

City of Port Clinton

Appendix “D”

**Standard Specifications
Drawings**

FIGURE #1
TYPICAL WATER SERVICE LINE

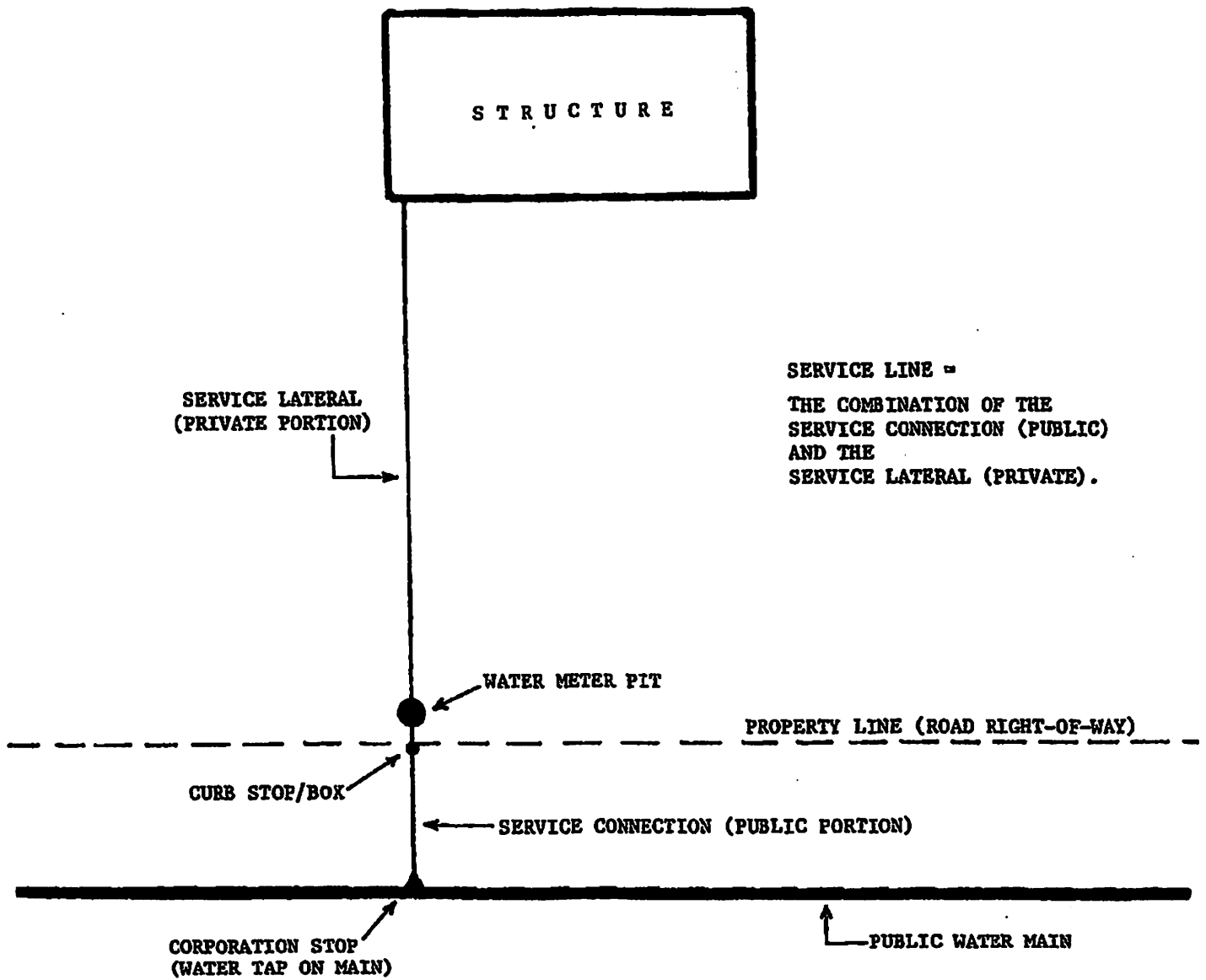
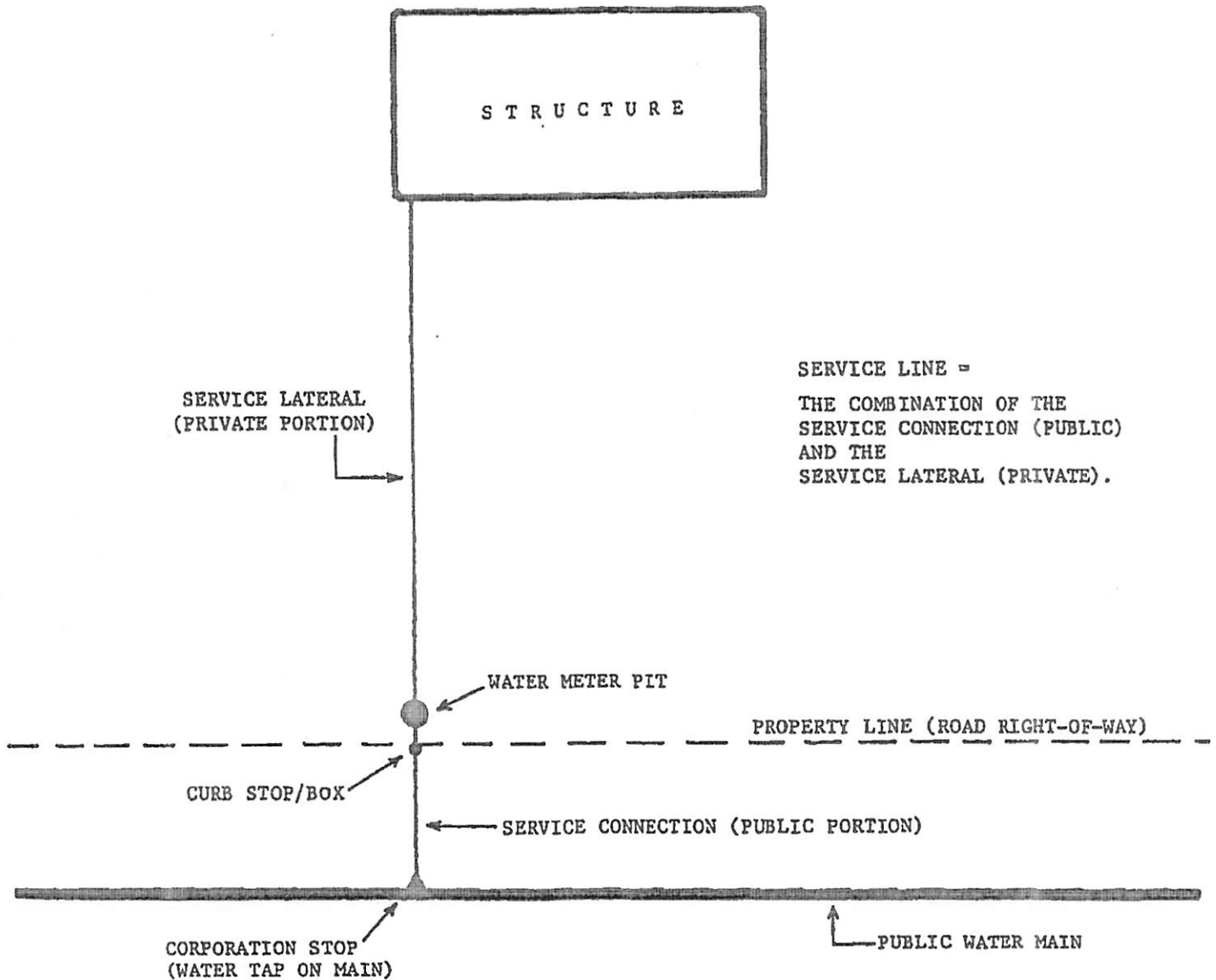
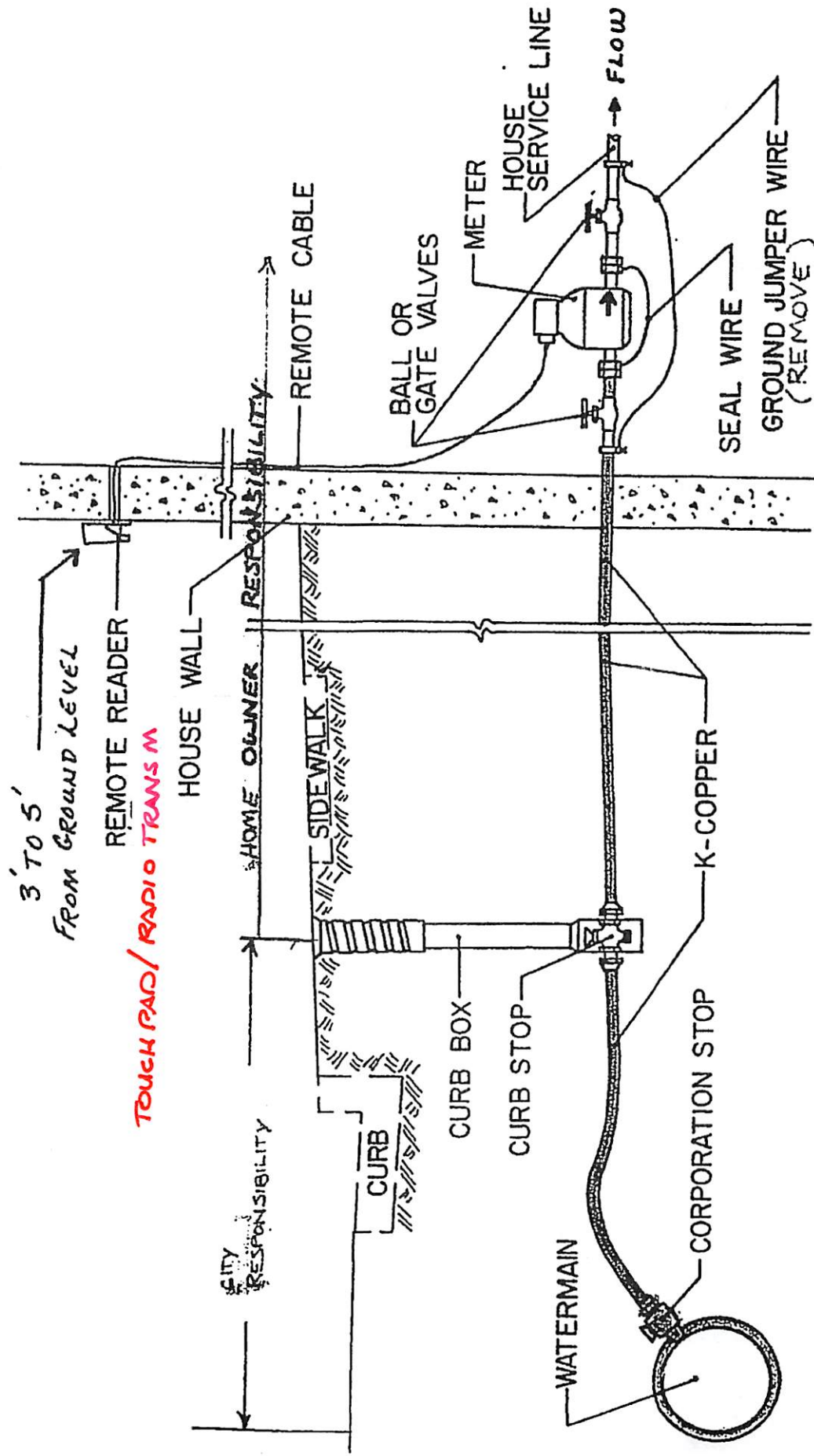


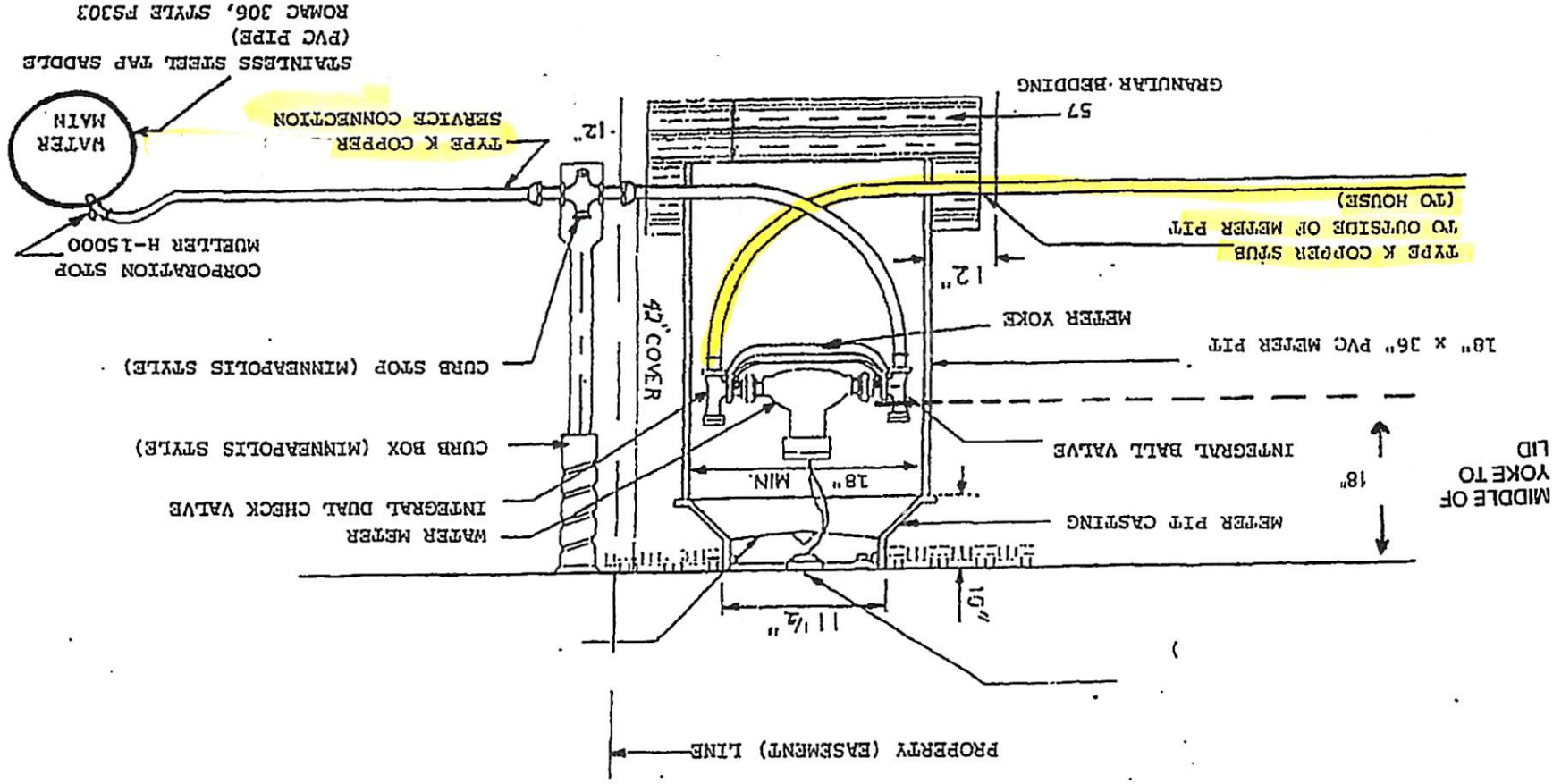
FIGURE #1
TYPICAL WATER SERVICE LINE





WATER SERVICE - INSIDE METER SETTING

FIGURE #2
TYPICAL 5/8" X 1 1/2" METER PIT SETTING/SPECIFICATIONS
PORT CLINTON OHIO



**Specification #'s from HD SUPPLY for Water Pit
upgrades in the City Of Port Clinton: RESIDENTIAL ONLY**

Iron Yoke Piece 5/8 Y501

Expansion Connection EC-5/8

¾ Angle Valve AV94-313WQ

HHCA94-313Q 5/8 ANG DUAL

CHECK VALVE MTR YOKE x QJ

METER PIT MATERIAL

18" C32-T TYPE C CVR W/ TRLID

18" PRO LINK CORR PIPE

FIGURE #2A
TYPICAL 3/4" and 1" METER PIT SETTING/SPECIFICATIONS
 PORT CLINTON ; OHIO

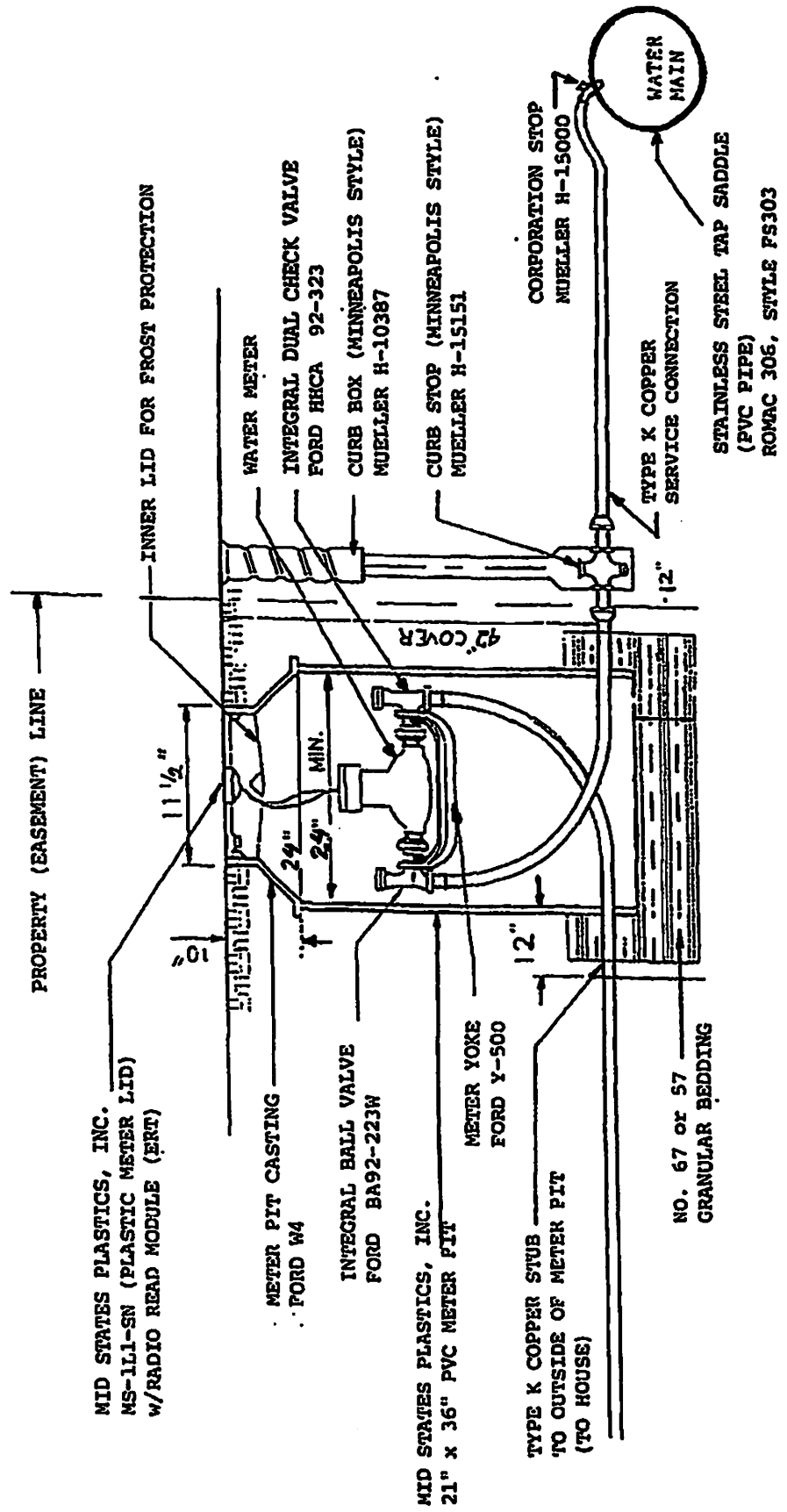
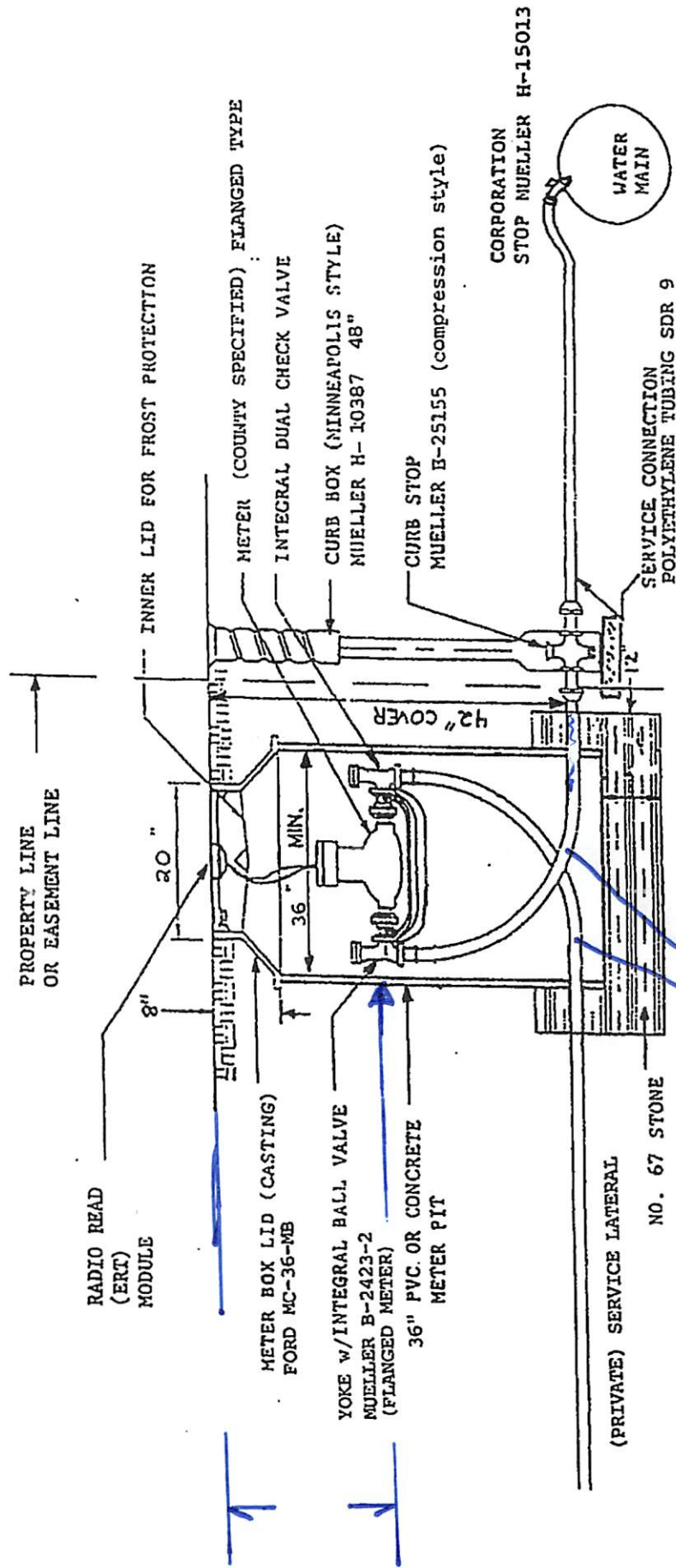


FIGURE #3
TYPICAL 1 1/2" - 2" METER PIT SETTING

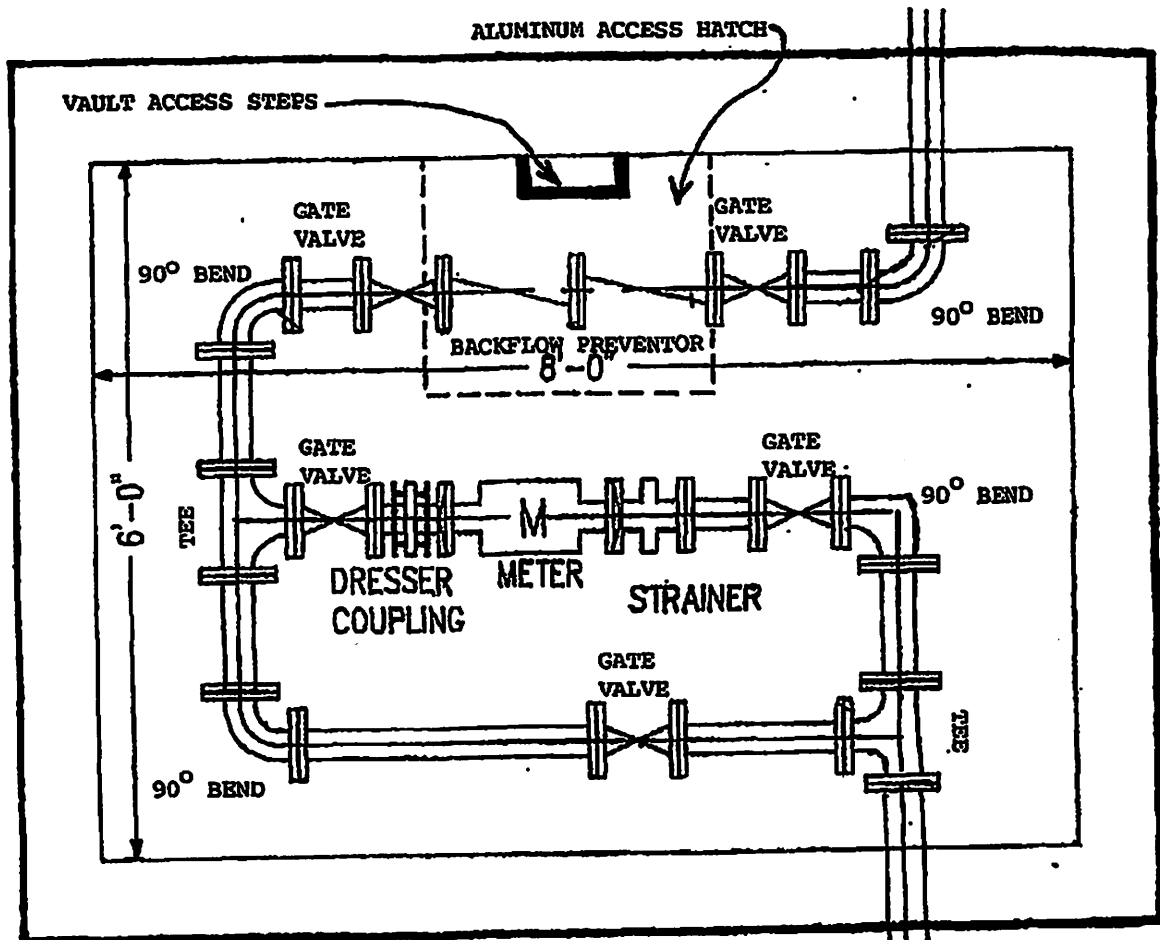


5' OF 1 1/2" OR 2" COPPER

FIGURE #4
TYPICAL 3" AND LARGER METER VAULT
w/BACKFLOW PREVENTOR, METER, AND BY-PASS

5/10/01

OTTAWA COUNTY



* A SUMP HOLE SIZED FOR VAULT SHALL BE INCLUDED

GENERAL NOTES:

- All piping, valves, and appurtenances within vault are the same diameter/size of service line.
- Vaults for 8" diameter service lines and larger shall require a larger vault than one shown.
- Shop drawings for the vault and all appurtenances must be submitted for approval prior to the issuance of a permit.
- All vaults shall have a concrete floor unless otherwise approved by the Sanitary Engineer.

FIGURE #5A
(STANDARD) TYPE "A" HYDRANT SETTING
(PERPENDICULAR TO WATER MAIN)

NOTE: STEAMER NOZZLE SHALL BE 4½"
 SIDE NOZZLES SHALL BE 2½"
 STONE FITTINGS ON STEAMER, NOZZLES
 HYDRANT SHALL BE RED WITH
 WHITE CAPS AND BONNET (TOP)

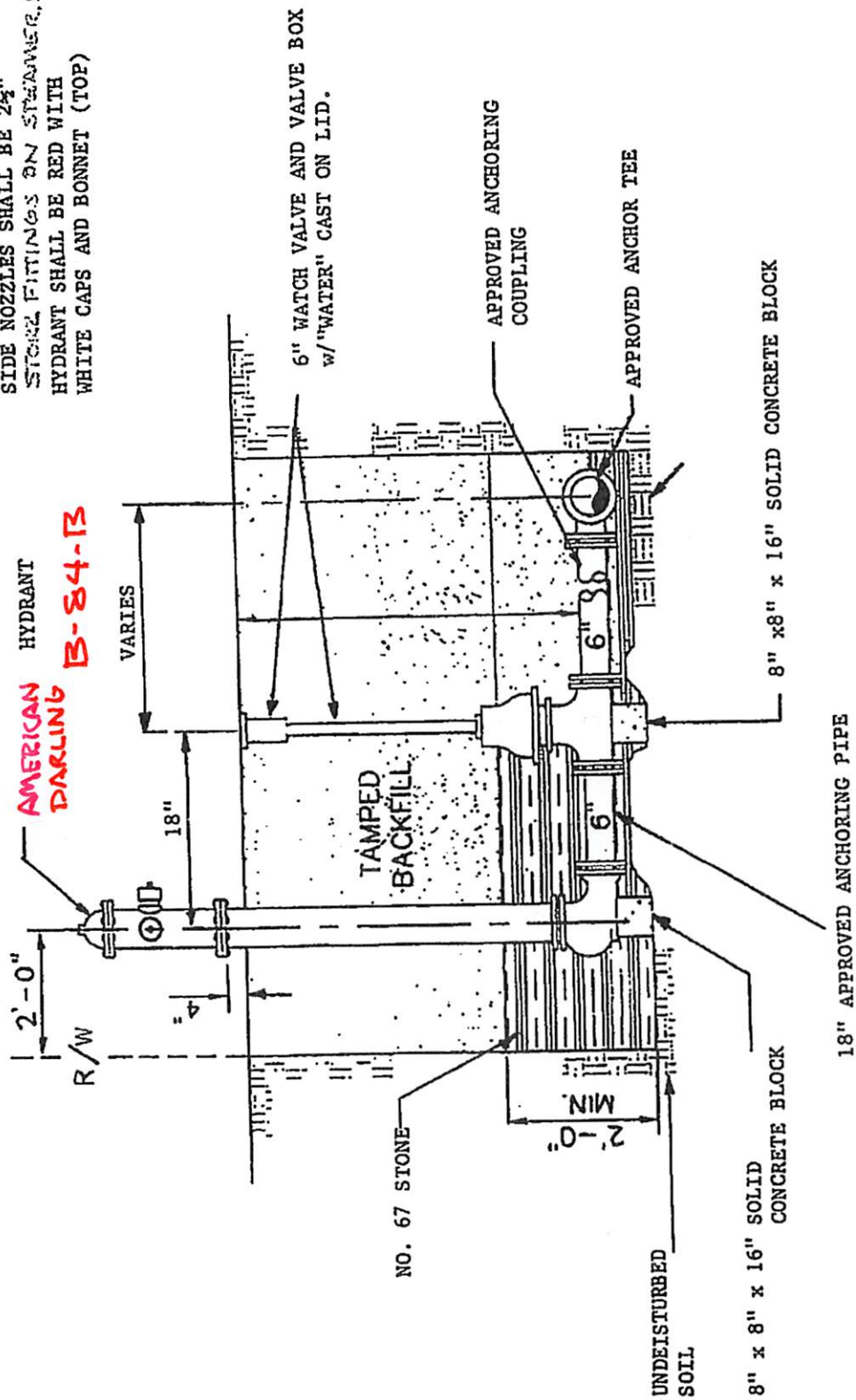
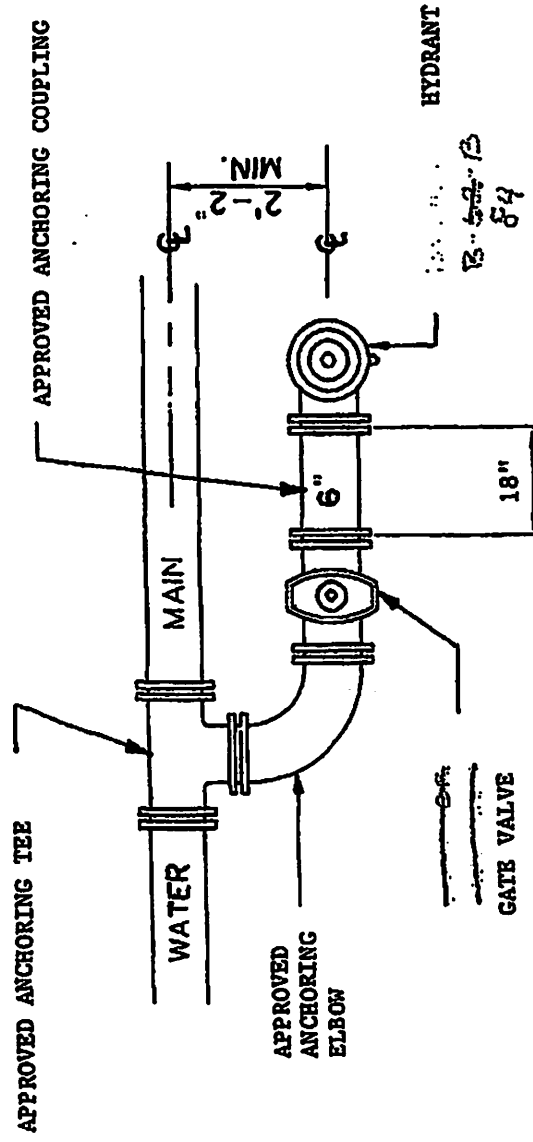


FIGURE #5B **TYPE "B" HYDRANT SETTING (PARALLEL TO WATER MAIN)**

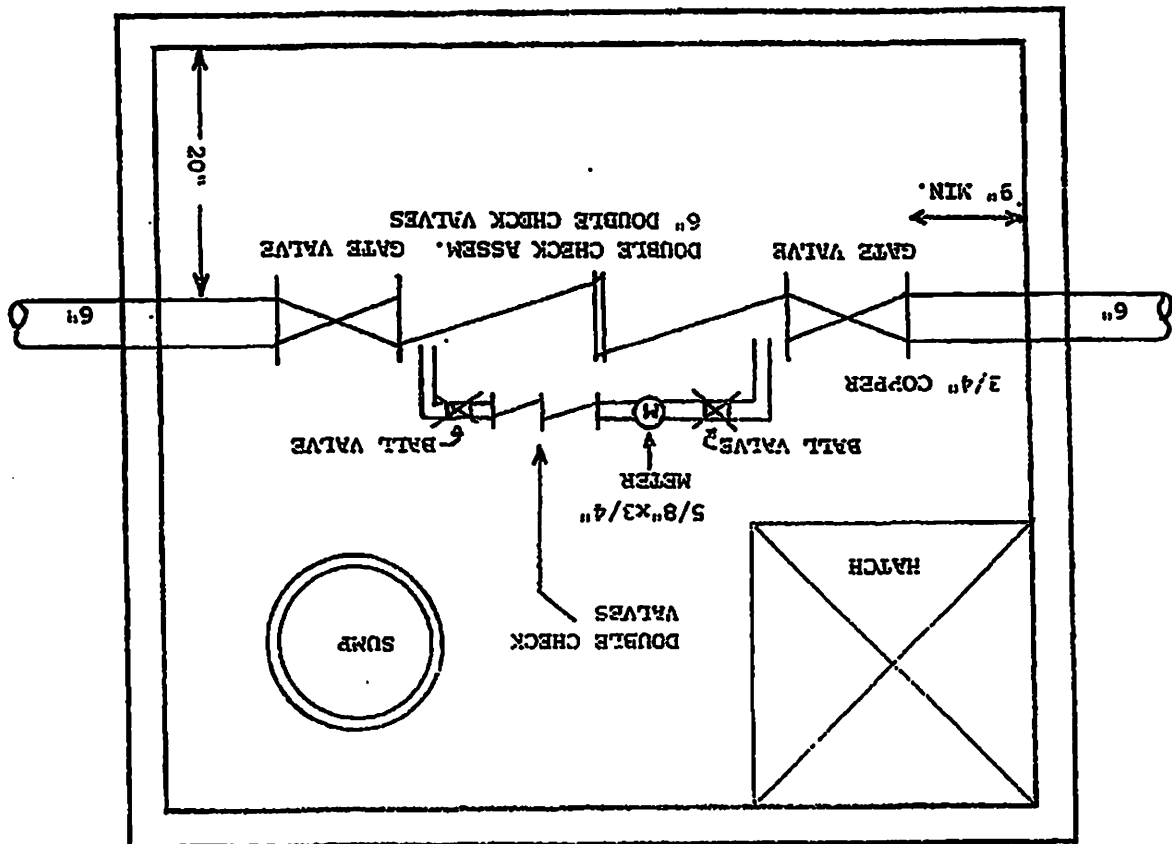
NOTE: BLOCKING UNDER PIPE AND HYDRANT
 (STONE DRAIN) SHALL BE
 8" x 8" x 16" SOLID CONCRETE BLOCKS.
 (SEE FIGURE #5A FOR LOCATIONS)



AMERICAN
 2500 SERIES

FIRE LINE DETECTOR CHECK AND VAULT **SPECIFICATIONS**

FIGURE #7

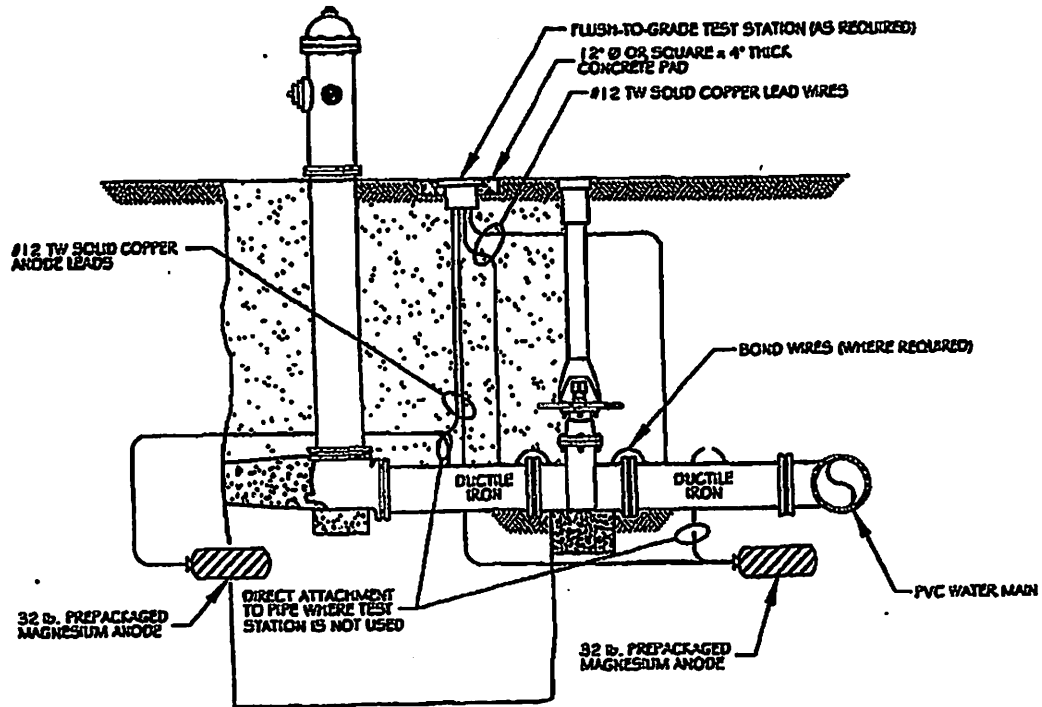


DETAILS:

HATCH = 30" x 30" "BILCO" ALUMINUM (MINIMUM SIZE)
 VAULT = 5'w x 7'h CONCRETE VAULT WITH SUMP
 SUMP = 12" DIAMETER x 9" DEEP SUMP HOLE
 GATE VALVES = 6" KENNEDY w/ NON RISING STEMS AND WITH WHEEL HANDLE
 DETECTOR CHECK VALVE = AMES 3000SS OR APPROVED EQUAL
 SMALL DIAMETER BY-PASS METER: INVERTING-METER w/ BCR REGISTER & IRON-ERNI
 SMALL DIAMETER BY-PASS BALL VALVES: FULL STAINLESS STEEL w/ HANDLES

SENSUS

FIGURE #11



FOR DUCTILE IRON PIPE ADD ADDITIONAL ANODES TO TEE AND PIPING AS SPECIFIED

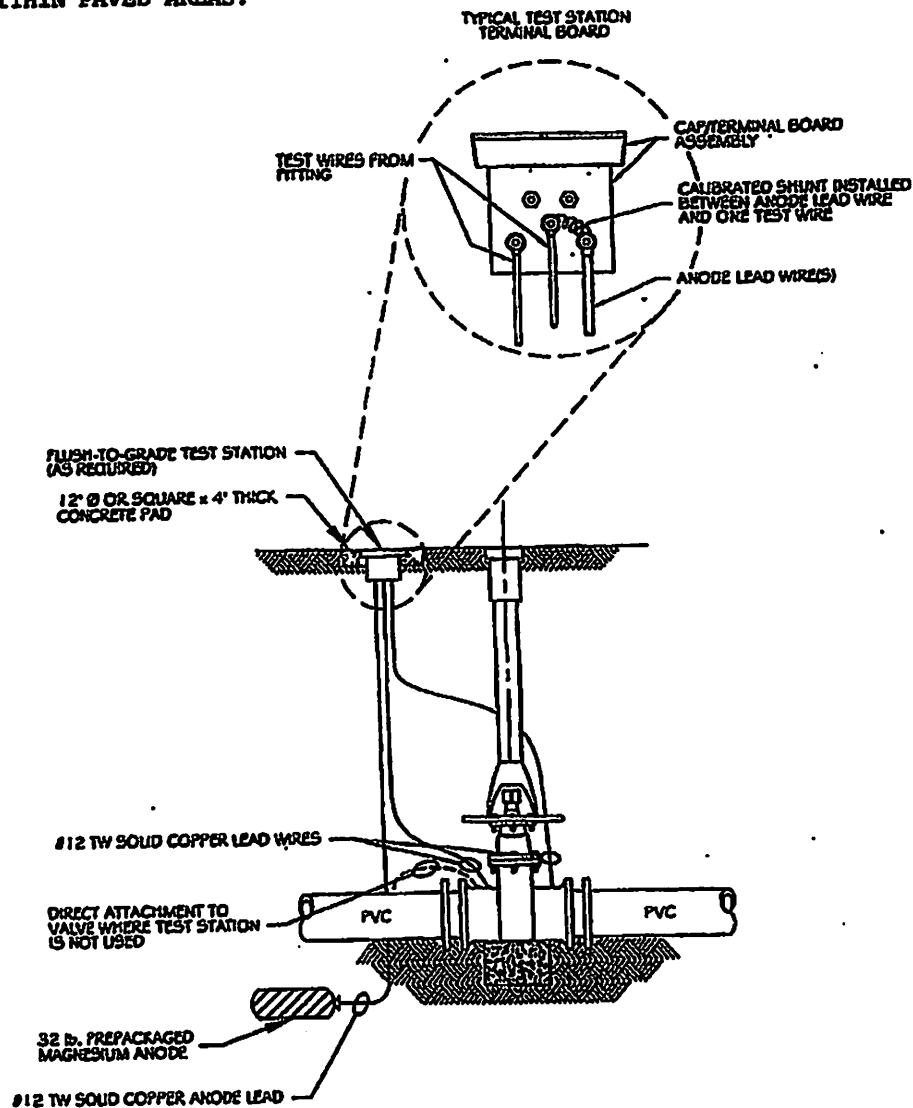
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NO.	DATE	BY	REVISION
CORRPRO COMPANIES, INC. 1055 West Smith Road Medina, Ohio 44258 (330) 723-5082			
DRAWN BY		J.W.P.	
DESIGNED BY		D.F.Z.	
DATE		8-29-02	
SCALE		NONE	
SHEET		1 OF 1	
DWG. NO.		A1-31957-T	

TYPICAL HYDRANT
ASSEMBLY
WITH MAGNESIUM ANODES

FIGURE #12

NOTE: TEST STATIONS SHALL NOT BE LOCATED WITHIN PAVED AREAS.



FOR DUCTILE IRON PIPE ADD ADDITIONAL ANODES TO VALVE AND PIPING AS SPECIFIED

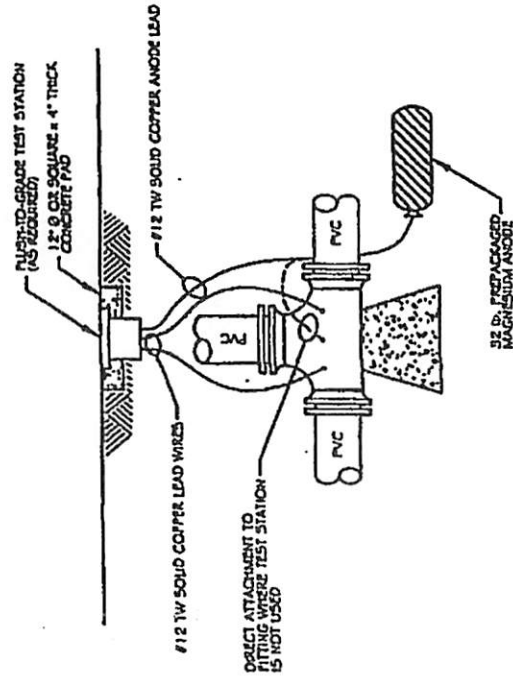
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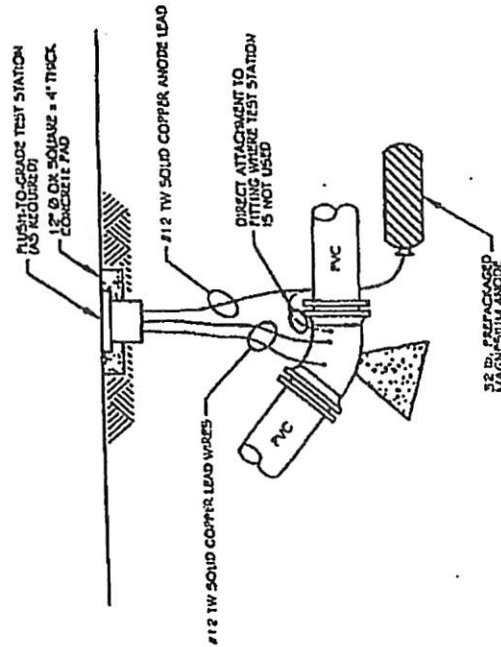
 CORRPRO COMPANIES, INC. 1055 West Smith Road Medina, Ohio 44258 (330) 723-5082	DRAWN BY	J.W.P.
	DESIGNED BY	D.F.Z.
	DATE	8-29-02
	SCALE	NONE
	SHEET	1 OF 1
	DWG. No.	AI-31958-T

TYPICAL GATE VALVE WITH MAGNESIUM ANODE

FIGURE #13




TYPICAL PIPE TEE



TYPICAL PIPE BEND

FOR DUCTILE IRON PIPE ADD ADDITIONAL ANODES TO PIPING AS SPECIFIED

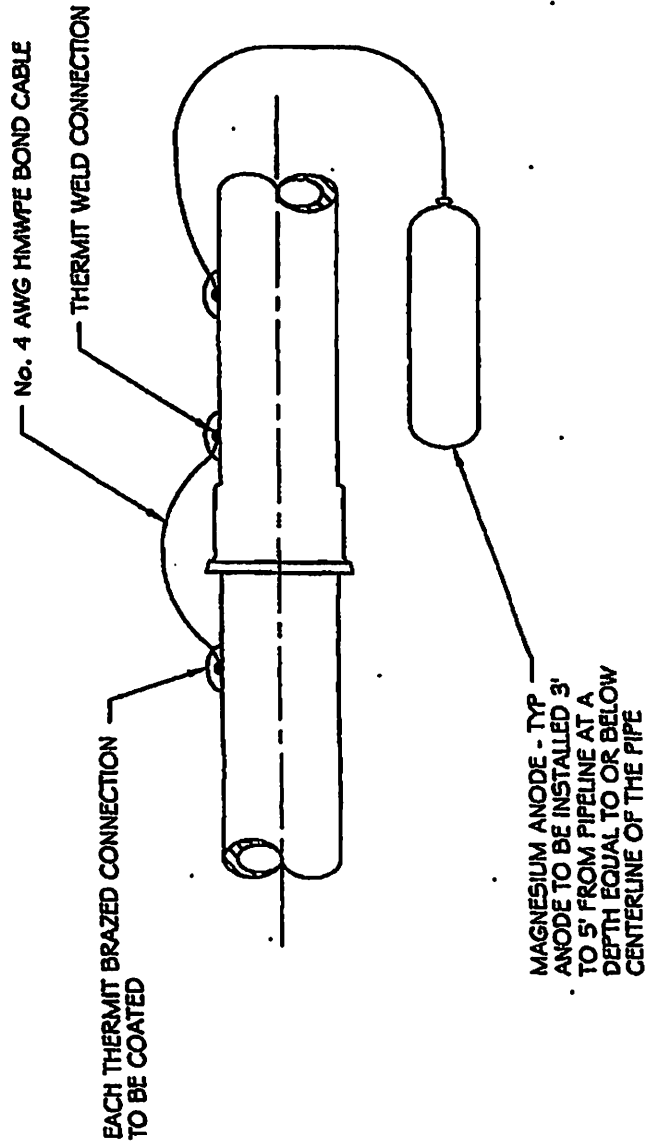
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DWG. NO.		A1-31959-T		



CORRPRO COMPANIES, INC.
1055 West Smith Road
Medina, Ohio 44258
(330) 723-5082

**TYPICAL PIPE BEND
& PIPE TEE
WITH MAGNESIUM ANODE**

FIGURE #14



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DRAWN BY R.E.C.

DESIGNED BY D.A.D.

DATE 9-3-91

SCALE NONE

SHEET 1 OF 1

OPER. NO. A1-29750-T

REVISION

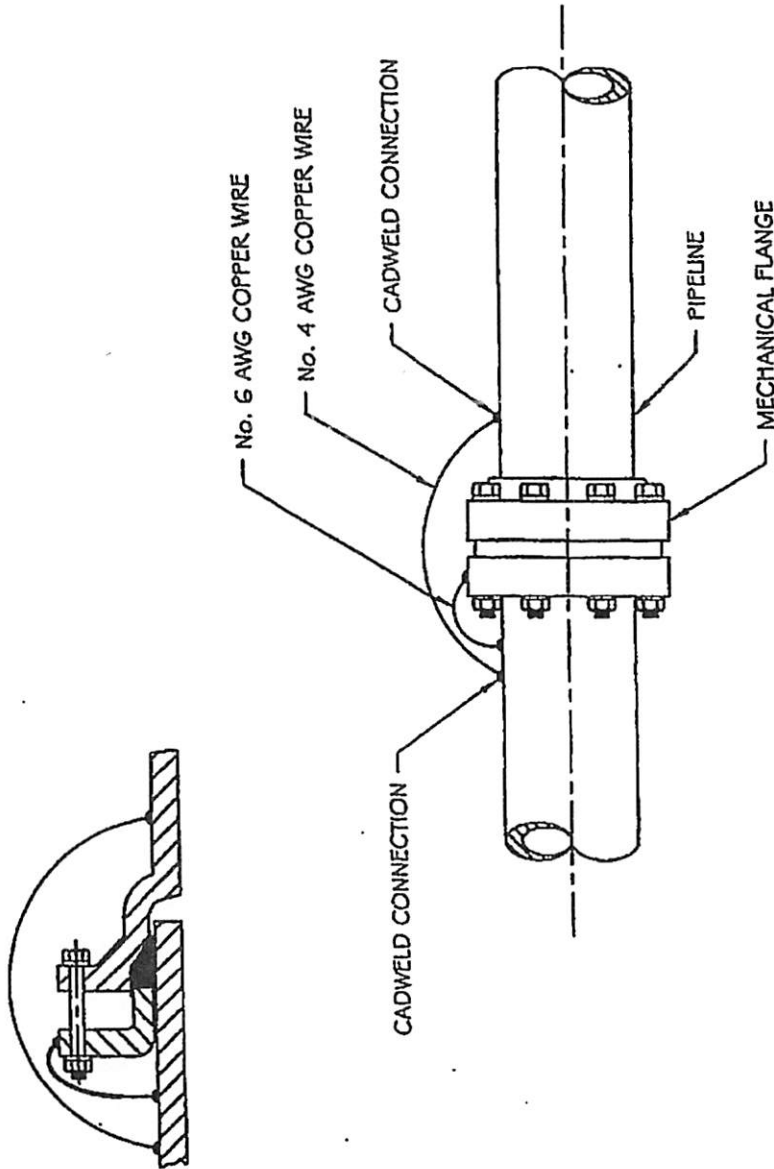
NO. DATE BY

CORRPRO COMPANIES, INC.
1055 West Smith Road
Medina, Ohio 44258
(330) 723-5082



TYPICAL
BONDING AND ANODE INSTALLATION
AT PUSH JOINT

FIGURE #15



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DRAWN BY S.M.T.

DESIGNED BY

DATE 8-12-93

SCALE NONE

SHEET 1 OF 1

DWG. No. 24124-T

CATHODIC PROTECTION SYSTEM
TYPICAL METHOD
OF BONDING ACROSS
MECHANICAL FLANGE

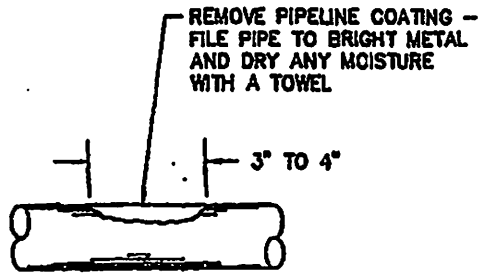
REVISION

NO. DATE BY

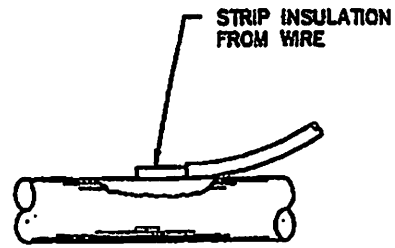
CORRPRO COMPANIES, INC.
1055 West Smith Road
Medina, Ohio 44258
(330) 723-5082



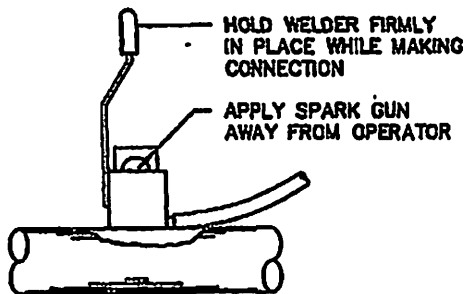
FIGURE #16



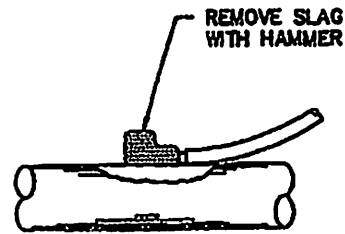
STEP 1



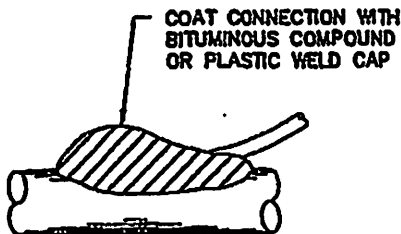
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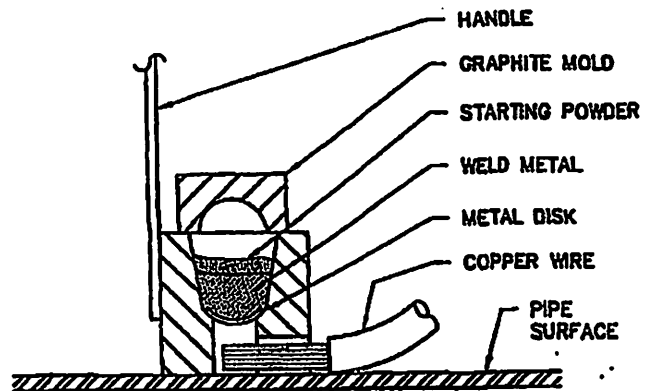
STEP 3



STEP 4



STEP 5



** WHEN No. 14 To No. 10 AWG SOLID WIRE IS USED, IT WILL BE NECESSARY TO INSTALL A COPPER SLEEVE (CAB-133-1H) OVER THE BARE SECTION OF WIRE BEFORE THE CONNECTION IS ATTEMPTED. WIRE SHOULD PROTRUDE 1/8" BEYOND END OF SLEEVE.

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<div style="display: flex; align-items: center;"> <div> <p>CORRPRO COMPANIES, INC. 1055 West Smith Road Medina, Ohio 44258 (330) 723-5082</p> </div> </div>			
			DRAWN BY A.M.S.
			DESIGNED BY
			DATE 6-4-74
			SCALE NONE
			SHEET 1 OF 2
			DWG. No. 10634-T

PROCEDURE FOR MAKING CADWELD TYPE "HA" CONNECTIONS

FIGURE #17

GENERAL WELDING PROCEDURE TYPE HA

1. WHEN USING No. 14 To No. 10 AWG SOLID WIRE, IT WILL BE NECESSARY TO INSTALL A COPPER SLEEVE (CAB-133-1H) OVER THE BARE END OF THE WIRE AND CRIMP IN PLACE BEFORE ATTEMPTING TO MAKE THE CONNECTION. FOR No. 10 AWG STRANDED WIRE, USE CAB-133-1K. THE WIRE SHOULD PROTRUDE AT LEAST 1/8" FROM THE END OF THE SLEEVE.
2. INSERT THE CONDUCTOR INTO MOLD NOTING ANY SPECIAL INFORMATION UNDER "POSITIONING" FOR APPLICATION TYPE IN THE MANUFACTURERS INSTRUCTIONS PACKAGED WITH THE WELDER.
3. INSERT STEEL DISK IN BOTTOM OF CAVITY INSIDE MOLD. DUMP THE WELD METAL INTO MOLD BEING CAREFUL NOT TO UPSET THE STEEL DISK. TAP THE BOTTOM OF THE TUBE TO LOOSEN ALL THE STARTING POWDER AND SPREAD IT EVENLY OVER THE WELD METAL. PLACE A SMALL AMOUNT OF STARTING POWDER ON THE TOP EDGE OF MOLD UNDER COVER OPENING FOR EASY IGNITION.
4. CLOSE COVER AND IGNITE WITH THE FLINT GUN. MOVE FLINT GUN AWAY QUICKLY TO PREVENT FOULING. IF FLINT GUN SHOULD BECOME FOULED, SOAK IT IN HOUSEHOLD AMMONIA.
5. AFTER IGNITION, HOLD THE WELDER IN PLACE FOR A MOMENT TO ALLOW THE WELD TO SOLIDIFY. AFTER THE WELD HAS COOLED, REMOVE THE SLAG WITH A CHIPPING HAMMER OR WIRE BRUSH.
6. COAT THE CONNECTION AND THE ENTIRE PREPARED SURFACE WITH BITUMASTIC COMPOUND (KOPPERS No. 50 OR EQUAL) OR PLASTIC WELD CAPS.
7. REMOVE ALL SLAG FROM THE WELDER BEFORE MAKING THE NEXT WELD. CLEAN THE COVER EVERY 6 TO 10 WELDS.
8. WET OR DAMP MOLDS WILL PRODUCE POROUS WELDS. MOLDS MUST BE DRIED OUT BEFORE ATTEMPTING TO WELD.
9. CONNECTIONS ARE TO BE PLACED A MINIMUM OF 3 INCHES APART. UNSUCCESSFUL WELDS ARE TO BE ABANDONED AND MOVED TO ANOTHER PREPARED SURFACE NOT LESS THAN 3 INCHES AWAY.

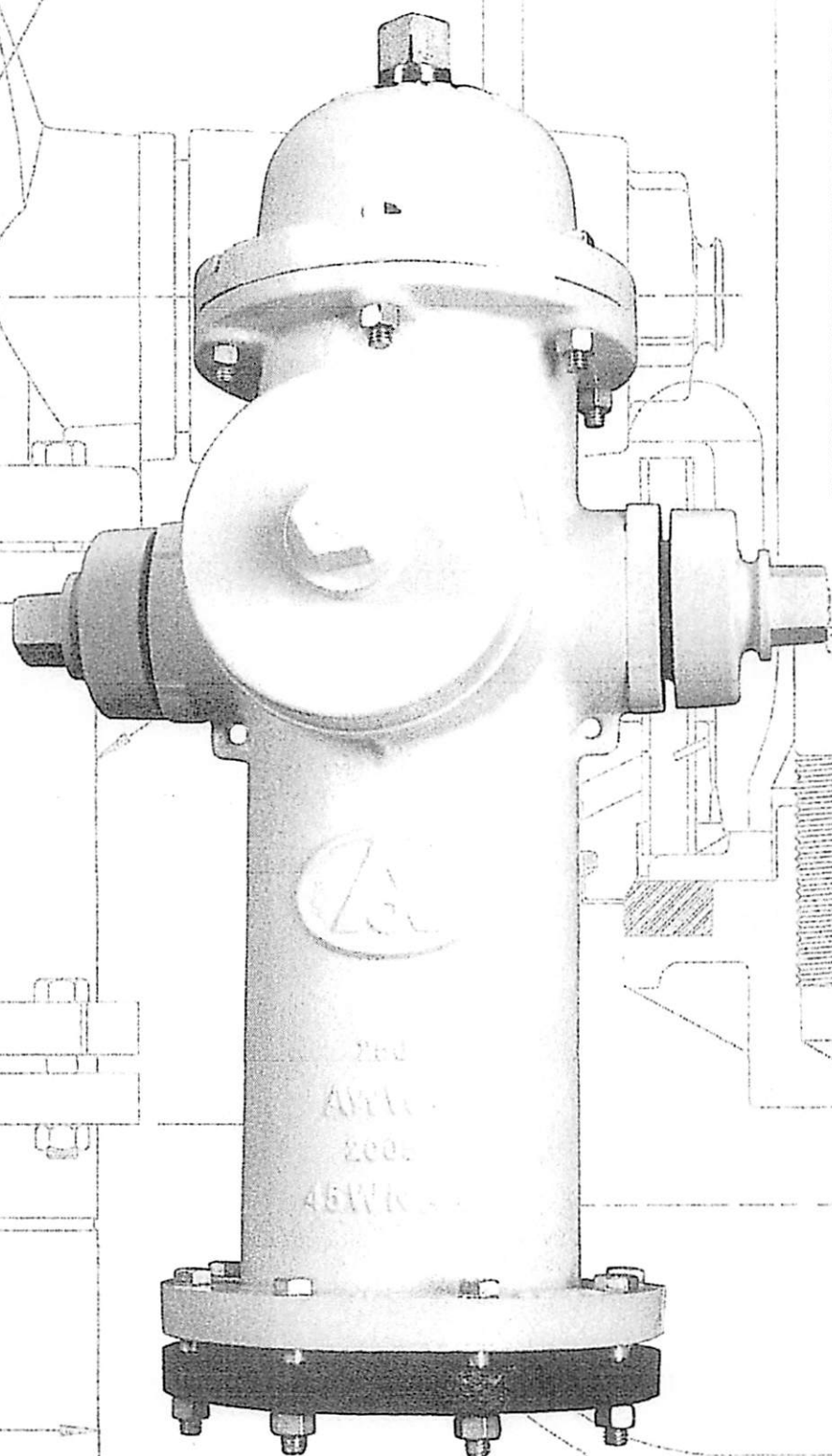
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			DATE 6-4-74
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			SHEET 2 OF 2
			DWG. No. 10634-T

**PROCEDURE FOR MAKING
CADWELD TYPE "HA"
CONNECTIONS**



AMERICAN
FLOW CONTROL

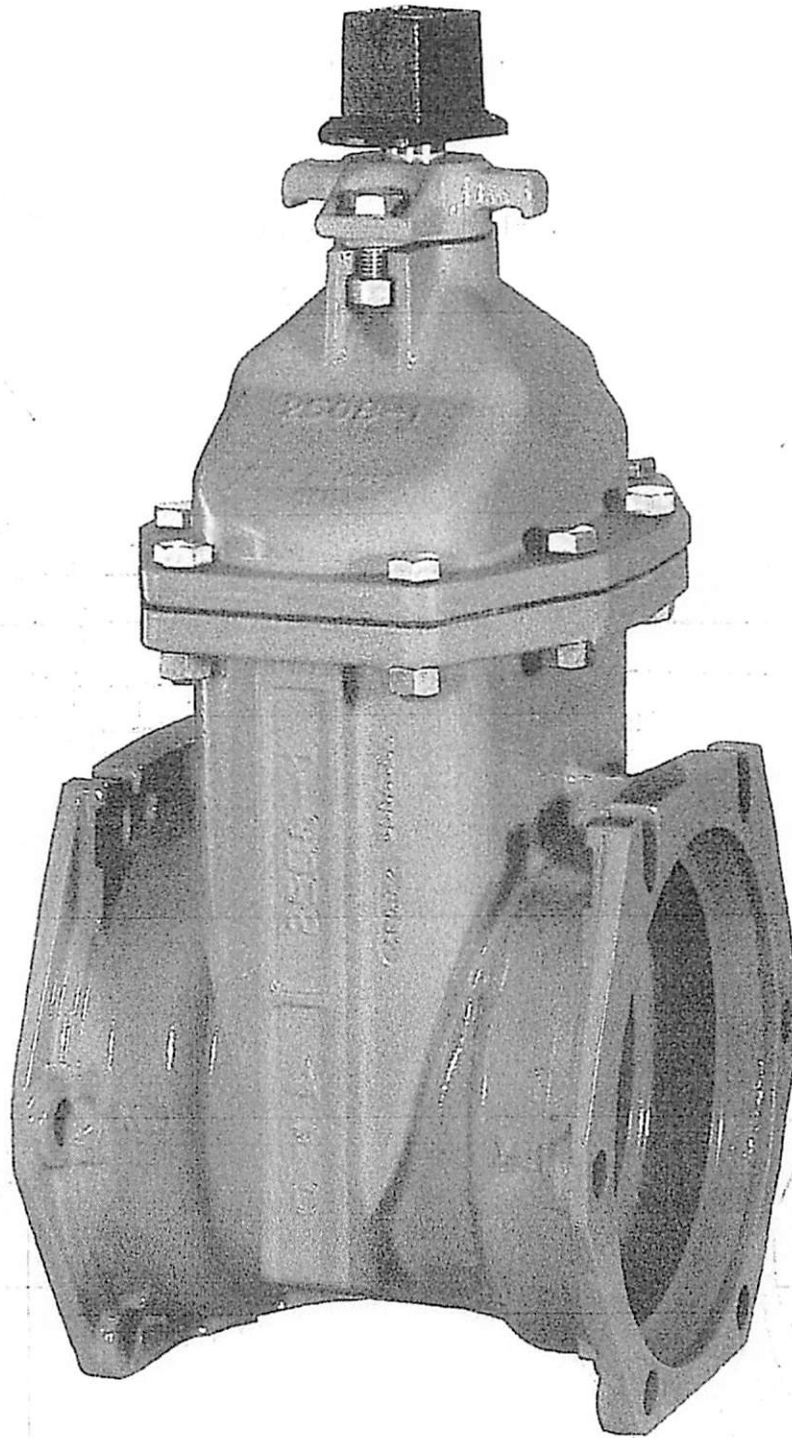
AMERICAN-DARLING 5-1/4" B-84-B-5 FIRE HYDRANT





AMERICAN
FLOW CONTROL

2" - 12" SERIES 2500 RESILIENT WEDGE GATE VALVE



**AMERICAN**

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5 1/4" American-Darling B-84-B-5



Product Description

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

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

The B-84-B-5 fire hydrant has all the features you expect from a high-quality fire hydrant. The all-bronze seat and bronze drain ring assure that the B-84-B-5 fire hydrant is easily repaired by just one person. The epoxy-primed and polyurethane top-coat system on the external surfaces on the upper barrel of the AMERICAN B-84-B-5 fire hydrant provides a durable, high-gloss finish that, under normal conditions, should continue to look good for years without repainting.

The B-84-B-5 fire hydrant has been manufactured for more than 30 years.

UL Listed and FM Approved

The B-84-B-5 fire hydrant is UL Listed and Approved by FM Approvals in applicable configurations.

Certified to NSF/ANSI 61 and NSF/ANSI 372

The B-84-B-5 fire hydrant is Certified as complying with NSF/ANSI Standard 61 and NSF/ANSI 372, which exhibit compliance with the U.S. Safe Drinking Water Act.

Related Products

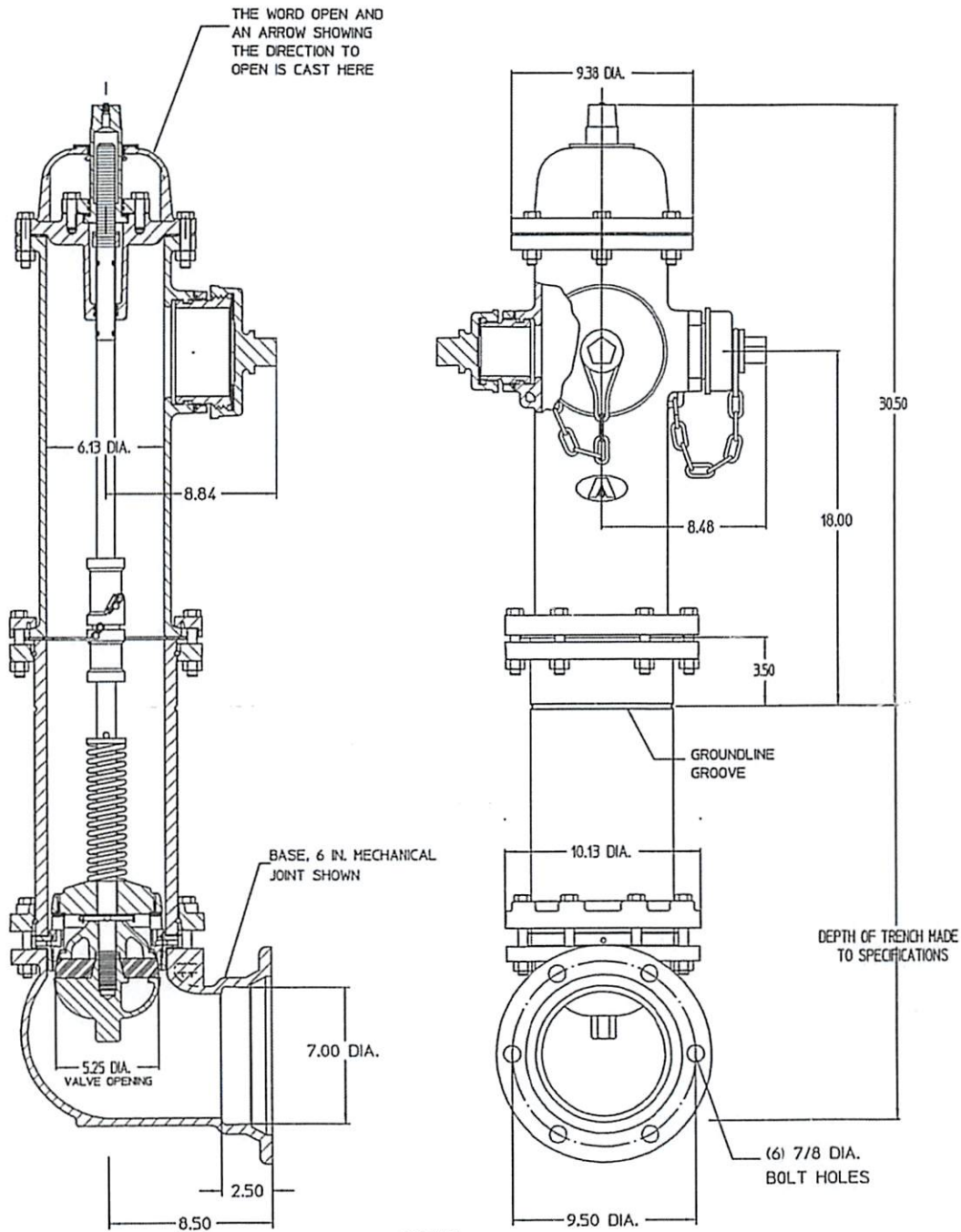
Storz Nozzles - Quarter Turn Pumper Connection

The AMERICAN Captivator™ - Locking Nozzle Cap

Series 2100 Hydrant Security Check Valve

AMERICAN Flow Control Submittal Information

5-1/4 B84B-5 TRAFFIC MODEL FIRE HYDRANT



91-21441

NOTES

1. Size and shape of operating nut and nut on caps, threading on nozzles and caps and the direction of opening made to specifications.
2. Cap chains are not furnished unless specified.
3. Bolts and nuts are rustproof steel ASTM A307 or equivalent, in accordance with AWWA C502.
4. Working pressure 250 psig, test pressure 500 psig.
5. Hydrant conforms to AWWA standard C502.
6. UL Listed and Approved by FM Approvals at 200 psig in allowable configurations.
7. Valve top, valve bottom and base coated with fusion bonded epoxy coating.
8. Certified to NSF/ANSI Standard 61 and NSF/ANSI 372.
9. Nominal turns to open is 19-1/2.



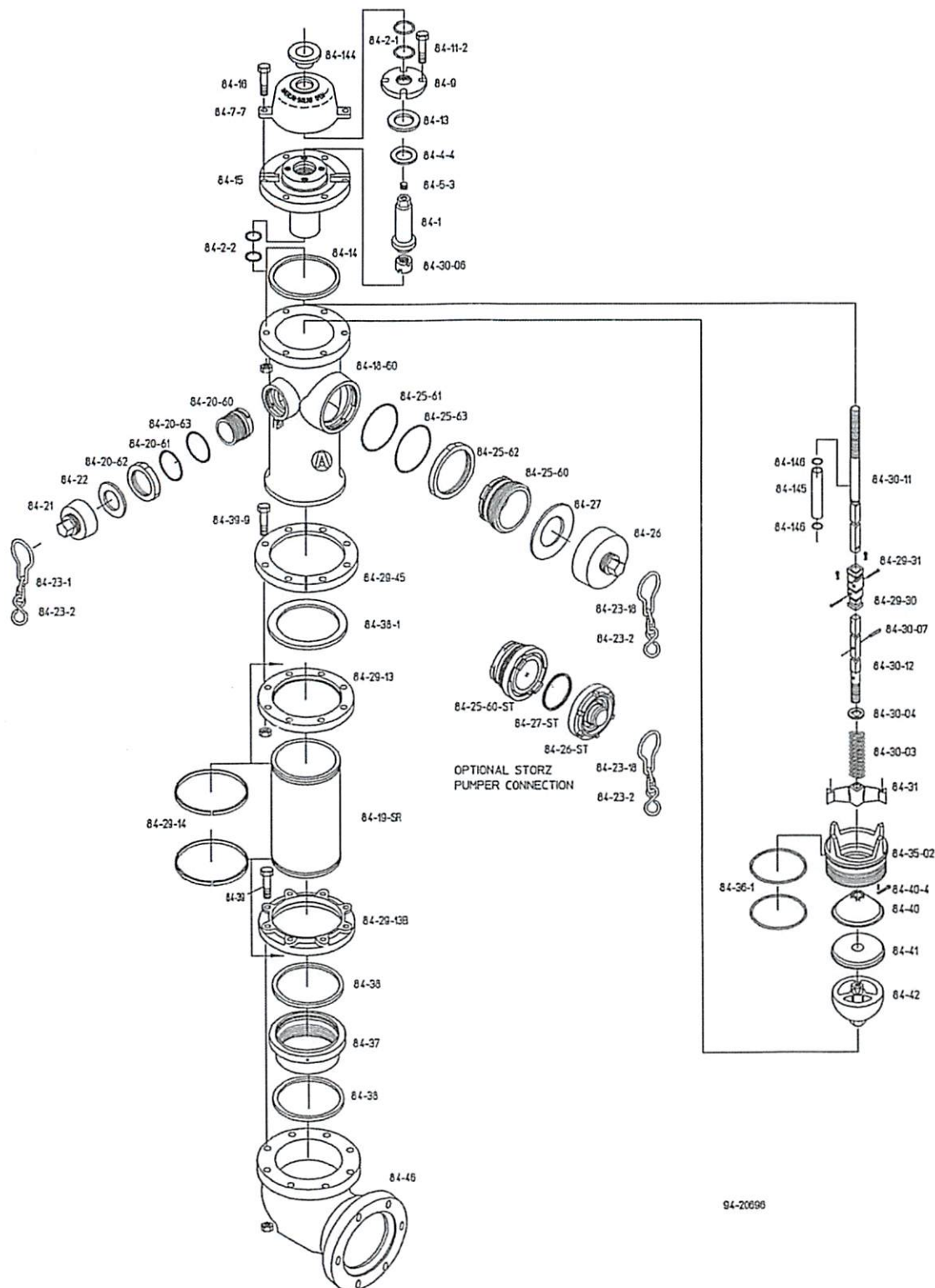
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AMERICAN Flow Control
P.O. Box 2727
Birmingham, AL 35202-2727
Phone: 800-326-8051
Fax: 800-610-3589
Email: afcsales@american-usa.com

Waterous Company
125 Hardman Avenue South
South St. Paul, Mn. 55075-1191
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Fax: 800-601-2809
Email: afcsales@american-usa.com

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South St. Paul, Mn. 55075-1191
Phone: 888-266-3686
Fax: 800-601-2809
Email: afcsales@american-usa.com

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Ref. No.	Qty.	Description	Material
84-1	1	Operating Nut	Bronze ASTM B763 UNS C86500
84-2-1	2	Cover O-Ring	Buna N
84-2-2	2	Housing O-Ring	Buna N
84-4-4	1	Thrust Washer	Nylatron
84-5-3	1	Pipe Plug	Stainless Steel
84-7-7	1	Weather Cover	Gray Iron ASTM A126 Class B
84-9	1	Housing Cover	Gray Iron ASTM A126 Class B
84-11-2	4	Cover Cap Screws	See Note 3
84-13	1	Cover Gasket	Fiber
84-14	1	Housing Gasket	EPDM Rubber
84-15	1	Housing	Ductile Iron ASTM A536 Grade 65-45-12
84-16	6	Housing Bolts & Nuts	See Note 3
84-18-60	1	Upper Barrel	Ductile Iron ASTM A536 Grade 65-45-12
84-19-SR	1	Lower Barrel	Ductile Iron ASTM A536 Grade 65-45-12
84-20-60	2	Hose Nozzle	Bronze ASTM B763 UNS C87600
84-20-61	2	Hose Nozzle Seal	Buna N
84-20-62	2	Hose Nozzle Retainer	Ductile Iron ASTM A536 Grade 65-45-12
84-20-63	2	Hose Nozzle Retainer Washer	Teflon
84-21	2	Hose Cap	*See Below
84-22	2	Hose Cap Gasket	Rubber
84-23-1	2	Hose Cap Chain with S-Hook	Steel
84-23-2	3	S-Hook	Steel
84-23-18	1	Pumper Cap Chain with S-Hook	Steel
84-25-60	1	Pumper Nozzle	Bronze ASTM B763 UNS C86700
84-25-60-ST	1	Storz Nozzle	Bronze/Aluminum
84-25-61	1	Pumper Nozzle Seal	Buna N
84-25-62	1	Pumper Nozzle Retainer	Ductile Iron ASTM A536 Grade 65-45-12
84-25-63	1	Pumper Nozzle Retainer Washer	Teflon
84-26	1	Pumper Cap	*See Below
84-26-ST	1	Storz Nozzle Cap	Aluminum
84-27	1	Pumper Cap Gasket	Rubber
84-27-ST	1	Storz Cap Gasket	Rubber
84-29-13	1	Barrel Flange	Ductile Iron ASTM A536 Grade 65-45-12
84-29-13B	1	Base Flange	Ductile Iron ASTM A536 Grade 65-45-12
84-29-14	2	Snap Ring	Stainless Steel

*National Standard and other common cap configurations are constructed of ASTM A536 Grade 65-45-12 ductile iron. Other offerings may be constructed of ASTM A126 Class B gray cast iron.

Ref. No.	Qty.	Description	Material
84-29-30	1	Rod Coupling	Gray Iron ASTM A126 Class B
84-29-31	2	Rod Coupling Pin & Clip Pin	Stainless Steel
84-29-45	1	Breakable Flange	Gray Iron ASTM A126 Class B
84-30-03	1	Hydrant Spring	Stainless Steel
84-30-04	1	Spring Plate	Stainless Steel
84-30-06	1	Travel Stop Nut	Bronze ASTM B283 UNS C37700
84-30-07	1	Spring Plate Pin	Stainless Steel
84-30-11	1	Upper Rod	Steel
84-30-12	1	Lower Rod	Steel
84-31	1	Drain Lever	Bronze ASTM B584 UNS C92200
84-35-02	1	Hydrant Seat	Bronze ASTM B584 UNS C92200
84-36-1	2	Seat O-Ring	Buna N
84-37	1	Drain Ring	Bronze ASTM B763 UNS C87600
84-38	2	Drain Ring Gasket	Composition Rubber
84-38-1	1	Barrel Gasket	Composition Rubber
84-39	8	Base Bolts & Nuts	0304 Stainless Steel
84-39-9	8	Barrel Bolts & Nuts	See Note 3
84-40	1	Valve Top	Gray Iron ASTM A126 Class B
84-40-4	1	Valve Top Clevis & Clip Pin	Stainless Steel
84-41	1	Hydrant Valve	EPDM Rubber
84-42	1	Valve Bottom	Ductile Iron ASTM A536 Grade 65-45-12
84-46-2	1	Flanged Base	Ductile Iron ASTM A536 Grade 65-45-12
84-46-2A	1	Flanged Vertical Entry Base	Ductile Iron ASTM A536 Grade 65-45-12
84-46-5	1	Mechanical Joint Base	Ductile Iron ASTM A536 Grade 65-45-12
84-46-PE	1	Mechanical Joint Plain End Base	Ductile Iron ASTM A536 Grade 65-45-12
84-46-TY	1	Tyton Base	Ductile Iron ASTM A536 Grade 65-45-12
84-144	1	Weather Shield	Rubber
84-145	1	Rod Sleeve	Bronze
84-146	2	Rod Sleeve O-Ring	Buna N

Hydrants are furnished as "Draining" unless optional "Non-Draining" Configuration is otherwise noted below.

☐ Optional "Non-Draining" Configuration required

Open Direction ☐ Left(C.C.W.) ☐ Right(C.W.)



AMERICAN
FLOW CONTROL

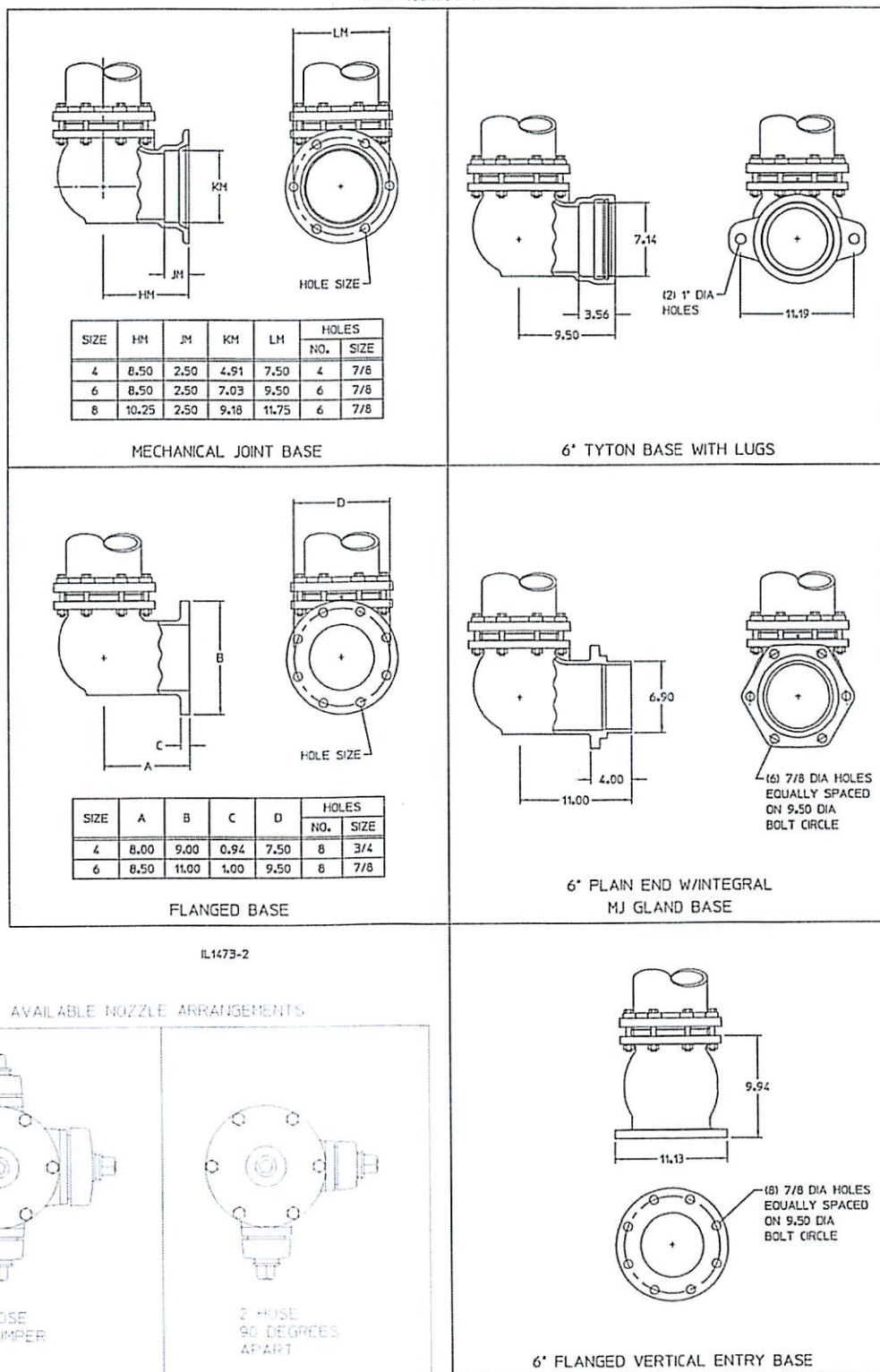
THE RIGHT WAY

AMERICAN Flow Control
P.O. Box 2727
Birmingham, AL 35202-2727
Phone: 800-326-8051
Fax: 800-610-3569
Email: afcsales@american-usa.com

Waterous Company
125 Hardman Avenue South
South St. Paul, MN 55075-1191
Phone: 888-266-3686
Fax: 800-601-2809
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SEARCH

[Home](#) [Products](#) [Valves and Hydrants](#) [14"-66" Series 2500 RW Gate Valves](#) [14"-24" Resilient Wedge Gate Valves with Flanged Ends](#)

14"-24" Resilient Wedge Gate Valves with Flanged Ends

Valves 14"-24" shall be resilient wedge gate valves, of a non-rising stem design and rated for 250 psig cold water working pressure. All cast ferrous components shall be ductile iron, ASTM A536. Valves 14"-24" shall meet or exceed all applicable requirements of AWWA C515. The words "Ductile Iron" or "D.I." shall be cast on the valve. The wedge shall be ductile iron fully encapsulated with EPDM rubber.

The wedge shall be symmetrical and seal equally well with flow in either direction. The wedge nut shall be independent of the wedge and held in place on three sides by the wedge to prevent possible misalignment. Valves shall be Certified to NSF 61-G.

Bolting materials shall be 304 stainless steel unless otherwise specified. Bolts may have either regular square or hexagonal shaped heads with dimensions conforming to ANSI B18.2.1. Metric size socket head cap screws are not allowed. The operating nut shall be constructed of ductile iron. All gaskets shall be pressure-energized O-Ring type seals. Stem shall be sealed by three O-Rings. O-Rings set in a cartridge shall not be allowed. The valve shall have thrust washers located with (1) above and (1) below the thrust collar to assist operation of the valve. All internal and external surfaces of the valve body and bonnet shall have an epoxy coating, complying with ANSI/AWWA C550.

Valves shall be AMERICAN's Series 2500 resilient wedge gate valve.

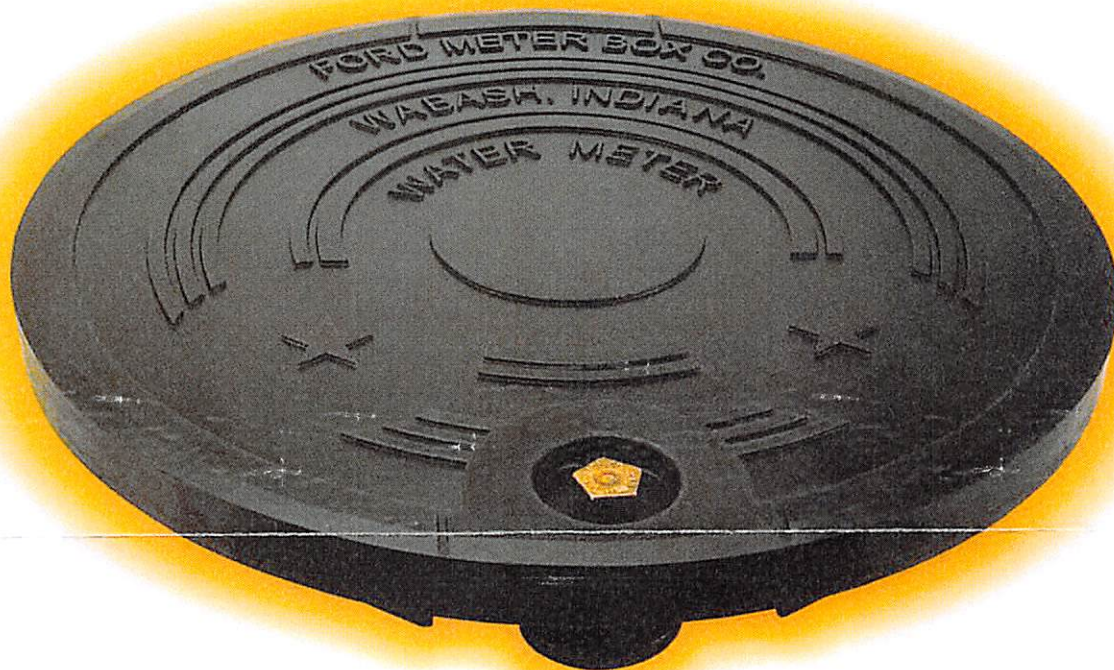
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The Meter Setter



A Plastic Lid Rated to 40,000 Pounds!

Ford offers coil pit lids with an H-20 rating.



For heavy duty lid applications that require low AMR signal interference, Ford offers two new coil pit lids. With an H-20 rating meeting 40,000 pound proof load for traffic requirements, these lids for 15" and 18" tile are durable and UV resistant.

Ford lids are tested in accord with the American Association of State Highway and Transportation Officials (AASHTO) M306 protocols to ensure standardized load rating and acceptance criteria.

Some H-20 rated lids are tested to different standards or outdated specifications that may not hold up to the AASHTO M306 protocols. Ford lids are engineered to achieve the rigorous standards of these protocols, providing our customers with the quality they have come to expect.

In addition to being UV resistant and offering an optional AMR bracket, the new lids also feature a pentagon bolt and the same Clark Style Worm Lock used in standard coil pit lids, making change outs with existing pits seamless.

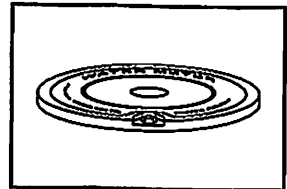
For information on the H-20 rated coil pit lid, or any of the other H-20 lids offered by Ford Meter Box, contact your local Ford distributor or your Ford Meter Box Customer Manager.



The Ford Meter Box Co., Inc. 775 Manchester Avenue, P.O. Box 443, Wabash, Indiana, USA 46992-0443
Telephone: 260-563-3171 FAX: 1-800-826-3487 Overseas FAX: 260-563-0167 www.fordmeterbox.com

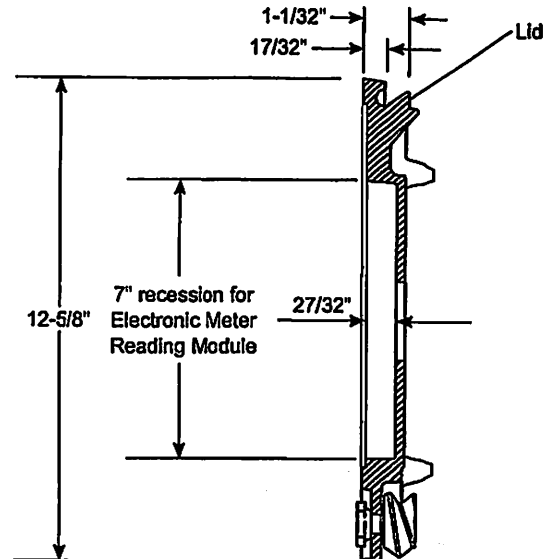
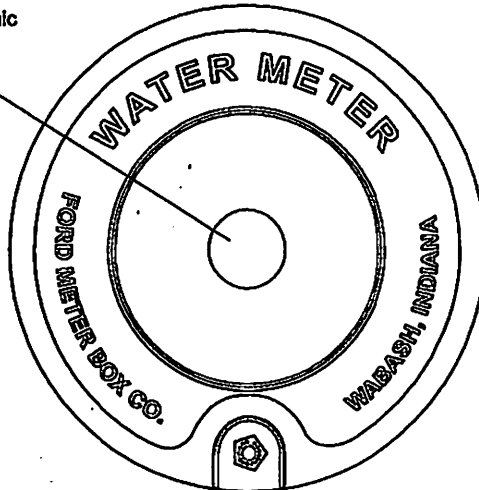
SUBMITTAL INFORMATION

Iron Lid for Iron Frame - (C3L-C-REC-T style)



11-1/2" OVERLAPPING LID WITH CENTER RECESS HOLE

2" hole for Electronic
Meter Reading
Module



*LID SIZE	APPROX. WT. LBS.	DESCRIPTION	CATALOG NUMBER	✓ SUBMITTED ITEM(S)
11-1/2"	11.4	Locking Overlapping Lid Single centered and recessed hole for Meter Reading Module	C3L-C-REC-T	

* Lid size indicates approximate pit access opening; actual lid diameter is approximately 1" larger.

FEATURES

- Standard pentagon bolt furnished with locking lids
- Lid is cast iron per ASTM A48, Class 25
- Recessed lid offers ideal location for large electronic meter reading module
- Finish is black e-coat epoxy coating

Optional Large Bolt for locking lid. Add "-LB" to end of catalog number

The Ford Meter Box Company considers the information in this submittal form to be correct at the time of publication. Item and option availability, including specifications, are subject to change without notice. Please verify that your product information is current.



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P.O. Box 443, Wabash, Indiana U.S.A. 46992-0443
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Overseas Fax: 260-563-0167
www.fordmeterbox.com

09/16/14

Submitted By:

ADS METER PIT SPECIFICATION

Scope

This specification describes 18-, 21-, and 24-inch (450, 525, and 600mm) Meter Pit for use as meter enclosures.

Requirements

ADS Meter Pits shall be white in color. Meter pits shall have a smooth interior and annular exterior corrugations. Based on ASTM D 2412 at 5% deflection the pipe stiffness for 18-inch (450 mm), 21-inch (525 mm), and 24-inch (600 mm) Meter Pits shall be 40 pii (275 N/m/mm), 34 pii (235 N/m/mm), and 34 pii (235 N/m/mm), respectively. The pits shall be available in 24, 30, 36, 48 inch, and 12 foot (0.6, 0.8, 0.9, 1.2, and 3.7 m) lengths. Meter Pits shall be notched at 0 and 180 degrees at the base to accommodate inlet and outlet pipes.

Material Properties

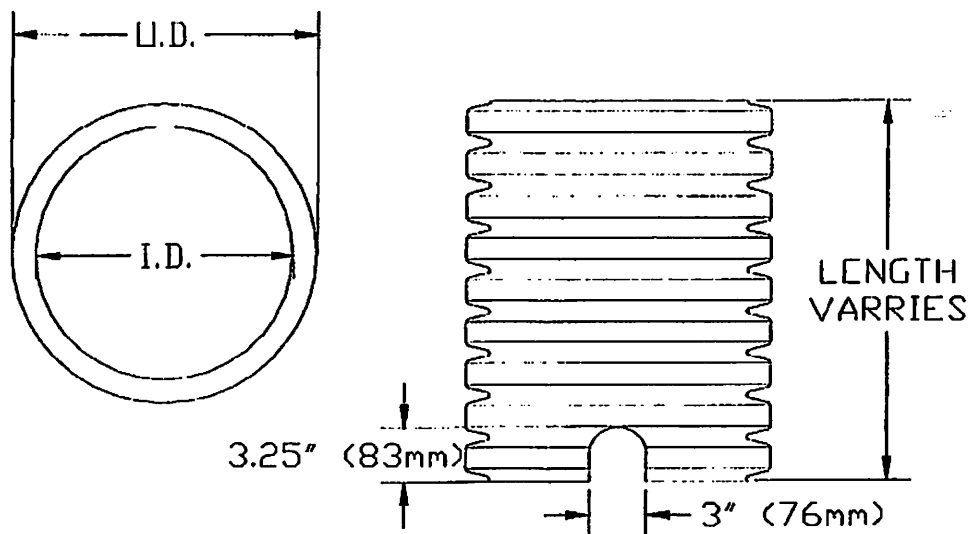
Meter pits shall be high density polyethylene conforming with the minimum requirements of cell classification 424420 B as defined and described in the latest version of ASTM D3350.

Installation

Installation shall be in accordance with ADS installation instructions or those issued by regional, state, or local agencies.

Nominal Dimensions

Inner Diameter	in (mm)	18 (450)	21 (525)	24 (600)
Outer Diameter	in (mm)	21.5 (546)	25 (635)	28.4 (721)



Warning: This product is not supplied with a grate or lid for means of termination at the ground surface. It is the sole responsibility of the installer/user of this product to adequately insure the product has been covered and secured at the top of the structure/product. Poor installation or failure to adequately cover and secure this product may result in injury to persons and property.

iPERL™ Water Management System

Specifications

TYPE

Solid state, battery operated electromagnetic flow measurement system with a hermetically sealed, glass covered, electronic register with a programmable 9-digit display.

CONFORMANCE TO STANDARDS

Must conform to American Water Works Standard C-700 and C-710 as most recently revised with respect to accuracy and pressure loss requirements, or other appropriate American Water Works Standard. Must be compliant with NSF/ANSI Standard 61 Annex F and G.

REGISTER

The register must be an electronic device encapsulated in glass with 9 programmable digits utilizing a liquid crystal display (LCD). It will have indicators for flow direction, empty pipe, battery life and unit of measurement. The register must be hermetically sealed with a heat tempered glass cover and be tamperresistant. The register shall not be removable from the measuring sensor. The register shall utilize a magnetic coupling technology to connect to a touch read, radio read or fixed base meter reading system in either an inside or pit set installation.

MEASURING ELEMENT

The measuring element shall be made of a noncorrosive, lead-free glass fiber reinforced, composite alloy material. A battery powered magnetic flow sensor utilizing silver/silver chloride electrodes will be utilized to measure the velocity of the water which is linearly proportional to the volume. The measuring element will have no moving parts and will be specific for each size.

EXTERNAL HOUSING

The register and measuring element will be an integrated unit housed within a thermal plastic external casing. This integrated unit will not be removable from the external housing. The systems shall have the size and direction of water flow through the system imprinted on the external housing.

PRESSURE CAPABILITY

System shall operate up to a working pressure of 200 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation of pressure up to 200 psi.

PERFORMANCE WARRANTIES

In evaluating bid submittals, warranty coverage will be considered. All bidders are required to submit their most current nationally published warranty statements for water meter maincases, registers and measuring chambers.

OPERATING CHARACTERISTICS

METER SIZE	LOW FLOW (95% Min)	OPERATING RANGE (98.5%-101.5%)	PRESSURE LOSS (Not to Exceed)
5/8"	0.03gpm	0.11 to 25gpm	4psi @ 15gpm
5/8" x 3/4"	0.03gpm	0.11 to 35gpm	2psi @ 15gpm
3/4" S	0.03gpm	0.11 to 35gpm	2psi @ 15gpm
3/4"	0.03gpm	0.11 to 35gpm	2psi @ 15gpm
1"	0.11gpm	0.4 to 55gpm	2psi @ 25gpm

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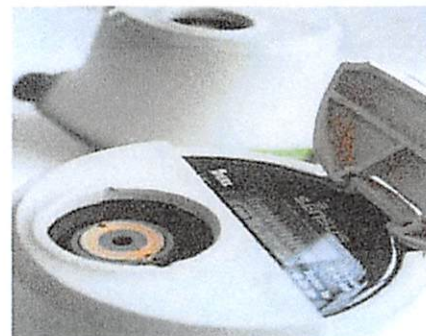
iPERL™ Water Management System

Electromagnetic Flow Measurement System

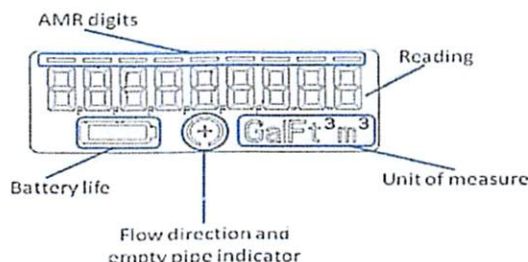
Description

5/8" (DN 15mm), 3/4" (DN 20mm) and 1" (DN 25mm) Sizes

With no moving parts, the Sensus iPERL water management system is based on innovative electromagnetic flow measurement technology. The iPERL system family has an operating range of 0.03 gpm (0.007 m³/hr) @ 95% minimum to 55 gpm (12.5 m³/hr) @ 100% ± 1.5% registration of actual throughput.



Electronic Register LCD Display



Features

CONFORMANCE TO STANDARDS

The iPERL system far exceeds the most recent revision of ANSI/AWWA Standard C-700 and C-710 for accuracy and pressure loss requirements. All iPERL systems are NSF/ANSI Standard 61 Annex F and G compliant and tested to AWWA standards.

PERFORMANCE

The patented measurement technology of the iPERL system allows enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product over the full measurement range when installed horizontal, vertical or diagonal.

CONSTRUCTION

The iPERL system is an integrated unit that incorporates an electronic register and measuring device encased in an external housing. The measuring device is comprised of a composite alloy flowtube with externally-threaded spud

ends. Embedded in the flowtube are magnetic flow sensors. The all electronic, programmable register is hermetically sealed with a tempered glass cover. The iPERL system has a 20 year life cycle, along with a 20 year battery life guarantee.

ELECTRONIC REGISTER

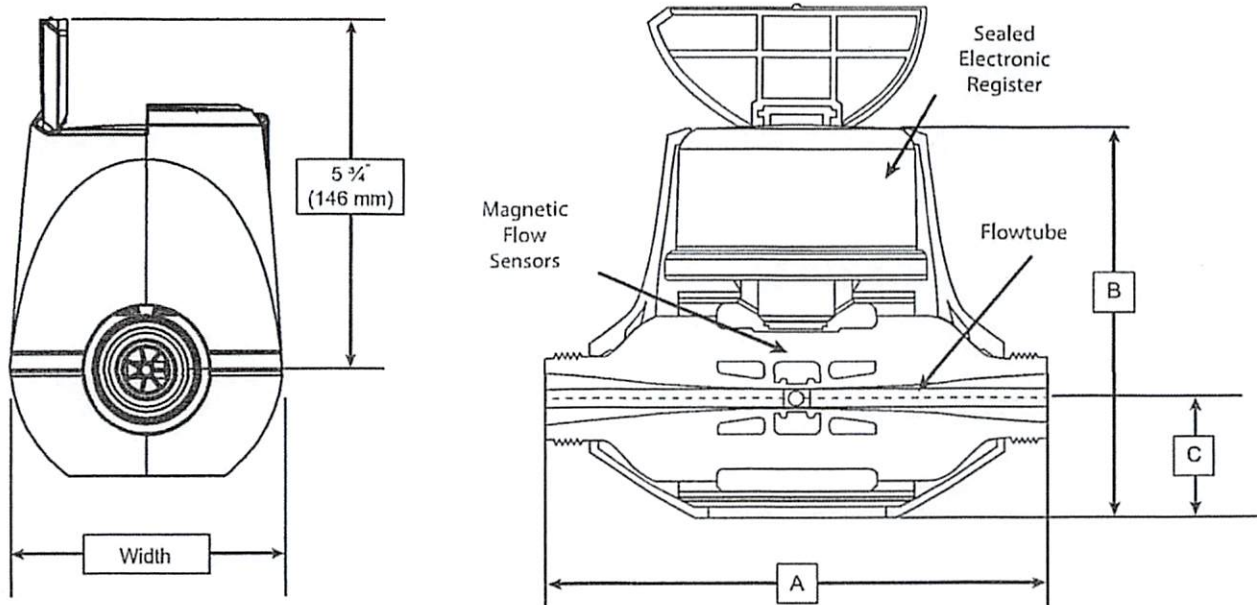
The high resolution 9-digit hermetically sealed electronic register with LCD display was designed to eliminate dirt, lens fogging issues and moisture contamination in pit settings with built in tamper protection. The tempered glass register cover displays readings with the AMR digits highlighted. Direction of flow and units of measure are also easily readable on the register display. The iPERL register features; AMR resolution and unit of measure that are fully programmable, integral customer data logging compatible with UniPro software tools. The large, easy to read display also includes battery life, empty pipe and forward/reverse flow indicators.

TAMPERPROOF FEATURES

The integrated construction of the iPERL system prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the iPERL system.

AMR / AMI SYSTEMS

iPERL systems are compatible with current Sensus AMR/AMI systems.



DIMENSIONS AND NET WEIGHTS

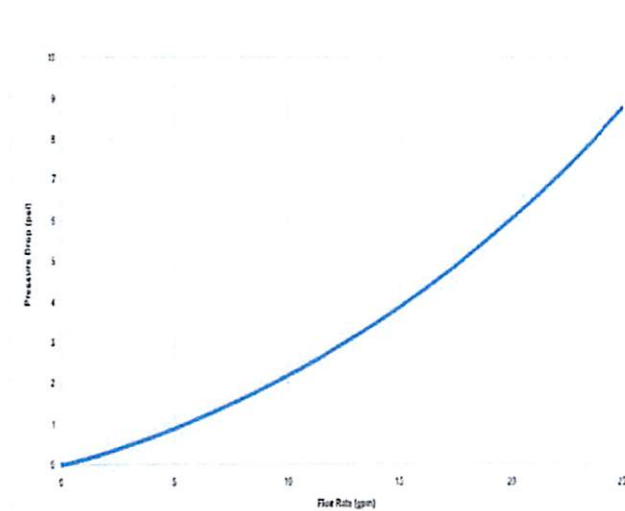
Size	A (lay length)	B	C	Spud Ends	NPSM Thread Size	Width	Net Weight
5/8" (DN 15 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	5/8" (15 mm)	3/4" (19 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4"S (5/8" x 3/4") (DN 20 mm)	7-1/2" (190 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.1 lb. (1.4 kg)
3/4" (DN 20 mm)	9" (229 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	3/4" (20 mm)	1" (25 mm)	4-1/2" (114 mm)	3.2 lb. (1.5 kg)
1" (DN 25 mm)	10-3/4" (273 mm)	6-1/10" (155 mm)	1-3/4" (44 mm)	1" (25 mm)	1-1/4" (32 mm)	4-1/2" (114 mm)	3.3 lb. (1.6 kg)

SPECIFICATIONS

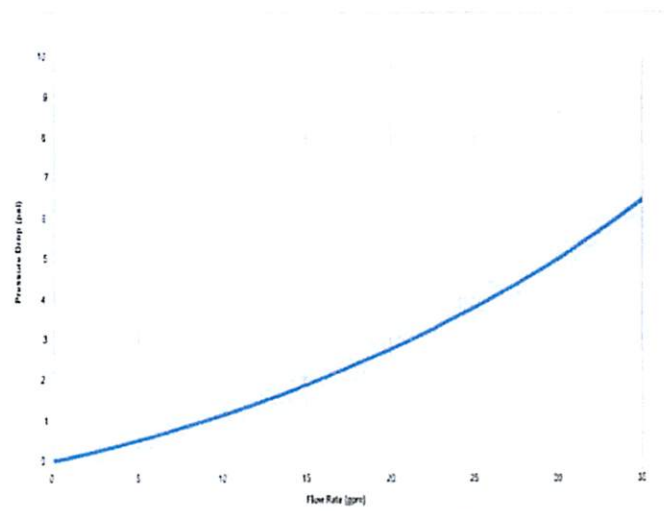
SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 °F (0.56 °C) - 150 °F (65.6 °C)
NORMAL OPERATING FLOW RANGE (100% ±1.5%)	5/8" (DN 15mm) size: 0.11 to 25 gpm (0.02 to 5.7 m ³ /hr) 3/4" (DN 20mm) size: 0.11 to 35 gpm (0.02 to 8.0 m ³ /hr) 1" (DN 25mm) size: 0.4 to 55 gpm (0.09 to 12.5 m ³ /hr)
LOW FLOW REGISTRATION (85% - 101.5%)	5/8" (DN 15mm) size: 0.03 gpm (0.007 m ³ /h) 3/4" (DN 20mm) size: 0.03 gpm (0.007 m ³ /h) 1" (DN 25mm) size: 0.11 gpm (0.025 m ³ /h)
MAXIMUM PRESSURE LOSS	5/8" (DN 15mm) size: 4 psi at 15 gpm (0.3 bar at 3.4 m ³ /h) 3/4" (DN 20mm) size: 2 psi at 15 gpm (0.1 bar at 3.4 m ³ /h) 1" (DN 25mm) size: 2 psi at 25 gpm (0.1 bar at 5.7 m ³ /h)
MAXIMUM OPERATING PRESSURE	200 psi (13.8 bar)
MEASUREMENT TECHNOLOGY	Solid state electromagnetic flow

REGISTER	Hermetically sealed, 9-digit programmable electronic register AMR/AMI compatible IPERL system register programmable using the UniPro programming package
MATERIALS	External housing - Thermal plastic Flowtube - Polyphenylene sulfide alloy Electrode - Silver/silver chloride Register cover - Tempered glass
ALARM DEFAULTS	Alarm Duration - 90 days Leak Duration - 24 hours Catalog Interval - 1 hour Alarm Mask - All alarms reported History Mask - All event types reported

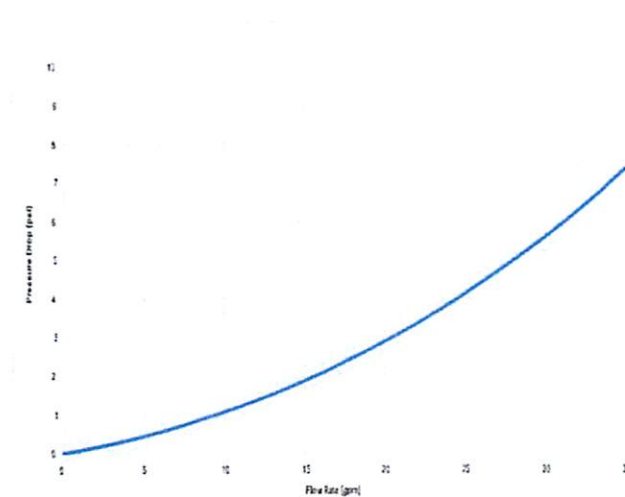
HEADLOSS CURVES



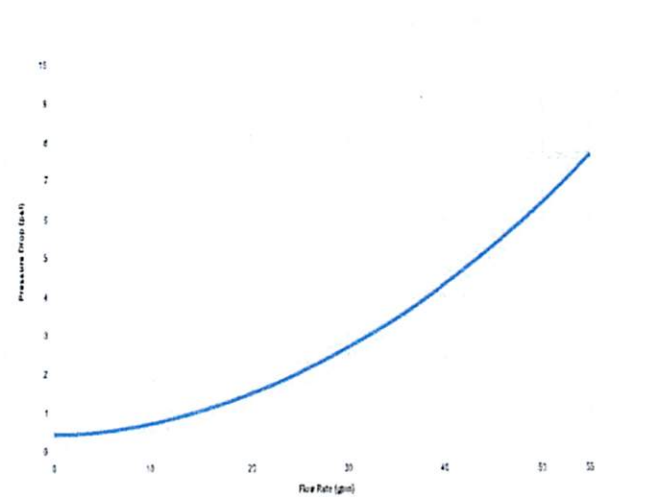
5/8" Headloss Curve



3/4" Short Headloss Curve



3/4" Headloss Curve



1" Headloss Curve

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OMNI™ C²1-1/2", 2", 3", 4", 6", 8" and 10" OMNI C² Meter**Description****1-1/2", 2", 3", 4", 6", 8" and 10" Sizes**

The OMNI C² meter operation is based on advanced Floating Ball Technology (FBT).

**Features****CONFORMANCE TO STANDARDS**

The OMNI C² meter meets and far exceeds the most recent revision of AWWA Standard C701 and C702 class II. Additionally, the meter does not require a valve to meet these standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved latest standards.

PERFORMANCE

The patented measurement principles of the OMNI C² meter assure enhanced accuracy ranges, an overall greater accuracy, and a longer service life than any other comparable class meter produced. The OMNI C² meter has no restrictions as to sustained flow rates within its continuous operating range. The floating ball measurement technology allows for flows up to its rated maximum capacity without undue wear or accuracy degradation when installed in any orientation.

CONSTRUCTION

The OMNI C² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the "floating ball" impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the

maincase using a high pressure o-ring, testing port and an AWWA compliant strainer.

OMNI ELECTRONIC REGISTER

The OMNI C² electronic register is hermetically sealed with an electronic pickup containing no mechanical gearing. The large character LCD displays AMR, Totalization and a Resettable Test Totalizer. OMNI register features; AMR resolution units that are fully programmable, Pulse output frequency that are fully programmable, Integral customer data logging capability, Integral resettable accuracy testing feature compatible with UniPro Testing Assistant Program, Large, easy-to-read LCD also displays both forward and reverse flow directions and all with a 10-year battery life guarantee.

MAGNETIC DRIVE

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

MEASURING ELEMENT

The revolutionary thermoplastic, hydro-dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI C² meter.

STRAINER

The OMNI C² with the AWWA compliant "V" shaped strainer using a stainless steel screen along with Floating Ball Technology (FBT) create a design that gives far improved accuracy even in those once thought questionable settings. A removable strainer cover permits easy access to the screen for routine maintenance.

MAINTENANCE

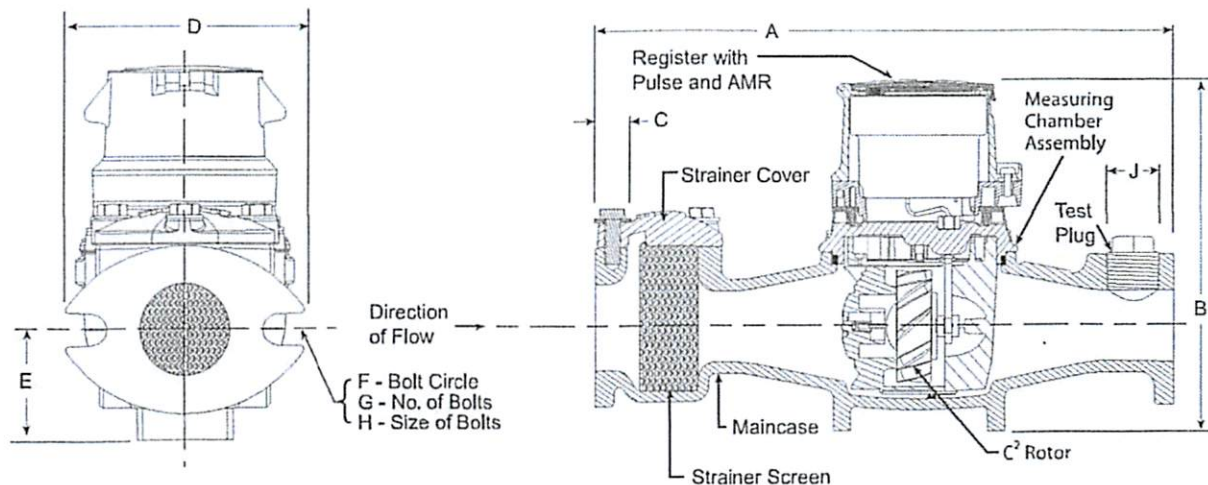
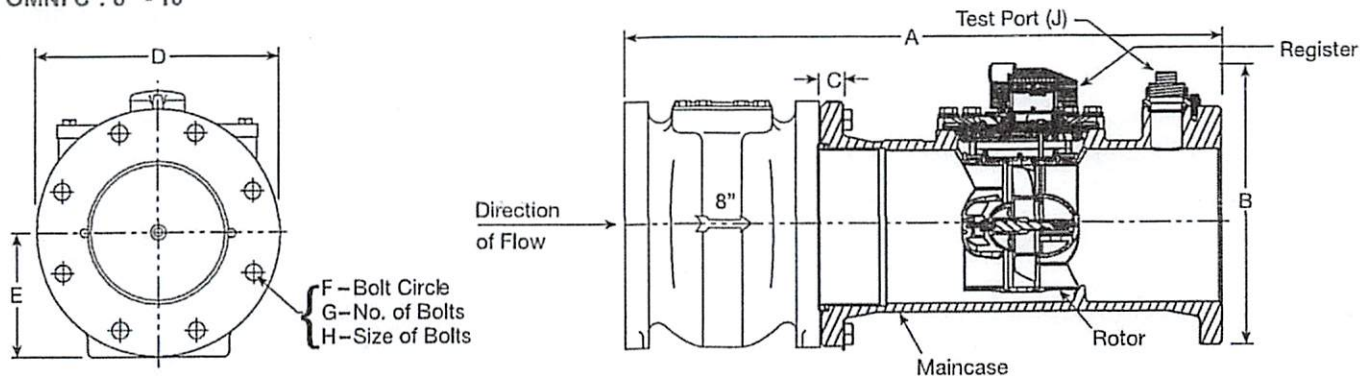
The OMNI C² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and / or strainer cover can be removed independently. Parts and or a replacement measuring chamber may be utilized in the event repairs are needed. Replacement Measuring Chambers are available for the OMNI C² meters and may also be utilized for retrofitting to competitive meters to achieve increased accuracy and extended service life.

AMR / AMI SYSTEMS:

Meters and encoders are compatible with current Sensus AMR/AMI systems.

GUARANTEE:

Sensus OMNI C² Meters are backed by "The Sensus Guarantee." Ask your Sensus representative for details or see Bulletin G-500.

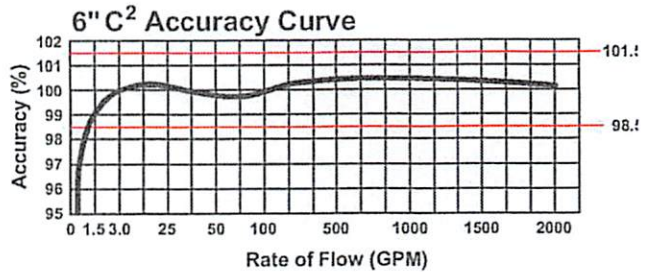
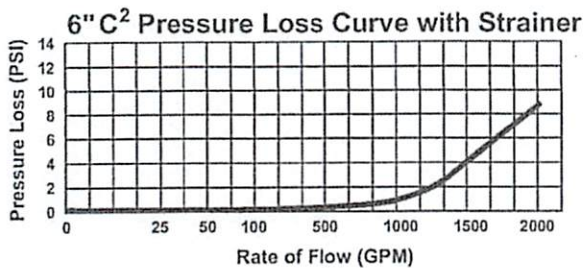
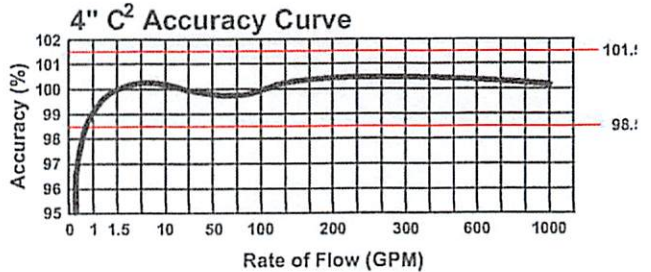
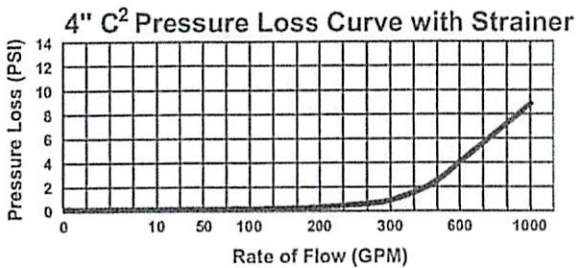
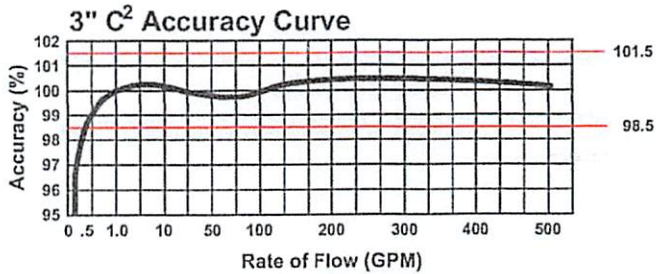
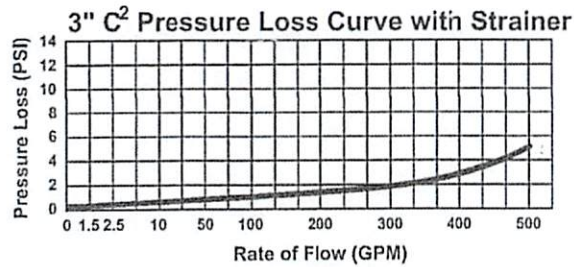
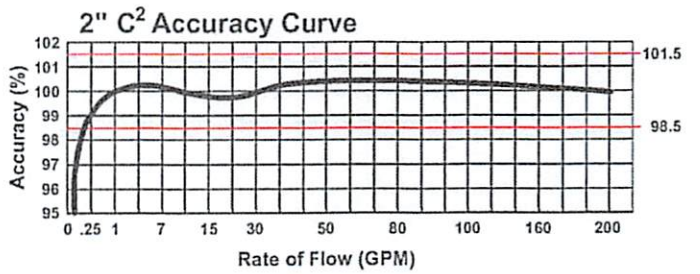
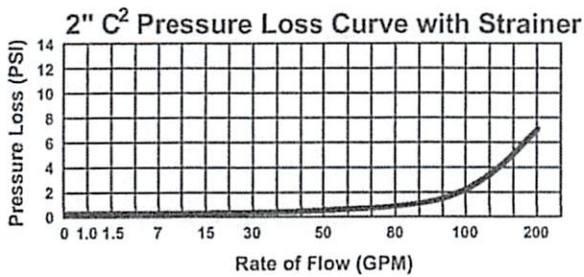
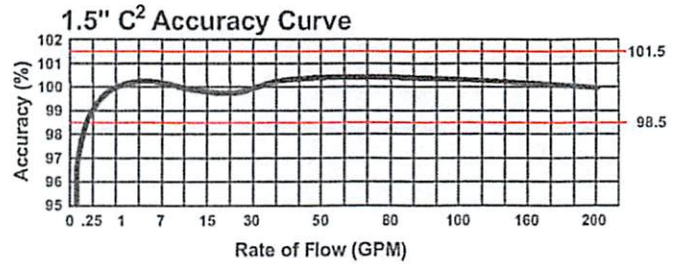
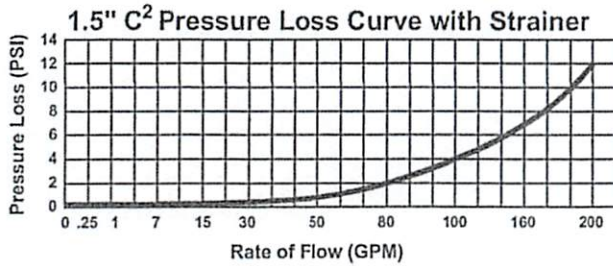
OMNI C²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes**OMNI C²: 1 1/2" - 6"****OMNI C²: 8" - 10"****DIMENSIONS AND NET WEIGHTS**

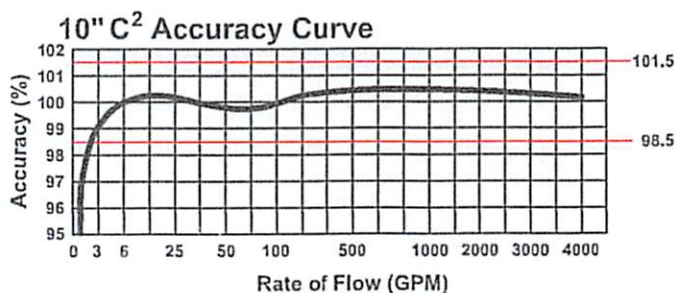
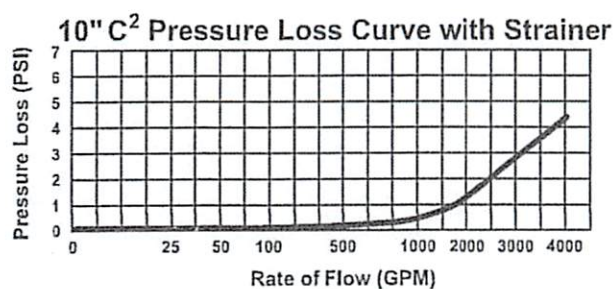
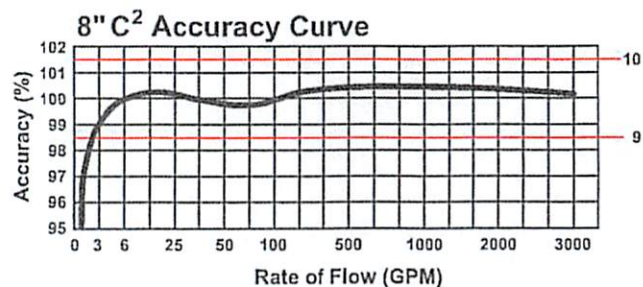
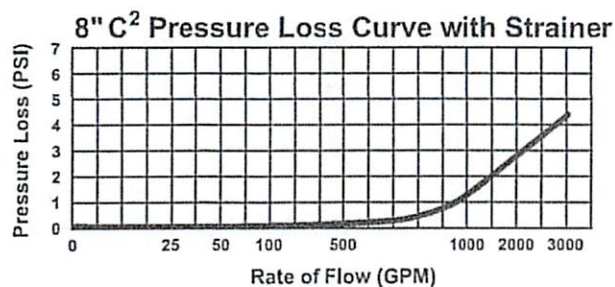
Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight
1-1/2" DN 40mm	.5 gpm .11 m ³ /hr	200 gpm 45 m ³ /hr	Flanged	13" 330mm	7-7/8" 200mm	15/16" 24mm	5-1/8" 130mm	2-5/16" 59mm	4" 102mm	2	5/8" 16mm	1" 25mm	18.8 lbs. 8.53 kg.	22.5 lbs. 10.20 kg.
2" DN 50mm	.5 gpm .11 m ³ /hr	200 gpm 45 m ³ /hr	Flanged	15-1/4" 387mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	1" 25mm	25.4 lbs. 11.39 kg.	32.5 lbs. 14.74 kg.
3" DN 80mm	1 gpm .23 m ³ /hr	500 gpm 114 m ³ /hr	Flanged	17" 432mm	8-3/4" 222mm	3/4" 19mm	7-7/8" 200mm	4-1/8" 105mm	6" 153mm	4	5/8" 16mm	1" 25mm	45 lbs. 20.41 kg.	72.8 lbs. 33.02 kg.
4" DN 100mm	1.5 gpm .34 m ³ /hr	1000 gpm 227 m ³ /hr	Flanged	20" 508mm	11-3/16" 284mm	15/16" 24mm	9-1/8" 232mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	1-1/2" 40mm	64.9 lbs. 29.44 kg.	72.8 lbs. 33.02 kg.
6" DN 150mm	3 gpm .68 m ³ /hr	2500 gpm 5687 m ³ /hr	Flanged	24" 610mm	13-1/4" 336mm	15/16" 24mm	11" 279mm	5-3/4" 146mm	9-1/2" 242mm	8	3/4" 19mm	1-1/2" 40mm	130 lbs. 48.5 kg.	155 lbs. 57.8 kg.
8" DN 200mm	4 gpm .91 m ³ /hr	2700 gpm 614 m ³ /hr	Flanged	30-1/8" 765 mm	15" 381 mm	11/16" 17 mm	13-1/2" 343 mm	6-3/4" 172 mm	11-3/4" 300 mm	8	3/4" 19 mm	2" NPT	471 lbs. 214 kg.	521 lbs. 236 kg.
10" DN 250mm	5 gpm 1.1 m ³ /hr	4000 gpm 908 m ³ /hr	Flanged	41-1/8" 1045mm	19" 485mm	11/16" 17mm	16" 406mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8" 22mm	2" NPT	685 lbs. 311 kg.	745 lbs. 338 kg.

OMNI C²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes

SPECIFICATIONS

SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 °F (56 °C) - 150 °F (65.6 °C)	
OPERATING RANGE (100% ± 1.5%)	1-1/2": .5 – 200 GPM (.11 - 45 m ³ /hr) 2": .5 – 200 GPM (.11 - 45 m ³ /hr) 3": 1.0 – 500 GPM (.23 - 114 m ³ /hr) 4": 1.5 – 1000 GPM (.34 - 227 m ³ /hr) 6": 3 – 2000 GPM (.68 - 454 m ³ /hr) 8": 4 – 2700 GPM (0.91 – 614 m ³ /hr) 10": 5-4000 GPM (1.1-908 m ³ /hr)	
LOW FLOW (95% – 101.5%)	1-1/2": .25 GPM (.06 m ³ /hr) 2": .25 GPM (.06 m ³ /hr) 3": .5 GPM (.11 m ³ /hr) 4": .75 GPM (.17 m ³ /hr) 6": 1.5 GPM (.34 m ³ /hr) 8": 2.5 GPM (.57 m ³ /hr) 10": 3.5 GPM (.8 m ³ /hr)	
MAXIMUM CONTINUOUS OPERATION	1-1/2": 160 GPM (36 m ³ /hr) 2": 160 GPM (36 m ³ /hr) 3": 400 GPM (91 m ³ /hr) 4": 800 GPM (182 m ³ /hr) 6": 1600 GPM (363 m ³ /hr) 8": 2700 GPM (614 m ³ /hr) 10": 4000 GPM (908 m ³ /hr)	
MAXIMUM INTERMITTENT OPERATION	1-1/2": 200 GPM (45 m ³ /hr) 2": 200 GPM (45 m ³ /hr) 3": 500 GPM (114 m ³ /hr) 4": 1000 GPM (227 m ³ /hr) 6": 2000 GPM (454 m ³ /hr) 8": 3400 GPM (773 m ³ /hr) 10": 5000 GPM (1136 m ³ /hr)	
PRESSURE LOSS	1-1/2": 6.9 psi @ 160 GPM (48 bar @ 36 m ³ /hr) 2": 4.3 psi @ 160 GPM (.30 bar @ 36 m ³ /hr) 3": 3.2 psi @ 400 GPM (.22 bar @ 91 m ³ /hr) 4": 6.4 psi @ 800 GPM (.51 bar @ 182 m ³ /hr) 6": 5.5 psi @ 1600 GPM (.56 bar @ 363 m ³ /hr) 8": 4 psi @ 2700 GPM (.27 bar @ 614 m ³ /hr) 10": 4.5 psi @ 4000 GPM (.31 bar @ 908 m ³ /hr)	
MAXIMUM OPERATING PRESSURE	200 PSI (13.8 bar)	
FLANGE CONNECTIONS	U.S. ANSI B16.1 / AWWA Class 125	
REGISTER	Fully electronic sealed register with programmable registration (Gal. / Cu.Ft. / Cu. Mtr. / Imp.Gal / Acre Ft.) Programmable AMR/AMI reading and pulse outputs Guaranteed 10 year battery life	
NSF APPROVED MATERIALS	Maincase: Measuring Chamber: Rotor "Floating Ball": Radial Bearings: Thrust Bearings: Magnets: Strainer Screen: Strainer Cover: Test Plug:	Coated Ductile Iron Thermoplastic Thermoplastic Hybrid Thermoplastic Sapphire/Ceramic Jewel Ceramic Magnet Stainless Steel Coated Ductile Iron Coated Ductile Iron

OMNI C²: 1-1/2", 2", 3", 4", and 6" Sizes**Headloss Curves**

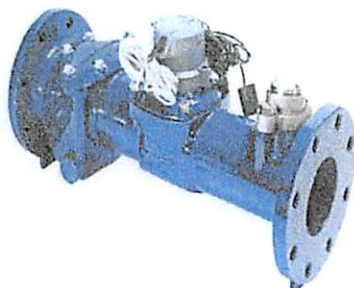
OMNI C²: 8" and 10" Sizes**Headloss Curves**

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OMNI™ T²1-1/2", 2", 3", 4", 6", 8" and 10" OMNI T² Meter**Description****1-1/2", 2", 3", 4", 6", 8" and 10" Sizes**

The OMNI T² meter operation is based on advanced Floating Ball Technology (FBT).

**Features****CONFORMANCE TO STANDARDS**

The OMNI T² meter meets and far exceeds the most recent revision of AWWA Standard C701 class II standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved.

PERFORMANCE

The patented measurement principles of the OMNI T² meter assure enhanced accuracy ranges, an overall greater accuracy, and a longer service life than any other comparable class meter produced. The OMNI T² meter has no restrictions as to sustained flow rates within its continuous operating range. The floating ball measurement technology allows for flows up to its rated maximum capacity without affecting undue wear or accuracy degradation when installed in any orientation.

CONSTRUCTION

The OMNI T² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the "floating ball" impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber seal to the maincase using a high pres-

sure o-ring, testing port and a convenient integral strainer.

OMNI ELECTRONIC REGISTER

The OMNI T² electronic register consist of a hermetically sealed register with an electronic pickup containing no mechanical gearing. The large character LCD displays AMR, Totalization and a Resettable Test Totalizer. OMNI register features; AMR resolution units that are fully programmable, Pulse output frequency that are fully programmable, Integral customer data logging capability, Integral resettable accuracy testing feature compatible with the UniPro Testing Assistant Program, Large, easy-to-read LCD also displays both forward and reverse flow directions and all with a 10-year battery life guarantee.

MAGNETIC DRIVE

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

MEASURING ELEMENT

The revolutionary thermoplastic, hydro dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended

upper and lower flow ranges capable on only the OMNI T² meter.

STRAINER

The OMNI T² with the "V" shaped integral strainer using a stainless steel screen along with Floating Ball Technology (FBT) create a design that gives far improved accuracy even in those once thought questionable settings. A removable strainer cover permits easy access to the screen for routine maintenance.

MAINTENANCE

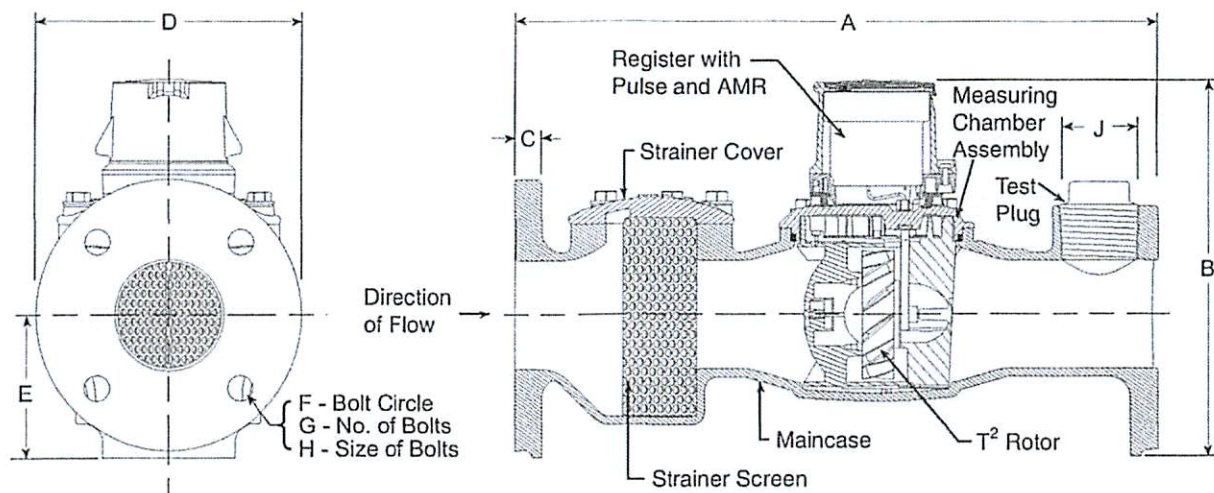
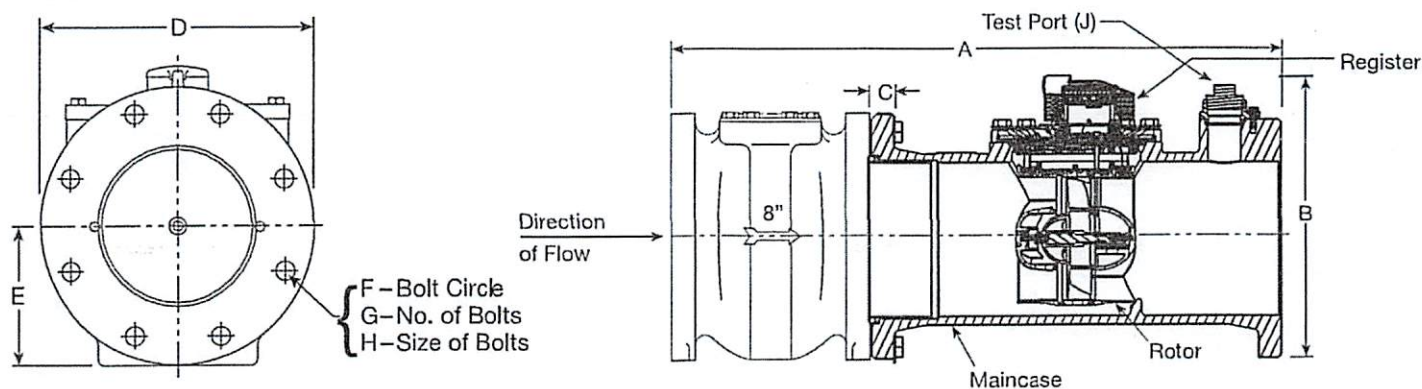
The OMNI T² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and / or strainer cover can be removed independently. Parts and or a replacement measuring chamber may be utilized in the event repairs are needed. Replacement Measuring Chambers Exchange are available for the OMNI T² meters and may also be utilized for retrofitting to competitive meters to achieve increased accuracy and extended service life.

AMR / AMI SYSTEMS:

Meters and encoders are compatible with current Sensus AMR/AMI systems.

GUARANTEE:

Sensus OMNI T² Meters are backed by "The Sensus Guarantee." Ask your Sensus representative for details or see Bulletin G-500.

OMNI T²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes**OMNI T²: 1 1/2" - 6"****OMNI T²: 8" - 10"****DIMENSIONS AND NET WEIGHTS**

Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight
1-1/2" DN 40mm	1.25 gpm .28 m ³ /hr	200 gpm 45 m ³ /hr	Flanged	13" 330mm	7-7/8" 200mm	15/16" 24mm	5-1/8" 130mm	2-5/16" 59mm	4" 102mm	2	5/8" 16mm	1" 25mm	18.8 lbs. 8.53 kg.	22.5 lbs. 10.20 kg.
2" DN 50mm	1.5 gpm .34 m ³ /hr	250 gpm 57 m ³ /hr	Flanged	17" 432mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	1-1/2" 40mm	27.4 lbs. 12.42 kg.	34.5 lbs. 15.65 kg.
2" without Strainer DN 50mm	1.5 gpm .34 m ³ /hr	250 gpm 57 m ³ /hr	Flanged	10" 254mm	7-7/8" 200mm	1" 25mm	5-3/4" 146mm	2-5/16" 59mm	4-1/2" 114mm	2	3/4" 19mm	N/A	17.4 lbs. 7.9 kg.	24.5 lbs. 11.11 kg.
3" DN 80mm	2.5 gpm .57 m ³ /hr	650 gpm 148 m ³ /hr	Flanged	19" 483mm	8-3/4" 222mm	3/4" 19mm	7-7/8" 200mm	4-1/8" 105mm	6" 153mm	4	5/8" 16mm	2" 50mm	48.5 lbs. 22.00 kg.	57.4 lbs. 26.04 kg.
4" DN 100mm	3.0 gpm .68 m ³ /hr	1250 gpm 284 m ³ /hr	Flanged	23" 584mm	11-3/16" 284mm	15/16" 24mm	9-1/8" 232mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	2" 50mm	67.9 lbs. 30.80 kg.	75.8 lbs. 34.38 kg.
6" DN 150mm	4 gpm .91 m ³ /hr	2500 gpm 568 m ³ /hr	Flanged	27" 685mm	13-1/4" 336mm	15/16" 24mm	11" 279mm	5-3/4" 146mm	9-1/2" 242mm	8	3/4" 19mm	2" 50mm	140 lbs. 52.3 kg.	165 lbs. 61.6 kg.
8" DN 200mm	5 gpm 1.1 m ³ /hr	3500 gpm 795 m ³ /hr	Flanged	30-1/8" 765 mm	15" 381 mm	11/16" 17 mm	13-1/2" 343 mm	6-3/4" 172 mm	11-3/4" 300 mm	8	3/4" 19 mm	2" NPT	471 lbs. 214 kg.	521 lbs. 236 kg.
10" DN 250mm	6 gpm 1.4 m ³ /hr	5500 gpm 1249 m ³ /hr	Flanged	41-1/8" 485mm	19" 485mm	11/16" 17mm	16" 406mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8" 22mm	2" NPT	685 lbs. 311 kg.	745 lbs. 338 kg.

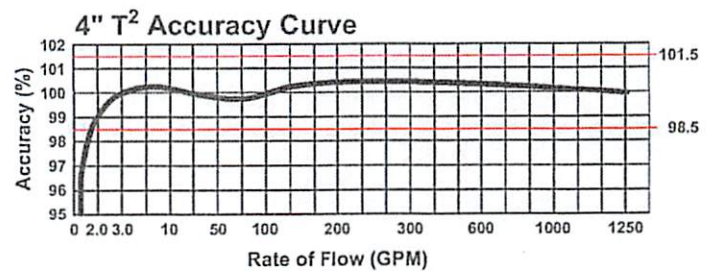
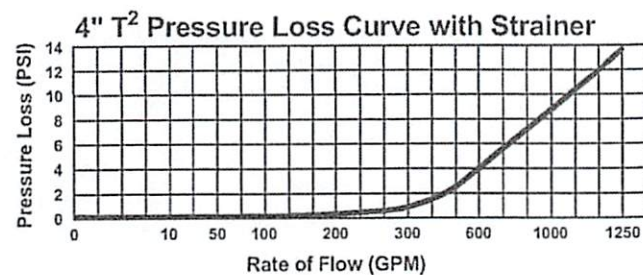
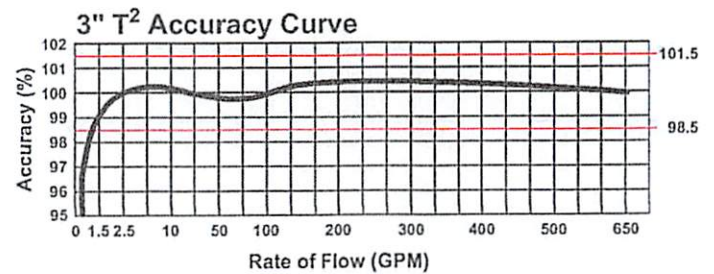
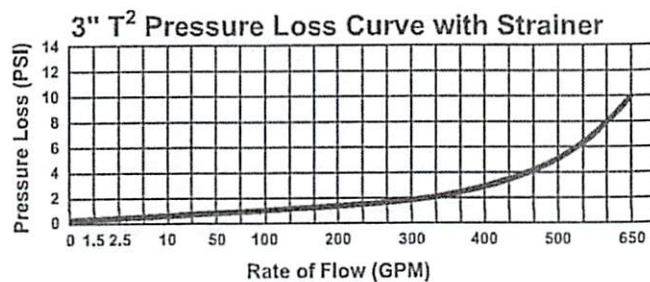
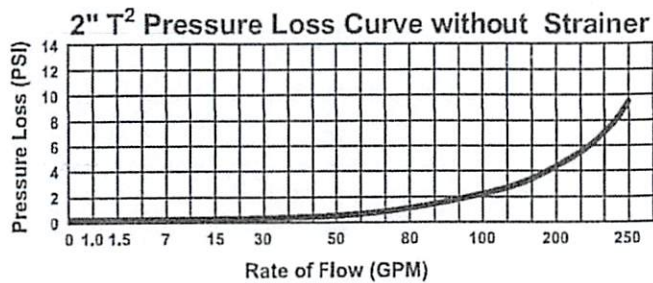
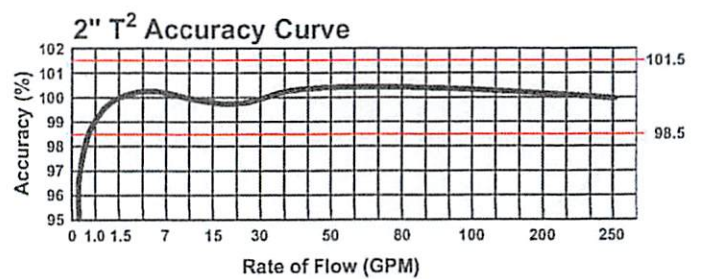
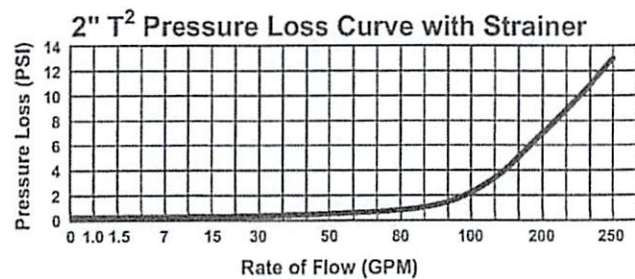
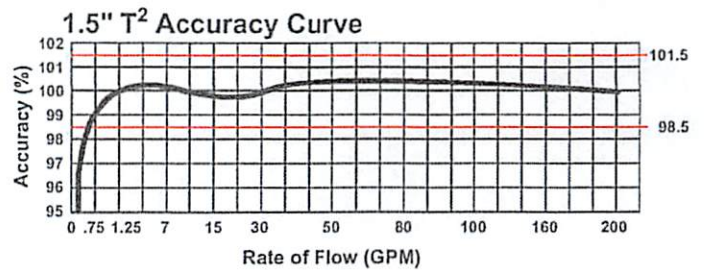
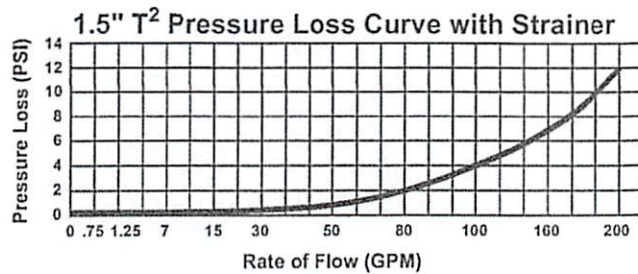
OMNI T²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes

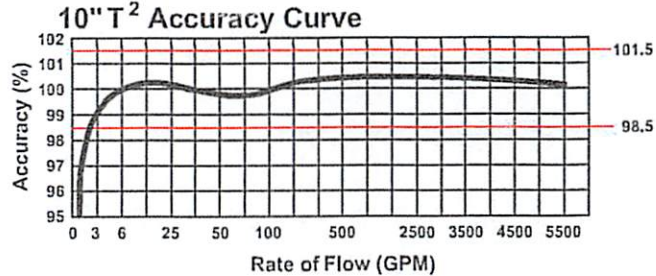
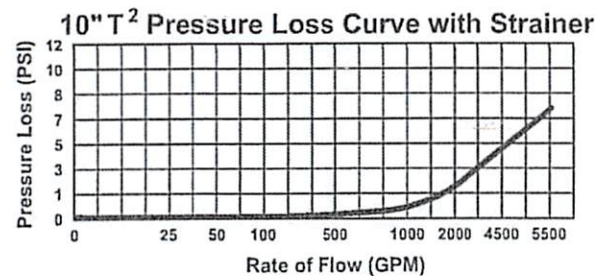
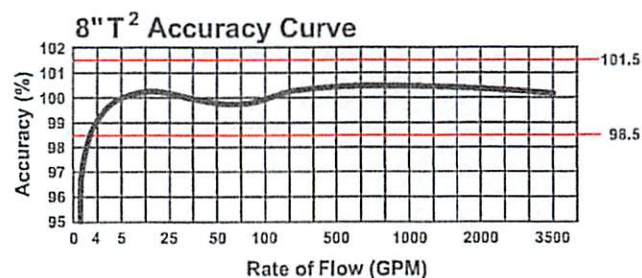
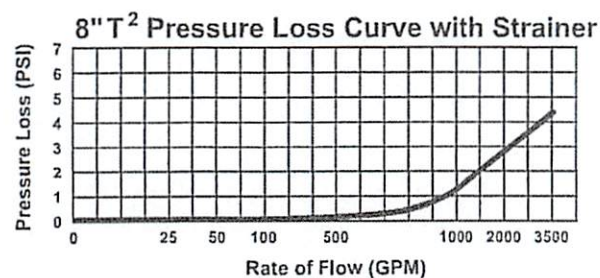
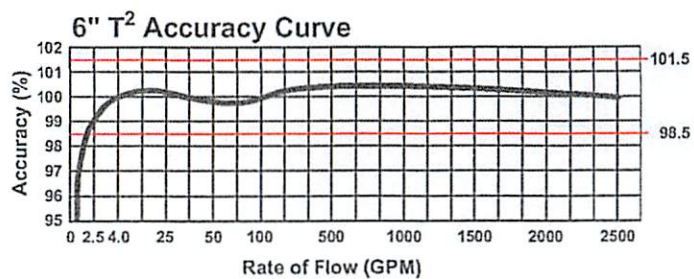
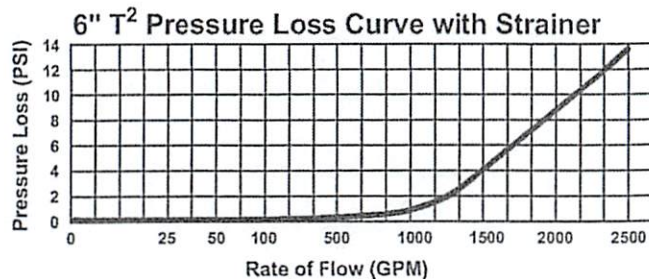
SPECIFICATIONS

SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 °F (56 °C) - 150 °F (65.6 °C)																		
OPERATING RANGE (100% ± 1.5%)	1-1/2": 1.25 – 200 GPM (.28 - 45 m ³ /hr) 2" and 2" without Strainer: 1.5 – 250 GPM (.34 – 57 m ³ /hr) 3": 2.5 – 650 GPM (.57 – 148 m ³ /hr) 4": 3 – 1250 GPM (.68 – 284 m ³ /hr) 6": 4 – 2500 GPM (.91 – 568 m ³ /hr) 8": 5 – 3500 GPM (1.1-795 m ³ /hr) 10": 6 – 5500 GPM (1.4 - 1249 m ³ /hr)																		
LOW FLOW (95% – 101.5%)	1-1/2": .75 GPM (.17 m ³ /hr) 2" and 2" without Strainer: 1.0 GPM (.23 m ³ /hr) 3": 1.5 GPM (.34 m ³ /hr) 4": 2.0 GPM (.45 m ³ /hr) 6": 2.5 GPM (.57 m ³ /hr) 8": 4 GPM (0.9 m ³ /hr) 10": 5 GPM (1.1 m ³ /hr)																		
MAXIMUM CONTINUOUS OPERATION	1-1/2": 160 GPM (36 m ³ /hr) 2" and 2" without Strainer: 200 GPM (45 m ³ /hr) 3": 500 GPM (114 m ³ /hr) 4": 1000 GPM (227 m ³ /hr) 6": 2000 GPM (454 m ³ /hr) 8": 3500 GPM (795 m ³ /hr) 10": 5500 GPM (1249 m ³ /hr)																		
MAXIMUM INTERMITTENT OPERATION	1-1/2": 200 GPM (45 m ³ /hr) 2" and 2" without Strainer: 250 GPM (57 m ³ /hr) 3": 650 GPM (148 m ³ /hr) 4": 1250 GPM (284 m ³ /hr) 6": 2500 GPM (568 m ³ /hr) 8": 4700 GPM (1067 m ³ /hr) 10": 7000 GPM (1590 m ³ /hr)																		
PRESSURE LOSS	1-1/2": 6.9 psi @ 160 GPM (48 bar @ 36 m ³ /hr) 2" and 2" without Strainer: 7.0 psi @ 200 GPM (.48 bar @ 45 m ³ /hr) 3": 5.1 psi @ 500 GPM (.35 bar @ 114 m ³ /hr) 4": 8.7 psi @ 1000 GPM (.60 bar @ 227 m ³ /hr) 6": 8.2 psi @ 2000 GPM (.56 bar @ 454 m ³ /hr) 8": 5.1 psi @ 3500 GPM (.35 bar @ 795 m ³ /hr) 10": 7.2 psi @ 5500 GPM (.50 bar @ 1249 m ³ /hr)																		
MAXIMUM OPERATING PRESSURE	200 PSI (13.8 bar)																		
FLANGE CONNECTIONS	U.S. ANSI B16.1 / AWWA Class 125																		
REGISTER	Fully electronic sealed register with programmable registration (Gal. / Cu.Ft. / Cu. Mtr. / Imp.Gal / Acre Ft.) Programmable AMR/AMI reading and pulse outputs Guaranteed 10 year battery life																		
NSF APPROVED MATERIALS	<table> <tr> <td>Maincase:</td><td>Coated Ductile Iron</td></tr> <tr> <td>Measuring Chamber:</td><td>Thermoplastic</td></tr> <tr> <td>Rotor "Floating Ball":</td><td>Thermoplastic</td></tr> <tr> <td>Radial Bearings:</td><td>Hybrid Thermoplastic</td></tr> <tr> <td>Thrust Bearings:</td><td>Sapphire/Ceramic Jewel</td></tr> <tr> <td>Magnets:</td><td>Ceramic Magnet</td></tr> <tr> <td>Strainer Screen:</td><td>Stainless Steel</td></tr> <tr> <td>Strainer Cover:</td><td>Coated Ductile Iron</td></tr> <tr> <td>Test Plug:</td><td>Coated Ductile Iron</td></tr> </table>	Maincase:	Coated Ductile Iron	Measuring Chamber:	Thermoplastic	Rotor "Floating Ball":	Thermoplastic	Radial Bearings:	Hybrid Thermoplastic	Thrust Bearings:	Sapphire/Ceramic Jewel	Magnets:	Ceramic Magnet	Strainer Screen:	Stainless Steel	Strainer Cover:	Coated Ductile Iron	Test Plug:	Coated Ductile Iron
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OMNI T²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes

Headloss Curves



OMNI T²: 1-1/2", 2", 3", 4", 6", 8" and 10" Sizes**Headloss Curves**

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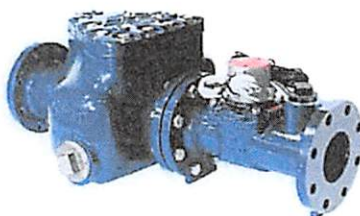
OMNI™ F²

4", 6", 8" and 10" OMNI F² Meter

Description

4", 6", 8" and 10" Sizes

The OMNI F² meter operation is based on advanced Floating Ball Technology (FBT).

**Features****CONFORMANCE TO STANDARDS**

The OMNI F² meter meets and far exceeds the most recent revision of AWWA Standard C703 class II. Additionally, the meter does not require a valve to meet these standards. Each meter is performance tested to ensure compliance. All OMNI meters are NSF/ANSI Standard 61, Annex F and G approved. The OMNI F² meter is UL (Underwriters Laboratories) Listed and FM (Factory Mutual) approved for use on fire protection and domestic water applications.

PERFORMANCE

The patented measurement principles of the OMNI F² meter assure enhanced accuracy ranges, an overall greater accuracy, and a longer service life than any other comparable class meter produced. The F² meter has no restrictions as to sustained flow rates within its continuous operating range. The floating ball measurement technology allows for flows up to its rated maximum capacity without undue wear or accuracy degradation.

CONSTRUCTION

The OMNI F² meter consists of two basic assemblies; the maincase and the measuring chamber. The measuring chamber assembly includes the "floating ball" impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all electronic programmable register with protective bonnet. The maincase is made from industry proven Ductile Iron with an approved NSF epoxy coating. Maincase features are; easily removable measuring chamber, unique chamber

seal to the maincase using a high pressure o-ring, testing port and a convenient integral strainer with optional drain/debris-flushing ports.

OMNI ELECTRONIC REGISTER

The OMNI F² electronic register is hermetically sealed with electronic pickup containing no mechanical gearing. The large character LCD displays AMR, Totalization and a Resettable Test Totalizer. OMNI register features; AMR resolution units that are fully programmable, Pulse output frequency that are fully programmable, Integral customer data logging capability, Integral resettable accuracy testing feature compatible with the UniPro Testing Assistant Program, Large, easy-to-read LCD also displays both forward and reverse flow directions and all with a 10-year battery life guarantee.

MAGNETIC DRIVE

Meter registration is achieved by utilizing a fully magnetic pickup system. This is accomplished by the magnetic actions of the embedded rotor magnets and the ultra sensitive register pickup probe. The only moving component in water is the "floating ball" impeller.

MEASURING ELEMENT

The revolutionary thermoplastic, hydro dynamically balanced impeller floats between the bearings. The Floating Ball Technology (FBT) allows the measuring element to operate virtually without friction or wear, thus creating the extended upper and lower flow ranges capable on only the OMNI F² meter.

STRAINER

The OMNI F² meter includes the Sensus designed "V" shaped UL Listed/FM approved strainer which utilizes a stainless steel screen along with Floating Ball Technology (FBT) to create a design that gives far improved accuracy even in those once thought questionable settings. A removable strainer cover permits easy access to the screen for routine maintenance. Optional drain ports, located at the back lower corners of the strainer body, allow for easy discharging of debris without the need to remove the cover.

MAINTENANCE

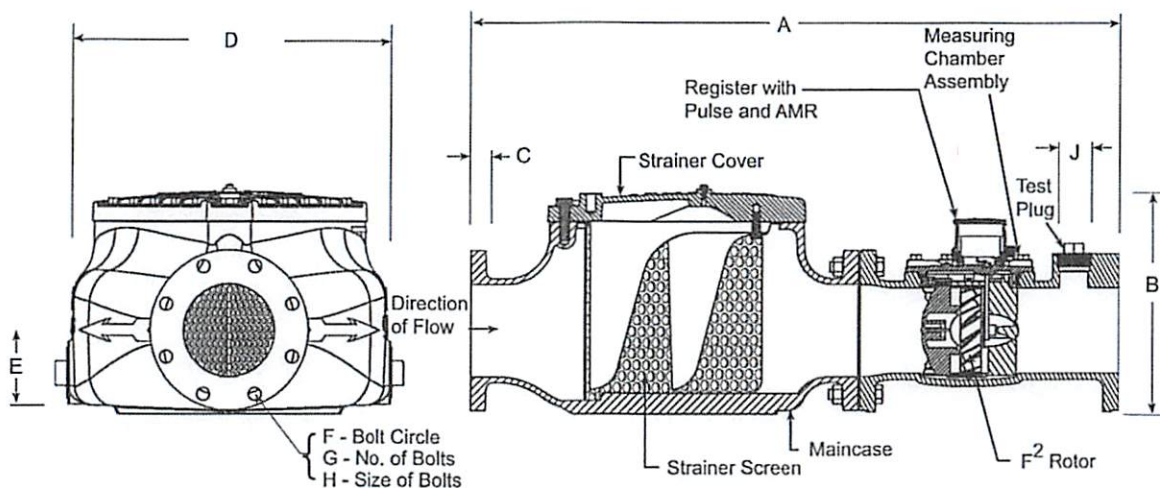
The OMNI F² meter is designed for easy maintenance. Should any maintenance be required, the measuring chamber and/or strainer cover can be removed independently. Parts and or a replacement measuring chamber may be utilized in the event repairs are needed. Replacement Measuring Chambers are available for the OMNI F² meters.

AMR / AMI SYSTEMS

Meters and encoders are compatible with current Sensus AMR/AMI systems.

GUARANTEE

Sensus OMNI F² Meters are backed by "The Sensus Guarantee." Ask your Sensus representative for details or see Bulletin G-500.

OMNI F²: 4", 6", 8" and 10"

DIMENSIONS AND NET WEIGHTS

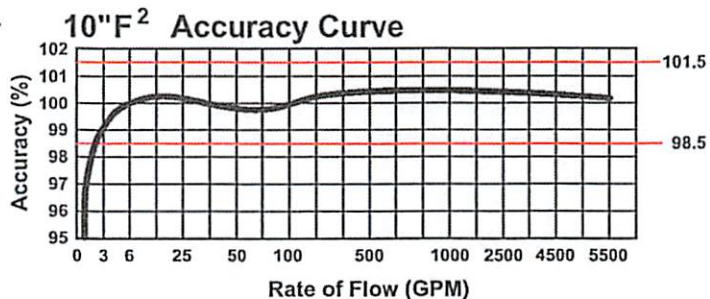
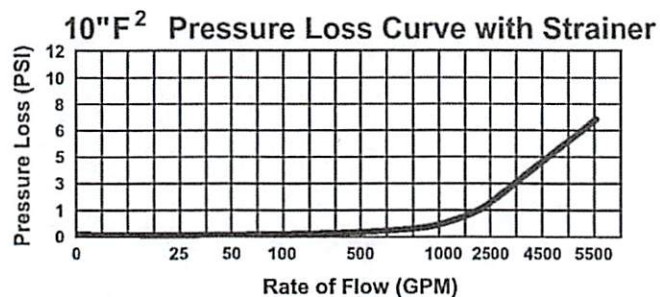
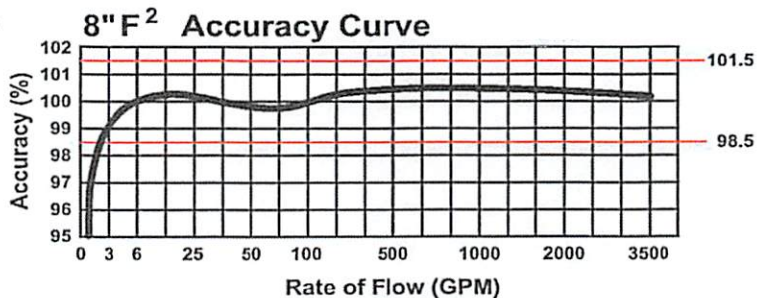
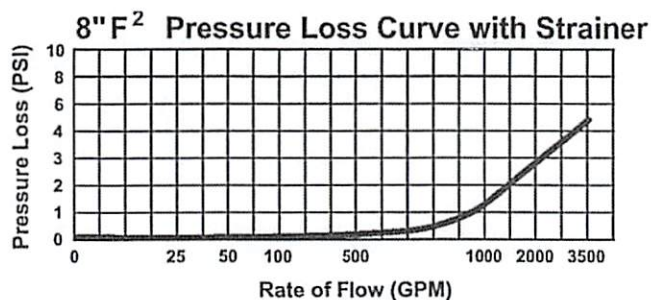
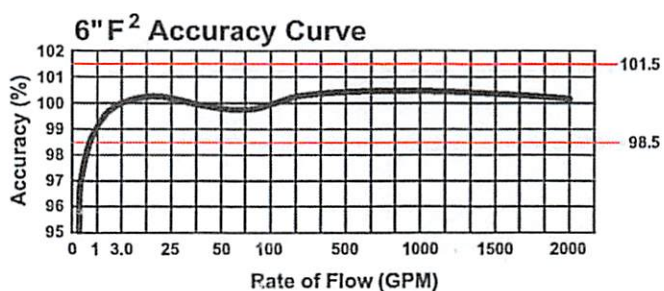
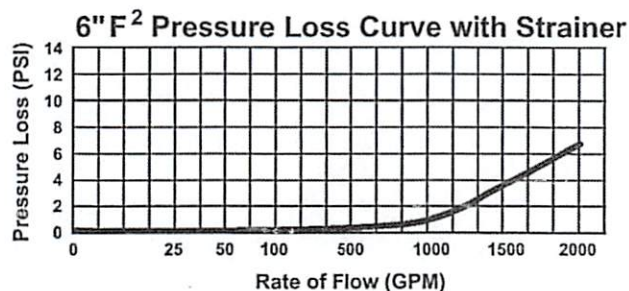
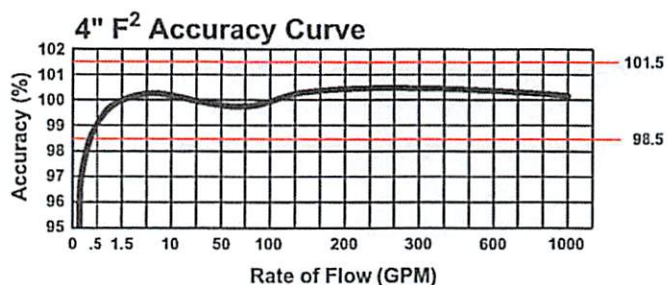
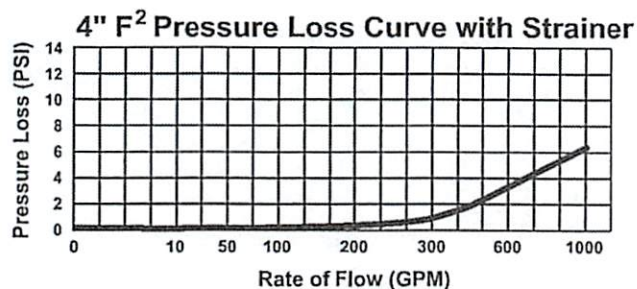
Meter and Pipe Size	Normal Operating Range		Connections	A	B	C	D	E	F	G	H	J	Net Weight	Shipping Weight	Standard Fireline
4" DN 100mm	1.5 gpm .34 m ³ /hr	1000 gpm 227 m ³ /hr	Flanged	33" 838mm	13-11/16" 348mm	15/16" 24mm	17-1/2" 446mm	4-3/4" 121mm	7-1/2" 191mm	8	5/8" 16mm	2" 50mm	212 lbs. 96 kg.	252 lbs. 115 kg.	51-7/8" (1317mm)
6" DN 150mm	3.0 gpm .681 m ³ /hr	2000 gpm 454 m ³ /hr	Flanged	45" 1143mm	15-3/4" 400mm	15/16" 24mm	22-3/8" 569mm	5-3/4" 146mm	9-1/2" 242mm	8	3/4" 19mm	2" 50mm	394 lbs. 179 kg.	449 lbs. 204 kg.	67-5/8" (1717mm)
8" DN 200mm	4 gpm .91 m ³ /hr	3500 gpm 795 m ³ /hr	Flanged	53" 1346mm	18-1/2" 470mm	11/16" 17mm	31" 787mm	6-3/4" 172mm	11-3/4" 298mm	8	3/4" 19mm	2" NPT	736 lbs. 334 kg.	786 lbs. 357 kg.	77" (1956mm)
10" DN 250mm	5 gpm 1.1 m ³ /hr	5500 gpm 1249 m ³ /hr	Flanged	68" 1727mm	22-1/4" 565mm	11/16" 17mm	37-1/3" 947mm	8-1/2" 216mm	14-1/4" 362mm	12	7/8" 22mm	2" NPT	1155 lbs. 524 kg.	1215 lbs. 551 kg.	90" (2286mm)

* Standard Fireline lay length with optional spool piece added.

SPECIFICATIONS

SERVICE	Measurement of potable and reclaim water. Operating temperature range of 33 °F (56 °C) - 150 °F (65.6 °C)
OPERATING RANGE (100% ± 1.5%)	4": 1.5 – 1000 GPM (.34 - 227 m ³ /hr) 6": 3.0 – 2000 GPM (.68 - 454 m ³ /hr) 8": 4 – 3500 GPM (0.91-795 m ³ /hr) 10": 5 – 5500 GPM (1.1-1249 m ³ /hr)
LOW FLOW (95% – 101.5%)	4": .75 GPM (.06 m ³ /hr) 6": 1.5 GPM (.06 m ³ /hr) 8": 2.5 GPM (0.57 m ³ /hr) 10": 3.5 GPM (0.8 m ³ /hr)
UL MINIMUM FLOW	8": 97% @ 3 GPM (0.68 m ³ /hr) 10": 97% @ 4 GPM (0.9 m ³ /hr)
MAXIMUM CONTINUOUS OPERATION	4": 1000 GPM (227 m ³ /hr) 6": 2000 GPM (454 m ³ /hr) 8": 3500 GPM (795 m ³ /hr) 10": 5500 GPM (1249 m ³ /hr)
MAXIMUM INTERMITTENT OPERATION	4": 1250 GPM (284 m ³ /hr) 6": 2500 GPM (568 m ³ /hr) 8": 4700 GPM (1067 m ³ /hr) 10": 7000 GPM (1590 m ³ /hr)

PRESSURE LOSS	4": 6.4 psi @ 1000 GPM (.60 bar @ 227 m ³ /hr) 6": 6.7 psi @ 2000 GPM (.56 bar @ 454 m ³ /hr) 8": 5 psi @ 3500 GPM (.34 bar @ 795 m ³ /hr) 10": 7 psi @ 5500 GPM (.48 bar @ 1249 m ³ /hr)																		
MAXIMUM OPERATING PRESSURE	175 PSI (12 bar)																		
FLANGE CONNECTIONS	U.S. ANSI B16.1 / AWWA Class 125																		
REGISTER	Fully electronic sealed register with programmable registration (Gal./Cu.Ft./ Cu. Mtr. / Imp.Gal / Acre Ft.) Programmable AMR/AMI reading and pulse outputs Guaranteed 10 year battery life																		
NSF APPROVED MATERIALS	<table> <tr> <td>Maincase:</td><td>Coated Ductile Iron</td></tr> <tr> <td>Measuring Chamber:</td><td>Thermoplastic</td></tr> <tr> <td>Rotor "Floating Ball":</td><td>Thermoplastic</td></tr> <tr> <td>Radial Bearings:</td><td>Hybrid Thermoplastic</td></tr> <tr> <td>Thrust Bearings:</td><td>Sapphire/Ceramic Jewel</td></tr> <tr> <td>Magnets:</td><td>Ceramic Magnet</td></tr> <tr> <td>Strainer Screen:</td><td>Stainless Steel</td></tr> <tr> <td>Strainer Cover:</td><td>Coated Ductile Iron</td></tr> <tr> <td>Test Plug:</td><td>Coated Ductile Iron</td></tr> </table>	Maincase:	Coated Ductile Iron	Measuring Chamber:	Thermoplastic	Rotor "Floating Ball":	Thermoplastic	Radial Bearings:	Hybrid Thermoplastic	Thrust Bearings:	Sapphire/Ceramic Jewel	Magnets:	Ceramic Magnet	Strainer Screen:	Stainless Steel	Strainer Cover:	Coated Ductile Iron	Test Plug:	Coated Ductile Iron
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Test Plug:	Coated Ductile Iron																		

OMNI F²: 4", 6", 8" and 10"**Headloss Curves**

All products purchased and services performed are subject to Sensus' terms of sale, available at either: <http://na.sensus.com/TC/TermsConditions.pdf> or 1-800-METER-IT. Sensus reserves the right to modify terms and conditions in its own discretion without notice to the customer.

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RT Series - 19 gauge conductor

Description

Water blocking reinforced tracer wire used for direct burial locating purposes in the telecommunications, gas, sewer or water utilities. Insulated metallic conductor enables location of all-dielectric cables, gas lines, sewer lines or water pipes.

Features & Benefits

- ▲ Durably printed with sequential footage or meter markings*
- ▲ Conductor additionally protected by product construction
- ▲ Market specific coloring for easy identification
- ▲ Water blocking yarns
- ▲ Polyethylene jacket
- ▲ Low elongation for enhanced worker safety
- ▲ Lightweight and easy to handle and install
- ▲ Packaged on sturdy recyclable plastic reels
- ▲ Corrosion-resistant conductor functions at a wide range of frequencies and is compatible with any standard transmitting / receiving equipment
- ▲ Fungus resistant
- ▲ NEPTCO TRACE-SAFE® identification tags included with every reel



Please refer to NEPTCO's TRACE-SAFE® Water Blocking Tracer Wire Splicing Instructions.

TRACE-SAFE® WATER BLOCKING TRACER WIRE PRODUCT ORDERING INFORMATION					
Product	Color Code	Market	Strength		Nominal Diameter
			lbs.	(kg)	
RT1800W	Orange	Telecommunications	1800	(818)	.235"
RT1801W	Yellow	Gas	1800	(818)	.235"
RT1802W	Blue	Water	1800	(818)	.235"
RT1803W	Green	Sewer	1800	(818)	.235"
RT1804W	Purple	Reclamation	1800	(818)	.235"

* Also available unprinted

TRACE-SAFE®

WATER BLOCKING TRACER WIRE

US Pat. No. 7,932,469; other patents pending

<p>TS-19 TRACE-SAFE CONNECTOR MAIN LINE to LATERAL/TAP (IVORY)</p> <p>NEPTCO Incorporated Pawtucket, RI 02861 (401) 722-5500</p> <p>*Trace Safe wire is oval in cross-section</p> <p>1 Hold bottom of connector perpendicular to the main line wire, with top of box facing away. Insert main line wire into top slot of box. Push wire into place with thumb.</p>	<p>1-10-12</p> <p>2 Hold main line wire and rotate connector 90 degrees until flat.</p> <p>3 Place top of connector on loosely (1/8"). Line up lateral/tap wire to the open hole of the connector. Slide wire through the connector, making contact with the back wall. Press connector together with fingers.</p> <p>4 Place channel lock pliers on installation pads and squeeze together until closed.</p>	
<p>TS-19-IL TRACE-SAFE CONNECTOR IN LINE BUTT SPLICE (GRAY)</p> <p>NEPTCO Incorporated Pawtucket, RI 02861 (401) 722-5500</p> <p>*Trace Safe wire is oval in cross-section</p> <p>1 Place top of connector on loosely (no more than 1/8"). Line up Trace-Safe wire to the open hole of the connector. Slide wire through the connector, making contact with the back wall, making sure the wire clears the teeth. Insert second wire into opposite hole, making contact with the back wall. Press together with fingers to lock wires together in position.</p> <p>2 Place channel lock pliers on installation pads and squeeze together until closed.</p>	<p>TS-12-19 TRACE-SAFE CONNECTOR 12 AWG MAIN LINE to LATERAL/TAP (BROWN)</p> <p>NEPTCO Incorporated Pawtucket, RI 02861 (401) 722-5500</p> <p>*Trace Safe wire is oval in cross-section</p> <p>1 Hold bottom of connector up to the 12 AWG main line wire, with top of box facing away. Insert main line wire into top slot of box. Push wire into place with thumb.</p> <p>2 Place top of connector on loosely (no more than 1/8"). Line up (lateral/tap) Trace-Safe wire to the open hole (bottom) of the connector. Slide wire through the connector, making contact with the back wall, making sure the wire clears the teeth. Press together with fingers to lock wires together in position.</p> <p>3 Place channel lock pliers on installation pads and squeeze together until closed.</p>	<p>TS-12-19-IL TRACE-SAFE CONNECTOR IN LINE BUTT SPLICE (BLACK)</p> <p>NEPTCO Incorporated Pawtucket, RI 02861 (401) 722-5500</p> <p>*Trace Safe wire is oval in cross-section</p> <p>1 Place top of connector on loosely (no more than 1/8"). Line up Trace-Safe wire to the larger open hole of the connector. Slide wire through the connector, making contact with the back wall, making sure the wire clears the teeth. Insert 12 AWG wire into opposite hole, making contact with the back wall. Press together with fingers to lock wires together in position.</p> <p>2 Place channel lock pliers on installation pads and squeeze together until closed.</p>

Figure 3 - Installation Instructions for the Trace Safe Connectors



WARNING

TRACE-SAFE® Water Blocking Tracer Wire: To promote detection of underground cables and utilities - As with any conductor, it has the potential to transfer electrical energy. Do not pull, strap, bind or lift items with this product.



NEPTCO

Box 2323, 30 Hamlet Street
Pawtucket, RI 02861 USA
Tel: 401-722-5500 Fax: 401-722-6378
www.trace-safe.com



RT Series - 19 gauge conductor

Conductor Data

AWG	19 Tin Coated Solid Copper
Diameter	.0358" Nominal
Resistivity	16.85 OHMS per MFT
Tensile Strength	38,500 psi Nominal
Break Strength	38.95 lbs. Nominal
Elongation	30 %

Conductor Insulation Data


Type	Polyethylene - Black Color
Thickness	.006" Nominal
Overall Thickness	.048" Nominal
Maximum Voltage	300 V Insulated
Dielectric Constant	2.29 @ 1 MHZ

Core Material

Type	Woven polyester and water blocking polyester yarns
------	--

Outer Jacket

Type	High Density Polyethylene
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	WARNING
TRACE-SAFE® Water Blocking Tracer Wire: To promote detection of underground cables and utilities - As with any conductor, it has the potential to transfer electrical energy. Do not pull, strap, bind or lift items with this product.	

NEPTCO warrants that its products will work in a manner consistent with the capabilities described in the data sheet. This warranty shall be void if the product has been tampered with or improperly used. Except for the express warranty and limited remedies described above, NEPTCO disclaims all other warranties including implied warranties. NEPTCO and its authorized agents shall have no other liability beyond the price of the product for damages to a purchaser, including consequential damages occurring in connection with the use or performance of the product.



US Pat. No. 7,932,469; other patents pending

TRACE-SAFE® WATER BLOCKING CONNECTORS

For use with TRACE-SAFE® Water Blocking Tracer Wire

TRACE-SAFE® Water Blocking Connector is compact, durable and easy to use in the field.

Application Includes

P / N

TRACE-SAFE® main line end to end butt splice	T-S 19IL
TRACE-SAFE® main line lateral connection - TRACE-SAFE® main to lateral	T-S 19
TRACE-SAFE® main line butt splice to an existing 10, 12, 14 AWG main line tracer wire	T-S 12-19IL
TRACE-SAFE® lateral to existing 10, 12, 14 AWG main line tracer wire	T-S 12-19

TRACE-SAFE® connectors were evaluated to:

UL 467-2007
Grounding and bonding equipment
Chase 9.5 - short time current test

UL 486A - 486B - 2003
Standard for wire connectors
Chase 9.3.4 - pullout test

ASTM B117-09 - salt spray fog test

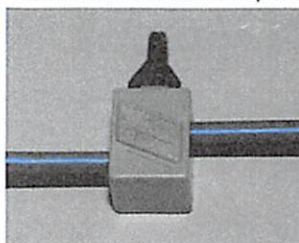
Test report available at www.trace-safe.com

Product specification and dimensions:

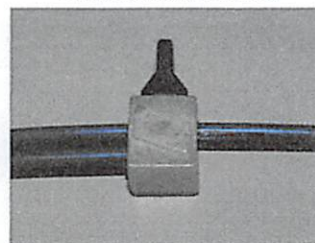
Material:	High strength glass filled polycarbonate
Connector dimension:	1 7/16" L x 23/32" W x 23/32" H
Water blocking:	Filled with sealrite water blocking non-hardening gel
Conductor range:	10 AWG - 19 AWG solid copper

US Pat. No. 7,932,469; other patents pending / Trademark

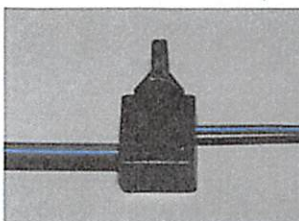
Trace-Safe End to End Butt Splice



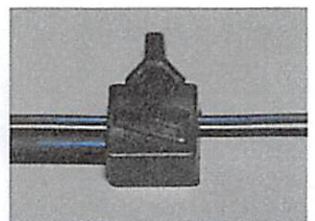
Trace-Safe Main to Lateral



TRACE-SAFE to 12 AWG Butt Splice



12 AWG Main to Trace-Safe lateral



TRACE-SAFE® Water Blocking Tracer Wire: To promote detection of underground cables and utilities - As with any conductor, it has the potential to transfer electrical energy. Do not pull, strap, bind or lift items with this product.



Box 2323, 30 Hamlet Street
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8E.4 **Mueller Co.**

Rev. 4-14 Shaded area indicates changes

MISCELLANEOUS METER SETTING EQUIPMENT



Brass meter idler
Has same end-to-end and
thread dimensions as meter.
Used to continue service
during meter repairs

H-10887

Catalog size	5/8	5/8x3/4	3/4	1
Meter size	5/8	5/8x3/4	3/4	1
Length	7-1/2	7-1/2	9	10-3/4
Meter th'd size	3/4	1	1	1-1/4



Water meter increaser
Used on threaded ends of
5/8" meter to increase threads
to 5/8 x 3/4 or 3/4 meter size
(1" thread)

H-10888: for plain nuts
H-10888-99002: for saddle nuts

H-10888N H-10888N-02

Catalog size	5/8x3/4	5/8x3/4
Meter size	5/8	5/8
Length	11/16"	1"



**Brass locking device (padlock
and valve not included)**
For use on MUELLER®
MARK II ORISEAL® Meter
Valves - cannot be used on
valves having angle lever
handles.

H-14338

Catalog size	3/4	1
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H-11091



H-11092

Lock wing sealing device
This device is used to detect
unauthorized use of valve or
stop. Used with lock wings
drilled 3/8" or 1/2". The
H-11090 is made up of a collar
and set screw (H-11091) and
a pin (H-11092). The pin is
available in 3/8" or 1/2" sizes
and the collar with set screw is
used on both sizes.



H-11090



**Meter bushing with
rubber washer**
Used on threaded ends of
5/8 x 3/4 or 3/4 meters to
adapt to 1" meter thread size
(1-1/4")
H-10889: for saddle nuts
H-10889-99000: for plain nuts

H-10889N H-10889N-00

Catalog size	3/4x1	3/4x1
Meter size	5/8x3/4, 3/4	5/8x3/4, 3/4
Length	1-1/4"	15-16"



**Meter bushing with rubber
washer (complete for both
ends)**
Used on threaded ends of
5/8x3/4 meter to adapt to 1"
meter thread size (1-1/4") and
standard length.



H-10879N

Catalog size	5/8x3/4x1	3/4x1
Meter size	5/8x3/4	3/4
Length	2.062	1.313



Meter coupling washer
H-10893: Fiber washer

H-10893



Meter coupling washer
H-10895: Rubber washer

H-10895

Catalog size	5/8	3/4	1	1-1/4	1-1/2*	2**
Meter size	5/8	5/8x3/4, 3/4	1	1-1/4	1-1/2	2

** Flange gasket for 1-1/2" and 2" sizes.

Catalog size	5/8	3/4	1	1-1/4	1-1/2*	2**
Meter size	5/8	5/8x3/4, 3/4	1	1-1/4	1-1/2	2

** Flange gasket for 1-1/2" and 2" sizes.

MUELLER Valves and Couplings are manufactured and tested in accordance with ANSI/AWWA C800. Components in contact with potable water will also comply with latest requirements of the Federal Safe Drinking Water Act.

HYDRA-STOP®

4" - 8" HSF 250™ & HSF 250 Patriot Series™

Line Stop Fitting Installation Instructions

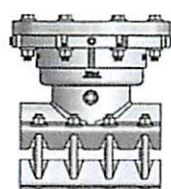


Figure 1

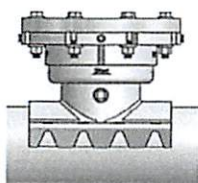


Figure 2

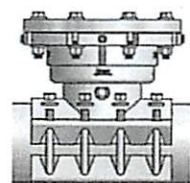


Figure 3

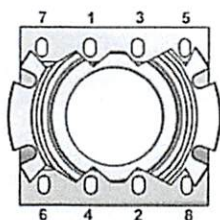


Figure 4

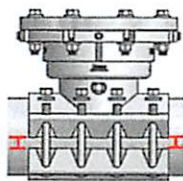


Figure 5

IMPORTANT: Read installation instructions before installing Hydra-Stop line stop fittings. Failure to follow installation instructions will void product warranty.

INSTALLATION INSTRUCTION STEPS

1. **Confirm bore of temporary gate valve is 8.5 inches.** If the bore of your temporary gate valves is smaller than 8.5 inches immediately call Hydra-Stop technical support (708-389-5111).

2. Inspect the line stop fitting to ensure no damage has occurred during shipment or storage (See Figure 1). Locate and remove completion plug and box containing stainless steel mounting hardware. Store in a clean, safe location.

3. Measure pipe outside diameter where the line stop fitting is being installed to ensure the correct line stop fitting is being used.

4. Thoroughly clean the pipe surface where the line stop fitting will be installed and inspect for flaws, i.e., gouges, protrusions, excessive corrosion, etc. Irregular surfaces should be avoided to assure maximum gasket sealing.

5. Lubricate top and bottom of pipe and mat and branch gaskets with a soap/water solution. Ensure branch gasket is adequately lubricated. Do not use grease or pipe lubricant.

6. Mount the top half of the line stop fitting on the pipe in the position required for permanent installation (See Figure 2). Use a level to ensure the flange is level. Do not rotate the top half of the line stop fitting after it is positioned on the pipe.

7. Install the bottom half of the line stop fitting over the tapered ends of the mat gasket ensuring they are flat and smooth against the pipe surface. Visually inspect gasket to ensure tapered ends are not folded or rolled under themselves. Install stainless steel bolts, washers and nuts (See Figure 3). Finger tighten, ensuring gaps between top half and bottom half of the line stop fitting are the same front to back and side to side (within 1/8"). NOTE: It is acceptable to invert the middle two bolts on each side of the 4" line stop fitting to utilize a socket wrench for installation.

8. Using a torque wrench, tighten bolts in proper sequence (See Figure 4). Ensure gaps between top half and bottom half of the line stop fitting are the same front to back and side to side (within 1/8") (See Figure 5). After bolts have been tightened to recommended torque wait 10 minutes to allow the gasket to fully seat and re-tighten bolts to recommended torque.

NOTE: 8" fitting has 10 total bolts. Please see figure 6 for bolt torque sequence.

Installation Instructions and Best Practices continued on back

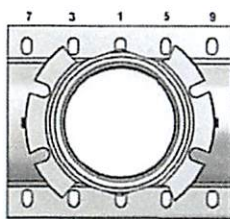


Figure 6

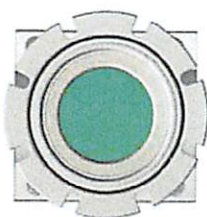


Figure 7

Recommended Torque:

CI / DI Pipe: 115 ft-lbs. PVC Pipe: 55 ft-lbs. AC Pipe: 75 ft-lbs.

9. Perform pressure test to ensure a complete seal between the line stop fitting and pipe (do not use a compressible medium such as air).

Minimum Test Pressure: 1.5 times the system working pressure

Maximum Test Pressure: 375 psi

10. Remove the blind flange and flange o-ring.

11. Check inside of line stop fitting outlet to ensure gasket is properly seated and not protruding where cutter can damage it. Ensure completion plug set pins are flush with I.D. of the flange (See Figure 7).

12. Properly block (support) HSF 250 line stop fitting and ensure pipe joints are properly restrained. Proceed with line stopping operation.

For Questions, please call 800.538.7867

HYDRA-STOP FITTINGS - INSTALLATION BEST PRACTICES

- Keep nuts and bolts clean and free of debris.
- Adequately lubricate pipe and HSF 250 fitting gaskets with soap/water solution paying special attention to AC pipe. Ensure branch gasket is adequately lubricated. Do not use grease or pipe lubricants.
- Avoid rotating top half of HSF 250 once placed on pipe.
- Tighten nuts equally in no more than 25 ft-lb increments.
- After bolts have been tightened to recommended torque wait 10 minutes to allow the gasket to fully seat and re-tighten bolts to recommended torque.
- Ensure gaps between top half and bottom half of the HSF 250 are the same front to back and side to side (within 1/8").
- Check final torque with a torque wrench to ensure HSF 250 has been torqued to installation specifications.
- Do not use a pneumatic wrench to tighten bolts.
- Hydrostatically pressure test a minimum of 1.5 times the system working pressure or a maximum of 1.5 times the rated working pressure of the HSF 250.
- Block / support the pipe before installing the tapping machine.

HYDRA-STOP®

Line Stopping • Line Tapping • Valve Insertion • Training and Support
144 Tower Drive, Burr Ridge, IL 60527
Phone: 708-389-5111 / Fax: 708-389-5125
Toll Free: 1-800-538-7867

An IDEX Water Services & Technology Business



Call Hydra-Stop for Technical Support at 800.538.7867 and visit us on the web at www.hydra-stop.com

Specifications subject to change without notice.

HYDRA-STOP®

4" - 8" HSF 250™ & HSF 250 Patriot Series™

Push and Pin Completion Plug Installation Instructions

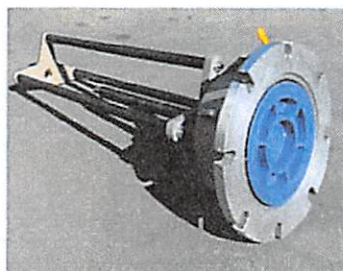


Figure 1



Figure 2

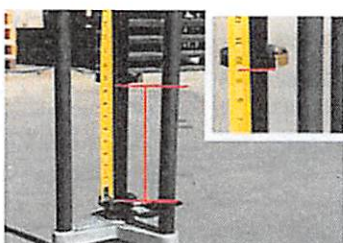


Figure 3

1. Remove cutter from saw mandrel.
2. Install completion plug onto saw mandrel. Grease O-ring with Primolube.
3. Install saw mandrel into the tapping machine housing. Align the bottom of completion plug so that it is flush with the bottom of the tap machine housing (See Figure 1). NOTE: If completion plug is not aligned flush with the bottom of tap machine housing the completion process as outlined in this document will not be successful.
4. Lock the saw mandrel in place using the packing nut assembly thumb screw (See Figure 2).
5. Install stop collar onto the saw mandrel. Set the bottom of the stop collar to 9.5 inches from the top of the packing nut assembly. (See Figure 3). Tighten stop collar.
6. Mount the tapping machine on the gate valve. Use all eight nuts and bolts provided with Hydra-Stopper equipment.
7. Install the drive unit, or the optional completion spacer bar between the feedscrew and saw mandrel. Feed down the feedscrew until drive unit or completion spacer is locked in place. If using the air drive use the 19" feed screw, for hydraulic drive use the 30" feed screw.
8. Slowly open gate valve. Equalize pressure on the top side of the completion plug by using the ball valve on the tapping machine housing.
9. Loosen the packing nut assembly thumb screw and advance the feed screw until the stop collar reaches the top of the packing nut assembly. Please note: it will become tighter when the completion plug o-ring starts to compress. Equalization may be required to fully seat the completion plug.
10. Once the completion plug is fully seated, lock the saw mandrel in place using the packing nut assembly thumb screw. Remove the pin plugs from the fitting flange and store them in a clean, safe location.

Completion Plug Installation Instructions continued on back



Figure 4

11. Tighten the four set pins in the fitting flange to lock the completion plug in place by turning them clockwise 8-10 turns (See Figure 4). Back off each of the four set pins a half a turn. Install the pin plugs back into the flange.
12. Verify completion plug seal by opening the blow off valve on the tapping housing.
13. Turn the feedscrew counter clockwise to remove the drive unit or completion spacer bar. Loosen the packing nut assembly thumb screw.
14. Disengage the saw mandrel from the completion plug by turning counter clockwise. Pull the saw mandrel into the tap machine housing. Tighten the packing nut thumb screw to secure the mandrel.
15. Close the gate valve.
16. Remove the tapping machine from the gate valve.
17. Remove the gate valve from the fitting top flange.
18. Install the blind flange on the fitting top flange.
19. Clean and inspect installation equipment prior to storage.
20. Order replacement parts, if necessary, to replace lost, damaged or worn componets.

Questions? Please call 800.538.7867

HYDRA-STOP®

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