

**SECTION 23 0519**  
**METERS AND GAGES FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Positive displacement meters.
- B. Flow meters.
- C. Pressure gages and pressure gage taps.
- D. Thermometers and thermometer wells.
- E. Static pressure gages.
- F. Filter gages.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 0923 - Direct-Digital Control System for HVAC.
- B. Section 23 0993 - Sequence of Operations for HVAC Controls.
- C. Section 23 2113 - Hydronic Piping.
- D. Section 23 2213 - Steam and Condensate Heating Piping.

**1.03 REFERENCE STANDARDS**

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.
- B. ASME MFC-3M - Measurement of Fluid Flow in Pipes Using Orifice, Nozzle and Venturi; 2007.
- C. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.
- D. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014.
- E. AWWA C700 - Cold-Water Meters -- Displacement Type, Metal Alloy Main Case; 2015.
- F. AWWA C701 - Cold-Water Meters -- Turbine Type, for Customer Service; 2012.
- G. AWWA C702 - Cold-Water Meters -- Compound Type; 2010.
- H. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; 2012.
- I. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.
- J. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.
- C. Project Record Documents: Record actual locations of components and instrumentation.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Gage Oil for Inclined Manometers: One bottle.
  - 3. Extra Pressure Gages: One of each type and size.

**1.05 FIELD CONDITIONS**

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

**PART 2 PRODUCTS**

**2.01 POSITIVE DISPLACEMENT METERS (LIQUID)**

- A. Manufacturers:

1. Dwyer Instruments, Inc; \_\_\_\_\_: www.dwyer-inst.com.
  2. FMC Technologies; \_\_\_\_\_: www.fmctechnologies.com.
  3. Venture Measurement, a Danaher Corporation Company; \_\_\_\_\_: www.venturemeasurement.com.
  4. Substitutions: See Section 01 6000 - Product Requirements.
- B. AWWA C700, positive displacement disc type suitable for fluid with metal alloy main case and cast iron frost-proof, breakaway bottom cap, hermetically sealed register, remote reading.
- C. Meter: Brass body turbine meter with magnetic drive register.
1. Service: Cold water, 122 degrees F.

## 2.02 PRESSURE GAGES

- A. Manufacturers:
1. Dwyer Instruments, Inc; \_\_\_\_\_: www.dwyer-inst.com.
  2. Moeller Instrument Company, Inc; \_\_\_\_\_: www.moellerinstrument.com.
  3. Omega Engineering, Inc; \_\_\_\_\_: www.omega.com.
  4. Substitutions: See Section 01 6000 - Product Requirements.
- 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. Mid-Scale Accuracy: One percent.
  4. Scale: Psi and KPa.

## 2.03 PRESSURE GAGE TAPPINGS

- A. Gage Cock: Tee or lever handle, brass for maximum 150 psi.
- B. Needle Valve: Brass, 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.

## 2.04 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 6000 - 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. Stem: \_\_\_\_\_ inch brass.
  4. Accuracy: 2 percent, per ASTM E77.
  5. 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. Stem: 3/4 inch NPT brass.
  4. Accuracy: 2 percent, per ASTM E77.
  5. Calibration: Degrees F.

## 2.05 DIAL THERMOMETERS

- A. Manufacturers:
  - 1. Dwyer Instruments, Inc; \_\_\_\_\_: [www.dwyer-inst.com](http://www.dwyer-inst.com).
  - 2. Omega Engineering, Inc; \_\_\_\_\_: [www.omega.com](http://www.omega.com).
  - 3. Weksler Glass Thermometer Corp; \_\_\_\_\_: [www.wekslerglass.com](http://www.wekslerglass.com).
  - 4. \_\_\_\_\_.
  - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Thermometers - Fixed Mounting: Dial type bimetallic actuated; ASTM E1; stainless steel case, silicone fluid damping, white with black markings and black pointer, hermetically sealed lens, stainless steel stem.
  - 1. Size: 5 inch diameter dial.
  - 2. Lens: Clear glass.
  - 3. Accuracy: 1 percent.
  - 4. Calibration: Degrees F.
- C. Thermometer: ASTM E1, stainless steel case, adjustable angle with front recalibration, bimetallic helix actuated with silicone fluid damping, white with black markings and black pointer hermetically sealed lens, stainless steel stem.
  - 1. Size: 3 inch diameter dial.
  - 2. Lens: Clear glass.
  - 3. Accuracy: 1 percent.
  - 4. Calibration: Degrees F.

## 2.06 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.

## 2.07 TEST PLUGS

- A. Test Plug: 1/4 inch or 1/2 inch brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F.

## 2.08 STATIC PRESSURE GAGES

- A. Manufacturers:
  - 1. Dwyer Instruments, Inc; \_\_\_\_\_: [www.dwyer-inst.com](http://www.dwyer-inst.com).
  - 2. Omega Engineering, Inc; \_\_\_\_\_: [www.omega.com](http://www.omega.com).
  - 3. Veris Industries; \_\_\_\_\_: [www.veris.com](http://www.veris.com).
  - 4. Weksler Glass Thermometer Corp; \_\_\_\_\_: [www.wekslerglass.com](http://www.wekslerglass.com).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. 3-1/2 inch diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full scale accuracy.
- C. Inclined manometer, red liquid on white background with black figures, front recalibration adjustment, 3 percent of full scale accuracy.
- D. Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4 inch diameter tubing.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

**END OF SECTION 23 0519**

