blue allows four times the number of cycles to failure, compared to conventional PVC pipe.





Larger Inside Diameter Equals Superior Flow Capacity

Ultra-Blue's high hoop strength results in equal pressure ratings, while being lighter weight than ductile iron or conventional PVC. Consequently, when Ultra-Blue is manufactured with a CI O. D., larger I. D.s result, and cross sectional areas are increased by approximately 9%. Because it has the same smooth interior (C=150) as all PVC pressure pipes, and is supplied in the same 20 foot laying lengths, Ultra-Blue will supply approximately 9% greater flow capacity over ductile iron and conventional PVC pipes of the same pressure rating.

	DR18 - C.I.O.D.			Ductile Iron*			Ultra-Blue C.I.O.D.		
Nominal Pipe Size	PSI Rating @ 73° F	O.D. Nom.	Wall Thickness	I.D. Nom.	O.D. Nom.	Thickness for Design Strength & Tapping**	Net Iron Hydraulic Inner Diameter***	O.D. Nom.	Wall Thickness	I.D. Nom.
6"	150	6.90	0.383	6.134	6.90	0.18	6.025	6.90	0.209	6.48
8"	150	9.05	0.503	8.044	9.05	0.18	8.175	9.05	0.274	8.50
10"	150	11.10	0.617	9.866	11.10	0.18	10.205	11.10	0.336	10.43
12"	150	13.20	0.733	11.734	13.20	0.20	12.265	13.20	0.400	12.40

**Based on PC 355 ductile iron pipe, if thickness classes are used, wall thicknesses increase and I.D. decreases accordingly*
***Based on PC 350 ductile iron pipe (per AWWA C151 and M41) and subject to tolerances*
****Including cement mortar lining*

Installation

The Sealing System

The retained gasket is a combined lip and compression seal, which is locked inside the bell groove.

Making the seal an integral part of the pipe eliminates many of the disadvantages of separate sealing rings. The seal is positioned in the bell by the pipe manufacturer.

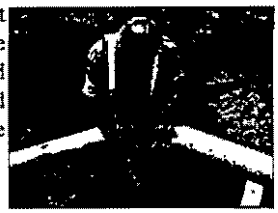
The unique design, with the reinforcing plastic element, is a one piece seal, which holds the sealing ring securely in position during transport and pipe assembly.

Backfilling and Testing

Backfilling should be done immediately after installing each length of pipe. Backfill that will lay adjacent to the pipe should contain no large rocks or hard clods. Tamp around and under the pipe to insure adequate soil support. Pipe may be tested at any time after installation. Prior to testing, make sure the line is properly thrust blocked and all air has been evacuated. Do not exceed the maximum water pressure rating of the pipe.

Fittings

Ultra-Blue has ductile iron (DI) outside diameters (O. D.), making standard PVC gasketed fittings compatible. **(Note: solvent weld PVC fittings cannot be used.)** Ductile iron or cast iron mechanical joint fittings and ductile iron push on type fittings can be installed directly onto Ultra-Blue, using the standard M.J. gasket made for cast iron or ductile iron pipe.



Joint Restraint Devices

Any joint restraint devices that are commonly used with standard PVC can be used with Ultra-Blue.

Joint Assembly

Ultra-Blue will arrive on the jobsite with the gasket installed, ready for assembly. Assemble as follows:

1. Inspect the bell and remove any foreign matter such as mud, sand or ice.
2. Clean off the spigot end of the pipe and apply lubricant to the spigot end, covering the beveled nose and sealing surface all the way to the stop mark.
3. Place the beveled end in the companion bell and provide straight alignment.
4. Push the pipe straight home with a bar and block until the stop mark on the spigot end is even with the end of the bell.
5. After assembly to the stop mark, the joint may be deflected axially up to 2 degrees.

Note:

1. Do not assemble the joint by swinging or stabbing.
2. Ultra-Blue can not be solvent welded.

Tapping

Ultra-Blue is one of the easiest and safest pipes to tap. Ultra-Blue may be tapped with the same tapping saddles used on conventional C900 PVC pipe. The service clamps or saddles used should:

a) provide full support around the circumference of the pipe.
b) provide a bearing area of sufficient width along the axis of the pipe.

Standards & Listings

Ultra-Blue (PVCO) pipe shall be manufactured in accordance with the following standards:

AWWA C909 - AWWA Standard for Molecular Oriented Poly(Vinyl Chloride) (PVCO) Pressure Pipe, 4"-12", for Water Distribution

ASTM D1784 - Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

ASTM D3139 - Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

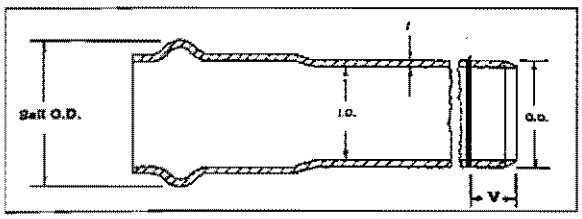
UNI-B-1 - Recommended Specification for Thermoplastic Pipe Joints - Pressure and Non-Pressure Applications

ANSI/NSF STANDARD NO. 61 - Drinking Water System Components - Health Effects

UL STANDARD 1285 - Pipe and Couplings, Poly(Vinyl Chloride) (PVC) for Underground Fire Service

FM CLASS #1612 - Approval Standard Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings for Underground Fire Protection Service

Pipe Dimensions & Weights



Nominal Pipe Size (mm)	PSI Class @73° F	Nominal Bell O.D. in. (mm)	Nominal Barrel O.D. in. (mm)	Min. Wall Thickness (t) in. (mm)	Nominal Barrel I.D. in. (mm)	Nominal Stop Mark (v)* in. (mm)	Approx. Wght.Lbs/Ft.	Approx. Wght. Lbs/Jnt
(152)	150	8.40 (213)	6.90 (175)	.209 (5.31)	6.48 (165)	5.75 (146)	2.8	56.0
8 (203)	150	10.75 (273)	9.05 (230)	.274 (6.96)	8.50 (216)	6.50 (165)	4.8	96.0
10 (254)	150	13.23 (336)	11.10 (282)	.336 (8.53)	10.43 (265)	7.25 (184)	7.7	154.0
12 (305)	150	15.48 (393)	13.20 (335)	.400 (10.16)	12.40 (315)	7.75 (197)	10.05	210.0

*plus or minus 1/2"

Warranty

All products sold are subject to the following warranty:
Uponor ETI (ETI) warrants for a period of one year from date of delivery to the original purchaser, that the product is free from defects in materials and workmanship. ETI makes no other warranty of any kind, express or implied, in fact or in law, including without limitation, the warranty of merchantability or the warranty of fitness for a particular purpose, other than the limited warranty set forth above. Every claim under this warranty shall be deemed waived, unless in writing and received by ETI within thirty (30) days of the date the defect to which each claim relates is discovered, or should have been discovered.

Limitation of Liability

It is expressly understood and agreed that the limit of ETI's liability shall be at ETI's sole option, repair or resupply of a like quantity of nondefective product, and that ETI shall have no such liability except where the damage results solely from breach of ETI's warranty. It is also agreed that ETI shall not be liable for any incidental, consequential, or other damages for any alleged negligence, breach of warranty, strict liability, or any other theory, other than the limited liability set forth above. The physical (or chemical) properties of ETI products represent typical average values obtained in accordance with accepted test methods, and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice.

Customer Service Centers
Missouri 800-341-0053
fax 573-474-1760
West Virginia 800-624-3111
fax 304-472-0742

Plants
Missouri 800-341-0053
fax 573-474-1760
West Virginia 800-624-3111
fax 304-472-0742
Texas 936-760-2888
fax 936-760-1357

uponor
Uponor ETI Company
1700 Broadway, Suite 1710
Denver, CO 80290
303-893-1101
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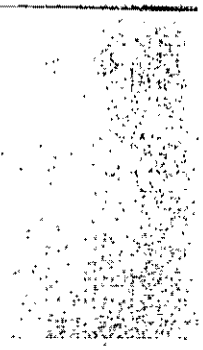
www.uponoreti.com



II. PIPE-SDR-26 PIPE

USFilter

USF DISTRIBUTION
4333 IRVING BLVD., 75247
P.O. BOX 569250
DALLAS, TX 75356-9250

TELEPHONE 214-631-9410
FACSIMILE 214-905-0768

CERTIFICATION OF CONFORMANCE

THIS CERTIFIES THAT THE FOLLOWING MATERIAL(S):

2" THRU 12" CLASS 160 SDR26 PVC WATER PIPE

AS FURNISHED BY U.S. FILTER/DISTRIBUTION GROUP TO:

PURCHASER: **Rycon, Inc.**

PROJECT: **Marsh Lane Wtr. Line Replacement**
Addison, Texas

MEET THE REQUIREMENTS OF THE FOLLOWING SPECIFICATION(S):

ASTM D2241 -	POLY (VINYL CHLORIDE) (PVC) PLASTIC PIPE (SDR-PR) PVC
NSF-PW -	NATIONAL SANITATION FOUNDATION
ASTM D1784 -	(COMPOUNDS)

CERTIFICATIONS FORWARDED:

SUBSCRIBED, AND SWORN TO
GROUP
BEFORE ME THIS DAY OF

DATE July 1, 2002

NOTARY Mary Lindsey
Mary Lindsey

MARY LINDSEY
NOTARY PUBLIC
State of Texas
Comm. Exp. 01-26-2004

U.S. FILTER/DISTRIBUTION

BY _____
Bruce Ellingsworth
LOCATION Dallas, Texas

III. GATE VALVES

MUELLER® 2360 SERIES™ RESILIENT WEDGE GATE VALVE

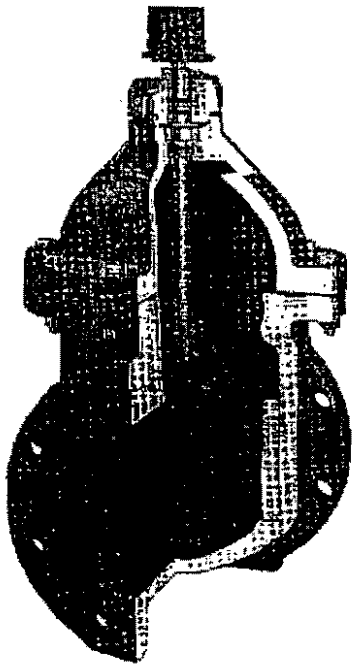
Mueller Co.

10A.1

REV. 3-97

MUELLER® 2-1/2"-12" Resilient Wedge Gate Valve Features

- ☐ TWO ANTI - FRICTION WASHERS — polymer washers (one above and one below the thrust collar) further reduce operating torque in both the opening and closing directions.
- ☐ TRIPLE O-RING SEALS — two above the trust collar, one below. Uppermost serves as dirt seal. Retain lubrication on thrust collar and isolate it from waterway and outside contamination. Top two can be replaced with valve fully open and under pressure.
- ☐ STEM — machined from forged manganese bronze bar stock for strength where it is needed most, at the thrust collar.
- ☐ WEDGE — cast iron, fully encapsulated in molded rubber complying with ASTM D2000.
- ☐ MUELLER® PRO-GARD™ FUSION EPOXY COATING— of nominal 6 mils protects all interior and exterior exposed iron surfaces and complies fully with AWWA 550 and is certified to NSF 61.
- ☐ MANUFACTURED AND TESTED — in compliance with ANSI/AWWA C509 Standard and is certified to ANSI/NSF 61. Manufactured at facility with ISO 9001 certification and UL 262, FM 1120/1130.
- ☐ BI-DIRECTIONAL FLOW
- ☐ FLAT BOTTOM SURFACES — allow all 2360 series valves to stand upright for ease of handling and storage.



- ☐ 250 PSIG MAXIMUM WORKING PRESSURE— hydrostatically tested at 500 psig. Surpasses ANSI/AWWA C509 standards by 25% (UL/FM 200 psig working pressure, 400 psig hydrostatic pressure).
- ☐ EXTENDED WEDGE GUIDES— molded as part of the wedge, fit into guide channels in the valve body and maintain optimum wedge alignment with the stem throughout the wedge's travel, preventing the disc from tilting downstream during operation.
- ☐ GUIDE CAP BEARINGS — protective guide cap bearings made of a polymer bearing material snap over each rubber encapsulated guide on the wedge, providing a bearing interface between the wedge guides and the body's interior guide channels, protecting both from wear, even after thousands of cycles under severe pressure and flow conditions.
- ☐ SMOOTH, OVERSIZED FLOW WAY — all Mueller 2360 series RW Valves have a full, round, unobstructed flow way which accommodates full-sized shell cutters without interference and which provides superior flow characteristics.
- ☐ TEN YEAR LIMITED WARRANTY — (see separate Mueller Warranty document for terms).

MUELLER® 14"-24" Resilient Wedge Gate Valve Features

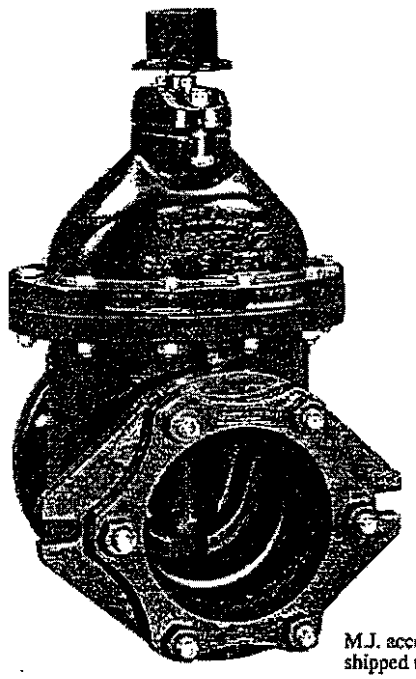
- ☐ DUCTILE IRON BODY & BONNET— with all interior and exterior exposed surfaces protected by fusion epoxy coating.
- ☐ FUSION EPOXY COATING— protects all interior and exterior exposed iron surfaces. Complies fully with AWWA C550.
- ☐ NON-RISING STEM — made of stainless steel.
- ☐ SOFT SEATED WEDGE — made of Ductile Iron with EPDM elastomer seal.
- ☐ FLAT BOTTOM SURFACES — allow all 2360 series valves to stand upright for ease of handling and storage.

- ☐ DOUBLE O-RING SEALS — above thrust collar area.
- ☐ EYEBOLTS — for greater convenience during handling.
- ☐ 250 PSIG MAXIMUM WORKING PRESSURE— 500 psig (3447 kPa) static test pressure.
- ☐ TEN YEAR LIMITED WARRANTY — (see separate Mueller Warranty document for terms).
- ☐ SMOOTH, OVERSIZED FLOW WAY — all Mueller 2360 series RW Valves have a full, round, smooth, unobstructed, oversized flow way which accommodates full-sized shell cutters without interference and which provides superior flow characteristics.

Mueller Co.

4"-12" MUELLER® A-2360 RESILIENT WEDGE GATE VALVES WITH M.J. x FL. ENDS

- Catalog number—
  A-2360-16 mechanical joint x flanged ends (with mechanical joint unassembled accessories)
  A-2360-19 mechanical joint x flanged ends (less mechanical joint accessories)
- Sizes— 4", 6", 8", 10", 12"
- Meets or exceeds all applicable requirements of ANSI/AWWA C509 Standard and is certified to ANSI/NSF 61
- Flanged end dimensions and drilling comply with ANSI B16.1, class 125
- Mechanical joint end complies with ANSI/AWWA C111 Standard
- 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)
- 2" square wrench nut (optional handwheel available)—open left or open right
- 4"-12" sizes—250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure
- UL Listed, FM Approved —200 psig (1379 kPa)



M.J. accessories shipped unassembled

A-2360-16

Options

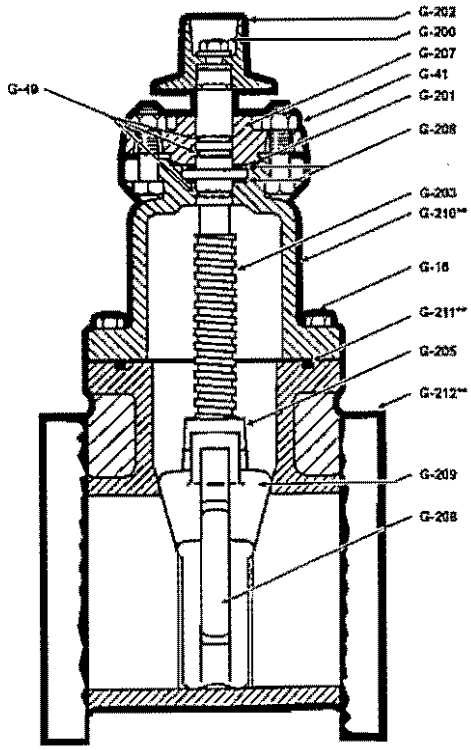
See pages 10.68 and 10.69 for more information on Resilient Wedge Gate Valve options

- ☐ Position indicators
- ☐ ASTM B98-C66100/H04 stem
- ☐ Stainless steel fasteners: Type 304, Type 316
- ☐ Handwheel

Resilient wedge gate valve parts

Catalog Part No.	Description	Material	Material standard
G-16	Bonnet Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-41	Stuffing Box Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-49	Stem O -rings (3)	Rubber	ASTM D2000
G-200	Wrench Nut Cap Screw	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-201	Stuffing Box Seal	Rubber	ASTM D2000
G-202	Wrench Nut	Cast Iron	ASTM A126 CL.B
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B62
G-206	Guide Cap Bearings	Celcon	
G-207	Stuffing Box	Cast iron	ASTM A126 CL.B
G-208	Anti-friction Washers (2)	Celcon	
G-209	Wedge, Rubber Encapsulated	Cast Iron*	ASTM A126 CL.B
G-210	Bonnet	Cast Iron	ASTM A126 CL.B
G-211	Bonnet O-ring	Rubber	ASTM D2000
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 ith additional bolts. Confirm the type of seal when ordering a replacement gasket or O-ring.

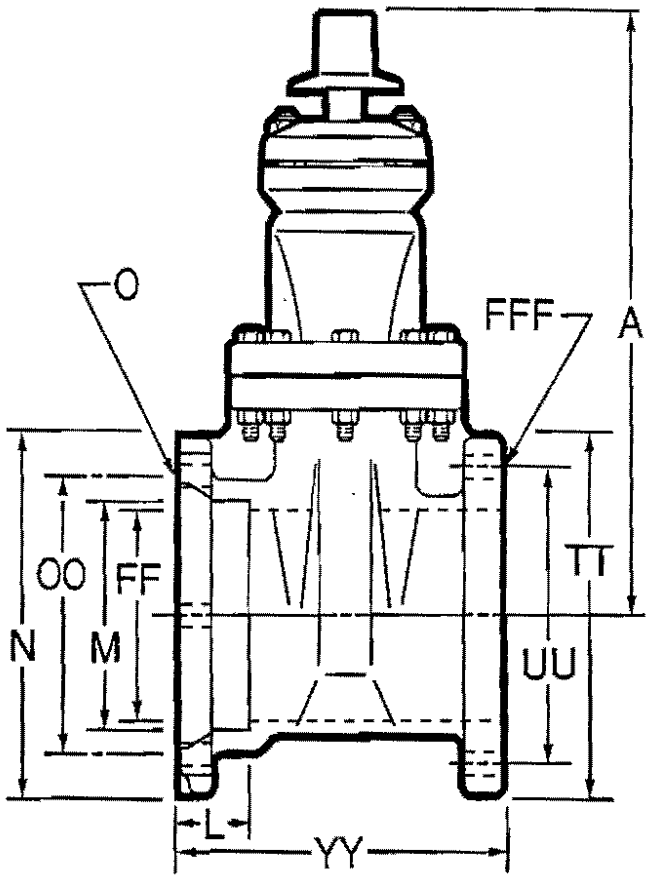


SEE PAGE 10.73 FOR ORDERING INSTRUCTIONS

4"-12" MUELLER® A-2360 RESILIENT WEDGE GATE VALVE DIMENSIONS - M.J. x FL. ENDS

Mueller Co.

REV. 4-99



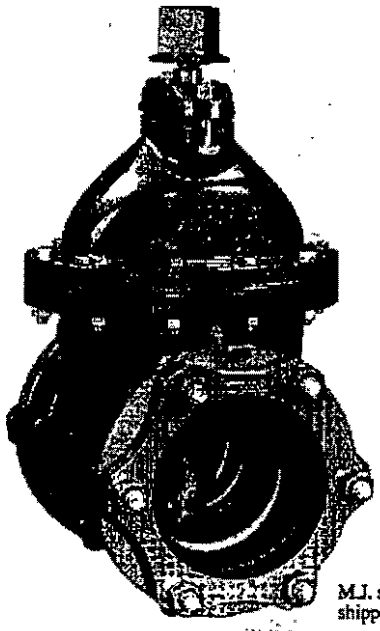
Dimensions

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
M	4.90	7.00	9.15	11.20	13.30
N	9.12	11.12	13.37	15.62	17.88
O (number and size of holes for MJ)	4—7/8"	6—7/8"	6—7/8"	8—7/8"	8—7/8"
FF	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
TT	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
YY	9.50	11.00	12.00	13.88	14.44
FFF (number and size of holes for FL)	8--3/4"	8—7/8"	8—7/8"	12—1"	12—1"
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 and are in approximate pounds.

MUELLER® A-2360 RESILIENT WEDGE GATE VALVES WITH M.J. x M.J. ENDS

- ☐ Catalog number—
  A-2360-20 Mechanical joint ends (with mechanical joint unassembled accessories)
  A-2360-23 Mechanical joint ends (less mechanical joint accessories)
- ☐ Sizes—2", 3", 4", 6", 8", 10", 12"
- ☐ Meets or exceeds all applicable requirements of ANSI/AWWA C509 Standard
- ☐ 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)
- ☐ 2" square wrench nut (optional handwheel available)—open left or open right
- ☐ 2"-12" sizes—250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure



M.J. accessories shipped unassembled

A-2360-20

Options

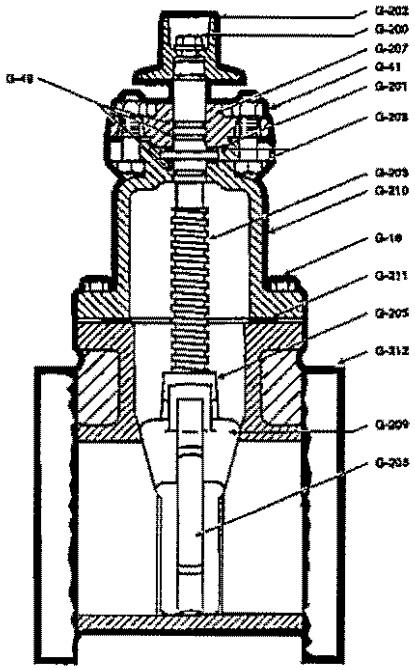
See pages 10.54 and 10.55 for more information on Resilient Wedge Gate Valve options

- ☐ Position indicators
- ☐ ASTM B98-C66100/H04 stem
- ☐ Stainless steel fasteners: Type 304, Type 316
- ☐ Handwheel

Resilient wedge gate valve parts

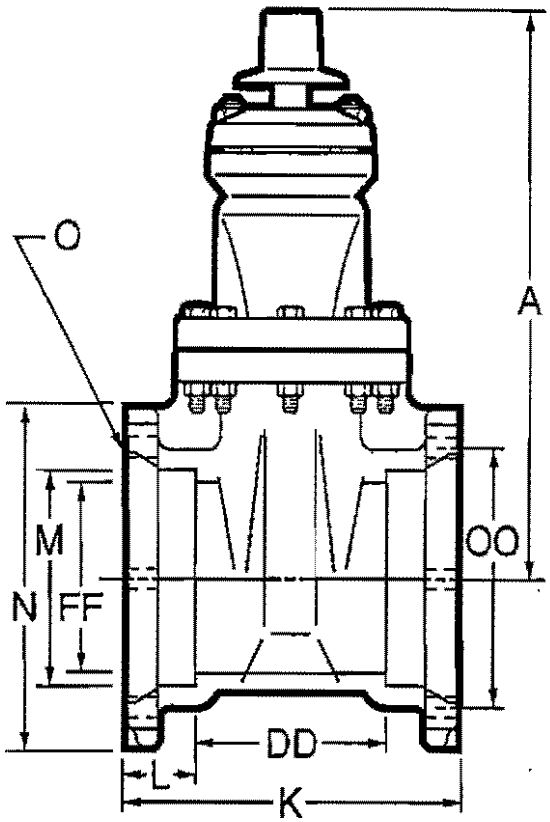
Catalog Part No.	Description	Material	Material standard
G-16	Bonnet Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-41	Stuffing Box Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-49	Stem O -rings (3)	Rubber	ASTM D2000
G-200	Wrench Nut Cap Screw	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-201	Stuffing Box Seal	Rubber	ASTM D2000
G-202	Wrench Nut	Cast Iron	ASTM A126 CL.B
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B62
G-206	Guide Cap Bearings	Celcon	
G-207	Stuffing Box	Cast iron	ASTM A126 CL.B
G-208	Anti-friction Washers (2)	Celcon	
G-209	Wedge, Rubber Encapsulated	Cast Iron*	ASTM A126 CL.B
G-210	Bonnet	Cast Iron	ASTM A126 CL.B
G-211	Bonnet Gasket	Rubber	ASTM D2000
	Body	Cast Iron	ASTM A126 CL.B

* Fully encapsulated in molded rubber with no iron exposed



SEE PAGE 10.59 FOR ORDERING INSTRUCTIONS

MUELLER® A-2360 RESILIENT WEDGE GATE VALVE DIMENSIONS - M.J. x M.J. ENDS



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
K	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
M	2.75	4.06	4.90	7.00	9.15	11.20	13.30
N	4.62	7.50	9.12	11.12	13.37	15.62	17.88
O (number and size of holes)	4—7/8	4—7/8	4—7/8	6—7/8	6—7/8	8—7/8	8—7/8
DD	3.50	4.00	5.00	6.50	7.50	9.75	9.88
FF	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	436	546

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

IV. FIRE HYDRANTS

MUELLER® SUPER CENTURION® FIRE HYDRANT

Mueller Co.

9.1

REV. 3-97

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.

☐ **STAINLES 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.

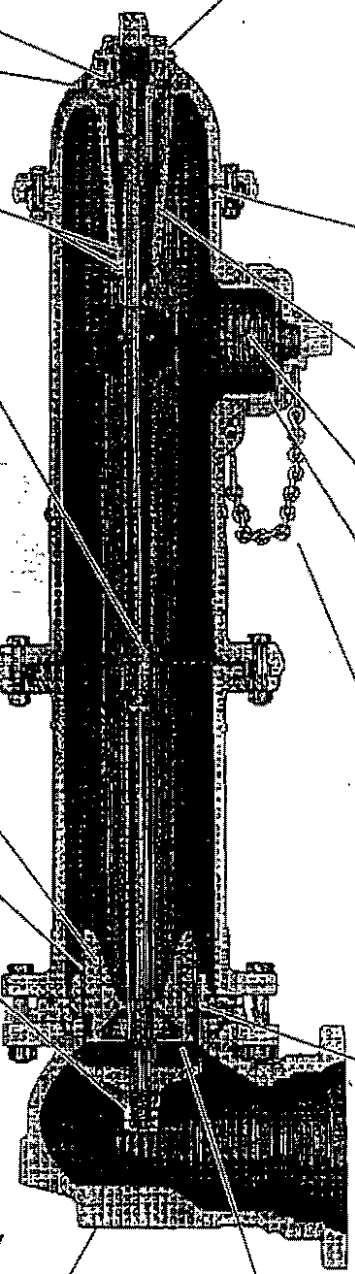
☐ **DRAIN VALVE FACINGS**— specially designed, long-life facings provide effective sealing.

☐ **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.

☐ **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.

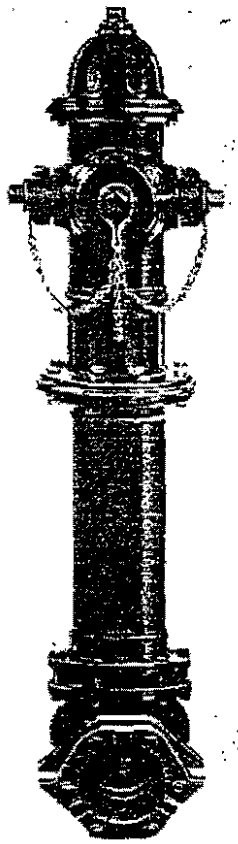
☐ **BRONZE SEAT RING**— threaded into drain ring and O-ring sealed. Seat ring is easily removed or installed from above ground. Each time main valve is opened or closed, double drain valves force-flush both drain valve openings to keep them open for effective barrel drainage. Bronze drain valves are integral parts of main valve assembly.

☐ **REVERSIBLE, COMPRESSION-TYPE MAIN VALVE(Patent Pending)** — closes with pressure for positive seal. Rubber material has long service life, yet is reversible providing a convenient spare in place.

Mueller Co.

MUELLER® SUPER CENTURION® FIRE HYDRANT

Super Centurion 250™ 3-way catalog numbers
(approved to UL 262, FM 1120/1130, 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 (Patent Pending)

Operating nut available in wide variety of shapes and sizes—open left or right

Field replaceable hose and pumper nozzles

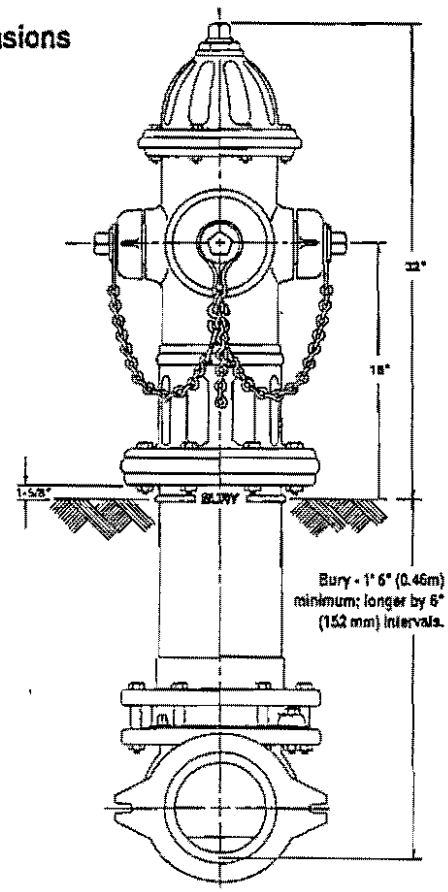
Hose and pumper nozzles have large radius, full flow openings for low friction loss

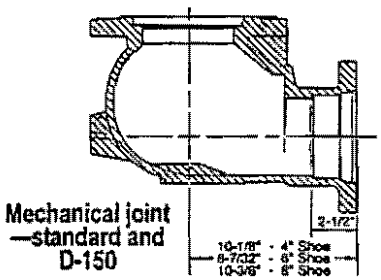
Contoured shoe is designed for full flow

Du onze drain valves provide effective barrel drainage

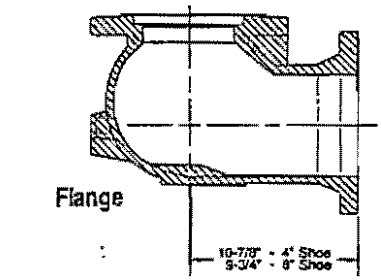
250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure for 3-way hydrants; 200 psig (1379 kPa) maximum working pressure, 400 psig (2758 kPa) static test pressure for 2-way and 1-way hydrants

imensions

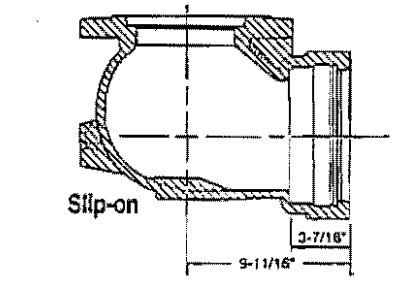




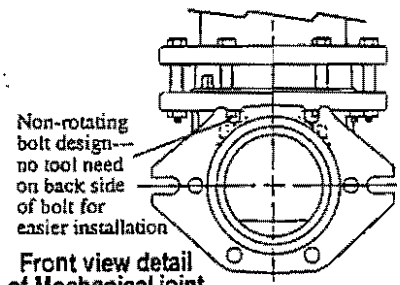
Mechanical joint —standard and D-150



Flange

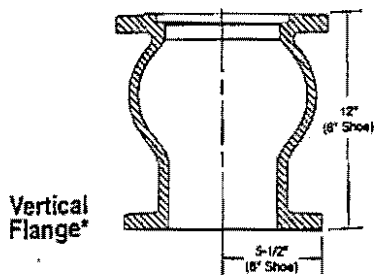


Slip-on



Non-rotating bolt design—no tool need on back side of bolt for easier installation

Front view detail of Mechanical joint (Standard only)



Vertical Flange*

* 4" Vertical shoe available for A-420 and A-421 hydrants.

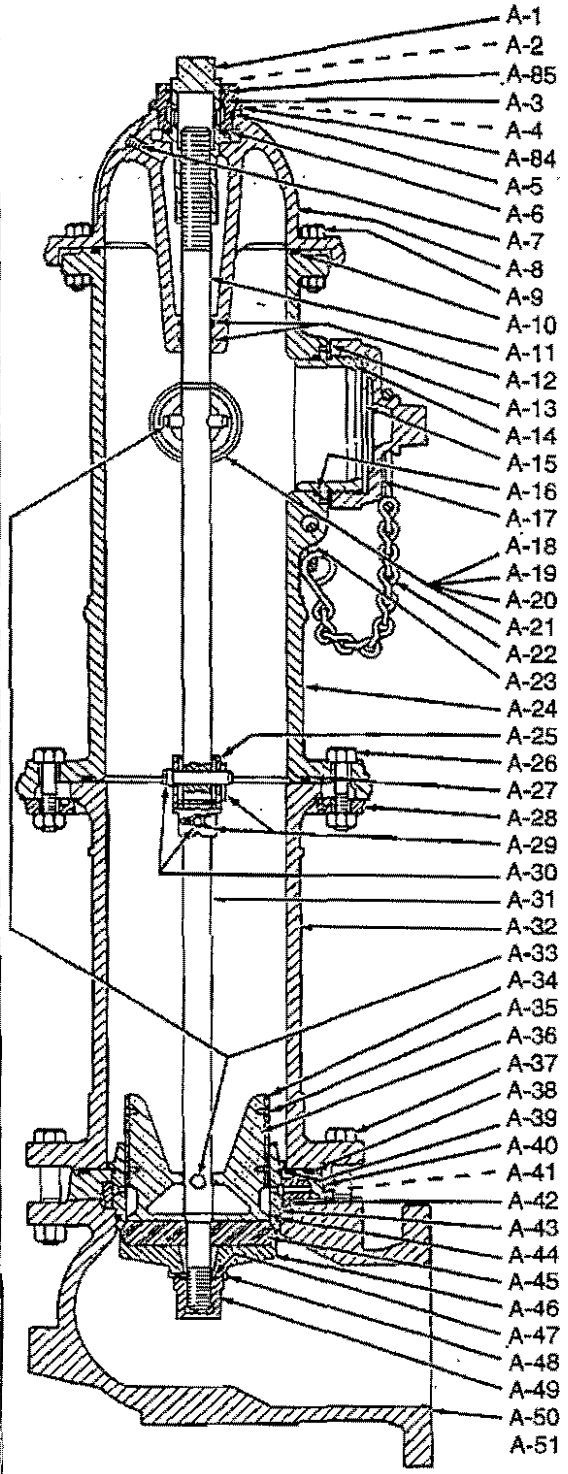
MUELLER® SUPER CENTURION® FIRE HYDRANT PARTS

Mueller Co.
A TYCO INTERNATIONAL LTD. COMPANY

REV. 3-97

MUELLER Super Centurion Fire Hydrant Parts

Cat. part #	Description	Material	Material standard
A-1	Operating nut	Bronze	ASTM B584
A-2	Weather cap (not shown; used only on pre-1988 models)	Cast iron	ASTM A126 CL.B
A-3	Hold down nut O-ring	Rubber	ASTM D2000 BUNA N
A-4	Hold down nut (not shown; used only on pre-1988 models)	Bronze	ASTM B584
A-5	Bonnet O-ring	Rubber	ASTM D2000 BUNA N
A-6	Anti-friction washer	Celcon	
A-7	Oil plug	Bruss	ASTM B16
A-8	Bonnet	Cast iron	ASTM A126 CL.B
A-9	Bonnet bolt and nut	Steel	ASTM A307 Plated
A-10	Bonnet O-ring (1997 and newer 3-way models; all pre-1997 models and 1-way and 2-way models have flat gasket)	Rubber	ASTM D2000 BUNA N
A-11	Upper stem	Steel	ASTM A576 GR.B
A-12	Stem O-ring	Rubber	ASTM D2000 BUNA N
A-13	Nozzle lock	Stainless steel	ASTM A276
A-14	Pumper nozzle	Bronze	ASTM B584
A-15	Pumper nozzle gasket	Rubber	ASTM D2000 Neoprene
A-16	Pumper nozzle O-ring	Rubber	ASTM D2000 BUNA N
A-17	Pumper nozzle cap	Cast iron	ASTM A126 CL.B
A-18	Hose nozzle	Bronze	ASTM B584
A-19	Hose nozzle gasket	Rubber	ASTM D2000 Neoprene
A-20	Hose nozzle O-ring	Rubber	ASTM D2000 BUNA N
A-21	Hose nozzle cap	Cast iron	ASTM A126 CL.B
A-22	Cap chain	Steel	Plated
A-23	Chain ring	Steel	Plated
A-24	Upper barrel less nozzles	Cast iron	ASTM A126 CL.B
A-25	Safety coupling	Stainless steel	ASTM A890
A-26	Safety flange bolt and nut	Steel	ASTM A307 Plated
A-27	Safety flange O-ring (1997 and newer models; pre-1997 models have flat gasket)	Rubber	Cellulose
A-28	Safety flange	Cast iron	ASTM A126 CL.B
A-29	Cotter pin	Stainless steel	ASTM A276
A-30	Clevis pin	Stainless steel	ASTM A276
A-31	Lower stem	Steel	ASTM A576 GR.B
A-32	Lower barrel	Cast iron	ASTM A126 CL.B
A-33	Stem pin	Stainless steel	ASTM A276
A-34	Drain valve facing	Plastic	
A-35	Drain valve screw	Stainless steel	ASTM A276
A-36	Upper valve plate (includes A-34 and A-35)	Bronze	ASTM B584
A-37	Shoe bolt and nut	Steel	ASTM A307 Plated
A-38	Drain ring housing O-ring (1997 and newer models; pre-1997 models have flat gasket)	Rubber	ASTM D2000 BUNA N
A-39	Seat ring top O-ring	Rubber	ASTM D2000 BUNA N
A-40	Drain ring housing	Cast iron	ASTM A126 CL.B
A-41	Drain ring housing bolt and nut (not shown; used only on pre-1997 model hydrants)	Steel	ASTM A307 Plated
A-42	Drain ring	Bronze	ASTM B584
A-43	Seat ring	Bronze	ASTM B584
A-44	Seat ring bottom O-ring	Rubber	ASTM D2000 BUNA N
A-45*	Reversible main valve (1997 and newer models only; pre-1997 models use non-reversible main valve and lower valve plate - not shown)	Rubber	ASTM D2000
A-46	Lower valve plate (1997 and newer models for reversible main valve; pre-1997 models have non-reversible main valve - not shown)	Cast iron	ASTM A126 CL.B
A-47	Cap nut seal	Rubber	ASTM D2000
A-48	Lock washer	Stainless steel	ASTM A276
A-49	Lower valve plate nut	Cast iron	ASTM A126 CL.B
A-50	Shoe	Cast iron	ASTM A126 CL.B
A-84	Hold down nut	Bronze	ASTM B584
A-85	Weather seal	Rubber	ASTM D2000
A-51	10.5 oz. hydrant lubricating oil (not shown)		



* Pre-1997 models may be upgraded to use the reversible main valve by also replacing the lower valve plate with the 1997 model.

SEE PAGE 9.26 FOR ORDERING INSTRUCTIONS

V. VALVE BOXES,

Tyler Pipe
Subsidiary of
Tyler Corporation

CAST IRON VALVE BOXES, TWO-PIECE

Accommodates 4" Through 12" Valves
5¼-Inch Shafts, Screw-Type
6850 Series

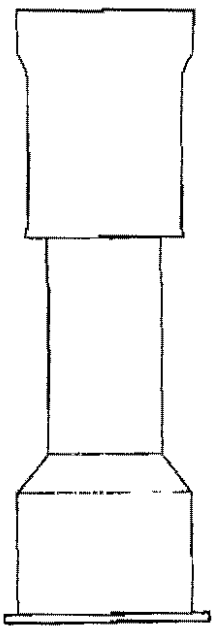
Item	Box Complete Extension, in Inches	Wt.	Top Section, w/Lid Length	Top Section, w/Lid Wt.	Bottom Length	Bottom Wt.	*Pieces Per Pkg.
461-S	19-22	60	10	35	15	25	..
462-S	**27-32**	**70**	**10**	**35**	**24**	**35**	..
562-S	27-37	80	16	45	24	35	20
563-S	**33-43**	**85**	**16**	**45**	**30**	**40**	**20**
564-S	39-50	90	16	45	36	45	20
662-S	**36-52**	**105**	**26**	**65**	**30**	**40**	**20**
664-S	39-60	110	26	65	36	45	20
666-S	**51-71**	**135**	**26**	**65**	**48	70	**20**
668-S	62-82	145	26	65	**60	80	20

*Tyler may ship loose pieces if packaging delays your order

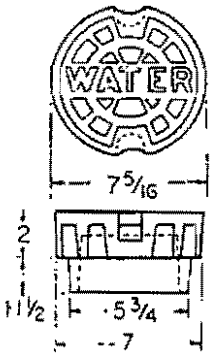
**May be furnished in two pieces screwed together to make the length required.

For special application components, see pages 8-10.

LIDS ARE MARKED "WATER" OR "GAS"
Unless specified otherwise, "Water" will be shipped.

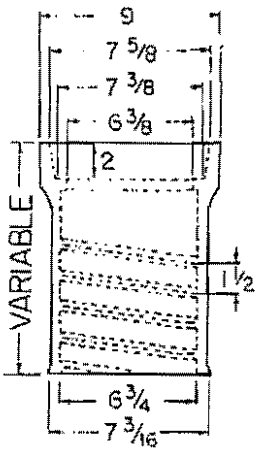


BOX COMPLETE

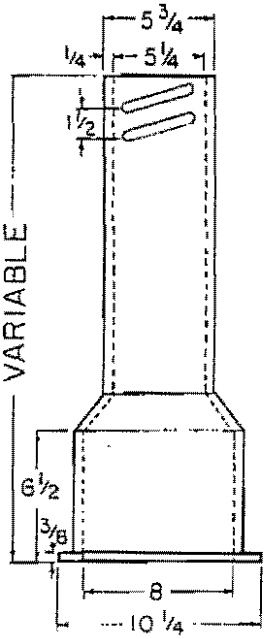


5¼ DROP LID
†Variable Skirt Depths

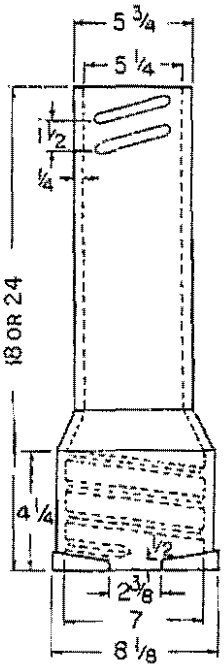
Skirt	Wt.
½	13
1	13
2	13



TOP

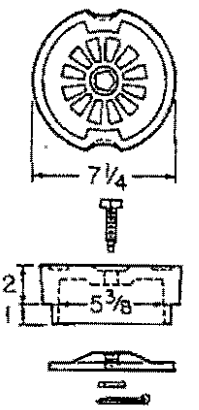


BOTTOM



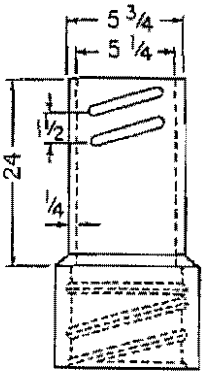
58 AND 59 EXTENSION

Item	Height Increase	Wt.
58	14	25
59	18	30



5¼ LOCK LID

Wt.
18



60 EXTENSION

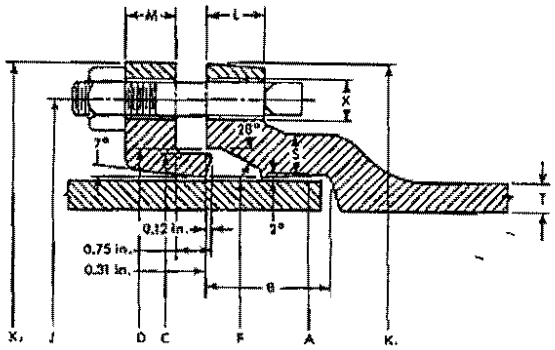
Item	Height Increase	Wt.
60	24	35

These extensions also fit Series 6860 three-piece valve boxes

VI. D. I. FITTINGS

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

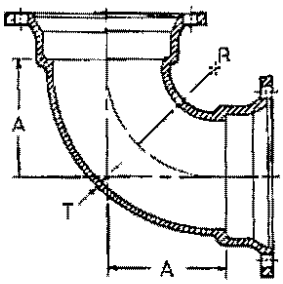
Sample Specification
3" through 16" Mechanical Joint Ductile Iron Fittings shall be produced in strict accordance with all applicable terms and provisions of ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11 18" thru 24" diameters shall be manufacturer's standards with wall thickness equivalent to Class 56 ductile iron pipe. The working pressure rating shall be 350 PSI.



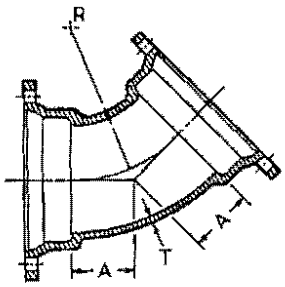
Joint Dimensions in Inches

Size	A Dia.	B	C Dia.	D Dia.	F Dia.	J Dia.	K_1 Dia.	K_2 Dia.	L	M	S	T	X Dia.	Bolt Size	Bolt No.
3	3.96	2.50	4.84	4.94	4.06	6.19	7.62	7.69	.59	.62	.38	.34	¾	⅝ x 3	4
4	4.80	2.50	5.92	6.02	4.90	7.50	9.06	9.12	.60	.75	.41	.35	⅞	¾ x 3½	4
6	6.90	2.50	8.02	8.12	7.00	9.50	11.06	11.12	.63	.88	.43	.37	⅞	¾ x 3½	6
8	9.05	2.50	10.17	10.27	9.15	11.75	13.31	13.37	.66	1.00	.45	.39	⅞	¾ x 3½	6
10	11.10	2.50	12.22	12.34	11.20	14.00	15.62	15.62	.70	1.00	.47	.41	⅞	¾ x 3½	8
12	13.20	2.50	14.32	14.44	13.30	16.25	17.88	17.88	.73	1.00	.49	.43	⅞	¾ x 3½	8
14	15.30	3.50	16.40	16.54	15.44	18.75	20.31	20.25	.79	1.25	.56	.51	⅞	¾ x 4	10
16	17.40	3.50	18.50	18.64	17.54	21.00	22.56	22.50	.85	1.31	.57	.52	⅞	¾ x 4	12
18	19.50	3.50	20.60	20.74	19.64	23.25	24.83	24.75	1.00	1.38	.68	.59	⅞	¾ x 4	12
20	21.60	3.50	22.70	22.84	21.74	25.50	27.08	27.00	1.02	1.44	.69	.60	⅞	¾ x 4	14
24	25.80	3.50	26.90	27.04	25.94	30.00	31.58	31.50	1.02	1.56	.75	.62	⅞	¾ x 4½	16

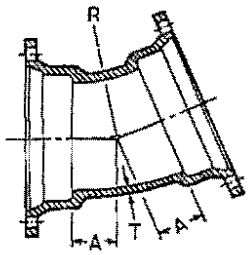
BENDS



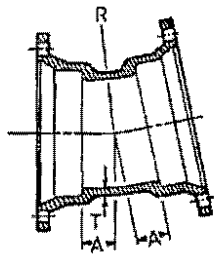
90° Bends (1/4)
5-600



45° Bends(1/8)
5-605



22½° Bends (1/16)
5-609



11¼° (1/32)
5-611

Size	Dimensions			Weights	Dimensions		Weights	Dimensions		Weights	Dimensions		Weights
	T	A	R		A	R		A	R		A	R	
3	.34	4.5	4	20	2.00	3.62	16	1.50	4.98	15	1.25	7.62	15
4	.35	5.0	4.5	26	2.49	4.81	22	1.82	6.66	21	1.55	10.7	20
6	.37	6.5	6	48	3.50	7.25	38	2.59	10.5	37	1.81	13.26	33
8	.39	7.5	7	68	4.00	8.44	59	2.85	11.8	51	2.06	15.8	48
10	.41	9.5	9	107	5.01	10.88	81	3.35	14.35	67	2.32	18.36	61
12	.43	10.5	10	141	5.98	13.25	111	3.86	16.9	80	2.56	20.9	79
14	.51	12.0	11.5	220	5.50	12.06	164	3.93	17.25	148	2.59	21.25	131
16	.52	13.0	12.5	264	5.98	13.25	202	3.98	17.5	179	2.62	21.5	159
18	.59	15.5	14.0	410	7.5	14.5	289	7.5	30.19	292	7.5	60.94	292
20	.60	17.0	15.5	505	8.0	16.88	348	8.5	35.19	364	8.5	71.07	377
24	.62	20.0	18.5	695	9.0	18.12	475	9.0	37.69	460	9.0	76.12	457

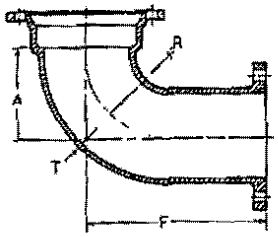
*18" thru 24" not included in AWWA C153 as of August, 1992

Tyler Pipe
Subsidiary of
Tyler Corporation

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

BENDS

90° MJ x Flange Bend (1/4)
5-600 F



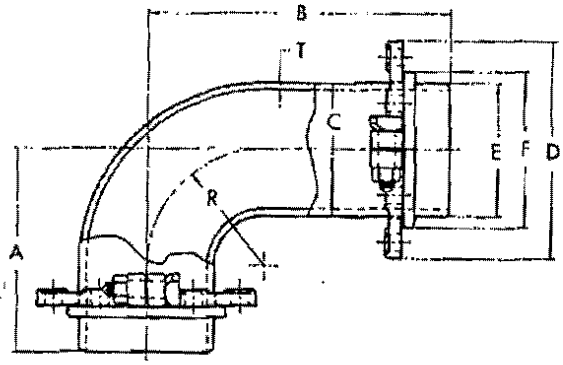
Size	Dimensions				Weights
	T	A	R	F	
3	.34	4.5	4	5.5	20
4	**.35**	**5.0**	**4.5**	**6.5**	**26**
6	.37	6.5	6	8.0	48
8	**.39**	**7.5**	**7**	**9.0**	**68**
10	.41	9.5	9	11.0	107
12	**.43**	**10.5**	**10**	**12.0**	**141**
14	.51	12.0	11.5	14.0	227
16	**.52**	**13.0**	**12.5**	**15.0**	**280**

GLANDS

Glands
5-690

Size	Weight*	Size	Weight*
3	3	12	12
4	4	14	16
6	6	16	20
8	8	18	25
10	10	20	31
		24	39

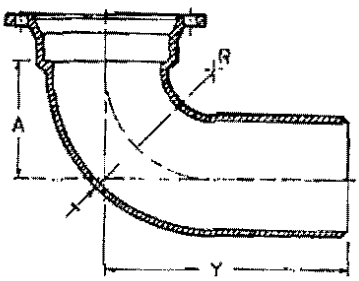
*18" thru 24" not included in AWWA C153 as of August, 1992

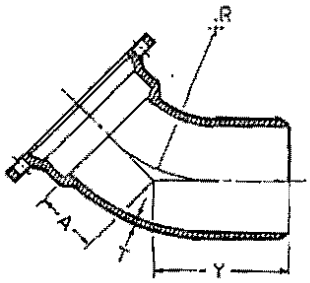


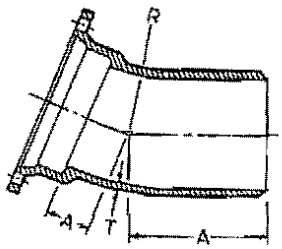
90° Swivel x MJ Hydrant Ell
5-698

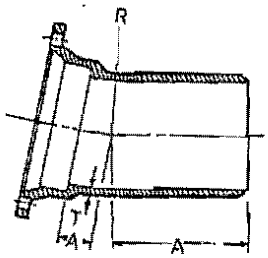
Size	Dimensions								*Weight
	T	A	B	C	D	E	F	R	
6	.37	10.5	15.5	7.10	11.2	6.90	8.02	6.0	85

*with glands









90° MJ x PE Bend (1/4)
*5-603

45° MJ x PE Bend (1/8)
*5-607

22½° MJ x PE Bend (1/16)
*5-610

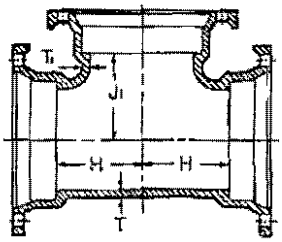
11¼° MJ x PE Bend (1/32)
*5-612

Size	90° Dimensions				90° Weights	45° Dimensions			45° Weights	22½° Dimensions			22½° Weights	11¼° Dimensions			11¼° Weights
	T	A	Y	R		A	Y	R		A	Y	R		A	Y	R	
3	.34	4.5	10.0	4.0	20	2.0	7.5	3.62	16	1.50	7.00	4.98	16	1.25	6.75	7.62	16
4	**.35**	**5.0**	**10.5**	**4.5**	**25**	**2.5**	**8.0**	**4.81**	**22**	**1.82**	**7.32**	**6.66**	**20**	**1.55**	**7.05**	**10.70**	**19**
6	.37	6.5	12.0	6.0	45	3.5	9.0	7.25	37	2.58	8.08	10.50	35	1.80	7.30	13.26	32
8	**.39**	**7.5**	**13.0**	**7.0**	**65**	**4.0**	**9.5**	**8.44**	**56**	**2.84**	**8.34**	**11.80**	**49**	**2.05**	**7.55**	**15.80**	**46**
10	.41	9.5	15.0	9.0	109	5.0	10.5	10.88	83	3.35	8.85	14.35	66	2.31	7.81	18.36	60
12	**.43**	**10.5**	**16.0**	**10.0**	**135**	**6.0**	**11.5**	**13.25**	**108**	**3.86**	**9.36**	**16.90**	**79**	**2.56**	**8.06**	**20.90**	**78**
14	.51	12.0	20.0	11.5	220	5.5	13.5	12.06	165	3.93	11.93	17.25	152	2.59	10.59	21.25	133
16	**.52**	**13.0**	**21.0**	**12.5**	**254**	**6.0**	**14.0**	**13.25**	**206**	**3.98**	**11.98**	**17.50**	**181**	**2.62**	**10.62**	**21.50**	**161**
18	.59	15.5	23.5	14.0	405	6.0	15.5	14.50	290	7.50	15.50	30.19	290	7.50	15.5	60.94	288
20	**.60**	**17.0**	**25.0**	**15.5**	**465**	**7.5**	**16.5**	**16.88**	**340**	**8.50**	**16.50**	**35.19**	**345**	**8.50**	**16.5**	**71.07**	**360**
24	.62	20.0	28.0	18.5	710	9.0	17.0	18.12	460	9.00	17.00	37.69	445	9.00	17.0	76.12	...

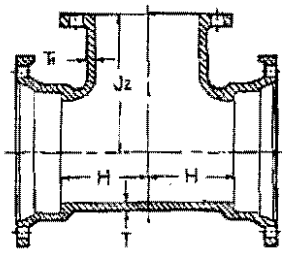
*18" thru 24" not included in AWWA C153 as of August, 1992

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

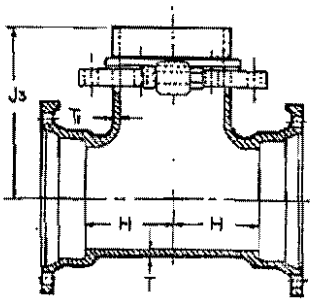
TEES



MJ Tee
5-620

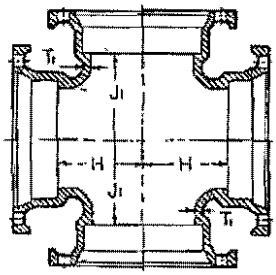


MJ x FE Tee
5-623



MJ x Swivel Tee
5-625

CROSS



Cross
5-631

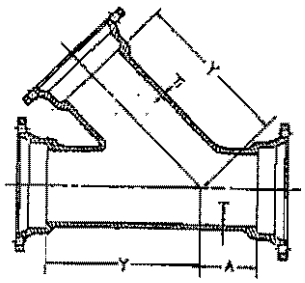
Size	Dimensions						Weights			
	T	T'	H	J'	J²	J³	5-620	5-623	5-625†	5-631
3	.34	.34	3.5	3.5	5.5		24	26		29
4x3	**.35**	**.34**	**3.5**	**4**	**6.5**		**32**	**34**		**38**
4	.35	.35	4	4	6.5		35	38		42
6x3	**.37**	**.34**	**3.5**	**5**	**8**		**40**	**43**		**54**
6x4	.37	.35	4	5	8		51	54		60
6	**.37**	**.37**	**5**	**5**	**8**	**10.5**	**60**	**64**	**77**	**72**
8x3	.39	.34	4	6.5	9		67	68		
8x4	**.39**	**.35**	**4.5**	**6.5**	**9**		**71**	**72**		**81**
8x6	.39	.37	5.5	6.5	9	11.5	80	83	89	94
8	**.39**	**.39**	**6.5**	**6.5**	**9**	**11.5**	**90**	**94**	**116**	**108**
10x3	.41	.34	4	7.5	11		83	81		
10x4	**.41**	**.35**	**4.5**	**7.5**	**11**		**83**	**89**		**93**
10x6	.41	.37	5.5	7.5	11	13.0	93	107	113	106
10x8	**.41**	**.39**	**6.5**	**7.5**	**11**	**13.0**	**111**	**115**	**129**	**131**
10	.41	.41	7.5	7.5	11		120	130		144
12x3	**.43**	**.34**	**4**	**8.75**	**12**		**98**	**106**		
12x4	.43	.35	4.5	8.75	12		104	115		114
12x6	**.43**	**.37**	**5.5**	**8.75**	**12**	**14.25**	**115**	**120**	**128**	**129**
12x8	.43	.39	6.5	8.75	12	14.25	123	146	149	140
12x10	**.43**	**.41**	**7.5**	**8.75**	**12**		**153**	**174**		**181**
12	.43	.43	8.75	8.75	12		178	198		214
14x6	**.51**	**.44**	**6.5**	**10.5**	**14**	**16.0**	**183**	**205**	**211**	**210**
14x8	.51	.45	7.5	10.5	14		206	227		231
14x10	**.51**	**.46**	**8.5**	**10.5**	**14**		**229**	**244**		**255**
14x12	.51	.47	9.5	10.5	14		235	276		269
14	**.51**	**.51**	**10.5**	**10.5**	**14**		**281**	**302**		**344**
16x6	.52	.45	6.5	11.5	15	17.0	229	213	248	250
16x8	**.52**	**.46**	**7.5**	**11.5**	**15**		**248**	**260**		**264**
16x10	.52	.47	8.5	11.5	15		265	287		286
16x12	**.52**	**.48**	**9.5**	**11.5**	**15**		**281**	**312**		**310**
16x14	.52	.51	10.5	11.5	15		317	348		363
16	**.52**	**.52**	**11.5**	**11.5**	**15**		**323**	**374**		**410**

**Made to order only. Not returnable.

†Includes swivel gland

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

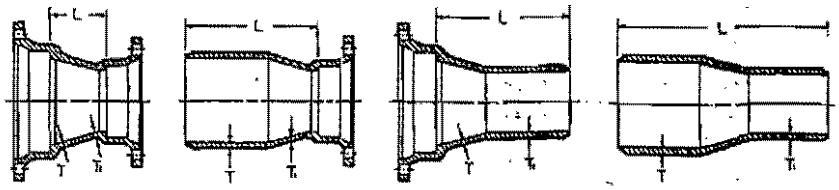
Tyler Pipe
Subsidiary of
Tyler Corporation



WYES
*5-628

Size	Dimensions				Weights
	A	Y	T	T'	
3	2.0	8.5	.34	.34	36
4x3	**1.0**	**9.0**	**.35**	**.34**	**40**
4	2.5	9.5	.35	.35	45
6x4	**1.5**	**11.0**	**.37**	**.35**	**67**
6	3.0	13.0	.37	.37	93
8x4	**0.5**	**13.0**	**.39**	**.35**	**93**
8x6	2.0	14.5	.39	.37	113
8	**3.5**	**16.0**	**.39**	**.39**	**136**
10x4	0	15.0	.41	.35	118
10x6	**1.0**	**16.0**	**.41**	**.37**	**136**
10x8	2.5	17.0	.41	.39	170
10	**3.5**	**19.0**	**.41**	**.41**	**199**
12x4	0	16.5	.43	.35	150
12x6	**1.5**	**18.5**	**.43**	**.37**	**186**
12x8	1.5	18.5	.43	.39	188
12x10	**3.0**	**20.0**	**.43**	**.41**	**223**
12	4.5	22.5	.43	.43	272
14x6	**0**	**19.5**	**.51**	**.44**	**256**
14x8	1.5	21.0	.51	.45	286
14x10	**3.0**	**22.5**	**.51**	**.46**	**322**
14x12	4.5	24.0	.51	.47	387
14	**6.0**	**25.0**	**.51**	**.51**	**465**
16x6	0	21.0	.52	.45	300
16x8	**0.5**	**22.5**	**.52**	**.46**	**327**
16x10	2.0	24.0	.52	.47	375
16x12	**3.5**	**25.0**	**.52**	**.48**	**465**
16x14	5.0	26.5	.52	.51	492
16	**6.5**	**28.0**	**.52**	**.52**	**575**

REDUCERS



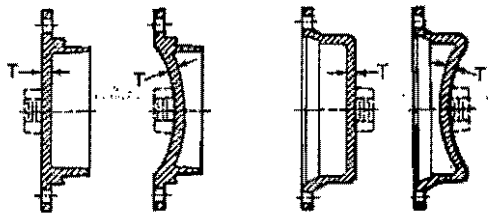
MJ x MJ 5-635 | **MJ SEB 5-636** | **MJ LEB 5-637** | **PE x PE 5-638**

Size	Dimensions						Weights			
	T	T'	5-635 L	5-636 L	5-637 L	5-638 L	5-635	5-636	5-637	5-638
4x3	.35	.34	4.	9.5	9.5	15.0	18	17	18	14
6x3	**.37**	**.34**	**5.**	**10.5**	**10.5**	**16.0**	**21**	**21**	**21**	**18**
6x4	.37	.35	4.	9.5	9.5	15.0	27	26	22	22
8x4	**.39**	**.35**	**5.**	**10.5**	**10.5**	**16.0**	**36**	**34**	**29**	**30**
8x6	.39	.37	4.	9.5	9.5	15.0	40	37	32	31
10x4	**.41**	**.35**	**7.**	**12.5**	**12.5**	**18.0**	**47**	**46**	**40**	**40**
10x6	.41	.37	5.	10.5	10.5	16.0	47	48	42	42
10x8	**.41**	**.39**	**4.**	**9.5**	**9.5**	**15.0**	**54**	**52**	**45**	**44**
12x4	.43	.35	9.	14.5	14.5	20.0	67	61	52	54
12x6	**.43**	**.37**	**7.**	**12.5**	**12.5**	**18.0**	**67**	**58**	**53**	**56**
12x8	.43	.39	5.	10.5	10.5	16.0	64	62	55	58
12x10	**.43**	**.41**	**4.**	**9.5**	**9.5**	**15.0**	**78**	**62**	**57**	**60**
14x6	.51	.44	9.	17.0	14.5	22.5	108	107	112	109
14x8	**.51**	**.45**	**7.**	**15.0**	**12.5**	**20.5**	**104**	**107**	**108**	**101**
14x10	.51	.46	5.	13.0	10.5	18.5	100	102	100	96
14x12	**.51**	**.47**	**4.**	**12.0**	**9.5**	**17.5**	**100**	**101**	**100**	**85**
16x6	.52	.45	11.	19.0	16.5	24.5	136	132	144	128
16x8	**.52**	**.46**	**9.**	**17.0**	**14.5**	**22.5**	**132**	**128**	**136**	**112**
16x10	.52	.47	7.	15.0	12.5	20.5	128	124	128	123
16x12	**.52**	**.48**	**5.**	**13.0**	**10.5**	**18.5**	**125**	**123**	**119**	**113**
16x14	.52	.51	4.	12.0	12.0	20.0	140	139	138	133
18x8	**.59**	**.45**	**14.**	**22.0**	**19.5**	**27.5**	**194**	**190**	**195**	**170**
18x10	.59	.47	12.	20.0	17.5	25.5	196	180	185	175
18x12	**.59**	**.49**	**10.**	**18.0**	**15.5**	**23.5**	**185**	**170**	**190**	**181**
18x14	.59	.56	8.	16.0	16.0	24.0	190	181	200	185
18x16	**.59**	**.57**	**7.**	**15.0**	**15.0**	**23.0**	**196**	**180**	**190**	**188**
20x10	.60	.47	14.	22.0	19.0	27.5	225	210	210	185
20x12	**.60**	**.49**	**12.**	**20.0**	**17.5**	**25.5**	**210**	**200**	**210**	**195**
20x14	.60	.56	10.	18.0	18.0	26.0	208	198	205	195
20x16	**.60**	**.57**	**8.**	**16.0**	**16.0**	**24.0**	**225**	**215**	**222**	**212**
24x18	.60	.59	7.	15.0	15.0	23.0	233	220	225	210
24x10			...	...	...	...	**225**	...	...	...
24x12	.62	.49	16.	24.0	21.5	29.5	310	300	210	290
24x14	**.62**	**.56**	**14.**	**22.0**	**22.0**	**30.0**	**315**	**325**	**335**	**310**
24x16	.62	.57	12.	20.0	20.0	28.0	324	319	310	304
24x18	**.62**	**.59**	**10.**	**18.0**	**18.0**	**26.0**	**312**	**310**	**315**	**304**
24x20	.62	.60	8.	16.0	16.0	24.0	315	305	307	304

*18" thru 24" not included in AWWA C153 as of August, 1992

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

PLUGS & CAPS



3"-12" 14"-24" 3"-12" 14"-24"

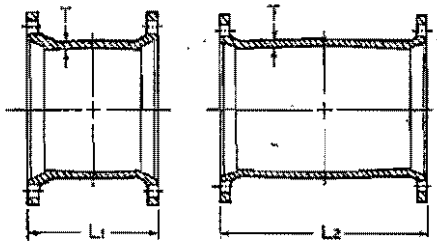
MJ Plug
Solid 5-650
Tapt 5-652

MJ Cap
Solid 5-654
Tapt 5-655

Size	Dimensions		Weights	
	T	Max. Tap	5-650 & 5-652	5-654 & 5-655
3	.46	3	6	7
4	.46	4	10	10
6	.46	4	18	17
8	.46	4	26	25
10	.56	4	36	35
12	.56	4	46	44
14	.62	4	85	79
16	.62	4	93	100
18	.65	4	130	122
20	.66	4	153	202
24	.68	4	202	214

*18" thru 24" not included in AWWA C153 as of August, 1992

SLEEVES

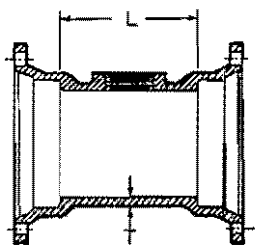


Short
5-644S

Long
5-644L

Size	Dimensions			Weights	
	T	L[1]	L[2]	5-644S	5-644L
3	.34	7.5	12	13	21
4	.35	7.5	12	17	25
6	.37	7.5	12	28	39
8	.39	7.5	12	38	53
10	.41	7.5	12	49	64
12	.43	7.5	12	56	82
14	.56	9.5	15	111	141
16	.57	9.5	15	137	172
18	.68	9.5	15	---	200
20	.69	9.5	15	---	270
24	.75	9.5	15	---	370

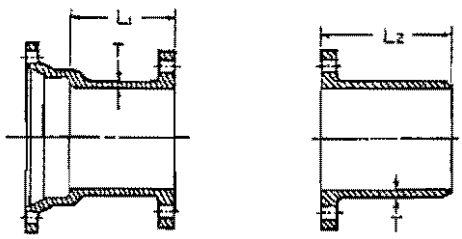
TAPPED TEE



MJ Tapped Tee
5-642

Size	Dimensions			Weights
	T	L	Max. Tap	
3	.34	6	2½	19
4	.35	6	3	23
6	.37	6	4	37
8	.39	6	4	53
10	.41	6	4	71
12	.43	6	4	82
14	.51	6	4	127
16	.52	6	4	164

ADAPTERS



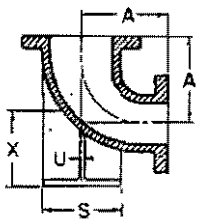
MJxFE
5-658

FExPE
5-661

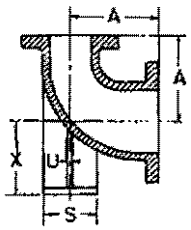
Size	Dimensions			Weights	
	T	L[1]	L[2]	5-658	5-661
3	.34	6	12	18	18
4	.35	6	12	24	24
6	.37	6	12	36	33
8	.39	6	12	52	52
10	.41	6	12	67	69
12	.43	6	12	80	88
14	.51	6	12	127	127
16	.52	6	12	166	149

DUCTILE IRON AND GRAY IRON FLANGED FITTINGS

*REDUCING BASE BENDS



Base Under Large End 5-702 LE



Base Under Small End 5-702 SE

Size	Dimensions			Wt.
	X	S	U	
4x3	5.5	6	.5	45
6x4	**7**	**7**	**.62**	**75**
8x4	8.38	9	.88	115
8x6	**8.38**	**9**	**.88**	**130**
10x6	9.75	9	.88	170
10x8	**9.75**	**9**	**.88**	**195**
12x6	11.25	11	1	230
12x8	**11.25**	**11**	**1**	**255**
12x10	11.25	11	1	285

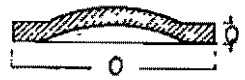
*Not included in AWWA C110

*FLANGES

Flange for Steel Pipe 5-750
Reducing Flange for Steel Pipe 5-752

Flange for CI Pipe 5-751
Reducing Flange for CI Pipe 5-753

Under 12" Blind Flange



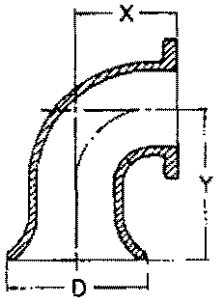
12" and Larger Blind Flange

Blind Flanges 5-754

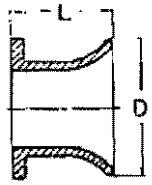
Size	Dimensions				Wt.		
	O	Q	X	Y	5-750	5-751	5-754
2	6	.62	....	1	4	.	4
2½	**7**	**.69**	....	**1.13**	**6**	.	**7**
3	7.5	.75	1.8	1.19	7	7	8
4	**9**	**.94**	**1.89**	**1.31**	**12**	**12**	**14**
6	11	1.00	2.1	1.56	17	17	25
8	**13.5**	**1.12**	**2.31**	**1.75**	**25**	**28**	**40**
10	16	1.19	2.52	1.94	35	38	60
12	**19**	**1.25**	**2.73**	**2.19**	**55**	**58**	**80**
14	21	1.38	2.875	2.25	..	75	110
16	**23.5**	**1.44**	**3.188**	**2.5**	..	**95**	**145**
18	25	1.56	3.125	2.69	..	105	190
20	**27.5**	**1.69**	**3.5**	**2.88**	..	**135**	**250**
24	32	1.88	3.687	3.25	..	160	370
30	**38.75**	**2.12**	**4.875**	...	..	**255**	**580**
36	46	2.38	.....	...	..	390	880

NOTE: All flanges conform to ANSI/AWWA C115/A21.15-83 Standards.

*FLANGE AND FLARE



*Flange and Flare 90° Bend 5-765



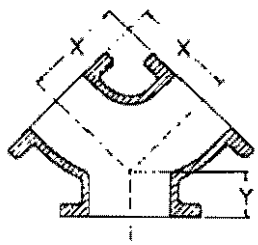
Flange and Flare Piece 5-766

Size	Dimensions			Wt.
	D	X	Y	5-765
3	7.5	5.5	8.5	25
4	**9**	**6.5**	**9.5**	**40**
6	11	8	12	70
8	**13.5**	**9**	**13**	**110**
10	16	11	15	175
12	**19**	**12**	**16**	**245**
14	21	14	22	450
16	**23.5**	**15**	**23**	**545**
18	25	16.5	24.5	675
20	**27.5**	**18**	**26**	**860**
24	32	22	30	1195

Size	Dimensions		Wt.
	D	L	5-766
3	7.5	8	20
4	**9**	**8**	**30**
6	11	8	40
8	**13.5**	**10**	**70**
10	16	10	95
12	**19**	**12**	**155**
14	21	12	225
16	**23.5**	**16**	**330**
18	25	16	355
20	**27.5**	**18**	**460**
24	32	18	635

*Not included in AWWA C110

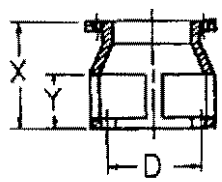
*TRUE WYE



True Wye 5-767

Size		Dimensions		Wt.
Stem	Branches	X	Y	
4	4	6.5	3	50
6	**4**	**8**	**3.5**	**75**
6	6	8	3.5	80
8	**6**	**9**	**4.5**	**120**
8	8	9	4.5	125

*FLANGE SLUDGE SHOE



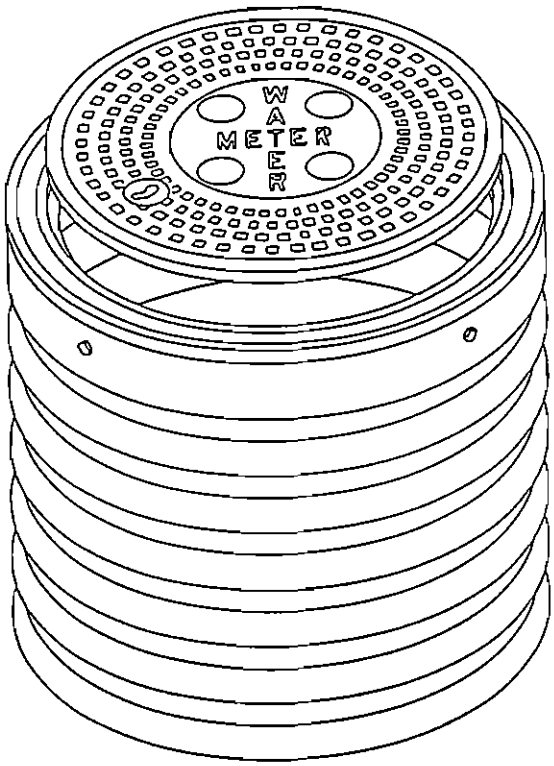
Flange Sludge Shoe 5-768

Size	Dimensions			Wt.
	D	X	Y	
3	5.75	12	6	25
4	**7**	**12**	**6**	**35**
6	7.87	12	6	45
8	**10.12**	**12**	**6**	**65**
10	12.25	12	6	85
12	**15.25**	**12**	**6**	**120**

*Not Included in AWWA C110.

ANSI/AWWA C110/A21.10, ANSI/AWWA C111/A21.11

VII. METER BOXES



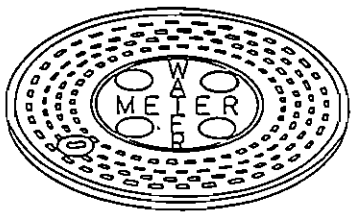
548 Series Galvanized Meter Boxes

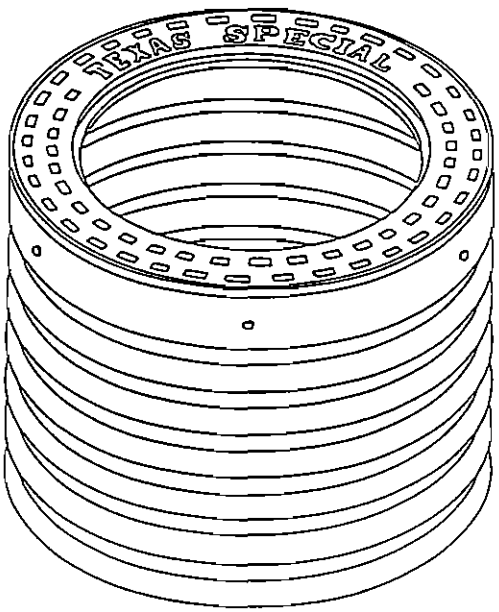
with 24" dia. corrugated cans

Part no.	Height	Weight
# 548 A	18"	80 lbs
# 548 B	24"	85 lbs
# 548 C	30"	90 lbs
# 548 D	36"	95 lbs
# 548 E	42"	100 lbs
# 548 F	48"	105 lbs
# 548 G	54"	110 lbs
# 548 H	60"	115 lbs

55 Series Galvanized Meter Boxes

with 28" dia. corrugated cans





Part no.	Height	Weight
# 55 A	18"	125 lbs
# 55 A1S	18"	125 lbs
# 55 A2S	18"	125 lbs
# 55 B	24"	130 lbs
# 55 C	30"	135 lbs
# 55 D	36"	140 lbs
# 55 E	42"	145 lbs
# 55 F	48"	150 lbs
# 55 A1S 18 ga. can - Dallas std		

VIII. TAPPING SLEEVE

2.2

Mueller Co.

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

Catalog number—
H-615 Mechanical Joint Tapping Sleeve

Sizes—4"-24" main and outlet (see chart below for available size combinations)

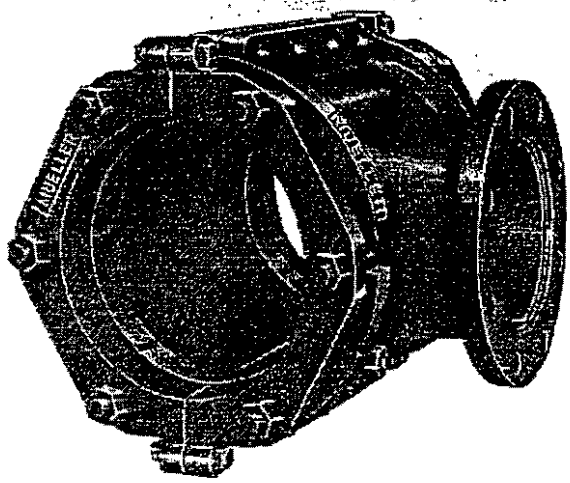
Outlet flange dimensions and drilling comply with ANSI B16.1, class 125 and with MSS SP-60.

Certified to ANSI/NSF 61.

Iron body with 3/4" NPT test plug.

4"-12" sizes---250 psig (1723 kPa) maximum working pressure.

14" - 24" sizes—150 psig (1034 kPa) maximum working pressure.



H-615

apping Sleeve pipe information

lominal ize of main	O.D. range of sleeve		Class and type of pipe	End Gasket part numbers
	Inch	mm		
"	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
"	6.84"-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
"	8.99"-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
0"	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
2"	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
4"	15.22"-15.35"	386.7-389.8	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195127
6"	17.32"-17.45"	440.0-443.1	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195128
8"	19.42"-19.55"	493.4-496.5	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195266
0"	21.52"-21.65"	546.7-549.8	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195129
4"	25.72"-25.85"	653.4-656.5	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195130

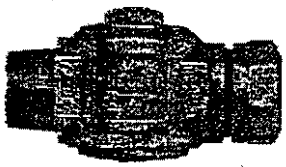
Sizes available

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

IX. BRASS-CORP. STOP, CURB STOP, COUPLING, SADDLES

Mueller Co.

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



H-15013

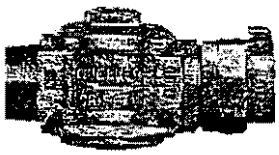
MUELLER® ORI-CORP® Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: MUELLER® 110® Conductive Compression Connection for CTS O.D. tubing*

1-1/2"	2"

H-15023

MUELLER® ORI-CORP® Corporation Valve
Inlet: AWWA I.P. thread.
Outlet: MUELLER® 110® Conductive Compression Connection for CTS O.D. tubing*

1-1/2"	2" **



P-15013

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

1-1/2"	2"

P-15023

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA I.P. thread
Outlet: MUELLER Pack Joint Connection for CTS O.D. tubing*

1-1/2"	2" **

H-15014

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: F.I.P. thread

1-1/2" ‡	2" ‡

H-15015

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA I.P. thread
Outlet: F.I.P. thread

1-1/2" ‡	2" ‡

H-9968

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: M.I.P. thread

1-1/2"	2"

H-9969

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA I.P. thread
Outlet: M.I.P. thread

1-1/2"	2" **

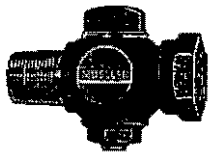
* See charts on pages 5.10-5.13 for tubing and pipe that may be used on these connections.
** For use with Service Saddle only---cannot be machine inserted.
‡ Requires minimum ordering quantity. Contact MUELLER Customer Service Center for minimum order requirements and availability.

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

H-10045

Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: F.I.P. thread

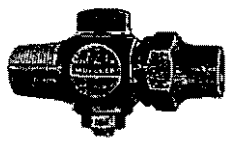
3/4"	3/4" x1" ‡	1"



H-10046

Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: F.I.P. thread

1/2"	3/4"	1"	1-1/4"‡	1-1/2"	2"



H-15002

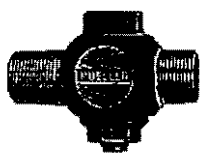
Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: I.P. thread copper flare connection - this connection thread is one size larger than the copper tubing to be flared

1/2"	3/4"	1"	1-1/4"‡	1-1/2"	2"

H-9996

Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: M.I.P. thread

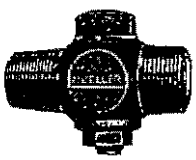
3/4"	1"	1-1/2"‡	2"



H-10013

Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: M.I.P. thread

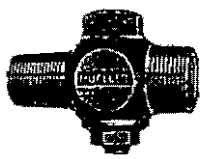
1"



H-10003

Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER"CC) thread
Outlet: Increasing I.P. thread (outlet is one size larger than inlet)

3/4"	1"	1-1/2"‡	2" ‡



H-9979

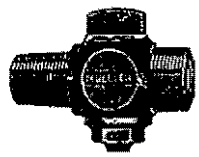
Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: Increasing I.P. thread (outlet is one size larger than inlet)

1/2"	5/8" (3/4" outlet)	3/4"	1"	1-1/2"	2"

H-9971

Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: MUELLER Coupling thread

1/2"	5/8" (3/4" outlet)	3/4"	1"	1-1/4"	1-1/2"	2"



H-9976

Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: MUELLER Coupling thread

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

‡ Requires minimum ordering quantity. Contact MUELLER Customer Service Center for minimum order requirements and availability.
NOTE: Sizes shown above represent nominal size of inlet and outlet connections.

MUELLER® Corporation Valves are manufactured and tested in accordance with ANSI/AWWA C800.

Mueller Co.

GROUND KEY ANGLE METER VALVES & SERVICE VALVES - 3/4" - 2"

Ground Key Angle Meter Valve
MUELLER 110® Conductive Compression Connection for CTS O.D.* tubing x meter flange
180° turn check - lock wing

H-14277

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Pipe size	1-1/2	2

Ground Key Angle Meter Valve
MUELLER® Pack Joint Connection for CTS O.D.* tubing x meter flange
180° turn check - lock wing

P-14277

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Pipe size	1-1/2	2

Ground Key Angle Meter Valve
Copper flare nut x meter flange
180° turn check - lock wing

H-14276

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Tubing size	1-1/2	2

Ground Key Angle Meter Valve
F.I.P. x meter flange
180° turn check - lock wing

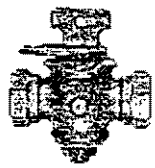
H-14286

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Pipe size	1-1/2	2

Ground Key Angle Meter Valve
F.I.P. x F.I.P.
180° turn check - lock wing

H-14285

Catalog size	3/4



MUELLER Solid Tee Head Roundway Meter Stop
F.I.P. x F.I.P.
360° turn - lock wing

H-10281

Catalog size	1/2

* See charts on pages 8D.15 and 8D.16 for tubing and pipe that can be used with this connection.

SERVICE FITTINGS WITH MUELLER 110® COMPRESSION CONNECTION

Straight three part union MUELLER 110® Conductive Compression Connection for CTS O.D.* tubing-**both ends**

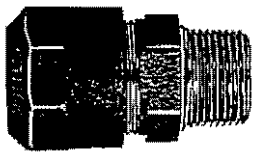
H-15403

1/2"	3/4"	1"	1"x3/4"	1-1/4"	1-1/4"x1"	1-1/2"	2"

Straight coupling MUELLER 110 Conductive Compression Connection for CTS O.D.* tubing x F.I.P. thread

H-15451

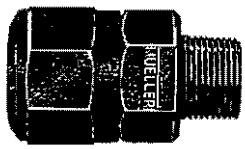
3/4"	3/4"x1"	1"	1"x3/4"	1-1/4"	1-1/4"x1"	1-1/2"	2"



Straight coupling MUELLER 110 Conductive Compression Connection for CTS O.D.* tubing x M.I.P. thread

H-15428

1/2" ‡	3/4"	3/4"x1"	1"	1"x3/4"	1-1/4"x1"	1-1/4"	1-1/2"	1-1/2"x1"	2"



Straight coupling MUELLER 110 Compression Connection for IPS PE* pipe x M.I.P. thread

H-15429

3/4"	1"

Straight three part union MUELLER 110® Compression Connection for IPS PE* pipe-**both ends**

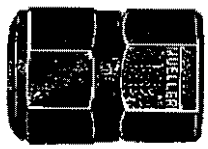
H-15404

3/4"	1"	1"X3/4"

Straight three part union MUELLER 110 Conductive Compression Connection for CTS O.D.* tubing x 110 Compression Connection for IPS PE* pipe

H-15409

3/4"	1"



Straight coupling MUELLER 110 Compression Connection for IPS PE* pipe x F.I.P. thread

H-15454

3/4"	1"

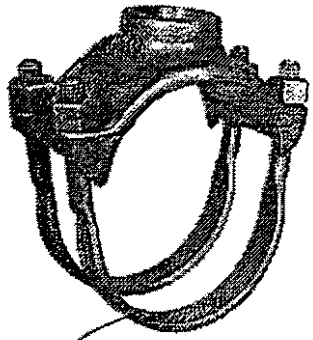
MUELLER® BR2B & BR2S SERIES BRONZE SERVICE SADDLES - DOUBLE STRAP

Mueller Co. **4.5**

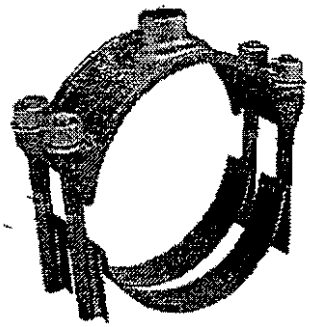
REV. 4-99

MUELLER® Service Saddles for use on A-C, cast iron, ductile iron, and AWWA C900 PVC plastic pipe

- ☐ Outlet tapped with either AWWA taper (C.C.) or AWWA I.P. thread (F.I.P.T.)
- ☐ For use on A-C pipe, cast iron or ductile iron pipe and cast iron O.D. PVC pipe
- ☐ 200 psig (1379 kPa) maximum working pressure
- ☐ Available in single and double strap designs
- ☐ Brass body
- ☐ Flattened silicon bronze straps (standard)
- ☐ Optional 304L stainless steel straps
- ☐ Rolled strap threads
- ☐ O-ring sealed outlet
- ☐ 3/4" thru 2" tap sizes
- ☐ Meets all applicable parts of ANSI/AWWA C800
- ☐ NSF 61 certified



BR 2 B Series



BR 2 S Series

MUELLER® Service Saddles with AWWA taper thread

Pipe O.D. range		Kind and size of pipe *		Bronze double strap with AWWA taper thread (C.C.)							Optional stainless steel double strap with AWWA taper thread (C.C.)							
Inch	mm	A-C	Cast or ductile iron, C900 PVC plastic pipe	Base Catalog Number	Size of tapping (add to "Base" to complete catalog number)						Base Catalog Number	Size of tapping (add to "Base" to complete catalog number)						
					5/8"	3/4"	1"	1-1/4"	1-1/2"	2"		1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"
4.74"-5.32"	121.0-135.0	4" Cl. 150	4"	BR 2 B 0474 CC	050	075	100	125	150	200	BR 2 S 0474 CC	050	062	075	-	125	150	200
6.84"-7.45"	174.0-189.0	6" Cl. 150	6"	BR 2 B 0684 CC	050	075	100	125	150	200	BR 2 S 0684 CC	050	062	075	100	125	150	200
8.99"-9.67"	229.0-245.0	8" Cl.150	8"	BR 2 B 0899 CC	050	075	100	125	150	200	BR 2 S 0899 CC	050	062	075	100	125	150	200
11.04"-12.12"	281.0-307.0	10" Cl. 150-200	10"	BR 2 B 1104 CC	050	075	100	125	150	200	BR 2 S 1104 CC	050	062	075	-	125	150	200
13.14"-14.58"	334.0-370.0	12" Cl. 150-200	12"	BR 2 B 1314 CC	050	075	100	125	150	200	BR 2 S 1314 CC	050	062	075	100	125	150	200
15.22"-16.88"	386.6-428.7	14" Cl. 150-200	14"	BR 2 B 1522 CC	-	075	100	-	150	200	BR 2 S 1522 CC	-	-	075	100	-	150	200
17.32"-19.19"	439.9-487.4	16" Cl. 150-200	16"	BR 2 B 1732 CC	-	075	100	-	150	200	BR 2 S 1732 CC	-	-	075	100	-	150	200

MUELLER® Service Saddles with AWWA iron pipe thread

Pipe O.D. range		Kind and size of pipe*		Bronze double strap with AWWA I.P. thread (F.I.P.T.)							Optional stainless steel double strap with AWWA I.P. thread (F.I.P.T.)							
Inch	mm	A-C	Cast or ductile iron, C900 PVC plastic pipe	Base Catalog Number	Size of Tapping (add to "Base" to complete catalog number)						Base Catalog Number	Size of Tapping (add to "Base" to complete catalog number)						
					1/2"	3/4"	1"	1-1/4"	1-1/2"	2"		1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"
4.74"-5.32"	121.0-135.0	4" Class 150	4"	BR 2 B 0474 IP	050	075	100	125	150	200	BR 2 S 0474 IP	050	062	075	100	-	150	200
6.84"-7.45"	174.0-189.0	6" Class 150	6"	BR 2 B 0684 IP	050	075	100	125	150	200	BR 2 S 0684 IP	050	062	075	100	125	150	200
8.99"-9.67"	229.0-245.0	8" Class 150	8"	BR 2 B 0899 IP	050	075	100	125	150	200	BR 2 S 0899 IP	050	062	075	100	125	150	200
11.04"-12.12"	281.0-307.0	10" Class 150-200	10"	BR 2 B 1104 IP	050	075	100	125	150	200	BR 2 S 1104 IP	050	062	075	100	125	150	200
13.14"-14.58"	334.0-370.0	12" Class 150-200	12"	BR 2 B 1314 IP	050	075	100	125	150	200	BR 2 S 1314 IP	050	062	075	100	125	150	200
15.22"-16.88"	386.6-428.7	14" Cl. 150-200	14"	BR 2 B 1522 IP	-	075	100	-	150	200	BR 2 S 1522 IP	-	-	075	100	-	150	200
17.32"-19.19"	439.9-487.4	16" Cl. 150-200	16"	BR 2 B 1732 IP	-	075	100	-	150	200	BR 2 S 1732 IP	-	-	075	100	-	150	200

* A-C pipe, classes 150-200 per ASTM C296 and AWWA C400—actual O.D. of pipe being used must fall within the pipe O.D. range listed in the preceeding charts. Centrifugally cast pipe, classes 50-250per ANSI/AWWA C102/A21.2; ANSI/AWWA C106/A21.6; ANSI/AWWA C108/A21.8, and Federal specification WW-P-421. Ductile iron pipe, classes 50-56 per ANSI/AWWAC151/A21.51; Cast iron O.D. PVC plastic pipe per AWWA C900.

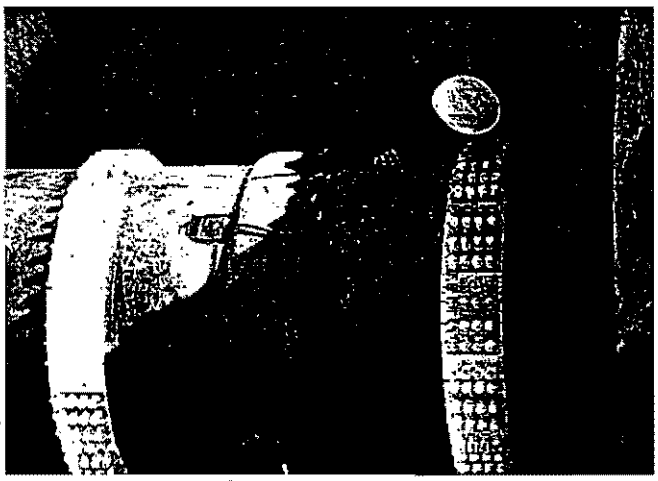
These machines may be used with the service saddles illustrated on this page

Machine	Service saddle tap size				
	1/2"	3/4"	1"	1-1/2"	2"
E-3™	X	X	X	X	X
D-5™	-	X	X	X	X
TRU-CUT™	-	X	X	-	-
MEGA-CUT™	X	X	X	X	X
PL-2™	-	X	X	-	-

TO ORDER SPECIFY QUANTITY, OUTLET TAPPING SIZE AND CATALOG NUMBER

X. CASING SPACERS

raci patented casing spacers for cased pipelines



48" Ductile Iron through steel casing

raci, the leaders in casing spacer technology, has been in business since 1952 and are **ISO 9002** CERTIFIED. Their uniquely designed, engineered and patented spacers are respected and their dependability has made them the number one choice of specifiers and installers world wide.

raci Casing Spacers **isolate water, sewer and gas pipelines** from casings simply and cost effectively. Insulators are required to separate casing and carrier pipes with the following criteria.

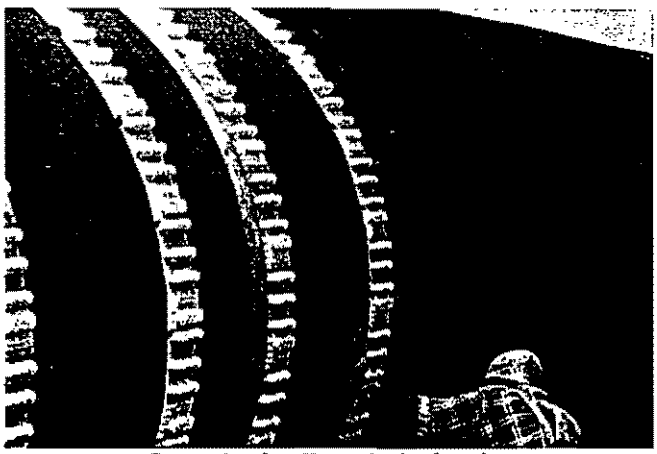
- Must ensure electrical insulation between the two pipes
- Permanently prevent bells from sliding or resting on casing pipe
- Must fasten tightly on the carrier pipe to ensure no horizontal movement during insertion
- Must be made of materials which do not conduct electricity and are permanently resistant to chemical corrosion
- Must be resistant to both mechanical and thermal shocks and stresses, particularly during installation

960 ft. 20" C905 PVC through steel casing

raci SPACER ADVANTAGES:

raci spacers meet the above requirements with the following advantages over the standard skid and strap application and other models of manufactured spacers.

- Spacers are manufactured entirely out of high density polyethylene with **NO METAL bolts or attachments required**
- Spacers are quickly and easily assembled by manually fitting elements one into the other
- Tooth insertion method allows on site adjustment to fit a wide range of pipe diameters and coatings
- Spacers slide into casing with ease



Concrete pipe through steel casing

- Spacers maintain continual long term support for the carrier pipe and its contents
- Spacers provide **constant projections around the *entire* circumference** of the carrier pipe.
- Spacers provide long term corrosion protection
- Spacers can be installed on coated or plain concrete, ductile iron, plastic, ribbed, and steel pipe.

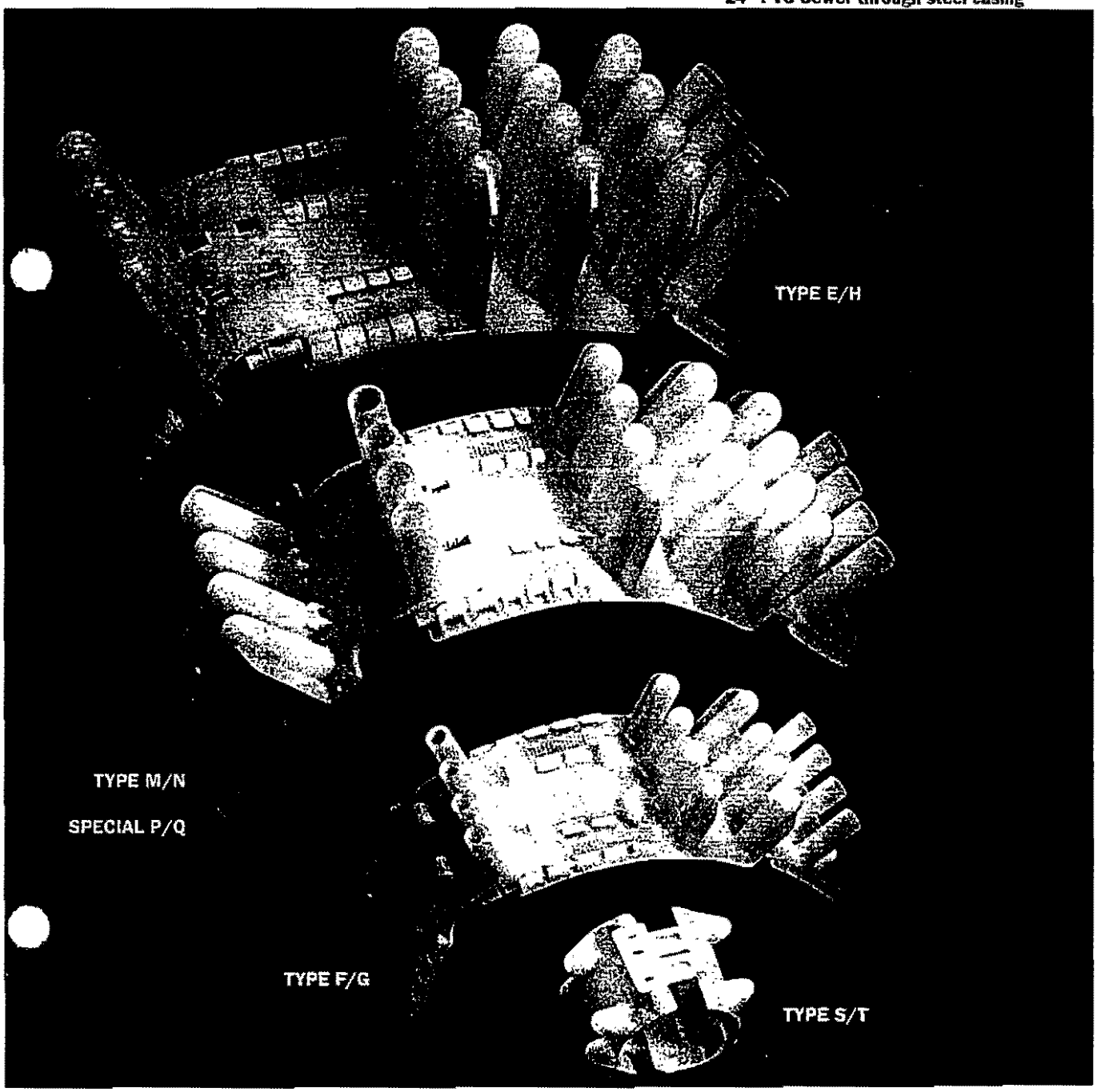
The spacers are divided into four groups which address a wide range of pipe sizes and weights. Within each grouping there are **varying support heights** that allow the spacer to clear bell joints, flanges, couplings, and other jointing methods. These heights range from .78 inches to 5.11 inches (20 - 130 mm)

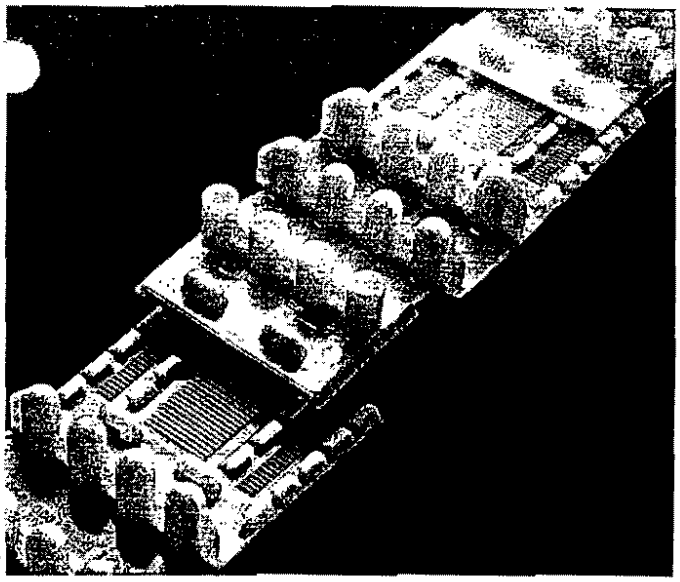
SPECIAL APPLICATIONS: For applications with continued operating temperatures in excess of 60°C/140° F, spacers are available in nylon.

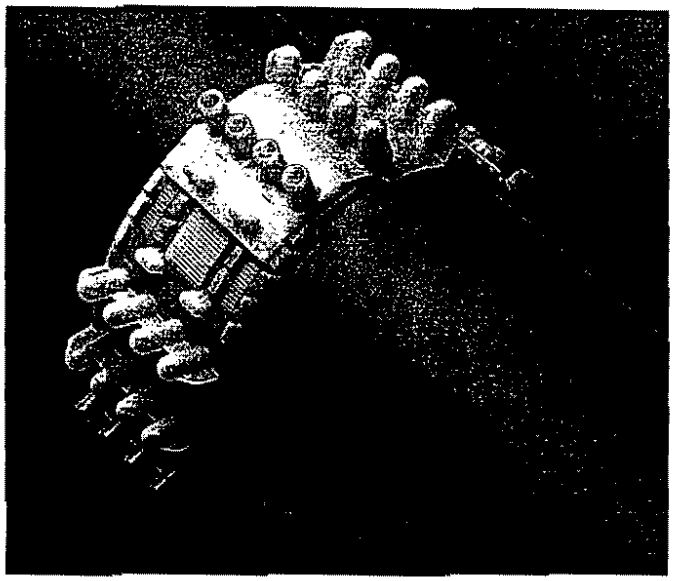
On request, spacers can be manufactured in other types of plastic material according to the mechanical and temperature requirements of the pipeline.

The **HDPE spacer** is manufactured by injection molding. This gives it a high impact strength and a low coefficient of friction which exceeds industry standards. Each spacer element represents a flexible section that has a toothed male butt strap at one end and an appropriately toothed female slot on the other end. Absolutely **no metallic parts** are involved in their assembly. This design allows for **on site adjustments** for any variances within the O.D. range. Coupled with their flexibility they cover all types of pipe from O.D. range 1.18 inches (30 mm) and upward.

24" PVC Sewer through steel casing







Spacing

The spacing of the rings must ensure that the carrier **pipe is fully supported throughout its length.** To ensure against the effects of differential loading at the entrance and exit points of the casing, two rings are used at the beginning and end of each casing, regardless of pipe size or length.

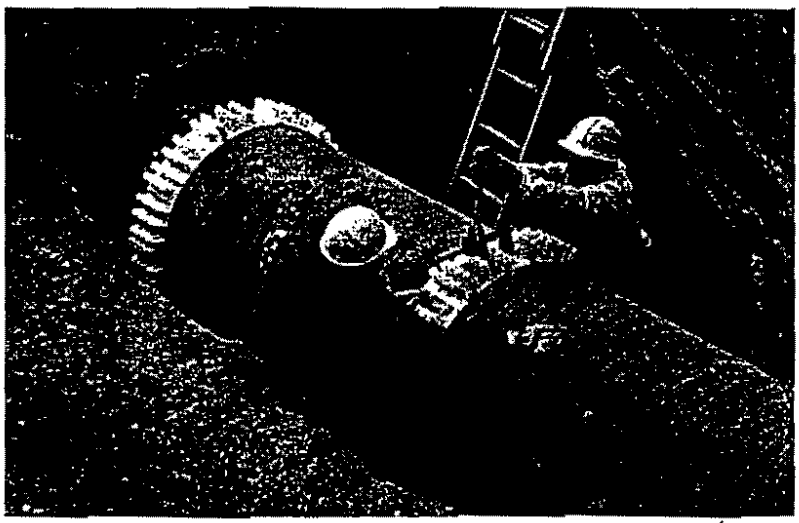
Where mechanically joined pipes, flanges, couplings or bells are involved rings should be installed within 1 foot (.3 m) on each side of the bell and one in the centre of the pipe, when 18 to 20 foot lengths are used.

Selection Guidelines

The selection of spacer type depends on the following dimensions:

- exact carrier pipe O.D.
- exact bell, flange or coupling O.D.
- exact casing pipe I.D.
- clearance desired between casing and carrier pipe
- length of application and linear weight of filled carrier pipe

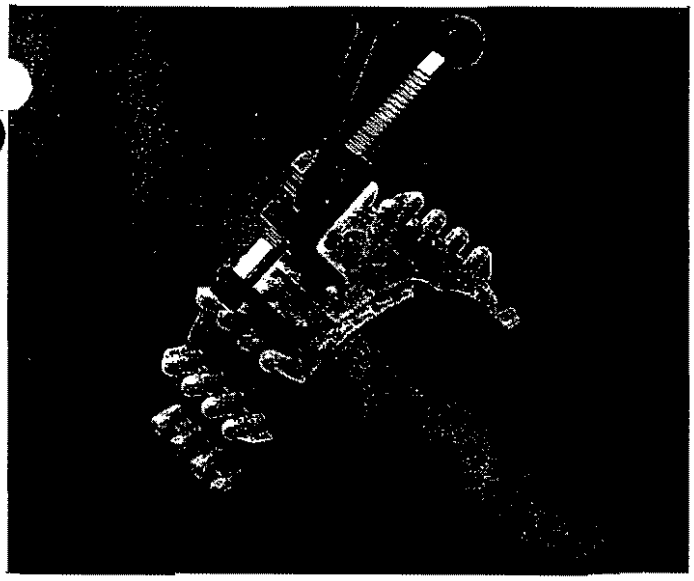
With the above information and using the charts on pages 5 and 6, the type and number of spacer elements required for each ring and how far they will be spaced can be determined.

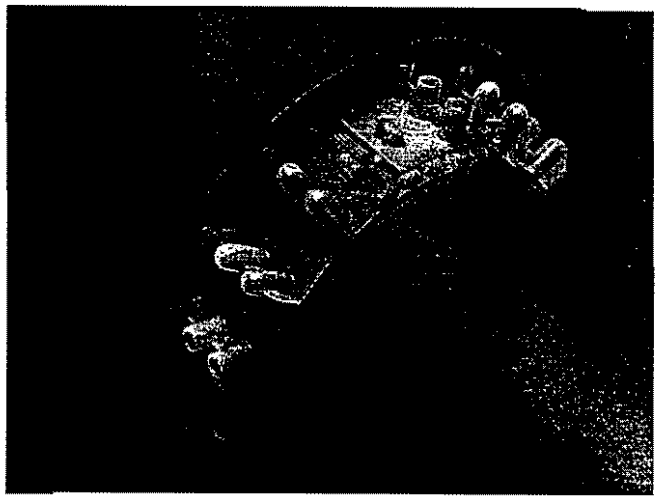


36" Concrete Pressure Pipe through steel casing

Instructions For Ring Assembly

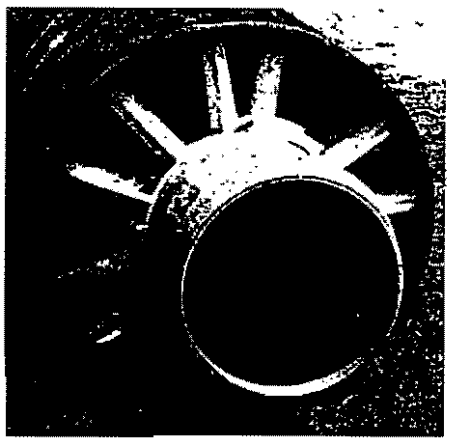
- In cases where the carrier pipe is plastic, the contact zone between the pipe and spacer shall be taped to ensure a textured contact area. It is recommended to use tape on all types of pipe. Double backed tape should be either self amalgamating or bituminous.
- Insert the male butt strap **three teeth** into the slotted female end of the next element. Continue until you have formed a chain of the required number of elements.
- To complete the **ring**, wrap the spacer loosely around the pipe and complete the last linking by hand.
- Pull each of the butt straps together by hand until the spacer is tightened uniformly on the pipe.
- The final tightening is done using the special clamping tool for the spacer type.
- The minimum and maximum operating temperatures are -4 to 140°F or -20 to 60°C.



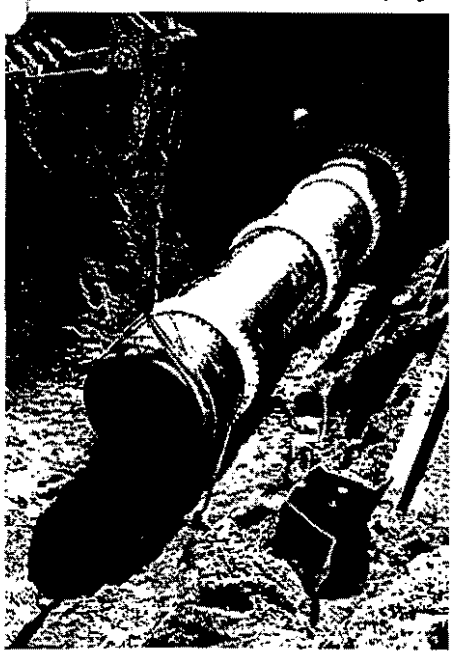


raci spacer assembly and insertion

Specification suggestions for casing spacers



Casing spacers shall be used to install carrier pipe inside the encasement pipe. To provide support around the periphery of the pipe should the pipe twist as it is pushed through the casing. The spacers shall be of a projection type that has a minimum number of projections around the circumference totalling the number of diameter inches. For example, 8" pipe shall have a minimum of 8 projections and 18" pipe shall have a minimum of 18 projections.



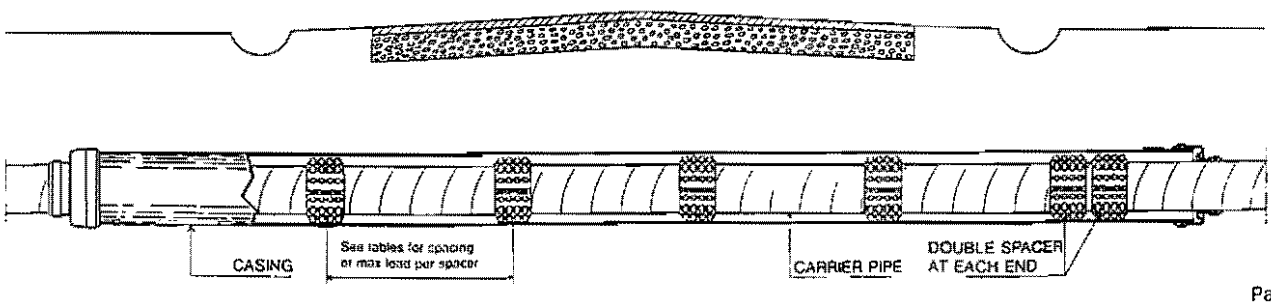
48" Ductile Iron through 66" casing

Casing spacers shall use double backed tape to fasten tightly onto the carrier pipe so that the spacers do not move during installation. Installation instructions shall be provided with each shipment. Casing spacers shall have a span of 10 feet to 6-1/2 feet dependent on the total load anticipated with the pipe full of liquid. On sewer pipe, the maximum span should be 6-1/2 feet to prevent sagging of the carrier pipe. The maximum load shall not exceed the load limits per spacer listed in the brochure. These values in the brochure include conservative safety factors for class spacer used. Spacers shall have minimum height that clears the pipe bell or as otherwise indicated on plans.

Casing spacers shall be projection type totally non-metallic spacers constructed of preformed sections of high-density polyethylene. Spacers shall be ISO 9002 certified for strength and quality. Projection type spacers shall be **RACI type spacers by Raci Spacers North America Inc.**

(Specification suggestion available in electronic form; e-mail or disc)

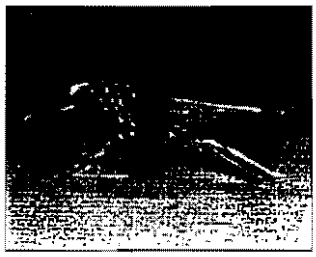
TYPICAL ROAD CROSSING



raci SPACER OPTIONS:

Spacer elements S and T

These spacers are linked by a tongue and groove method. S and T spacers are able to support a maximum weight load of 250 lb./110 kg. per ring. They are best suited for pipe ranges 1.18 - 4.13 inches (30 - 105 mm). For installation the Clamping Tool Type 3 is used - O.D. range 1.18 - 6.46 inches (30 - 164 mm)



S/T SPACER TABLE: SMALL DIAMETER PIPE

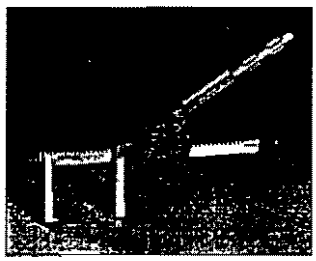
TYPE S AND T 20 mm element support heights of .78 inches							
O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	S	T	ft	m
1.18	1.38	30	35	1		5	1.5
1.50	1.69	38	43		1	5	1.5
2.36	2.76	60	70	2		5	1.5
2.68	2.99	68	76	1	1	5	1.5
3.03	3.39	77	86		2	6-10	1.5
3.54	4.13	90	105	3		6-10	1.5
4.17	4.72	106	120	1	2	6-10	1.5
4.76	5.43	121	138	4		6-10	1.5
5.47	6.06	139	154	2	2	6-10	1.5
6.10	6.46	155	164	1	3	*6-10	1.5

Maximum load 250 lbs or 110 kgs per ring

MAXIMUM LOAD MUST NOT EXCEED 250 LBS OR 110 KGS PER RING

Spacer elements F and G

These spacers are engineered to be used on small to medium sized pipe and are able to support a maximum weight load of 1102 lb./500 kg. per ring. F and G spacers are best suited for pipe ranges 3.62 to 17.56 inches (92 to 406 mm). For installation the Clamping Tool Type 1 is used. Channel Lock tool also available.



F/G SPACER TABLE: SMALL TO MEDIUM DIAMETER PIPE

TYPE F and G 25, 41, and 60 mm element support heights of .98, 1.6, and 2.36 inches							
O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	F	G	ft	m
3.62	4.53	92	115	1		6-10	1.8-3.0
4.57	5.98	116	152	2		6-10	1.8-3.0
6.02	7.40	153	188	2	1	6-10	1.8-3.0
7.44	8.34	189	224	3		6-10	1.8-3.0
8.35	10.24	225	260	3	1	6-10	1.8-3.0
10.28	11.61	261	295	4		6-10	1.8-3.0
11.65	12.32	296	313	4	1	6-10	1.8-3.0
12.36	14.80	314	376	5		6-10	1.8-3.0
14.84	17.56	377	446	6		6-10	1.8-3.0
17.60	20.79	447	528	7		*6-10	1.8-3.0

Maximum load 1102 lbs or 500 kgs per ring

MAXIMUM LOAD MUST NOT EXCEED 1102 LBS OR 500 KGS PER RING

Spacer elements P and Q Special

The P and Q spacer is designed for that middle pipe O.D. range application. They are able to support a maximum weight load of 1213 lbs. / 550 kg. per ring. The P and Q spacers are best suited for the pipe range 6.00 to 12.00 inches (152 mm to 305 mm). For O.D. Ranges above 12" contact your distributor. For installation the Clamping Tool Type 6 is used.

P/Q SPACER TABLE: MEDIUM DIAMETER PIPE

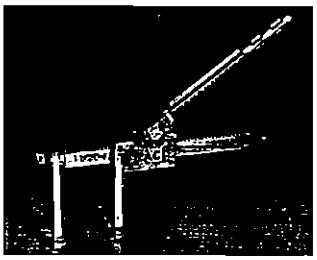
TYPE P and Q 120 mm Special element support heights of 4.73 inches							
O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	P	Q	ft	m
5.63	6.61	143	168	1	1	6-10	1.8-3.0
6.65	7.91	169	201	2		6-10	1.8-3.0
7.95	8.94	202	227	1	2	6-10	1.8-3.0
8.98	9.92	228	252	2	1	6-10	1.8-3.0
9.96	11.26	253	286	3		6-10	1.8-3.0
11.30	12.24	287	311	2	2	6-10	1.8-3.0
12.28	13.27	312	337	3	1	*6-10	1.8-3.0
13.31	15.55	338	395	4		*6-10	1.8-3.0
15.59	16.57	396	421	4	1	*6-10	1.8-3.0
16.61	19.88	422	505	5		*6-10	1.8-3.0
19.92	23.23	506	590	6		*4.9	1.5

Maximum load 1213 lbs or 550 kgs per ring

MAXIMUM LOAD MUST NOT EXCEED 1213 LBS OR 550 KGS PER RING

Spacer elements M and N

The M and N spacer is designed for that middle pipe O.D. range application. They are able to support a maximum weight load of 2204 lb./1000 kg. per ring. The M and N spacers are best suited for the pipe range 13.31 to 29.88 inches (358 to 764 mm). For installation the Clamping Tool Type 5 is used. Channel Lock tool also available.



Spacer elements E and H

For large diameter pipe, heavier applications or long casings where maximum strength is required the E and H elements are used. They are able to support a maximum weight load of [illegible] lb./2700 kg. per ring and are best suited for the pipe range above 24 inches (609 mm). For installation, the Clamping Tool Type 2 is used for support heights up to 90 mm. Tool Type 4 is used for the E 130s.

NOTICE

Distance between spacers **must** be calculated so the maximum load per spacer ring does not exceed the max. load carrying capacity for the type used. (S&T 250 lb/110 kg, F&G 1102 lb/500 kg, P&Q 1213 lb/550 kg, M&N 2204 lb/1000kg, E&H 5952 lb/2700 kg) - / spacer ring.

Maximum load per spacer is calculated based on the weight of the pipe filled with liquid divided by the number of spacer rings installed. The maximum distance of 10 feet/3 meters shall not be exceeded due to the danger of the pipe sagging between the spacers support points unless the pipe manufacturer states differently.

M/N SPACER TABLE: MEDIUM DIAMETER PIPE

TYPE M and N 18, 36, 50, 75, and 90 mm element support heights of 0.7, 1.42, 1.97, 2.95, and 3.54 inches

O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	M	N	ft	m
5.63	6.61	143	168	1	1	6-10	1.8-3.0
6.65	7.91	169	201	2		6-10	1.8-3.0
7.95	8.94	202	227	1	2	6-10	1.8-3.0
8.98	9.92	228	252	2	1	6-10	1.8-3.0
9.96	11.26	253	286	3		6-10	1.8-3.0
11.30	12.24	287	311	2	2	6-10	1.8-3.0
12.28	13.27	312	337	3	1	6-10	1.8-3.0
13.31	15.55	338	395	4		6-10	1.8-3.0
15.59	16.57	396	421	4	1	6-10	1.8-3.0
16.61	19.88	422	505	5		6-10	1.8-3.0
19.92	23.23	506	590	6		*4-10	1.5-3.0
23.27	26.54	591	674	7		*4-10	1.5-3.0
26.57	29.88	675	759	8		*4.6	1.5
29.92	32.68	760	830	9		*4.6	1.5

Maximum load 2204 lbs or 1000 kgs per ring

***MAXIMUM LOAD MUST NOT EXCEED 2204 LBS OR 1000 KGS PER RING**

E/H SPACER TABLE: LARGE DIAMETER PIPE

TYPE E and H 25, 41, 60, 75, 90, 110 and 130 mm element support heights of .98, 1.6, 2.36, 2.95, 3.54, 4.33 and 5.11 inches

O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	E	H	ft	m
8.70	10.55	221	268	2	1	6-10	1.8-3.0
10.59	12.60	269	320	3		6-10	1.8-3.0
12.64	14.41	321	366	3	1	6-10	1.8-3.0
14.45	16.54	367	420	4		6-10	1.8-3.0
16.57	18.31	421	465	4	1	6-10	1.8-3.0
18.35	20.87	466	530	5		6-10	1.8-3.0
20.91	24.80	531	630	6		6-10	1.8-3.0
24.84	28.74	631	730	7		6-10	1.8-3.0
28.78	32.68	731	830	8		6-10	1.8-3.0
32.72	36.61	831	930	9		6-10	1.8-3.0
36.65	40.55	931	1030	10		*4-10	1.5-3.0
40.59	45.63	1031	1159	11		*4-10	1.5-3.0
45.67	53.54	1160	1360	13		*4-10	1.5-3.0
53.58	62.99	1361	1600	15		*4-10	1.5-3.0
63.03	70.83	1601	1799	17		1.9	0.6
70.87	83.07	1800	2110	20		1.9	0.6
83.11	95.67	2111	2430	23		1.9	0.6
97.71	112.60	2431	2860	27			
112.64	134.41	2861	3414	32			

Maximum load 5952 lbs or 2700 kgs per ring

***MAXIMUM LOAD MUST NOT EXCEED 5952 LBS OR 2700 KGS PER RING**

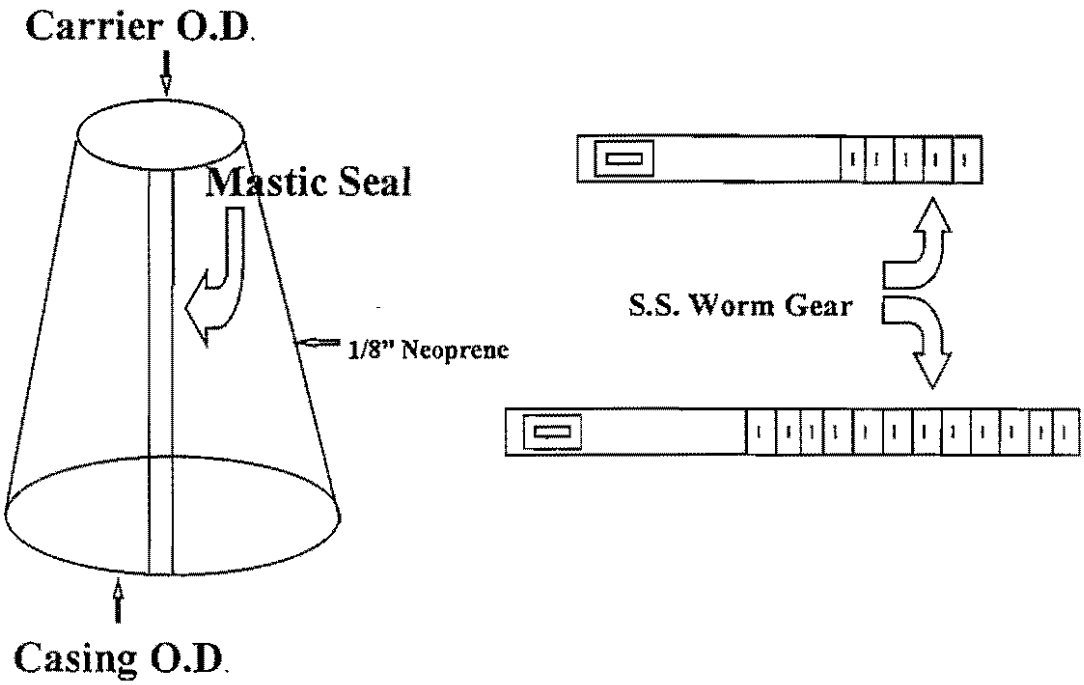
PHYSICAL CHARACTERISTICS OF SPECIFICALLY DESIGNED HIGH DENSITY POLYETHYLENE FOR RACI SPACERS

Yield strength	3625 PSI	25 N/mm²	ASTM D 638
Tensile Strength	2900 PSI	20 N/mm²	ASTM D 638
Elongation at break	800%	800%	ASTM D 638
Hardness shore D	65	65	ASTM D 2240
Minimum working temperature	-4° F	-20° C	
Dielectric strength	>940 Kv/inch	>37 Kv/mm	ASTM 149/64
UVL Stabilization	yes	yes	

PWM

Public Works Marketing, Inc.

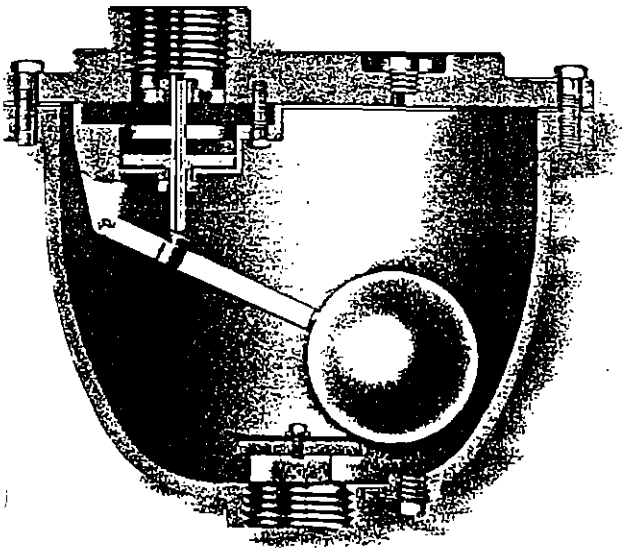
Wrap Around End Seal



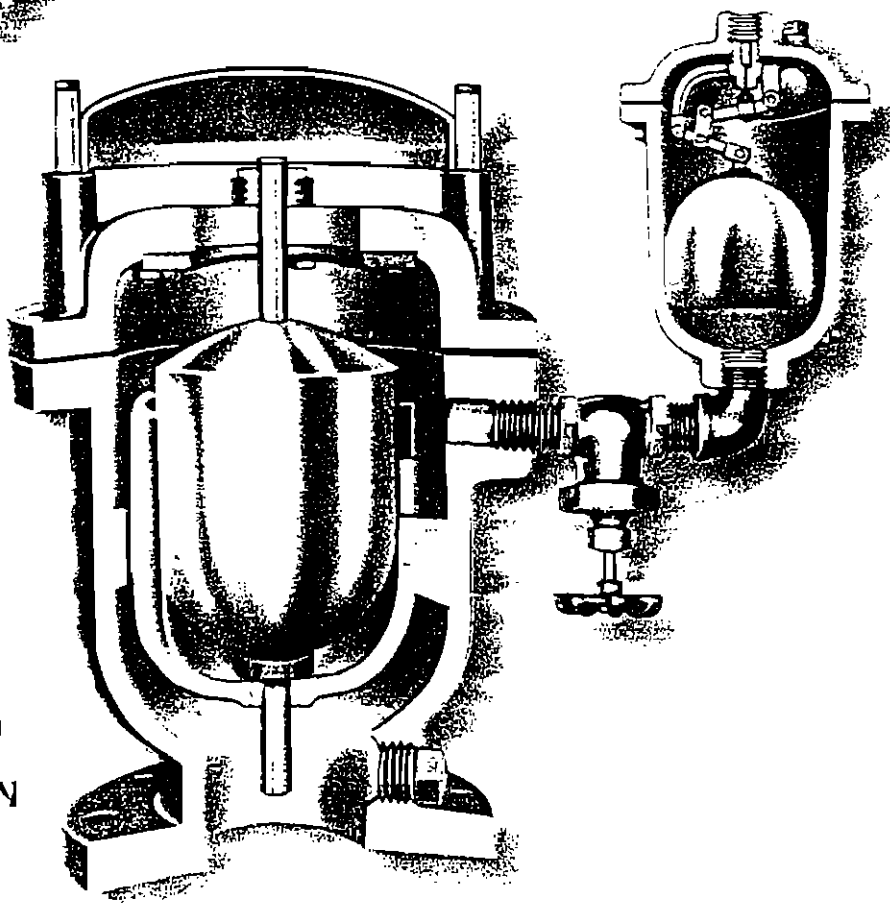
P.O. Box 38174 Dallas, Texas 75238-0174 Phone: 800-517-0395 Fax: 214-343-7105 Email: PWM12@aol.com

XI. COMBINATION AIR VALVE

APCO
COMBINATION AIR VALVES



SERIES 140C
STANDARD COMBINATION
SINGLE BODY



MANUFACTURED TO AWWA C-512 STANDARDS

ISO FLANGE CONNECTIONS AVAILABLE

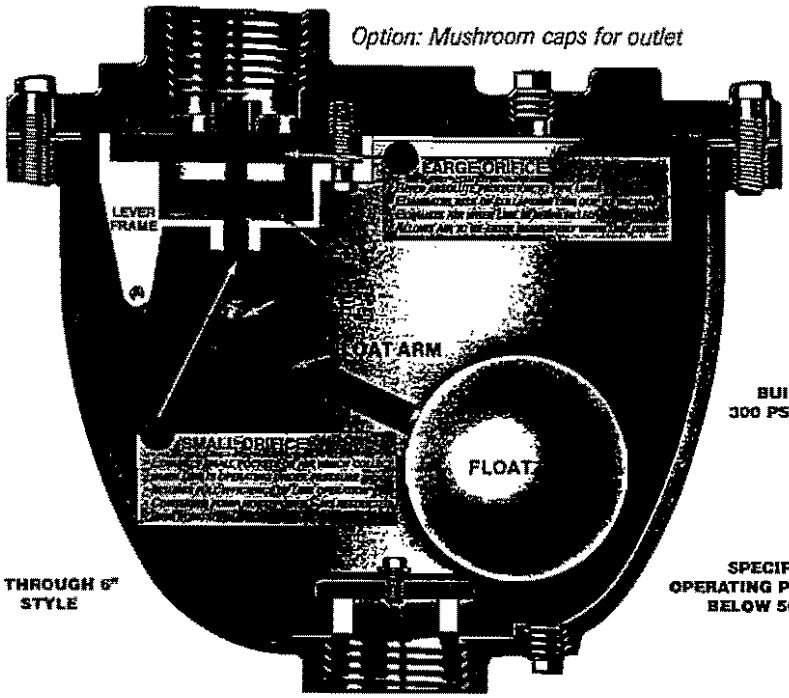
SERIES 1800
CUSTOM COMBINATION
DUPLEX BODY

VALVE & PRIME CORPORATION
1420 S. WRIGHT BLVD. • SCHAUMBURG, IL 60193-4599

APCO COMBINATION AIR VALVES

SINGLE BODY *Double Orifice*

Option: Mushroom caps for outlet



1" THROUGH 6" STYLE

BUILT FOR 300 PSI SERVICE

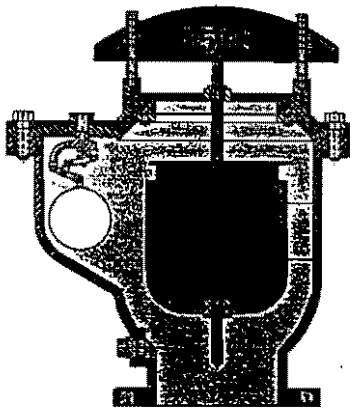
SPECIFY IF OPERATING PRESSURES BELOW 50 P.S.I.

MATERIALS USED IN BOTH STYLE COMBINATION AIR VALVES

Body, Cover, Lever Frame	Cast Iron
Float	Stainless Steel
Seat	Buna-N
Lever Frame (1" & 2" size)	Delrin
Leverage Mechanism (8" size)	Stainless Steel

ALL OTHER INTERNAL PARTS STAINLESS STEEL OR BONZE

8" STYLE



TO SIZE AIR VALVES FOR PIPELINE SERVICE USE APCO AIR VALVE COMPUTER *or* APSLIDE COMPUTER SOFTWARE

1" 143C	2" 145C	3" 147C	4" 149C	6" 150C	8" 151C
ILLUSTRATED ABOVE*	ILLUSTRATED ABOVE	ILLUSTRATED ABOVE	ILLUSTRATED ABOVE	ILLUSTRATED ABOVE	SEE ABOVE DRAWING
PHYSICAL DIMENSIONS · Height 10" · Width 7" · Length 11" · Weight 35 lbs.	PHYSICAL DIMENSIONS · Height 12 1/4" · Width 8" · Length 14" · Weight 75 lbs.	PHYSICAL DIMENSIONS · Height 15 1/2" · Width 10" · Length 16" · Weight 100 lbs.	PHYSICAL DIMENSIONS · Height 17 1/8" · Width 11" · Length 18" · Weight 170 lbs.	PHYSICAL DIMENSIONS · Height 27 1/4" · Width 13" · Length 18 3/8" · Weight 205 lbs.	PHYSICAL DIMENSIONS · Height 25 3/4" · Width 17 1/2" · Length 22 1/4" · Weight 300 lbs.
INLET / OUTLET 1" PIPE THREAD * EXCEPT POPPET	INLET / OUTLET 2" PIPE THREAD	INLET / OUTLET 3" PIPE THREAD 125 & 250 LB. FLANGES ALSO AVAILABLE HEIGHT FLANGED 16 1/2"	INLET / OUTLET 4" PIPE THREAD 125 & 250 LB. FLANGES ALSO AVAILABLE HEIGHT FLANGED 19"	INLET 125 & 250 LB. FLANGE OUTLET OPTIONS • PLAIN WITH HOOD • THREADED • FLANGED	INLET 125 & 250 LB. FLANGE OUTLET OPTIONS • PLAIN WITH HOOD (AS SHOWN) • FLANGED

SINGLE BODY SPECIFICATIONS

Combination Air Valve sizes 1" through 6", (single body, double orifice) allows large volumes of air to escape out the large orifice when filling a pipeline and closes when liquid enters the valve. When the valve is closed and pressurized, the small air release orifice will open to allow small pockets of air to escape automatically and independently of the large orifice.

The large orifice shall also allow large volumes of air to enter during pipeline drainage to break the vacuum. The body inlet must be baffled to protect the float from direct forces of rushing air and water to prevent premature valve shut-off.

The Buna-N seat must be fastened to the valve cover without distortion for drop tight shut-off. The floats shall be heavy stainless steel. The plug or float shall be center guided through hex bushings for positive shut-off.

Valve exterior to be painted with Red Oxide Primer Paint as accepted by the FDA for use in Potable Water.

All materials of construction shall be certified in writing to conform to A.S.T.M. specifications as follows:

Body & Cover	Cast iron	ASTM A126 GR.B
Float	Stainless steel	ASTM A240
Needle & seat	Buna-N	
Plug	Bronze	ASTM B124
Leverage frame	Delrin/Cast iron	ASTM D2133/ASTM A126 GR.B

Valve to be APCO Model (Engineer to Name) Combination Air Valve as manufactured by Valve & Primer Corporation, Schaumburg, Illinois, U.S.A.

THERE ARE BASICALLY TWO TYPES OF AIR VALVES:

TYPE 1. AIR/VACUUM VALVES with ① LARGE ORIFICE to vent large volumes of air for efficient filling and draining of pipelines. This protects against vacuum and water column separation or pipeline collapse.

TYPE 2. AIR RELEASE VALVES with ② SMALL ORIFICE for continuous venting of air pockets as they accumulate in a pressurized pipeline.

When the above types are combined, the result is a COMBINATION AIR VALVE.

The Combination Air Valve is available in a SINGLE BODY DOUBLE ORIFICE shown here, or in a DUPLEX arrangement (see Back Page).

The single body is most popular due to its smaller overall size and resulting space saving inside a valve vault. It is available in 1" to 8" sizes.

HOW IT WORKS: Sizes 1" through 6" incorporate a poppet (or plug) which rests freely inside the lever frame. The center stem of the poppet has a SMALL ORIFICE through it. When water enters the main valve body it raises the float and float arm which puts the needle, attached to the arm, in contact with the poppet stem while lifting the poppet to the shut-off position against the LARGE ORIFICE.

As air accumulates inside the main valve body the water is displaced. The float arm falls away from the poppet stem to expose the small orifice and the pocket of air is vented. Water re-enters the main valve body lifting the float arm back to the shut-off position and the cycle repeats as air accumulates. As long as the main valve body is under pressure, the poppet stays closed because the pressure differential across the large orifice is more than the poppet can overcome.

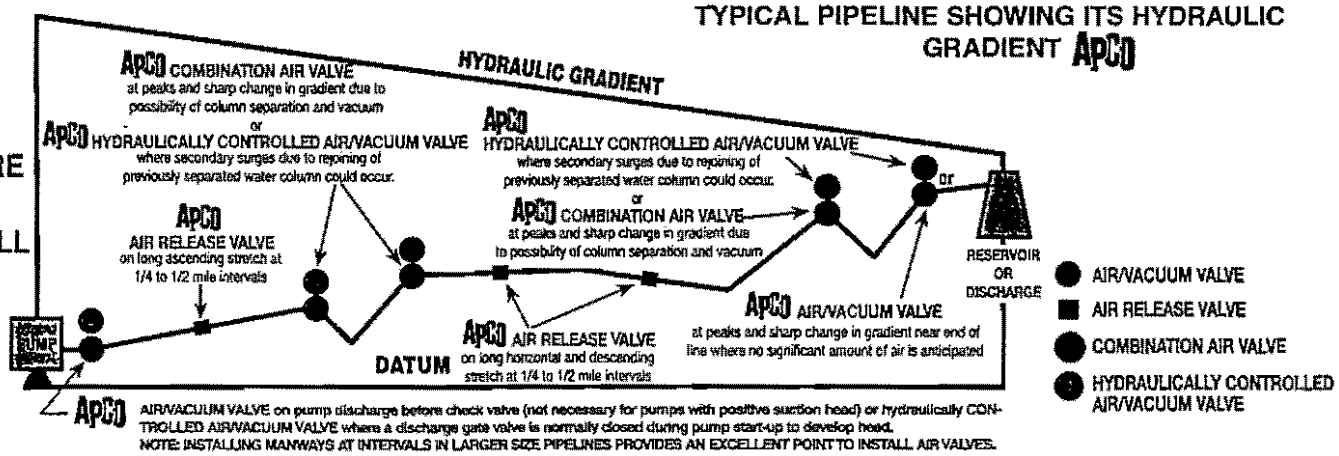
If, however, a negative pressure occurs inside the main valve body, the poppet will drop open to allow air in and prevent a vacuum from forming in the pipeline.

Size 8" functions in the same manner, but, instead of a poppet, a float is used for shutting off the large orifice and a separate internal float operated lever mechanism is incorporated with a small orifice for venting smaller pockets of air when the system is pressurized.

Every Combination Air Valve is hydrostatically seat and shell tested before it leaves our factory to insure quality performance in the field.

WHERE TO INSTALL

TYPICAL PIPELINE SHOWING ITS HYDRAULIC GRADIENT APCO

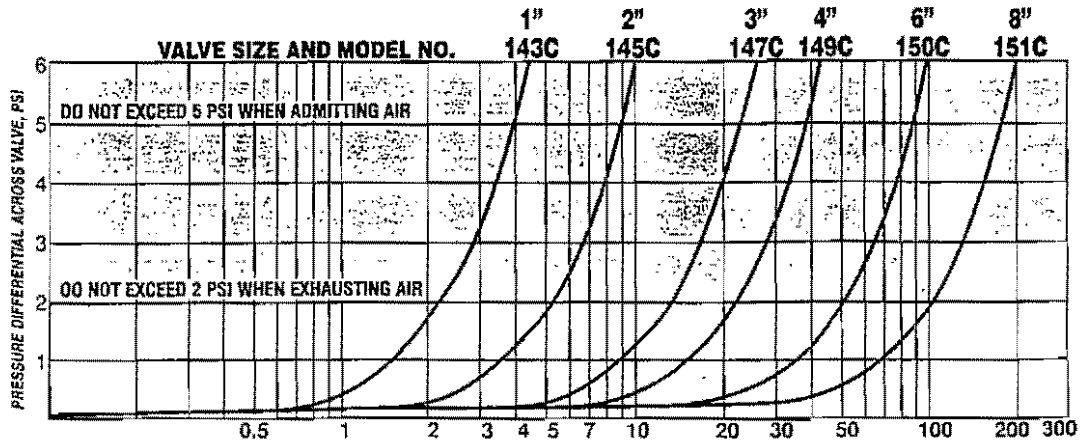


ORIFICE SIZES
for 300 psi working pressure

MODEL	❶ LARGE ORIFICE	❷ SMALL ORIFICE
143C	1"	5/64"
145C	2"	3/32"
147C	3"	3/32"
149C	4"	3/32"
150C	6"	1/8"
151C	8"	5/32"

DISCHARGE CAPACITIES FOR COMBINATION AIR VALVE

CURVES SHOWN ARE ACTUAL FLOW CAPACITIES AT 14.7 PSI BAROMETRIC PRESSURE AND 70° F TEMPERATURE BASE ON ACTUAL TEST. THESE FIGURES ARE NOT ONLY THE FLOW CAPACITIES ACROSS THE ORIFICE BUT FLOW ACROSS THE ENTIRE VALVE. IN THE TEST SET-UP, APPROACH VELOCITY TO THE VALVE IS NEGLIGIBLE THEREFORE ACTUAL CAPACITY EXCEEDS THE VALUES SHOWN ON CHART.
TEST CONDUCTED BY: PHILLIP PETROLEUM COMPANY ENGINEERING DEPARTMENT - TEST DIVISION EDMOND PLANT OCTOBER 1, 1961.



XII. MISC.-FLANGE BOLT & GASKET SET, POLYWRAP, DETECTABLE TAPE, MEGALUGS, HYDRANT MARKERS, COPPER TUBING, DOUBLE DETECTOR CHECK VALVE, BRASS VALVE

COWTOWN GASKET CO.

B-Rite
The Right Gasket Works

B-Tite
Bolt Sets that Fit

Bull Strong
Tough Products for Tough Jobs

3320 Stuart Dr.
Ft. Worth, TX 76110
817-921-6501
817-921-2782 fax

BOLTING SPECIFICATIONS – PLAIN FINISH
Standard Bolt and Nut Sets, Capscrew Sets and Flange Paks contain Hex Head Machine Bolts and Hex Head Capscrews I/A/W ASTM A307 Gr. A. Their dimensional specifications are I/A/W ASTM A563 Gr. A. All Bolts, Screws and Nuts have National Coarse threads, C 1.2A fit.

BOLTING SPECIFICATIONS – STAINLESS STEEL
Bolt and Nut Sets contain Hex Head Machine Bolts I/A/W ASTM F593 Gr. 18-8. Their dimensional specifications are I/A/W ANSI/ASME B18.2.1. Finished Hex Pattern Nuts are I/A/W ASTM F594 Gr. 18-8. All Bolts and Nuts have National Coarse threads, C 1.2A fit.

BOLTING SPECIFICATIONS – B7
Alloy Stud Bolt and Heavy Hex Head Bolt material is I/A/W ASTM A193 Gr. B7. Threading is ASME B1.1 class 2A National Coarse threads for bolts up to 1 inch and 8 thread series for bolts above 1 inch. Nut material is I/A/W ASTM A194 Gr. 2H. Heavy Nuts I/A/W ASME B18.2.2 have C1.2B course series threads for nuts up to 1 inch and 8 thread series for nuts above 1 inch.

Standard Bolting Material provided will generally be of an import manufacturer. Domestic material available on request.

GASKET SPECIFICATIONS
Flange Gaskets dimensional requirements are I/A/W ANSI/ASME B16.21. For physical characteristics please reference the attachment.

STANDARD HARDWARE

POLYWRAP

(Polyethylene Encasement for Ductile Iron Pipe)

All polywrap supplied by Standard Hardware, Inc., will meet or exceed the following specifics:

AWWA C105

ASTM D1248-84

Thickness:	8 mil (tolerance +/- 10%)
Material:	Linear Low Density, Type I, Class C-Black, Grade E-1, Manufactured from 100% virgin resin. Colors & Clear = same specifications.
Tensile Strength:	1200 PSI (8.3 MP) minimum
Elongation:	300% minimum
Dielectric Strength:	(raw material) Volume resistivity ohm*cm= minimum
Dielectric Strength:	(finished film) 800V/mil (31.5V/um) thickness minimum

1500 ROYAL PARKWAY EULESS, TX 76040-6726 817-354-1111

Detectable Underground Utility Marking Tape

Specifications, Test Data, Approvals and Color Code

I. SPECIFICATIONS

Consists of a minimum 5.0 mil (0.005") overall thickness, with no less than a 35 gauge (0.00035") solid aluminum foil core. The foil must be visible from BOTH sides. The layers shall be laminated together with the extrusion lamination process, not adhesives. Further, there shall be NO inks or printing extending to the edges of the tape. The adhesive will NOT contain any dilutants, pigments, or contaminants and is specially formulated to resist degradation by elements normally encountered in the soil. All printing shall be encased to avoid ink rub-off.

II. TEST DATA

PROPERTY	METHOD	VALUE
Thickness	ASTM D2103	5.0 mils
Tensile strength	ASTM D882	25 lbs /inch (5500 PSI)
Elongation	ASTM D882-88	<50% at break
Printability	ASTM D2578	>50 dynes/cm^2
Flexibility	ASTM D671-81	pliable hand
Inks	Mfg. specs.	heat set Mylex
Message repeat	Mfg. specs.	every 20 inches
Foil	Mfg. specs.	deadsoft/annealled
Top layer	Mfg. specs.	virgin PET
Bottom layer	Mfg. specs.	virgin LDPE
Adhesives	Mfg. specs.	>30%. solid 1.5#/R
Bond strength	Boiling H^{2}0 @ 100°C	5 hours w/0 peel
Colors	APWA Code	see below

III. APPROVALS

A. Department of Transportation, Materials Transportation Bureau, Office of Pipeline Safety. USAS code for pressure piping B31.8, paragraph 192.321 (e).

B. National Transportation Safety Board, Washington, DC, Special Study Prevention of Damage to Pipelines. Adopted June 7, 1974. Report NTSB-PSS-73-1.

C. American Petroleum Institute (API). Recommended practice for marking buried liquid petroleum pipelines--API RP 1109.

D. General Services Administration, Washington, DC, Public Buildings Service Guide Specification for Mechanical and Electrical Equipment--PBS 4-1501, Amendment 2, page 1 501-14, paragraph 18, subparagraph 18.1, clause 18.1.1.

E. Rural Electrification Authority (REA), U.S. Dept. of Agriculture, Washington, DC, National Electrical Safety Code for Underground Construction for remote and immediate hazards.

IV. COLOR CODE

Safety Red--Electric power, distribution and transmission and municipal electric systems.
High Visibility Safety Yellow--Gas and oil distribution and transmission, dangerous materials, product and steam.
Safety Alert Orange--Telephone and telegraph systems, police and fire communications and cable television.
Safety Precaution Blue--Water systems and slurry pipelines.
Safety Green--Sanitary and storm sewer systems.
Safety Brown--Force mains, reclaimed water lines and effluent re-use lines.
Alert Purple--Reclaimed non-potable water lines.

MagnaTec®

The standard detectable product used for location and early warning protection for underground lines.

- Multi-layer construction offers permanence of message, strength and locatability.
- No ink extends to the edge of the tape providing the strongest bond between layers to prevent delamination.
- Bold black letters include message and installation recommendations.
- Silver foil shows through on the front and the back for excellent dig-in visibility.

Use widest tape possible and bury as close to the surface as practical.

WATER UTILITY TAPE - MAGNATEC

STOCK

Item No.	Width x Length	Message	Color	Indv. Wt.	Pkg. Qty.	Pkg. Lbs.
3	2" x 1000'	CAUTION WATER LINE BELOW	Blue/silver	5.0	6	30.5
31-022	3" x 1000'	CAUTION WATER LINE BELOW	Blue/silver	7.0	4	30.5
31-024	6" x 1000'	CAUTION WATER LINE BELOW	Blue/silver	14.0	2	30.5
EW 31-016	3" x 1000'	CAUTION POTABLE WATER LINE BELOW	Blue/silver	7.0	4	30.5
31-052	2" x 1000'	CAUTION SEWER LINE BELOW	Green/silver	5.0	6	30.5
31-053	3" x 1000'	CAUTION SEWER LINE BELOW	Green/silver	7.0	4	30.5
31-055	6" x 1000'	CAUTION SEWER LINE BELOW	Green/silver	14.0	2	30.5
EW 31-031	3" x 1000'	CAUTION STORM DRAIN BELOW	Green/silver	7.0	4	30.5
EW 31-042	2" x 1000'	CAUTION FORCE MAIN BELOW	Green/silver	5.0	6	30.5
EW 31-043	3" x 1000'	CAUTION FORCE MAIN BELOW	Green/silver	7.0	4	30.5
EW 31-122	2" x 1000'	CAUTION FORCE MAIN BELOW	Tan/silver	5.0	6	30.5
EW 31-123	3" x 1000'	CAUTION FORCE MAIN WATER	Tan/silver	7.0	4	30.5
EW 31-099	2" x 1000'	CAUTION RECLAIMED WATER LINE BELOW	Purple/silver	5.0	6	30.5
31-100	3" x 1000'	CAUTION RECLAIMED WATER BELOW DO NOT DRINK	Purple/silver	7.0	4	30.5

GAS UTILITY TAPE - MAGNATEC

STOCK

Item No.	Width x Length	Message	Color	Indv. Wt.	Pkg. Qty.	Pkg. Lbs.
31-140	2" x 1000'	CAUTION GAS LINE BELOW	Yellow/silver	5.0	6	30.5
31-141	3" x 1000'	CAUTION GAS LINE BELOW	Yellow/silver	7.0	4	30.5
31-143	6" x 1000'	CAUTION GAS LINE BELOW	Yellow/silver	14.0	2	30.5
31-087	2" x 1000'	CAUTION OIL LINE BELOW	Orange/silver	5.0	6	30.5

ELECTRIC UTILITY TAPE - MAGNATEC

STOCK

Item No.	Width x Length	Message	Color	Indv. Wt.	Pkg. Qty.	Pkg. Lbs.
31-106	2" x 1000'	CAUTION ELECTRIC LINE BELOW	Red/silver	5.0	6	30.5
31-107	3" x 1000'	CAUTION ELECTRIC LINE BELOW	Red/silver	7.0	4	30.5
31-109	6" x 1000'	CAUTION ELECTRIC LINE BELOW	Red/silver	14.0	2	30.5

THE ORIGINAL

Series 2000PV

MECHANICAL JOINT RESTRAINT GLAND FOR USE WITH C-900 OR IPS OD PVC PIPE

The 2000PV mechanical joint restraint is the fastest and most economical method of restraining PVC pipe to mechanical joints. Now the need for costly concrete thrust blocks and corrodible steel tie rods is eliminated. It can be used in straight alignment or at the pre-set deflection recommended for the mechanical joint.

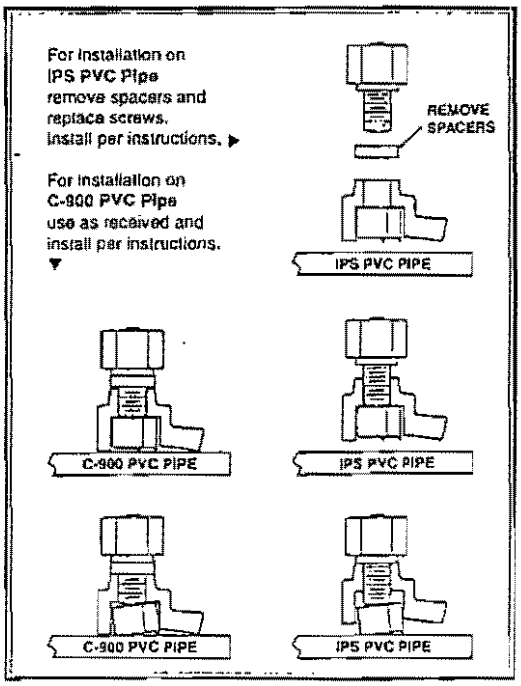
The 2000PV was the first PVC joint restraint to be tested to UNI-B-13, Underwriters Laboratories, and Factory Mutual.

Meets all of the requirements of UNI-B-13 "Recommended Standard Performance Specification for Joint Restraint Devices for use with Polyvinyl Chloride (PVC) pipe."

UL-listed in the four through twelve inch sizes for joining UL-listed ductile iron fittings to UL-listed, Class 150 PVC pressure pipe. The maximum allowable joint deflection is five degrees.

Factory Mutual approved for use on DR18 PVC pipe in four through twelve inch sizes.

The fastest and most economical method of restraining PVC pipe to mechanical joints. Eliminates costly concrete thrust blocks and corrodible steel tie rods.



2000PV mechanical joint restraints can be used on both C-900 and IPS OD PVC pipe. A spacer is provided under each torque-limiting screw to accommodate the different diameters.

The pressure rating for the 2000PV joint restraint is the standardized pressure rating of the PVC pipe on which it is used. 2000PV joint restraints can be used on both C-900 and IPS OD PVC pipe, 3" through 12".

STANDARDIZED PRESSURE RATINGS FOR ORDINARY WATER WORKS WITH TRANSIENT SURGES ONLY. RATINGS ARE FOR PVC PIPE AND 2000 PV.

ANSI/AWWA C900 CI OD		ASTMD2241 IPS OD	
DR 14	200 PSI	SDR 17	250 PSI
DR 18	150 PSI	SDR 21	200 PSI
DR 25	100 PSI	SDR 26	160 PSI

RATINGS FOR PEAK PRESSURES USED IN SEWAGE FORCE MAINS AND OTHER INSTALLATIONS DESIGNED FOR CYCLIC SURGES OF 1-MILLION CYCLES. RATINGS ARE FOR PVC PIPE AND 2000 PV.

ANSI/AWWA C900 CI OD		ASTM D2241 IPS OD	
DR 14	200 PSI	SDR 17	200 PSI
DR 18	150 PSI	SDR 21	160 PSI
DR 25	100 PSI	SDR 26	128 PSI

LARGE DIAMETER

Series 2000PV

MECHANICAL JOINT RESTRAINT GLAND
FOR USE WITH C-905 PVC PIPE

The Large Diameter 2000PV is a mechanical joint restraint for use with C-905 PVC pipe with nominal size diameters from 14 through 24 inches.

NOMINAL PIPE SIZE	SERIES NUMBER	PVC PIPE CLASS	PRESSURE RATING	SAFETY FACTOR
14	2014PV	DR25	165	Full Pipe Capacity
	2014PV	DR18	235	Full Pipe Capacity
16	2016PV	DR25	165	Full Pipe Capacity
	2016PV	DR18	235	Full Pipe Capacity
18	2018PV	DR25	165	Full Pipe Capacity
	2018PV	DR18	235	2.5 : 1
20	2020PV	DR25	165	Full Pipe Capacity
	2020PV	DR18	235	2.5 : 1
24	2024PV	DR25	165	Full Pipe Capacity
	2024PV	DR18	235	2.5 : 1

Since the large diameter 2000PV is used with only one pipe diameter, there are no spacers as used with the 4"-12" 2000PV series.

The large diameter 2000PV restraints have been tested to pressures exceeding the minimum quick burst pressure requirements for the pipe shown in the table, and have the same pressure ratings as the pipe.

APPLICATION VERSATILITY

Other EBAA Products for Use on PVC Pipe

Series 2000SV

This series is a **split restraint** system for the mechanical joint. This split restraint allows for the repair of existing valves, fittings, and hydrants where it is advisable to restrain mechanical joints on existing PVC pipe systems. The installation is simple and it is available in the 4" through 12" sizes.

Series 2100

The Megaflange® **flange adapter** is a field-adaptable, restrained flanging system. The Megaflange adapter has a restraint ring and a gasket ring to give the maximum amount of flexibility during and after installation. It is available for use on PVC pipe in the 3" through 24" sizes. It can also be used on ductile iron in all sizes and on steel in some sizes.

Series 2800

This series is a **solid ring harness** for use on C-905 PVC pipe bells. It is composed of a wedge action restraint ring that is assembled on the spigot, and a bell ring that is positioned behind the pipe bell. All of the components are made of ductile iron. Available in 14" through 24" sizes.

Series 1600

This series is a **split, serrated restraint for C-900 PVC pipe bells.** It is composed of a serrated restraint ring that is assembled on the spigot and a split bell ring that is assembled behind the bell. The rings and tie bolts are made of ductile iron. Available in 4" through 12" sizes.

Series 2500

This series is a **split, serrated restraint for C-907 PVC fitting bells.** The assembly and components are similar to the 1600 Series. Available in 4", 6" and 8" sizes.

EBAA-Seal™ Gasket

This is an **improved mechanical joint gasket** designed to combine the ease of assembly of the mechanical joint with the sealing capabilities of the push-on joint. The EBAA-Seal gasket can be split and used with the 2000SV to repair existing mechanical joint problems. Available in 4" through 48" sizes.

2000 PV JOINT RESTRAINT FOR PVC PIPE

Sample Specification

Mechanical joint restraint shall be incorporated into the design of the follower gland. The restraint mechanism shall consist of a plurality of individually-actuated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536-80.

The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of restraining devices.

The restraining glands shall have a pressure rating equal to that of the pipe on which it is used. The restraining glands shall have been tested to UNI-B-13-92, be listed by Underwriters Laboratories, and be approved by Factory Mutual. The restraint shall be the EBAA Iron Series 2000PV or approved equal.

Listings and Approvals

Sizes 4" through 12" are listed by Underwriters Laboratories, Inc., category EJKF "Fittings, Retainer Type," with a deflection angle of five degrees when used on UL-listed, Class 150 PVC pressure pipe and a UL-listed appurtenance. The listing number is EX2836. Sizes 4" through 12" are approved by Factory Mutual for use on approved DR18 PVC pipe and mechanical joint appurtenances. The 2000PV restraint exceeds all requirements of UNI-B-13-92.

Patent Information

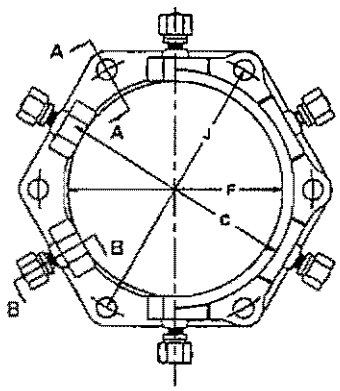
The products presented herein are covered by one or more of the following patents: 4586112, 4627774, 4896903, 5071175.

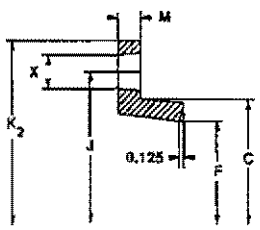
Special Notes

For test pressures above the rated pressures, consult the engineering department of EBAA Iron, Inc. for recommendations.

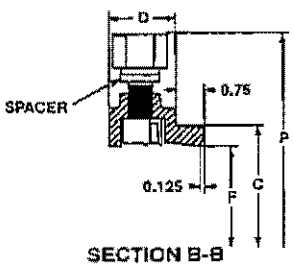
Dimensional Data

SERIES	C	D	F	J	M	X	NO OF WEDGES	NO OF BOLTS	P	P WITH NUTS TWISTED OFF	K_2	PVC PIPE OD PIPE SIZE	SHIPPING WEIGHT	CIOD AWWA C900	IPS ASTM D2241 D1785
2003PV	4.84	1.55	3.60	6.19	0.50	3/4	4	4	9.8	8.6	7.69	3	7.0	—	3.5
2004PV	5.92	1.68	4.90	7.50	0.50	7/8	4	4	10.5	9.5	9.13	4	8.8	4.8	4.5
2006PV	8.02	1.68	7.00	9.50	0.50	7/8	6	6	13.0	12.1	11.13	6	12.1	6.9	6.625
2008PV	10.17	1.68	9.15	11.75	0.62	7/8	6	6	14.5	13.6	13.38	8	16.3	9.05	8.625
2010PV	12.22	2.10	11.20	14.00	0.62	7/8	8	8	17.0	16.0	15.63	10	26.0	11.1	10.75
2012PV	14.32	2.10	13.30	16.25	0.75	7/8	8	8	19.0	18.1	17.88	12	31.4	13.2	12.75
2014PV	16.40	2.25	15.49	18.75	0.875	7/8	10	10	21.7	20.85	20.38	14	47.8	15.3	—
2016PV	18.50	2.25	17.58	21.00	0.875	7/8	12	12	23.8	22.95	22.63	16	52.8	17.4	—
2018PV	20.60	2.25	19.68	23.25	1.125	7/8	12	12	25.9	25.05	24.88	18	61.8	19.5	—
2020PV	22.70	2.25	21.79	25.50	1.250	7/8	14	14	28.0	27.15	27.13	20	70.9	21.6	—
2024PV	26.90	2.75	25.99	30.00	1.420	7/8	16	16	32.3	31.45	31.63	24	92.9	25.8	—
2030PV	CALL FOR AVAILABILITY											30		32.0	—
2036PV	CALL FOR AVAILABILITY											36		38.3	—





SECTION A-A

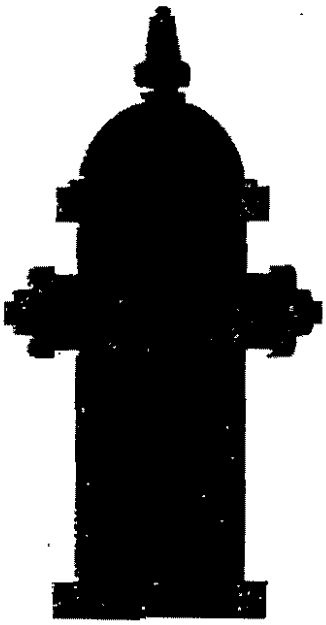


SECTION B-B

EBAA IRON™

EBAA IRON SALES, INC.

P.O. BOX 857 EASTLAND, TEXAS 76448 USA
817 / 629 1731 800 / 433 1716 FAX 817 / 629 8931



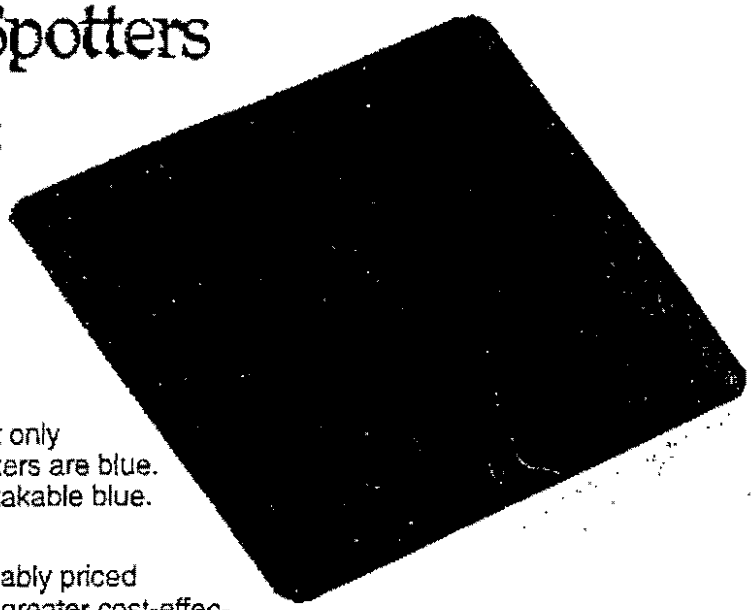
When seconds count, count on

Stimsonite®

FIRE-LITE®

Hydrant Spotters

Instantly spot hydrants from as far as 1000 feet!



The Fire-Lite Hydrant Spotter pavement marker helps fire departments immediately locate their city's fire hydrants—saving crucial time on every alarm response. Placed on the roadway directly across from each hydrant, on either the center line or the right hand lane line, the brilliant blue reflective marker signals hydrant location from up to 1000 feet away.

The raised marker is the same type that your state highway department approves for traffic guidance. But only Fire-Lite markers are blue. Bright, unmistakable blue.

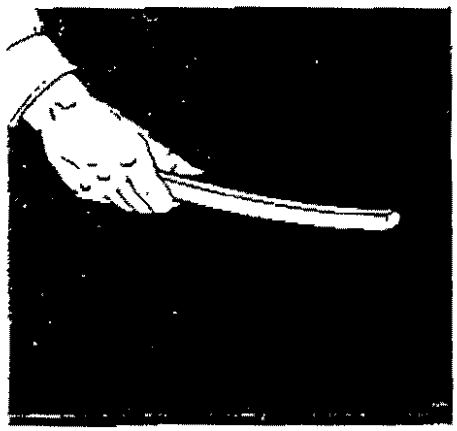
Inexpensive

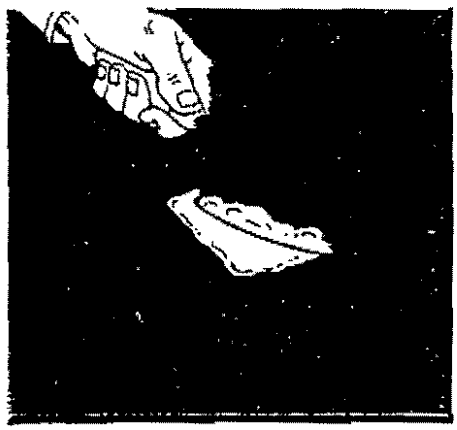
These reasonably priced markers offer greater cost-effectiveness than other hydrant marking systems. Fire department personnel can install them when not busy with other duties.

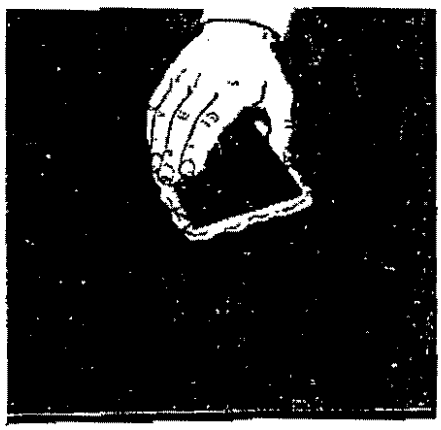
Easy to install

Each Fire-Lite takes only a couple of minutes to install using Stimsonite's high strength adhesives. Pressure-sensitive adhesive pads are also available.

Spotlight your hydrants with Stimsonite Fire-Lite Hydrant Spotters. For information or a quote, contact your Fire-Lite distributor. Or call or write Stimsonite today.







Distributed by:

STIMSONITE®

Stimsonite Corporation
7542 N. Natchez Ave., Niles, IL 60648-3804
(708) 647-7717 FAX (708) 647-1205

Printed in U.S.A. SP-6804 10.0 M 10-91 Refer to current price list

C. Optical Testing Procedure

A random lot of retroreflectors shall be tested. Specific intensity shall be measured at 30.5 m (100 feet) test distance, spacing between source center and receptor center shall be 5.33 cm (2.1 in), receptor diameter and source diameter shall each be 2.54 cm (1.0 in). Other test distances 15.2 m (50 feet) and above may be used provided that the angular aperture requirements are met. (See ASTM E809, Measuring Photometric Characteristics of Retroreflectors).

3. *COLOR*

Color shall conform to the color requirements of ASTM D4280. Test method is provided in ASTM 4280 if required.

PHYSICAL PROPERTIES

1. *FLEXURAL STRENGTH REQUIREMENTS*

Markers conditioned to 23°+/-2°C (73.4°-/+3.6°F) shall support a load of 909 kg (2000 lbs.) as applied in the following manner:

A random sample of three markers shall be selected for test purposes.

In accordance with ASTM D4280, center the marker base down over the open end of a hollow metal cylinder 2.5 cm (1 in.) high, 7.6 cm (3 in.) I.D., 8.9 cm (3.5 in.) O.D. Apply a load to the top of the marker through a 2.5 cm (1 in.) diameter by 2.5 cm (1 in.) high metal plug centered on the top of the marker. Rate of loading shall be 0.5 cm (0.2 in.) per minute.

Failure shall constitute either breakage or significant deformation of the marker at any load of less than 909 kg (2000 lbs.).

2. *RESISTANCE TO LENS CRACKING*

(Note: On two color units, the red lens may not be glass covered and if so should not be subjected to impact test.)

A. *Sampling*

A random sample of markers to provide 10 lenses for each test (20 total) shall be selected from each lot.

B. *Impact Testing*

Condition the markers in a convection oven at 54°C (130°F) for one hour. Set the marker on a steel fixture designed to hold the reflecting face horizontal and set the fixture in a solid surface such as a concrete floor. While at the elevated temperature, impact the reflective face by allowing a 190 gm (0.42 lb.) dart fitted with a 0.64 cm (0.25 in.) radius spherical head to drop 45.7 cm. (18 in.) perpendicularly onto the center of the reflective surface. Cracks in the impact area shall be generally concentric in appearance. There shall be no more than two radial cracks longer than 0.64 cm (0.25 in.). There shall be no radial cracks extending to the edge of the glass.

C. *Temperature Cycling*

Subject samples to 3 cycles of 60°C (140°F) for 4 hours followed by 7°C (20°F) for 4 hours. There shall be no cracking or delamination following temperature cycling.

D. *Tolerances*

In either the impact or temperature cycling test, if 90% (9 lenses) of the test samples meet the above requirements, the lot shall be acceptable. Failure of 3 lenses of the sample shall be cause for rejection of the lot. Failure of 2 lenses shall necessitate a resample of 10 additional lenses. Failure of more than 1 lens of the resample shall be cause for rejection of the lot.

3. *BOND STRENGTH TEST*

Sand blast end of 5.1 cm (2 in.) diameter by 5.7 cm (2-1/4 in.) long steel test plugs with a threaded hole in the other end. Condition test plugs, pavement markers, and specified adhesive (Stimsonite Type 88 Epoxy) at 23°+/-2°C (73.4°-/+3.6°F) for at least 4 hours before testing. Mix the specified adhesive until the mixture shows no streaks. Place adhesive on the center of the bottom surface of the marker and spread a layer of adhesive on the sandblasted surface of the test plug. Press plug firmly in the center of the marker with a twisting motion. With a squared end tool remove any adhesive which extrudes from under the plug. After 24 hours cure at 23°+/- 2°C (73.4°+/- 3.6°F) measure bond strength using a tensile testing machine adjusted to travel at 0.5 cm (0.2 in.) per minute. Test fixture shall be designed to provide uniform load distribution. Bond strength less than 35.1 kg /cm^2 (500 psi) shall be considered a failure.

March, 1994 Printed in U.S.A.
(Supersedes January, 1992)

SPECIFICATIONS FOR ABRASION RESISTANT PRISMATIC RETROREFLECTIVE PAVEMENT MARKER

GENERAL DESCRIPTION

Markers shall consist of an acrylic plastic shell filled with a tightly adherent potting compound. The shell shall contain one or two glass covered prismatic retroreflective faces as required to reflect incident light from a single or opposite directions.

DETAILED SPECIFICATIONS

1. DESIGN AND FABRICATION

A. Dimensional Details

Overall Dimensions	10. 16 cm x 10. 16 cm x1.78 cm (4 in. x 4 in. x 0. 70 in.)
Slope of Reflecting Face	30° to base
Area of Each Reflecting Surface	21.0 sq. cm (3.25 sq. in.)

B. Material

The shell shall be molded of methyl methacrylate conforming to ASTM D788 Grade 8.

Filler shall be a potting compound selected for strength, resilience, and adhesion adequate to pass physical requirements as outlined below.

C. Surface

Thin untempered glass shall be bonded to the prismatic retroreflective faces to provide an extremely hard durable abrasion resistant surface. The area covered by the glass shall not be less than 19.35 sq. cm (3.00 sq. in.). The outer surface of the shell shall be smooth except for purposes of identification.

The base of the marker shall be substantially free from gloss and substances that may reduce its bond to adhesive.

OPTICAL REQUIREMENTS

1. DEFINITIONS

Horizontal entrance angle shall mean the angle in the horizontal plane between the direction of incident light and the normal to the leading edge of the marker.

Observation angle shall mean the angle at the reflector between the illumination axis and the observation axis.

Coefficient of Luminous Intensity (CIL) shall mean the ratio of the luminous intensity of the retroreflector in the direction of observation to the illuminance at the retroreflector on a plane perpendicular to the direction of the incident light. For markers, CIL is expressed in millicandelas per incident lux (mcd/lx). The equivalent English term is Specific Intensity (SI) expressed in candles per foot candle (cd/ft c).

2. OPTICAL PERFORMANCE

A. Coefficient of Luminous Intensity (Specific Intensity)

For each lot consisting of 10,000 markers or less, select 20 markers at random for coefficient of luminous intensity check. Photometer in accordance with procedure 2C. Coefficient of luminous intensity of each retroreflecting surface shall be not less than shown in Table 1 when the incident light is parallel to the base of the markers. Failure of more than 10% of the retroreflecting faces shall be cause for rejection of the lot.

TABLE 1 COEFFICIENT OF LUMINOUS INTENSITY (SPECIFIC INTENSITY) REQUIREMENTS

Observation Angle (degrees)	Horizontal Entrance Angle (degrees)	Coefficient of Luminous Intensity mcd/lux					Specific Intensity cd/ft				
		White	Yellow	Red	Green	Blue	White	Yellow	Red	Green	Blue
0 2	0	279	167	70	93	23	3.0	1.8	0.75	1.0	0.28
0.2	20	112	67	28	37	10	1.2	0.7	0.3	0.4	0.11

B. Abrasion Resistance

Select at random four retroreflective faces previously passing the specific intensity requirements. Place on each retroreflective face a 2 5 +/- 0.1 cm (1.0 +/- 0.2 in.) diameter pad of No. 3 coarse steel wool conforming to Federal Specification FF-W-1825A. Apply a load of 22.7 +/- 0.2 kg (50 +/- 0.5 lbs.) and rub the entire surface 100 times. Photometer in accordance with procedure 2C. Failure shall constitute loss in reflex of greater than 25% of original value. The failure of more than one retroreflective face shall be cause for rejection of the lot. (Note: On two color units the red lens may not be covered with glass and if so should not be abraded.)

Continued . . .

MUELLER BRASS CO. PORT HURON, MICHIGAN 48060

Date _____

Customer _____ Contractor _____

Street No. _____ Address _____

City & State _____ Contract No. _____

Order No. _____ Job Description _____

Attention _____ Location _____

PRODUCT SPECIFICATIONS
CERTIFICATION OF CONFORMANCE

Mueller Brass products are manufactured in conformance to the latest revisions of the following recognized industry standards.

- ☐ WROT COPPER AND COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS — To ANSI B16.22.
- ☐ CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS — To ANSI B16.18.
- ☐ CAST COPPER ALLOY FITTINGS FOR FLARED COPPER TUBES — To ANSI B16.26.
- ☒ STREAMLINE COPPER WATER TUBE — TYPES K, L & M — To ASTM B88 and WWT-799.
- ☐ REFRIGERATION FLARE-TYPE FITTINGS — To SAEJ513, and Military Standards MS-16993, MS-35867 thru MS-35873 inclusive, MS-35919 and MS-35926.
- ☐ STREAMLINE COPPER REFRIGERATION SERVICE TUBE — To ASTM B280, and WWT-775.
- ☐ STREAMLINE NITROGENIZED ACR HARD DRAWN COPPER TUBE — To ASTM B88 - Type L, in accordance with ASTM B280.
- ☐ OXYGEN SERVICE TUBE — To ASTM B88, Types K and L — hard drawn lengths only — in accordance to CDA cleanliness specifications and NFPA 56F, Seamless Copper Tube cleaned for Oxygen Gas Service.
- ☐ WROT COPPER AND COPPER ALLOY SOLDER JOINT DRAINAGE FITTINGS - DWV — To ANSI B16.29.
- ☐ CAST COPPER ALLOY SOLDER JOINT DRAINAGE FITTINGS - DWV — To ANSI B16.23.
- ☐ STREAMLINE COPPER DRAINAGE TUBE - DWV — To ASTM B306.
- ☐ COPPER PIPE — To ASTM B42.
- ☐ RED BRASS PIPE — To ASTM B43 — Can be supplied in hard temper.

Yours truly,
MUELLER BRASS CO.

By _____

Series 007 ½" - 2", 007DCDA 2"

Double check valve assemblies

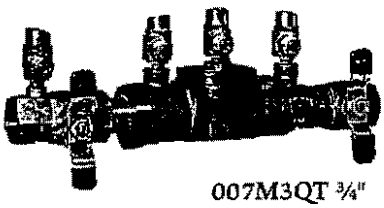
- Backflow preventers designed to protect potable water supplies in accordance with national plumbing codes for non-health hazard cross connections and continuous pressure applications.
- Provides protection against back siphonage and backpressure backflow.

Specifications

- All sizes supplied with resilient seated shutoffs
- Sizes: ½" - 1" (15-25 mm) have tee handle shutoffs. 1¼" - 2" (32-50 mm) have lever handle shutoffs.
- For supply pressures up to 175 psi (12.1 bars).
- Water temperature: sizes ½" - 2" (13-50 mm) from 33°F to 180°F (.55°C to 82°C).

Flow Charts see page 37, 38.

Features



007M3QT ¾"

- Line sized construction for reduced fouling
- Replaceable seats and seat discs
- No screws in the waterway for reliable operation
- Captured springs for safety
- Top entry, single cover for access ease
- Top mounted test cocks to simplify testing

For additional information, request ES-007.
For WattsBox Enclosures, request ES-WB and ES-WB-T.

Options *add Suffix:*

PC - with internal polymer coating

S - with bronze strainer

LF - without shutoff valves

LH - with locking handle ball valves (open position)

SH - with stainless steel ball valve handles

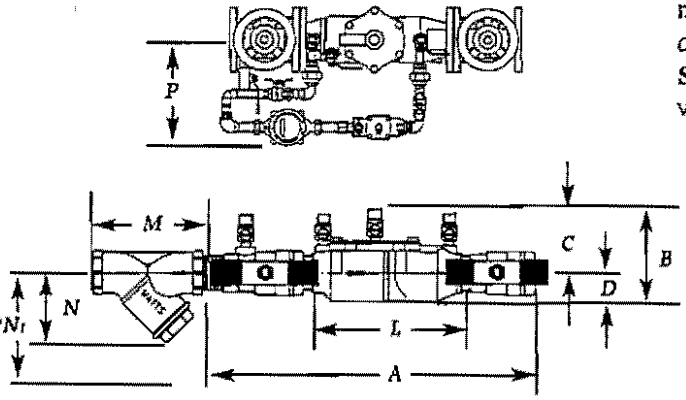
U - union connections

HC - with fire hydrant connections (female hose swivel x male NST)

add Prefix:

SS - with 316 stainless steel backflow preventer and ball valve shutoffs.

Dimensions/Wgts.



STRAINER DIMENSIONS

Size (DN) in.	Size (DN) mm	M in.	M mm	N in.	N mm	*N1 in.	*N1 mm
½	15	2¾	70	2¼	57	10	254
¾	20	3 3/16	81	2¾	70	10	254
1	25	3¾	95	3	76	12	305
1¼	32	4 7/16	113	3½	89	20	508
1½	40	4⅞	124	4	102	22¾	578
2	50	5 5/16	151	5	127	28	711

**Dimensions required for screen removal.*

Model	Order No§	Size (DN) in.	Size (DN) mm	A in.	A mm	B in.	B mm	C in.	C mm	D in.	D mm	P		Weight lbs.	Weight kg.
007QT	62131	½	15	10	250	3⅛	79	2⅜	60	¾	19	–	–	4½	2.0
007M3QT	62020	¾	20	11⅛	282	4	100	3⅛	79	⅞	22	–	–	5	2.3
007M1QT	62306	1	25	13¼	337	5⅛	130	3⅞	98	1¼	32	–	–	12	5.4
007M2QT	62681	1¼	32	16⅜	416	5	127	3½	89	1½	38	–	–	23	10.4
007M2QT	62436	1½	40	16¾	425	5	127	3½	89	1½	38	–	–	27	12.2
007M1QT	62427	2	50	19½	495	6¼	159	3¾	95	2½	64	–	–	25¾	11.7
007QT-S	62132	½	15	10	250	6	150	2⅜	60	¾	19	–	–	5½	2.5
007M3QT-S	62021	¾	20	11⅛	282	6⅛	156	3⅛	79	⅞	22	–	–	6¾	3.1
007M1QT-S	62308	1	25	13¼	337	7¾	197	3⅞	98	1¼	32	–	–	14	6.5
007M2QT-S	62450	1¼	32	16⅜	416	7	178	3½	89	1½	38	–	–	26	11.7
007M2QT-S	62616	1½	40	16¾	425	7	178	3½	89	1½	38	–	–	35½	16.0
007[illegible]QT-S	62428	2	50	19½	495	8¾	222	3¾	95	2½	64	–	–	33½	15.2
*0[illegible]DAOSY‡	62665	2	50	35⅛	892	11	279	12¼	311	2¼	57	12¼	311	97	44

§- Contact your local Watts Agent or call Customer Service (978) 689-6066 for other models and order numbers or refer to PL-WR. For Union Models refer to ES-007. ‡ - models come with CFM/GPM meters. For GPM codes see price list.
**B dimension is from the lowest part of the valve (the unmachined relief port) to the highest part of the gate/ball valve shutoff.*

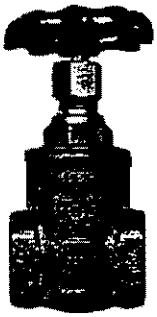
Plumbing & Heating Valves

Hammond plumbing and heating valves are designed for the end user. To the wholesalers, engineers and contractors this means you are buying, specifying and installing valves that have become the mainstay in the plumbing-heating-cooling industry. Every valve made by Hammond sees service before it goes into the job because it passes rigorous quality checks before it leaves the factory.

GATE VALVES

606

MADE IN THE USA



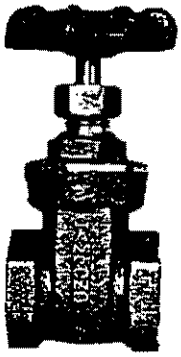
Features
- 125 WSP - 200 WOG (to 353°F) Rating
- Bronze Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/4" thru 3"

607

MADE IN THE USA

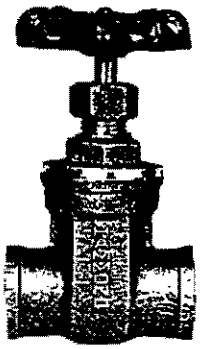
Features
- 125 WSP - 200 WOG (to 353°F) Rating
- Bronze Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 3/8" thru 3"

667



Features
- 200 WOG Rating
- Brass Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/4" thru 4"

668



Features
- 200 WOG Rating
- Brass Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 3/8" thru 3"

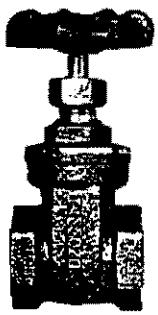
667-20

Features
- 200 WOG Rating
- Drainable Brass Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/2" thru 1"

668-20

Features
- 200 WOG Rating
- Drainable Brass Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/2" thru 1"

567



Features
- 150 WOG Rating
- Brass Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/4" thru 4"

568

Features
- 150 WOG Rating
- Brass Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/2" thru 2"

RYCON, INC.
MARSH LANE WATER LINE REPLACEMENT
ADDISON, TEXAS

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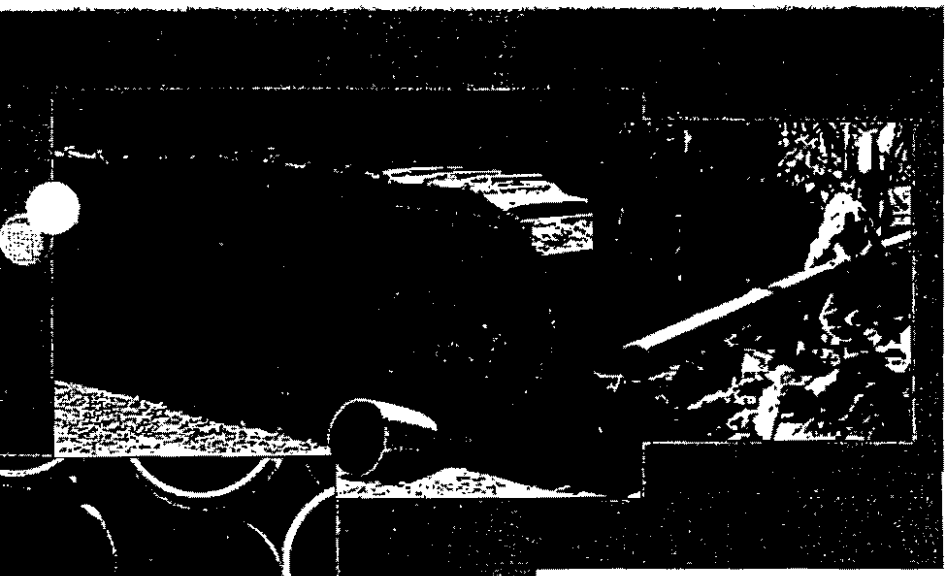
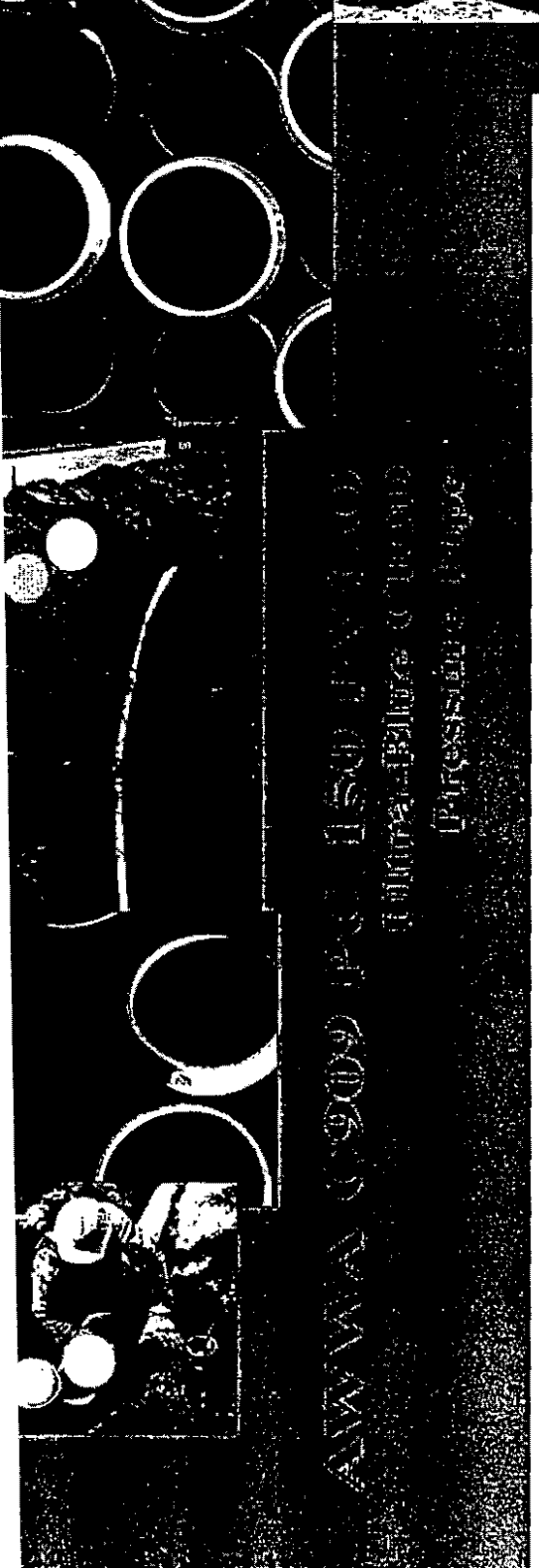
I. PIPE-C909 ULTRA BLUE PVC WATER PIPE





Uponor

Uponor ETI Company

Ultra-Blue CIOD

Molecularly Oriented for High Strength and Superior Performance

Ultra-Blue CIOD
AWWA C909 Class 150 PVC Molecularly Oriented Pressure Pipe with Cast Iron O.D.s

Non-Corroding

Ductile Iron Pipe O.D.s
No transition gaskets or special fittings required

Larger I.D. than Ductile Iron or Conventional PVC
Superior flow capacity and less head loss

Lighter Weight than Ductile Iron or Conventional PVC
43% lighter than C900-DR-18, safer and easier to handle, lower installed cost and more footage installed per day

Higher Impact Strength
Four times regular PVC and no linings to crack or flake off

Greater Cyclic and Hoop Strength

Higher Design Basis Compared to Conventional PVC Pipe
HDB of 7100 psi versus 4000 psi

Superior Notch Resistance
Resists splitting and crack propagation
Pipe will not split from end to end

One of the Safest and Easiest Pressure Pipes to Tap

Go with the flow... Go Ultra-Blue CIOD

1 oduction

Ultra-Blue PVCO Pressure Pipe manufactured by Uponor ETI combines innovative engineering design with years of experience in PVC pipe manufacturing. The result is a higher performance, lighter weight, more cost effective pressure pipe for potable water and force main systems.

PVCO stands for Molecular Oriented Poly(Vinyl Chloride) (PVC). The process of molecular orientation has long been used to strengthen many materials. Ultra-Blue is manufactured by a process that reorients the molecules of conventionally extruded PVC pipe. The pipe, approximately half the diameter and twice the wall thickness of the finished Ultra-Blue product, is placed inside a mold sized to the proper outside diameter of the finished product. The temperature of the pipe is raised to the appropriate level for expansion and internal pressure is applied. This internal pressure causes the pipe to uniformly expand to the inside dimensions of the mold. The mold is designed so that during the process, the bell and gasket groove are also formed, producing a high quality bell.

During the pipe expansion process, the molecular orientation is changed and the physical properties of the finished pipe product are established. Improvements in design and physical properties include:

- **Greater Hoop Strength**
- **Greater Impact Strength**
- **Enhanced Cyclic Fatigue Resistance**
- **Lighter Weight**
- **Larger Inside Diameter**
- **Greater Flow Capacity**

Ultra-Blue meets all the requirements of AWWA C909 Class 150 psi with a 2.5 to 1 safety factor. Manufactured with ductile iron pipe diameters, coventional ductile iron fittings can be used without the need for transition gaskets.

Features

Greater Hoop Strength

The unique material structure of Ultra-Blue gives it a burst strength greatly in excess of conventional PVC pressure pipe with the same wall thickness. Long term hydrostatic pressure tests show Ultra-Blue has a Hydrostatic Design Basis (HDB) of 7100 psi. Conventional PVC pressure pipe has an HDB of 4000 psi. With equivalent safety factors, the wall thickness of Ultra-Blue can be reduced to approximately half that of conventional PVC pipe and still maintain the same pressure rating.

Lighter Weight

Ultra-Blue is lighter weight than ductile iron and conventional PVC pipe. The table below compares the weight of Ultra-Blue, ductile iron and conventional PVC pipe. The difference results in easier handling and installation.

AWWA C909 - Class 150 psi

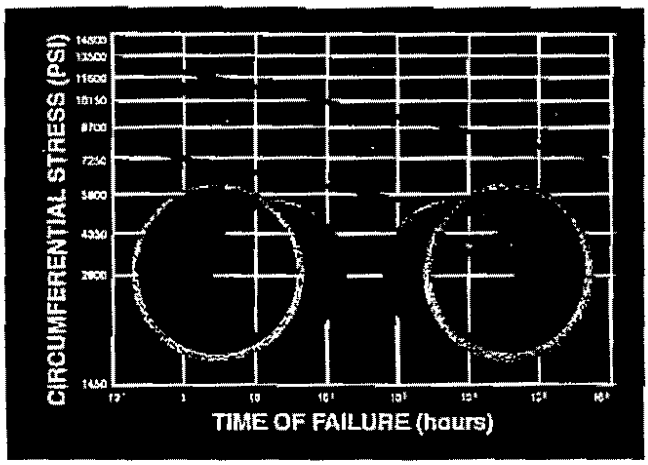
Nominal Pipe Size	SDR18Approx. Wght. (lbs./ft.)	DI Approx. Wght. (lbs./ft.)	UB Approx. Wght. (lbs./ft.)
6"	5.12	16.50	2.80
8"	8.89	22.00	4.82
10"	13.47	28.25	7.70
12"	19.00	36.25	10.45

Greater Impact Strength

mpact tests per ASTM D2444 demonstrate Ultra-Blue's uperior impact resistance when compared to conventional 'VC pressure pipe. Ultra-Blue has an impact strength three o four times greater than conventional PVC pipe of the same lass.

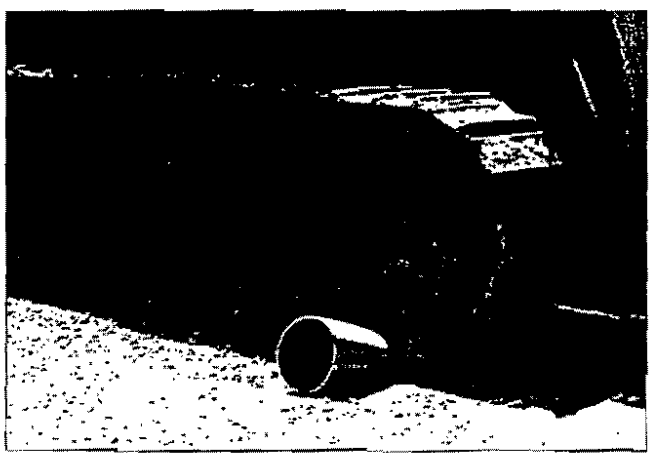
Stress Regression Line

As shown above, by orienting conventionally extruded PVC pipe, actual pressure capability is dramatically increased.



Non-Corrosive

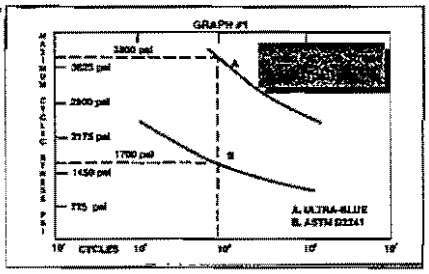
Ultra-Blue, because it is non-metallic, will not corrode.

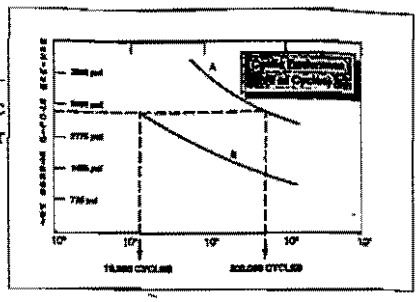


Performance

Enhanced Cyclic Fatigue Resistance

Abrupt pressure changes in a pipe line contribute to cyclic stresses and expansion and contraction of the pipe. Ultra-Blue's oriented configuration contributes to exceptional cyclic fatigue resistance, which is much greater than conventional PVC pipe. Ultra-Blue allows four times the number of cycles to failure, compared to conventional PVC pipe.





Larger Inside Diameter Equals Superior Flow Capacity

Ultra-Blue's high hoop strength results in equal pressure ratings, while being lighter weight than ductile iron or conventional PVC. Consequently, when Ultra-Blue is manufactured with a CI O. D., larger I. D.s result, and cross sectional areas are increased by approximately 9%. Because it has the same smooth interior (C=150) as all PVC pressure pipes, and is supplied in the same 20 foot laying lengths, Ultra-Blue will supply approximately 9% greater flow capacity over ductile iron and conventional PVC pipes of the same pressure rating.

	DR18 - C.I.O.D.			Ductile Iron*			Ultra-Blue C.I.O.D.		
Nominal Pipe Size	PSI Rating @ 73° F	O.D. Nom.	Wall Thickness	I.D. Nom.	O.D. Nom.	Thickness for Design Strength & Tapping**	Net Iron Hydraulic Inner Diameter***	O.D. Nom.	Wall Thickness	I.D. Nom.
6"	150	6.90	0.383	6.134	6.90	0.18	6.025	6.90	0.209	6.48
8"	150	9.05	0.503	8.044	9.05	0.18	8.175	9.05	0.274	8.50
10"	150	11.10	0.617	9.866	11.10	0.18	10.205	11.10	0.336	10.43
12"	150	13.20	0.733	11.734	13.20	0.20	12.265	13.20	0.400	12.40

**Based on PC 355 ductile iron pipe, if thickness classes are used, wall thicknesses increase and I.D. decreases accordingly*
***Based on PC 350 ductile iron pipe (per AWWA C151 and M41) and subject to tolerances*
****Including cement mortar lining*

Installation

The Sealing System

The retained gasket is a combined lip and compression seal, which is locked inside the bell groove.

Making the seal an integral part of the pipe eliminates many of the disadvantages of separate sealing rings. The seal is positioned in the bell by the pipe manufacturer.

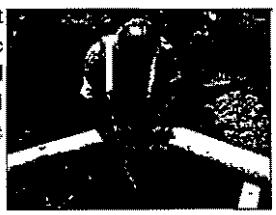
The unique design, with the reinforcing plastic element, is a one piece seal, which holds the sealing ring securely in position during transport and pipe assembly.

Backfilling and Testing

Backfilling should be done immediately after installing each length of pipe. Backfill that will lay adjacent to the pipe should contain no large rocks or hard clods. Tamp around and under the pipe to insure adequate soil support. Pipe may be tested at any time after installation. Prior to testing, make sure the line is properly thrust blocked and all air has been evacuated. Do not exceed the maximum water pressure rating of the pipe.

Fittings

Ultra-Blue has ductile iron (DI) outside diameters (O. D.), making standard PVC gasketed fittings compatible. **(Note: solvent weld PVC fittings cannot be used.)** Ductile iron or cast iron mechanical joint fittings and ductile iron push on type fittings can be installed directly onto Ultra-Blue, using the standard M.J. gasket made for cast iron or ductile iron pipe.



Joint Restraint Devices

Any joint restraint devices that are commonly used with standard PVC can be used with Ultra-Blue.

Joint Assembly

Ultra-Blue will arrive on the jobsite with the gasket installed, ready for assembly. Assemble as follows:

1. Inspect the bell and remove any foreign matter such as mud, sand or ice.
2. Clean off the spigot end of the pipe and apply lubricant to the spigot end, covering the beveled nose and sealing surface all the way to the stop mark.
3. Place the beveled end in the companion bell and provide straight alignment.
4. Push the pipe straight home with a bar and block until the stop mark on the spigot end is even with the end of the bell.
5. After assembly to the stop mark, the joint may be deflected axially up to 2 degrees.

Note:

1. Do not assemble the joint by swinging or stabbing.
2. Ultra-Blue can not be solvent welded.

Tapping

Ultra-Blue is one of the easiest and safest pipes to tap. Ultra-Blue may be tapped with the same tapping saddles used on conventional C900 PVC pipe. The service clamps or saddles used should:

a) provide full support around the circumference of the pipe.
b) provide a bearing area of sufficient width along the axis of the pipe.

Standards & Listings

Ultra-Blue (PVCO) pipe shall be manufactured in accordance with the following standards:

AWWA C909 - AWWA Standard for Molecular Oriented Poly(Vinyl Chloride) (PVCO) Pressure Pipe, 4"-12", for Water Distribution

ASTM D1784 - Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

ASTM D3139 - Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

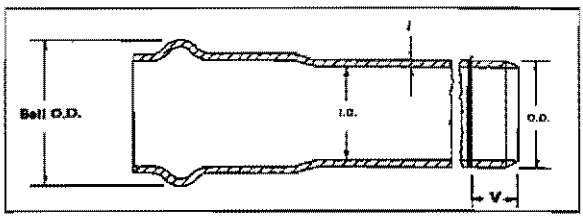
UNI-B-1 - Recommended Specification for Thermoplastic Pipe Joints - Pressure and Non-Pressure Applications

ANSI/NSF STANDARD NO. 61 - Drinking Water System Components - Health Effects

UL STANDARD 1285 - Pipe and Couplings, Poly(Vinyl Chloride) (PVC) for Underground Fire Service

FM CLASS #1612 - Approval Standard Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings for Underground Fire Protection Service

Pipe Dimensions & Weights



Nominal Pipe Size (mm)	PSI Class @73° F	Nominal Bell O.D. in. (mm)	Nominal Barrel O.D. in. (mm)	Min. Wall Thickness (t) in. (mm)	Nominal Barrel I.D. in. (mm)	Nominal Stop Mark (v)* in. (mm)	Approx. Wght.Lbs/Ft.	Approx. Wght. Lbs/Jnt
(152)	150	8.40 (213)	6.90 (175)	.209 (5.31)	6.48 (165)	5.75 (146)	2.8	56.0
8 (203)	150	10.75 (273)	9.05 (230)	.274 (6.96)	8.50 (216)	6.50 (165)	4.8	96.0
10 (254)	150	13.23 (336)	11.10 (282)	.336 (8.53)	10.43 (265)	7.25 (184)	7.7	154.0
12 (305)	150	15.48 (393)	13.20 (335)	.400 (10.16)	12.40 (315)	7.75 (197)	10.05	210.0

*plus or minus 1/2"

Warranty

All products sold are subject to the following warranty:
Uponor ETI (ETI) warrants for a period of one year from date of delivery to the original purchaser, that the product is free from defects in materials and workmanship. ETI makes no other warranty of any kind, express or implied, in fact or in law, including without limitation, the warranty of merchantability or the warranty of fitness for a particular purpose, other than the limited warranty set forth above. Every claim under this warranty shall be deemed waived, unless in writing and received by ETI within thirty (30) days of the date the defect to which each claim relates is discovered, or should have been discovered.

Limitation of Liability

It is expressly understood and agreed that the limit of ETI's liability shall be at ETI's sole option, repair or resupply of a like quantity of nondefective product, and that ETI shall have no such liability except where the damage results solely from breach of ETI's warranty. It is also agreed that ETI shall not be liable for any incidental, consequential, or other damages for any alleged negligence, breach of warranty, strict liability, or any other theory, other than the limited liability set forth above. The physical (or chemical) properties of ETI products represent typical average values obtained in accordance with accepted test methods, and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice.

Customer Service Centers
Missouri 800-341-0053
fax 573-474-1760
West Virginia 800-624-3111
fax 304-472-0742

Plants
Missouri 800-341-0053
fax 573-474-1760
West Virginia 800-624-3111
fax 304-472-0742
Texas 936-760-2888
fax 936-760-1357

Uponor ETI Company
1700 Broadway, Suite 1710
Denver, CO 80290
303-893-1101
Fax - 303-893-4140
www.uponoreti.com

II. PIPE-SDR-26 PIPE

USFilter

USF DISTRIBUTION
4333 IRVING BLVD., 75247
P.O. BOX 569250
DALLAS, TX 75356-9250

TELEPHONE 214-631-9410
FACSIMILE 214-905-0768

CERTIFICATION OF CONFORMANCE

THIS CERTIFIES THAT THE FOLLOWING MATERIAL(S):

2" THRU 12" CLASS 160 SDR26 PVC WATER PIPE

AS FURNISHED BY U.S. FILTER/DISTRIBUTION GROUP TO:

PURCHASER: Rycon, Inc.

PROJECT: Marsh Lane Wtr. Line Replacement
Addison, Texas

MEET THE REQUIREMENTS OF THE FOLLOWING SPECIFICATION(S):

ASTM D2241 -	POLY (VINYL CHLORIDE) (PVC) PLASTIC PIPE (SDR-PR) PVC
NSF-PW -	NATIONAL SANITATION FOUNDATION
ASTM D1784 -	(COMPOUNDS)

CERTIFICATIONS FORWARDED:

SUBSCRIBED, AND SWORN TO GROUP
BEFORE ME THIS DAY OF

DATE July 1, 2002

NOTARY Mary Lindsey
Mary Lindsey

MARY LINDSEY
NOTARY PUBLIC
State of Texas
Comm. Exp. 01-26-2004

U.S. FILTER/DISTRIBUTION

BY
Bruce Ellingsworth

LOCATION Dallas, Texas

III. GATE VALVES

MUELLER® 2360 SERIES™ RESILIENT WEDGE GATE VALVE

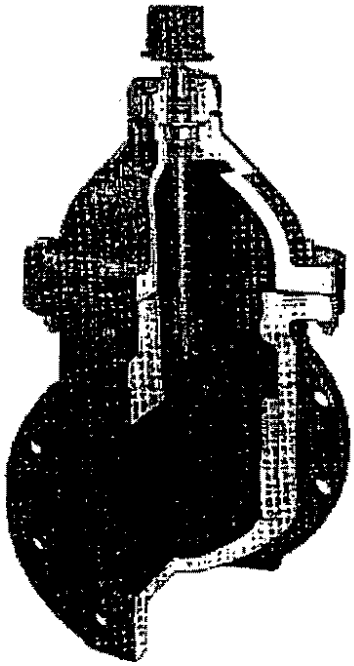
Mueller Co.

10A.1

REV. 3-97

MUELLER® 2-1/2"-12" Resilient Wedge Gate Valve Features

- ☐ TWO ANTI - FRICTION WASHERS — polymer washers (one above and one below the thrust collar) further reduce operating torque in both the opening and closing directions.
- ☐ STEM — machined from forged manganese bronze bar stock for strength where it is needed most, at the thrust collar.
- ☐ WEDGE — cast iron, fully encapsulated in molded rubber complying with ASTM D2000.
- ☐ MUELLER® PRO-GARD™ FUSION EPOXY COATING— of nominal 6 mils protects all interior and exterior exposed iron surfaces and complies fully with AWWA 550 and is certified to NSF 61.
- ☐ MANUFACTURED AND TESTED — in compliance with ANSI/AWWA C509 Standard and is certified to ANSI/NSF 61. Manufactured at facility with ISO 9001 certification and UL 262, FM 1120/1130.
- ☐ BI-DIRECTIONAL FLOW
- ☐ FLAT BOTTOM SURFACES — allow all 2360 series valves to stand upright for ease of handling and storage.
- ☐ TRIPLE O-RING SEALS — two above the trust collar; one below. Uppermost serves as dirt seal. Retain lubrication on thrust collar and isolate it from waterway and outside contamination. Top two can be replaced with valve fully open and under pressure.



- ☐ 250 PSIG MAXIMUM WORKING PRESSURE— hydrostatically tested at 500 psig. Surpasses ANSI/AWWA C509 standards by 25% (UL/FM 200 psig working pressure, 400 psig hydrostatic pressure).
- ☐ EXTENDED WEDGE GUIDES— molded as part of the wedge, fit into guide channels in the valve body and maintain optimum wedge alignment with the stem throughout the wedge's travel, preventing the disc from tilting downstream during operation.
- ☐ GUIDE CAP BEARINGS — protective guide cap bearings made of a polymer bearing material snap over each rubber encapsulated guide on the wedge, providing a bearing interface between the wedge guides and the body's interior guide channels, protecting both from wear, even after thousands of cycles under severe pressure and flow conditions.
- ☐ SMOOTH, OVERSIZED FLOW WAY — all Mueller 2360 series RW Valves have a full, round, unobstructed flow way which accommodates full-sized shell cutters without interference and which provides superior flow characteristics.
- ☐ TEN YEAR LIMITED WARRANTY — (see separate Mueller Warranty document for terms).

MUELLER® 14"-24" Resilient Wedge Gate Valve Features

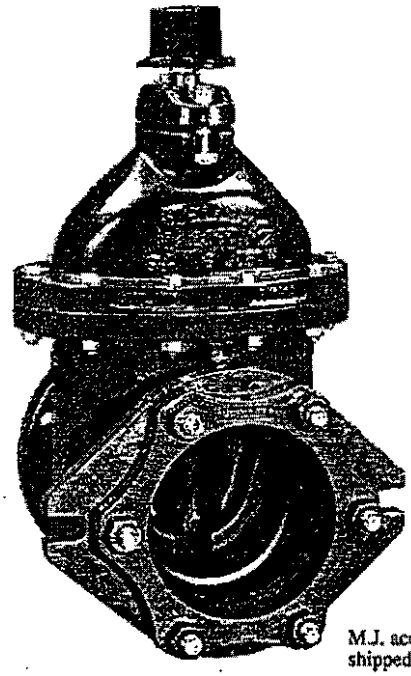
- ☐ DUCTILE IRON BODY & BONNET— with all interior and exterior exposed surfaces protected by fusion epoxy coating.
- ☐ FUSION EPOXY COATING— protects all interior and exterior exposed iron surfaces. Complies fully with AWWA C550.
- ☐ NON-RISING STEM — made of stainless steel.
- ☐ SOFT SEATED WEDGE — made of Ductile Iron with EPDM elastomer seal.
- ☐ FLAT BOTTOM SURFACES — allow all 2360 series valves to stand upright for ease of handling and storage.

- ☐ DOUBLE O-RING SEALS — above thrust collar area.
- ☐ EYEBOLTS — for greater convenience during handling.
- ☐ 250 PSIG MAXIMUM WORKING PRESSURE— 500 psig (3447 kPa) static test pressure.
- ☐ TEN YEAR LIMITED WARRANTY — (see separate Mueller Warranty document for terms).
- ☐ SMOOTH, OVERSIZED FLOW WAY — all Mueller 2360 series RW Valves have a full, round, smooth, unobstructed, oversized flow way which accommodates full-sized shell cutters without interference and which provides superior flow characteristics.

Mueller Co.

4"-12" MUELLER® A-2360 RESILIENT WEDGE GATE VALVES WITH M.J. x FL. ENDS

- Catalog number—
  A-2360-16 mechanical joint x flanged ends (with mechanical joint unassembled accessories)
  A-2360-19 mechanical joint x flanged ends (less mechanical joint accessories)
- Sizes— 4", 6", 8", 10", 12"
- Meets or exceeds all applicable requirements of ANSI/AWWA C509 Standard and is certified to ANSI/NSF 61
- Flanged end dimensions and drilling comply with ANSI B16.1, class 125
- Mechanical joint end complies with ANSI/AWWA C111 Standard
- 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)
- 2" square wrench nut (optional handwheel available)—open left or open right
- 4"-12" sizes—250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure
- UL Listed, FM Approved —200 psig (1379 kPa)



M.J. accessories shipped unassembled

A-2360-16

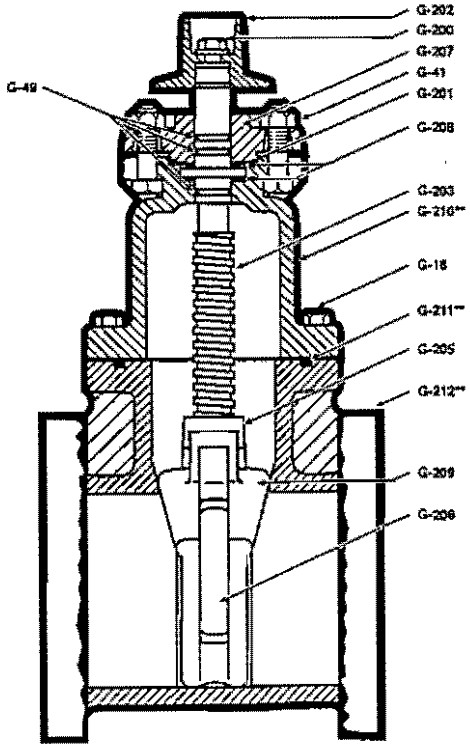
Options

See pages 10.68 and 10.69 for more information on Resilient Wedge Gate Valve options

- Position indicators
- ASTM B98-C66100/H04 stem
- Stainless steel fasteners: Type 304, Type 316
- Handwheel

Resilient wedge gate valve parts

Catalog Part No.	Description	Material	Material standard
G-16	Bonnet Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-41	Stuffing Box Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-49	Stem O -rings (3)	Rubber	ASTM D2000
G-200	Wrench Nut Cap Screw	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-201	Stuffing Box Seal	Rubber	ASTM D2000
G-202	Wrench Nut	Cast Iron	ASTM A126 CL.B
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B62
G-206	Guide Cap Bearings	Celcon	
G-207	Stuffing Box	Cast iron	ASTM A126 CL.B
G-208	Anti-friction Washers (2)	Celcon	
G-209	Wedge, Rubber Encapsulated	Cast Iron*	ASTM A126 CL.B
G-210	Bonnet	Cast Iron	ASTM A126 CL.B
G-211	Bonnet O-ring	Rubber	ASTM D2000
G-212**	Body	Cast Iron	ASTM A126 CL.B



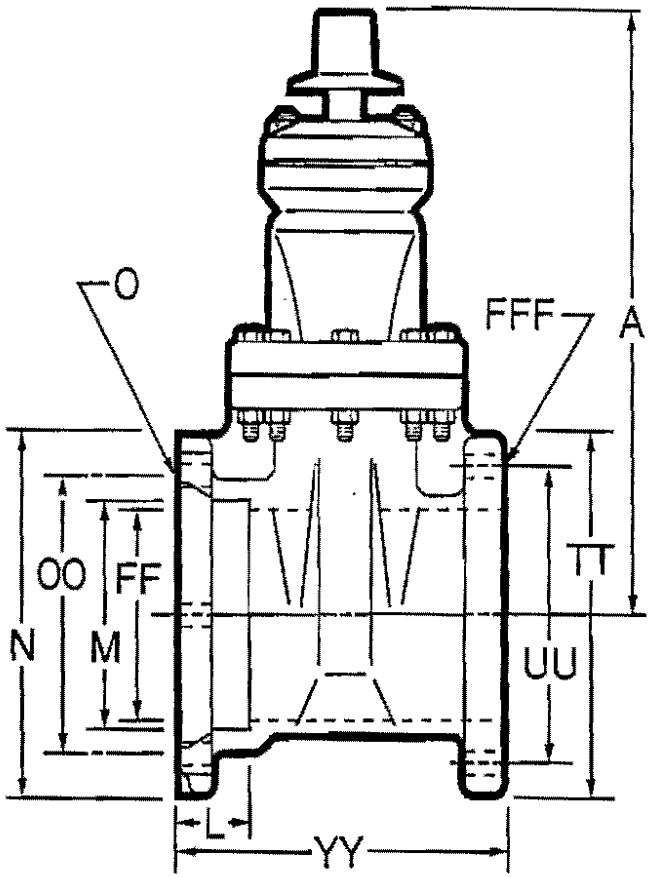
Fully encapsulated in molded rubber with no iron exposed
** Previous to 1999 these parts on 4"-12" valves were designed with a gasket instead of an O-ring and with additional bolts. Confirm the type of seal when ordering a replacement gasket or O-ring.

SEE PAGE 10.73 FOR ORDERING INSTRUCTIONS

4"-12" MUELLER® A-2360 RESILIENT WEDGE GATE VALVE DIMENSIONS - M.J. x FL. ENDS

Mueller Co.

REV. 4-99



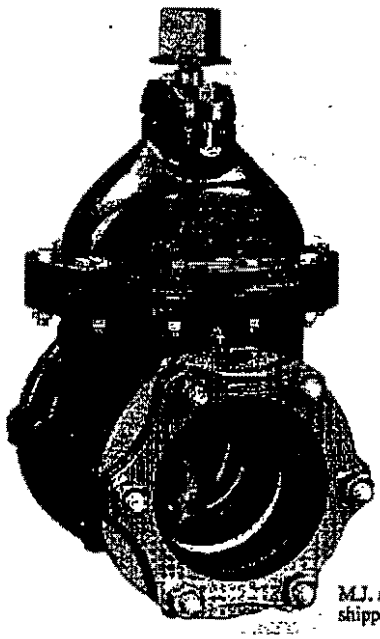
Dimensions

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
M	4.90	7.00	9.15	11.20	13.30
N	9.12	11.12	13.37	15.62	17.88
O (number and size of holes for MJ)	4—7/8"	6—7/8"	6—7/8"	8—7/8"	8—7/8"
FF	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
TT	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
YY	9.50	11.00	12.00	13.88	14.44
FFF (number and size of holes for FL)	8--3/4"	8—7/8"	8—7/8"	12—1"	12—1"
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 and are in approximate pounds.

MUELLER® A-2360 RESILIENT WEDGE GATE VALVES WITH M.J. x M.J. ENDS

- ☐ Catalog number—
  A-2360-20 Mechanical joint ends (with mechanical joint unassembled accessories)
  A-2360-23 Mechanical joint ends (less mechanical joint accessories)
- ☐ Sizes—2", 3", 4", 6", 8", 10", 12"
- ☐ Meets or exceeds all applicable requirements of ANSI/AWWA C509 Standard
- ☐ 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)
- ☐ 2" square wrench nut (optional handwheel available)—open left or open right
- ☐ 2"-12" sizes—250 psig (1723 kPa) maximum working pressure, 500 psig (3447 kPa) static test pressure



M.J. accessories shipped unassembled

A-2360-20

Options

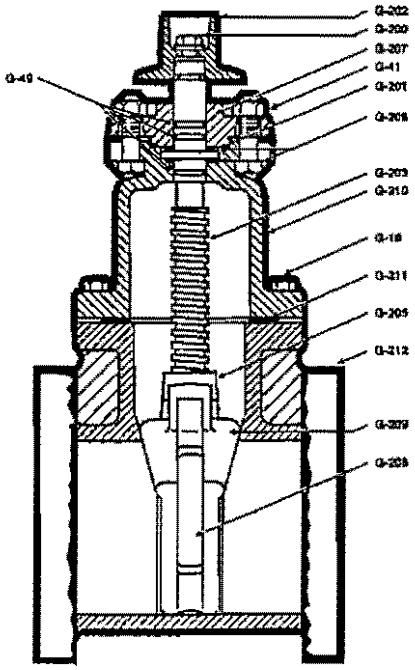
See pages 10.54 and 10.55 for more information on Resilient Wedge Gate Valve options

- ☐ Position indicators
- ☐ ASTM B98-C66100/H04 stem
- ☐ Stainless steel fasteners: Type 304, Type 316
- ☐ Handwheel

Resilient wedge gate valve parts

Catalog Part No.	Description	Material	Material standard
G-16	Bonnet Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-41	Stuffing Box Bolts & Nuts	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-49	Stem O -rings (3)	Rubber	ASTM D2000
G-200	Wrench Nut Cap Screw	Carbon Steel	ASTM A307 Grade B, Zinc Plated
G-201	Stuffing Box Seal	Rubber	ASTM D2000
G-202	Wrench Nut	Cast Iron	ASTM A126 CL.B
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron	ASTM A126 CL.B
G-205	Stem Nut	Bronze	ASTM B62
G-206	Guide Cap Bearings	Celcon	
G-207	Stuffing Box	Cast iron	ASTM A126 CL.B
G-208	Anti-friction Washers (2)	Celcon	
G-209	Wedge, Rubber Encapsulated	Cast Iron*	ASTM A126 CL.B
G-210	Bonnet	Cast Iron	ASTM A126 CL.B
G-211	Bonnet Gasket	Rubber	ASTM D2000
	Body	Cast Iron	ASTM A126 CL.B

* Fully encapsulated in molded rubber with no iron exposed

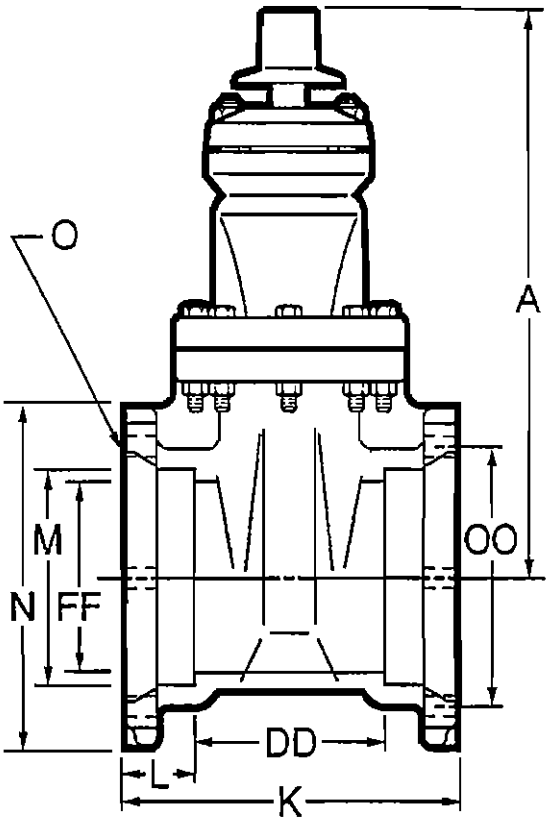


SEE PAGE 10.59 FOR ORDERING INSTRUCTIONS

MUELLER® A-2360 RESILIENT WEDGE GATE VALVE DIMENSIONS - M.J. x M.J. ENDS

Mueller Co. 10A.7

4-95



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
K	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
M	2.75	4.06	4.90	7.00	9.15	11.20	13.30
N	4.62	7.50	9.12	11.12	13.37	15.62	17.88
O (number and size of holes)	4—7/8	4—7/8	4—7/8	6—7/8	6—7/8	8—7/8	8—7/8
DD	3.50	4.00	5.00	6.50	7.50	9.75	9.88
FF	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	436	546

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

IV. FIRE HYDRANTS

MUELLER® SUPER CENTURION® FIRE HYDRANT

Mueller Co.

REV. 3-97

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.

☐ **STAINLES 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.

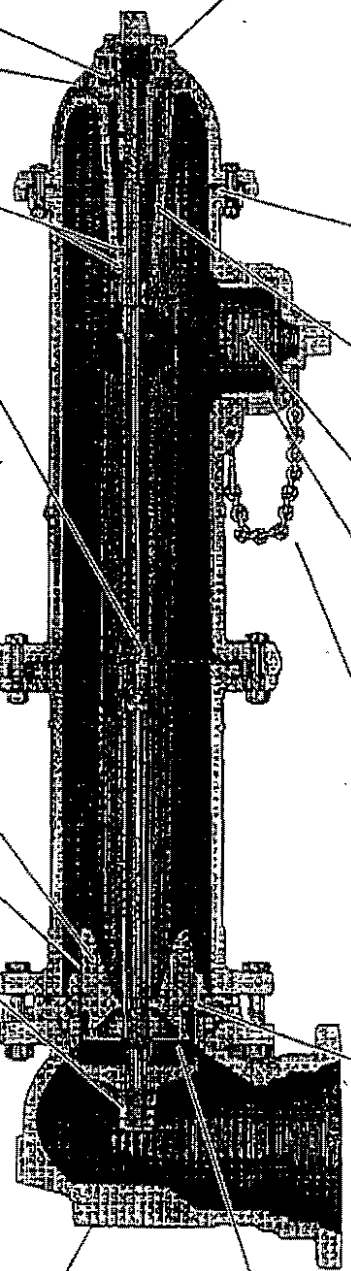
☐ **DRAIN VALVE FACINGS**— specially designed, long-life facings provide effective sealing.

☐ **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.

☐ **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.

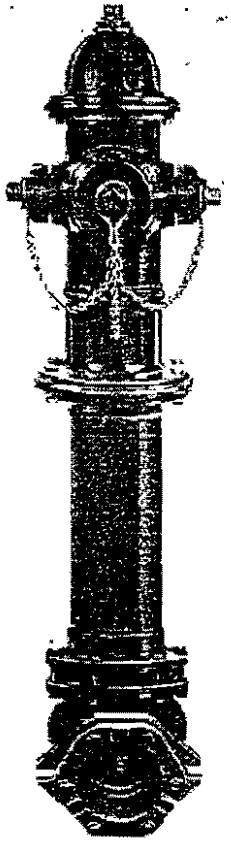
☐ **BRONZE SEAT RING**— threaded into drain ring and O-ring sealed. Seat ring is easily removed or installed from above ground. Each time main valve is opened or closed, double drain valves force-flush both drain valve openings to keep them open for effective barrel drainage. Bronze drain valves are integral parts of main valve assembly.

☐ **REVERSIBLE, COMPRESSION-TYPE MAIN VALVE(Patent Pending)** — closes with pressure for positive seal. Rubber material has long service life, yet is reversible providing a convenient spare in place.

Mueller Co.

MUELLER® SUPER CENTURION® FIRE HYDRANT

Super Centurion 250™ 3-way catalog numbers
(approved to UL 262, FM 1120/1130, 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 (Patent Pending)

Operating nut available in wide variety of shapes and sizes—open left or right

Field replaceable hose and pumper nozzles

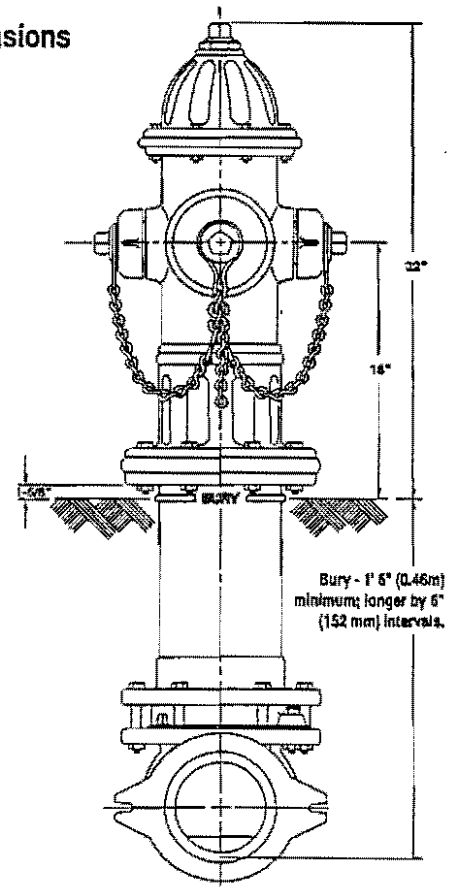
Hose and pumper nozzles have large radius, full flow openings for low friction loss

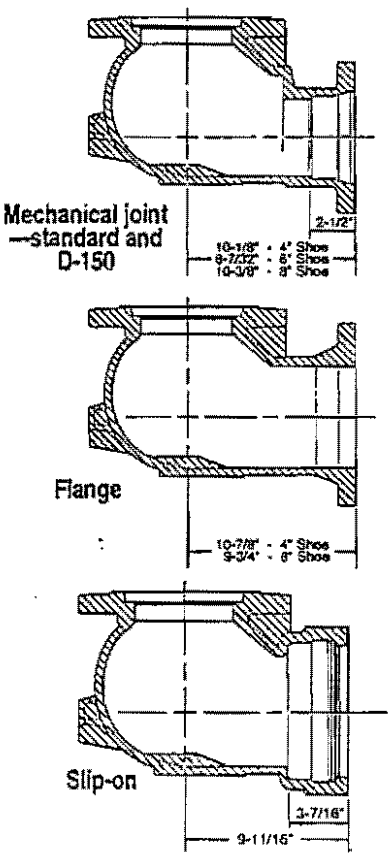
Contoured shoe is designed for full flow

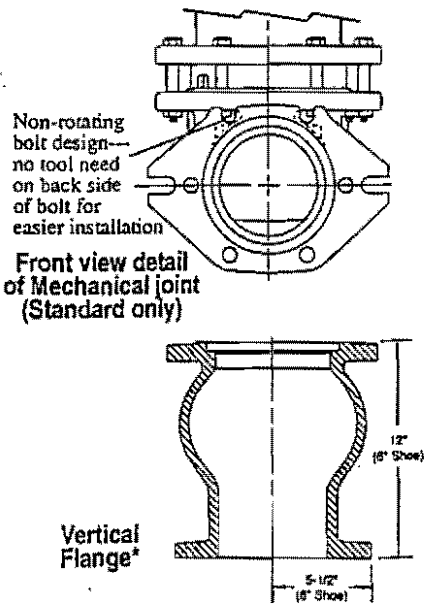
Du onze drain valves provide effective barrel drainage

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







* 4" Vertical shoe available for A-420 and A-421 hydrants.

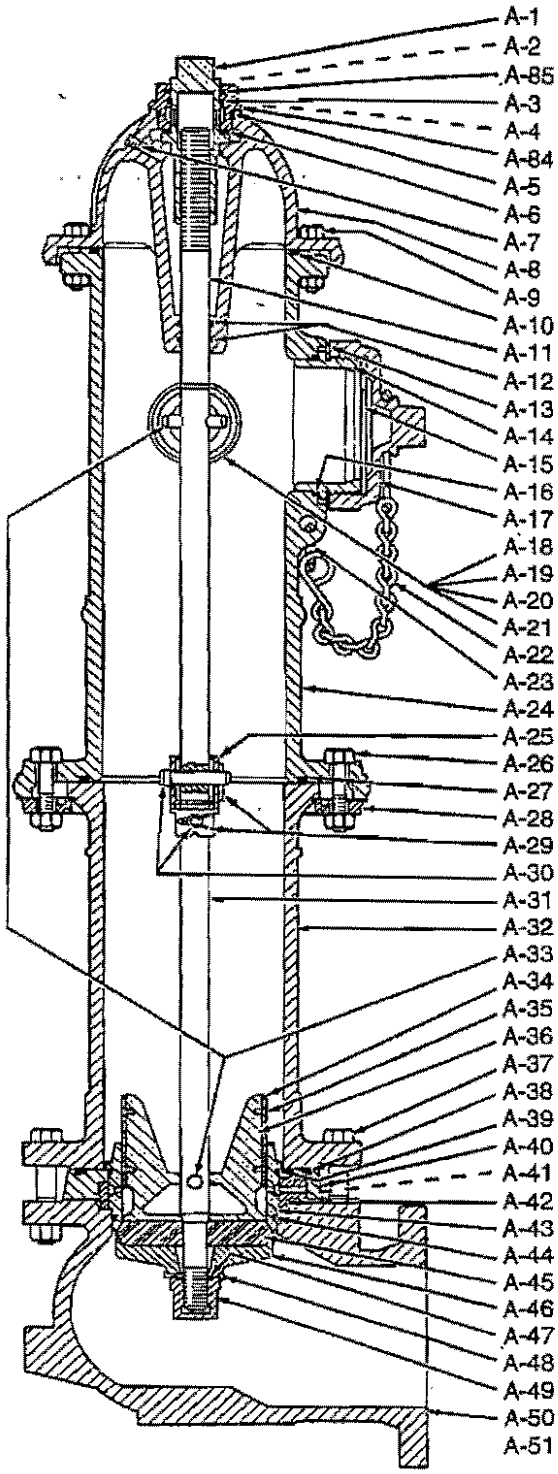
MUELLER® SUPER CENTURION® FIRE HYDRANT PARTS

Mueller Co.
A TYCO INTERNATIONAL LTD. COMPANY

REV. 3-07

MUELLER Super Centurion Fire Hydrant Parts

Cat. part #	Description	Material	Material standard
A-1	Operating nut	Bronze	ASTM B584
A-2	Weather cap (not shown; used only on pre-1988 models)	Cast iron	ASTM A126 CL.B
A-3	Hold down nut O-ring	Rubber	ASTM D2000 BUNA N
A-4	Hold down nut (not shown; used only on pre-1988 models)	Bronze	ASTM B584
A-5	Bonnet O-ring	Rubber	ASTM D2000 BUNA N
A-6	Anti-friction washer	Celcon	
A-7	Oil plug	Brass	ASTM B16
A-8	Bonnet	Cast iron	ASTM A126 CL.B
A-9	Bonnet bolt and nut	Steel	ASTM A307 Plated
A-10	Bonnet O-ring (1997 and newer 3-way models; all pre-1997 models and 1-way and 2-way models have flat gasket)	Rubber	ASTM D2000 BUNA N
A-11	Upper stem	Steel	ASTM A576 GR.B
A-12	Stem O-ring	Rubber	ASTM D2000 BUNA N
A-13	Nozzle lock	Stainless steel	ASTM A276
A-14	Pumper nozzle	Bronze	ASTM B584
A-15	Pumper nozzle gasket	Rubber	ASTM D2000 Neoprene
A-16	Pumper nozzle O-ring	Rubber	ASTM D2000 BUNA N
A-17	Pumper nozzle cap	Cast iron	ASTM A126 CL.B
A-18	Hose nozzle	Bronze	ASTM B584
A-19	Hose nozzle gasket	Rubber	ASTM D2000 Neoprene
A-20	Hose nozzle O-ring	Rubber	ASTM D2000 BUNA N
A-21	Hose nozzle cap	Cast iron	ASTM A126 CL.B
A-22	Cap chain	Steel	Plated
A-23	Chain ring	Steel	Plated
A-24	Upper barrel less nozzles	Cast iron	ASTM A126 CL.B
A-25	Safety coupling	Stainless steel	ASTM A890
A-26	Safety flange bolt and nut	Steel	ASTM A307 Plated
A-27	Safety flange O-ring (1997 and newer models; pre-1997 models have flat gasket)	Rubber	Cellulose
A-28	Safety flange	Cast iron	ASTM A126 CL.B
A-29	Cotter pin	Stainless steel	ASTM A276
A-30	Clevis pin	Stainless steel	ASTM A276
A-31	Lower stem	Steel	ASTM A576 GR.B
A-32	Lower barrel	Cast iron	ASTM A126 CL.B
A-33	Stem pin	Stainless steel	ASTM A276
A-34	Drain valve facing	Plastic	
A-35	Drain valve screw	Stainless steel	ASTM A276
A-36	Upper valve plate (includes A-34 and A-35)	Bronze	ASTM B584
A-37	Shoe bolt and nut	Steel	ASTM A307 Plated
A-38	Drain ring housing O-ring (1997 and newer models; pre-1997 models have flat gasket)	Rubber	ASTM D2000 BUNA N
A-39	Seat ring top O-ring	Rubber	ASTM D2000 BUNA N
A-40	Drain ring housing	Cast iron	ASTM A126 CL.B
A-41	Drain ring housing bolt and nut (not shown; used only on pre-1997 model hydrants)	Steel	ASTM A307 Plated
A-42	Drain ring	Bronze	ASTM B584
A-43	Seat ring	Bronze	ASTM B584
A-44	Seat ring bottom O-ring	Rubber	ASTM D2000 BUNA N
A-45*	Reversible main valve (1997 and newer models only; pre-1997 models use non-reversible main valve and lower valve plate - not shown)	Rubber	ASTM D2000
A-46	Lower valve plate (1997 and newer models for reversible main valve; pre-1997 models have non-reversible main valve - not shown)	Cast iron	ASTM A126 CL.B
A-47	Cap nut seal	Rubber	ASTM D2000
A-48	Lock washer	Stainless steel	ASTM A276
A-49	Lower valve plate nut	Cast iron	ASTM A126 CL.B
A-50	Shoe	Cast iron	ASTM A126 CL.B
A-84	Hold down nut	Bronze	ASTM B584
A-85	Weather seal	Rubber	ASTM D2000
A-51	10.5 oz. hydrant lubricating oil (not shown)		



* Pre-1997 models may be upgraded to use the reversible main valve by also replacing the lower valve plate with the 1997 model.

SEE PAGE 9.26 FOR ORDERING INSTRUCTIONS

V. VALVE BOXES,

Tyler Pipe
Subsidiary of
Tyler Corporation

CAST IRON VALVE BOXES, TWO-PIECE

Accommodates 4" Through 12" Valves
5¼-Inch Shafts, Screw-Type
6850 Series

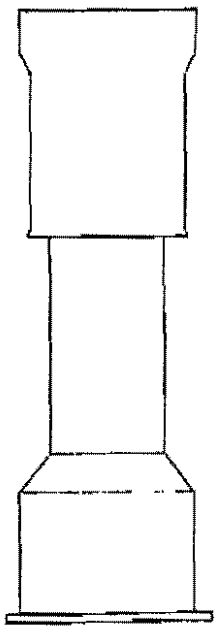
Item	Box Complete Extension, In Inches	Wt.	Top Section, w/Lid Length	Top Section, w/Lid Wt.	Bottom Length	Bottom Wt.	*Pieces Per Pkg.
461-S	19-22	60	10	35	15	25	..
462-S	**27-32**	**70**	**10**	**35**	**24**	**35**	..
562-S	27-37	80	16	45	24	35	20
563-S	**33-43**	**85**	**16**	**45**	**30**	**40**	**20**
564-S	39-50	90	16	45	36	45	20
662-S	**36-52**	**105**	**26**	**65**	**30**	**40**	**20**
664-S	39-60	110	26	65	36	45	20
666-S	**51-71**	**135**	**26**	**65**	****48**	**70**	**20**
668-S	62-82	145	26	65	****60**	80	20

*Tyler may ship loose pieces if packaging delays your order

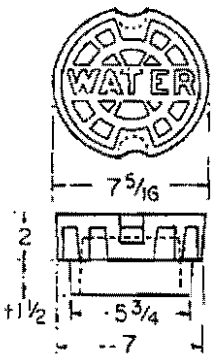
**May be furnished in two pieces screwed together to make the length required.

For special application components, see pages 8-10.

LIDS ARE MARKED "WATER" OR "GAS"
Unless specified otherwise, "Water" will be shipped.

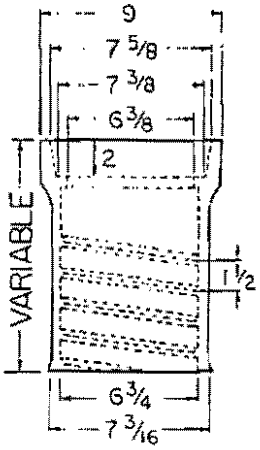


BOX COMPLETE

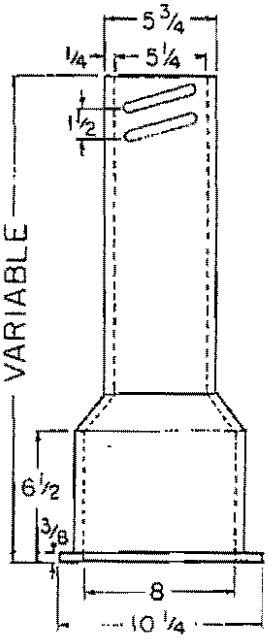


5¼ DROP LID
Variable Skirt Depths

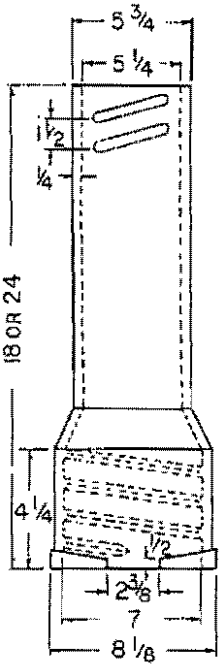
Skirt	Wt.
½	13
1	13
2	13



TOP

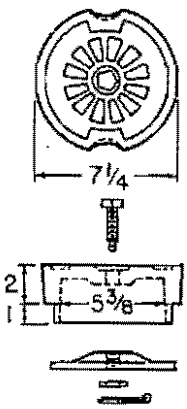


BOTTOM



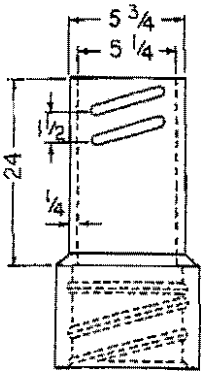
58 AND 59 EXTENSION

Item	Height Increase	Wt.
58	14	25
59	18	30



5¼ LOCK LID

Wt.
18



60 EXTENSION

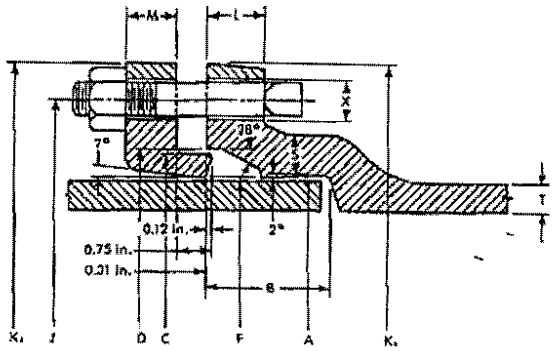
Item	Height Increase	Wt.
60	24	35

These extensions also fit Series 6860 three-piece valve boxes

VI. D. I. FITTINGS

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

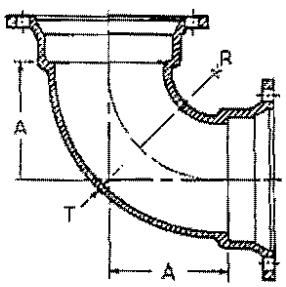
Sample Specification
3" through 16" Mechanical Joint Ductile Iron Fittings shall be produced in strict accordance with all applicable terms and provisions of ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11 18" thru 24" diameters shall be manufacturer's standards with wall thickness equivalent to Class 56 ductile iron pipe. The working pressure rating shall be 350 PSI.



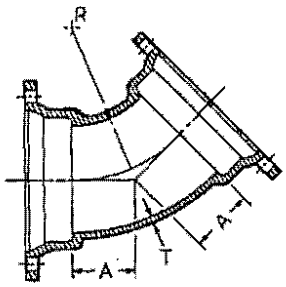
Joint Dimensions in Inches

Size	A Dia.	B	C Dia.	D Dia.	F Dia.	J Dia.	K₁ Dia.	K₂ Dia.	L	M	S	T	X Dia.	Bolt Size	Bolt No.
3	3.96	2.50	4.84	4.94	4.06	6.19	7.62	7.69	.59	.62	.38	.34	¾	⅝ x 3	4
4	**4.80**	**2.50**	**5.92**	**6.02**	**4.90**	**7.50**	**9.06**	**9.12**	**.60**	**.75**	**.41**	**.35**	⅞	¾ x 3½	4
6	6.90	2.50	8.02	8.12	7.00	9.50	11.06	11.12	.63	.88	.43	.37	⅞	¾ x 3½	6
8	**9.05**	**2.50**	**10.17**	**10.27**	**9.15**	**11.75**	**13.31**	**13.37**	**.66**	**1.00**	**.45**	**.39**	⅞	¾ x 3½	6
10	11.10	2.50	12.22	12.34	11.20	14.00	15.62	15.62	.70	1.00	.47	.41	⅞	¾ x 3½	8
12	**13.20**	**2.50**	**14.32**	**14.44**	**13.30**	**16.25**	**17.88**	**17.88**	**.73**	**1.00**	**.49**	**.43**	⅞	¾ x 3½	8
14	15.30	3.50	16.40	16.54	15.44	18.75	20.31	20.25	.79	1.25	.56	.51	⅞	¾ x 4	10
16	**17.40**	**3.50**	**18.50**	**18.64**	**17.54**	**21.00**	**22.56**	**22.50**	**.85**	**1.31**	**.57**	**.52**	⅞	¾ x 4	12
18	19.50	3.50	20.60	20.74	19.64	23.25	24.83	24.75	1.00	1.38	.68	.59	⅞	¾ x 4	12
20	**21.60**	**3.50**	**22.70**	**22.84**	**21.74**	**25.50**	**27.08**	**27.00**	**1.02**	**1.44**	**.69**	**.60**	⅞	¾ x 4	14
24	25.80	3.50	26.90	27.04	25.94	30.00	31.58	31.50	1.02	1.56	.75	.62	⅞	¾ x 4½	16

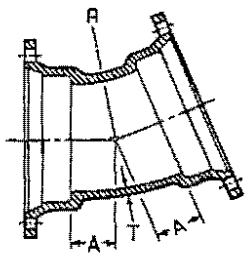
BENDS



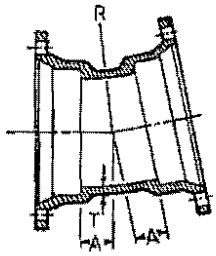
90° Bends (1/4)
5-600



45° Bends(1/8)
5-605



22½° Bends (1/16)
5-609



11¼° (1/32)
5-611

Size	Dimensions			Weights	Dimensions		Weights	Dimensions		Weights	Dimensions		Weights
	T	A	R		A	R		A	R		A	R	
3	.34	4.5	4	20	2.00	3.62	16	1.50	4.98	15	1.25	7.62	15
4	**.35**	**5.0**	**4.5**	**26**	**2.49**	**4.81**	**22**	**1.82**	**6.66**	**21**	**1.55**	**10.7**	**20**
6	.37	6.5	6	48	3.50	7.25	38	2.59	10.5	37	1.81	13.26	33
8	**.39**	**7.5**	**7**	**68**	**4.00**	**8.44**	**59**	**2.85**	**11.8**	**51**	**2.06**	**15.8**	**48**
10	.41	9.5	9	107	5.01	10.88	81	3.35	14.35	67	2.32	18.36	61
12	**.43**	**10.5**	**10**	**141**	**5.98**	**13.25**	**111**	**3.86**	**16.9**	**80**	**2.56**	**20.9**	**79**
14	.51	12.0	11.5	220	5.50	12.06	164	3.93	17.25	148	2.59	21.25	131
16	**.52**	**13.0**	**12.5**	**264**	**5.98**	**13.25**	**202**	**3.98**	**17.5**	**179**	**2.62**	**21.5**	**159**
18	.59	15.5	14.0	410	7.5	14.5	289	7.5	30.19	292	7.5	60.94	292
20	**.60**	**17.0**	**15.5**	**505**	**8.0**	**16.88**	**348**	**8.5**	**35.19**	**364**	**8.5**	**71.07**	**377**
24	.62	20.0	18.5	695	9.0	18.12	475	9.0	37.69	460	9.0	76.12	457

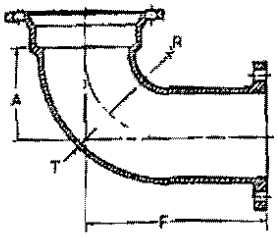
*18" thru 24" not included in AWWA C153 as of August, 1992

Tyler Pipe
Subsidiary of
Tyler Corporation

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

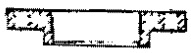
BENDS

90° MJ x Flange Bend (1/4)
5-600 F



Size	Dimensions				Weights
	T	A	R	F	
3	.34	4.5	4	5.5	20
4	.35	5.0	4.5	6.5	26
6	.37	6.5	6	8.0	48
8	.39	7.5	7	9.0	68
10	.41	9.5	9	11.0	107
12	.43	10.5	10	12.0	141
14	.51	12.0	11.5	14.0	227
16	.52	13.0	12.5	15.0	280

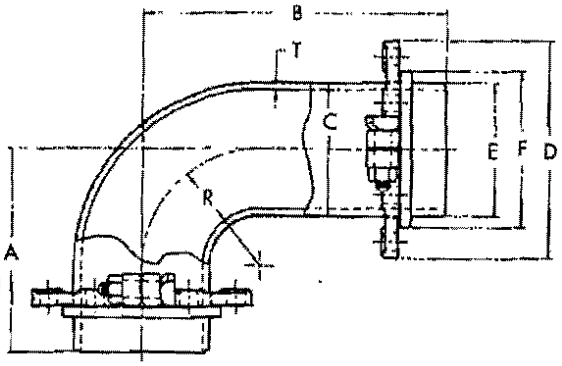
GLANDS



Glands
5-690

Size	Weight*	Size	Weight*
3	3	12	12
4	4	14	16
6	6	16	20
8	8	18	25
10	10	20	31
		24	39

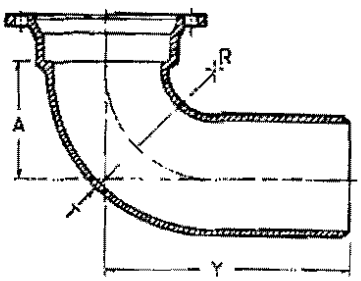
*18" thru 24" not included in AWWA C153 as of August, 1992



90° Swivel x MJ Hydrant Ell
5-698

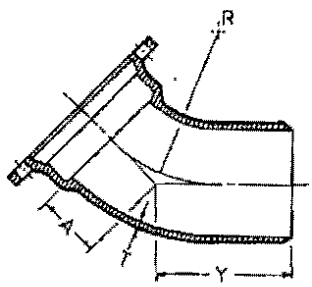
Size	Deminsions								*Weight
	T	A	B	C	D	E	F	R	
6	.37	10.5	15.5	7.10	11.2	6.90	8.02	6.0	85

*with glands



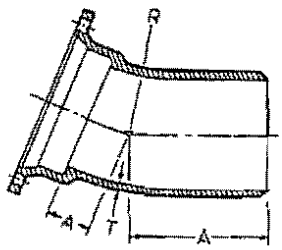
90° MJ x PE Bend (1/4)
***5-603**

Size	Dimensions				Weights
	T	A	Y	R	
3	.34	4.5	10.0	4.0	20
4	.35	5.0	10.5	4.5	25
6	.37	6.5	12.0	6.0	45
8	.39	7.5	13.0	7.0	65
10	.41	9.5	15.0	9.0	109
12	.43	10.5	16.0	10.0	135
14	.51	12.0	20.0	11.5	220
16	.52	13.0	21.0	12.5	254
18	.59	15.5	23.5	14.0	405
20	.60	17.0	25.0	15.5	465
24	.62	20.0	28.0	18.5	710



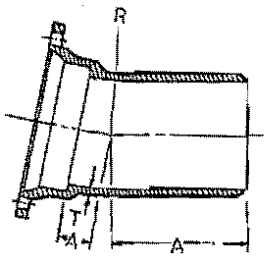
45° MJ x PE Bend (1/8)
***5-607**

Dimensions			Weights
A	Y	R	
2.0	7.5	3.62	16
2.5	8.0	4.81	22
3.5	9.0	7.25	37
4.0	9.5	8.44	56
5.0	10.5	10.88	83
6.0	11.5	13.25	108
5.5	13.5	12.06	165
6.0	14.0	13.25	206
6.0	15.5	14.50	290
7.5	16.5	16.88	340
9.0	17.0	18.12	460



22½° MJ x PE Bend (1/16)
***5-610**

Dimensions			Weights
A	Y	R	
1.50	7.00	4.98	16
1.82	7.32	6.66	20
2.58	8.08	10.50	35
2.84	8.34	11.80	49
3.35	8.85	14.35	66
3.86	9.36	16.90	79
3.93	11.93	17.25	152
3.98	11.98	17.50	181
7.50	15.50	30.19	290
8.50	16.50	35.19	345
9.00	17.00	37.69	445



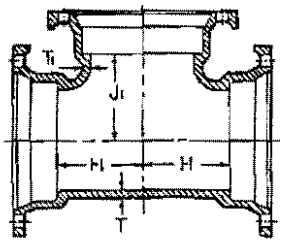
11¼° MJ x PE Bend (1/32)
***5-612**

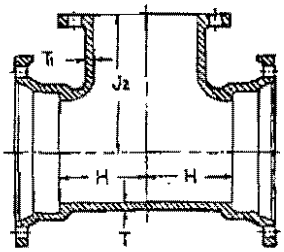
Dimensions			Weights
A	Y	R	
1.25	6.75	7.62	16
1.55	7.05	10.70	19
1.80	7.30	13.26	32
2.05	7.55	15.80	46
2.31	7.81	18.36	60
2.56	8.06	20.90	78
2.59	10.59	21.25	133
2.62	10.62	21.50	161
7.50	15.5	60.94	288
8.50	16.5	71.07	360
9.00	17.0	76.12	...

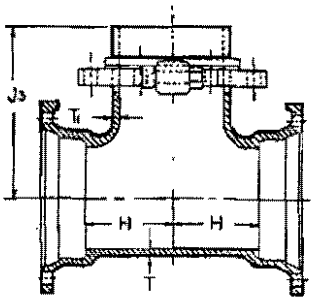
*18" thru 24" not included in AWWA C153 as of August, 1992

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

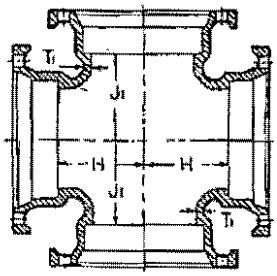
TEES







CROSS



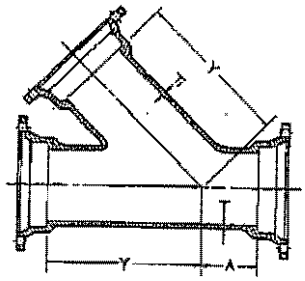
	MJ Tee 5-620		MJ x FE Tee 5-623		MJ x Swivel Tee 5-625		Cross 5-631			
Size	**Dimensions**						**Weights**			
	T	T1	H	J1	J2	J3	5-620	5-623	5-625†	5-631
3	.34	.34	3.5	3.5	5.5		24	26		29
4x3	**.35**	**.34**	**3.5**	**4**	**6.5**		**32**	**34**		**38**
4	.35	.35	4	4	6.5		35	38		42
6x3	**.37**	**.34**	**3.5**	**5**	**8**		**40**	**43**		**54**
6x4	.37	.35	4	5	8		51	54		60
6	**.37**	**.37**	**5**	**5**	**8**	**10.5**	**60**	**64**	**77**	**72**
8x3	.39	.34	4	6.5	9		67	68		
8x4	**.39**	**.35**	**4.5**	**6.5**	**9**		**71**	**72**		**81**
8x6	.39	.37	5.5	6.5	9	11.5	80	83	89	94
8	**.39**	**.39**	**6.5**	**6.5**	**9**	**11.5**	**90**	**94**	**116**	**108**
10x3	.41	.34	4	7.5	11		83	81		
10x4	**.41**	**.35**	**4.5**	**7.5**	**11**		**83**	**89**		**93**
10x6	.41	.37	5.5	7.5	11	13.0	93	107	113	106
10x8	**.41**	**.39**	**6.5**	**7.5**	**11**	**13.0**	**111**	**115**	**129**	**131**
10	.41	.41	7.5	7.5	11		120	130		144
12x3	**.43**	**.34**	**4**	**8.75**	**12**		**98**	**106**		
12x4	.43	.35	4.5	8.75	12		104	115		114
12x6	**.43**	**.37**	**5.5**	**8.75**	**12**	**14.25**	**115**	**120**	**128**	**129**
12x8	.43	.39	6.5	8.75	12	14.25	123	146	149	140
12x10	**.43**	**.41**	**7.5**	**8.75**	**12**		**153**	**174**		**181**
12	.43	.43	8.75	8.75	12		178	198		214
14x6	**.51**	**.44**	**6.5**	**10.5**	**14**	**16.0**	**183**	**205**	**211**	**210**
14x8	.51	.45	7.5	10.5	14		206	227		231
14x10	**.51**	**.46**	**8.5**	**10.5**	**14**		**229**	**244**		**255**
14x12	.51	.47	9.5	10.5	14		235	276		269
14	**.51**	**.51**	**10.5**	**10.5**	**14**		**281**	**302**		**344**
16x6	.52	.45	6.5	11.5	15	17.0	229	213	248	250
16x8	**.52**	**.46**	**7.5**	**11.5**	**15**		**248**	**260**		**264**
16x10	.52	.47	8.5	11.5	15		265	287		286
16x12	**.52**	**.48**	**9.5**	**11.5**	**15**		**281**	**312**		**310**
16x14	.52	.51	10.5	11.5	15		317	348		363
16	**.52**	**.52**	**11.5**	**11.5**	**15**		**323**	**374**		**410**

**Made to order only. Not returnable.

†Includes swivel gland

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

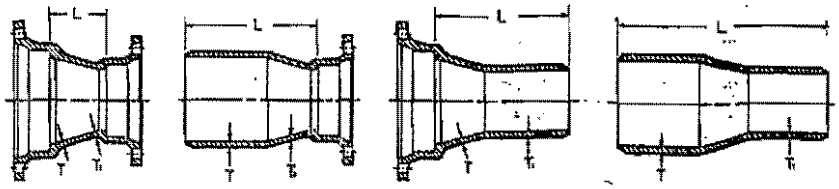
Tyler Pipe
Subsidiary of
Tyler Corporation



WYES
*5-628

Size	Dimensions				Weights
	A	Y	T	T'	
3	2.0	8.5	.34	.34	36
4x3	**1.0**	**9.0**	**.35**	**.34**	**40**
4	2.5	9.5	.35	.35	45
6x4	**1.5**	**11.0**	**.37**	**.35**	**67**
6	3.0	13.0	.37	.37	93
8x4	**0.5**	**13.0**	**.39**	**.35**	**93**
8x6	2.0	14.5	.39	.37	113
8	**3.5**	**16.0**	**.39**	**.39**	**136**
10x4	0	15.0	.41	.35	118
10x6	**1.0**	**16.0**	**.41**	**.37**	**136**
10x8	2.5	17.0	.41	.39	170
10	**3.5**	**19.0**	**.41**	**.41**	**199**
12x4	0	16.5	.43	.35	150
12x6	**1.5**	**18.5**	**.43**	**.37**	**186**
12x8	1.5	18.5	.43	.39	188
12x10	**3.0**	**20.0**	**.43**	**.41**	**223**
12	4.5	22.5	.43	.43	272
14x6	**0**	**19.5**	**.51**	**.44**	**256**
14x8	1.5	21.0	.51	.45	286
14x10	**3.0**	**22.5**	**.51**	**.46**	**322**
14x12	4.5	24.0	.51	.47	387
14	**6.0**	**25.0**	**.51**	**.51**	**465**
16x6	0	21.0	.52	.45	300
16x8	**0.5**	**22.5**	**.52**	**.46**	**327**
16x10	2.0	24.0	.52	.47	375
16x12	**3.5**	**25.0**	**.52**	**.48**	**465**
16x14	5.0	26.5	.52	.51	492
16	**6.5**	**28.0**	**.52**	**.52**	**575**

REDUCERS



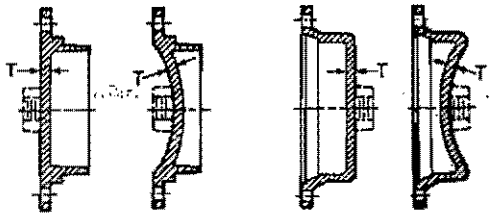
MJ x MJ 5-635 | **MJ SEB 5-636** | **MJ LEB 5-637** | **PE x PE 5-638**

Size	Dimensions						Weights			
	T	T'	5-635 L	5-636 L	5-637 L	5-638 L	5-635	5-636	5-637	5-638
4x3	.35	.34	4.	9.5	9.5	15.0	18	17	18	14
6x3	**.37**	**.34**	**5.**	**10.5**	**10.5**	**16.0**	**21**	**21**	**21**	**18**
6x4	.37	.35	4.	9.5	9.5	15.0	27	26	22	22
8x4	**.39**	**.35**	**5.**	**10.5**	**10.5**	**16.0**	**36**	**34**	**29**	**30**
8x6	.39	.37	4.	9.5	9.5	15.0	40	37	32	31
10x4	**.41**	**.35**	**7.**	**12.5**	**12.5**	**18.0**	**47**	**46**	**40**	**40**
10x6	.41	.37	5.	10.5	10.5	16.0	47	48	42	42
10x8	**.41**	**.39**	**4.**	**9.5**	**9.5**	**15.0**	**54**	**52**	**45**	**44**
12x4	.43	.35	9.	14.5	14.5	20.0	67	61	52	54
12x6	**.43**	**.37**	**7.**	**12.5**	**12.5**	**18.0**	**67**	**58**	**53**	**56**
12x8	.43	.39	5.	10.5	10.5	16.0	64	62	55	58
12x10	**.43**	**.41**	**4.**	**9.5**	**9.5**	**15.0**	**78**	**62**	**57**	**60**
14x6	.51	.44	9.	17.0	14.5	22.5	108	107	112	109
14x8	**.51**	**.45**	**7.**	**15.0**	**12.5**	**20.5**	**104**	**107**	**108**	**101**
14x10	.51	.46	5.	13.0	10.5	18.5	100	102	100	96
14x12	**.51**	**.47**	**4.**	**12.0**	**9.5**	**17.5**	**100**	**101**	**100**	**85**
16x6	.52	.45	11.	19.0	16.5	24.5	136	132	144	128
16x8	**.52**	**.46**	**9.**	**17.0**	**14.5**	**22.5**	**132**	**128**	**136**	**112**
16x10	.52	.47	7.	15.0	12.5	20.5	128	124	128	123
16x12	**.52**	**.48**	**5.**	**13.0**	**10.5**	**18.5**	**125**	**123**	**119**	**113**
16x14	.52	.51	4.	12.0	12.0	20.0	140	139	138	133
18x8	**.59**	**.45**	**14.**	**22.0**	**19.5**	**27.5**	**194**	**190**	**195**	**170**
18x10	.59	.47	12.	20.0	17.5	25.5	196	180	185	175
18x12	**.59**	**.49**	**10.**	**18.0**	**15.5**	**23.5**	**185**	**170**	**190**	**181**
18x14	.59	.56	8.	16.0	16.0	24.0	190	181	200	185
18x16	**.59**	**.57**	**7.**	**15.0**	**15.0**	**23.0**	**196**	**180**	**190**	**188**
20x10	.60	.47	14.	22.0	19.0	27.5	225	210	210	185
20x12	**.60**	**.49**	**12.**	**20.0**	**17.5**	**25.5**	**210**	**200**	**210**	**195**
20x14	.60	.56	10.	18.0	18.0	26.0	208	198	205	195
20x16	**.60**	**.57**	**8.**	**16.0**	**16.0**	**24.0**	**225**	**215**	**222**	**212**
24x18	.60	.59	7.	15.0	15.0	23.0	233	220	225	210
24x10			...	...	...	...	**225**	...	...	...
24x12	.62	.49	16.	24.0	21.5	29.5	310	300	210	290
24x14	**.62**	**.56**	**14.**	**22.0**	**22.0**	**30.0**	**315**	**325**	**335**	**310**
24x16	.62	.57	12.	20.0	20.0	28.0	324	319	310	304
24x18	**.62**	**.59**	**10.**	**18.0**	**18.0**	**26.0**	**312**	**310**	**315**	**304**
24x20	.62	.60	8.	16.0	16.0	24.0	315	305	307	304

*18" thru 24" not included in AWWA C153 as of August, 1992

MECHANICAL JOINT SSB-DUCTILE IRON CLASS 350 FITTINGS

PLUGS & CAPS



3"-12" 14"-24" 3"-12" 14"-24"

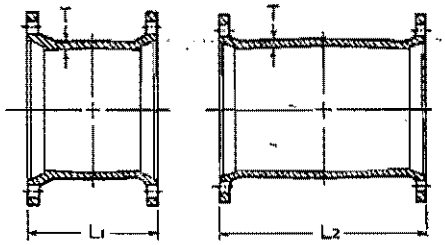
MJ Plug
Solid 5-650
Tapt 5-652

MJ Cap
Solid 5-654
Tapt 5-655

Size	Dimensions		Weights	
	T	Max. Tap	5-650 & 5-652	5-654 & 5-655
3	.46	3	6	7
4	.46	4	10	10
6	.46	4	18	17
8	.46	4	26	25
10	.56	4	36	35
12	.56	4	46	44
14	.62	4	85	79
16	.62	4	93	100
18	.65	4	130	122
20	.66	4	153	202
24	.68	4	202	214

*18" thru 24" not included in AWWA C153 as of August, 1992

SLEEVES

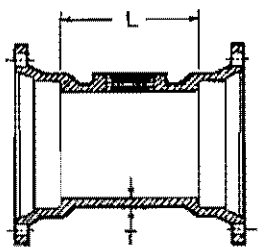


Short
5-644S

Long
5-644L

Size	Dimensions			Weights	
	T	L¹	L²	5-644S	5-644L
3	.34	7.5	12	13	21
4	.35	7.5	12	17	25
6	.37	7.5	12	28	39
8	.39	7.5	12	38	53
10	.41	7.5	12	49	64
12	.43	7.5	12	56	82
14	.56	9.5	15	111	141
16	.57	9.5	15	137	172
18	.68	9.5	15	...	200
20	.69	9.5	15	...	270
24	.75	9.5	15	...	370

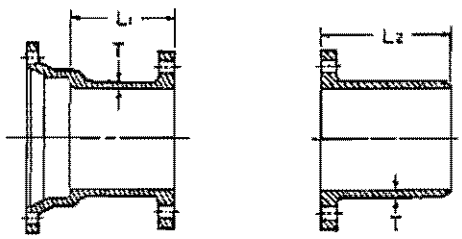
TAPPED TEE



MJ Tapped Tee
5-642

Size	Dimensions			Weights
	T	L	Max. Tap	
3	.34	6	2½	19
4	.35	6	3	23
6	.37	6	4	37
8	.39	6	4	53
10	.41	6	4	71
12	.43	6	4	82
14	.51	6	4	127
16	.52	6	4	164

ADAPTERS



MJxFE
5-658

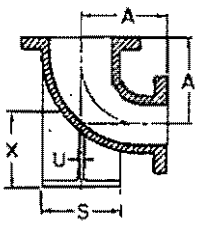
FExPE
5-661

Size	Dimensions			Weights	
	T	L¹	L²	5-658	5-661
3	.34	6	12	18	18
4	.35	6	12	24	24
6	.37	6	12	36	33
8	.39	6	12	52	52
10	.41	6	12	67	69
12	.43	6	12	80	88
14	.51	6	12	127	127
16	.52	6	12	166	149

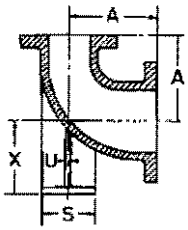
DUCTILE IRON AND GRAY IRON FLANGED FITTINGS

Tyler Pipe
Subsidiary of
Tyler Corporation

*REDUCING BASE BENDS



Base Under Large End 5-702 LE



Base Under Small End 5-702 SE

Size	Dimensions			Wt.
	X	S	U	
4x3	5.5	6	.5	45
6x4	**7**	**7**	**.62**	**75**
8x4	8.38	9	.88	115
8x6	**8.38**	**9**	**.88**	**130**
10x6	9.75	9	.88	170
10x8	**9.75**	**9**	**.88**	**195**
12x6	11.25	11	1	230
12x8	**11.25**	**11**	**1**	**255**
12x10	11.25	11	1	285

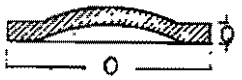
*Not included in AWWA C110

*FLANGES

Flange for Steel Pipe 5-750
Reducing Flange for Steel Pipe 5-752

Flange for CI Pipe 5-751
Reducing Flange for CI Pipe 5-753

Under 12" Blind Flange



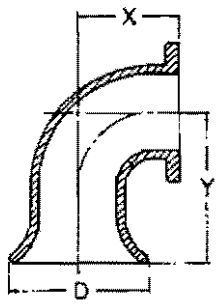
12" and Larger Blind Flange

Blind Flanges 5-754

Size	Dimensions				Wt.		
	O	Q	X	Y	5-750	5-751	5-754
2	6	.62	....	1	4	.	4
2½	**7**	**.69**	**....**	**1.13**	**6**	**.**	**7**
3	7.5	.75	1.8	1.19	7	7	8
4	**9**	**.94**	**1.89**	**1.31**	**12**	**12**	**14**
6	11	1.00	2.1	1.56	17	17	25
8	**13.5**	**1.12**	**2.31**	**1.75**	**25**	**28**	**40**
10	16	1.19	2.52	1.94	35	38	60
12	**19**	**1.25**	**2.73**	**2.19**	**55**	**58**	**80**
14	21	1.38	2.875	2.25	..	75	110
16	**23.5**	**1.44**	**3.188**	**2.5**	**..**	**95**	**145**
18	25	1.56	3.125	2.69	..	105	190
20	**27.5**	**1.69**	**3.5**	**2.88**	**..**	**135**	**250**
24	32	1.88	3.687	3.25	..	160	370
30	**38.75**	**2.12**	**4.875**	**...**	**..**	**255**	**580**
36	46	2.38	.....	...	..	390	880

NOTE: All flanges conform to ANSI/AWWA C115/A21.15-83 Standards.

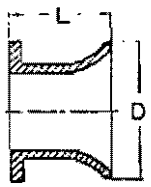
*FLANGE AND FLARE



*Flange and Flare 90° Bend 5-765

Size	Dimensions			Wt.
	D	X	Y	5-765
3	7.5	5.5	8.5	25
4	**9**	**6.5**	**9.5**	**40**
6	11	8	12	70
8	**13.5**	**9**	**13**	**110**
10	16	11	15	175
12	**19**	**12**	**16**	**245**
14	21	14	22	450
16	**23.5**	**15**	**23**	**545**
18	25	16.5	24.5	675
20	**27.5**	**18**	**26**	**860**
24	32	22	30	1195

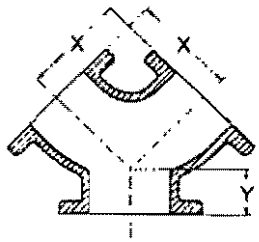
*Not included in AWWA C110



Flange and Flare Piece 5-766

Size	Dimensions		Wt.
	D	L	5-766
3	7.5	8	20
4	**9**	**8**	**30**
6	11	8	40
8	**13.5**	**10**	**70**
10	16	10	95
12	**19**	**12**	**155**
14	21	12	225
16	**23.5**	**16**	**330**
18	25	16	355
20	**27.5**	**18**	**460**
24	32	18	635

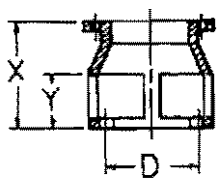
*TRUE WYE



True Wye 5-767

Size		Dimensions		Wt.
Stem	Branches	X	Y	
4	4	6.5	3	50
6	**4**	**8**	**3.5**	**75**
6	6	8	3.5	80
8	**6**	**9**	**4.5**	**120**
8	8	9	4.5	125

*FLANGE SLUDGE SHOE



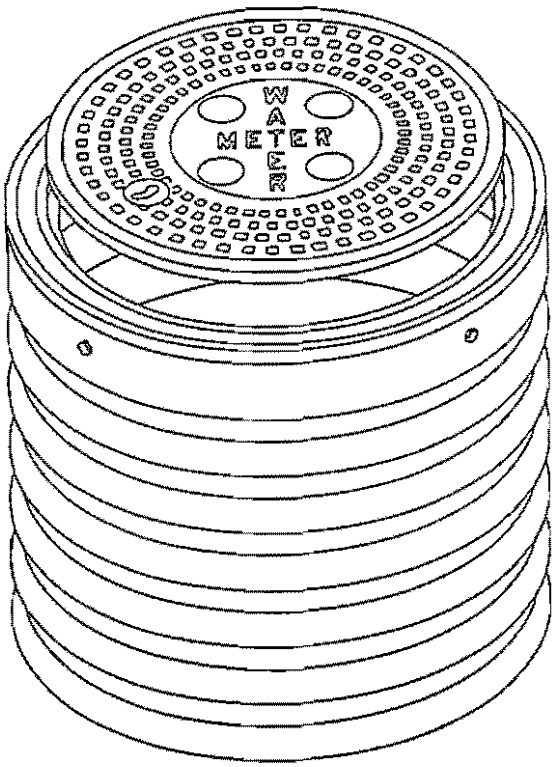
Flange Sludge Shoe 5-768

Size	Dimensions			Wt.
	D	X	Y	
3	5.75	12	6	25
4	**7**	**12**	**6**	**35**
6	7.87	12	6	45
8	**10.12**	**12**	**6**	**65**
10	12.25	12	6	85
12	**15.25**	**12**	**6**	**120**

*Not included in AWWA C110.

ANSI/AWWA C110/A21.10, ANSI/AWWA C111/A21.11

VII. METER BOXES



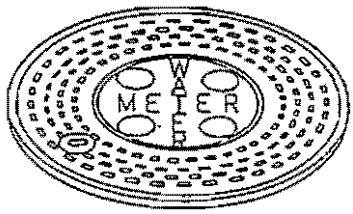
548 Series Galvanized Meter Boxes

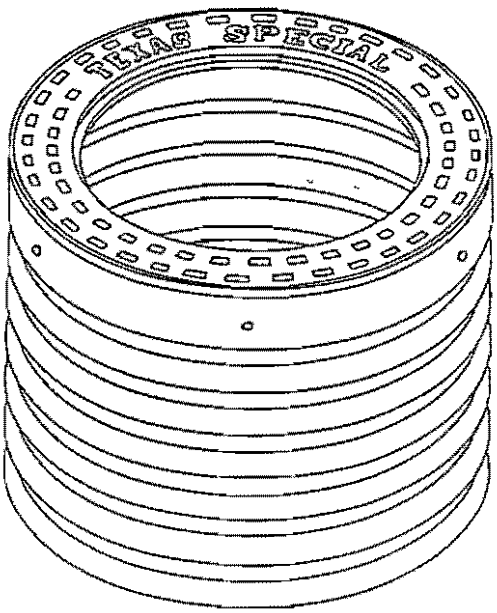
with 24" dia. corrugated cans

Part no.	Height	Weight
# 548 A	18"	80 lbs
# 548 B	24"	85 lbs
# 548 C	30"	90 lbs
# 548 D	36"	95 lbs
# 548 E	42"	100 lbs
# 548 F	48"	105 lbs
# 548 G	54"	110 lbs
# 548 H	60"	115 lbs

55 Series Galvanized Meter Boxes

with 28" dia. corrugated cans





Part no.	Height	Weight
# 55 A	18"	125 lbs
# 55 A1S	18"	125 lbs
# 55 A2S	18"	125 lbs
# 55 B	24"	130 lbs
# 55 C	30"	135 lbs
# 55 D	36"	140 lbs
# 55 E	42"	145 lbs
# 55 F	48"	150 lbs
# 55 A1S 18 ga. can - Dallas std		

VIII. TAPPING SLEEVE

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

Catalog number---
H-615 Mechanical Joint Tapping Sleeve

Sizes--- 4"-24" main and outlet (see chart below for available size combinations)

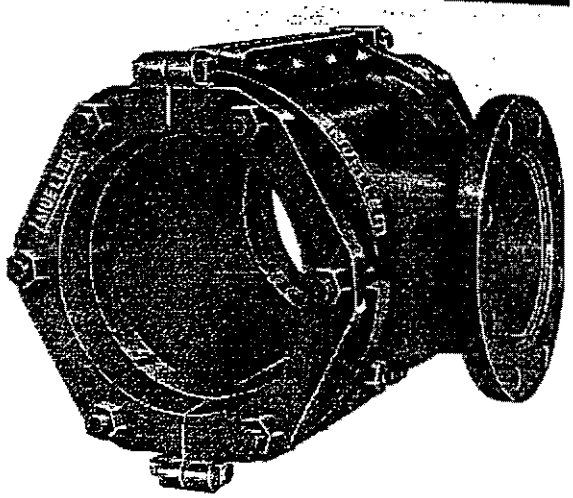
Outlet flange dimensions and drilling comply with ANSI B16.1, class 125 and with MSS SP-60.

Certified to ANSI/NSF 61.

Iron body with 3/4" NPT test plug.

4"-12" sizes---250 psig (1723 kPa) maximum working pressure.

14" - 24" sizes---150 psig (1034 kPa) maximum working pressure.



H-615

apping Sleeve pipe information

lominal ize of main	O.D. range of sleeve		Class and type of pipe	End Gasket part numbers
	Inch	mm		
"	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
"	6.84"-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
"	8.99"-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
0"	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
2"	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
4"	15.22"-15.35"	386.7-389.8	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195127
6"	17.32"-17.45"	440.0-443.1	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195128
8"	19.42"-19.55"	493.4-496.5	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195266
0"	21.52"-21.65"	546.7-549.8	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195129
4"	25.72"-25.85"	653.4-656.5	Cast iron classes 50, 100, 150, 200, 250, A and B - all classes ductile iron	195130

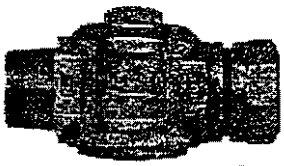
izes available

Nominal ize of nain	Outlet size									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
"	X	-	-	-	-	-	-	-	-	-
"	X	X	-	-	-	-	-	-	-	-
"	X	X	X	-	-	-	-	-	-	-
0"	X	X	X	X	-	-	-	-	-	-
2"	X	X	X	X	X	-	-	-	-	-
4"	-	X	X	X	X	X	-	-	-	-
6"	X	X	X	X	X	X	X	-	-	-
8"	X	X	X	X	X	-	X	X	-	-
0"	X	X	X	X	X	X	X	X	X	-
4"	X	X	X	X	X	X	X	X	X	X

IX. BRASS-CORP. STOP, CURB STOP, COUPLING, SADDLES

Mueller Co.

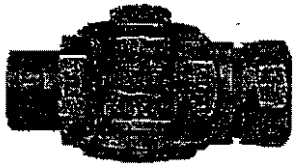
1-1/2" & 2" MUELLER® ORI-CORP® CORPORATION VALVES



MUELLER® ORI-CORP® Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: MUELLER® 110® Conductive Compression Connection for CTS O.D. tubing*

H-15013

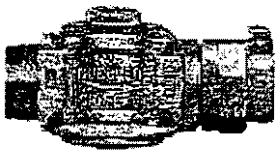
1-1/2"	2"



MUELLER® ORI-CORP® Corporation Valve
Inlet: AWWA I.P. thread.
Outlet: MUELLER® 110® Conductive Compression Connection for CTS O.D. tubing*

H-15023

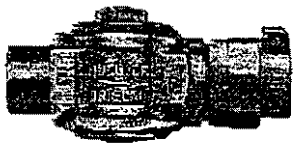
1-1/2"	2" **



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

P-15013

1-1/2"	2"



MUELLER ORI-CORP Corporation Valve
Inlet: AWWA I.P. thread
Outlet: MUELLER Pack Joint Connection for CTS O.D. tubing*

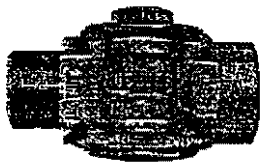
P-15023

1-1/2"	2" **

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: F.I.P. thread

H-15014

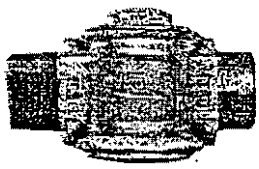
1-1/2" ‡	2" ‡



MUELLER ORI-CORP Corporation Valve
Inlet: AWWA I.P. thread
Outlet: F.I.P. thread

H-15015

1-1/2" ‡	2" ‡



MUELLER ORI-CORP Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: M.I.P. thread

H-9968

1-1/2"	2"

MUELLER ORI-CORP Corporation Valve
Inlet: AWWA I.P. thread
Outlet: M.I.P. thread

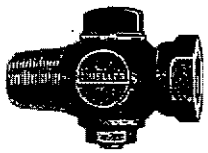
H-9969

1-1/2"	2" **

* See charts on pages 5.10-5.13 for tubing and pipe that may be used on these connections.
** For use with Service Saddle only---cannot be machine inserted.
‡ Requires minimum ordering quantity. Contact MUELLER Customer Service Center for minimum order requirements and availability.
NOTE: Sizes shown represent nominal size of inlet and outlet connections.

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

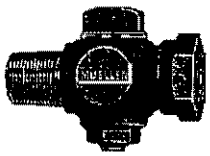
-01



Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: F.I.P. thread

H-10045

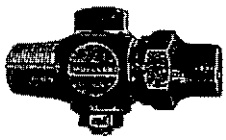
3/4"	3/4" x1" ‡	1"



Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: F.I.P. thread

H-10046

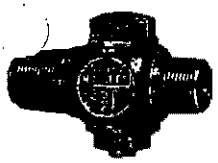
1/2"	3/4"	1"	1-1/4"‡	1-1/2"	2"



Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: I.P. thread copper flare connection - this connection thread is one size larger than the copper tubing to be flared

H-15002

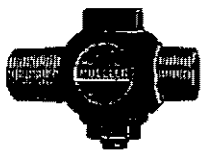
1/2"	3/4"	1"	1-1/4"‡	1-1/2"	2"



Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: M.I.P. thread

H-9996

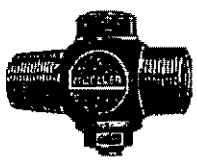
3/4"	1"	1-1/2"‡	2"



Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: M.I.P. thread

H-10013

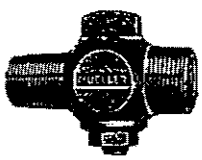
1"



Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER"CC) thread
Outlet: Increasing I.P. thread (outlet is one size larger than inlet)

H-10003

3/4"	1"	1-1/2"‡	2" ‡



Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: Increasing I.P. thread (outlet is one size larger than inlet)

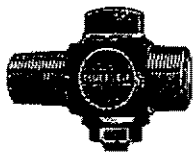
H-9979

1/2"	5/8" (3/4" outlet)	3/4"	1"	1-1/2"	2"

Ground Key Corporation Valve
Inlet: AWWA taper (MUELLER "CC") thread
Outlet: MUELLER Coupling thread

H-9971

1/2"	5/8" (3/4" outlet)	3/4"	1"	1-1/4"	1-1/2"	2"



Ground Key Corporation Valve
Inlet: AWWA I.P. thread
Outlet: MUELLER Coupling thread

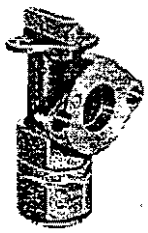
H-9976

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

‡ Requires minimum ordering quantity. Contact MUELLER Customer Service Center for minimum order requirements and availability.
NOTE: Sizes shown above represent nominal size of inlet and outlet connections.

MUELLER® Corporation Valves are manufactured and tested in accordance with ANSI/AWWA C800.

GROUND KEY ANGLE METER VALVES & SERVICE VALVES - 3/4" - 2"



Ground Key Angle Meter Valve
MUELLER 110® Conductive
Compression Connection for CTS
O.D.* tubing x meter flange
180° turn check - lock wing

H-14277

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Pipe size	1-1/2	2

Ground Key Angle Meter Valve
MUELLER® Pack Joint
Connection for CTS O.D.* tubing
x meter flange
180° turn check - lock wing

P-14277

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Pipe size	1-1/2	2

Ground Key Angle Meter Valve
Copper flare nut x meter flange
180° turn check - lock wing

H-14276

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Tubing size	1-1/2	2

Ground Key Angle Meter Valve
F.I.P. x meter flange
180° turn check - lock wing

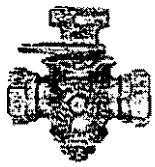
H-14286

Catalog size	1-1/2	2††
Meter size	1-1/2	1-1/2, 2
Pipe size	1-1/2	2

Ground Key Angle Meter Valve
F.I.P. x F.I.P.
180° turn check - lock wing

H-14285

Catalog size	3/4



MUELLER Solid Tee Head
Roundway Meter Stop
F.I.P. x F.I.P.
360° turn - lock wing

H-10281

Catalog size	1/2

* See charts on pages 8D.15 and 8D.16 for tubing and pipe that can be used with this connection.

SERVICE FITTINGS WITH MUELLER 110® COMPRESSION CONNECTION

Straight three part union MUELLER 110® Conductive Compression Connection for CTS O.D.* tubing-**both ends**

H-15403

1/2"	3/4"	1"	1"x3/4"	1-1/4"	1-1/4"x1"	1-1/2"	2"

Straight coupling MUELLER 110 Conductive Compression Connection for CTS O.D.* tubing x M.I.P. thread

H-15428

1/2" ‡	3/4"	3/4"x1"	1"	1"x3/4"	1-1/4"x1"	1-1/4"	1-1/2"	1-1/2"x1"	2"

Straight three part union MUELLER 110® Compression Connection for IPS PE* pipe-**both ends**

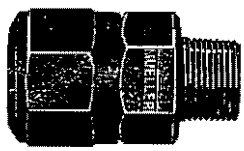
H-15404

3/4"	1"	1"X3/4"

Straight coupling MUELLER 110 Conductive Compression Connection for CTS O.D.* tubing x F.I.P. thread

H-15451

3/4"	3/4"x1"	1"	1"x3/4"	1-1/4"	1-1/4"x1"	1-1/2"	2"



Straight coupling MUELLER 110 Compression Connection for IPS PE* pipe x M.I.P. thread

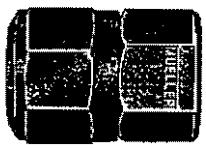
H-15429

3/4"	1"

Straight three part union MUELLER 110 Conductive Compression Connection for CTS O.D.* tubing x 110 Compression Connection for IPS PE* pipe

H-15409

3/4"	1"



Straight coupling MUELLER 110 Compression Connection for IPS PE* pipe x F.I.P. thread

H-15454

3/4"	1"

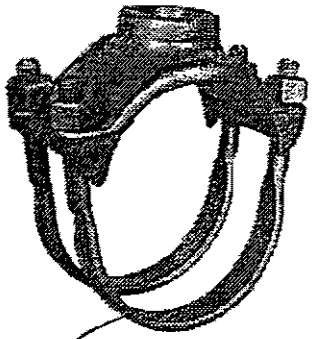
MUELLER® BR2B & BR2S SERIES BRONZE SERVICE SADDLES - DOUBLE STRAP

Mueller Co. **4.5**

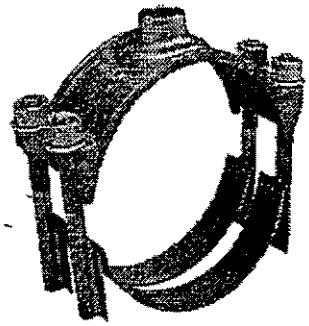
REV. 4-99

...LLER® Service Saddles for use on A-C, cast iron, ductile iron, and AWWA C900 PVC plastic pipe

- ☐ Outlet tapped with either AWWA taper (C.C.) or AWWA I.P. thread (F.I.P.T.)
- ☐ For use on A-C pipe, cast iron or ductile iron pipe and cast iron O.D. PVC pipe
- ☐ 200 psig (1379 kPa) maximum working pressure
- ☐ Available in single and double strap designs
- ☐ Brass body
- ☐ Flattened silicon bronze straps (standard)
- ☐ Optional 304L stainless steel straps
- ☐ Rolled strap threads
- ☐ O-ring sealed outlet
- ☐ 3/4" thru 2" tap sizes
- ☐ Meets all applicable parts of ANSI/AWWA C800
- ☐ NSF 61 certified



BR 2 B Series



BR 2 S Series

MUELLER® Service Saddles with AWWA taper thread

Pipe O.D. range		Kind and size of pipe *		Bronze double strap with AWWA taper thread (C.C.)							Optional stainless steel double strap with AWWA taper thread (C.C.)							
Inch	mm	A-C	Cast or ductile iron, C900 PVC plastic pipe	Base Catalog Number	Size of tapping (add to "Base" to complete catalog number)						Base Catalog Number	Size of tapping (add to "Base" to complete catalog number)						
					5/8"	3/4"	1"	1-1/4"	1-1/2"	2"		1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"
4.74"-5.32"	121.0-135.0	4" Cl. 150	4"	BR 2 B 0474 CC	050	075	100	125	150	200	BR 2 S 0474 CC	050	062	075	-	125	150	200
6.84"-7.45"	174.0-189.0	6" Cl. 150	6"	BR 2 B 0684 CC	050	075	100	125	150	200	BR 2 S 0684 CC	050	062	075	100	125	150	200
8.99"-9.67"	229.0-245.0	8" Cl.150	8"	BR 2 B 0899 CC	050	075	100	125	150	200	BR 2 S 0899 CC	050	062	075	100	125	150	200
11.04"-12.12"	281.0-307.0	10" Cl. 150-200	10"	BR 2 B 1104 CC	050	075	100	125	150	200	BR 2 S 1104 CC	050	062	075	-	125	150	200
13.14"-14.58"	334.0-370.0	12" Cl. 150-200	12"	BR 2 B 1314 CC	050	075	100	125	150	200	BR 2 S 1314 CC	050	062	075	100	125	150	200
15.22"-16.88"	386.6-428.7	14" Cl. 150-200	14"	BR 2 B 1522 CC	-	075	100	-	150	200	BR 2 S 1522 CC	-	-	075	100	-	150	200
17.32"-19.19"	439.9-487.4	16" Cl. 150-200	16"	BR 2 B 1732 CC	-	075	100	-	150	200	BR 2 S 1732 CC	-	-	075	100	-	150	200

MUELLER® Service Saddles with AWWA iron pipe thread

Pipe O.D. range		Kind and size of pipe*		Bronze double strap with AWWA I.P. thread (F.I.P.T.)							Optional stainless steel double strap with AWWA I.P. thread (F.I.P.T.)							
Inch	mm	A-C	Cast or ductile iron, C900 PVC plastic pipe	Base Catalog Number	Size of Tapping (add to "Base" to complete catalog number)						Base Catalog Number	Size of Tapping (add to "Base" to complete catalog number)						
					1/2"	3/4"	1"	1-1/4"	1-1/2"	2"		1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"
4.74"-5.32"	121.0-135.0	4" Class 150	4"	BR 2 B 0474 IP	050	075	100	125	150	200	BR 2 S 0474 IP	050	062	075	100	-	150	200
6.84"-7.45"	174.0-189.0	6" Class 150	6"	BR 2 B 0684 IP	050	075	100	125	150	200	BR 2 S 0684 IP	050	062	075	100	125	150	200
8.99"-9.67"	229.0-245.0	8" Class 150	8"	BR 2 B 0899 IP	050	075	100	125	150	200	BR 2 S 0899 IP	050	062	075	100	125	150	200
11.04"-12.12"	281.0-307.0	10" Class 150-200	10"	BR 2 B 1104 IP	050	075	100	125	150	200	BR 2 S 1104 IP	050	062	075	100	125	150	200
13.14"-14.58"	334.0-370.0	12" Class 150-200	12"	BR 2 B 1314 IP	050	075	100	125	150	200	BR 2 S 1314 IP	050	062	075	100	125	150	200
15.22"-16.88"	386.6-428.7	14" Cl. 150-200	14"	BR 2 B 1522 IP	-	075	100	-	150	200	BR 2 S 1522 IP	-	-	075	100	-	150	200
17.32"-19.19"	439.9-487.4	16" Cl. 150-200	16"	BR 2 B 1732 IP	-	075	100	-	150	200	BR 2 S 1732 IP	-	-	075	100	-	150	200

* A-C pipe, classes 150-200 per ASTM C296 and AWWA C400—actual O.D. of pipe being used must fall within the pipe O.D. range listed in the preceeding charts. Centrifugally cast pipe, classes 50-250per ANSI/AWWA C102/A21.2; ANSI/AWWA C106/A21.6; ANSI/AWWA C108/A21.8, and Federal specification WW-P-421. Ductile iron pipe, classes 50-56 per ANSI/AWWAC151/A21.51; Cast iron O.D. PVC plastic pipe per AWWA C900.

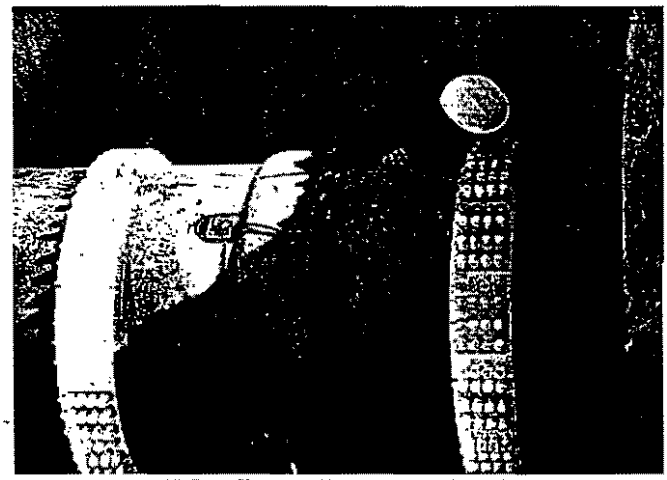
These machines may be used with the service saddles illustrated on this page

Machine	Service saddle tap size				
	1/2"	3/4"	1"	1-1/2"	2"
E-3™	X	X	X	X	X
D-5™	-	X	X	X	X
TRU-CUT™	-	X	X	-	-
MEGA-CUT™	X	X	X	X	X
PL-2™	-	X	X	-	-

TO ORDER SPECIFY QUANTITY, OUTLET TAPPING SIZE AND CATALOG NUMBER.

X. CASING SPACERS

raci patented casing spacers for cased pipelines



48" Ductile iron through steel casing

raci, the leaders in casing spacer technology, has been in business since 1952 and are **ISO 9002** CERTIFIED. Their uniquely designed, engineered and patented spacers are respected and their dependability has made them the number one choice of specifiers and installers world wide.

raci Casing Spacers **isolate water, sewer and gas pipelines** from casings simply and cost effectively. Insulators are required to separate casing and carrier pipes with the following criteria.

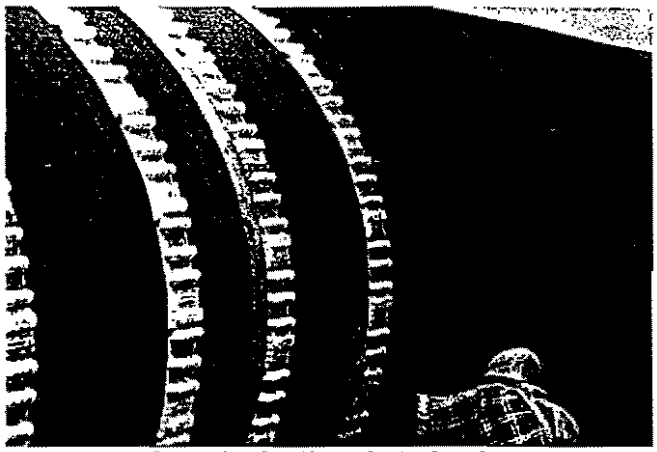
- Must ensure electrical insulation between the two pipes
- Permanently prevent bells from sliding or resting on casing pipe
- Must fasten tightly on the carrier pipe to ensure no horizontal movement during insertion
- Must be made of materials which do not conduct electricity and are permanently resistant to chemical corrosion
- Must be resistant to both mechanical and thermal shocks and stresses, particularly during installation

960 ft. 20" C905 PVC through steel casing

raci SPACER ADVANTAGES:

raci spacers meet the above requirements with the following advantages over the standard skid and strap application and other models of manufactured spacers.

- Spacers are manufactured entirely out of high density polyethylene with **NO METAL bolts or attachments required**
- Spacers are quickly and easily assembled by manually fitting elements one into the other
- Tooth insertion method allows on site adjustment to fit a wide range of pipe diameters and coatings
- Spacers slide into casing with ease



Concrete pipe through steel casing

- Spacers maintain continual long term support for the carrier pipe and its contents
- Spacers provide **constant projections around the *entire* circumference** of the carrier pipe.
- Spacers provide long term corrosion protection
- Spacers can be installed on coated or plain concrete, ductile iron, plastic, ribbed, and steel pipe.

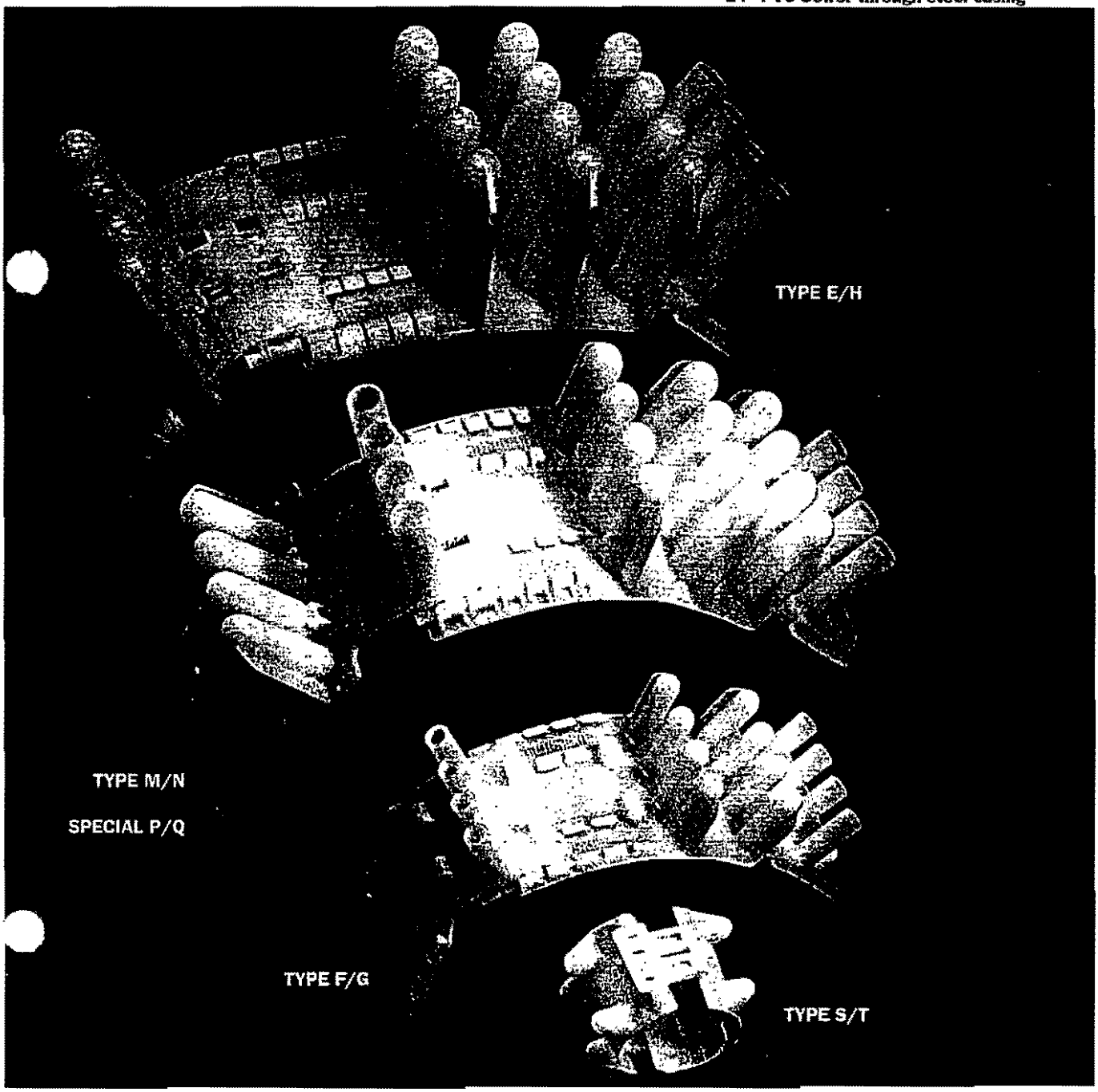
The spacers are divided into four groups which address a wide range of pipe sizes and weights. Within each grouping there are **varying support heights** that allow the spacer to clear bell joints, flanges, couplings, and other jointing methods. These heights range from .78 inches to 5.11 inches (20 - 130 mm)

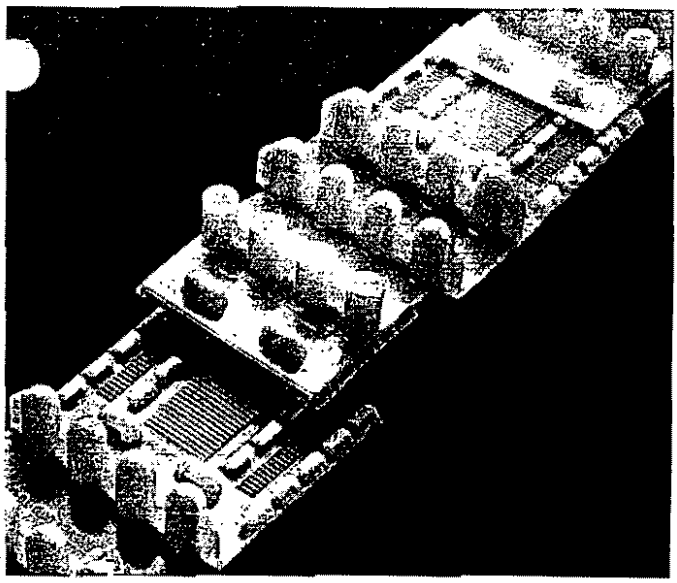
SPECIAL APPLICATIONS: For applications with continued operating temperatures in excess of 60°C/140° F, spacers are ... able in nylon.

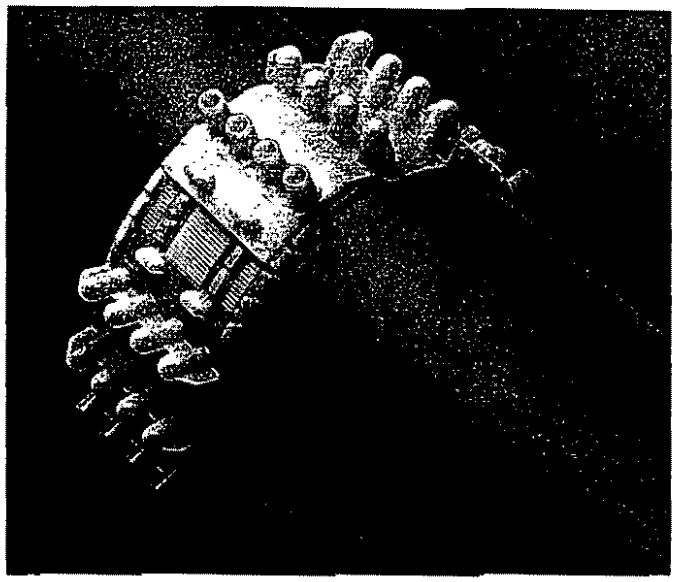
On request, spacers can be manufactured in other types of plastic material according to the mechanical and temperature requirements of the pipeline.

The **HDPE spacer** is manufactured by injection molding. This gives it a high impact strength and a low coefficient of friction which exceeds industry standards. Each spacer element represents a flexible section that has a toothed male butt strap at one end and an appropriately toothed female slot on the other end. Absolutely **no metallic parts** are involved in their assembly. This design allows for **on site adjustments** for any variances within the O.D. range. Coupled with their flexibility they cover all types of pipe from O.D. range 1.18 inches (30 mm) and upward.

24" PVC Sewer through steel casing







Spacing

The spacing of the rings must ensure that the carrier **pipe is fully supported throughout its length.** To ensure against the effects of differential loading at the entrance and exit points of the casing, two rings are used at the beginning and end of each casing, regardless of pipe size or length.

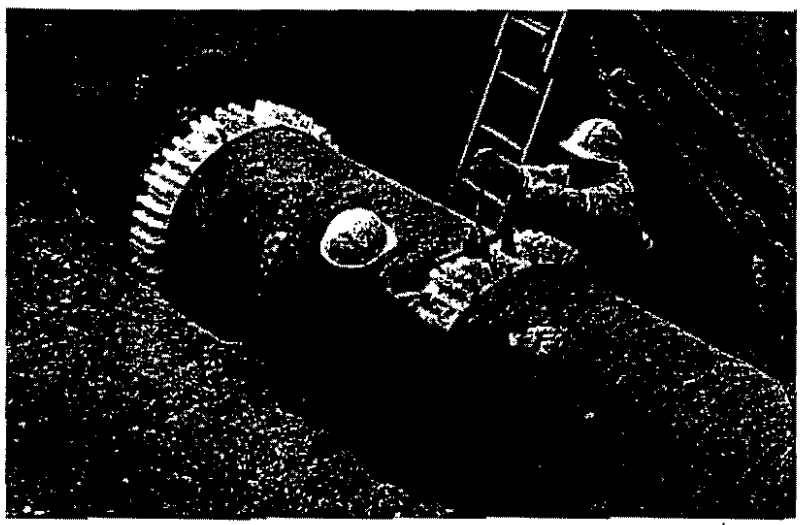
Where mechanically joined pipes, flanges, couplings or bells are involved rings should be installed within 1 foot (.3 m) on each side of the bell and one in the centre of the pipe, when 18 to 20 foot lengths are used.

Selection Guidelines

The selection of spacer type depends on the following dimensions:

- exact carrier pipe O.D.
- exact bell, flange or coupling O.D.
- exact casing pipe I.D.
- clearance desired between casing and carrier pipe
- length of application and linear weight of filled carrier pipe

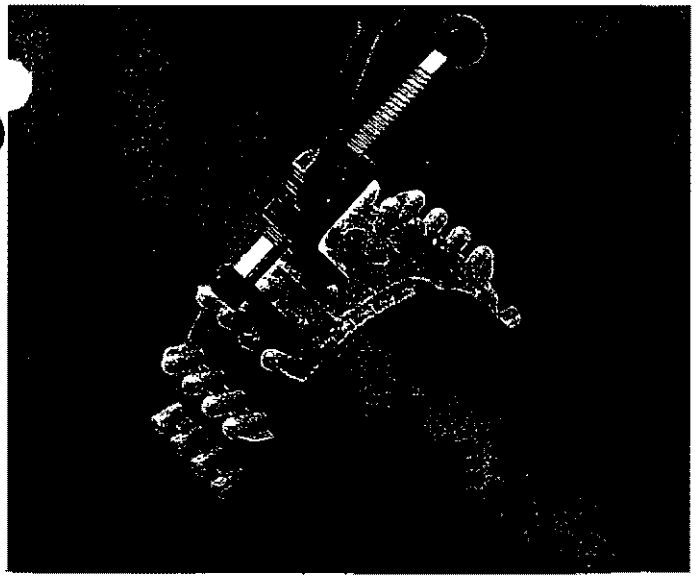
With the above information and using the charts on pages 5 and 6, the type and number of spacer elements required for each ring and how far they will be spaced can be determined.

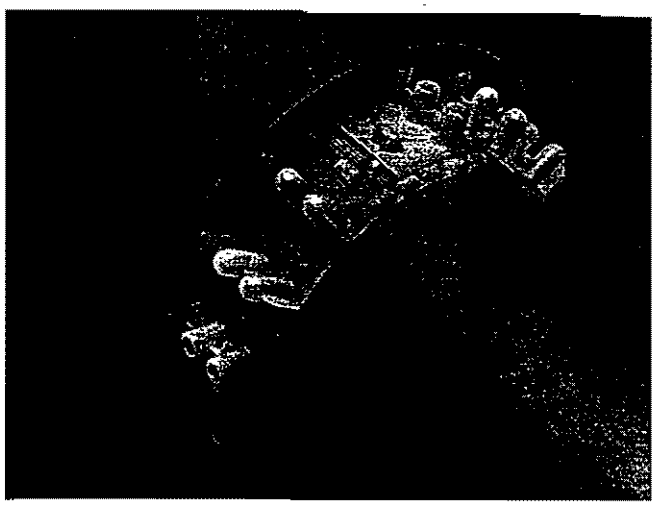


36" Concrete Pressure Pipe through steel casing

Instructions For Ring Assembly

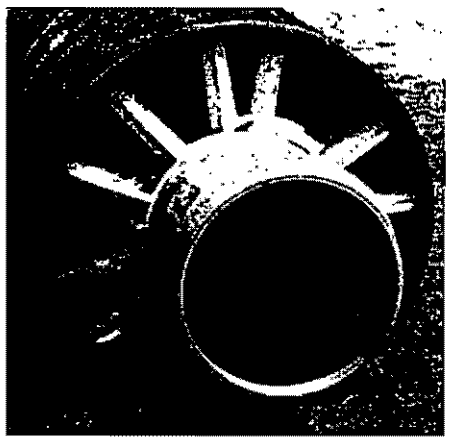
- In cases where the carrier pipe is plastic, the contact zone between the pipe and spacer shall be taped to ensure a textured contact area. It is recommended to use tape on all types of pipe. Double backed tape should be either self amalgamating or bituminous.
- Insert the male butt strap **three teeth** into the slotted female end of the next element. Continue until you have formed a chain of the required number of elements.
- To complete the **ring**, wrap the spacer loosely around the pipe and complete the last linking by hand.
- Pull each of the butt straps together by hand until the spacer is tightened uniformly on the pipe.
- The final tightening is done using the special clamping tool for the spacer type.
- The minimum and maximum operating temperatures are -4 to 140°F or -20 to 60°C.



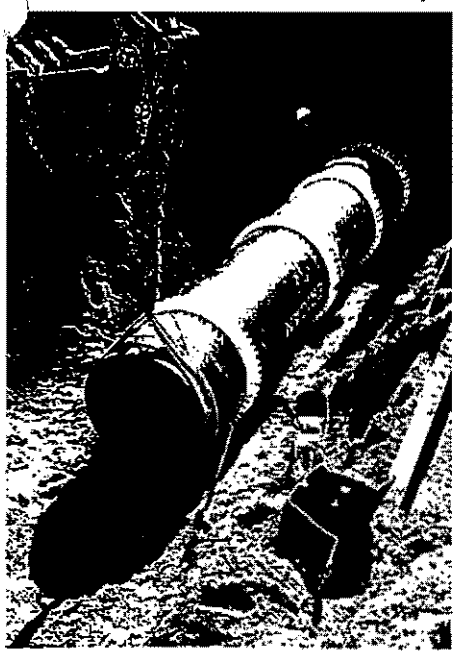


raci spacer assembly and insertion

Specification suggestions for casing spacers



Casing spacers shall be used to install carrier pipe inside the encasement pipe. To provide support around the periphery of the pipe should the pipe twist as it is pushed through the casing. The spacers shall be of a projection type that has a minimum number of projections around the circumference totalling the number of diameter inches. For example, 8" pipe shall have a minimum of 8 projections and 18" pipe shall have a minimum of 18 projections.



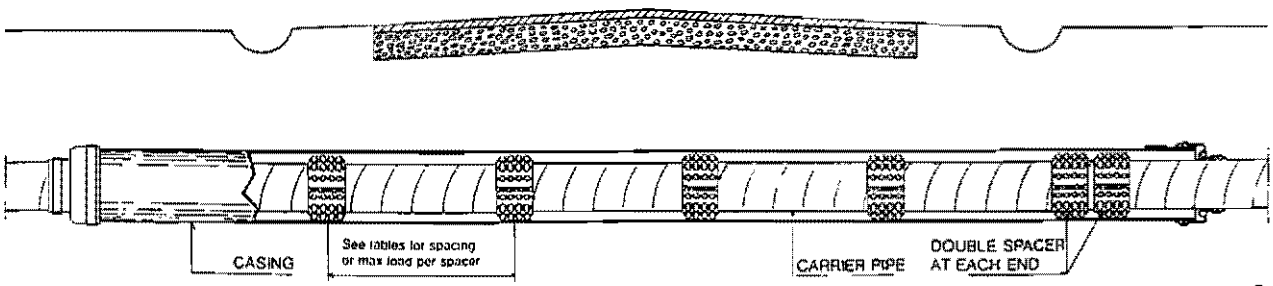
48" Ductile Iron through 66" casing

Casing spacers shall use double backed tape to fasten tightly onto the carrier pipe so that the spacers do not move during installation. Installation instructions shall be provided with each shipment. Casing spacers shall have a span of 10 feet to 6-1/2 feet dependent on the total load anticipated with the pipe full of liquid. On sewer pipe, the maximum span should be 6-1/2 feet to prevent sagging of the carrier pipe. The maximum load shall not exceed the load limits per spacer listed in the brochure. These values in the brochure include conservative safety factors for class spacer used. Spacers shall have minimum height that clears the pipe bell or as otherwise indicated on plans.

Casing spacers shall be projection type totally non-metallic spacers constructed of preformed sections of high-density polyethylene. Spacers shall be ISO 9002 certified for strength and quality. Projection type spacers shall be **RACI type spacers by Raci Spacers North America Inc.**

(Specification suggestion available in electronic form; e-mail or disc)

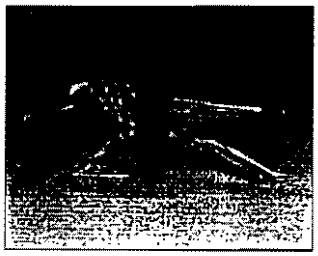
TYPICAL ROAD CROSSING



raci SPACER OPTIONS:

Spacer elements S and T

These spacers are linked by a tongue and groove method. S and T spacers are able to support a maximum weight load of 250 lb./110 kg. per ring. They are best suited for pipe ranges 1.18 - 4.13 inches (30 - 105 mm). For installation the Clamping Tool Type 3 is used - O.D. range 1.18 - 6.46 inches (30 - 164 mm)



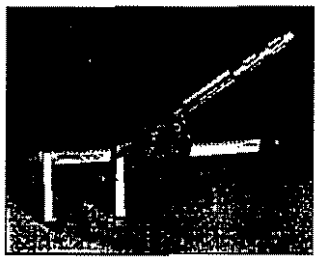
S/T SPACER TABLE: SMALL DIAMETER PIPE

TYPE S AND T 20 mm element support heights of .78 inches							
O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	S	T	ft	m
1.18	1.38	30	35	1		5	1.5
1.50	1.69	38	43		1	5	1.5
2.36	2.76	60	70	2		5	1.5
2.68	2.99	68	76	1	1	5	1.5
3.03	3.39	77	86		2	6-10	1.5
3.54	4.13	90	105	3		6-10	1.5
4.17	4.72	106	120	1	2	6-10	1.5
4.76	5.43	121	138	4		6-10	1.5
5.47	6.06	139	154	2	2	6-10	1.5
6.10	6.46	155	164	1	3	*6-10	1.5
Maximum load 250 lbs or 110 kgs per ring							

***MAXIMUM LOAD MUST NOT EXCEED 250 LBS OR 110 KGS PER RING**

Spacer elements F and G

These spacers are engineered to be used on small to medium sized pipe and are able to support a maximum weight load of 1102 lb./500 kg. per ring. F and G spacers are best suited for pipe ranges 3.62 to 17.56 inches (92 to 406 mm). For installation the Clamping Tool Type 1 is used. Channel Lock tool also available.



F/G SPACER TABLE: SMALL TO MEDIUM DIAMETER PIPE

TYPE F and G 25, 41, and 60 mm element support heights of .98, 1.6, and 2.36 inches							
O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	F	G	ft	m
3.62	4.53	92	115	1	1	6-10	1.8-3.0
4.57	5.98	116	152	2		6-10	1.8-3.0
6.02	7.40	153	188	2	1	6-10	1.8-3.0
7.44	8.34	189	224	3		6-10	1.8-3.0
8.35	10.24	225	260	3	1	6-10	1.8-3.0
10.28	11.61	261	295	4		6-10	1.8-3.0
11.65	12.32	296	313	4	1	6-10	1.8-3.0
12.36	14.80	314	376	5		6-10	1.8-3.0
14.84	17.56	377	446	6		6-10	1.8-3.0
17.60	20.79	447	528	7		*6-10	1.8-3.0
Maximum load 1102 lbs or 500 kgs per ring							

***MAXIMUM LOAD MUST NOT EXCEED 1102 LBS OR 500 KGS PER RING**

Spacer elements P and Q Special

The P and Q spacer is designed for that middle pipe O.D. range application. They are able to support a maximum weight load of 1213 lbs. / 550 kg. per ring. The P and Q spacers are best suited for the pipe range 6.00 to 12.00 inches (152 mm to 305 mm). For O.D. Ranges above 12" contact your distributor. For installation the Clamping Tool Type 6 is used.

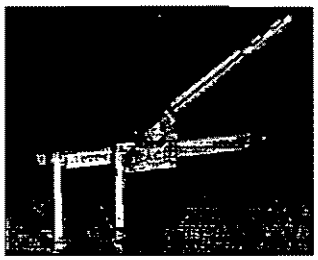
P/Q SPACER TABLE: MEDIUM DIAMETER PIPE

TYPE P and Q 120 mm Special element support heights of 4.73 inches							
O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	P	Q	ft	m
5.63	6.61	143	168	1	1	6-10	1.8-3.0
6.65	7.91	169	201	2		6-10	1.8-3.0
7.95	8.94	202	227	1	2	6-10	1.8-3.0
8.98	9.92	228	252	2	1	6-10	1.8-3.0
9.96	11.26	253	286	3		6-10	1.8-3.0
11.30	12.24	287	311	2	2	6-10	1.8-3.0
12.28	13.27	312	337	3	1	*6-10	1.8-3.0
13.31	15.55	338	395	4		*6-10	1.8-3.0
15.59	16.57	396	421	4	1	*6-10	1.8-3.0
16.61	19.88	422	505	5		*6-10	1.8-3.0
19.92	23.23	506	590	6		*4.9	1.5
Maximum load 1213 lbs or 550 kgs per ring							

***MAXIMUM LOAD MUST NOT EXCEED 1213 LBS OR 550 KGS PER RING**

Spacer elements M and N

The M and N spacer is designed for that middle pipe O.D. range application. They are able to support a maximum weight load of 2204 lb./1000 kg. per ring. The M and N spacers are best suited for the pipe range 13.31 to 29.88 inches (358 to 764 mm). For installation the Clamping Tool Type 5 is used. Channel Lock tool also available.



Spacer elements E and H

For large diameter pipe, heavier applications or long casings where maximum strength is required the E and H elements are used. They are able to support a maximum weight load of [illegible] lb./2700 kg. per ring and are best suited for the pipe range above 24 inches (609 mm). For installation, the Clamping Tool Type 2 is used for support heights up to 90 mm. Tool Type 4 is used for the E 130s.

M/N SPACER TABLE: MEDIUM DIAMETER PIPE

TYPE M and N 18, 36, 50, 75, and 90 mm element support heights of 0.7, 1.42, 1.97, 2.95, and 3.54 inches

O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	M	N	ft	m
5.63	6.61	143	168	1	1	6-10	1.8-3.0
6.65	7.91	169	201	2		6-10	1.8-3.0
7.95	8.94	202	227	1	2	6-10	1.8-3.0
8.98	9.92	228	252	2	1	6-10	1.8-3.0
9.96	11.26	253	286	3		6-10	1.8-3.0
11.30	12.24	287	311	2	2	6-10	1.8-3.0
12.28	13.27	312	337	3	1	6-10	1.8-3.0
13.31	15.55	338	395	4		6-10	1.8-3.0
15.59	16.57	396	421	4	1	6-10	1.8-3.0
16.61	19.88	422	505	5		6-10	1.8-3.0
19.92	23.23	506	590	6		*4-10	1.5-3.0
23.27	26.54	591	674	7		*4-10	1.5-3.0
26.57	29.88	675	759	8		*4-6	1.5
29.92	32.68	760	830	9		*4-6	1.5

Maximum load 2204 lbs or 1000 kgs per ring

***MAXIMUM LOAD MUST NOT EXCEED 2204 LBS OR 1000 KGS PER RING**

E/H SPACER TABLE: LARGE DIAMETER PIPE

TYPE E and H 25, 41, 60, 75, 90, 110 and 130 mm element support heights of .98, 1.6, 2.36, 2.95, 3.54, 4.33 and 5.11 inches

O.D. Range inches		O.D. Range millimeters		# of Elements to make a ring		Spacing between rings	
min	max	min	max	E	H	ft	m
8.70	10.55	221	268	2	1	6-10	1.8-3.0
10.59	12.60	269	320	3		6-10	1.8-3.0
12.64	14.41	321	366	3	1	6-10	1.8-3.0
14.45	16.54	367	420	4		6-10	1.8-3.0
16.57	18.31	421	465	4	1	6-10	1.8-3.0
18.35	20.87	466	530	5		6-10	1.8-3.0
20.91	24.80	531	630	6		6-10	1.8-3.0
24.84	28.74	631	730	7		6-10	1.8-3.0
28.78	32.68	731	830	8		6-10	1.8-3.0
32.72	36.61	831	930	9		6-10	1.8-3.0
36.65	40.55	931	1030	10		*4-10	1.5-3.0
40.59	45.63	1031	1159	11		*4-10	1.5-3.0
45.67	53.54	1160	1360	13		*4-10	1.5-3.0
53.58	62.99	1361	1600	15		*4-10	1.5-3.0
63.03	70.83	1601	1799	17		1.9	0.6
70.87	83.07	1800	2110	20		1.9	0.6
83.11	95.67	2111	2430	23		1.9	0.6
97.71	112.60	2431	2860	27			
112.64	134.41	2861	3414	32			

Maximum load 5952 lbs or 2700 kgs per ring

***MAXIMUM LOAD MUST NOT EXCEED 5952 LBS OR 2700 KGS PER RING**

NOTICE

Distance between spacers **must** be calculated so the maximum load per spacer ring does not exceed the max. load carrying capacity for the type used. (S&T 250 lb/110 kg, F&G 1102 lb/500 kg, P&Q 1213 lb/550 kg, M&N 2204 lb/1000kg, E&H 5952 lb/2700 kg) - / spacer ring.

Maximum load per spacer is calculated based on the weight of the pipe filled with liquid divided by the number of spacer rings installed. The maximum distance of 10 feet/3 meters shall not be exceeded due to the danger of the pipe sagging between the spacers support points unless the pipe manufacturer states differently.

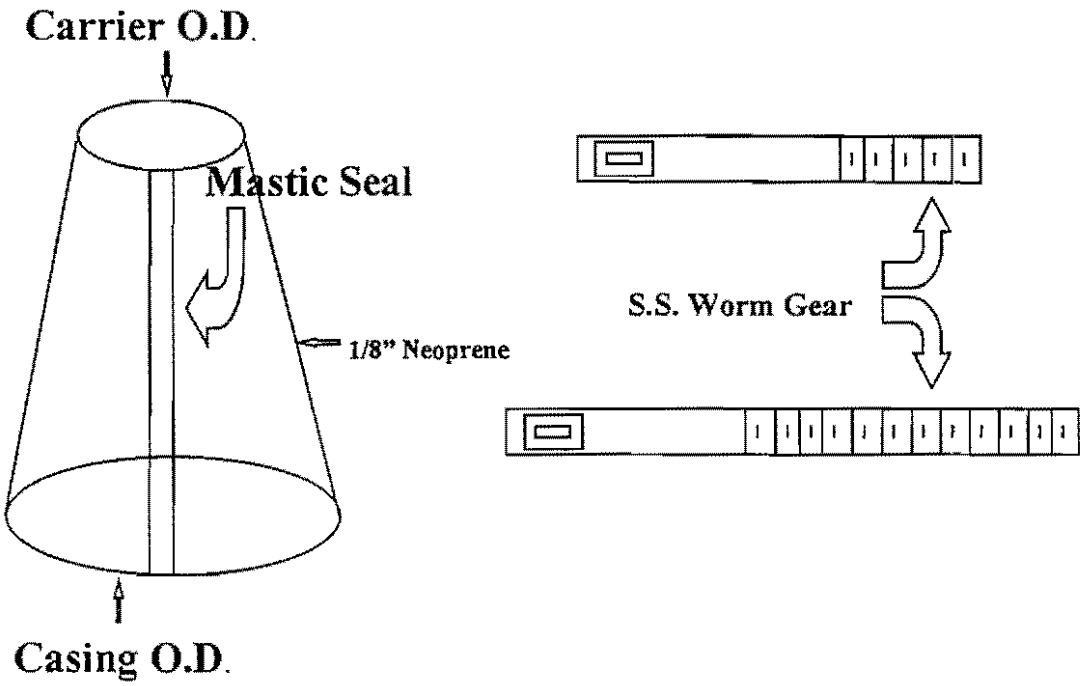
PHYSICAL CHARACTERISTICS OF SPECIFICALLY DESIGNED HIGH DENSITY POLYETHYLENE FOR RACI SPACERS

Yield strength	3625 PSI	25 N/mm²	ASTM D 638
Tensile Strength	2900 PSI	20 N/mm²	ASTM D 638
Elongation at break	800%	800%	ASTM D 638
Hardness shore D	65	65	ASTM D 2240
Minimum working temperature	-4° F	-20° C	
Dielectric strength	>940 Kv/inch	>37 Kv/mm	ASTM 149/64
UVL Stabilization	yes	yes	

P W M

Public Works Marketing, Inc.

Wrap Around End Seal



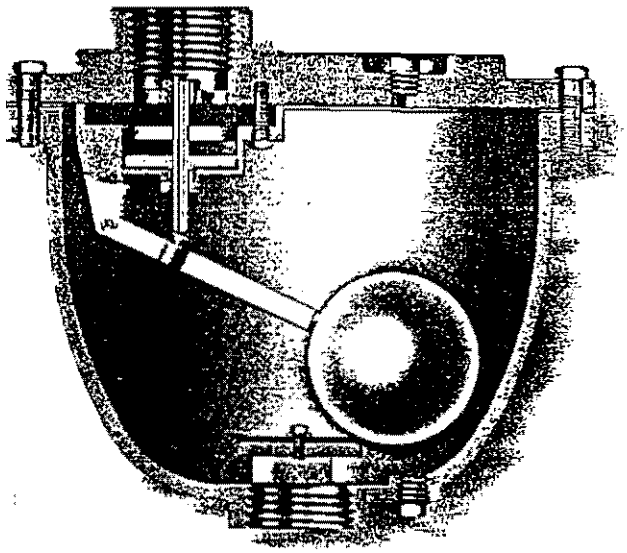
P.O. Box 38174 Dallas, Texas 75238-0174 Phone: 800-517-0395 Fax: 214-343-7105 Email: PWM12@aol.com

XI. COMBINATION AIR VALVE

2000 Millennium Edition

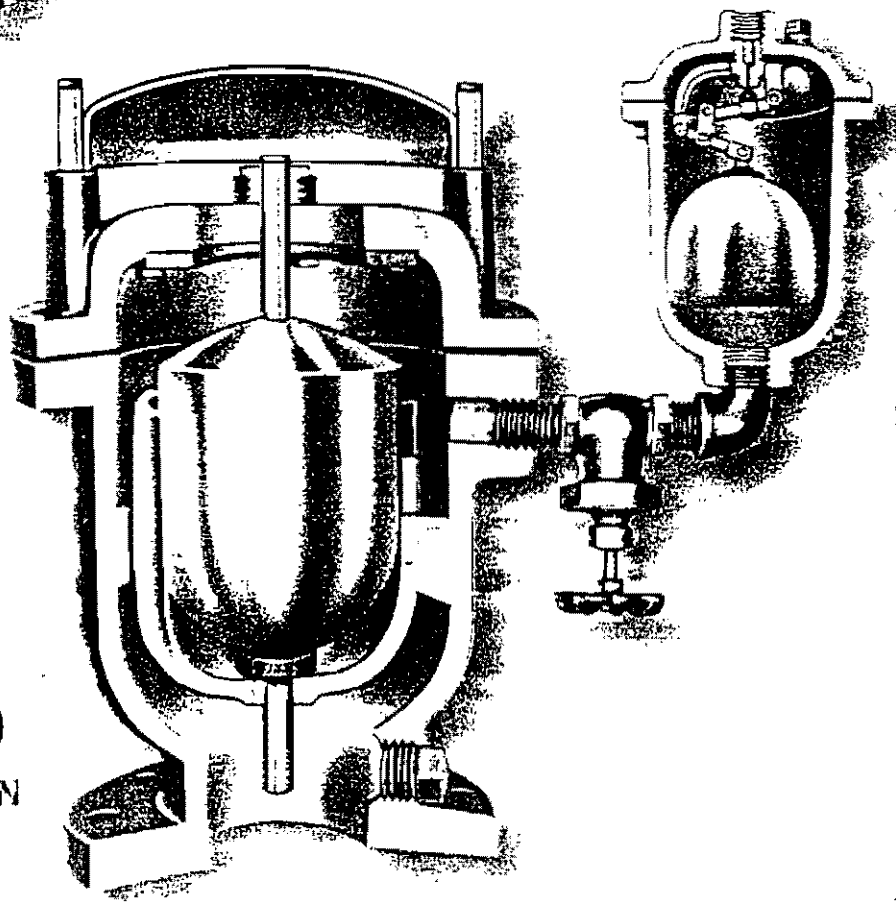
APCO

COMBINATION AIR VALVES



SERIES 140C

STANDARD COMBINATION
SINGLE BODY



MANUFACTURED TO AWWA C-512 STANDARDS

ISO FLANGE CONNECTIONS AVAILABLE

SERIES 1800

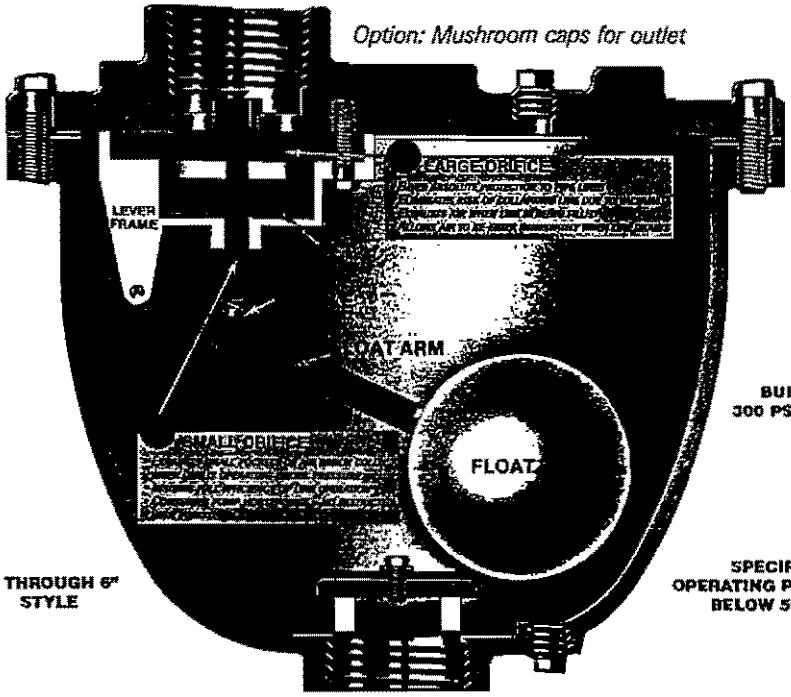
CUSTOM COMBINATION
DUPLEX BODY

AIR VALVES COMBINATION AIR VALVES

VALVE & PRIME CORPORATION
1420 S. WRIGHT BLVD. • SCHAUMBURG, IL 60193-4599
847-534-9000 • FAX:847-534-9007 • 800-323-6969

APCO COMBINATION AIR VALVES

SINGLE BODY *Double Orifice*



1" THROUGH 6" STYLE

BUILT FOR 300 PSI SERVICE

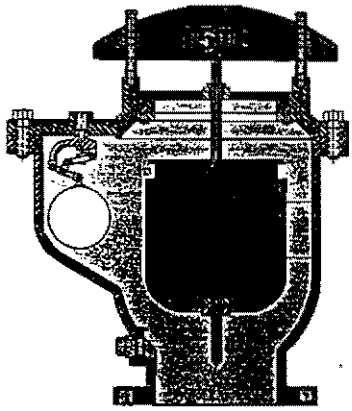
SPECIFY IF OPERATING PRESSURES BELOW 50 P.S.I.

MATERIALS USED IN BOTH STYLE COMBINATION AIR VALVES

Body, Cover, Lever Frame	Cast Iron
Float	Stainless Steel
Seat	Buna-N
Lever Frame (1" & 2" size)	Delrin
Leverage Mechanism (8" size)	Stainless Steel

ALL OTHER INTERNAL PARTS STAINLESS STEEL OR BONZE

8" STYLE



TO SIZE AIR VALVES FOR PIPELINE SERVICE USE APCO AIR VALVE COMPUTER *or* APSLIDE COMPUTER SOFTWARE

1" 143C	2" 145C	3" 147C	4" 149C	6" 150C	8" 151C
ILLUSTRATED ABOVE*	ILLUSTRATED ABOVE	ILLUSTRATED ABOVE	ILLUSTRATED ABOVE	ILLUSTRATED ABOVE	SEE ABOVE DRAWING
PHYSICAL DIMENSIONS · Height 10" · Width 7" · Length 11" · Weight 35 lbs.	PHYSICAL DIMENSIONS · Height 12 1/4" · Width 8" · Length 14" · Weight 76 lbs.	PHYSICAL DIMENSIONS · Height 15 1/2" · Width 10" · Length 16" · Weight 100 lbs.	PHYSICAL DIMENSIONS · Height 17 1/8" · Width 11" · Length 18" · Weight 170 lbs.	PHYSICAL DIMENSIONS · Height 27 1/4" · Width 13" · Length 18 3/8" · Weight 205 lbs.	PHYSICAL DIMENSIONS · Height 25 3/4" · Width 17 1/2" · Length 22 1/4" · Weight 300 lbs.
INLET / OUTLET 1" PIPE THREAD * EXCEPT POPPET	INLET / OUTLET 2" PIPE THREAD	INLET / OUTLET 3" PIPE THREAD 125 & 250 LB. FLANGES ALSO AVAILABLE HEIGHT FLANGED 16 1/2"	INLET / OUTLET 4" PIPE THREAD 125 & 250 LB. FLANGES ALSO AVAILABLE HEIGHT FLANGED 19"	INLET 125 & 250 LB. FLANGE OUTLET OPTIONS • PLAIN WITH HOOD • THREADED • FLANGED	INLET 125 & 250 LB. FLANGE OUTLET OPTIONS • PLAIN WITH HOOD (AS SHOWN) • FLANGED

SINGLE BODY SPECIFICATIONS

Combination Air Valve sizes 1" through 8", (single body, double orifice) allows large volumes of air to escape out the large orifice when filling a pipeline and closes when liquid enters the valve. When the valve is closed and pressurized, the small air release orifice will open to allow small pockets of air to escape automatically and independently of the large orifice.

The large orifice shall also allow large volumes of air to enter during pipeline drainage to break the vacuum. The body inlet must be baffled to protect the float from direct forces of rushing air and water to prevent premature valve shut-off.

The Buna-N seat must be fastened to the valve cover without distortion for drop tight shut-off. The floats shall be heavy stainless steel. The plug or float shall be center guided through hex bushings for positive shut-off.

Valve exterior to be painted with Red Oxide Primer Paint as accepted by the FDA for use in Potable Water.

All materials of construction shall be certified in writing to conform to A.S.T.M. specifications as follows:

Body & Cover	Cast iron	ASTM A126 GR.B
Float	Stainless steel	ASTM A240
Needle & seat	Buna-N	
Plug	Bronze	ASTM B124
Leverage frame	Delrin/Cast iron	ASTM D2133/ASTM A126 GR.B

Valve to be APCO Model (Engineer to Name) Combination Air Valve as manufactured by Valve & Primer Corporation, Schaumburg, Illinois, U.S.A.

THERE ARE BASICALLY TWO TYPES OF AIR VALVES:

TYPE 1. AIR/VACUUM VALVES with ① LARGE ORIFICE to vent large volumes of air for efficient filling and draining of pipelines. This protects against vacuum and water column separation or pipeline collapse.

TYPE 2. AIR RELEASE VALVES with ② SMALL ORIFICE for continuous venting of air pockets as they accumulate in a pressurized pipeline.

When the above types are combined, the result is a COMBINATION AIR VALVE.

The Combination Air Valve is available in a SINGLE BODY DOUBLE ORIFICE shown here, or in a DUPLEX arrangement (see Back Page).

The single body is most popular due to its smaller overall size and resulting space saving inside a valve vault. It is available in 1" to 8" sizes.

HOW IT WORKS: Sizes 1" through 6" incorporate a poppet (or plug) which rests freely inside the lever frame. The center stem of the poppet has a SMALL ORIFICE through it. When water enters the main valve body it raises the float and float arm which puts the needle, attached to the arm, in contact with the poppet stem while lifting the poppet to the shut-off position against the LARGE ORIFICE.

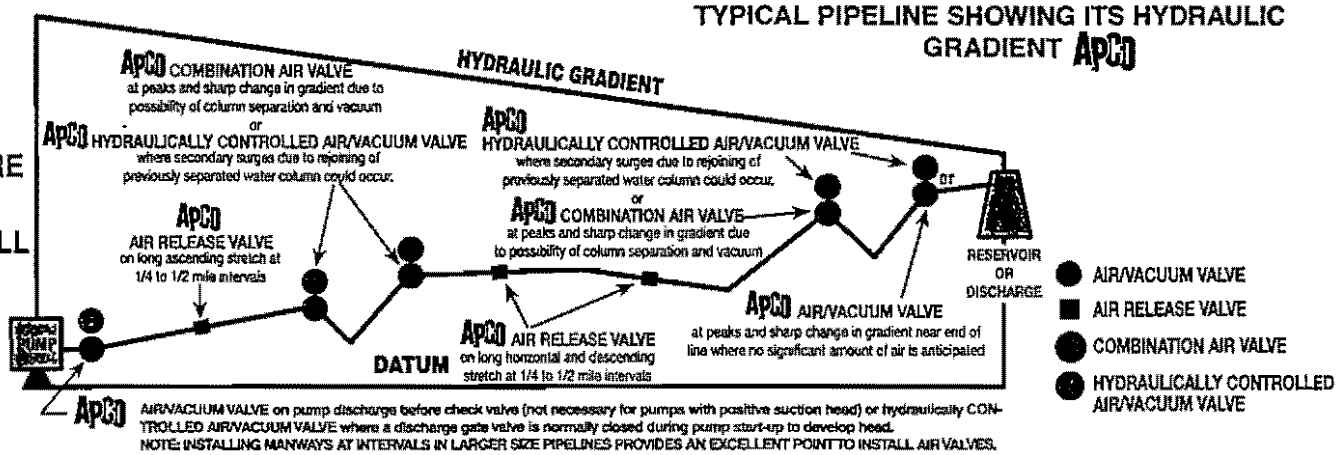
As air accumulates inside the main valve body the water is displaced. The float arm falls away from the poppet stem to expose the small orifice and the pocket of air is vented. Water re-enters the main valve body lifting the float arm back to the shut-off position and the cycle repeats as air accumulates. As long as the main valve body is under pressure, the poppet stays closed because the pressure differential across the large orifice is more than the poppet can overcome.

If, however, a negative pressure occurs inside the main valve body, the poppet will drop open to allow air in and prevent a vacuum from forming in the pipeline.

Size 8" functions in the same manner, but, instead of a poppet, a float is used for shutting off the large orifice and a separate internal float operated lever mechanism is incorporated with a small orifice for venting smaller pockets of air when the system is pressurized.

Every Combination Air Valve is hydrostatically seat and shell tested before it leaves our factory to insure quality performance in the field.

WHERE TO INSTALL

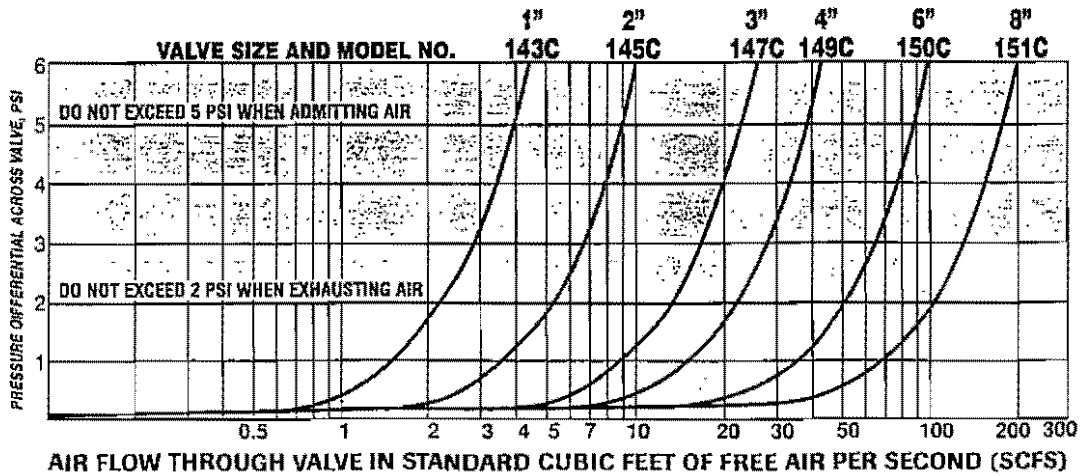


ORIFICE SIZES
for 300 psi working pressure

MODEL	① LARGE ORIFICE	② SMALL ORIFICE
143C	1"	5/64"
145C	2"	3/32"
147C	3"	3/32"
49C	4"	3/32"
150C	6"	1/8"
151C	8"	5/32"

DISCHARGE CAPACITIES FOR COMBINATION AIR VALVE

CURVES SHOWN ARE ACTUAL FLOW CAPACITIES AT 14.7 PSI BAROMETRIC PRESSURE AND 70° F TEMPERATURE BASE ON ACTUAL TEST. THESE FIGURES ARE NOT ONLY THE FLOW CAPACITIES ACROSS THE ORIFICE BUT FLOW ACROSS THE ENTIRE VALVE. IN THE TEST SET-UP, APPROACH VELOCITY TO THE VALVE IS NEGLIGIBLE THEREFORE ACTUAL CAPACITY EXCEEDS THE VALUES SHOWN ON CHART. TEST CONDUCTED BY: PHILLIP PETROLEUM COMPANY ENGINEERING DEPARTMENT - TEST DIVISION EDMOND PLANT OCTOBER 1, 1961.



XII. MISC.-FLANGE BOLT & GASKET SET, POLYWRAP, DETECTABLE TAPE, MEGALUGS, HYDRANT MARKERS, COPPER TUBING, DOUBLE DETECTOR CHECK VALVE, BRASS VALVE

COWTOWN GASKET CO.

B-Rite
The Right Gasket Works

B-Tite
Bolt Sets that Fit

Bull Strong
Tough Products for Tough Jobs

3320 Stuart Dr.
Ft. Worth, TX 76110
817-921-6501
817-921-2782 fax

BOLTING SPECIFICATIONS – PLAIN FINISH
Standard Bolt and Nut Sets, Capscrew Sets and Flange Paks contain Hex Head Machine Bolts and Hex Head Capscrews I/A/W ASTM A307 Gr. A. Their dimensional specifications are I/A/W ASTM A563 Gr. A. All Bolts, Screws and Nuts have National Coarse threads, C 1.2A fit.

BOLTING SPECIFICATIONS – STAINLESS STEEL
Bolt and Nut Sets contain Hex Head Machine Bolts I/A/W ASTM F593 Gr. 18-8. Their dimensional specifications are I/A/W ANSI/ASME B18.2.1. Finished Hex Pattern Nuts are I/A/W ASTM F594 Gr. 18-8. All Bolts and Nuts have National Coarse threads, C 1.2A fit.

BOLTING SPECIFICATIONS – B7
Alloy Stud Bolt and Heavy Hex Head Bolt material is I/A/W ASTM A193 Gr. B7. Threading is ASME B1.1 class 2A National Coarse threads for bolts up to 1 inch and 8 thread series for bolts above 1 inch. Nut material is I/A/W ASTM A194 Gr. 2H. Heavy Nuts I/A/W ASME B18.2.2 have C1.2B course series threads for nuts up to 1 inch and 8 thread series for nuts above 1 inch.

Standard Bolting Material provided will generally be of an import manufacturer. Domestic material available on request.

GASKET SPECIFICATIONS
Flange Gaskets dimensional requirements are I/A/W ANSI/ASME B16.21. For physical characteristics please reference the attachment.

STANDARD HARDWARE

POLYWRAP

(Polyethylene Encasement for Ductile Iron Pipe)

All polywrap supplied by Standard Hardware, Inc., will meet or exceed the following specifics:

AWWA C105

ASTM D1248-84

Thickness:	8 mil (tolerance +/- 10%)
Material:	Linear Low Density, Type I, Class C-Black, Grade E-1, Manufactured from 100% virgin resin. Colors & Clear = same specifications.
Tensile Strength:	1200 PSI (8.3 MP) minimum
Elongation:	300% minimum
Dielectric Strength:	(raw material) Volume resistivity ohm*cm= minimum
Dielectric Strength:	(finished film) 800V/mil (31.5V/um) thickness minimum

1500 ROYAL PARKWAY — EULESS, TX 76040-6726 — 817-354-1111

Detectable Underground Utility Marking Tape

Specifications, Test Data, Approvals and Color Code

I. SPECIFICATIONS

Consists of a minimum 5.0 mil (0.005") overall thickness, with no less than a 35 gauge (0.00035") solid aluminum foil core. The foil must be visible from BOTH sides. The layers shall be laminated together with the extrusion lamination process, not adhesives. Further, there shall be NO inks or printing extending to the edges of the tape. The adhesive will NOT contain any dilutants, pigments, or contaminants and is specially formulated to resist degradation by elements normally encountered in the soil. All printing shall be encased to avoid ink rub-off.

II. TEST DATA

PROPERTY	METHOD	VALUE
Thickness	ASTM D2103	5.0 mils
Tensile strength	ASTM D882	25 lbs /inch (5500 PSI)
Elongation	ASTM D882-88	<50% at break
Printability	ASTM D2578	>50 dynes/cm^2
Flexibility	ASTM D671-81	pliable hand
Inks	Mfg. specs.	heat set Mylex
Message repeat	Mfg. specs.	every 20 inches
Foil	Mfg. specs.	deadsoft/annealled
Top layer	Mfg. specs.	virgin PET
Bottom layer	Mfg. specs.	virgin LDPE
Adhesives	Mfg. specs.	>30%, solid 1.5#/R
Bond strength	Boiling H^{2}0 @ 100°C	5 hours w/0 peel
Colors	APWA Code	see below

III. APPROVALS

A. Department of Transportation, Materials Transportation Bureau, Office of Pipeline Safety. USAS code for pressure piping B31.8, paragraph 192.321 (e).

B. National Transportation Safety Board, Washington, DC, Special Study Prevention of Damage to Pipelines. Adopted June 7, 1974. Report NTSB-PSS-73-1.

C. American Petroleum Institute (API). Recommended practice for marking buried liquid petroleum pipelines--API RP 1109.

D. General Services Administration, Washington, DC, Public Buildings Service Guide Specification for Mechanical and Electrical Equipment--PBS 4-1501, Amendment 2, page 501-14, paragraph 18, subparagraph 18.1, clause 18.1.1.

E. Rural Electrification Authority (REA), U.S. Dept. of Agriculture, Washington, DC, National Electrical Safety Code for Underground Construction for remote and immediate hazards.

IV. COLOR CODE

Safety Red--Electric power, distribution and transmission and municipal electric systems.
High Visibility Safety Yellow--Gas and oil distribution and transmission, dangerous materials, product and steam.
Safety Alert Orange--Telephone and telegraph systems, police and fire communications and cable television.
Safety Precaution Blue--Water systems and slurry pipelines.
Safety Green--Sanitary and storm sewer systems.
Safety Brown--Force mains, reclaimed water lines and effluent re-use lines.
Alert Purple--Reclaimed non-potable water lines.

MagnaTec®

The standard detectable product used for location and early warning protection for underground lines.

- Multi-layer construction offers permanence of message, strength and locatability.
- No ink extends to the edge of the tape providing the strongest bond between layers to prevent delamination.
- Bold block letters include message and installation recommendations.
- Silver foil shows through on the front and the back for excellent dig-in visibility.

Use widest tape possible and bury as close to the surface as practical.

WATER UTILITY TAPE - MAGNATEC

STOCK

Item No.	Width x Length	Message	Color	Indv. Wt.	Pkg. Qty.	Pkg. Lbs.
3[illegible]	2" x 1000'	CAUTION WATER LINE BELOW	Blue/silver	5.0	6	30.5
31-022	3" x 1000'	CAUTION WATER LINE BELOW	Blue/silver	7.0	4	30.5
31-024	6" x 1000'	CAUTION WATER LINE BELOW	Blue/silver	14.0	2	30.5
W 31-016	3" x 1000'	CAUTION POTABLE WATER LINE BELOW	Blue/silver	7.0	4	30.5
31-052	2" x 1000'	CAUTION SEWER LINE BELOW	Green/silver	5.0	6	30.5
31-053	3" x 1000'	CAUTION SEWER LINE BELOW	Green/silver	7.0	4	30.5
31-055	6" x 1000'	CAUTION SEWER LINE BELOW	Green/silver	14.0	2	30.5
W 31-031	3" x 1000'	CAUTION STORM DRAIN BELOW	Green/silver	7.0	4	30.5
W 31-042	2" x 1000'	CAUTION FORCE MAIN BELOW	Green/silver	5.0	6	30.5
W 31-043	3" x 1000'	CAUTION FORCE MAIN BELOW	Green/silver	7.0	4	30.5
W 31-122	2" x 1000'	CAUTION FORCE MAIN BELOW	Tan/silver	5.0	6	30.5
W 31-123	3" x 1000'	CAUTION FORCE MAIN WATER	Tan/silver	7.0	4	30.5
W 31-099	2" x 1000'	CAUTION RECLAIMED WATER LINE BELOW	Purple/silver	5.0	6	30.5
31-100	3" x 1000'	CAUTION RECLAIMED WATER BELOW DO NOT DRINK	Purple/silver	7.0	4	30.5

GAS UTILITY TAPE - MAGNATEC

STOCK

Item No.	Width x Length	Message	Color	Indv. Wt.	Pkg. Qty.	Pkg. Lbs.
31-140	2" x 1000'	CAUTION GAS LINE BELOW	Yellow/silver	5.0	6	30.5
31-141	3" x 1000'	CAUTION GAS LINE BELOW	Yellow/silver	7.0	4	30.5
31-143	6" x 1000'	CAUTION GAS LINE BELOW	Yellow/silver	14.0	2	30.5
31-087	2" x 1000'	CAUTION OIL LINE BELOW	Orange/silver	5.0	6	30.5

ELECTRIC UTILITY TAPE - MAGNATEC

STOCK

Item No.	Width x Length	Message	Color	Indv. Wt.	Pkg. Qty.	Pkg. Lbs.
31-106	2" x 1000'	CAUTION ELECTRIC LINE BELOW	Red/silver	5.0	6	30.5
31-107	3" x 1000'	CAUTION ELECTRIC LINE BELOW	Red/silver	7.0	4	30.5
31-109	6" x 1000'	CAUTION ELECTRIC LINE BELOW	Red/silver	14.0	2	30.5

THE ORIGINAL

Series 2000PV

MECHANICAL JOINT RESTRAINT GLAND FOR USE WITH C-900 OR IPS OD PVC PIPE

The 2000PV mechanical joint restraint is the fastest and most economical method of restraining PVC pipe to mechanical joints. Now the need for costly concrete thrust blocks and corrodible steel tie rods is eliminated. It can be used in straight alignment or at the pre-set deflection recommended for the mechanical joint.

The 2000PV was the first PVC joint restraint to be tested to UNI-B-13, Underwriters Laboratories, and Factory Mutual.

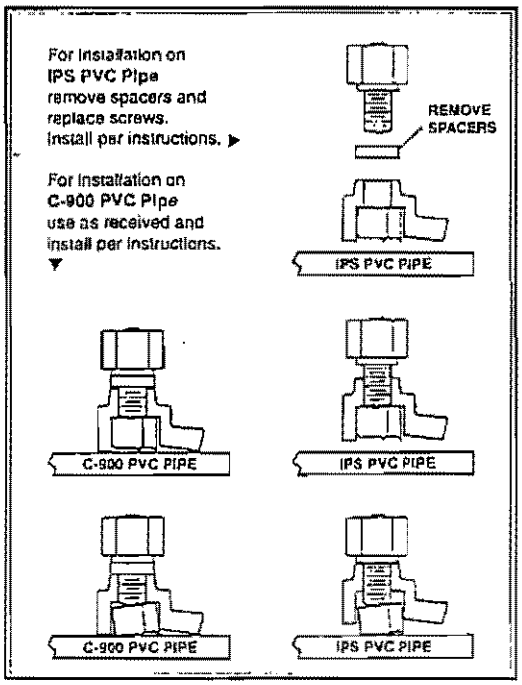
Meets all of the requirements of UNI-B-13 "Recommended Standard Performance Specification for Joint Restraint Devices for use with Polyvinyl Chloride (PVC) pipe."

UL-listed in the four through twelve inch sizes for joining UL-listed ductile iron fittings to UL-listed, Class 150 PVC pressure pipe. The maximum allowable joint deflection is five degrees.

Factory Mutual approved for use on DR18 PVC pipe in four through twelve inch sizes.

Approved

The fastest and most economical method of restraining PVC pipe to mechanical joints. Eliminates costly concrete thrust blocks and corrodible steel tie rods.



2000PV mechanical joint restraints can be used on both C-900 and IPS OD PVC pipe. A spacer is provided under each torque-limiting screw to accommodate the different diameters.

The pressure rating for the 2000PV joint restraint is the standardized pressure rating of the PVC pipe on which it is used. 2000PV joint restraints can be used on both C-900 and IPS OD PVC pipe, 3" through 12".

STANDARDIZED PRESSURE RATINGS FOR ORDINARY WATER WORKS WITH TRANSIENT SURGES ONLY. RATINGS ARE FOR PVC PIPE AND 2000 PV.

ANSI/AWWA C900 CI OD		ASTMD2241 IPS OD	
DR 14	200 PSI	SDR 17	250 PSI
DR 18	150 PSI	SDR 21	200 PSI
DR 25	100 PSI	SDR 26	160 PSI

RATINGS FOR PEAK PRESSURES USED IN SEWAGE FORCE MAINS AND OTHER INSTALLATIONS DESIGNED FOR CYCLIC SURGES OF 1-MILLION CYCLES. RATINGS ARE FOR PVC PIPE AND 2000 PV.

ANSI/AWWA C900 CI OD		ASTM D2241 IPS OD	
DR 14	200 PSI	SDR 17	200 PSI
DR 18	150 PSI	SDR 21	160 PSI
DR 25	100 PSI	SDR 26	128 PSI

LARGE DIAMETER

Series 2000PV

MECHANICAL JOINT RESTRAINT GLAND
FOR USE WITH C-905 PVC PIPE

The Large Diameter 2000PV is a mechanical joint restraint for use with C-905 PVC pipe with nominal size diameters from 14 through 24 inches.

NOMINAL PIPE SIZE	SERIES NUMBER	PVC PIPE CLASS	PRESSURE RATING	SAFETY FACTOR
14	2014PV	DR25	165	Full Pipe Capacity
	2014PV	DR18	235	Full Pipe Capacity
16	2016PV	DR25	165	Full Pipe Capacity
	2016PV	DR18	235	Full Pipe Capacity
18	2018PV	DR25	165	Full Pipe Capacity
	2018PV	DR18	235	2.5 : 1
20	2020PV	DR25	165	Full Pipe Capacity
	2020PV	DR18	235	2.5 : 1
24	2024PV	DR25	165	Full Pipe Capacity
	2024PV	DR18	235	2.5 : 1

Since the large diameter 2000PV is used with only one pipe diameter, there are no spacers as used with the 4"-12" 2000PV series.

The large diameter 2000PV restraints have been tested to pressures exceeding the minimum quick burst pressure requirements for the pipe shown in the table, and have the same pressure ratings as the pipe.

APPLICATION VERSATILITY

Other EBAA Products for Use on PVC Pipe

Series 2000SV

This series is a **split restraint** system for the mechanical joint. This split restraint allows for the repair of existing valves, fittings, and hydrants where it is advisable to restrain mechanical joints on existing PVC pipe systems. The installation is simple and it is available in the 4" through 12" sizes.

Series 2100

The Megaflange® **flange adapter** is a field-adaptable, restrained flanging system. The Megaflange adapter has a restraint ring and a gasket ring to give the maximum amount of flexibility during and after installation. It is available for use on PVC pipe in the 3" through 24" sizes. It can also be used on ductile iron in all sizes and on steel in some sizes.

Series 2800

This series is a **solid ring harness** for use on C-905 PVC pipe bells. It is composed of a wedge action restraint ring that is assembled on the spigot, and a bell ring that is positioned behind the pipe bell. All of the components are made of ductile iron. Available in 14" through 24" sizes.

Series 1600

This series is a **split, serrated restraint for C-900 PVC pipe bells.** It is composed of a serrated restraint ring that is assembled on the spigot and a split bell ring that is assembled behind the bell. The rings and tie bolts are made of ductile iron. Available in 4" through 12" sizes.

Series 2500

This series is a **split, serrated restraint for C-907 PVC fitting bells.** The assembly and components are similar to the 1600 Series. Available in 4", 6" and 8" sizes.

EBAA-Seal™ Gasket

This is an **improved mechanical joint gasket** designed to combine the ease of assembly of the mechanical joint with the sealing capabilities of the push-on joint. The EBAA-Seal gasket can be split and used with the 2000SV to repair existing mechanical joint problems. Available in 4" through 48" sizes.

2000 PV JOINT RESTRAINT FOR PVC PIPE

Sample Specification

Mechanical joint restraint shall be incorporated into the design of the follower gland. The restraint mechanism shall consist of a plurality of individually-actuated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536-80.

The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of restraining devices.

The restraining glands shall have a pressure rating equal to that of the pipe on which it is used. The restraining glands shall have been tested to UNI-B-13-92, be listed by Underwriters Laboratories, and be approved by Factory Mutual. The restraint shall be the EBAA Iron Series 2000PV or approved equal.

Listings and Approvals

Sizes 4" through 12" are listed by Underwriters Laboratories, Inc., category UJKF "Fittings, Retainer Type," with a deflection angle of five degrees when used on UL-listed, Class 150 PVC pressure pipe and a UL-listed appurtenance. The listing number is EX2836. Sizes 4" through 12" are approved by Factory Mutual for use on approved DR18 PVC pipe and mechanical joint appurtenances. The 2000PV restraint exceeds all requirements of UNI-B-13-92.

Patent Information

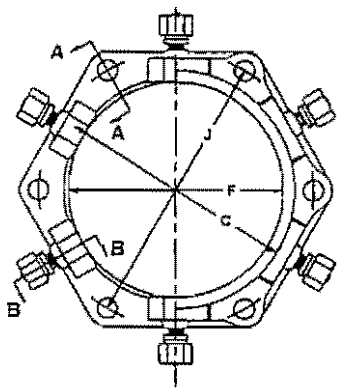
The products presented herein are covered by one or more of the following patents: 4586112, 4627774, 4896903, 5071175.

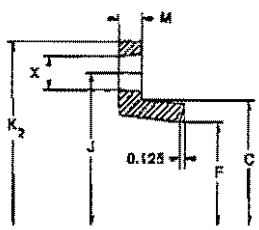
Special Notes

For test pressures above the rated pressures, consult the engineering department of EBAA Iron, Inc. for recommendations.

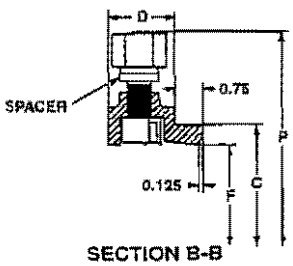
Dimensional Data

SERIES	C	D	F	J	M	X	NO OF WEDGES	NO OF BOLTS	P	P WITH NUTS TWISTED OFF	K_2	PIPE SIZE	SHIPPING WEIGHT	PVC PIPE OD CIOD AWWA C900	PVC PIPE OD IPS ASTM D2241 D1785
2003PV	4.84	1.55	3.60	6.19	0.50	3/4	4	4	9.8	8.6	7.69	3	7.0	—	3.5
2004PV	5.92	1.68	4.90	7.50	0.50	7/8	4	4	10.5	9.5	9.13	4	8.8	4.8	4.5
2006PV	8.02	1.68	7.00	9.50	0.50	7/8	6	6	13.0	12.1	11.13	6	12.1	6.9	6.625
2008PV	10.17	1.68	9.15	11.75	0.62	7/8	6	6	14.5	13.6	13.38	8	16.3	9.05	8.625
2010PV	12.22	2.10	11.20	14.00	0.62	7/8	8	8	17.0	16.0	15.63	10	26.0	11.1	10.75
2012PV	14.32	2.10	13.30	16.25	0.75	7/8	8	8	19.0	18.1	17.88	12	31.4	13.2	12.75
2014PV	16.40	2.25	15.49	18.75	0.875	7/8	10	10	21.7	20.85	20.38	14	47.6	15.3	—
2016PV	18.50	2.25	17.58	21.00	0.875	7/8	12	12	23.8	22.95	22.63	16	52.8	17.4	—
2018PV	20.60	2.25	19.68	23.25	1.125	7/8	12	12	25.9	25.05	24.88	18	61.8	19.5	—
2020PV	22.70	2.25	21.79	25.50	1.250	7/8	14	14	28.0	27.15	27.13	20	70.9	21.6	—
2024PV	26.90	2.75	25.99	30.00	1.420	7/8	16	16	32.3	31.45	31.63	24	92.9	25.8	—
2030PV	CALL FOR AVAILABILITY											30		32.0	—
2036PV	CALL FOR AVAILABILITY											36		36.3	—





SECTION A-A

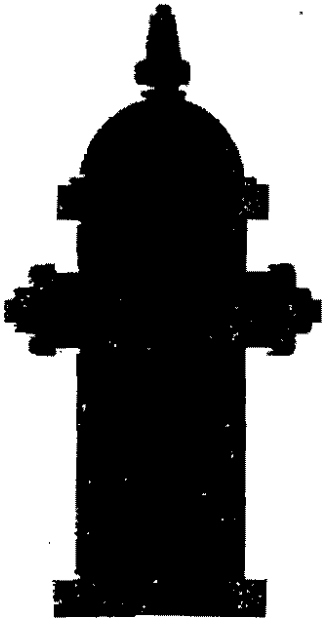


SECTION B-B

EBAA IRON™

EBAA IRON SALES, INC.

P.O. BOX 857 EASTLAND, TEXAS 76448 USA
817 / 629 1731 800 / 435 1716 FAX 817 / 629 8931

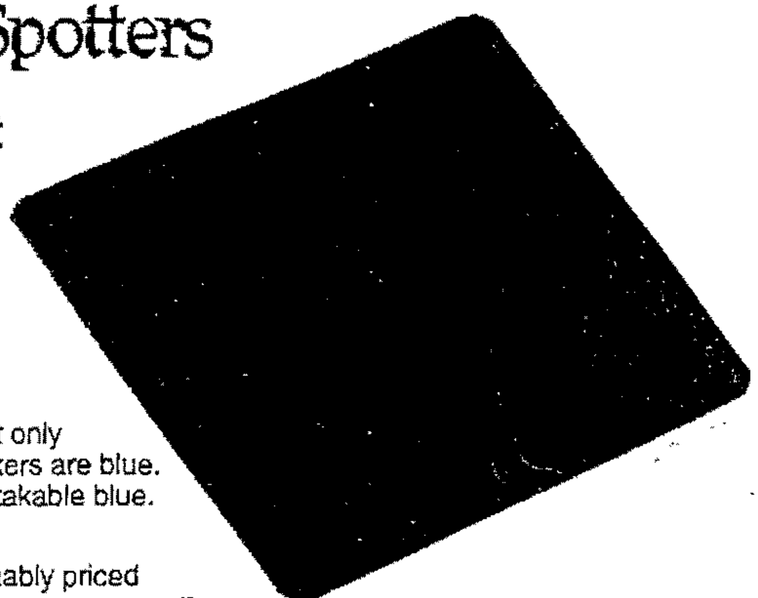


When seconds count, count on

Stimsonite® FIRE-LITE®

Hydrant Spotters

Instantly spot hydrants from as far as 1000 feet!



The Fire-Lite Hydrant Spotter pavement marker helps fire departments immediately locate their city's fire hydrants—saving crucial time on every alarm response. Placed on the roadway directly across from each hydrant, on either the center line or the right hand lane line, the brilliant blue reflective marker signals hydrant location from up to 1000 feet away.

The raised marker is the same type that your state highway department approves for traffic guidance. But only Fire-Lite markers are blue. Bright, unmistakable blue.

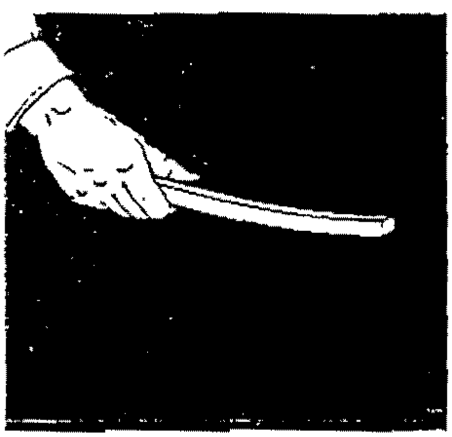
Inexpensive

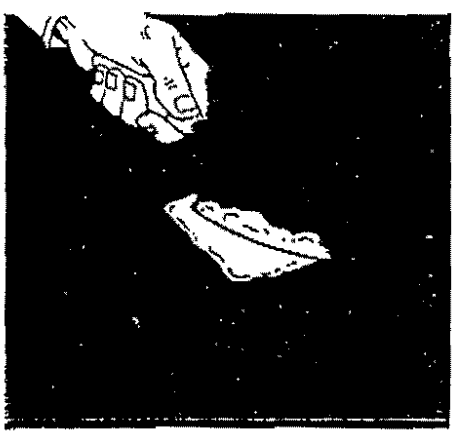
These reasonably priced markers offer greater cost-effectiveness than other hydrant marking systems. Fire department personnel can install them when not busy with other duties.

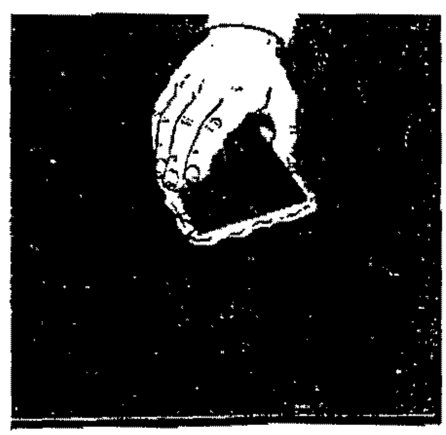
Easy to install

Each Fire-Lite takes only a couple of minutes to install using Stimsonite's high strength adhesives. Pressure-sensitive adhesive pads are also available.

Spotlight your hydrants with Stimsonite Fire-Lite Hydrant Spotters. For information or a quote, contact your Fire-Lite distributor. Or call or write Stimsonite today.







Distributed by:

STIMSONITE

Stimsonite Corporation
7542 N. Natchez Ave., Niles, IL 60648-3804
(708) 647-7717 FAX (708) 647-1205

Printed in U.S.A. [illegible]

C. Optical Testing Procedure

A random lot of retroreflectors shall be tested. Specific intensity shall be measured at 30.5 m (100 feet) test distance, spacing between source center and receptor center shall be 5.33 cm (2.1 in), receptor diameter and source diameter shall each be 2.54 cm (1.0 in). Other test distances 15.2 m (50 feet) and above may be used provided that the angular aperture requirements are met. (See ASTM E809, Measuring Photometric Characteristics of Retroreflectors).

3. *COLOR*

Color shall conform to the color requirements of ASTM D4280. Test method is provided in ASTM 4280 if required.

PHYSICAL PROPERTIES

1. *FLEXURAL STRENGTH REQUIREMENTS*

Markers conditioned to 23°+/-2°C (73.4°-/+3.6°F) shall support a load of 909 kg (2000 lbs.) as applied in the following manner.

A random sample of three markers shall be selected for test purposes.

In accordance with ASTM D4280, center the marker base down over the open end of a hollow metal cylinder 2.5 cm (1 in.) high, 7.6 cm (3 in.) I.D., 8.9 cm (3.5 in.) O.D. Apply a load to the top of the marker through a 2.5 cm (1 in.) diameter by 2.5 cm (1 in.) high metal plug centered on the top of the marker. Rate of loading shall be 0.5 cm (0.2 in.) per minute.

Failure shall constitute either breakage or significant deformation of the marker at any load of less than 909 kg (2000 lbs.).

2. *RESISTANCE TO LENS CRACKING*

(Note: On two color units, the red lens may not be glass covered and if so should not be subjected to impact test.)

A. Sampling

A random sample of markers to provide 10 lenses for each test (20 total) shall be selected from each lot.

B. Impact Testing

Condition the markers in a convection oven at 54°C (130°F) for one hour. Set the marker on a steel fixture designed to hold the reflecting face horizontal and set the fixture in a solid surface such as a concrete floor. While at the elevated temperature, impact the reflective face by allowing a 190 gm (0.42 lb.) dart fitted with a 0.64 cm (0.25 in.) radius spherical head to drop 45.7 cm. (18 in.) perpendicularly onto the center of the reflective surface. Cracks in the impact area shall be generally concentric in appearance. There shall be no more than two radial cracks longer than 0.64 cm (0.25 in.). There shall be no radial cracks extending to the edge of the glass.

C. Temperature Cycling

Subject samples to 3 cycles of 60°C (140°F) for 4 hours followed by 7°C (20°F) for 4 hours. There shall be no cracking or delamination following temperature cycling.

D. Tolerances

In either the impact or temperature cycling test, if 90% (9 lenses) of the test samples meet the above requirements, the lot shall be acceptable. Failure of 3 lenses of the sample shall be cause for rejection of the lot. Failure of 2 lenses shall necessitate a resample of 10 additional lenses. Failure of more than 1 lens of the resample shall be cause for rejection of the lot.

3. *BOND STRENGTH TEST*

Sand blast end of 5.1 cm (2 in.) diameter by 5.7 cm (2-1/4 in.) long steel test plugs with a threaded hole in the other end. Condition test plugs, pavement markers, and specified adhesive (Stimsonite Type 88 Epoxy) at 23°+/-2°C (73.4°-/+3.6°F) for at least 4 hours before testing. Mix the specified adhesive until the mixture shows no streaks. Place adhesive on the center of the bottom surface of the marker and spread a layer of adhesive on the sandblasted surface of the test plug. Press plug firmly in the center of the marker with a twisting motion. With a squared end tool remove any adhesive which extrudes from under the plug. After 24 hours cure at 23°+/- 2°C (73.4°+/- 3.6°F) measure bond strength using a tensile testing machine adjusted to travel at 0.5 cm (0.2 in.) per minute. Test fixture shall be designed to provide uniform load distribution. Bond strength less than 35.1 kg /cm^2 (500 psi) shall be considered a failure.

March, 1994 Printed in U.S.A.
(Supersedes January, 1992)

SPECIFICATIONS FOR ABRASION RESISTANT PRISMATIC RETROREFLECTIVE PAVEMENT MARKER

GENERAL DESCRIPTION

Markers shall consist of an acrylic plastic shell filled with a tightly adherent potting compound. The shell shall contain one or two glass covered prismatic retroreflective faces as required to reflect incident light from a single or opposite directions.

DETAILED SPECIFICATIONS

1. *DESIGN AND FABRICATION*

A. *Dimensional Details*

Overall Dimensions	10. 16 cm x 10. 16 cm x1.78 cm (4 in. x 4 in. x 0. 70 in.)
Slope of Reflecting Face	30° to base
Area of Each Reflecting Surface	21.0 sq. cm (3.25 sq. in.)

B. *Material*

The shell shall be molded of methyl methacrylate conforming to ASTM D788 Grade 8.

Filler shall be a potting compound selected for strength, resilience, and adhesion adequate to pass physical requirements as outlined below.

C. *Surface*

Thin untempered glass shall be bonded to the prismatic retroreflective faces to provide an extremely hard durable abrasion resistant surface. The area covered by the glass shall not be less than 19.35 sq. cm (3.00 sq. in.). The outer surface of the shell shall be smooth except for purposes of identification.

The base of the marker shall be substantially free from gloss and substances that may reduce its bond to adhesive.

OPTICAL REQUIREMENTS

1. *DEFINITIONS*

Horizontal entrance angle shall mean the angle in the horizontal plane between the direction of incident light and the normal to the leading edge of the marker.

Observation angle shall mean the angle at the reflector between the illumination axis and the observation axis.

Coefficient of Luminous Intensity (CIL) shall mean the ratio of the luminous intensity of the retroreflector in the direction of observation to the illuminance at the retroreflector on a plane perpendicular to the direction of the incident light. For markers, CIL is expressed in millicandelas per incident lux (mcd/lx). The equivalent English term is Specific Intensity (SI) expressed in candles per foot candle (cd/ft c).

2. *OPTICAL PERFORMANCE*

A. Coefficient of Luminous Intensity (Specific Intensity)

For each lot consisting of 10,000 markers or less, select 20 markers at random for coefficient of luminous intensity check. Photometer in accordance with procedure 2C. Coefficient of luminous intensity of each retroreflecting surface shall be not less than shown in Table 1 when the incident light is parallel to the base of the markers. Failure of more than 10% of the retroreflecting faces shall be cause for rejection of the lot.

TABLE 1 COEFFICIENT OF LUMINOUS INTENSITY (SPECIFIC INTENSITY) REQUIREMENTS

Observation Angle (degrees)	Horizontal Entrance Angle (degrees)	Coefficient of Luminous Intensity mcd/lux					Specific Intensity cd/ft				
		White	Yellow	Red	Green	Blue	White	Yellow	Red	Green	Blue
0.2	0	279	167	70	93	23	3.0	1.8	0.75	1.0	0.28
0.2	20	112	67	28	37	10	1.2	0.7	0.3	0.4	0.11

B. Abrasion Resistance

Select at random four retroreflective faces previously passing the specific intensity requirements. Place on each retroreflective face a 2.5 +/- 0.1 cm (1.0 +/- 0.2 in.) diameter pad of No. 3 coarse steel wool conforming to Federal Specification FF-W-1825A. Apply a load of 22.7 +/- 0.2 kg (50 +/- 0.5 lbs.) and rub the entire surface 100 times. Photometer in accordance with procedure 2C. Failure shall constitute loss in reflex of greater than 25% of original value. The failure of more than one retroreflective face shall be cause for rejection of the lot. (Note: On two color units the red lens may not be covered with glass and if so should not be abraded.)

Continued . . .

MUELLER BRASS CO. PORT HURON, MICHIGAN 48060

Date _____

Customer _____ Contractor _____

Street No. _____ Address _____

City & State _____ Contract No. _____

Order No. _____ Job Description _____

Attention _____ Location _____

PRODUCT SPECIFICATIONS
CERTIFICATION OF CONFORMANCE

Mueller Brass products are manufactured in conformance to the latest revisions of the following recognized industry standards.

☐ WROT COPPER AND COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS — To ANSI B16.22.

☐ CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS — To ANSI B16.18.

☐ CAST COPPER ALLOY FITTINGS FOR FLARED COPPER TUBES — To ANSI B16.26.

☐ STREAMLINE COPPER WATER TUBE — TYPES K, L & M — To ASTM B88 and WWT-799.

☐ REFRIGERATION FLARE-TYPE FITTINGS — To SAEJ513, and Military Standards MS-16993, MS-35867 thru MS-35873 inclusive, MS-35919 and MS-35926.

☐ STREAMLINE COPPER REFRIGERATION SERVICE TUBE — To ASTM B280, and WWT-775.

☐ STREAMLINE NITROGENIZED ACR HARD DRAWN COPPER TUBE — To ASTM B88 - Type L, in accordance with ASTM B280.

☐ OXYGEN SERVICE TUBE — To ASTM B88, Types K and L — hard drawn lengths only — in accordance to CDA cleanliness specifications and NFPA 56F, Seamless Copper Tube cleaned for Oxygen Gas Service.

☐ WROT COPPER AND COPPER ALLOY SOLDER JOINT DRAINAGE FITTINGS - DWV — To ANSI B16.29.

☐ CAST COPPER ALLOY SOLDER JOINT DRAINAGE FITTINGS - DWV — To ANSI B16.23.

☐ STREAMLINE COPPER DRAINAGE TUBE - DWV — To ASTM B306.

☐ COPPER PIPE — To ASTM B42.

☐ RED BRASS PIPE — To ASTM B43 — Can be supplied in hard temper.

Yours truly,
MUELLER BRASS CO.

By _____

Series 007 ½" - 2", 007DCDA 2"

Double check valve assemblies

Backflow preventers designed to protect potable water supplies in accordance with national plumbing codes for non-health hazard cross connections and continuous pressure applications.

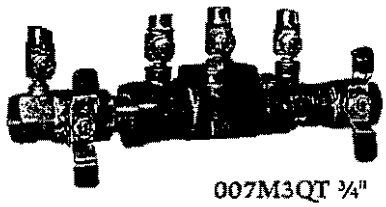
Provides protection against back siphonage and backpressure backflow.

Specifications

- All sizes supplied with resilient seated shutoffs
- Sizes: ½" - 1" (15-25 mm) have tee handle shutoffs. 1¼" - 2" (32-50 mm) have lever handle shutoffs.
- For supply pressures up to 175 psi (12.1 bars).
- Water temperature: sizes ½" - 2" (13-50 mm) from 33°F to 180°F (.55°C to 82°C).

Flow Charts see page 37, 38.

Features



007M3QT ¾"

- Line sized construction for reduced fouling
- Replaceable seats and seat discs
- No screws in the waterway for reliable operation
- Captured springs for safety
- Top entry, single cover for access ease
- Top mounted test cocks to simplify testing

For additional information, request ES-007.
For WattsBox Enclosures, request ES-WB and ES-WB-T.

Options *add Suffix:*

PC - with internal polymer coating

S - with bronze strainer

LF - without shutoff valves

LH - with locking handle ball valves (open position)

SH - with stainless steel ball valve handles

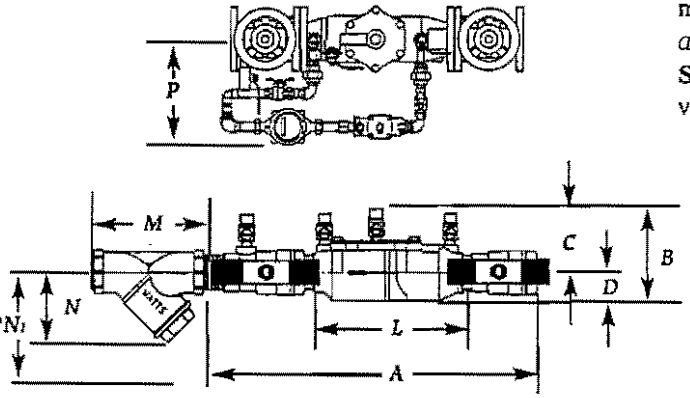
U - union connections

HC - with fire hydrant connections (female hose swivel x male NST)

add Prefix:

SS - with 316 stainless steel backflow preventer and ball valve shutoffs.

Dimensions/Wgts.



STRAINER DIMENSIONS

Size (DN) in.	mm	M in.	mm	N in.	mm	*N1 in.	mm
½	15	2¾	70	2¼	57	10	254
¾	20	3 3/16	81	2¾	70	10	254
1	25	3¾	95	3	76	12	305
1¼	32	4 7/16	113	3½	89	20	508
1½	40	4⅞	124	4	102	22¾	578
2	50	5 5/16	151	5	127	28	711

**Dimensions required for screen removal.*

Model	Order No§	Size (DN) in.	mm	A in.	mm	B in.	mm	C in.	mm	D in.	mm	P		Weight lbs.	kg.
007QT	62131	½	15	10	250	3⅛	79	2⅜	60	¾	19	–	–	4½	2.0
007M3QT	62020	¾	20	11⅛	282	4	100	3⅛	79	⅞	22	–	–	5	2.3
007M1QT	62306	1	25	13¼	337	5⅛	130	3⅞	98	1¼	32	–	–	12	5.4
007M2QT	62681	1¼	32	16⅜	416	5	127	3½	89	1½	38	–	–	23	10.4
007M2QT	62436	1½	40	16¾	425	5	127	3½	89	1½	38	–	–	27	12.2
007M1QT	62427	2	50	19½	495	6¼	159	3¾	95	2½	64	–	–	25¾	11.7
007QT-S	62132	½	15	10	250	6	150	2⅜	60	¾	19	–	–	5½	2.5
007M3QT-S	62021	¾	20	11⅛	282	6⅛	156	3⅛	79	⅞	22	–	–	6¾	3.1
007M1QT-S	62308	1	25	13¼	337	7¾	197	3⅞	98	1¼	32	–	–	14	6.5
007M2QT-S	62450	1¼	32	16⅜	416	7	178	3½	89	1½	38	–	–	26	11.7
007M2QT-S	62616	1½	40	16¾	425	7	178	3½	89	1½	38	–	–	35½	16.0
007 QT-S	62428	2	50	19½	495	8¾	222	3¾	95	2½	64	–	–	33½	15.2
*0C JAOSY‡	62665	2	50	35⅛	892	11	279	12¼	311	2¼	57	12¼	311	97	44

§- Contact your local Watts Agent or call Customer Service (978) 689-6066 for other models and order numbers or refer to PL-WR. For Union Models refer to ES-007. ‡ - models come with CFM/GPM meters. For GPM codes see price list.
**B dimension is from the lowest part of the valve (the unmachined relief port) to the highest port of the gate/ball valve shutoff.*

Plumbing & Heating Valves

Hammond plumbing and heating valves are designed for the end user. To the wholesalers, engineers and contractors this means you are buying, specifying and installing valves that have become the mainstay in the plumbing-heating-cooling industry. Every valve made by Hammond sees service before it goes into the job because it passes rigorous quality checks before it leaves the factory.

GATE VALVES

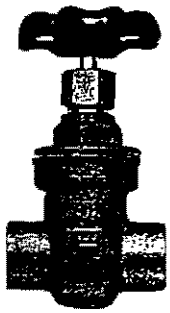
606

MADE IN THE USA

Features
- 125 WSP - 200 WOG (to 353°F) Rating
- Bronze Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/4" thru 3"

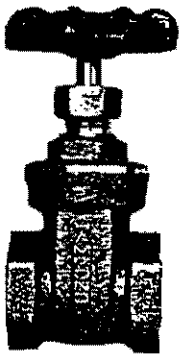
607

MADE IN THE USA



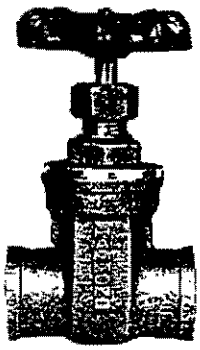
Features
- 125 WSP - 200 WOG (to 353°F) Rating
- Bronze Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 3/8" thru 3"

667



Features
- 200 WOG Rating
- Brass Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/4" thru 4"

668



Features
- 200 WOG Rating
- Brass Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 3/8" thru 3"

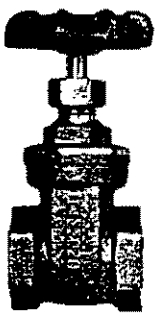
667-20

Features
- 200 WOG Rating
- Drainable Brass Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/2" thru 1"

668-20

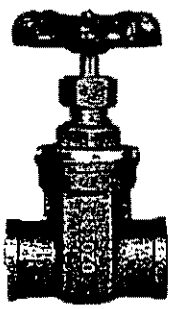
Features
- 200 WOG Rating
- Drainable Brass Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/2" thru 1"

567



Features
- 150 WOG Rating
- Brass Body
- Threaded Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/4" thru 4"

568



Features
- 150 WOG Rating
- Brass Body
- Solder Ends
- Threaded Bonnet
- Non-Rising Stem
- Solid Wedge
- Integral Seat
- Iron Handwheel
- Sizes 1/2" thru 2"

Addison!

BID NUMBER 02-30

SPECIFICATIONS, CONTRACT DOCUMENTS AND PLANS
FOR THE CONSTRUCTION OF

MARSH LANE WATER LINE

PRELIMINARY

3/02
Reviewed & comments returned on 3/5/02

PREPARED BY

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
DALLAS, TEXAS

FEBRUARY, 2002

Addison!

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DALLAS, TEXAS

FEBRUARY, 2002

SPECIFICATIONS, CONTRACT DOCUMENTS AND PLANS FOR THE CONSTRUCTION OF

MARSH LANE WATER LINE

FOR

TOWN OF ADDISON, TEXAS

Prepared for:

Town of Addison
P. O. Box 9010
Addison, Texas 75001

Prepared by:

Birkhoff, Hendricks & Conway, L.L.P.
8333 Douglas Avenue, #820
Dallas, Texas 75225

January, 2002

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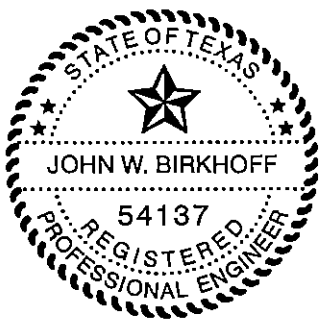

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION AND PERMIT PURPOSES.

John W Birkhoff

Date: 2/14/02

SECTION AB

ADVERTISEMENT FOR BIDS

SECTION AB

ADVERTISEMENT FOR BIDS

1. Sealed bids addressed to the Town of Addison, Texas, for **Marsh Lane Water Line** in the Town of Addison, Texas, hereinafter called "City" in accordance with specifications and contract documents prepared by Birkhoff, Hendricks & Conway, L.L.P. will be received at the office of Bryan Langley, Assistant Finance Director, Finance Building, 5350 Belt Line Road, Addison, Texas until **2:00 p.m. on** _____, **2002**. Bids received by the appointed time will be opened and read aloud. Any bids received after closing time will be returned unopened.

2. The Contractor shall identify his bid on the outside of the envelope by writing the words MARSH LANE WATER LINE, Bid No. 02-30.

3. Bids shall be accompanied by a cashier's check or certified check upon a national or state bank in an amount not less than five percent (5%) of the total maximum bid price payable without recourse to the Town of Addison, or a bid bond in the same amount from a reliable surety company licensed by the State of Texas to act as a Surety and be listed on the current U.S. Treasury Listing of Approved Sureties, or a Binder of Insurance executed by a surety company licensed by the State of Texas to act as a surety or its authorized agent as a guarantee that the bidder will enter into a contract and execute a Performance Bond within ten (10) days after notice of award of contract to him.

4. Plans, specifications and bidding documents may be secured from Bryan Langley, Assistant Finance Director, Finance Building, 5350 Belt Line Road, Addison, Texas. No fee or deposit for documents.

5. The right is reserved by the Mayor and the City Council as the interests of the City may require to reject any or all bids and to waive any informality in bids received.

6. The Bidder (Proposer) must supply all the information required by the Proposal Form.

7. A Performance Bond, Labor and Material Payment Bond, and Maintenance Bond will be required by the Owner; each Bond shall be in the amount of 100% of the total contract amount. Bonds shall be issued by a surety company licensed by the State of Texas to act as a Surety and be listed on the current U.S. Treasury Listing of Approved Sureties.

8. For information on bidding or to secure bid documents, call Bryan Langley (972) 450-7090. For information on the work to be performed, call Steve Chutchian, Town of Addison (972) 450-2886 or John Birkhoff of Birkhoff, Hendricks & Conway, L.L.P. (214) 361-7900.

9. The project consists of furnishing and installing perimeter fencing in accordance with the specifications.

10. Estimated quantities for major items include the following:

Description	Quantity
8" Water Line	2,400 L.F.
10" Reinforced Concrete Pavement Replacement	5,000 S.Y.

11. No Pre-Bid Conference will be held.

TOWN OF ADDISON, TEXAS

SECTION IB

INSTRUCTIONS TO BIDDERS

SECTION IB

INSTRUCTIONS TO BIDDERS

A. PROJECT: Marsh Lane Water Line in the Town of Addison.

B. PROJECT DESCRIPTION: This project consists of furnishing and installing 2,400 linear feet of 8-inch waterline in accordance with the specifications.

C. PROPOSALS: Proposals must be in accordance with these instructions in order to receive consideration.

D. DOCUMENTS: Documents include the Bidding Requirements, General Provisions, Special provisions, Technical Specifications, Drawings plus Addenda which may be issued by the Consultant during the bidding period. Bidding Documents may be viewed and/or obtained under the terms and conditions set forth in the Advertisement for Bids, Section AB of this Project Manual.

E. EXAMINATION OF DOCUMENTS AND SITE: Bidders shall carefully examine the Bidding Documents and the construction site to obtain first-hand knowledge of the scope and the conditions of the Work. Each Contractor, Subcontractor and Sub-subcontractor, by submitting a proposal to perform any portion of the Work, represents and warrants that he has examined the Drawings, Specifications (Project Manual) and the site of the work, and from his own investigation has satisfied himself as to the scope, accessibility, nature and location of the Work; the character of the equipment and other facilities needed of the performance of the Work; the character and extent of other work to be performed; the local conditions; labor availability, practices and jurisdictions and other circumstances that may affect the performance of the Work. No additional compensation will be allowed by the Owner for the failure of such Contractor, Subcontractor of Sub-subcontractor to inform himself as to conditions affecting the Work.

F. INTERPRETATION OF DOCUMENTS: If any person contemplating submitting a bid for the proposed Contract is in doubt as to the meaning of any part of the Drawings, Specifications (Project Manual) or other proposed Contract Documents, he may submit to the Consultant, not later than four (4) calendar days prior to the date set for opening bids, a written request for an interpretation or clarification. Bidders should act promptly and allow sufficient time for a reply to reach them before preparing their bids. Any interpretation or clarification will be in the form of an Addendum duly issued. No alleged verbal interpretation or ruling will be held binding upon the Owner.

G. SUBSTITUTIONS: Conditions governing the submission of substitutions for specific materials, products, equipment and processes are in the Special Provisions. Request for substitutions must be received by the Consultant seven (7) calendar days prior to the established bid date.

H. ADDENDA: Interpretations, clarifications, additions, deletions and modifications to the Documents during the bidding period will be issued in the form of Addenda and a copy of such Addenda will be mailed, faxed or made available for pickup to each person who has been issued a set of the Bidding Documents. Addenda will be a part of the Bidding Documents and the Contract Documents, and receipt of them shall be acknowledged in the Bid Form. All such interpretations and supplemental instructions will be in the form of written addenda to the contract documents which, if issued, will be sent by U. S. Mail, facsimile, or available for pickup to all prospective bidders (at the respective addresses furnished for such purposes) not later than three (3) calendar days prior to the date fixed for the opening of bids. If any bidder fails to acknowledge the receipt of such addenda in the space provided in the bid form, his bid will nevertheless be construed as though the receipt of such addenda has been acknowledged.

I. COMPLETION TIME: A reasonable completion time has been established by the Owner and is indicated in the Proposal Form.

J. PREPARATION OF BIDS: Prices quoted shall include all items of cost, expenses, taxes, fees and charges incurred, or arising out of, the performance of the work to be performed under the Contract. Bids shall be signed in ink. Any bid on other than the required form will be considered informal and may be rejected. Erasures or other changes in a bid must be explained or noted over the initials of the bidder. Bids containing any conditions, omissions, unexplained erasures and alterations, or irregularities of any kind may be rejected as informal. The prices should be expressed in words and figures or they may be deemed informal and may be rejected. In case of discrepancy between the prices written in the bid and those given in the figures, the price in writing will be considered as the bid. Failure to submit all requested information will make a bid irregular and subject to rejection. Bids shall be signed with name typed or printed below signature, and, if a partnership, give full name of all partners. When bidder is a corporation, bids must be signed with the legal name of the corporation followed by the name of the state of incorporation and the legal signature of an officer authorized to bind the corporation to a contract.

K. SUBMITTAL OF BIDS: Sealed proposal will be received at the time, date and place stated in the Advertisement for Bids. Proposals shall be made on unaltered Proposal Forms furnished by the Consultant. Submit proposal in an opaque, sealed envelope addressed to the Owner and plainly mark on the outside of the envelope the project name, and the name and address of the bidder. The Bid Bond must be completed and signed by each bidder and submitted with the bid. Submit Bids by mail or in person prior to the time for receiving bids set forth in the Advertisement for Bids issued by the City.

L. MODIFICATION AND WITHDRAWAL OF BIDS: Prior to the time set for bid opening, bids may be withdrawn or modified. Bids may be modified only on the official bid form and must be signed by a person legally empowered to bind the bidder. No bidder shall modify, withdraw or cancel his bid or any part thereof for thirty (30) calendar days after the time agreed upon for the receipt of bids.

M. DISQUALIFICATION OF BIDDERS: Bidders may be disqualified and their proposal not considered for any of the following specific reasons:

1) Reason for believing collusion exists among the bidders.

2) Reasonable grounds for believing that any bidder is interested in more than one proposal for the work contemplated.

3) The Bidder or his surety being currently in any litigation against the Owner, or where such litigation is contemplated or imminent, in the sole opinion of Owner.

4) The bidder being in arrears on any existing contract or having defaulted on a previous contract.

5) Lack of competency, responsibility or financial capability as revealed by the bid questionnaires, financial statement, etc.

6) Uncompleted work which in the judgement of the Owner shall prevent or hinder the prompt completion of additional work if awarded.

7) Failure of bidder to use Owner's form of bid bond in submitting his bid, or submission of a cashier's check drawn on a state or national bank not located in the Owner's jurisdiction area.

8) Unbalanced value of any bid items.

N. SUBMISSION OF POST-BID INFORMATION: Upon notification of acceptance, the selected bidder shall, within five (5) calendar days, submit the following:

1) A designation of the portions of the Work proposed to be performed by the bidder with his own force.

2) A list of names of the subcontractors or other persons or organizations, including those who are to furnish materials and equipment fabricated to a special design proposed for such portions of the Work as may be designated in the Bidding Documents or as may be requested by the Consultant.

3) The bidder will be required to establish to the satisfaction of the Owner and the Consultant the reliability and responsibility of themselves and proposed Subcontractors and suppliers to furnish and perform the Work. Bidder to provide experience record, including contact references (names and telephone) and dollar size of project.

O. AWARD: The Owner reserves the right to accept any or to reject any bids without compensation to bidders and to waive irregularities and formalities.

P. EXECUTION OF THE CONTRACT: The successful bidder will be required to enter into a contract with the Owner within ten (10) calendar days of notice by the Owner that his bid has been accepted. Failure to enter into contract within the established time limit without proper justification shall be considered grounds for forfeiture of the bid bond.

Q. CONSTRUCTION SCHEDULE: It is the Owner's desire to have the project completed and operational in as short a time as possible. The number of calendar days for completion of the project will begin with the date specified in the Notice to Proceed. The Notice to Proceed will be issued in a manner to facilitate a smooth construction of the project.

In no instance shall the number of calendar days for completion of the work measured from the proposed date of beginning exceed **Ninety (90)** calendar days.

R. LIQUIDATED DAMAGES: The time of completion is the essence of this contract. For each calendar day that any work shall remain uncompleted after the time specified in the proposal and the contract, or the increased time granted by the Owner, or as equitably increased by additional work or materials ordered after the contract is signed, the sum per day given in the following schedule shall be deducted from the monies due the Contractor:

$240.00 per Calendar Day

The sum of money thus deducted for such delay, failure or non-completion is not to be considered as a penalty, but shall be deemed, taken and treated as reasonable liquidated damages, per calendar day that the Contractor shall be in default after the time stipulated in the contract for completing the work. The said amounts are fixed and agreed upon by an between Owner and Contractor because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner in such event would sustain; and said amounts are agreed to be the amounts of damages which the Owner would sustain and which shall be retained from the monies due, or that may become due, the Contractor under this contract; and if said monies be insufficient to cover the amount owing, then the Contractor or his surety shall immediately pay any additional amounts due. If the contractor finds it impossible, for reasons beyond his control, to complete the work within the contract time as specified, the Contractor may make a written request for an extension of time in accordance with the General Provisions.

S. FORM OF CONTRACT: The contract for the construction of the project will be drawn up by the Owner. A sample form of agreement is included in the Contract Agreement Section.

T. BONDS: A Performance Bond, a Labor and Material Payment Bond and a Maintenance Bond each in the amount of 100% of the contract will be required by the Owner. Sample forms have been included in the Performance Bond, Payment Bond and Maintenance Bond sections.

U. BID SECURITY: Bids shall be accompanied by a cashier's check or certified check upon a national or state band in an amount not less than five percent (5%) of the total maximum bid price payable without recourse to the Town of Addison, or a bid bond in the same amount from a reliable surety company as a guarantee that the bidder will enter into a contract and execute Performance Bond within ten (10) calendar days after notice of award of contract to him. Such checks or bid bonds will be returned to all except the three lowest bidders within three (3) days after the opening of bids, and the remaining checks or bid bonds will be returned promptly after the Owner has made an award of contract, or, if no award has been made within thirty (30) calendar days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid.

V. RESOLUTIONS: If the bidder is a corporation, a copy of the resolution empowering the person submitting the bid to bind the bidder must be included with the bid.

W. CONSTRUCTION STAKING: Benchmarks and horizontal control are shown on the plans.

X. FINAL PAYMENT: The general provisions for Final Payment shall be as stated in Item 1.51.4 of the North Central Texas Standard Specifications for Public Works Construction (1983 Edition) including all Amendments and Additions. Prior to final payment the Contractor shall provide the Owner with the following items:

1) A Contractor's Affidavit of Bills Paid in accordance with Section BP.

2) A Consent of Surety Company to Final Payment.

3) A complete set of Record Drawings which indicate all construction variations from the original construction documents.

4) A two (2) year Maintenance Bond in the amount of one hundred percent (100%) of the contract in accordance with Section MB.

END OF SECTION IB

SECTION PF

PROPOSAL FORM

BID FORM

_____ , 2002

TO: The Honorable Mayor and Town Council
Town of Addison, Texas

Gentlemen:

The undersigned bidder, having examined the plans, specifications and contract documents, and the location of the proposed work, and being fully advised as to the extent and character of the work, proposes to furnish all equipment and to perform labor and work necessary for completion of the work described by and in accordance with the Plans, Specifications and Contract for the following prices, to wit:

Signed by: _____

ACKNOWLEDGMENT OF ADDENDA:

The Bidder acknowledges receipt of the following addenda:

Addendum No. 1 _____

Addendum No. 2 _____

Addendum No. 3 _____

TOWN OF ADDISON, TEXAS
Marsh Lane Water Line

BID SCHEDULE

Item No.	Estimated Quantity	Unit	Description and Price in Words	Price in Figures	Extended Amount
1	2,015	L.F.	Furnish and Install 8-Inch PVC Waterline, including DIP Fittings by Open Cut complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
2	390	L.F.	Furnish and Install 8-Inch PVC Waterline by other than Open Cut complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
3	85	L.F.	Furnish and Install 6-Inch PVC Waterline, including DIP Fittings by Open Cut complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
4	15	Ea.	Furnish and Install 2-Inch Service Connection, including All Fittings at Water Main complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
5	18	Ea.	Furnish and Install New Meter With Box and Service Connection complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		

Item No.	Estimated Quantity	Unit	Description and Price in Words	Price in Figures	Extended Amount
6	6	Ea.	Furnish and Install 8-Inch Resilient Seated Gate Valve complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
7	7	Ea.	Furnish and Install 6-Inch Resilient Seated Gate Valve complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
8	7	Ea.	Furnish and Install Standard Fire Hydrant complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
9	160	L.F.	Furnish and Install 2-Inch Copper Waterline, including All Fittings by Open Cut complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
10	4	Ea.	For Cutting and Plugging Existing 8-Inch Waterline complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
11	4	Ea.	For Connecting to Existing 8-Inch Waterline complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		

Item No.	Estimated Quantity	Unit	Description and Price in Words	Price in Figures	Extended Amount
12	5,000	Lbs.	Furnishing and Installing Ductile Iron Fittings complete in place, the sum of _____ _____ Dollars and _____ Cents per Pound		
13	36	L.F.	For Removing Existing 6-Inch Sanitary Sewer and Replacing with 6-Inch ASTM 2241 PVC with Embedment complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
14	4	Ea.	For Connecting to Existing 6-Inch Sanitary Sewer complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
15	600	S.Y.	For Removing Existing 8-Inch Reinforced Concrete Pavement complete in place, the sum of _____ _____ Dollars and _____ Cents per Square Yard		
16	600	S.Y.	For Furnishing and Placing 10-Inch Reinforced Concrete Pavement complete in place, the sum of _____ _____ Dollars and _____ Cents per Square Yard		
17	325	S.Y.	For Removing and Replacing Existing 8-Inch Reinforced Concrete Driveway complete in place, the sum of _____ _____ Dollars and _____ Cents per Square Yard		

Item No.	Estimated Quantity	Unit	Description and Price in Words	Price in Figures	Extended Amount
18	50	Ton	For Removing and Replacing Existing Hot Mix Asphaltic Concrete complete in place, the sum of _____ _____ Dollars and _____ Cents per Ton		
19	275	S.Y.	For Removing and Replacing Existing 4-Inch Reinforce Concrete Walk complete in place, the sum of _____ _____ Dollars and _____ Cents per Square Yard		
20	150	Ton	Furnishing and Placing 1-1/2-Inch Hot Mix Asphalt Overlay complete in place, the sum of _____ _____ Dollars and _____ Cents per Ton		
21	352	L.F.	For Removing and Replacing Existing 6- Inch Monolithic Curb complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
22	632	L.F.	For Removing and Replacing Existing 6-Inch Curb and Gutter complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
23	3,262	L.F.	Full Depth Saw Cut complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		

Item No.	Estimated Quantity	Unit	Description and Price in Words	Price in Figures	Extended Amount
24	0.25	Ac.	Furnish, Place Maintain and Establish Solid Sod complete in place, the sum of _____ _____ Dollars and _____ Cents per Acre		
25	3	Ea.	For Removing Existing Trees and Replace with 3-Inch Bradford Pear Trees complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
26	5	Ea.	For Removing and Delivering to Town Service Center Existing Fire Hydrant and Valve complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		
27	9	L.F.	Furnish and Install 12-Inch High Density Polyethylene Drainage Pipe complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
28	1	Ea.	For Connecting 12-Inch High Density Polyethylene Drainage Pipe to Existing Grate Inlet complete in place, the sum of _____ _____ Dollars and _____ Cents per Each		

Item No.	Estimated Quantity	Unit	Description and Price in Words	Price in Figures	Extended Amount
29	1	L.F.	For Connecting 12-Inch High Density Polyethylene Drainage Pipe to Existing 18-Inch Corrugated Metal Pipe with Concrete Collar complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
30	1	L.S.	Barricades, Signs and Traffic Handling complete in place, the sum of _____ _____ Dollars and _____ Cents per Lump Sum		
31	600	L.F.	Temporary Sediment Control Fencing complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
32	2,486	L.F.	Furnish and Install Trench Safety System complete in place, the sum of _____ _____ Dollars and _____ Cents per Linear Foot		
33	1	L.S.	Furnish Trench Safety Plan complete in place, the sum of _____ _____ Dollars and _____ Cents per Lump Sum		
TOTAL AMOUNT BID (Items 1 Through 33)					

NOTES:

1. All items, labor, materials, equipment, facilities, incidentals and work required for construction of the project are to be provided and installed by the Contractor as part of the project and payment for the cost of such shall be included in the price bid for the construction of the project.

2. Prices must be shown in words and figures for each item listed in the Proposal. In the event of discrepancy, the words shall control.

3. Materials, which are "tax exempt", are those items which are physically incorporated into the facilities constructed for the OWNER, as set forth in the Special Provisions. Materials include, but are not limited to purchased items such as concrete, and roadbase, etc.

   Services, which are "not tax exempt", are those items which are used by the Contractor but are not physically incorporated into the OWNER's facility and/or items which are consumed by construction, as set forth in the Special Provisions. Services include, but are not limited to, items such as supplies, tools, skill and labor, the purchase, rental or lease of equipment, etc.

_____

Name of Person Signing Bid

_____

Signature of Person Signing Bid

_____

Address

_____

Telephone No. Fax No.

_____

T.I.N. (Tax Identification or Employer's Number)

If BIDDER is:

An Individual

By _____ (Seal)
(Individual's Name)

doing business as _____

Business address: _____

_____

_____

Phone No. _____

A Partnership

By _____ (Seal)
(Firm Name)

_____
(General Partner)

doing business as _____

Business address: _____

_____

_____

Phone No. _____

A Corporation

By _____
(Corporation Name)

_____
(State of Incorporation)

By _____
(Name of Person Authorized to Sign)

_____
(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

_____

_____

Phone No. _____

A Joint Venture

By _____
(Name)

_____
(Address)

By _____
(Name)

_____
(Address)

(Each joint venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

SECTION CA

CONTRACT AGREEMENT

AGREEMENT

STATE OF _____

COUNTY OF _____

THIS AGREEMENT is made and entered into this _____ day of _____, **2002**, by and between the Town of Addison, of the County of Dallas and State of Texas, acting through its City Manager, thereunto duly authorized so to do, Party of the First Part, hereinafter termed the OWNER, and _____, of the City of _____, County of _____, State of _____, Party of the Second Part, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payment and agreement hereinafter mentioned, to be made and performed by the OWNER, the said CONTRACTOR hereby agrees with the said OWNER to commence and complete construction of certain improvements as follows:

Marsh Lane Water Line

and all extra work in connection therewith, under the terms as stated in the General and Specific Conditions of the AGREEMENT; and at his own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached hereto and in accordance with the Advertisement for Bids, Instructions to Bidders, General Provisions, Special Provisions, Plans, and other drawings and printed or written explanatory matter thereof, and the Technical Specifications and Addenda thereto, as prepared by the OWNER, each of which has been identified by the endorsement of the CONTRACTOR and the OWNER thereon, together with the CONTRACTOR's written Proposal and the General Provisions, all of which are made a part hereof and collectively evidence and constitute the entire AGREEMENT.

The CONTRACTOR hereby agrees to commence work within five (5) calendar days after the date of written notice to do so shall have been given to him, to complete the work within _____ (____) calendar days, after he commences work, subject to such extensions of time as are provided by the General Provisions.

The OWNER agrees to pay the CONTRACTOR _____ _____ Dollars ($_____) in current funds for the performance of the Contract in accordance with the Proposal submitted thereof, subject to additions and deductions, as provided in the General Provisions, and to make payments of account thereof as provided therein.

IN WITNESS WHEREOF, the parties of these presents have executed this AGREEMENT in the year and day first above written.

TOWN OF ADDISON, TEXAS (OWNER)

By: _____
Ron Whitehead, City Manager

ATTEST:

By: _____
Carmen Moran, City Secretary

(CONTRACTOR)

By: _____

ATTEST:

By: _____

The following to be executed if the CONTRACTOR is a corporation:

I, _____ certify that I am the secretary of the corporation named as CONTRACTOR herein; that _____, who signed this Contract on behalf of the CONTRACTOR is the _____ (official title) of said corporation; that said Contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

Signed: _____

Corporate Seal

SECTION PrB

PERFORMANCE BOND

STATUTORY PERFORMANCE BOND PURSUANT TO CHAPTER 2253 OF THE TEXAS GOVERNMENT CODE (PUBLIC WORKS)

(Penalty of this Bond must be 100% of Contract Amount)

KNOW ALL MEN BY THESE PRESENTS, That _____ (hereinafter called the Principal), as Principal, and _____ (hereinafter called the Surety), as Surety are held and firmly bound unto the **Town of Addison** (hereinafter called the Obligee), in the amount of _____ _____ Dollars ($ _____) for the payment whereof the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____ , 2002 to

Marsh Lane Water Line

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform the work in accordance with the plans, specifications and contract documents, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of said Chapter to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed this instrument this _____ day of _____ , 2002.

_____
(Principal)

_____ By: _____

_____
(Surety)

_____ By: _____
(Attorney-in-Fact)

SECTION PyB

PAYMENT BOND

STATUTORY PAYMENT BOND PURSUANT TO CHAPTER 2253
OF THE TEXAS GOVERNMENT CODE
(PUBLIC WORKS)

(Penalty of this Bond must be 100% of Contract Amount)

KNOW ALL MEN BY THESE PRESENTS, That _____

(hereinafter called the Principal), as Principal, and _____

(hereinafter called the Surety), as Surety are held and firmly bound unto the **Town of Addison** (hereinafter called the Obligee), in the amount of _____

_____ Dollars ($ _____) for the payment whereof the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____ , 2002 to

Marsh Lane Water Line

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of said Chapter to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed this instrument this _____ day of _____ , 2002.

_____
(Principal)

_____ By: _____

_____
(Surety)

_____ By: _____
(Attorney-in-Fact)

SECTION MB

MAINTENANCE BOND

SECTION MB

MAINTENANCE BOND

STATE OF TEXAS

COUNTY OF DALLAS

That _____ as principal and _____

_____, a corporation organized under the laws of _____

and _____ as sureties, said sureties being authorized to do business in the State of Texas, do hereby expressly acknowledge themselves to be held and bound to pay unto the Town of Addison, a municipal corporation, chartered by virtue of a Special Act of Legislature of the State of Texas, as Addison, Dallas County, Texas, the sum of

_____

_____

_____

($_____) for the payment of which sum will and truly to be made unto said Town of Addison and its successors, said principal and sureties do hereby bind themselves, their assigns and successors, jointly and severally.

This obligation is conditioned, however, that whereas said

_____

has this day entered into a written contract with the said Town of Addison to build and construct the

_____

_____

_____

_____

which contract and the Plans and Specifications therein mentioned adopted by the Town of Addison, are hereby expressly made a part hereof as though the same were written and embodied herein.

WHEREAS, under the Plans, Specifications and Contract it is provided that the Contractor will maintain and keep in good repair the work herein contracted to be done and performed for a period of two (2) years from the date of startup, and to do all necessary backfilling that may arise on account of sunken conditions in ditches, or otherwise, and to do and perform all necessary work and repair any defective condition growing out of or arising from the improper joining of the same, or on account of any breaking of the same caused by the said Contractor in laying or building the same, or on account of any defect arising in any of said part of said work laid or constructed by the said Contractor, or on account of improper excavation or backfilling; it being understood that the purpose of this section is to cover all defective conditions arising by reason of defective materials, work or labor performed by the said Contractor; and in case the said Contractor shall fail to do, it is agreed that the City may do said work and supply such materials, and charge the same against the said Contractor and sureties on this obligation, and the said Contractor and sureties hereon shall be subject to the liquidated damages mentioned in said contract for each day's failure on its part to comply with the terms of the said provisions of said contract;

NOW THEREFORE, if the said Contractor shall keep and perform its said agreement to maintain said work and keep the same in repair for the said maintenance period of two (2) years, as provided, then these presents shall be null and void and have no further effect; but if default shall be made by the said Contractor in the performance of its contract to so maintain and repair said work, then these presents shall have full force and effect, and said Town of Addison shall have and recover from the Contractor and its sureties damages in the premises, as provided, and it is further understood and agreed that this obligation shall be a continuing one against the principal and sureties hereon and that successive recoveries may be had hereon for successive branches until the full amount shall have been exhausted; and it is further understood that the obligation herein to maintain said work shall continue throughout said maintenance period, and the same shall not be changed, diminished, or in any manner affected from any cause during said time.

IN WITNESS WHEREOF, the said _____ has caused these presents to be executed by _____ and the said _____ has hereunto set his hand this the _____ day of _____, 20 _____

SURETY

_____

_____

By: _____
Attorney in Fact

By: _____
Surety

_____

_____
Agency and Address

PRINCIPAL

_____

By: _____

ATTEST

_____
Secretary

NOTE: Date of Maintenance Bond must be same as date City acceptance.

SECTION BP

CONTRACTOR'S AFFIDAVIT OF BILLS PAID

SECTION BP

CONTRACTOR'S AFFIDAVIT OF BILLS PAID

STATE OF TEXAS

COUNTY OF DALLAS

Personally, before me the undersigned authority, on this day appeared _____ who, being duly sworn, on oath, says that he is a legal representative of _____
(full name of Contractor as in contract)

and that the contract for the construction of the project, designated as

_____
(Project No.)

has been satisfactorily completed and that all bills for materials, apparatus, fixtures, machinery and labor used in connection with the construction of this project have, to the best of my knowledge and belief, been fully paid.

_____
Signature

_____
Title

Sworn to and subscribed before me this _____day of _____, 2002.

_____
Notary Public in and for

_____ County, Texas

Instructions:

If the contractor is an individual, he shall sign the affidavit. If the contractor is a partnership, any partner may sign the affidavit. If the contractor is a corporation, a person authorized by the by-laws or by the Board of Directors shall sign the affidavit. If the Contractor is a joint-venture of individuals, any of the individuals may sign the affidavit. If the Contractor is a joint-venture of partnerships, or of individuals and partnerships, the affidavit may be signed by the individual or any partner of any partnership. If the contractor is a joint-venture in which a corporation is a party, separate affidavits must be executed in the name of the joint-venture: one by each corporation and one by each individual or partnership. Signatures for corporations should be by a duly authorized officer. If signature is by another, a showing of authority to sign must accompany the affidavit.

SECTION GP

GENERAL PROVISIONS

GENERAL PROVISIONS

The General Provisions of the Contract shall be as stated in the Standard Specifications for Public Works Construction, North Central Texas Council of Governments (1983), under Part I, "General Provisions," Items 1.0 through 1.63 inclusive, as amended or supplemented and except as modified by the Special Provisions.

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SPECIAL PROVISIONS

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SPECIAL PROVISIONS

SECTION SP

SPECIAL PROVISIONS

SP.1 LOCATION OF PROJECT

The location of the waterline project is along Marsh Lane from Brookhaven Club to Spring Valley, in the Town of Addison, Texas. A location map is included at the end of these specifications.

SP.2 SCOPE OF WORK

The work under this contract includes furnishing and installing approximately 2,400 linear feet of 8-inch waterline.

SP.3 CONSTRUCTION SCHEDULE

Prior to starting work, the Contractor shall submit a proposed schedule for the work included herein and shall submit any major revisions to this schedule as the project progresses. This schedule shall provide for completion of the project within the time provided in the specifications. Working hours is 7:00 a.m. to 7:00 p.m. weekdays. No weekend work permitted. Northbound Marsh Lane may be closed to one-lane traffic during work hours of 9:30 a.m. to 3:30 p.m. Two-lanes must be open at all other times.

SP.4 COPIES OF PLANS AND SPECIFICATIONS

Five (5) copies of the plans and specifications shall be furnished to the Contractor, at no charge, for construction purposes. Additional copies may be obtained at a cost of $50.00.

SP.5 REFERENCE SPECIFICATIONS

Where reference is made in these specifications, to specifications compiled by others, such reference is made for expediency and standardization from the material supplier's point of view, and such specifications referred to are hereby made a part of these specifications.

SP.6 TRADE NAMES AND MATERIALS

No material which has been used by the Contractor for any temporary purposes whatsoever is to be incorporated in the permanent structure without written consent of the Engineer.

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard for quality or performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing, in the opinion or judgment of the Engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the specifications in connection with material, manufactured article, or process, the material, article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer, and the Engineer shall have the right to require the use of such specifically designated material, article or process.

SP.7 PROJECT MAINTENANCE

The Contractor shall maintain, and keep in good repair, the improvements covered by these plans and specifications during the life of his contract.

SP.8 CLEANUP

During Construction: The Contractor shall at all times keep the jobsite as free from all disposable material, debris, and rubbish as is practicable, and shall remove same from any portion of the jobsite when it becomes objectionable or interferes with the progress of the project, in the opinion of the Engineer or the Owner. Broken pipe and other debris resulting from construction shall not be left on the site after the construction work is completed. During the construction the Contractor shall not damage improvements on public or private property, including shrubs, grass, pavement, walks, curbs and fences. In the event Contractor damages private property, Contractor shall immediately perform restoration at his own cost.

Video: Contractor shall make and provide to the Owner an original color, VHS format tape of existing conditions outside of lift station. The areas shall be narrated as to location. Video shall be provided to the Owner prior to actual construction work commencing. City Inspector shall be present during taping and take possession of tape when completed.

Final: Upon completion of the work, the Contractor shall remove from the site all plants, materials, tools and equipment belonging to him and restore the site with an appearance acceptable to the Engineer and the Owner. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver over such materials and equipment in a bright, clean, polished and new-appearing condition.

SP.9 PERMITS AND RIGHTS-OF-WAY

The Owner will provide rights-of-way for the purpose of construction without cost to the Contractor, by securing permits in areas of public dedication or by obtaining easements across privately owned property. It shall be the responsibility of the Contractor, prior to the initiation of construction on easements through private property, to inform the property owner of this intent to begin construction. Before beginning construction in areas of public dedication, the Contractor shall inform the agency having jurisdiction in the area forty-eight (48) hours prior to initiation of the work.

Electricians shall be registered with the Town's Building Department. The registration fee of $60.00 shall be paid by the Contractor. Inspections from the Building Inspector shall be scheduled by Contractor, 24-hours prior to inspection.

SP.10 CLEAN AIR ACT AND CLEAN WATER ACT

Include in all construction contract exceeding $100,000, the following requirement: "Contractor is responsible for compliance with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act, Section 505 of the Clean Water Act, Executive Order 11738, and Environmental Protection Agency regulations."

SP.11 COORDINATION WITH OTHERS

In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with other contractors.

SP.12 LIGHTS AND POWER

The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution of the work.

SP.13 WAGE RATES

All employees of the Contractor for the work to be performed under this contract shall be paid the prevailing wage scale in this locality for work of a similar character, and in no event less than the minimums prescribed in the following schedule:

The "prevailing rates" shown will be the minimum wags acceptable on this project.

If the construction project involves the expenditure of federal funds in excess of $2,000.00, the minimum wages to be paid various classes of laborers and mechanics will be based upon the wages that will be determined by the Secretary of Labor to be prevailing for the corresponding classes of laborers and mechanics employed on the project of a character similar to the contract work in the City of Addison or the rate given above, whichever is higher.

Except for work on legal holidays, the "general prevailing rate of per diem wage" for the various crafts or type of workers or mechanics is the produce to (a) the number of hours worked per day, except for overtime hours, times (b) the above respective Rate Per Hour.

For legal holidays, the "general prevailing rate of per diem wage" for the various crafts or type of workers or mechanics is the product of (a) one and one-half times the above respective Rate Per Hour, times (b) the number of hours worked on the legal holiday.

The "general prevailing rate for overtime work" for the crafts or type of workers or mechanics is one and one-half times the above respective Rate Per Hour.

Under the provisions of Article 5159a, Vernon's Annotated Texas Statutes, the Contractor shall forfeit as a penalty to the entity on whose behalf the contract is made or awarded, Ten Dollars ($10.00) for each laborer, worker or mechanic employed, for each calendar day, or portion thereof, such laborer, worker or mechanic is paid less than the said stipulated rates for any work under the contract, by him, or by any subcontractor under him.

PREVAILING WAGE RATES

GENERAL DECISION **TX000034** 07/07/00 TX34

General Decision Number **TX000034**

Superseded General Decision No. TX990034

State: TEXAS

Construction Type: HEAVY

County(ies):			
	COLLIN	DENTON	KAUFMAN
	DALLAS	ELLIS	ROCKWALL

Heavy Construction, including Treatment Plants (does not include water/sewer lines)

Modification Number	Publication Date
0	02/11/2000
1	02/18/2000
2	03/17/2000
3	05/05/2000
4	06/02/2000
5	06/30/2000
6	07/07/2000

	Rates	Fringes
ASBE0021C 05/01/1999		
Asbestos Workers/Insulators (includes application of all insulating materials, protective coverings, coatings, and finishings to all types of mechanical systems)	$16.20	$4.35

	Rates	Fringes
ELEC0020C 06/01/2000		
Electricians:		
Electrician	$20.20	11% + 2.45
Cable Splicer	$22.22	11% + 2.45
ELEC0020F 06/01/2000		
Line Construction:		
Lineman & Equipment Operators	$20.45	
Cable Splicers		
Groundman		
ENGI0178A 06/01/1999		
Cranes:		
Hydraulic over 35-tons (Derricks, Overhead Gentry, Stiffleg, Tower, etc., and Cranes w/Piledriving or Caisson attachments)	$17.00	$3.85
Hydraulic Crane (35 ton & under)	$16.50	$3.85
IRON0263K 06/01/2000		
Ironworkers:		
Reinforcing & Structural	$16.60	$4.05
PLUM0100B 05/01/2000		
Plumbers & Pipefitters	$19.80	$4.31
SHEE0068B 05/01/1996		
Sheet Metal Workers	$15.70	3% + 4.32
SUTX2034A 08/01/1990		
Carpenters	$10.536	
Concrete Finishers	$9.603	
Form Builders	$8.036	
Form Setters	$9.578	
Laborers:		
Common	$6.379	
Utility	$6.974	
Pipelayers	$7.961	
Power Equipment Operators:		
Backhoe	$10.971	
Bulldozer	$9.942	
Front End Loader	$10.771	
Mechanic	$9.880	
Motor Grader	$11.633	
Oiler	$9.183	
Scraper	$8.000	
Truck Drivers	$7.465	
Welders:		
Receive rate prescribed for craft performing operations to which welding is incidental.		

SP.14 CLAIMS FOR DAMAGES OR INJURY

Item 1.24.3 - SMALL CLAIMS FOR DAMAGE OR INJURY is amended to read as follows:

If any person files a claim against the Owner or Contractor for personal injury or property damage resulting from, arising out of, or caused by, the operations of the Contractor, or any work within the limits of the project, the Contractor must either submit to the Owner a duly executed full release within thirty (30) days from the date of written claim, or immediately report the claim to his liability insurance carrier

for their action in adjusting the claim. If the Contractor fails to comply with this provision within the stipulated time limit, it will be automatically deemed that the Contractor has appointed the Owner as its irrevocably Attorney-In-Fact authorizing the Owner to report the claim directly with the liability insurance carrier. This provision is in and of itself a Power-of-Attorney from the Contractor to the Owner which authorizes the Owner to take said action on behalf of the Contractor without the necessity of the execution of any other document. If the Contractor fails to comply with the provisions of this item the Owner, at its own discretion, may terminate this contract or take any other actions it deems appropriate. Any payment or portion thereof due the Contractor, whether it is a final payment, progress payment, payment out of retainage or refund payment may be withheld by the Owner as is authorized by Item 1.52. Bankruptcy, insolvency or denial of liability by the insurance carrier shall not exonerate the Contractor from liability.

As a result of the additional work created to Owner due to un-responded claims for damages by Contractor to third parties, Contractor shall incur penalties for failure to abide by this Special Provision.

In accordance with the obligations set forth in Special Provision Item 1.24.3, Contractor shall respond to the claimant in writing regarding the status of the claim, including whether Contractor disputes the claim, wishes to settle, or will notify its liability insurance carrier regarding the claim. Contractor will be assessed a penalty by Owner of $75.00 per claim, for its failure to respond to the claimant as described above within thirty days of its written notice of claim by the City.

To ensure Contractor compliance, the Owner shall be notified, by copied correspondence of responses or settlement by Contractor.

SP.15 COOPERATION OF CONTRACTORS

The Contractor shall have on the project at all times, as his agent, a competent Superintendent capable of reading and thoroughly understanding the plans and specifications, and thoroughly experienced in the type of work being performed. The Superintendent shall have full authority to execute orders or directions and to promptly supply such materials, equipment, tools, labor and incidentals as may be required. Such superintendent shall be furnished irrespective of the amount of work subcontracted.

The Superintendent and the Contractor shall be responsible for all work performed by the subcontractor at all times during construction.

SP.16 ANTITRUST

The Contractor hereby assigns to the Owner any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States 15 U.S.C.A. Sec. 1, et seq. (1973).

SP.17 PUBLIC UTILITIES AND OTHER PROPERTY TO BE CHANGED

In case it is necessary to change or move the property of any Owner or of a public utility, such property shall not be moved or interfered with until authorized by the utility company or approved by the Owner. The right is reserved to the Owner or public utilities to enter upon the limits of the project for the purpose of making such changes or repairs of their property that may be made necessary by the performance of this contract.

SP.18 EXISTING UTILITIES AND SERVICE LINES

The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken, or damaged, the Contractor shall replace the utilities or service lines with the same type of original construction, or better, at his own cost and expense. Existing landscaping and irrigation shall be protected at all times.

SP.19 USE OF EXPLOSIVES

Use of explosives will not be allowed.

SP.20 INSURANCE

Each insurance policy that the Contractor must furnish in accordance with these contract documents shall name the Town of Addison and the Engineer as additional insured.

1.0 The Contractor shall agree to furnish and maintain, during the contract period, insurance coverage meeting the following requirements:

1.1 Commercial General Liability Insurance at minimum combined single limits of $500,000 per occurrence and $1,000,000 general aggregate for Bodily Injury and Property Damage, which coverage shall include Products/Completed Operations, and XCU Hazards. Contractual Liability must be maintained with respect to the Contractor's obligations contained in the contract. The policy must be amended to provide a per-project general aggregate limit of insurance of $1,000,000 with respect to this contract.

1.2 Workers Compensation Insurance at statutory limits, including employer's liability coverage at minimum limits of $500,000 by disease aggregate, $100,000 by disease - per occurrence, $100,000 per occurrence - each accident. (See attachment on Workers Compensation Commission rules)

1.3 Commercial Automobile Liability Insurance at minimum combined single limits of $1,000,000 per occurrence for bodily injury an property damage, including owned, non-owned, and hired car coverage.

2.0 Contractor shall provide the following endorsements:

2.1 Named insured wording which includes the Contractor and the Town of Addison with respect to general liability and automobile liability.

2.2 All liability policies shall contain cross liability and severability of interest clause.

2.3 A waiver of subrogation in favor of the Town of Addison with respect to the workers' compensation insurance.

2.4 The policy shall be endorsed to require the insured to immediately notify the Town of Addison of any material changes in the insurance coverage.

2.5 The certificate shall notate the Project Name or Bid Number.

2.6 All certificates shall be mailed to Town of Addison, Purchasing Dept., P.O. Box 9010, Addison, Texas 75001.

3.0 All insurance shall be purchased from an insurance company who meets the following requirements:

3.1 Is acceptable to the Town with regard to financial strength and stability.

3.2 Licensed and admitted to do business in the State of Texas.

4.0 All insurance must be written on forms filed with and approved by the Texas State Board of Insurance. Certificates of insurance shall be prepared and executed by the insurance company or its authorized agent and shall contain provisions representing and warranting the following:

4.1 The company is licensed and admitted to do business in the State of Texas.

4.2 The company's forms have been approved by the Texas State Board of Insurance.

4.3 Sets forth all endorsements as required above.

4.4 The Town of Addison will receive at least sixty (60) days notice prior to cancellation or termination of the insurance.

5.0 Upon request, Contractor, shall furnish the Owner with:

a) certified copies of all insurance policies, and

b) valid Certificates of Insurance covering all subcontractors in accordance with the insurance requirements set forth herein for Contractor.

SP.21 WORKERS' COMPENSATION INSURANCE COVERAGE

A. Definitions

Certificate of Coverage ("certificate"): A copy of a certificate of insurance, a certificate of authority to self insure issued by the Texas Workers' Compensation Commission (the "TWCC"), or a coverage agreement (TWCC-81, TWCC-82, TWCC-83 or TWCC-84), showing Statutory Workers' Compensation Insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the Project: Includes the time from the beginning of the work on the project until the Contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons Providing Services on the Project ("subcontractor" in Section 406.096 of the Texas Labor Code): Includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other services related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The Contractor shall provide coverage, based on property reporting of classification codes and payroll amounts and filing of any coverage agreement, which meets the statutory requirements of Texas Labor Code, 401.011(44) for all employees of the Contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the Owner prior to being awarded the contract.

D. If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner, showing that the coverage has been extended.

E. The Contractor shall obtain from each person providing services on the project, and provide to the Owner;

1) a certificate of coverage, prior to that person beginning work on the project, so that the Owner will have on file certificates of coverage showing coverage for all persons providing services on the project; and,

2) no later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

F. The Contractor shall retain all required certificates of coverage on file for the duration of the project and for one year thereafter.

G. The Contractor shall notify the Owner in writing by certified mail or personal delivery, within 10 days after the Contractor knew or should have known, of any changes that materially affects the provisions of coverage of any person providing services on the project.

H. The Contractor shall post on each project site a notice, in the text, form and manner prescribed by the TWCC, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify current coverage and report failure to provide coverage.

I. The Contractor shall contractually require each person with whom it contracts to provide services on a project to:

1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Codes 401.011 (44) for all its employees providing services on the project, for the duration of the project;

2) provide to the Contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

3) provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

4) obtain from each person with whom it contracts, and provide to the Contractor;

a) a certificate of coverage, prior to the other person beginning work on the project; and,

b) a new certificate of coverage showing extension of the coverage period, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

6) notify the Owner in writing by certified mail or personal delivery, within 10-days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

7) contractually require each other person with whom it contracts to perform as required by paragraphs (1) - (7) with the certificate of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the project will be covered by worker's compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the TWCC's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties or other civil actions.

K. The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Owner.

The following is the form of notice of workers' compensation coverage prescribed by the TWCC. Pursuant to Section 110.110 (d) (7), this notice must be printed with a title in at least 30-point bold type, and text in at least 19-point nominal type, and shall be in both English and Spanish and any other language common to the worker population.

REQUIRED WORKERS' COMPENSATION COVERAGE

"The law requires that each person working on this site or providing services related to this construction project must be covered by workers' compensation insurance. This includes persons providing, hauling or delivering equipment or materials, or providing labor or transportation or other services related to the project, regardless of the identity of their employer or status as an employee.

"Call the Texas Workers' Compensation Commission (TWCC) at (512) 440-3789 to receive further information on the legal requirements for coverage, to verify whether your employer has provided the required coverage, or to report an employer's failure to provide coverage."

SP.22 RESOLUTION OF DISPUTES

The parties hereby covenant and agree that in the event of any controversy, dispute, or claim of whatever nature arising out of, in connection with or in relation to the interpretation, performance or breach of this agreement, including but not limited to any claims based on contract, tort or statute before filing a lawsuit the parties agree to submit the matter to Alternative Dispute Resolution pursuant to the laws of the State of Texas. The parties shall select a third party arbitrator or mediator from the current list of neutrals on file with the Alternative Dispute Resolution Administrator of the Dallas County District Courts. All forms of Alternative Dispute Resolution may be used except binding arbitration. The proceedings shall be conducted in accordance with the laws of the State of Texas.

SP.23 NON-DISCRIMINATION POLICY

It is the policy of the Town of Addison to afford all people an equal opportunity to bid on any contract being let by the Town.

The Town of Addison has a policy that prohibits discrimination against any person because of race, color, sex, or national origin, in the award or performance of any contract.

The Town of Addison will require its employees, agents, and contractors to adhere to this policy.

SP.24 COMPLIANCE WITH IMMIGRATION LAWS

Contractor shall take all steps necessary to ensure that all of the contractor's employees are authorized to work in the United Stages as required by the Immigration Reform and Control Act of 1986.

SP.25 COMPLIANCE WITH GENERAL RULES AND LAWS

Contractor shall familiarize himself with the nature and extent of the specifications, site conditions, traffic and safety requirements, and comply with all federal, state and local laws, ordinances, rules and regulations. Contractor shall determine how compliance with requirements, laws, rules, and regulations will affect his cost, progress, or performance of the Work and include that cost in his bid.

SP.26 SHOP DRAWING

Contractor shall furnish a minimum of four and a maximum of six copies of shop drawings for review by the City. Acceptable submittals will be returned as follows:

Two (2) – Town of Addison

One (1) – Contractor

One (1) – Birkhoff, Hendricks & Conway, L.L.P.

Maximum size of submittal shall be 11 x 17 inch. No fax copies are acceptable. All copies shall be from clear legible original.

Shop drawings shall include all items to be installed in the project, including:

- Pipe
- Valves
- Fire Hydrants
- Fittings
- Plantings
- Irrigation
- Mix Designs

SP.27 BARRICADES, WARNING SIGNS, DETOURS AND SEQUENCE OF WORK

A. Throughout the construction operations, streets and intersections will remain open to traffic by constructing the work in stages. All streets, driveways, adjacent business and alleys shall remain open to traffic as far as is practicable.

B. General Construction: The Contractor shall plan his work sequence in a manner that will cause minimum interference with traffic during construction operations. Before beginning work on this project, the Contractor shall submit, for approval by the Owner, a plan of construction operations outlining in detail a sequence of work to be followed; setting out the method of handling traffic on streets, roads and driveways along, across and adjacent to the work. If at any time during the construction, the Contractor's proposed plan of operation for handling traffic does not provide for safe comfortable movement, the Contractor shall immediately change his operations to correct the unsatisfactory conditions.

Ditches across the traffic lanes will be kept covered with a portable traffic-bearing surface at all times unless work in the ditch is in progress. Only one lane of traffic may be closed at a time when work is in progress in a ditch.

C. Safety: The Contractor shall provide, construct and maintain barricades and signs at locations set out in the plans and in the Special Provisions in accordance with the Texas Manual on "Uniform Traffic Control Devices for Streets and Highways". In addition, he shall provide and maintain such other barricades and signs as deemed necessary by the Owner, and provide and maintain, between sunset and sunrise, a sufficient number of lights at barricades and points of danger for the protection of vehicular and pedestrian traffic.

Barricades shall be placed in such a manner as not to interfere with the sight distance of drivers entering the street from side streets.

The Contractor shall keep traveled surfaces used in his hauling operation clear and free of dirt or other material.

The Contractor shall provide and maintain qualified flagmen at such points and for such periods of time as may be required to provide for the safety and convenience of public travel and Contractor's personnel.

SP.28 CONSTRUCTION IN PUBLIC ROADS AND PRIVATE DRIVES

No public road shall be entirely closed overnight. It shall be the responsibility of the Contractor to build and maintain all weather bypasses and detours, if necessary, and to properly light, barricade and mark all bypasses and detours that might be required on and across the roads involved in the work included in this contract.

No interference with traffic flow on city streets shall be permitted during the hours of 6:30 a.m. to 9:30 a.m. and 3:30 p.m. to 7:30 p.m., Mondays through Fridays.

The Contractor shall make every effort to complete construction and allow immediate access to adjacent property at driveway entrances located along the roadways. Owners or tenants of improvements where access and/or entrance drives are located shall be notified at least twenty-four (24) hours prior to the time the construction will be started at their driveways or entrances and informed as to the length of time driveways will be closed. Contractor shall at all times maintain at least one point of access into all properties, unless obtaining written permission from property owner to do otherwise with such written permission being provided to the Town's inspector.

The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of such reconstruction. In the event the repairs and maintenance are not made immediately to the satisfaction of the Owner, and it becomes necessary for the Town to make such repairs, the Contractor shall reimburse the Town for the cost of such repairs.

The Contractor shall, at all times, keep a sufficient width of the roadway clear of dirt and other material to allow the free flow of traffic. The Contractor shall assume any and all responsibility for damage, personal or otherwise, that may be caused by the construction along roads and private drives.

SP.29 EXCAVATION SAFETY SYSTEMS

The work performed under this section of the specifications consists of providing trench safety systems consisting of shoring, sheeting, trench shield, and/or laid back slopes to meet the trench safety requirements of the Occupational Safety and Health Administration (O.S.H.A.), as required for this project and specified herein.

A. General

Trench safety systems shall be provided by the Contractor as provided in Subpart P - Excavation, Trenching and Shoring, Part 1926 of the Code of Federal Regulations which describes safety and health regulations as administered by the U.S. Department of Labor Occupational Safety and Health Administration (O.S.H.A.). The standards specified by the O.S.H.A. Regulations shall be the minimum allowed on this project. It shall be the responsibility of the Contractor to design and install adequate trench safety systems for all trenches excavated on this project.

The Contractor shall furnish to the Owner for review, prior to beginning construction activity, a Trench Safety Plan for the entire project. The trench safety plan must be prepared and sealed by a

Professional Engineer registered in the State of Texas. In addition, all trench safety systems utilized in this project must be designed by a Professional Engineer registered in the State of Texas. The Contractor shall be totally responsible for the safety of all persons involved in the construction of this project.

B. Core Borings

Any core borings and soil data furnished by the Owner are for the convenience of the Contractor. The Contractor shall be responsible for any additional soil or geotechnical information required. The Contractor shall be responsible for properly designed trench safety systems to be utilized for any type of subsurface condition found on this project. The furnishing of soil information by the Owner in no way relieves the Contractor of this obligation.

If no core borings or soil data are furnished by the Owner, it shall be the Contractor's responsibility to obtain whatever geotechnical information required for preparation of trench safety systems.

C. Inspections

In addition to the inspections of the trench and trench safety systems required of the Contractor by the O.S.H.A. Regulations, the Owner may further inspect the work. The Owner shall have the right to reject any trench safety systems which he finds to be inadequate, and the Contractor shall immediately improve the system to comply with this specification.

D. Measurement and Payment

Measurement and payment of Trench Safety Systems shall be based on the actual linear footage of the pipe installed on the project. The payment shall be full compensation for all planning, engineering, materials, equipment, fabrications, installation, recovery and all incidental work required. All excavation and backfill in addition to that specified elsewhere in these specifications shall be considered subsidiary to this bid item.

SP.30 SPRINKLER REPAIR

The Contractor is responsible for the repair or replacement of any sprinkler damage caused by his construction. This repair is subsidiary to the contract unless there is a specific item for sprinkler repair. All repairs or replacements shall be completed by irrigator licensed in the State of Texas, paid for by the Contractor.

SP.31 PROJECT VIDEO

Prior to start of construction, Contractor shall color videotape construction area and property adjacent to construction. The Contractor shall furnish the Owner a copy of the tape in VHS format prior to commencement of project. This shall be subsidiary to project.

SP.32 WATERLINE PIPE

The following waterline pipe is acceptable for this project in accordance with the assigned NCTCOG Standard Specification item number and ASTM designation:

- Polyvinyl Chloride (PVC) Water Pipe NCTCOG Item 2.12.20 – AWWA Standard C909.
- Fittings for PVC Water Pipe shall be Ductile Iron (Poly Wrapped) NCTCOG Item 2.12.8 - AWWA Standard C110.

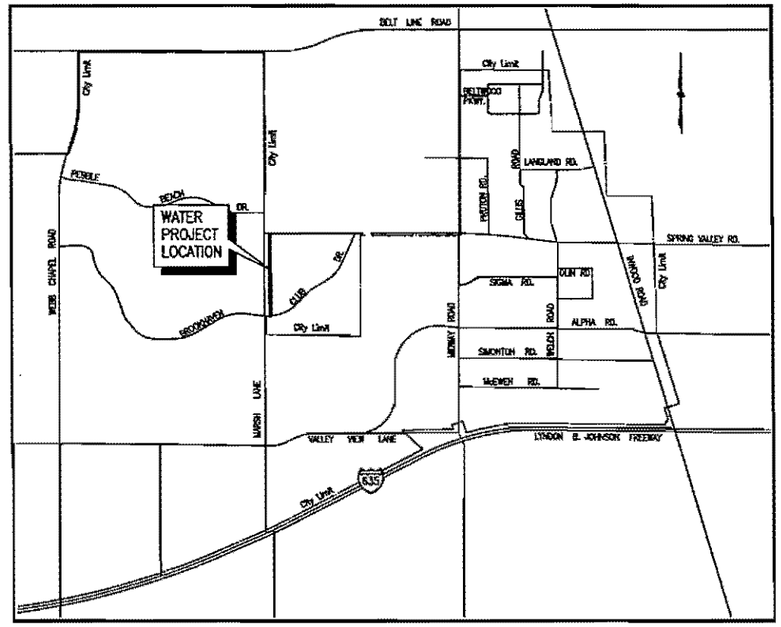
SP.33 RESILIENT SEATED GATE VALVES

Gate valves shall be in accordance with AWWA Standard C509 and C509a.

Addison!®

CONSTRUCTION PLANS FOR

MARSH LANE WATER LINE



LOCATION MAP

SHEET INDEX

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

FEBRUARY, 2002

STATE OF TEXAS · JOHN W. BIRKHOFF · 54127 · REGISTERED · PROFESSIONAL ENGINEER

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.
DATE: 2/12/02

98123W00.DWG
SCALE: 1=1
REVISED 02/12/02 RJL

CP 1

CP 60

MARSH LANE

N 9817.6390
E 10094.9389
STA. 0+00
FURNISH & INSTALL:
1 – 8" R.S. VALVE
1 – 8" 90° BEND
1 – 8" PLUG
CUT & PLUG EXIST. LINE TO WEST
CONNECT TO EXIST. 8" WATER LINE EAST
BEGIN PROP. 8" WATER LINE

STA. 0+00 TO STA. 2+95 BY OTHER THAN OPEN CUT

N 9898.4406
E 10097.4301
STA. 0+80.84
CENTER WATER LINE PIPE LENGTH OVER EXIST. SAN. SEW. REMOVE 18 L.F. OF EXIST. 6" SAN. SEW. PIPE AND REPLACE WITH 6" ASTM 2241 P.V.C. SANITARY SEWER PIPE W/ CLASS "PJ" EMBEDMENT CENTERED ON WATER LINE

N 9929.3053
E 10098.3817
STA. 1+11.72
Δ = 03°28'28"
PULL PIPE JOINT FOR DEFLECTION

N 10066.3312
E 10094.2947
STA. 2+43.8
FURNISH & INSTALL:
1 – 2" OUTLET
1 – 2" COPPER WATER
INSTALL NEW METER WITH BOX & SERVICE CONNECTION.

N 10057.5244
E 10094.2591
STA. 2+50
FURNISH & INSTALL:
1 – 2" OUTLET
1 – 2" COPPER WATER
INSTALL (4 EA.) NEW METERS WITH BOXES & SERVICE CONNECTIONS.

N 10117.5926
E 10092.7812
P.I. STA. 3+00.00
Δ = 02°33'44"
PULL PIPE JOINT FOR DEFLECTION

N 10232.8028
E 10096.3260
STA. 2+50
FURNISH & INSTALL:
1 – 2" OUTLET
1 – 2" COPPER WATER
INSTALL NEW METER WITH BOX & SERVICE CONNECTION.

REMOVE & DELIVER TO TOWN'S SERVICE CENTER EXIST. FIRE HYDRANT & EXIST. 6" VALVE

N 10279.5160
E 10097.7624
STA. 4+82
FURNISH & INSTALL
1 – 8"x6" TEE
1 – 8" R.S. VALVE
1 – 6" R.S. VALVE
5 L.F. 6" P.V.C. WATER LINE
1 – STD. FIRE HYDRANT

FURNISH & INSTALL 8" WATER LINE

MATCH LINE STA. 5+00

BROOKHAVEN CLUB DRIVE

OAKBROOK APARTMENTS
(TARRAGON BROOKS L.P.)
VOL. 99101, PG. 5374

NOTES:
1. REPLACE EXISTING 3" BRADFORD PEAR TREES WITH 3" BRADFORD PEAR TREES.
2. REPLACE CONCRETE CURB AND GUTTER FROM STA. 2+95 TO STA. 5+00 ALONG OAKBROOK APARTMENTS PARKING LOT.
3. CONTRACTOR TO PROTECT INLETS AND CURB ALONG MARSH LANE.
4. COORDINATES ARE PROJECT SPECIFIC AND NOT STATE PLANE RELATED.

CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING UTILITIES MIN. 48 HOURS PRIOR TO START OF CONSTRUCTION.

BENCHMARK: T.B.M. 27 "□" CENTER OF INLET LOCATED APPROX. 60' EAST OF NE INTERSECTION OF MARSH LN. & BROOKHAVEN CLUB DRIVE ELEV. 545.91

T.B.M. M.-1 "□" CENTER OF INLET LOCATED APPROX. 530' SOUTH OF INTERSECTION OF MARSH LN. & SPRING VALLEY RD. ELEV. 566.08

HORIZONTAL 0 20 40 60
SCALE IN FEET

SURVEY CONTROL POINTS
CP 1 PK NAIL SET N 10000.0000 E 10000.0000
CP 50 PK NAIL SET N 10358.3388 E 10013.1780

WATER SERVICES

LOCATION	PROP. 2" SERVICE (L.F.)
STA. 2+48.8 RT.	35.5
STA. 2+50.0 LT. (*)	7.5
STA. 4+15.3 LT.	4.2

FURNISH & INSTALL: PROP. 2" OUTLET, NEW 2" HIGH DENSITY POLYETHYLENE WATER PIPE AND METER BOX. CONNECT TO EXISTING WATER LINE AT EACH WATER SERVICE LOCATION. TOWN TO FURNISH WATER METER
* 4 METERS REQUIRED

H.M.A.C. REMOVAL AND REPLACEMENT
CONCRETE PAVEMENT, CURB & WALK REMOVAL AND REPLACEMENT
1-1/2-INCHES H.M.A.C. OVERLAY
SHADING INDICATES APPROX. WIDTH OF TRACK HOE
TREE REMOVAL AND REPLACEMENT

EXIST. GROUND @ ℄ OF PIPE

8" P.V.C. ON -3.80%
8" P.V.C. ON +2.16%
8" P.V.C. ON +1.46%

295.00 L.F. 8" P.V.C. BY OTHER THAN OPEN CUT
205.00 L.F. 8" P.V.C. BY OPEN CUT W/ EMBEDMENT

BEGIN PROP. 8" WATER LINE F.L. PROP. 8" WATER LINE 541.80 F.L. EX. 8" WATER 541.80
P.V.I. STA. 0+92 F.L. PROP. 8" WATER LINE 538.30
F.L. PROP. 8" WATER LINE 538.48
F.L. PROP. 8" WATER LINE 540.63
F.L. PROP. 8" WATER LINE 542.79
F.L. PROP. 8" WATER LINE 544.93
P.V.I. STA. 4+60 F.L. PROP. 8" WATER LINE 546.29
F.L. PROP. 8" WATER LINE 546.63

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.
DATE: 2/12/02

JOHN W. BIRKHOFF 54137 REGISTERED PROFESSIONAL ENGINEER

TOWN OF ADDISON, TEXAS

MARSH LANE WATER LINE

MARSH LANE WATER LINE PLAN – PROFILE STA. 0+00 TO STA. 5+00

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY: J.W.B. DRAWN BY: S.J. & F.
PROJECT: 1999 123 DATE: FEBRUARY, 2002
SHEET NO. 1 OF 8 SHEETS

REVISED 02/14/02 R.L.
9912MH01.DNG
SCALE: 1"=20
BLOCKS: PROFMH

CP 60

CP 561

MARSH LANE

MATCH LINE STA. 5+00

MATCH LINE STA. 10+00

8" S.S.

24" S.S.

FURNISH & INSTALL 8" WATER LINE

STA. 8+33 TO STA. 9+28 BY OTHER THAN OPEN CUT

N 10757.2872
E 10112.7050
STA. 9+50
FURNISH & INSTALL:
1 - 8"x6" TEE (UP)
1 - 8" R.S. VALVE
1 - 6" R.S. VALVE
1 - 6" 90° BEND
8 L.F. 6" P.V.C. WATER LINE
1 - STD. FIRE HYDRANT
REMOVE & DELIVER TO TOWN'S SERVICE CENTER
EXIST. FIRE HYDRANT & EXIST. 6" VALVE

N 10550.8055
E 10106.1047
STA. 7+33.42
Δ = 00°00'54"
PULL PIPE JOINT FOR DEFLECTION

N 10812.2663
E 10114.0764
STA. 9+95
FURNISH & INSTALL:
1 - 8"x8" TEE
1 - 8" R.S. VALVE
9.5 L.F. 8" P.V.C. WATER LINE
CONNECT TO EXIST. 8" WATER LINE

EXIST. 8" WATER LINE
PROP. 8" WATER LINE
PROP. SERVICE CONN. & VALVE
EXIST. 33" R.C.P.
EXIST. 6" W. L.

HORIZONTAL
0 20 40 60
SCALE IN FEET

SURVEY CONTROL POINTS

CP 60	PK NAIL SET	N 10358.3388 E 10013.1780
CP 561	PK NAIL SET	N 10759.9079 E 10025.8270

WATER SERVICES

LOCATION	PROP. 2" SERVICE (L.F.)
STA. 6+14.7 LT.	5.3
STA. 6+16.5 RT.	18.1
STA. 6+73.0 LT.	2.0
STA. 6+76.0 LT.	2.2
STA. 6+77.0 LT.	1.0
STA. 6+77.4 RT.	17.1
STA. 6+80.9 RT.	8.3
STA. 9+62.4 RT.	7.3

FURNISH & INSTALL: PROP. 2" OUTLET, NEW 2" HIGH DENSITY POLYETHYLENE WATER PIPE, AND METER BOX. CONNECT TO EXISTING WATER LINE AT EACH WATER SERVICE LOCATION. TOWN TO FURNISH WATER METER.

H.M.A.C. REMOVAL AND REPLACEMENT

CONCRETE PAVEMENT, CURB & WALK REMOVAL AND REPLACEMENT

1-1/2-INCHES H.M.A.C. OVERLAY

SHADING INDICATES APPROX. WIDTH OF TRACK HOE

NOTES:
1. REPLACE EXISTING HAWTHORNE BUSHES WITH 5 GALLON HAWTHORNE BUSHES.
2. REPLACE CONCRETE CURB AND GUTTER FROM STA. 5+00 TO STA. 8+41.65 ALONG THE BROOKS APARTMENTS PARKING LOT.
3. ADJUST WATER METER BOXES IN H.M.A.C. OVERLAY AREAS TO MATCH FINAL GRADE OF OVERLAY.
4. REPLACE SIDEWALK FROM STA. 9+13.51 TO STA. 9+67.65 AND STA. 9+91.78 TO STA. 10+00.
5. CONTRACTOR TO PROTECT INLETS AND CURB ALONG MARSH LANE.
6. COORDINATES ARE PROJECT SPECIFIC AND NOT STATE PLANE RELATED.

THE BROOKS APARTMENTS
(DAVISTER GREENBROOK CORP.)
VOL. 97209, PG. 1663

GOODYEAR TIRE
(MILTON WAGER AND GAY GELLER COLEMAN)
VOL. 78139, PG. 769

CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING UTILITIES MIN. 48 HOURS PRIOR TO START OF CONSTRUCTION.

BENCHMARK: T.B.M. 27 "□" CENTER OF INLET LOCATED APPROX. 60' EAST OF NE INTERSECTION OF MARSH LN. & BROOKHAVEN CLUB DRIVE ELEV. 546.91

T.B.M. ML-1 "□" CENTER OF INLET LOCATED APPROX. 530' SOUTH OF INTERSECTION OF MARSH LN. & SPRING VALLEY RD. ELEV. 566.08

565 560 555 550 545 540 535 530 525

EXIST. GROUND @ ℄ OF PIPE

8" P.V.C. ON +1.46%

8" P.V.C. ON -48.80%

8" P.V.C. ON +0.52%

8" P.V.C. ON +57.28%

8" P.V.C. ON +0.26%

333 L.F. 8" P.V.C. BY OPEN CUT W/ EMBEDMENT

95 L.F. 8" P.V.C. BY OTHER THAN OPEN CUT

72 L.F. 8" P.V.C. BY OPEN CUT W/ EMBEDMENT

STA. 8+79.85 EX. 8" S.S. F.L. 549.14

STA. 9+21.21 EX. 39" R.C.P. F.L. 551.94

STA. 9+92.31 EX. 8" WATER F.L. 553.34

F.L. PROP. 8" WATER LINE 546.83

F.L. PROP. 8" WATER LINE 548.29

F.L. PROP. 8" WATER LINE 549.75

F.L. PROP. 8" WATER LINE 551.21

P.V.I. STA. 8+90 F.L. PROP. 8" WATER LINE 551.50

P.V.I. STA. 8+30 F.L. PROP. 8" WATER LINE 546.62

P.V.I. STA. 9+50 F.L. PROP. 8" WATER LINE 547.14

P.V.I. STA. 9+40 F.L. PROP. 8" WATER LINE 552.87

F.L. PROP. 8" WATER LINE 553.03

5+00 6+00 7+00 8+00 9+00 10+00

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.
DATE: 2/12/02

STATE OF TEXAS
JOHN W. BIRKHOFF
54137
REGISTERED PROFESSIONAL ENGINEER

TOWN OF ADDISON, TEXAS

MARSH LANE WATER LINE

MARSH LANE WATER LINE PLAN – PROFILE STA. 5+00 TO STA. 10+00

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY:	J.W.B.	PROJECT: 1999 123	SHEET NO. 2
DRAWN BY:	S.J. & F.	DATE: FEBRUARY, 2002	OF 8 SHEETS

REVISED 02/14/02 R.L. 9912MW02.DWG SCALE: 1=20 BLOCKS: PROFW2

MATCH LINE STA. 15+00 BK. = MATCH LINE STA. 15+01.32 FWD.

STATION EQUATION
N 11312.1886, E 10114.597
MATCH LINE STA. 15+00 BK. =
MATCH LINE STA. 15+01.32 FWD.

N 11452.8440
E 10117.4342
STA. 16+42.01
CENTER WATER LINE. PIPE LENGTH OVER EXIST. SAN. SEW. REMOVE 18 L.F. OF EXIST. 8" SAN. SEW. PIPE AND REPLACE WITH ASTM 2241 P.V.C. SANITARY SEWER PIPE W/ CLASS "H" EMBEDMENT CENTERED ON WATER LINE

N 11428.5321
E 10116.9438
STA. 16+17.69
FURNISH & INSTALL:
1 – 8"x6" TEE (UP)
1–6" 90° BEND
1 – 6" R.S. VALVE
1 – 6" R.S. VALVE
18 L.F. 6" P.V.C. WATER LINE
1 – STD. FIRE HYDRANT

N 11389.4944
E 10116.1564
STA. 15+78.64
FURNISH & INSTALL:
1–2" WATER OUTLET & CONNECTIONS

N 11485.8355, E 10117.6962
STA. 16+55, FURNISH & INSTALL:
1 – 8"x8" TEE
2 – 8" 90 BENDS
1 – 8" R.S.G.V.
3 – 8" PLUGS
3 – CUT & PLUG EXIST. W.L. (EAST)
22.5 L.F. 8" P.V.C. WATER LINE
CONNECT TO EXIST. 8" W.L. (EAST)

N 11608.2418
E 10121.3726
STA. 17+97.17
FURNISH & INSTALL:
1 – 8"x6" TEE (UP)
1–6" 90° BEND
1 – 6" R.S. VALVE
15 L.F. 6" P.V.C. WATER LINE
1 – STD. FIRE HYDRANT
REMOVE & DELIVER TO TOWN'S SERVICE CENTER EXIST. FIRE HYDRANT & 6" VALVE

N 11392.8503
E 10116.224
STA. 15+82
FURNISH & INSTALL:
1 – 8" WATER VALVE

N 11483.7340
E 10118.0523
P.I. STA. 16+72.90
PULL PIPE JOINT FOR DEFLECTION

CP 1161

CP 1162

MARSH LANE

FURNISH & INSTALL 8" WATER LINE

MARCELLO'S ITALIAN RESTAURANT

SHOPPING CENTER

CONCRETE PAVEMENT

ASPHALT PAVEMENT

WARNING
S.W. BELL BURIED TELEPHONE CABLE
CALL ENTERPRISE 9800
72 HOURS PRIOR TO EXCAVATION IN VICINITY OF STA. 16+26 & STA. 16+63

HORIZONTAL 0 20 40 80
SCALE IN FEET

WATER SERVICES	
LOCATION	PROP. 2" SERVICE (L.F.)
STA. 15+78.64 RT.	19.2'

FURNISH & INSTALL: PROP. 2" OUTLET, NEW 2" HIGH DENSITY POLYETHYLENE WATER PIPE, AND METER BOX. CONNECT TO EXISTING WATER LINE AT EACH WATER SERVICE LOCATION. TOWN TO FURNISH WATER METER.

CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING UTILITIES MIN. 48 HOURS PRIOR TO START OF CONSTRUCTION.

SURVEY CONTROL POINTS
CP 1161 PK NAIL SET N 11437.5911 E 10170.6581
CP 1162 PK NAIL SET N 11676.7098 E 10054.0723

CONCRETE PAVEMENT, CURB & WALK REMOVAL AND REPLACEMENT

SHADING INDICATES APPROX. WIDTH OF TRACK HOE

NOTES:
1. CONTRACTOR TO PROTECT INLETS ALONG MARSH LANE.
2. COORDINATES ARE PROJECT SPECIFIC AND NOT STATE PLANE RELATED.

BENCHMARK: T.B.M. 27 "□" CENTER OF INLET LOCATED APPROX. 60' EAST OF NE INTERSECTION OF MARSH LN. & BROOKHAVEN CLUB DRIVE. ELEV. 545.91

T.B.M. NO.-1 "□" CENTER OF INLET LOCATED APPROX. 530' SOUTH OF INTERSECTION OF MARSH LN. & SPRING VALLEY RD. ELEV. 566.08

575 570 565 560 555 550 545 540 535

STA. 15+26.15 EXIST. TELE. F.L. 550.64
STA. 16+42 EXIST. 8" S.S. F.L. 537.44
STA. 16+63.82 EXIST. TELE. F.L. 539.12
STA. 17+18.73 EXIST. 18" R.C.P. F.L. 538.52
STA. 18+34.19 EXIST. 18" R.C.P. F.L. 540.44

EXIST. GROUND @ ℄ OF PIPE

8" P.V.C. ON +0.26%

8" P.V.C. ON +2.66%

498.62 L.F. 8" P.V.C. BY OPEN CUT W/ EMBEDMENT

STATION EQUATION
N 11312.1886, E 10114.597
MATCH LINE STA. 15+00 BK. =
MATCH LINE STA. 15+01.32 FWD.

F.L. PROP. 8" WATER LINE 551.33
F.L. PROP. 8" WATER LINE 551.59
F.L. PROP. 8" WATER LINE 554.65
P.I. STA. 17+20
F.L. PROP. 8" WATER LINE 551.90
F.L. PROP. 8" WATER LINE 557.03
F.L. PROP. 8" WATER LINE 556.69
F.L. PROP. 8" WATER LINE 562.35

15+00 16+00 17+00 18+00 20+00

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.
DATE: 2/12/02

STATE OF TEXAS · JOHN W. BIRKHOFF · 54137 · REGISTERED · PROFESSIONAL ENGINEER

TOWN OF ADDISON, TEXAS

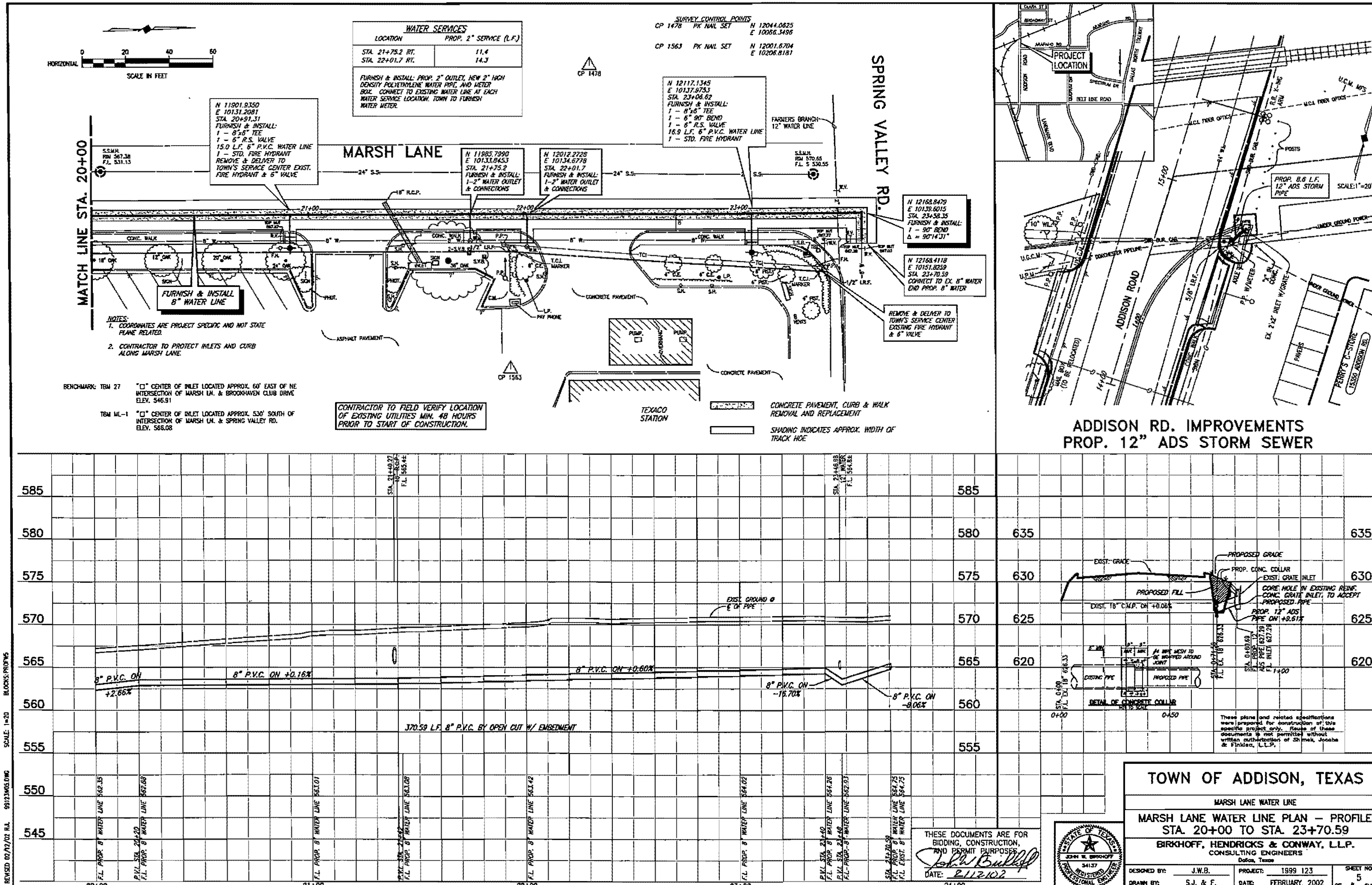
MARSH LANE WATER LINE

MARSH LANE WATER LINE PLAN – PROFILE STA. 15+00 TO STA. 20+00

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY: J.W.H.	PROJECT: 1999 123	SHEET NO. 4
DRAWN BY: S.J. & F.	DATE: FEBRUARY, 2002	OF 8 SHEETS

REVISED 02/12/02 RJL 9912SWR4.DWG SCALE: 1=20 BLOCKS: PROFW4


WATER SERVICES
LOCATION | PROP. 2" SERVICE (L.F.)
STA. 21+75.2 RT. 11.4
STA. 22+01.7 RT. 14.3
FURNISH & INSTALL: PROP. 2" OUTLET, NEW 2" HIGH DENSITY POLYETHYLENE WATER PIPE, AND METER BOX. CONNECT TO EXISTING WATER LINE AT EACH WATER SERVICE LOCATION. TOWN TO FURNISH WATER METER.
SURVEY CONTROL POINTS
CP 1478 PK NAIL SET N 12044.0625 E 10066.3496
CP 1563 PK NAIL SET N 12001.6704 E 10206.8181
HORIZONTAL 0 20 40 60
SCALE IN FEET
MARSH LANE
SPRING VALLEY RD.
MATCH LINE STA. 20+00
N 11901.9350 E 10131.2081 STA. 20+91.31 FURNISH & INSTALL: 1 - 8"x6" TEE 1 - 6" R.S. VALVE 15.0 L.F. 6" P.V.C. WATER LINE 1 - STD. FIRE HYDRANT REMOVE & DELIVER TO TOWN'S SERVICE CENTER EXIST. FIRE HYDRANT & 6" VALVE
N 11985.7990 E 10133.8453 STA. 21+75.2 FURNISH & INSTALL: 1-2" WATER OUTLET & CONNECTIONS
N 12012.2728 E 10134.6778 STA. 22+01.7 FURNISH & INSTALL: 1-2" WATER OUTLET & CONNECTIONS
N 12117.1345 E 10137.9753 STA. 23+06.62 FURNISH & INSTALL: 1 - 8"x6" TEE 1 - 6" 90° BEND 1 - 6" R.S. VALVE 16.9 L.F. 6" P.V.C. WATER LINE 1 - STD. FIRE HYDRANT
FARMERS BRANCH 12" WATER LINE
N 12168.8479 E 10139.6015 STA. 23+58.35 FURNISH & INSTALL: 1 - 90° BEND Δ = 90°14'31"
N 12168.4118 E 10151.8259 STA. 23+70.59 CONNECT TO EX. 8" WATER END PROP. 8" WATER
REMOVE & DELIVER TO TOWN'S SERVICE CENTER EXISTING FIRE HYDRANT & 6" VALVE
FURNISH & INSTALL 8" WATER LINE
NOTES:
1. COORDINATES ARE PROJECT SPECIFIC AND NOT STATE PLANE RELATED.
2. CONTRACTOR TO PROTECT INLETS AND CURB ALONG MARSH LANE.
BENCHMARK: TBM 27 "□" CENTER OF INLET LOCATED APPROX. 60' EAST OF NE INTERSECTION OF MARSH LN. & BROOKHAVEN CLUB DRIVE ELEV. 546.91
TBM ML-1 "□" CENTER OF INLET LOCATED APPROX. 530' SOUTH OF INTERSECTION OF MARSH LN. & SPRING VALLEY RD. ELEV. 566.08
CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING UTILITIES MIN. 48 HOURS PRIOR TO START OF CONSTRUCTION.
TEXACO STATION
CONCRETE PAVEMENT, CURB & WALK REMOVAL AND REPLACEMENT
SHADING INDICATES APPROX. WIDTH OF TRACK HOE
ADDISON RD. IMPROVEMENTS
PROP. 12" ADS STORM SEWER
PROJECT LOCATION
PROP. 8.6 L.F. 12" ADS STORM PIPE
SCALE: 1"=20'
ADDISON ROAD
PERRY'S C-STORE
EXIST. GROUND @ ℄ OF PIPE
8" P.V.C. ON +2.66%
8" P.V.C. ON +0.16%
8" P.V.C. ON +0.60%
8" P.V.C. ON -16.70%
8" P.V.C. ON -8.06%
370.59 L.F. 8" P.V.C. BY OPEN CUT W/ EMBEDMENT
PROPOSED GRADE
EXIST. GRADE
PROP. CONC. COLLAR
EXIST. GRATE INLET
PROPOSED FILL
CORE HOLE IN EXISTING REINF. CONC. GRATE INLET, TO ACCEPT PROPOSED PIPE
EXIST. 18" C.M.P. ON +0.06%
PROP. 12" ADS PIPE ON +9.61%
DETAIL OF CONCRETE COLLAR
20+00
21+00
22+00
23+00
24+00
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THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES
DATE: 2/12/02
STATE OF TEXAS JOHN W. BIRKHOFF 34137 REGISTERED PROFESSIONAL ENGINEER

TOWN OF ADDISON, TEXAS

MARSH LANE WATER LINE

MARSH LANE WATER LINE PLAN – PROFILE
STA. 20+00 TO STA. 23+70.59

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY:	J.W.B.	PROJECT:	1999 123	SHEET NO. 5
DRAWN BY:	S.J. & F.	DATE:	FEBRUARY, 2002	OF 8 SHEETS

REVISED 02/12/02 R.J. 99123W05.DWG SCALE: 1=20 BLOCKS: PROFWS

GENERAL NOTES

(NOTES APPLY TO ALL SHEETS)

1. REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATION OF ALL KNOWN UNDERGROUND UTILITIES AND SERVICE LINES. HOWEVER, THE OWNER ASSUMES NO RESPONSIBILITY FOR FAILURE TO SHOW ANY OR ALL EXISTING SUBSURFACE OR SURFACE UTILITIES OR UTILITY LINES, OR TO SHOW THEM IN THEIR EXACT LOCATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES, SERVICE LINES OR THE LIKE, WHICH ARE CROSSED OR EXPOSED BY THE CONSTRUCTION OPERATION.

2. CONTRACTOR SHALL NOTIFY UTILITY COMPANIES 72 HOURS PRIOR TO CONSTRUCTION
   A. T.U. ELECTRIC
   B. GENERAL TELEPHONE (G.T.E.)
   C. LONE STAR GAS
   D. CABLE TELEPHONE
   E. T.C.I. CABLE TV

3. ALL PAVEMENT SHALL BE SAWCUT FOR TRENCHES. SAWCUTS SHALL BE FULL DEPTH.

4. ALL CONCRETE PAVEMENT (ROADWAYS, CURB & GUTTERS, DRIVES, AND SIDEWALKS, ETC.) SHALL HAVE BE FULL DEPTH SAWCUT. 18 INCH LONG NO. 4 DOWELS SHALL BE DRILLED INTO EXISTING PAVEMENT. CONTRACTOR SHALL UTILIZE A DRILLING RIG TO DRILL HOLES FOR DOWEL BARS. CONTRACTOR SHALL UTILIZE PROPER BITS AND PRESSURE, AS NOT TO DAMAGE EXISTING CONCRETE. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGED PAVEMENT AND REPAIR AT HIS OWN COST.

5. THE CONTRACTOR SHALL PROTECT ALL UNDERGROUND SPRINKLER SYSTEMS. ALL DAMAGES CAUSED BY CONSTRUCTION SHALL BE REPAIRED BY A IRRIGATOR LICENSED IN THE STATE OF TEXAS. IRRIGATION REPAIR SHALL OCCUR WITHIN 48 HOURS OF DAMAGE OR AS PIPE LAYING TRAIN PASSES AFFECTED AREA. ALL COST SHALL BORNE BY THE CONTRACTOR.

6. CONTRACTOR SHALL HAVE UTILITY COMPANIES SUPPORT AND PROTECT OR RELOCATE THEIR UTILITY POLES, GUY WIRES OR CABLE AND/OR LIGHT POLES IN WORK AREA. COST SHALL BE SUBSIDIARY TO THE CONTRACT.

7. ALL ROADWAYS/ DRIVEWAYS, ETC. SHALL REMAIN OPEN DURING CONSTRUCTION. AT LEAST ONE WAY TRAFFIC (USING A FLAGMAN OR OTHER MEANS) SHALL BE AVAILABLE DURING WORKING HOURS. AFTER HOURS, TWO WAY TRAFFIC MUST BE MAINTAINED.

8. THE CONTRACTOR SHALL REPLACE ALL SHRUBS, PLANTS, TREES, ETC. THAT ARE REMOVED FOR THE CONVENIENCE OF CONSTRUCTION AT HIS EXPENSE. NEW SHRUBS, PLANTS, TREES, ETC. SHALL BE EQUAL TO OR BETTER THAN EXISTING ONES OR MEET THE NEEDS OF THE PROPERTY OWNER.

9. THE CONTRACTOR SHALL RESTORE ALL EXISTING LANDSCAPING AND VEGETATION ALONG THE CONSTRUCTION ROUTE TO ITS ORIGINAL CONDITION AFTER COMPLETION OF CONSTRUCTION.

10. ALL WATER VALVES SHALL BE RESILIENT SEATED WEDGE GATE VALVES.

11. EXISTING FIRE HYDRANTS, VALVES AND VALVE STACKS CALLED OUT IN PLANS TO BE REMOVED AND DELIVERED TO TOWN'S SERVICE CENTER BY THE CONTRACTOR.

12. ALL CHANGES OF DIRECTION OF THE PROPOSED WATER LINE SHALL BE MARKED ON THE SURFACE. PAVEMENT SHALL BE MARKED WITH PERMANENT MARKERS MANUFACTURED BY D.A.S. MANUFACTURING, INC. OF VALRICO, FLORIDA (813-681-6024). THE MARKER SHALL BE BLUE WITH THE WORD "WATER" AND AN ARROW(S) FOR THE DIRECTION(S) OF THE LINE.

13. ALL WATER SERVICES SHALL INCLUDE AN U.S.C. APPROVED DOUBLE CHECK VALVE ASSEMBLY UPSTREAM OF METER. EACH SHALL BE SET IN ITS OWN VALVE OR METER BOX.

14. ALL GRASS DISTURBED ALONG PROJECT SHALL BE REPLACED WITH SOLID SOD PLACED END TO END. CONTRACTOR SHALL WATER SOD TWICE A DAY FOR A PERIOD OF SIX WEEKS. WATERING SHALL BE ACCOMPLISHED BY USE OF A WATER TRUCK.

15. ALL EXISTING AND NEW FIRE HYDRANTS NOT ACTIVE SHALL HAVE OUT OF SERVICE MARKERS PLACED ON TWO NOZZLES. MARKERS SHALL BE FROM HYDRA-SHIELD MANUFACTURING 1-800-676-0911 OR EQUAL. THE COLOR SHALL BE RED.

16. FINAL LOCATION OF WATER METER SHALL BE DETERMINED IN THE FIELD BY THE TOWN OF ADDISON.

17. ALL PAVEMENT CUTS SHALL BE COMPLETED UTILIZING FULL DEPTH SAW CUT. PROPOSED CONCRETE PAVEMENT SHALL BE DOWELED INTO EXIST. CONCRETE PAVEMENT (SEE LONGITUDINAL BUTT JOINT DETAIL).

18. CONTRACTOR SHALL MAINTAIN A MINIMUM OF ONE DRIVE WAY OPEN TO ALL RESIDENTS AND BUSINESSES DURING CONSTRUCTION. DRIVEWAYS THAT ARE CLOSE FOR CONSTRUCTION SHALL BE DONE BETWEEN THE HOURS OF 9 AM AND 4 PM. ALL DRIVEWAYS CLOSED FOR CONSTRUCTION SHALL BE OPENED BY PLACEMENT OF STEEL PLATES OR BACKFILLED WITH ALL WEATHER SURFACE IMMEDIATELY AFTER WATER LINE IS CONSTRUCTED.

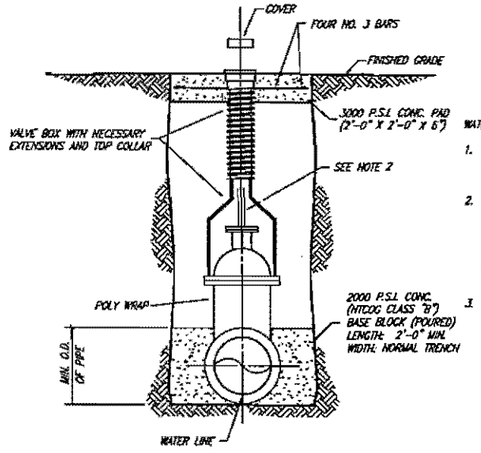
19. MARSH LANE NORTHBOUND SHALL BE OPEN TO TRAFFIC AT ALL TIMES. WITHIN THE CONSTRUCTION ZONE THE CONTRACTOR MAY CLOSE DOWN MARSH LANE TO ONE LANE OF TRAFFIC FROM 7 AM TO 3 PM. AT ALL OTHER TIMES A MINIMUM OF TWO LANES OF TRAFFIC SHALL BE MAINTAINED. CONTRACTOR SHALL SUBMIT BARRICADE AND PHASING PLAN FOR TOWN'S REVIEW AND APPROVAL A MINIMUM OF 10 DAYS PRIOR TO ROAD CLOSURES. (SEE SPECIFICATIONS)

20. CONTRACTOR SHALL PLACE 2 INCH HMAC OVERLAY ON APARTMENT COMPLEX PARKING LOT AS SHOWN. AREAS OUTSIDE OF DESIGNATED AREAS DAMAGED BY CONSTRUCTION SHALL BE REPLACED BY CONTRACTOR AT CONTRACTOR'S EXPENSE.

21. COORDINATES ARE PROJECT SPECIFIC AND NOT STATE PLANE RELATED.

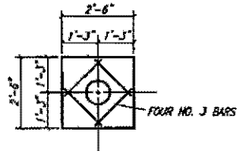
22. HMAC OVERLAY SHALL BE A MINIMUM 1 1/2" COMPACTED IN PLACE AND ALLOW FOR POSITIVE DRAINAGE. EXISTING SURFACE SHALL RECEIVE A TACK COAT PRIOR TO OVERLAY.

23. EXISTING WATER LINE SHALL REMAIN IN SERVICE UNTIL PROPOSED MAIN IS ACCEPTED BY TOWN OF ADDISON.



VALVE SETTING & BOX

NO SCALE

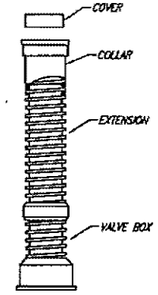


VALVE BOX PAD PLAN

NO SCALE

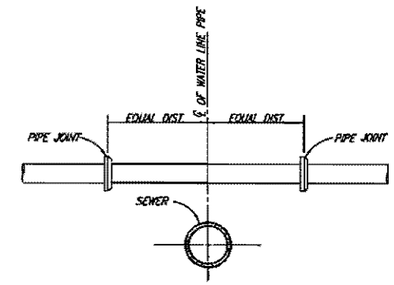
WATER VALVE NOTES:

1. 4" TO 12" GATE VALVE SHALL BE RESILIENT SEATED WEDGE GATE VALVES ACCORDANCE WITH AWWA STANDARD C-509.
2. A PERMANENTLY ATTACHED VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WHOSE OPERATING NUT IS LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE OF SUFFICIENT LENGTH TO ENSURE THAT ITS TOP IS WITHIN 4" OF THE VALVE BOX COVER.
3. VALVE SHALL BE WRAPPED IN POLY WRAP.



VALVE BOX WITH EXTENSION

NO SCALE



TYPICAL WATER/SEWER CROSSING

NO SCALE

WATER LINE PHASING

(NOTES APPLY TO ALL SHEETS)

1. CONTRACTOR SHALL CONSTRUCT WATER LINE FROM STATION 0+00 TO STATION 16+17.
2. CONTRACTOR SHALL TEST LINE AND HAVE ACCEPTED BY TOWN OF ADDISON.
3. CONTRACTOR SHALL MAKE SERVICE CONNECTIONS.
4. CONTRACTOR SHALL CONSTRUCT WATER LINE FROM 16+17 TO END OF PROJECT.
5. CONTRACTOR SHALL TEST WATER LINE STARTING FROM 16+17 TO END OF LINE AND HAVE ACCEPTED BY TOWN OF ADDISON.
6. CONTRACTOR SHALL MAKE REMAINING SERVICE CONNECTIONS.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

John W. Birkhoff

DATE: 2/12/02

STATE OF TEXAS — JOHN W. BIRKHOFF — 84137 — REGISTERED — PROFESSIONAL ENGINEER

TOWN OF ADDISON, TEXAS

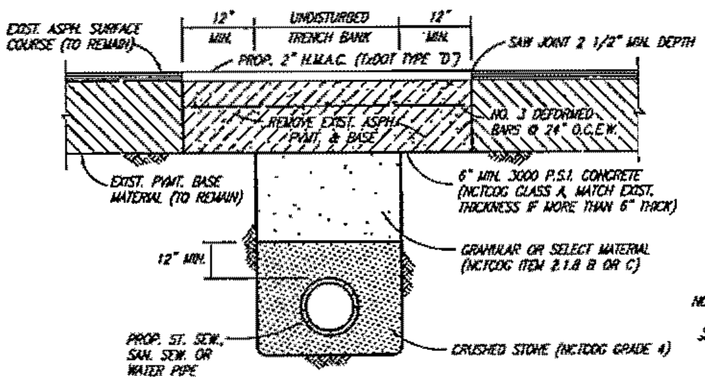
MARSH LANE WATER LINE

GENERAL NOTES & DETAILS

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY: J.W.B.	PROJECT: 1999 123	SHEET NO. 6
DRAWN BY: S.J. & F.	DATE: FEBRUARY, 2002	OF 8 SHEETS

02/12/2002 R.L. 99123WOR.DWG BLOCKS-ARREL-2,W-SSX,YARDV,V, MANHOLE

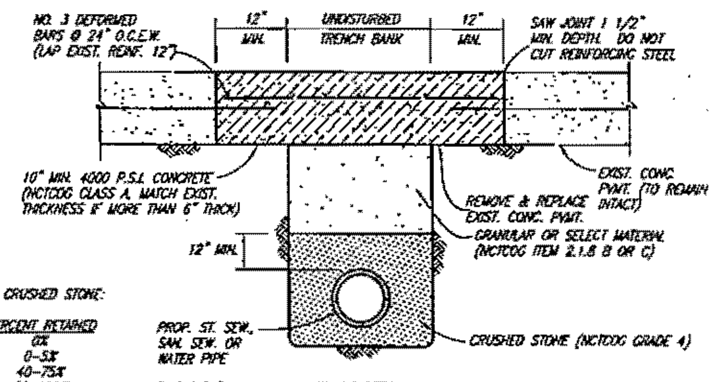


ASPHALT PAVEMENT REPAIR

NO SCALE

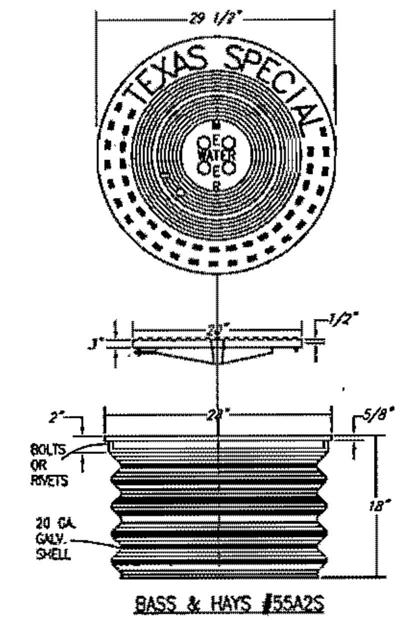
NCTCOG GRADE 4 CRUSHED STONE:

SIEVE SIZE	PERCENT RETAINED
1 1/2"	0%
1"	0-5%
1/2"	40-75%
NO. 4	90-100%
NO. 8	95-100%



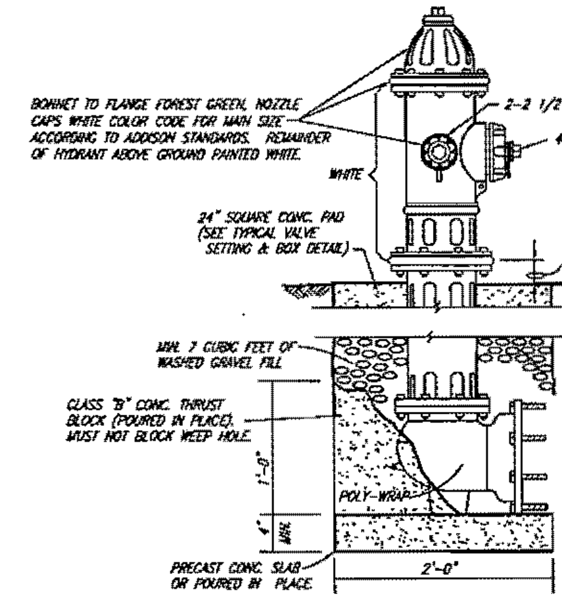
CONCRETE PAVEMENT REPAIR

NO SCALE



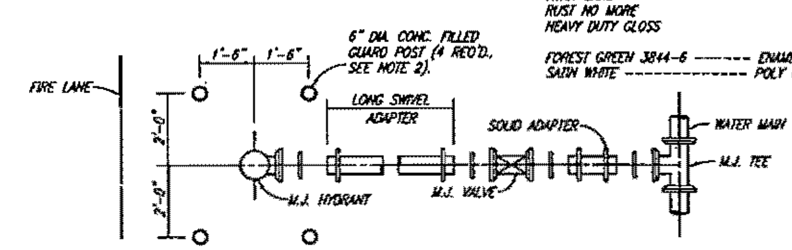
METER BOX RING & COVER
METER BOX DETAILS

NO SCALE



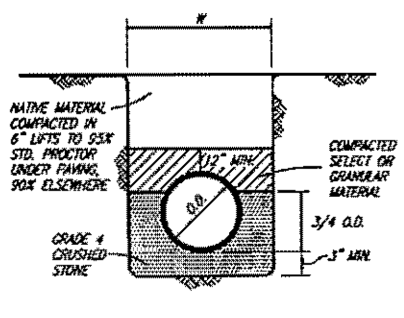
FIRE HYDRANT NOTES:

1. IN GENERAL ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARDS SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE FOR WATER AND SANITARY SEWER IMPROVEMENTS. FIRE HYDRANTS SHALL HAVE A 5-1/4" MINIMUM VALVE OPENING AND WITH A BARREL APPROXIMATELY 7" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE. ALL HYDRANTS SHALL BE APPROVED BY THE TOWN OF ADDISON.
2. GUARD POSTS SHALL BE 5 L.F. OF 6" DIA. STEEL PIPE (3' ABOVE & BELOW GROUND LEVEL). POST SHALL BE ENCASED IN 16" DIA. CONC. PIER TO A DEPTH OF 12" BELOW POST BOTTOM. REINF. CONC. PIER WITH 2 NO. 6 BARS (12" LONG) THRU POST INTO PIER. POST ABOVE GROUND LEVEL SHALL BE PAINTED ALUMINUM WITH 2-2 INCH BANDS OF RED AND WHITE REFLECTIVE TAPE.
3. ACCEPTABLE FIRE HYDRANTS IN ADDISON ARE MUELLER, CLOW, AND WATEROUS.
4. FIRE HYDRANT PAINT
   VITRA-GARD
   RUST NO MORE
   HEAVY DUTY GLOSS
   FOREST GREEN 3844-6 -------- ENAMEL
   SATIN WHITE ---------------- POLY URETHANE



TYPICAL FIRE HYDRANT INSTALLATION

NO SCALE

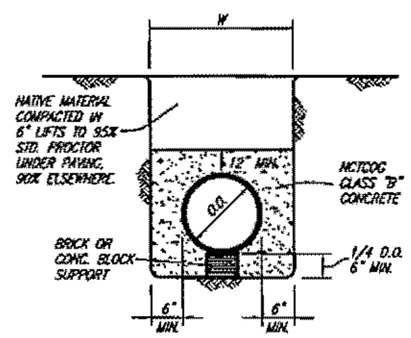


CLASS B-1 EMBEDMENT

P.V.C. PIPE ONLY
STD. P.V.C. WATER

EMBEDMENT NOTES:

1. DEPTH OF TRENCH BELOW PIPE:
   - 3" MIN. FOR 27" PIPE & SMALLER
   - 4" MIN. FOR 30" TO 60" PIPE
   - 6" MIN. FOR 66" PIPE & LARGER
2. MAXIMUM TRENCH WIDTH ("W") SHALL BE 24" PLUS O.D. FOR PIPE ≤ 36" I.D. AND 36" PLUS O.D. FOR PIPE > 36" I.D.



CLASS G EMBEDMENT

CONCRETE ENCASEMENT

NCTCOG GRADE 4 CRUSHED STONE:

SIEVE SIZE	PERCENT RETAINED
1 1/2"	0%
1"	0-5%
1/2"	40-75%
NO. 4	90-100%
NO. 8	95-100%

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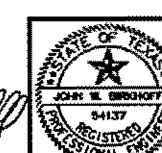
DATE: 2/12/02



TOWN OF ADDISON, TEXAS

MARSH LANE WATER LINE

DETAILS

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY:	J.W.B.	PROJECT:	1999 123	SHEET NO. 8
DRAWN BY:	S.J. & F.	DATE:	FEBRUARY, 2002	OF 8 SHEETS

02/12/2002 R.L. 99123WDE.DWG SCALE: 1=20 BLOCKS:ASPHPVMT,CLASSB1,CLASSG,CLASSH,FIREHYD,WATERSVC