SECTION 33 12 33

NON-RESIDENTIAL WATER METERS (FORT HOOD)

PART 1: GENERAL

1.01 SCOPE

A. This specification shall specify non-residential water meters at Fort Hood.

1.02 SUBMITTALS

A. Conform to requirements of Section 01 30 00 - Submittals.

B. Submit written certification of calibration and test results.

C. Submit manufacturer's certification that water meters meet applicable requirements of this Section.

D. Submit accuracy registration test certification from manufacturer for each 3-inch through 10 inch diameter meter.

1.03 QUALITY CONTROL

A. Submit manufacturer's warranty against defects in materials and workmanship for one (1) year from date of Substantial Completion.

B. Provide manufacturer's unconditional guarantee for each sealed register against leakage, fogging, discoloration and stoppage for 15 years from date of installation.

C. Vendor may replace meters that become defective within guarantee period with meters that comply with this Specification. AW will return defective meters to vendor at vendor's expense. Meters repaired or replaced under this guarantee must meet accuracy limits for new meters upon receipt and accuracy limits for remaining period of initial guarantee.

1.04 METER LOCATION REQUIREMENTS

A. Install water meters and shut-off valves (stop boxes) at point of demarcation or as close to point of demarcation as physically possible.

B. Meters placed inside of government owned facilities shall be located as and where directed by Fort Hood DPW. Meters located within buildings shall remain as government property and maintenance and operation of these meters shall remain the responsibility of the government.

C. Meters shall be located so that there is a minimum length of straight pipe equal to 10 pipe diameters upstream of the meter and a minimum of length of straight

pipe equal to 5 pipe diameters downstream unless otherwise approved by AW Project Manager.

PART 2: PRODUCTS

2.01 GENERAL

A. Provide meters of type and size as indicated on Drawings, unless otherwise indicated.

B. Provide bolted split casings. Main casings of meters and external fasteners: Copper alloy with minimum 75 percent copper for 5/8 inch to 2 inches, bronze or cast iron, hot-dipped galvanized or epoxy coating for 3 inches and larger.

C. Straightening Vanes: Non-corrosive material compatible with case material.

D. Intermediate gear train shall not come into contact with water and shall operate in suitable lubricant.

E. Registers: Automatic Meter Reading (AMR) type that provides pulse, contact closure, piezo switch or encoder generated output signal, compatible with AW's radio AMR systems. Provide minimum 12-foot wire when permanently connected to register. Lens: impact resistant. Register box: tamper resistant by means of tamper screw or plug: Register: permanently sealed, straight-reading, center-sweep test hand, magnetic driven, U.S. gallons. Digits: 6, black in color, with lowest registering 3 digits (below 1,000-gallon registration) having contrasting digit and background color. Register capacity of meters: 9.99 million gallons for 5/8 inch to 2 inches and 999.999 million gallons for 3 inches and larger. Register shall be Tricon "S" type as manufactured by Neptune.

F. Connections: 5/8 inch to 1 inch: threads at each end; 1-1/2 to 2 inches: 2-bolt oval flanges each end; 3 inches and larger: flange at each end.

G. Stamp manufacturer's meter serial number on outer case. Stamp manufacturer's meter serial number on outside of register lid when provided. Manufacturer's serial numbers shall be individual and not duplicated.

H. Non- Residential Water Meters:

1. Provide approved meters capable of providing pulse output of 1 pulse equivalent to 1,000 gallons that is compatible with Fort Hood's Metasys system.

2. Displacement Meters shall be: Neptune Model T10, with R 900i Neptune pit style register Meter Interface Unit (MIU) complete with 6-ft of antenna wire. ~~NO EXCEPTIONS~~

3. Turbine Meters shall be Neptune HP Turbine Water Meters with Neptune pit style R900i complete with 6-ft of antenna wire. ~~NO EXCEPTIONS~~

4. Compound Meters shall be Neptune TRU/FLO Compound Water Meters with Neptune pit style MIU c/w 6-ft of antenna wire. ~~NO EXCEPTIONS~~

5. Fire Service Meters shall be Neptune Fire Service Meters with Neptune pit style MIU c/w 6-ft of antenna wire ~~NO EXCEPTIONS.~~

6. Water Meter to be supplied with a cast iron yoke or copper meter setter as shown on standard detail drawings.

I. Manufacturing quality control shall permit successful interchangeability from one meter to another of same size including registers, measuring chambers and units, discs or pistons as units, change gears, bolts, nuts, and washers without affecting accuracy of new meter.

J. For water meters installed on existing mains where new valve vaults are required, isolation valves shall be provided upstream and downstream of the meter box to allow for maintenance and/or repair of meters. Isolation valves are not required on applications where meter boxes are utilized.

K. For water meter vaults provide vaults in accordance with requirements set forth in Specification Section – Valve Boxes and Meter Vaults.

L. Meters shall be stored in a location that offers protection from the elements, away from direct sunlight and not subject to extreme temperatures

2.02 REDUCTION OF LEAD IN DRINKING WATER ACT COMPLIANCE

A. The Contractor shall comply with the requirements and standards of the Reduction of Lead in Drinking Water Act.

B. Any pipe, fitting or fixture (e.g. corp stops, curb valves, gate valves less than 2 inches in diameter, backflow prevention devices, water meters, hose bibs, etc.), solder and flux installed or requiring replacement as of January 4, 2014 must be "lead free". The Contractor shall be responsible to comply with the State, local laws, ordinances, codes, rules, and regulations governing the Reduction of Lead in Drinking Water Act that may have additional limitations or requirements."

C. The definition of 'lead free' is as follows:

1. Not containing more than 0.2 percent lead when used with respect to solder and flux; and

2. Not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures

2.03 METER APPLICATIONS

A. Sizes 5/8-inch to 2-inch Meters: Displacement type (except for constant flow where 2-inch turbine may apply).

B. Meters greater than 2 inches and up to 6 inches: Turbine, Compound, or Fire Service type, as specified in the Project Scope or Drawings and in accordance with the AW Project Manager. ~~in accordance with AW Design Guide.~~

C. All Meters larger than 6 inches and all other meters that are to be used for fire protection must comply with AWWA C703.

2.04 MATERIALS

A. Cold-Water Meters:

1. Displacement Type: AWWA C700; sizes 5/8 inch up to and including 2 inches; oscillating disc or piston of magnetic drive type; bolted split-case design, with either being removable.

2. Turbine Type: AWWA C701; Class II; sizes 3 inches through 6 inches; flanged; straight-through measuring chamber; rotor construction: polypropylene or similar non rubber material with specific gravity of approximately 1.0, equipped with near frictionless replaceable bearings in turbine working against rotor shaft positioned thrust bearing. Transient/Fire Hydrant Meter Inlet: Female fitting for attachment to hose nozzle with National Standard Fire hose thread. Outlet: 2-inch nipple with National Pipe Thread. Include restriction plate to limit flow through meter to 400 gpm at 65 psi.

3. Compound Type: AWWA C702; Class II, sizes 2 inches through 6 inches. Measuring chambers: For use in continuous operation; separate units of copper alloy (minimum 84 percent copper) or approved polymer material, inert in corrosive potable water; with centering device for proper positioning. Measuring pistons: Non-pilot type with division plates of rubber covering vulcanized to stainless steel or other approved material of sufficient thickness to provide minimum piston oscillation noise. Measuring discs: Flat or conical type, one piece, mounted on monel or 316 stainless steel spindle. Measuring chamber strainer screen area: Twice area of main case inlet.

4. Fire-Service Type: sizes 4 inches through 10 inches; turbine-type, compound type, proportional type; AWWA C703, with separate check valve conforming to AWWA C510. Determine size of fire meter by adding fire flow and domestic flow.

2.05 STRAINERS

A. Displacement Potable Water Meters 5/8 inch through 2 inches: Self-straining by means of annular space between measuring chamber and external case or with strainer screens installed in meter. Provide rigid screens which fit snugly, are easy to remove, with effective straining area at least double that of main case inlet.

B. Potable Water Meters larger than 2 inches: Equip with separate external strainer with bronze body for diameters less than 8 inches. 8-inch diameter and larger may be cast iron, hot-dipped galvanized or epoxy coating. Strainers: Bolted to inlet side of meter, detachable from meter, easily removable lid. Strainer screen: Made of stainless steel wire complying with ASTM A240, or copper alloy containing not less than 85 percent copper complying with ASTM B584, having nominal screen size of 3-1/2 mesh-per-inch (U.S. Series) not less than 45 percent clear area.

C. Provide separate approved external strainers (when required by meter manufacturer) approved for use in fire service metered connections by Underwriters Laboratories. Bodies: Cast iron or copper alloy. Ends: Flanged in accordance with ASME B16.1, Class 125. Provide stainless steel basket. Strainers shall be detachable from meter.

2.06 CONNECTIONS AND FITTINGS

A. Provide pipe for connections in accordance with Section 33 11 00.15 - Ductile Iron Pipe and Fittings and Section 33 11 00.11 - Polyvinyl Chloride Pipe. Use restrained joints and flanged joints only.

B. Fittings:

1. For meters 2 inches and smaller: Same type of fittings as Outlet End fittings for Curb Stop in accordance with Section 22 11 16.11 - Water Tap and Service Line Installation.

2. For meters larger than 2 inches: Restrained ductile iron; push-on bell joints or mechanical joint fittings between water line and meter vault; Class 125 flanged inside meter vaults; cement mortar lined and sealed.

2.07 ELECTRICAL BOX

A. Electrical box shall be wall-mounted NEMA 1 or as appropriate for wet or damp locations, electrical control enclosure. Enclosure shall be a minimum of 12”H x 12”W x 6”D and be provided with keyed alike latches.

B. A terminal block with a minimum of 8 pins shall be mounted inside the electrical box.

2.08 LAYING LENGTHS

A. Minimum laying lengths for meter and standard strainer shall be as shown on Project Drawings.

PART 3: EXECUTION

3.01 TAPPING AND METER SERVICE INSTALLATION

A. Meter Service Line:

1. Use pipe and fittings conforming to requirements of Section 33 11 00.15 - Ductile Iron Pipe and Fittings, or Specification Section ~~33 11 00.11~~ - Polyvinyl Chloride Pipe.

2. Limit pulling and deflecting of joints to limits recommended by manufacturer.

3. Make vertical adjustments with offset bends where room will permit. Minimize number of bends.

4. Provide a minimum straight pipe length upstream and downstream of meter vault in accordance with section 1.04 of this specification.

3.02 METER FITTING HOOKUP

A. Support meter piping and meter, level and plumb, during installation. Support meters larger than 2" with concrete supports, or adjustable galvanized pipe supports, at a minimum of two locations.

B. Use round flanged fittings inside meter box or vault except for mechanical joint to flange adapter. Provide full-face 1/8-inch black neoprene or red rubber gasket material on flanged joints. Provide stainless steel bolts and nuts.

C. Tighten bolts in proper sequence and to correct torque.

D. Visually check for leaks under normal operating pressure following installation. Repair or replace leaking components.

3.03 METER BOX AND VAULT INSTALLATION

A. Conform to requirements of Section - Valve Boxes and Meter Vaults.

B. Perform adjustment to existing meter in accordance with Section 03 48 20 - Valve Boxes and Meter Vaults.

3.04 METASYS CONNECTION

A. Contractor shall install NEMA 1 electrical enclosure within mechanical or communication room of facility water meter is measuring.

B. 1" conduit and 3-strand 18-gauge wiring shall be installed from the meter into the mechanical room. Mechanical room shall be within 500 feet of the mechanical room.

C. Wiring from the installed water meter shall be tied into the terminal blocks provided with the NEMA 1 electrical enclosure.

D. Contractor shall be responsible for providing all labor, equipment, and materials necessary to install, connect, test, and calibrate the water meter(s) and the wires up to the terminal block. Contractor shall not be responsible for final connection of the METASYS access device.

3.05 TESTING

A. Accuracy registration tests will be conducted in accordance with latest revision of AWWA standard for type and size of meter.

1. Accuracy of displacement meters during guarantee period shall be as follows:

a. Initial period: of 18 months from date of shipment or 12 months from date of installation: 98.5% to 101.5% at standard and minimum flow rates; 98% to 101% at low flow rates.

b. Second period: AWWA new meter accuracy as tested below.

	GUARANTEE PERIOD			TEST FLOW RATE
Meter Size (inches)	Age of Meter (Years)	Or	Million* Gallons	Minimum Rate (gpm)
5/8	>1 to <5		0.5	1/4
1	>1 to <5		1.0	3/4
1-1/2	>1 to <5		2.5	1-1/2
2	>1 to <5		5.5	2

* Total registration.

c. Third period: AWWA new meter accuracy for standard flow rates and AWWA repair meter accuracy for minimum flow rate as tested below.

	GUARANTEE PERIOD			TEST FLOW RATE
Meter Size (inches)	Age of Meter (Years)	Or	Million* Gallons	Minimum Rate (gpm)
5/8	>5 to <10		1.5	1/4
1	>5 to <10		2.5	3/4
1-1/2	>5 to <10		5.0	1-1/2
2	>5 to <10		10.0	2

2. Minimal acceptable accuracy in percent of low flow registration for turbine meters:

Meter Size (inches)	Minimum Flow (gpm)	% Accuracy Required
2	3	95
3	5	95
4	15	95
6	20	95
8	20	95
10	30	95

END OF SECTION 33 12 33