



SECTION 23 21 16 - HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pressure gages.
 - 2. Pressure gage taps.
 - 3. Thermometers.
 - 4. Thermometer supports.
 - 5. Test plugs.
 - 6. Air vents.
 - 7. Strainers.
 - 8. Flow controls.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
 - 2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
- B. ASTM International:
 - 1. ASTM E1 - Standard Specification for ASTM Thermometers.
 - 2. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.

1.3 SUBMITTALS

- A. Product Data: Submit for manufactured products and assemblies used in this Project.
 - 1. Manufacturer's data and list indicating use, operating range, total range, accuracy, and location for manufactured components.
 - 2. Submit product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.
 - 3. Submit schedule indicating manufacturer, model number, size, location, rated capacity, load served, and features for each piping specialty.
 - 4. Submit electrical characteristics and connection requirements where appropriate.



1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary protective coating on cast iron and steel valves.
- B. Protect systems from entry of foreign materials by temporary covers, caps and closures, completing sections of the work, and isolating parts of completed system until installation.

PART 2 - PRODUCTS

2.1 PRESSURE GAGES

- A. Manufacturers:
 - 1. **Trerice.**
 - 2. **Dwyer .**
 - 3. **Ashcroft.**
- B. Gage: ASME B40.1, UL Listed with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
 - 1. Case: Steel.
 - 2. Bourdon Tube: Brass.
 - 3. Dial Size: 2 inch diameter minimum.
 - 4. Mid-Scale Accuracy: One percent.
 - 5. Scale: PSI.

2.2 PRESSURE GAGE TAPS

- A. Manufacturers:
 - 1. **Trerice.**
 - 2. **Dwyer**
 - 3. **Ashcroft.**
- B. Valve: Brass, 1/4 inch NPT for minimum 300 psi.
- C. Ball Valve: Brass 1/4 inch NPT for 250 psi.
- D. Pulsation Damper: Pressure snubber, brass with 1/4 inch NPT connections.



2.3 STEM TYPE THERMOMETERS

- A. Manufacturers:
 - 1. **Trerice.**
 - 2. **Dwyer**
 - 3. **Ashcroft**

- B. Thermometer: ASTM E1, red appearing mercury, lens front tube, cast aluminum case with enamel finish.
 - 1. Size: 9 inch scale.
 - 2. Window: Clear glass or Lexan.
 - 3. Stem: Brass, 3/4 inch NPT long.
 - 4. Accuracy: ASTM E77 2 percent.
 - 5. Calibration: Degrees F.

- C. Thermometer: ASTM E1, adjustable angle, red appearing mercury, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
 - 1. Size: 9 inch scale.
 - 2. Window: Clear glass or Lexan.
 - 3. Stem: Brass, 3/4 inch NPT long.
 - 4. Accuracy: ASTM E77 2 percent.
 - 5. Calibration: Degrees F.

2.4 THERMOMETER SUPPORTS

- A. Socket: Brass separable sockets for thermometer stems with or without extensions, and with cap and chain.

- B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.5 TEST PLUGS

- A. Manufacturers:
 - 1. **Trerice.**
 - 2. **Peterson Equipment.**
 - 3. **Watts Industries.**

- B. 1/4 inch NPT or 1/2 inch NPT brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with:
 - 1. Neoprene core for temperatures up to 200 degrees F.
 - 2. Nordel core for temperatures up to 350 degrees F.
 - 3. Viton core for temperatures up to 400 degrees F.



- C. Test Kit:
 - 1. Carrying case, internally padded and fitted containing:
 - a. Two 2-1/2 inch diameter pressure gages.

2.6 AIR VENTS

- A. Manufacturers:
 - 1. **Trerice.**
 - 2. **Peterson Equipment.**
 - 3. **Watts Industries.**
- B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.
- C. Float Type:
 - 1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
 - 2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
- D. Washer Type:
 - 1. Brass with hydrosopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.7 STRAINERS

- A. Manufacturers:
 - 1. **Nibco.**
 - 2. **Milwaukee.**
 - 3. **Zurn-Wilkins.**
- B. Size 2 inch and Smaller:
 - 1. Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
- C. Size 2-1/2 inch to 4 inch:
 - 1. Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- D. Size 5 inch and Larger:
 - 1. Flanged iron body for 175 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen.



2.8 FLOW CONTROLS

- A. Manufacturers:
 - 1. **Griswold.**
 - 2. **Bell & Gossett.**
 - 3. **Tour and Andersson**
- B. Construction: Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet combination blow-down and back-flush drain.
- C. Calibration: Control within 5 percent of design flow over entire operating pressure.
- D. Control Mechanism: Stainless steel or nickel plated brass piston or regulator cup, operating against stainless steel helical or wave formed spring.
- E. Accessories: In-line strainer on inlet and ball valve on outlet.

PART 3 - EXECUTION

3.1 INSTALLATION - THERMOMETERS AND GAGES

- A. Install one pressure gage for each pump, locate taps before strainers and on suction and discharge of pump; pipe to gage.
- B. Install gage taps in piping
- C. Install pressure gages with pulsation dampers. Provide needle valve or ball valve to isolate each gage. Extend nipples to allow clearance from insulation.
- D. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Allow clearance from insulation.
- E. Install thermometer sockets adjacent to controls systems thermostat, transmitter, or sensor sockets. Where thermometers are provided on local panels, pipe mounted thermometers are not required.
- F. Coil and conceal excess capillary on remote element instruments.
- G. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- H. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- I. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.



3.2 INSTALLATION - HYDRONIC PIPING SPECIALTIES

- A. Where large air quantities accumulate, provide enlarged air collection standpipes.
- B. Install manual air vents at system high points.
- C. For automatic air vents in ceiling spaces or other concealed locations, install vent tubing to nearest drain.
- D. Provide drain and hose connection with valve on strainer blow down connection.

3.3 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not install hydronic pressure gauges until after systems are pressure tested.

END OF SECTION 23 21 16