SECTION 22 05 19

METERS AND GAGES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Positive displacement meters.

B. Pressure gages and pressure gage taps.

C. Thermometers and thermometer wells.

D. Static pressure gages.

E. Filter gages.

1.02 REFERENCE STANDARDS

A. ASME B40.100 - Pressure Gauges and Gauge Attachments; The American Society of Mechanical Engineers.

B. ASME MFC-3M - Measurement of Fluid Flow in Pipes Using Orifice, Nozzle and Venturi; The American Society of Mechanical Engineers.

C. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers.

D. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.

E. AWWA C700 - Cold Water Meters -- Displacement Type, Bronze Main Case; American Water Works Association (ANSI/AWWA C700).

F. AWWA C701 - Cold Water Meters -- Turbine Type, for Customer Service; American Water Works Association.

G. AWWA C702 - Cold Water Meters -- Compound Type; American Water Works Association.

H. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold Water Meters; American Water Works Association (ANSI/AWWA C706).

I. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; American Water Works Association.

J. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Underwriters Laboratories Inc..

1.03 SUBMITTALS

A. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

B. Project Record Documents: Record actual locations of components and instrumentation.

C. Operation and Maintenance Data:.

1.04 FIELD CONDITIONS

A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

1.05 EXTRA MATERIALS

A. Supply two bottles of red gage oil for static pressure gages.

B. Supply two pressure gages with pulsation damper or dial thermometers.

PART 2 PRODUCTS

2.01 PRESSURE GAGES

A. Manufacturers:
   1. Dwyer Instruments, Inc: www.dwyer-inst.com.
   2. Moeller Instrument Co., Inc: www.moellerinstrument.com.
   3. Omega Engineering, Inc: www.omega.com.

B. Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
   1. Case: Steel with brass bourdon tube.
   2. Size: 4-1/2 inch diameter.
   3. Size: 2 inch diameter.
   4. Mid-Scale Accuracy: One percent.
   5. Scale: Psi.

2.02 PRESSURE GAGE TAPPINGS

A. Gage Cock: Tee or lever handle, brass for maximum 150 psi.

B. Needle Valve: Brass or Stainless Steel, 1/4 inch NPT for minimum 150 psi.

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.

D. Syphon: Steel, Schedule 40, 1/4 inch angle or straight pattern.

2.03 STEM TYPE THERMOMETERS

A. Manufacturers:
   1. Dwyer Instruments, Inc: www.dwyer-inst.com.
   2. Omega Engineering, Inc: www.omega.com.
   3. Weksler Glass Thermometer Corp: www.wekslerglass.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Thermometers - Fixed Mounting: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish.
   1. Size: 9 inch scale.
   2. Window: Clear Lexan.
   3. Size: 9 inch scale.
   4. Window: Clear glass or Lexan.
   5. Accuracy: 2 percent, per ASTM E77.
   6. Calibration: Degrees F.

C. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
   1. Size: 9 inch scale.
   2. Window: Clear Lexan.
   3. Size: 9 inch scale.
   4. Window: Clear glass or Lexan.
   5. Stem: 3/4 inch NPT brass.

6. Accuracy: 2 percent, per ASTM E77.
7. Calibration: Degrees F.

2.04 THERMOMETER SUPPORTS

A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.05 TEST PLUGS

A. Test Plug: 1/4 inch or 1/2 inch brass or stainless steel fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with Nordel core for temperatures up to 350 degrees F.

B. Test Kit: Carrying case, internally padded and fitted containing one 2-1/2 inch diameter pressure gages, one gage adapters with 1/8 inch probes, two 1 inch dial thermometers.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install positive displacement meters with isolating valves on inlet and outlet to AWWA M6. Provide full line size valved bypass with globe valve for liquid service meters.

C. Provide one pressure gage per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage.

D. Install pressure gages with pulsation dampers. Provide gage cock or needle valve to isolate each gage. Extend nipples and siphons to allow clearance from insulation.

E. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

F. Install thermometer sockets adjacent to controls systems thermostat, transmitter, or sensor sockets. Refer to Section 23 09 43.

G. Coil and conceal excess capillary on remote element instruments.

H. Provide instruments with scale ranges selected according to service with largest appropriate scale.

I. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

J. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

K. Locate test plugs adjacent thermometers and thermometer sockets, adjacent to pressure gages and pressure gage taps, adjacent to control device sockets or where indicated.

3.02 SCHEDULES

A. Positive Displacement Meters, Location:
1. Domestic cold water.
2. Expansion tank make-up.

B. Pressure Gages, Location and Scale Range:
   1. Pumps, 0 to 100 psi.
   2. Expansion tanks, 0 to 100 psi.
   3. Sprinkler system, 0 to 100 psi.
   4. Backflow preventers, 0 to 100 psi.

C. Pressure Gage Tappings, Location:
   1. Control valves 3/4 inch & larger - inlets and outlets.
   2. Major coils - inlets and outlets.
   3. Heat exchangers - inlets and outlets.

D. Stem Type Thermometers, Location and Scale Range:
   1. Domestic hot water supply and recirculation, 0 to 220 degrees F.

END OF SECTION