

SECTION 15120  
METERS AND GAGES

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods" apply to work specified in this Section.

1.02 SUMMARY

- A. This Section specifies meters and gages used in mechanical systems.
- B. Related Work Specified in Other Sections:
  - 1. Meters and gages furnished as part of factory-fabricated equipment are specified as part of the equipment assembly in other Division 15 Sections.

1.03 SUBMITTALS

- A. Product data for each type of meter, gage, and fitting specified. Include scale range, ratings, and calibrated performance curves, certified where indicated. Submit a meter and gage schedule showing manufacturer's figure number, scale range, location, and accessories for each meter and gage.
- B. Product certificates signed by manufacturers of meters and gages certifying accuracies under specified operating conditions and compliance with specified requirements.
- C. Maintenance data to include in the "Operating and Maintenance Manuals" specified in Division 1 Section "Project Closeout". Include data for the following:
  - 1. Test plugs.
  - 2. Flow measuring systems.
  - 3. Flow meters.
  - 4. Temperature and pressure gages.

1.04 QUALITY ASSURANCE

- A. Comply with applicable portions of American Society of Mechanical Engineers (ASME) and Instrument Society of America (ISA) standards pertaining to construction and installation of meters and gages.
- B. Design Criteria: The Drawings indicate types, sizes, capacities, ranges, profiles, connections, and dimensional requirements of meters and gages and are based on the specific manufacturer types and models indicated.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Bimetal Dial Thermometers: Subject to compliance with requirements, provide products by one of the following:
1. Ashcroft by Dresser Industries, Instrument Div.
  2. Marsh Instrument Co.
  3. Marshalltown Instruments, Inc.
  4. Reotemp Instrument Corp.
  5. Tel-Tru Manufacturing Co., Inc.
  6. H.O. Trerice Co.
  7. Weiss Instruments, Inc.
  8. Weksler Instruments Corp.
- B. Insertion Dial Thermometers: Subject to compliance with requirements, provide products by one of the following:
1. Ashcroft by Dresser Industries, Instrument Div.
  2. Reotemp Instrument Corp.
  3. Tel-Tru Manufacturing Co., Inc.
  4. H.O. Trerice Co.
  5. Weiss Instruments, Inc.
  6. Weksler Instruments Corp.
- C. Pressure Gages: Subject to compliance with requirements, provide products by one of the following:
1. AMETEK, U.S. Gauge Div.
  2. Ashcroft by Dresser Industries, Instrument Div.
  3. Marsh Instrument Co.
  4. Marshalltown Instruments, Inc.
  5. H.O. Trerice Co.
  6. Weiss Instruments, Inc.
  7. Weksler Instruments Corp.
  8. WIKA Instruments Corp.
- D. Test Plugs: Subject to compliance with requirements, provide products by one of the following:
1. Flow Design, Inc.
  2. MG Piping Products Co.
  3. Peterson Equipment Co., Inc.
  4. Sisco Co., Spedco, Inc.
  5. H.O. Trerice Co.
  6. Watts Regulator Co.

### 2.02 THERMOMETERS

- A. Scale Range: Temperature ranges for services listed as follows:
1. Domestic Hot Water: 30 to 240 deg F, with 2-degree scale divisions (0 to 115 deg C, with 1-degree scale divisions).
  2. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions (minus 18 to 38 deg C, with 1-degree scale divisions).

3. Hot Water: 30 to 300 deg F, with 2-degree scale divisions (0 to 150 deg C, with 1-degree scale divisions).
  4. Energy Recovery Water: 0 to 160 deg F, with 2-degree scale divisions (minus 18 to 70 deg C, with 1-degree scale divisions).
  5. Chilled Water: 0 to 100 deg F, with 2-degree scale divisions (minus 18 to 38 deg C, with 1-degree scale divisions).
  6. Steam and Condensate: 50 to 400 deg F, with 2-degree scale divisions (10 to 205 deg C, with 1-degree scale divisions).
- B. Accuracy: Plus or minus 1 percent of range span or plus or minus one scale division to maximum of 1.5 percent of range span.
- C. Bimetal Dial Thermometers: Direct-mounted universal-angle bimetal dial thermometer.
1. Case: Stainless steel with 5-inch (125mm) -diameter glass lens.
  2. Adjustable Joint: Finish to match case, 180-degree (3.1rad) adjustment in vertical plane, 360-degree (6.3rad) adjustment in horizontal plane, with locking device.
  3. Element: Bimetal coil.
  4. Scale: Satin-faced nonreflective-aluminum with permanently etched markings.
  5. Stem: Stainless steel for separable socket, of length to suit installation.
- D. Insertion Dial Thermometers: Bimetal dial thermometer with 1-inch (25 mm) diameter dial, stainless steel case, dustproof and leakproof 1/8-inch (3mm) -diameter tapered-end stem with nominal length of 5 inches (125 mm).
- E. Thermometer Wells: Brass or stainless-steel thermometer well, with pressure rating not less than piping system design pressure.
1. Stem Length: To extend to center of pipe.
  2. Extension for Insulated Piping: 2 inches (50 mm) nominal, but not less than thickness of insulation.
  3. Threaded Cap Nut: With chain permanently fastened to well and cap.

## 2.03 PRESSURE GAGES

- A. Gages: ASME B40.1, Grade A phosphor-bronze Bourdon-tube pressure gage, with bottom connection; drawn steel, brass, or aluminum with 4-1/2-inch (115mm) -diameter glass lens; white-coated aluminum scale with permanently etched markings.
1. Connector: Brass, 1/4-inch (8mm) NPS.
  2. Accuracy: Plus or minus 1 percent of range span.
  3. Range: 30 inches Hg of vacuum to 15 psig of pressure.
- B. Accessories:
1. Syphons: 1/4-inch (8mm) straight coil of brass tubing with threads on each end.
  2. Snubbers: 1/4-inch (8mm) brass bushing with corrosion-resistant porous-metal disc of material suitable for system fluid and working pressure.

## 2.04 TEST PLUGS

- A. Description: Nickel-plated brass-body test plug in 1/2-inch (15mm) fitting.
- B. Body: Length as required to extend beyond insulation.

- C. Pressure Rating: 500 psig (3450 kPa) minimum.
- D. Core Inserts: 2 self-sealing valve types, suitable for inserting a 1/8-inch (3mm) outside-diameter probe from a dial thermometer or pressure gage.
- E. Core Material: According to the following for fluid and temperature range:
  - 1. Air, Water, Oil, and Gas: 20 to 200 deg F (minus 7 to 93 deg C), neoprene rubber.
  - 2. Air and Water: Minus 30 deg to 275 deg F (minus 35 to 136 deg C), ethylene-propylene-diene-terpolymer (EPDM) rubber.
- F. Test-Plug Cap: Gasketed and threaded cap, with retention chain.
- G. Test Kit: Provide test kit consisting of 1 pressure gage and gage adapter with probe, 2 bimetal dial thermometers and a carrying case.
- H. Pressure Gage and Thermometer Ranges: Approximately 2 times systems operating conditions.

### PART 3 - EXECUTION

#### 3.01 METER AND GAGE APPLICATIONS

- A. General: Where indicated, install meters and gages of types, sizes, capacities, and with features indicated.

#### 3.02 METER AND GAGE INSTALLATION, GENERAL

- A. Install meters, gages, and accessories according to manufacturers' written instructions for applications where used.

#### 3.03 THERMOMETER INSTALLATION

- A. Install thermometers and adjust vertical and tilted positions.
- B. Install in the following locations and elsewhere as indicated:
  - 1. At inlet and outlet of each hydronic zone.
  - 2. At inlet and outlet of each hydronic boiler and chiller.
  - 3. At inlet and outlet of each hydronic coil in air-handling units and built-up central systems.
  - 4. At inlet and outlet of each hydronic heat exchanger.
- C. Thermometer Wells: Install in vertical position in piping tees where thermometers are indicated.
  - 1. Install wells with stem extending to center of pipe.
  - 2. Fill wells with oil or graphite and secure caps.

#### 3.04 PRESSURE GAGE INSTALLATION

- A. Install pressure gages in piping tee with pressure gage valve located on pipe at most readable position.

- B. Install in the following locations and elsewhere as indicated:
  - 1. At suction and discharge of each pump.
  - 2. At discharge of each pressure-reducing valve.
  - 3. At building water service entrance.
  - 4. At chilled water and energy recovery water inlets and outlets of chillers.
- C. Pressure Gage Needle Valves: Install in piping tee with snubber. Install syphon instead of snubber for steam pressure gages.

### 3.05 TEST PLUG INSTALLATION

- A. Install test plugs in piping tees where indicated, located on pipe at most readable position. Secure cap.

### 3.06 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. The Drawings indicate the general arrangement of piping, fittings, and specialties.
- B. Install meters and gages adjacent to machines and equipment to allow servicing and maintenance.
- C. Make electrical connections to power supply and electrically operated meters and devices.

### 3.07 ADJUSTING AND CLEANING

- A. Calibrate meters according to manufacturer's written instructions, after installation.
- B. Adjusting: Adjust faces of meters and gages to proper angle for best visibility.
- C. Cleaning: Clean windows of meters and gages and factory-finished surfaces. Replace cracked and broken windows and repair scratched and marred surfaces with manufacturer's touchup paint.

END OF SECTION 15120