

**SPECIFICATION FOR COLD WATER METER  
COMPOUND TYPE**

***Meter must consist of a combination Class II Turbine for measuring high flows and a disc or piston type (positive displacement) meter for measuring low flows.***

***All compound water meters must meet or exceed the latest performance and accuracy requirements for AWWA C-702.***

***Meters must have a minimum of five years of successful field use to be eligible for acceptance.***

***Main case must be non-corrosive bronze***

***All meters must be equipped with a test riser assembly as per City of Chesapeake test riser specifications.***

***External casing bolts must be stainless steel.***

***All main cases must be flanged.***

***The main case shall withstand a working pressure of 150 psi without leakage at the gasket, seepage in the casting and/or distortion affecting the free operation of the measuring unit.***

***Single or dual sealed magnetic drive registers will be accepted. Registers must be six (6) wheel exact/absolute encoded remote registers, and must be straight reading in cubic feet.***

***The meter number must be imprinted on the (top) center portion of flange on outlet side of meter where it can be read after installation.***

***All meters shall have cast or stamped in the outer case, the size, model, and direction of flow through the meter. The manufacturer's name shall be stamped on the register face for identification purposes. All meter identification, register and main-case shall be clearly legible for the duration of the warranty.***

***The measuring chamber must be a self-contained unit. The turbine spindles must be tungsten carbide or stainless steel and must rotate with graphite bearings.***

***The piston or disc chamber must be a self-contained unit.***

***The intermediate gear train must be directly coupled from the turbine spindle and magnetically coupled to the register through the meter cover.***

***The compound meter will be guaranteed to be free from defects in materials and workmanship for a period of one (1) year from the date of installation.***

**Compound Meter Specifications  
Page 1 of 1**

***meterspecsrevised 06-2003***

**SPECIFICATION FOR COLD WATER METER  
COMPOUND TYPE**

*All meters must include an appropriate sized (same size as meter) bronze flanged plate type strainer as part of the meter. The strainer must be completely assembled and attached to the compound meter prior to delivery. Also, a strainer must be provided for the internal disc meter.*

*Registration accuracy over the normal operating range must be 98.5% to 101.5%.*

*Meters shall be capable of field calibration by adjustable vane screws, change gears, or other similar feature.*

*All meters must be equipped with digital exact/absolute encoded remote registers per AWWA C-702 and must include all required hardware for installation and account number insertion.*

*Acceptable meters will be, Neptune Tru/Flo compounds, and Invensys SRH compound meters or approved equal.*

*Compound Meter Specifications  
Page 1 of 2*

**SPECIFICATIONS FOR COLD WATER METERS  
FIRE SERVICE TYPE**

***Meter must consist of a combination of an AWWA C-703 Class II in-line horizontal axis turbine for measuring high flows and for measuring low flows. An automatic valve must direct the flow from the bypass meter to the mainline meter as flows increase and back to the bypass meter as flows decrease. All components of the meter must be both UL (Underwriter's Laboratory) listed and FM (Factory Mutual) approved for fire service use. Both ends of meter must be flanged.***

***All fire service water meters must meet or exceed the latest performance and accuracy requirements for AWWA C-703.***

***The register must have date of manufacture, size, and model stamped on dial face.***

***Meter must operate at a maximum operating pressure of 175 psi.***

***The meter body must be constructed of bronze or grade 36 epoxy coated steel. The strainer must be UL listed and FM approved. The valve body can be welded or bolted to the meter body main case, but must be epoxy coated.***

***The piping connecting the bypass meter to the mainline must be brass.***

***The bypass meter must be an in-line horizontal turbine type. The meter casing must be constructed of bronze. The cover in the turbines must contain a calibration vane for the purpose of calibrating the turbines.***

***Meter cover bolts must be stainless steel.***

***Registers must be permanently sealed straight reading in cubic feet and must have six (6) wheel exact/absolute encoded remote registers.***

***The meter number must be imprinted on the (top) center portion of flange on outlet side of meter where it can be read after installation.***

***The turbine – measuring element must be a self-contained unit. As a unit the turbine measuring element, register and/or cover must be calibrated and replaceable by any other like-calibrated unitized measuring element.***

**SPECIFICATIONS FOR COLD WATER METERS**

**FIRE SERVICE TYPE**

***The intermediate gear train must be directly coupled from the turbine spindle and magnetically coupled to the register through the meter cover.***

***Registration accuracy over the normal operating range must be 98.5% to 101.5%. Registration at the crossover must not be less than 90 percent. Extended low flows must not be less than 95 percent.***

***All meters must be equipped with digital exact/absolute encoded remote registers per AWWA C-703 and must include all required hardware for installation and account number insertion.***

***Acceptable meters will be required to have the following laying lengths:***

***4" Meter - 33" 6" Meter - 45" 8" Meter - 53" 10" Meter - 68"***

***Acceptable meters will be Neptune - Protectus III, Invensys - Fireline meters or approved equal.***

***All meters must be equipped with test riser assemblies per City of Chesapeake test riser specifications.***

***The fire service meter will be guaranteed to be free from defects in materials and workmanship for a period of one (1) year from the date of installation.***

**SPECIFICATIONS FOR COLD WATER METERS**  
**FOR FIRE SERVICE USE – MAGNETIC DRIVE TURBINE TYPE**

**All turbine type water meters must meet or exceed the latest performance and accuracy requirements for AWWA C-703.**

**Meter must be horizontal in-line type.**

**Main case must be bronze.**

**Meter must operate at a maximum operating pressure of 175 psi.**

**Outside cover must contain a calibration vane for in field calibration and be protected by a tamper resistant device.**

**Meters must be supplied with a flanged UL/FM approved strainer attached to meter prior to delivery. The meter and strainer assembly must be UL Listed and FM approved.**

**Main case must be flanged on both sides of meter.**

**The meter number must be imprinted on the (top) center portion of flange on outlet side of meter where it can be read after installation.**

**The measuring chamber must contain an interchangeable measuring element, calibration device and register. The turbine rotor must rotate on a spindle or a shaft constructed of tungsten carbide or stainless steel, and must rotate with graphite bearings. The rotor can be designed to rotate on two stationary spindles.**

**Registration accuracy over the normal operating range must be 98.5% to 101.5%.**

**The register must have date of manufacturer, size, and model stamped on dial face.**

**All meters must have straight reading six (6) wheel exact/absolute encoded remote registers, recording in cubic feet.**

**Acceptable meters will be Neptune HP Turbine and Invensys "W" Turbo meters or approved equal.**

**All meters must be equipped with appropriate sized (same size as meter) flanged testing tee and test riser assembly as per City of Chesapeake test riser specifications.**

**All specifications must meet or exceed the latest revision of AWWA C-703.**

**The turbine meter will be guaranteed to be free from defects in materials and workmanship for a period of one (1) year from the date of installation.**

**SPECIFICATIONS FOR COLD WATER METERS  
FOR NON FIRE USE – MAGNETIC DRIVE-TURBINE TYPE**

**All turbine type water meters must meet or exceed the latest performance and accuracy requirements for AWWA C-701.**

**Meter must be horizontal in-line type.**

**Main case must be bronze.**

**Meter must operate at a maximum operating pressure of 175 psi.**

**Outside cover must contain a calibration vane for in field calibration and be protected by a tamper resistant device.**

**Meters must be supplied with a brass flanged strainer attached to meter prior to delivery.**

**Main case must be flanged on both sides of meter.**

**The meter number must be imprinted on the (top) center portion of flange on outlet side of meter where it can be read after installation.**

**The measuring chamber must contain an interchangeable measuring element, calibration device and register. The turbine rotor must rotate on a spindle or a shaft constructed of tungsten carbide or stainless steel, and must rotate with graphite bearings. The rotor can be designed to rotate on two stationary spindles.**

**Registration accuracy over the normal operating range must be 98.5% to 101.5%.**

**The register must have date of manufacturer, size, and model stamped on dial face.**

**All meters must have straight reading six (6) wheel exact/absolute encoded remote registers, recording in cubic feet.**

**Acceptable meters will be Neptune HP Turbine and Invensys "W" Turbo meters or approved equal.**

**All meters must be equipped with appropriate sized (same size as meter) flanged testing tee and test riser assembly as per City of Chesapeake test riser specifications.**

**All specifications must meet or exceed the latest revision of AWWA C-701.**

**The turbine meter will be guaranteed to be free from defects in materials and workmanship for a period of one (1) year from the date of installation**

## LARGE METER SCHEMATIC

The following meters are deemed acceptable if all registers are exact/absolute encoded and registers record in cubic feet.

### NEPTUNE

#### METER ONLY

HIGH PERFORMANCE TURBINE SEE SPECIAL REQUIREMENTS ATTACHMENT

#### TURBINE

3" 3" THROUGH 10" WITH UL/FM APPROVED

4" STRAINERS CAN BE USED FOR FIRE

6" SERVICE ONLY

8"

10" NOTE: FLANGED BRASS/BRONZE STRAINER MUST BE USED FOR DOMESTIC USE.

TRU-FLO COMPOUND METER ONLY - DOMESTIC USE ONLY  
SEE SPECIAL REQUIREMENTS ATTACHMENT

3"

4"

6"

### PROTECTUS III COMBINATION METER ASSEMBLY - UL/FM APPROVED

4" x 1"

6" X 1 1/2" USED FOR OPEN & CLOSED FIRE SYSTEMS - DOMESTIC APPLICATIONS

8" x 2"

10" x 2"

- 1) The mainline meter must be turbine.
- 2) The bypass meter must be turbine.
- 3) Each unit must contain a turbine mainline meter, turbine bypass meter, strainer, and check valve.
- 4) The bypass portion of the Protectus III are factory standard. If the bypass meter is upsized or downsized, then the meter will not meet UL (Underwriter Laboratory) or FM (Factory Mutual) approval. Note: In all probability the meter will fail to meet AWWA specifications or approval.
- 5) The bypass can be switched from right side to left side, but only by factory.

*Large Meter Schematic – Neptune Meters  
Page 1 of 1*

## LARGE METER SCHEMATIC

### NEPTUNE

#### SPECIAL REQUIREMENTS:

1. All meters must contain 2" test port with test riser assembly complete. Test riser assembly must be constructed of all brass, bronze, or aircraft/hard coat aluminum fittings. Note: Refer to test riser specifications for acceptable make up of fittings (There will be no exceptions). Must have brass protective cap covering the opening of the test adapter. Must be assembled to meter prior to delivery. Note: All turbine meters must be supplied with appropriate sized flanged testing tee (same size as meter) with blind plate. The blind plate must include & 2" threaded opening for test riser assembly. In this application, the test riser assembly will be installed in the 2" threaded portion of the blind plate for testing tee. The flanged testing tee and test riser assembly must be assembled to meter prior to delivery.
2. On all Protectus III combination meter assemblies the test riser must originate from the plug directly located at the top of check valve.
3. All meters must be Grade 36 epoxy coated steel or constructed of bronze.
4. All registers must be exact/absolute encoded and register in cubic feet.
5. Touch pad, pit lid connections and all necessary hardware must be included with meter.
6. All meters must be flanged with external strainers included. Strainer must be attached to meter upon delivery.
7. Each meter must be provided with (2) two each appropriate sized Smith Blair old style 912 flanged coupling adapters.

#### SMITH BLAIR OLD STYLE 912 FLANGED COUPLING ADAPTORS PART NUMBERS:

##### OLD STYLE

3"	912 - 00039603 - 000
4"	912 - 00048004 - 000
6"	912 - 00069006 - 000
8"	912 - 00090508 - 000
10"	912 - 00111010 - 000

## LARGE METER SCHEMATIC

### SPECIFICATIONS FOR DETECTOR CHECK METERS HERSEY EDC III

#### DETECTOR CHECK VALVES

#### BYPASS METERS ACCEPTED

4" X 5/8" (5/8" X 3/4") 5/8" X 3/4" EXACT/ABSOLUTE ENCODED BYPASS METER  
6" x 5/8" (5/8" X 3/4") MUST BE MANUFACTURED BY INVENSYS,  
8" X 5/8" (5/8" X 3/4") NEPTUNE, OR APPROVED EQUAL.  
10" X 5/8" (5/8" X 3/4")

The 5/8" x 3/4" meter must be exact/absolute encoded with exact/absolute encoded register. The meter must include touch pad or pit lid connections for 5/8" x 3/4" exact/absolute encoded meter. Register must record in cubic feet.

All detector check meters must be epoxy coated at the factory and must include stainless steel bolts and nuts. Note: No hand spray painted or hand brushed epoxy coatings will be accepted. (No Exceptions)

All detector check valves must contain bypass assembly for all 5/8" x 3/4" exact/absolute encoded meters. All piping and fittings for bypass assembly must be brass or bronze. All fittings must be Teflon taped/pipe doped and tightened upon delivery of meter (No Exceptions).

All detector check meters must be UL Listed and FM Approved. They must consist of a main check valve with rubber seal and operated by a weighted lever. The detector check must withstand a maximum working pressure of 175 PSI without leakage. It must also withstand a hydrostatic test pressure of 350 PSI. The temperature range should meet or exceed 33 F to 110 F. The clapper seat must be rubber to bronze. All internal shafts must be stainless steel. Meter must have air vent screw in cover for bleed off purposes.

Bypass assembly must contain 1 - 3/4" bronze or brass check valve on the down stream side of bypass meter. Also, bypass assembly must contain 1 - 3/4" bronze or brass double female curb stop on inlet side of bypass and 1 - 3/4" double female curb stop on outlet side of bypass meter. All other fittings and piping needed, must be either bronze or brass to complete assembly.

#### Notes:

- 1) Meter bypass cannot be altered. All bypass meter assemblies must be on right side of meter with flow arrow pointing down stream.
- 2) All detector checks must come with (2) two each Smith Blair old Style 912 flanged coupling adapters per parts list below.

#### Smith Blair old style 912 flanged coupling adapters part numbers:

4" 912 - 00048004 - 000  
6" 912 - 00069006 - 000  
8" 912 - 00090508 - 000  
10" 912 - 00111010 - 000

- 3) The register for bypass meter must be located as near to detector check valve bolt line as possible.
- 4) Detector check valves must be flanged on both ends.

Note: The detector check meter will be guaranteed to be free from defects in materials and workmanship for a period of one (1) year from the date of installation.

## LARGE METER SCHEMATIC

### INVENSYS

#### SINGLE REGISTER HIGH PERFORMANCE (SRH) COMPOUND - METER ONLY SEE SPECIAL REQUIREMENTS ATTACHMENT

3"  
4"  
6"

#### SERIES "W" TURBO - METER ONLY:

3" UL/FM STRAINER REQUIRED FOR FIRE  
SERVICE USE.  
4"  
6"  
8"  
10" NOTE: FLANGED BRASS/BRONZE STRAINER TO BE USED FOR DOMESTIC USE.  
16"

#### COMPACT FIRELINE ASSEMBLIES - THESE REPLACE STANDARD FIRELINE ASSEMBLIES

4" x 1 1/2"	USED FOR OPEN AND CLOSED FIRE SYSTEMS -
6" x 1 1/2" & 6" x 2"	DOMESTIC APPLICATIONS
8" x 2"	
10" x 2"	

All fireline assemblies must contain turbine meter, turbine bypass meter, strainer and check valve.

The bypass portion of the Invensys Fireline assembly is factory standard. If the bypass meter is upsized or downsized, then the meter will not meet UL (Underwriters Laboratory) or FM (Factory Mutual) approval. Note: In all probability the meter will fail to meet AWWA specifications or approval.

Bypass can be switched from right side to left side, but only by factory.

*Large Meter Schematic – Invensys Meters*  
*Page 1 of 1*

# LARGE METER SCHEMATIC

## INVENSYS

### SPECIAL REQUIREMENTS:

1. All meters must contain 2" test port with test riser assembly complete. Test riser assembly must be constructed of all brass, bronze, or aircraft/hard coat aluminum fittings. Note: Refer to test riser specifications for acceptable make up of fittings (There will be no exceptions). Must have brass protective cap covering the opening of the test adapter. Must be assembled to meter prior to delivery. Note: All turbine meters must be supplied with appropriate sized flanged testing tee (same size as meter) with blind plate. The blind plate must include & 2" threaded portion of the blind plate for testing tee. The flanged testing tee and test riser assembly must be assembled to meter prior to delivery.
2. All meters must be grade 36 epoxy coated steel or constructed of bronze.
3. All registers must be exact/absolute encoded and register in cubic feet.
4. Touch pad, pit lid connections and all necessary hardware must be included with meter.
5. All meters must be flanged with external strainers included. Strainer must be attached to meter upon delivery.
6. Each meter must be provided with (2) two each appropriate sized Smith Blair Old style 912 flanged coupling adapters.

**EXCEPTION:** Compact fire line assemblies must come with (1) one each - appropriate sized Smith Blair old style 912 flanged coupling adapter and (1) one each appropriate sized Smith Blair new style 912 flanged coupling adapter.

### **SMITH BLAIR OLD/NEW STYLE 912 FLANGED COUPLING ADAPTERS PART NUMBERS:**

<b>OLD STYLE</b>	<b>NEW STYLE</b>
3" 912 - 00039603 - 000	3" 912 90039603 - 000
4" 912 - 00048004 - 000	4" 912 90051004 - 000
6" 912 - 00069006 - 000	6" 912 90072006 - 000
8" 912 - 00090508 - 000	8" 912 90094008 - 000
10" 912 - 00111010 - 000	10" 912 90116010 - 000

*Large Meter Schematic – Invensys Meters  
Page 1 of 2*

## **SPECIFICATIONS FOR AN EXACT/ABSOLUTE REMOTE ENCODED REGISTER BASED METERING SYSTEM**

### **GENERAL DESCRIPTION**

*These specifications cover a register metering system that must obtain remote simultaneous water meter registration directly from the register odometer. This must be accomplished via a remotely located receptacle utilizing a data capture system.*

*The system must contain the following:*

*Exact/absolute encoded meter register directly mounted to or within the meter.*

*A remote pit mounted receptacle. This provides the necessary communication link to transmit the data from the register.*

*Data acquisition equipment with ability to interrogate the above.*

*A device that takes the information and displays it visually to confirm correct wiring system and installation.*

### **EXACT/ABSOLUTE ENCODED REGISTER UNIT**

*Registration:*

*Must give a six (6) digit visual registration at the meter.*

*Must encode four (4) or six (6) digits on the odometer as required simultaneously in digital form to the remote pit mounted receptacle. These digits represent the highest amounts of recorded water consumption.*

*A rapid indexing device must be used to prevent vague readings.*

*The unit must provide a full sweep hand or dial and a separate indicator hand for leak detection.*

*Registration must be in cubic feet.*

*Registers that require batteries or use pulse generated systems either by generator or conversion to digital output, Will Not be allowed.*

*The exact/absolute-encoded register must be guaranteed against defects in materials and workmanship for ten (10) years from date of installation. The manufacturer's serial number or meter number shall be permanently affixed to the register, beneath the glass, and clearly visible and legible for the duration of the warranty period.*

*The manufacturer will guarantee that the reading obtained electronically matches the mechanical odometer reading on the register. If these do not agree, the manufacturer will pay the difference at the current water rate whenever a discrepancy appears.*

## **MECHANICAL CONSTRUCTION**

*Materials used for construction of register must be compatible with emphasis on the meter's environment.*

*Registers must be permanently sealed or be equipped with a non toxic mineral oil to protect all internal parts, as wet pit applications are considered the norm.*

*The register must be attached to the meter case with a tamper proof pin or screw and must be installed as part of the meter casing. The register shall be removable without disassembling the meter and shall allow field installation and/or removal without disruption of water service to the customer.*

*Reading is obtained by contact with the receptacle.*

*All encoded registers intended for installation in a pit environment must be pre-wired and potted from the factory. This will assure proper moisture protection and minimize or eliminate reading failures.*

## **ELECTRICAL CONSTRUCTION**

*All contacts and connections must be made of materials that inhibit and resist corrosion due to water or pit environment.*

*Connections to register must be protected with a cover to provide protection from the elements and pit environment. This can be done with or without a removable cover.*

*The unit must be designed in that it provides the proper mechanical and electrical connection between the receptacle and interrogation devices.*

*Communication with the register must occur via an electrical induction field. The transmission of encoded information must occur at this time.*

*All data errors shall be indicated by the reading equipment.*

## **ELECTRONIC READING INFORMATION**

*The exact/absolute encoder register must provide an eight (8) digit identification code as well as a four (4) or six (6) digit meter reading to the reading device.*

*The successful bidder must provide the City of Chesapeake, Utilities Department with all details of information provided to the meter reader through the reading equipment upon interrogation, as well as any other available information or features.*

## **REMOTE RECEPTACLES**

*Materials used must be made of a sturdy and tamper proof construction unaffected by outside elements, severe wear and tear.*

*Mounting of the receptacle to the pit lid must be accomplished via mounting hardware provided by the City of Chesapeake's Utilities Department.*

*All encoded receptacles shall be warranted for five (5) years from the date of installation.*

*All receptacles must incorporate a surface contact point to be interrogated via reading devices.*

*Remote pit receptacles must contain the communication wire connected by the factory.*

## **CABLE**

*The connecting cable must be a two (2) or three (3) conductor covered in a sheath that provides for moisture resistance as well as resistance to abrasion. Each connection must be color-coded: Red, Green, and/or Black. Standard length must be fifteen (15) feet or more. All wire connections, whether performed by the manufacturer or the City, shall be guaranteed by the bidder against corrosion, leaks, or other sealant-related failure, for a period of ten (10) years from the date of installation.*

*NOTE: The meter must be fully equipped with an exact/absolute- encoded register for touch read (to interrogate reading) by a meter probe/wand.*

**THE REMOTE EXACT/ABSOLUTE ENCODED REGISTER BASED METERING SYSTEM MUST BE PROVIDED BY INVENSYS, NEPTUNE OR APPROVED EQUAL.**

**City of Chesapeake  
Water Meter Specifications**

**1. Water Meters (5/8 inch to 2-inch size)**

- a. Type: Magnetic driven, sealed registers, straight reading conforming to AWWA standard C-700 (latest revision). Meter may be nutating type or oscillating type piston or disc. All meters must be frost proof type. Meters must be of standard laying length according to their sizes. Meter design shall incorporate anti-knocking features to minimize meter noise and meter stoppages.**
- b. Main Cases: All meters main case, register box, and register box lid must conform to and meet the ANSI/NSF 61 standard. All main cases must be constructed of lead free brass containing a minimum of 85% copper. 1 1/2 inch and 2 inch meters must be split type case and must conform to ANSI/NSF 61 (lead free brass) certified standard for lower and upper shell assemblies. All meters shall have cast on them, in raised characters, the meter size and direction of flow through the meter. The manufacturer serial number shall be stamped on the meter case. The main case shall withstand a working pressure of 150 psi without leakage at the gasket, seepage in the casting, and/or distortion affecting the free operation of the measuring unit. The main case shall be guaranteed free from defects in material and workmanship for the life of the meter.**
- c. Bottom Plates: Cast iron or synthetic polymer frost proof bottom plates must be used. All 5/8" x 3/4" meters must have a plastic bottom plate. A rubber gasket shall be included to prevent leakage at the joint of the bottom plate and main case. The gasket shall rest in a recessed seat to prevent blow out under working pressure. Cast iron bottom plates must be four bolt type and must be protected against corrosion by inner liner.**
- d. Registers: The register must be a hermetically sealed and tamper proof unit. The register must be straight reading in cubic feet with red center sweep hand and must contain a separate indicator hand for leak detection. Numeral wheels for units and tens registration must be of different color from other numeral wheels. The register must be guaranteed against defects, materials and workmanship for twenty-five (25) years from date of shipment. All meters must be adaptable to six (6) wheel exact/absolute encoder registers and capable of being removed from the meter housing without interruption of service. All registers shall have the size, model, and date of manufacture stamped on the dial face of register. The register must be secured to the main-case by a plastic tamper proof seal to allow for inline replacement. The manufacturer's name shall be stamped on the register lid. All meter identification, register and housing shall be clearly legible for the duration of the warranty.**

**Water Meter Specifications – 5/8 inch to 2 inch size  
Page 1 of 1**

**Note: Definition of exact/absolute encoded register - a meter register providing the same visual and electronic meter reading directly from the odometer wheels upon demand. When read electronically, the wheel positions are digitally encoded and transmitted to the interrogation device without the use of pulses or batteries.**

- e. External Bolts and Washers: All external bolts and washers must be non magnetic stainless steel to prevent corrosion and easy to remove from main case. No shear pin bolts shall be permitted.**
- f. Measuring Chambers: The measuring chambers must be of bronze or a suitable synthetic polymer and must not be cast as part of the main case. All piston or disc assemblies shall be interchangeable in all measuring chamber assemblies of the same size. The measuring chamber shall be guaranteed free from defects in material and workmanship for a minimum of fifteen (15) years from date of manufacture.**
- g. Serial Numbers: Serial numbers of meters must be imprinted on the outlet port of the main case as well as register box lid. Meter numbers shall be exactly eight (8) digits and shall begin with a number to be specified by manufacturer after contract award. Numbering shall, be sequenced in ascending (increasing) order. Duplicate meter numbers, both proposed and to the existing City numbering system, shall not be permitted.**

**Note: The only exception to exclude the serial number will be with the exact/absolute encoder register, which does not have register box lids.**

- h. Companion Flanges: All 1 ½inch and 2 inch meters must be supplied with (2) two bronze, 1 ½inch or 2 inch iron pipe thread companion (meter) flanges, (4) four bolts, 5/8 - 11 x 2 1/2 USS Hex Head Cap-screws Grade 8 or better, perma-plated with (4) four nuts included and (4) four each smooth rubber gaskets without notches.**
- i. Test: Meters must be tested for accuracy of registration in accordance with AWWA C-700 (latest revision) standards for testing cold water meters. The accuracy certificates with test results must be attached to each meter upon delivery from factory or manufacturer.**
- j. Strainers: All 5/8"x ¾", ¾" x ¾", 1", 1 ½", and 2" meters shall be provided with an internal corrosion-resistant strainer, having an effective straining area of at least twice the inlet bore diameter.**

**Water Meter Specifications – 5/8 inch to 2 inch size  
Page 1 of 2**

**Guarantee and Performance:**

**To insure accuracy, a factory test tag certifying the accuracy at the flows required by AWWA C-700 must accompany each meter.**

**All meters must be free from manufacturing defects in workmanship and materials for 12 months from the date of installation.**

**Quotations will be accepted only from those companies who are actively engaged in manufacture of all parts for their meters in the United States and who have a minimum of five (5) years of satisfactory experience with their meters. The meters must be guaranteed to meet AWWA C-700 new meter accuracy standards for a period of five (5) years or five hundred thousand gallons after the date of shipment.**

**Any company that has not been in meter manufacturing for a minimum of five (5) years or do not meet the AWWA C-700 new meter accuracy standards will not be considered. Any water meter substitutions or changes in the product line during the contract term must be submitted in writing to the City for review and approval prior to the delivery of any meter.**

**All meters must meet or exceed the AWWA meter accuracy requirements, (C-700) as shown in the AWWA meter table below.**

**NEW AWWA Meter Accuracy Standards Table  
Years 1 through 5**

<b>SIZE (IN)</b>	<b>MIN. TEST LOW FLOW (GPM)</b>	<b>LOW FLOW ACCURACY (%)</b>	<b>INTERMEDIATE &amp; HIGH FLOW (GPM)</b>	<b>INTERMEDIATE &amp; HIGH FLOW ACCURACY (%)</b>
<b>5/8"</b>	<b>1/4</b>	<b>95 - 101</b>	<b>2 - 20</b>	<b>98.5 - 101.5</b>
<b>3/4"</b>	<b>1/2</b>	<b>95 - 101</b>	<b>2 - 30</b>	<b>98.5 - 101.5</b>
<b>1"</b>	<b>3/4</b>	<b>95 - 101</b>	<b>3 - 50</b>	<b>98.5 - 101.5</b>
<b>1 1/2"</b>	<b>1 1/2</b>	<b>95 - 101</b>	<b>5 - 100</b>	<b>98.5 - 101.5</b>
<b>2"</b>	<b>2</b>	<b>95 - 101</b>	<b>8 - 160</b>	<b>98.5 - 101.5</b>

**Water Meter Specifications – 5/8 inch to 2 inch size  
Page 1 of 3**

*The manufacturer must provide a repaired meter maintenance plan in writing. All meters must perform to repaired meter accuracy standards according to AWWA Manual M-6 Chapter 5 (1999) Table 5.3, as shown below.*

*The manufacturer must guarantee accuracy and performance of the meter for an additional ten (10) years or 1,500,000 gallons for 5/8 inch meters, 2,250,000 gallons for 3/4 inch meters, 3,000,000 gallons for 1 inch meters, 7,000,000 gallons for 1½ meters and 12,000,000 gallons for 2 inch meters, whichever event occurs first.*

*During this 10 year repaired meter accuracy standard period, the meter must perform to a minimum of 90% accuracy.*

**Table 5.3**

**AWWA Repaired Meter Accuracy Standards Table  
Years 6 through 15**

<b>SIZE (IN)</b>	<b>DURATION (YEARS)</b>	<b>REGISTRATION (GALLONS)</b>
<b>5/8"</b>	<b>10</b>	<b>1,500,000</b>
<b>3/4"</b>	<b>10</b>	<b>2,250,000</b>
<b>1"</b>	<b>10</b>	<b>3,000,000</b>
<b>1 1/2"</b>	<b>10</b>	<b>7,000,000</b>
<b>2"</b>	<b>10</b>	<b>12,000,000</b>

*The meter must be manufactured by Invensys, Neptune, or approved equal.*

*TEST RISER*

*SPECIFICATIONS*

*meterspecsrevised 06-2003*

# NEPTUNE

## *Test Riser System Parts List:*

1. *One – 2" Close Nipple (Brass)*
2. *One – 2" Brass Ball Valve with rubber coated or vinyl coated handle. Handle must be of locking design.*
3. *One – 2" NPT x 2 ½" NST brass or hard coat aluminum – double male hex nipple*
4. *One – 2 ½" NST brass protective thread cap*

*Note: For 8" and 10" Protectus III meters, the plug at the top of the check valve must be reduced from 3" to 2". The fitting used for the reduction from 3" to 2" must be brass.*

*Test Riser Specifications – Neptune Meters  
Page 1 of 1*

***meterspecsrevised 06-2003***

# *Invensys*

## *Test Riser System Parts List: 4" Fire Lines*

1. *One – 1 ½" x 5 ¼" Brass nipple*
2. *One – 1 ½" x 90 Degree street elbow (Brass)*
3. *One – 1 ½" Brass ball valve with flat rubber or vinyl coated handle (Handle to be of locking design)*
4. *One – 1 ½" Close nipple (Brass)*
5. *One - 2" x 1 ½" Hex pipe bushing (Brass)*
6. *One – 2" NPT x 2 ½" NST hex – double male hex nipple (brass or hard coat aluminum)*
7. *One – 2 ½" NST brass protective thread cap*

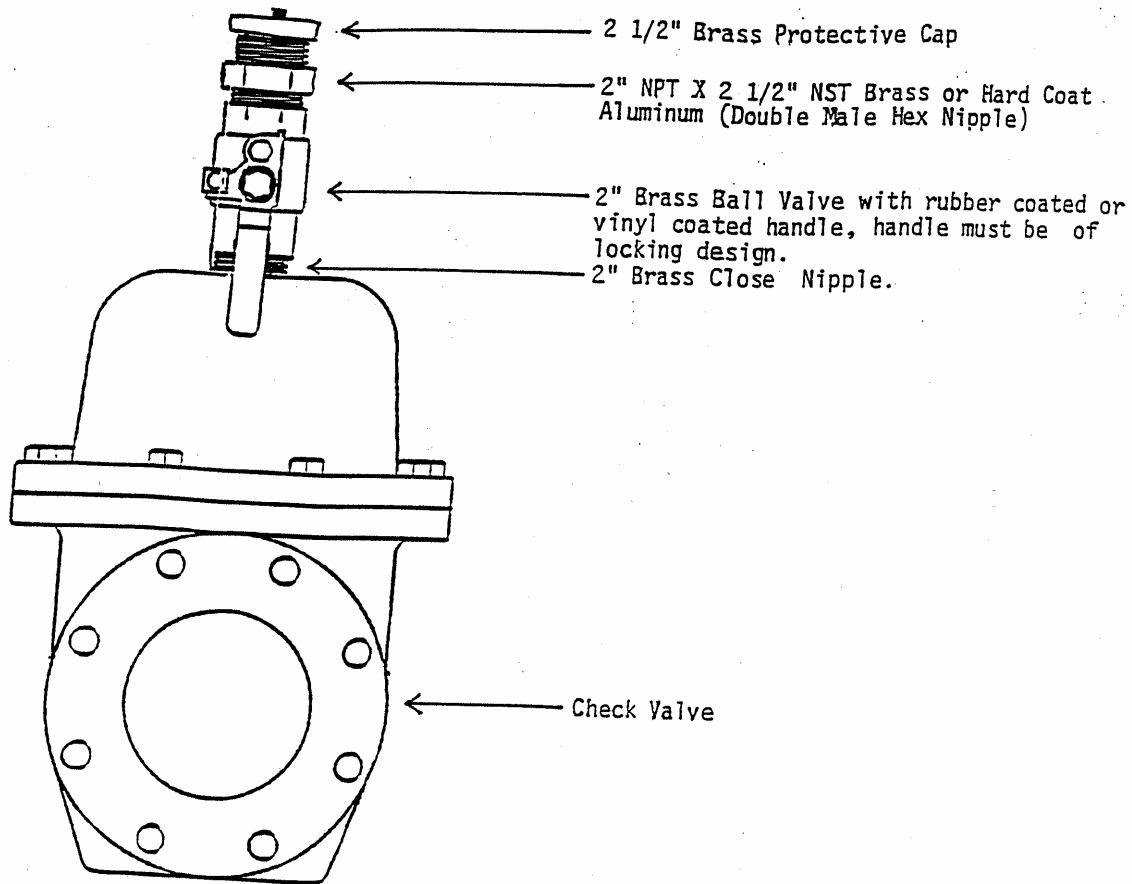
## *Test Riser System Parts List: 6" to 10" Fire Lines*

1. *One – 2" x 5 ¼" Brass nipple*
2. *One – 2" x 90 Degree street elbow (Brass)*
3. *One – 2" Brass ball valve with flat rubber or vinyl coated handle (Handle to be of locking design)*
4. *One – 2" Close nipple (Brass)*
5. *One – Double Male Hex nipple – 2" NPT x 2 ½" NST brass or hard coat aluminum*
6. *One – 2 ½" NST Brass protective thread cap*

*Note: See attached drawings for specifications and sizes.*

*Test Riser Specifications – Invensys Meters  
Page 1 of 1*

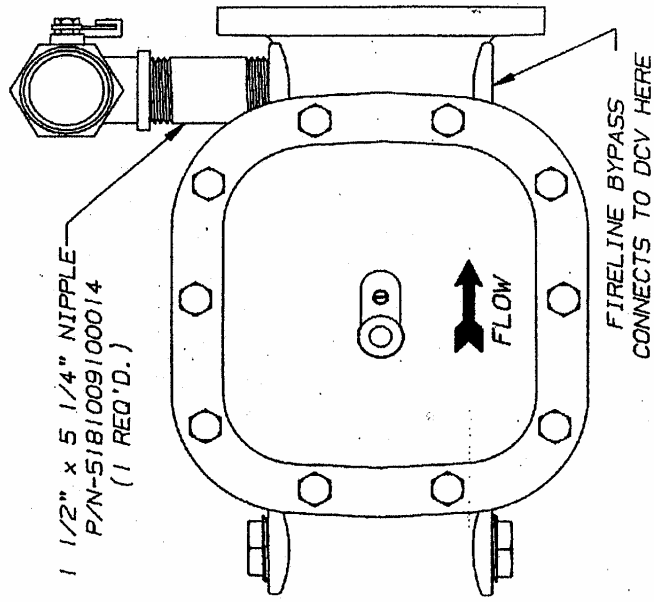
# NEPTUNE



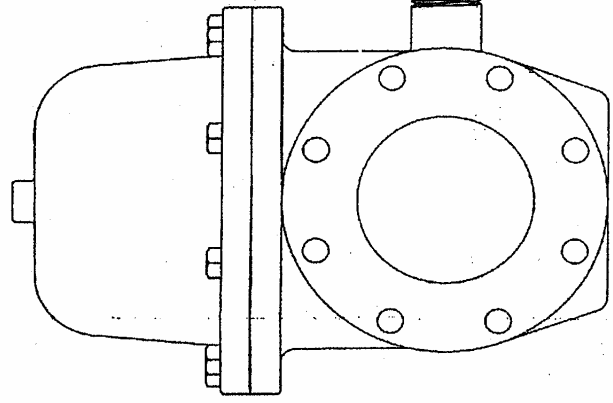
Note: For 8" and 10" Protectus III meters the plug at the top of check valve must be reduced from 3" to 2". Fitting used must be brass!!

*Test Riser Specifications – Neptune Meters*  
*Page 1 of 2*

- 2 1/2" NST Brass Protective Thread Cap
- HEX COUPLING ADAPTER  
2" NPT x 2 1/2" NH  
P/N-5381429200101  
(1 REQ'D.)
- HEX PIPE BUSHING  
2" x 1 1/2"  
P/N-5181009100021  
(1 REQ'D.)
- 1 1/2" CLOSE NIPPLE  
P/N-5181009100015  
(1 REQ'D.)
- 1 1/2" BALL VALVE  
P/N-5181015300002  
(1 REQ'D.)
- STREET ELBOW  
1 1/2" x 90°  
P/N-5181009100013  
(1 REQ'D.)



TOP VIEW



END VIEW

NOTES:

- 1. PIPE JOINTS TO BE SEALED WITH RTV 108 OR EQUIVALENT.

TOLERANCE U.N.D.	NOTES: BLURBS AND SHARP EDGES DO NOT SCALE DRAW	APP'D JACKSON	DATE 12/12/91
.004 ± .005	SCALE: NONE	DRN JACKSON	DATE 12/12/91
FINISH 1/32	SCALE: NONE	DRN LARSEN	DATE 12/11/91
ANGLEP 91°			
MACH. FIN. ✓ 1/32			

TITLE  
TEST RISER ASSEMBLY  
F/4" FIRELINES

P/N-518-10-353-00001	
MT-200675	
1/A	PAGE 1/RE
DRG. NO.	

SYM	DATE	DRN	ECN	REVISION
A	9/92	BRM	CHG.	PN'S

sensus TECHNOLOGIES, INC.	
P/N-518-10-353-00001	
MT-200675	
1/A	PAGE 1/RE
DRG. NO.	

