
Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 23 05 00 - Common Work Results for HVAC
- .2 Section 23 21 14 - Hydronic Specialties
- .3 Section 23 52 00 - Heating Boilers
- .4 Section 23 57 00 - Heat Exchanger for HVAC

1.2 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B40.100, Pressure Gauges and Gauge Attachments.
 - .2 ASME B40.200, Thermometers, Direct Reading and Remote Reading.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-14.4, Thermometers, Liquid-in-Glass, Self Indicating, Commercial/Industrial Type.
 - .2 CAN/CGSB-14.5, Thermometers, Bimetallic, Self-Indicating, Commercial/Industrial Type.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 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.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by a professional engineer registered or licensed in Canada and member of the OIQ.
- .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.

1.4 MATERIALS/PRODUCT REPLACEMENT

- .1 Where materials or products are specified by their trademark, consult the Instructions to Tenderers document for the procedures to follow regarding the request for approval for materials or product replacement.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 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 indoors 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 General
 - .1 Place direct reading thermometers so that readings can be taken from the floor or from platform if applicable.
 - .2 If it not possible to place thermometers so that readings can be taken easily, use remote reading thermometers.
 - .3 Lamicoid nameplates used for thermometer identification shall be placed as close to the thermometer as possible.
 - .4 Materials used to satisfy system requirements.
- .2 Industrial type, with aluminum casing, adjustable reading angle, liquid type with 228 mm (9") scale to CGSB 14-4M88 standard. Appropriate standard scale to measured temperatures with 1 °C increments (1 °F) the scale to be numbered every ten degrees, except for ranges beyond 150 °C (300 °F).
 - .1 Acceptable products: Winters, Ashcroft, Terice, Taylor-Weiss.
- .3 All thermometers to be supplied with wells. The depth of the wells shall permit an insertion of at least 50 mm (2") in liquids and 100 mm (4") in gases. Threads to be 20 mm (¾").

- .4 When insulation is used, wells shall be supplied with extension collars clearing the insulation thickness.
- .5 Scales to cover twice the system temperature range.
- .6 Thermometer scales to be in English and metric units.

2.3 THERMOMETER WELLS

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

2.4 Manometers

- .1 General
 - .1 Place direct reading manometers so that readings can be taken from the floor or from the platform if applicable.
 - .2 If it is not possible to place manometers so that readings can be taken easily, install them at 1.5 m (5') from the floor and connect them with 6 mm (¼") piping and bronze stopcock.
 - .3 Lamicoid nameplates used for manometer identification shall be placed as close to the manometer as possible.
 - .4 Materials used to satisfy system requirements.
- .2 With 115 mm (4½") dials, 0.5% accuracy and conforming to ANSI/ASME B40.100 Grade 2A unless otherwise noted, with bronze stop cock.
 - .1 Acceptable products: Marshalltown, Ashcroft, Terrice.
- .3 Each gauge shall be chosen to indicate twice the system operating pressure.
- .4 Provide a pigtail for steam service, a pulsation damper if required and a diaphragm for corrosive service.
- .5 When insulation is used on piping, provide extension to clear the insulation.
- .6 Manometer scales to be in English and metric units.

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.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

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 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 At expansion tanks.
 - .8 Upstream of backflow preventer.
 - .9 In other locations as indicated.
- .2 Install gauge cocks for balancing purposes.
- .3 Use extensions where pressure gauges are installed through insulation.

3.5 NAMEPLATES

- .1 Install engraved lamicoid 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