SECTION 230519
METERS AND GAUGES FOR HVAC PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Thermometers
   2. Thermowells
   3. Pressure Gauges
   4. Test plugs

1.02 DEFINITIONS

A. CR: Chlorosulfonated polyethylene synthetic rubber.

B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated; include performance curves.

B. Shop Drawings: Schedule for Thermometers and Gauges indicating manufacturer's number, scale range, and location for each.

PART 2 PRODUCTS

2.01 LIGHT POWERED DIGITAL THERMOMETERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Palmer - Wahl Instruments Inc.
   2. Weiss Instruments, Inc.
   3. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.

B. Case: Die-cast aluminum or brass, epoxy finish.

C. Sensor: Glass passivated thermistor.

D. Display: 9/16” LCD digits switchable between F/C scales. Push button Min/Max stored values with reset.

E. Stem & Connector: Style & Material as recommended my manufacturer for specific application and suitable for thermowell installation.

F. Accuracy: 1% or 1deg, whichever is greater.

G. Resolution: 1/10°

H. Minimum Update Interval: 10sec

I. Lux Rating: 10

2.02 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.

2.03 PRESSURE GAUGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AMETEK, Inc.; U.S. Gauge Div.
   2. Palmer - Wahl Instruments Inc.
   3. Weiss Instruments, Inc
   4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div
   5. Winters Instruments

B. Direct-Mounting, Dial-Type Pressure Gauges: Indicating-dial type complying with ASME B40.100.
   1. Case: 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 metal.
   7. Window: Glass.
   8. Ring: Metal.
   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-Gauge 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.

2.04 TEST PLUGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Flow Design, Inc.
   2. MG Piping Products Co.
   3. National Meter, Inc.
   4. Peterson Equipment Co., Inc.
   5. Sisco Manufacturing Co.
   6. Watts Industries, Inc.; Water Products Div.
   7. Winters Instruments.

B. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.

C. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.

D. Core Inserts: One or two self-sealing rubber valves.
   1. Insert material for air, water, oil, or gas service at 20 to 200 deg F shall be CR.
   2. Insert material for air or water service at minus 30 to plus 275 deg F shall be EPDM.

E. Test Kit: Furnish one test kit(s) containing one pressure gauge and adaptor, one thermometer, and carrying case. Pressure gauge, adapter probes, and thermometer sensing elements shall be of diameter to fit test plugs and of length to project into piping.

PART 3 EXECUTION

3.01 THERMOMETER APPLICATIONS

A. Install liquid-in-glass thermometers in the following locations:
   1. Inlet and outlet of each hydronic zone.
   2. Inlet and outlet of each hydronic boiler and chiller.
   3. Inlet and outlet of each hydronic coil in air-handling units and built-up central systems.
   4. Inlet and outlet of each hydronic heat exchanger.
   5. Inlet and outlet of each thermal storage tank.

B. Provide the following temperature ranges for thermometers:
   1. Heating Hot Water: 30 to 240 deg F, with 2-degree scale divisions.
   2. Chilled Water: 0 to 100 deg F, with 2-degree scale divisions.

3.02 GAUGE APPLICATIONS

A. Install liquid-filled-case-type pressure Gauges at chilled-water inlets and outlets of chillers.

B. Install liquid-filled-case-type pressure Gauges at suction and discharge of each pump.

3.03 INSTALLATIONS

A. Install direct-mounting thermometers and adjust vertical and tilted positions.

B. Install remote-mounting dial thermometers on panel, with tubing connecting panel and thermometer bulb supported to prevent kinks. Use minimum tubing length.

C. Install thermowells with socket extending one-third of diameter of pipe and in vertical position in piping tees where thermometers are indicated.

D. Install direct-mounting pressure Gauges in piping tees with pressure Gauge located on pipe at most readable position.

E. Install needle-valve and snubber fitting in piping for each pressure Gauge for fluids.

F. Install test plugs in tees in piping.

G. Piping Contractor shall install thermowells for DDC immersion type temp sensors provided by Controls Contractor. Refer to M9X series drawings for quantities and locations. Coordinate all requirements with Controls Contractor.

3.04 CONNECTIONS

A. Install Gauges adjacent to machines and equipment to allow service and maintenance for Gauges, machines, and equipment.

3.05 ADJUSTING

A. Calibrate meters according to manufacturer's written instructions, after installation.

B. Adjust faces of Gauges to proper angle for best visibility.

END OF SECTION 230519

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