

SECTION 15135 - METERS AND GAGES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Thermometers.
 - 2. Gages.
 - 3. Test plugs.

1.3 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated; include performance curves.
- B. Shop Drawings: Schedule for thermometers and gages indicating manufacturer's number, scale range, and location for each.
- C. Product Certificates: For each type of thermometer and gage, signed by product manufacturer.

PART 2 - PRODUCTS

2.1 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Palmer - Wahl Instruments Inc.
 - 2. Terice, H. O. Co.
 - 3. Weiss Instruments, Inc.
 - 4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
- B. Case: Die-cast aluminum 9 inches (229 mm) 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 BIMETALLIC-ACTUATED DIAL THERMOMETERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 2. Ernst Gage Co.
 3. Eugene Ernst Products Co.
 4. Marsh Bellofram.
 5. Miljoco Corp.
 6. NANMAC Corporation.
 7. Noshok, Inc.
 8. Palmer - Wahl Instruments Inc.
 9. REO TEMP Instrument Corporation.
 10. Tel-Tru Manufacturing Company.
 11. Trerice, H. O. Co.
 12. Weiss Instruments, Inc.
 13. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 14. WIKA Instrument Corporation.
 15. Winters Instruments.
- B. Description: Direct-mounting, bimetallic-actuated dial thermometers complying with ASME B40.3.
- C. Case: Dry type, stainless steel with 5-inch (127-mm) diameter.
- D. Element: Bimetal coil.
- E. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
- F. Pointer: Red or other dark-color metal.
- G. Window: Glass.
- H. Ring: Stainless steel.
- I. Connector: Adjustable angle type.
- J. Stem: Metal, for thermowell installation and of length to suit installation.

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

2.3 THERMOWELLS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AMETEK, Inc.; U.S. Gauge Div.
 - 2. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 - 3. Ernst Gage Co.
 - 4. Marsh Bellofram.
 - 5. Miljoco Corp.
 - 6. NANMAC Corporation.
 - 7. Noshok, Inc.
 - 8. Palmer - Wahl Instruments Inc.
 - 9. REO TEMP Instrument Corporation.
 - 10. Tel-Tru Manufacturing Company.
 - 11. Trerice, H. O. Co.
 - 12. Weiss Instruments, Inc.
 - 13. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 - 14. WIKA Instrument Corporation.
 - 15. Winters Instruments.
- B. Manufacturers: Same as manufacturer of thermometer being used.
- C. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

2.4 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AMETEK, Inc.; U.S. Gauge Div.
 - 2. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 - 3. Ernst Gage Co.
 - 4. Eugene Ernst Products Co.
 - 5. KOBOLD Instruments, Inc.
 - 6. Marsh Bellofram.
 - 7. Miljoco Corp.
 - 8. Noshok, Inc.
 - 9. Palmer - Wahl Instruments Inc.
 - 10. REO TEMP Instrument Corporation.
 - 11. Trerice, H. O. Co.
 - 12. Weiss Instruments, Inc.
 - 13. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 - 14. WIKA Instrument Corporation.
 - 15. Winters Instruments.
- B. Direct or Remote-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
 - 1. Case: Dry type, drawn steel or cast aluminum, 4-1/2-inch (114-mm) diameter.

2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
3. Pressure Connection: Brass, NPS 1/4 (DN 8), 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: Metal.
9. Accuracy: Grade B, plus or minus 2 percent of middle half scale.
10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure (100 kPa of vacuum to 103 kPa of pressure).
11. Range for Fluids under Pressure: Two times operating pressure.

C. Pressure-Gage Fittings:

1. Valves: NPS 1/4 (DN 8) brass or stainless-steel needle type.
2. Syphons: NPS 1/4 (DN 8) coil of brass tubing with threaded ends.
3. Snubbers: ASME B40.5, NPS 1/4 (DN 8) brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.5 TEST PLUGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, 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. Terrice, H. O. Co.
7. Watts Industries, Inc.; Water Products Div.

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 (3450 kPa at 93 deg C).

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 (minus 7 to plus 93 deg C) shall be CR.
2. Insert material for air or water service at minus 30 to plus 275 deg F (minus 35 to plus 136 deg C) shall be EPDM.

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

1. Pressure Gage: Small bourdon-tube insertion type with 2- to 3-inch- (51- to 76-mm-) diameter dial and probe. Dial range shall be 0 to 200 psig (0 to 1380 kPa).
2. Low-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch- (25- to 51-mm-) diameter dial and tapered-end sensing element. Dial ranges shall be 25 to 125 deg F (minus 4 to plus 52 deg C).

3. High-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch- (25- to 51-mm-) diameter dial and tapered-end sensing element. Dial ranges shall be 0 to 220 deg F (minus 18 to plus 104 deg C).
4. Carrying case shall have formed instrument padding.

PART 3 - EXECUTION

3.1 THERMOMETER APPLICATIONS

- A. Install liquid-in-glass thermometers in the following locations:
 1. Inlet and outlet of each hydronic boiler and chiller.
 2. Inlet and outlet of each hydronic coil in air-handling units and built-up central systems.
 3. Inlet and outlet of each hydronic heat-recovery unit.
- B. Install bimetallic-actuated dial thermometers in the following locations:
 1. Outside-air, return-air, and mixed-air ducts.
- C. Install dry-case-type, bimetallic-actuated dial thermometers at suction and discharge of each pump.
- D. Provide the following temperature ranges for thermometers:
 1. Heating Hot Water: 30 to 240 deg F, with 2-degree scale divisions (Minus 1 to plus 115 deg C, with 1-degree scale divisions) .
 2. Chilled Water: 0 to 100 deg F, with 2-degree scale divisions (Minus 18 to plus 38 deg C, with 1-degree scale divisions).
 3. Steam and Condensate: 50 to 400 deg F, with 5-degree scale divisions (10 to 205 deg C, with 3-degree scale divisions).
 4. Air Ducts: Minus 40 to plus 110 deg F, with 2-degree scale divisions (Minus 40 to plus 43 deg C, with 2-degree scale divisions).

3.2 GAGE APPLICATIONS

- A. Install dry-case-type pressure gages for discharge of each pressure-reducing valve.
- B. Install dry-case-type pressure gages at chilled- and condenser-water inlets and outlets of chillers.
- C. Install dry-case-type 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 to center of pipe and in vertical position in piping tees where thermometers are indicated.
- C. Duct Thermometer Support Flanges: Install in wall of duct where duct thermometers are indicated. Attach to duct with screws.
- 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 for fluids (except steam).
- F. Install needle-valve and syphon fitting in piping for each pressure gage for steam.
- G. Install test plugs in tees in piping.

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 15135