

## SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Pressure gages and pressure gage taps.
- B. Thermometers and thermometer wells.

## 1.2 REFERENCE STANDARDS

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments; The American Society of Mechanical Engineers; 2005.
- B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2007.
- C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2007.
- D. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

## 1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements. for additional provisions.

## 1.4 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

## 2.1 PRESSURE GAGES

- A. 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 (115 mm) diameter.
  - 3. Mid-Scale Accuracy: One percent.
  - 4. Scale: Psi and KPa.

## 2.2 PRESSURE GAGE TAPPINGS

- A. Gage Cock: Tee or lever handle, brass for maximum 150 psi (1034 kPa).
- B. Needle Valve: Brass, 1/4 inch (6 mm) NPT for minimum 150 psi (1034 kPa).
- C. Pulsation Damper: Pressure snubber, brass with 1/4 inch (6 mm) connections.
- D. Syphon: Steel, Schedule 40, 1/4 inch (6 mm) angle or straight pattern.

## 2.3 STEM TYPE THERMOMETERS

- A. 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 (225 mm) scale.
  - 2. Window: Clear Lexan.
  - 3. Accuracy: 2 percent, per ASTM E 77.
  - 4. Calibration: Degrees F.
- B. 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 (225 mm) scale.
  - 2. Window: Clear Lexan.
  - 3. Accuracy: 2 percent, per ASTM E 77.
  - 4. Calibration: Degrees F.

## 2.4 DIAL THERMOMETERS

- A. 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 (125 mm) diameter dial.
  - 2. Lens: Clear glass.
  - 3. Accuracy: 1 percent.
  - 4. Calibration: Degrees F.

- B. Thermometers - Adjustable Angle: Dial type bimetallic actuated; ASTM E1; stainless steel case, adjustable angle with front recalibration, silicone fluid damping, white with black markings and black pointer, hermetically sealed lens, stainless steel stem.
  - 1. Size: 5 inch (125 mm) diameter dial.
  - 2. Lens: Clear glass.
  - 3. Accuracy: 1 percent.
  - 4. Calibration: Degrees F.
  
- C. Thermometers: Dial type vapor or liquid actuated; ASTM E1; stainless steel case, with brass or copper bulb, copper or bronze braided capillary, white with black markings and black pointer, glass lens.
  - 1. Size: 4-1/2 inch (115 mm) diameter dial.
  - 2. Lens: Clear glass.
  - 3. Length of Capillary: Minimum 5 feet (1500 mm).
  - 4. Accuracy: 2 percent.
  - 5. Calibration: Degrees F.

## 2.5 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 (75 mm) outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
  
- B. Provide one pressure gage per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage.
  
- C. Install pressure gages with pulsation dampers. Provide gage cock to isolate each gage. Provide siphon on gages in steam systems. Extend nipples and siphons to allow clearance from insulation.
  
- D. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch (60 mm) for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

- E. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- F. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- G. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- H. Locate test plugs adjacent thermometers and thermometer sockets.

END OF SECTION