

## **PART 1 - GENERAL**

### **1.1 REFERENCE STANDARDS**

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME B40.100-2013, Pressure Gauges and Gauge Attachments.
  - .2 ASME B40.200-2008, Thermometers, Direct Reading and Remote Reading.

### **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for thermometers and pressure gauges and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Test and Evaluation Reports:
  - .1 Submit certified test reports for thermometers and pressure gauges from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

### **1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store thermometers and pressure gauges off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect thermometers and pressure gauges from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **PART 2 - PRODUCTS**

## **2.1 GENERAL**

- .1 Design point to be at mid-point of scale or range.

## **2.2 DIRECT READING THERMOMETERS**

- .1 Industrial, variable angle type, mercury-free, liquid filled, 225 mm scale length: to ASME B40.200 units °F/°C.
  - .1 Resistance to shock and vibration.

## **2.3 REMOTE READING THERMOMETERS**

- .1 100 mm diameter mercury-free liquid filled activated dial type: to ASME B40.200, accuracy within one scale division, brass movement, stainless steel capillary, stainless steel spiral armour, stainless steel bulb and polished brass or stainless steel case for wall mounting, units °F/°C.

## **2.4 THERMOMETER WELLS**

- .1 Copper pipe: copper or bronze.
- .2 Steel pipe: brass or stainless steel.

## **2.5 PRESSURE GAUGES**

- .1 112 mm, dial type: to ASME B40.100, Grade 2A, stainless steel or phosphor bronze bourdon tube having 0.5% accuracy full scale unless otherwise specified, units kPa/PSI.
- .2 Provide:
  - .1 Siphon for steam service.
  - .2 Snubber for pulsating operation.
  - .3 Diaphragm assembly for corrosive service.
  - .4 Gasketed pressure relief back with solid front.
  - .5 Bronze ball valve.
  - .6 Oil filled for high vibration applications.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
- .2 Visually inspect substrate in presence of Departmental Representative.

- .3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 GENERAL**

- .1 Install thermometers and gauges so they can be easily read from floor or platform.
  - .1 If this cannot be accomplished, install remote reading units.
- .2 Install between equipment and first fitting or valve.

### **3.3 THERMOMETERS**

- .1 Install in wells on piping. Include heat conductive material inside well.
- .2 Install in locations as indicated and on inlet and outlet of:
  - .1 Heat exchangers.
  - .2 Water heating and cooling coils.
  - .3 Water boilers.
  - .4 Chillers.
  - .5 Cooling towers.
  - .6 DHW tanks.
- .3 Install wells only as indicated for balancing purposes.
- .4 Use extensions where thermometers are installed through insulation.

### **3.4 PRESSURE GAUGES**

- .1 Install in locations as follows:
  - .1 Suction and discharge of pumps.
  - .2 Upstream and downstream of PRV's.
  - .3 Upstream and downstream of control valves.
  - .4 Inlet and outlet of coils.
  - .5 Inlet and outlet of liquid side of heat exchangers.
  - .6 Outlet of boilers.
  - .7 In other locations as indicated.
- .2 Install ball valves for balancing purposes, elsewhere as indicated.
- .3 Use extensions where pressure gauges are installed through insulation.

### **3.5 NAMEPLATES**

- .1 Install engraved lamicaid nameplates in accordance with Section 23 05 53.01 - Mechanical Identification, identifying medium.

### **3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.7 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by thermometer and gauge installation.

**END OF SECTION**