

AMR SCOPE OF WORK

I. General

- A. Submit with the Proposal, two (2) copies of manufacturer's literature describing the meter, encoder, interface unit/radio transmitter, including specifications and features. Submit with the Proposal, a list and description of any exceptions to these specifications, terms and conditions. Submit with the Proposal offered product warranties for all items including length of coverage, amount, terms, conditions and exceptions.
- B. The scope of work does not include any meter installation..
- C. Meters must be manufacturer in the United States.
- D. All manufacturers must have at least twenty five (25) years of water meter manufacturing experience. The meter manufacturer shall provide a complete line of meter types and sizes and shall produce all meter components including meter, encoder, interface unit/radio transmitter and spare parts.
- E. Meter, encoder, interface unit/radio transmitter shall be shipped fully assembled and ready for installation.
- F. Meters furnished under these specifications shall be the products of a manufacturer with at least ten (10) years experience in meter/radio transmitter manufacturing for the American Water Works market. Meters shall be new, first line quality and an affidavit of compliance from the manufacturer is required stating that the meters conform to American Water Works Standards as most recently revised for length, size, accuracy, capacity, pressure loss, dimensions, and all other applicable parameters as specified.

II. Residential Water Meters

- A. Furnish and deliver FOB meters with integrated registers and radio transmitters.
- B. All meters must be positive displacement type with an integrated register. The integrated register must include the radio frequency device inside the register with no wires.
- C. Specifications:

- All meters and strainers shall conform to the “Standard Specifications for Cold Water Meters”, latest revision issued by the AWWA, which includes C-700, 702, 703,706,C – 707-708.
- All meters and strainers must be ANSI/NSF 61 Compliant as well as Annex F and G Compliant.
- Only magnetic driven, positive displacement meters of the flat nutating disc type will be accepted because of enhanced low flow accuracy performance.
- Small 5/8” water meters include:

5/8” X 3/4” – Positive Displacement Type

5/8” X 1/2” – Positive Displacement Type

The meter connection size will be determined and stated when meters are ordered. An affidavit of compliance with applicable requirements as stated in these specifications and a certificate of tests for accuracy and capacity will be required in letterform to be sent with meters.

- Main cases shall have removable bottom caps.
- To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by the AWWA C-700 (low, intermediate and full flow).
- All meters shall be provided with removable plastic strainer screens.

III. Large Meters and Strainers

- A. Large meters consist of meter sizes from ¾ inch to 6 inch and include positive displacement and compound type meters as listed in Section VII Price Proposal.
- B. The large meters shall be furnished and delivered FOB. The water Assoc. reserves the right to add or delete meter quantities without impacting the unit bid prices.
- D. Specifications:

- Positive displacement meters shall meet the requirements for Residential Water Meters provided in Section II.
- All large meters must have Unitized Measuring Elements (UME's).
- Main cases shall have a maximum lead content of 5%.
- Meters must meet or exceed requirements of AWWA C702.
- The compound meters shall consist of a combination of AWWA Class II turbine meter for high rates of flow and a nutating disc type positive displacement meter for measuring low rates of flow, enclosed in a single main case. An automatic valve shall direct flows through the disc meter at low flow rates and through the turbine meter at high flow rates. At high flow rates, the automatic valve shall also serve to restrict the flow through the disc meter to minimize wear.
- The measuring chamber on the compound meter will be a self contained unit, attached to the cover for easy removal and will be able to be changed in the field. By using this unitized measuring element it will insure ease of maintenance, lower cost of service and minimal down time.
- The compound meter will have minimum low flow characteristics and normal operating range per size as follows:

2 inch	1/8 gpm; ½ to 200 gpm
3 inch	1/8 gpm; ½ to 450 gpm
4 inch	½ gpm; 1 to 1000 gpm
6 inch	¾ gpm; 1 ½ to 2000 gpm
8 inch	¾ gpm; 1 ½ to 2000 gpm
- The compound meter will have a high flow encoder register and a low flow encoder register so all flows can be properly monitored for billing charting use.
- Compound meters and positive displacement must be able to support encoder/interface unit with the characteristics described in these specifications.
- Furnish all meters with strainers. Strainers shall meet AWWA Standards and be designed for a minimum 150 psi operating pressure and minimal head loss at full flow capacity.

IV. Water Register, Encoder and Water Radio Transmitter

- A. The Transmitter Register consists of a local register combined with electronic circuitry capable of producing a signal compatible with the Remote Transmitter or Integral Transmitter.
- B. The transmitter shall be water resistant constructed of a scratch resistant glass face, non-corrosive metal bottom and non-gasket permanent seal. The encoder shall be integrated with the radio frequency device- with no wires.
- C. The Register shall consist of a permanently sealed glass face and metal bottom to eliminate moisture, dirt and other contaminates. The electronic encoder register must exceed all applicable requirements of the AWWA standards and C707 regarding moisture intrusion. The unit shall be enclosed in a self-contained plastic shroud assembly with either plastic or bronze lid and is magnetically coupled to the meter-measuring element.
- D. The encoder shall have been successfully life tested to accumulate 25 million gallons.
- E. The encoder must not be dependent upon any type of battery to function.
- F. Meters installed outside in pits or vaults shall allow for the transmitter to be remote mounted and be designed for operation in a flooded environment. Meters in outside pits shall have a glass faced register.
- G. Batteries shall be field replaceable.
- I. The unit shall have the following features:
- 8 digit remote reading and usage profiling.
 - 96 Days of Data profiling to store and log consumption data.
 - Leak, tamper and reverse flow detection.
 - No external wiring for integrated transmitter unit.
 - No programming required.
 - No FCC license required.
 - Rate of flow display.
 - Operating temperature range of -22°F to 149°F.
 - Operating humidity range of 0 to 95%.
 - Tamper resistant design to prevent removal of register and transmitter.
 - Transmitter shall be compatible with handheld, mobile or fixed base data collection system.

- The system must be expandable at any time without getting authorization from the FCC.
- The number of meter reads must not affect battery life.
- Battery life shall be at least 20 years.
- The unit shall not require programming if the battery discharges before it is replaced.
- Each unit must be individually addressable.
- For 5/8 inch through 1 inch meters, record usage to the nearest one (1) gallon or one tenth (1/10) cubic foot.
- For meter sizes larger than 1 inch, record usage to nearest ten (10) gallons or one (1) cubic foot.

HARDWARE REQUIREMENTS

1. HANDHELD COMPUTER HARDWARE

- a. Handheld computers shall be compatible with the mobile AMR system and shall be capable of receiving from the AMR modules
- b. All devices must have adequate memory and internal power sources to perform meter reading or field service activities for eight plus hours
 1. Memory for data and application used in the Handheld must be at least 1 GB flash Technology
 2. The device must be capable of allowing reading of Meters with radio modules.
- c. Keyboard – the keyboard must provide :
 1. Must meet Mil-spec 810f for water,dust and sand
 2. Alphanumeric data entry also touch screen keypad
- d. Display- Display must provide :
 1. Sunlight-readable 480x640 pixel (VGA) 16 bit color
 2. LED backlighting
- e. Power Supply - Handhelds must be equipped with:
 1. Rechargeable lithium battery pack –5000 mAh Capacity
 2. Fast charge system (4-6 hours)
 3. Power management system
 4. Integrated charge status and low battery indicator
 5. 10+ hour work day
- f. Physical Characteristics:
 1. Must be Windows driven touch screen.
 2. Must be able to perform data logging.
 3. Must be able to program gas modules.
 4. Must have intergrated speaker and microphone
 5. Must be able to survive immersion in up to a meter of water for four hours.