

## **SECTION 23 05 19 - METERS AND GAGES FOR PIPING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

**A. Section Includes:**

1. Thermometers.
2. Gages.
3. Test plugs.

#### **1.2 SUBMITTALS**

- A. Product Data:** For each type of product indicated.
- B. Operation and maintenance data.**

### **PART 2 - PRODUCTS**

#### **2.1 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS**

- A. Manufacturers:** Subject to compliance with requirements, provide products by one of the following or approved equal:
1. Terice, H. O. Co.
  2. Weiss Instruments, Inc.
  3. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
  4. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
- B. Case:** Die-cast aluminum, 9 inches long.
- C. Tube:** Red or blue reading, organic-liquid filled, with magnifying lens.
- D. Tube Background:** Satin faced, nonreflective aluminum with permanently etched scale markings.
- E. Window:** Glass.
- F. Connector:** Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
- G. Stem:** Copper plated steel, aluminum, or brass for thermowell installation and of length to suit installation.

- H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

## 2.2 THERMOWELLS

- A. Manufacturers: Same as manufacturer of thermometer being used.
- B. Description: Pressure tight, socket type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

## 2.3 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
  - 1. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
  - 2. Miljoco Corp.
  - 3. Trerice, H. O. Co.
  - 4. Weiss Instruments, Inc.
  - 5. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Direct Mounting, Dial Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
  - 1. Case: Dry or Liquid-filled type, drawn steel or cast aluminum, 4-1/2 inch diameter.
  - 2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
  - 3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
  - 4. Movement: Mechanical, with link to pressure element and connection to pointer.
  - 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
  - 6. Pointer: Red or other dark-color metal.
  - 7. Window: Glass.
  - 8. Ring: Stainless steel.
  - 9. Accuracy: Grade A, plus or minus 1 percent of middle half scale.
  - 10. Vacuum-Pressure Range: 30 in. Hg of vacuum to 15 psig of pressure.
  - 11. Range for Fluids under Pressure: Two times operating pressure.
- C. Pressure Gage Fittings:
  - 1. Valves: NPS 1/4 brass or stainless-steel needle type.
  - 2. Syphons: NPS 1/4 coil of brass tubing with threaded ends.
  - 3. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

## 2.4 TEST PLUGS

- A. Test Plug: Corrosion resistant brass or stainless steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating 500 psig at 200 deg F. Pete's Plugs or approved equal.

## PART 3 - EXECUTION

### 3.1 THERMOMETER AND TEST PLUG APPLICATIONS

- A. Install thermometers at all locations where fluid mixing and heat transfer occurs.
- B. Provide the following temperature ranges for thermometers:
  - 1. Heating Hot Water: 30 to 240 deg F, with 2 degree scale divisions.
  - 2. Condenser Water: 0 to 160 deg F, with 2 degree scale divisions.
  - 3. Chilled Water: 0 to 100 deg F, with 2 degree scale divisions.
  - 4. Steam and Condensate: 30 to 300 deg F, with 5 degree scale divisions.

### 3.2 GAGE APPLICATIONS

- A. Install pressure gages for discharge of each pressure reducing valve.
- B. Install pressure gages at chilled and condenser water inlets and outlets of chillers.
- C. Install pressure gages at suction and discharge of each pump.

### 3.3 INSTALLATIONS

- A. Install direct mounting thermometers and adjust vertical and tilted positions.
- B. Install thermowells with socket extending one-third of diameter of pipe and in vertical position in piping tees where thermometers are indicated.
- C. Install direct mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- D. Install needle valve and snubber fitting in piping for each pressure gage for fluids (except steam).
- E. Install needle valve and syphon fitting in piping for each pressure gage for steam.

3.4 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance for meters, gages, machines, and equipment.

3.5 ADJUSTING

- A. Adjust faces of meters and gages to proper angle for best visibility.

**END OF SECTION 23 05 19**