SECTION 220519 - METERS AND GAGES FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Thermometers.
   2. Gages.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include materials and finishes, dimensions, and accuracies. For pressure gages, submit pressure gage range for each application. For thermometers, submit temperature range and scale divisions for each application.

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:
   1. Trerice, H. O. Co.
   2. Weiss Instruments, Inc.

B. Case: Die-cast aluminum or brass, 9 inches long in mechanical rooms, 7 inches long elsewhere.

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.
I. Range: The maximum operating temperature should not exceed 75% of the full-scale range. The normal operating range should be in the middle half of the range (between 25% and 75% of the full-scale range); whenever possible.

2.2 THERMOWELLS

A. Manufacturers: Same as manufacturer of thermometer being used.

B. Description: Pressure-tight, threaded, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

C. Materials: Brass in copper piping systems, Type 316 stainless steel in all other piping systems.

D. Lagging Extensions: Provide in insulated piping systems, length suitable for insulation thickness.

2.3 PRESSURE GAGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   2. Ernst Gage Co.
   3. Palmer - Wahl Instruments Inc.

B. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.

   1. Case: Dry type, drawn steel, stainless 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.
   6. Pointer: Red or other dark-color metal.
   7. Window: Glass.
   8. Ring: Metal.
   9. Accuracy: Grade A, plus or minus 1 percent of middle half scale.
   10. Range: The maximum operating pressure should not exceed 75% of the full-scale range. The normal operating range should be in the middle half of the range (between 25% and 75% of the full-scale range); whenever possible.

C. Pressure-Gage Fittings:

   1. Valves: NPS 1/4 brass gage cock with lever handles, or brass or stainless-steel needle type.
   2. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.
PART 3 - EXECUTION

3.1 THERMOMETER APPLICATIONS

A. Install liquid-in-glass or digital thermometers in the following locations:

1. Outlet of each domestic, hot-water storage tank.
2. Outlet of each domestic water heater.
3. Outlet of each hot water circulation pump.
4. Outlet of each tempered water recirculation pump.

B. Provide the following temperature ranges for thermometers:

1. Domestic Hot and Tempered Water: 30 to 180 deg F, with 2-degree scale divisions.

3.2 GAGE APPLICATIONS

A. Install dry-case-type pressure gages for discharge of each pressure-reducing valve.

3.3 INSTALLATIONS

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

B. Install thermowells with socket extending a minimum of 2 inches into fluid, but not less than one-third of diameter of pipe and in vertical position in piping tees where thermometers are indicated.

C. Prime thermowells with an approved heat transfer medium such as graphite or heat transfer paste to provide optimal accuracy and response time.

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

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

F. Install thermometers and gages adjacent to machines and equipment to allow service and maintenance for thermometers, gages, machines, and equipment.

G. Adjust faces of thermometers and gages to proper angle for best visibility.

END OF SECTION