

SECTION 23 2216 - STEAM PIPING SPECIALTIES

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. This Section includes the following for LP (Low Pressure) and HP (High Pressure) steam and condensate piping:
 - 1. Butterfly valves.
 - 2. Check valves.
 - 3. Chainwheels.
 - 4. Strainers.
 - 5. Safety valves.
 - 6. Pressure regulating/reducing valves.
 - 7. Sound attenuators.
 - 8. Steam traps.
 - 9. Thermostatic air vents and vacuum breakers.
 - 10. Pressure gages and gage attachments.
 - 11. Condensate receiver sets.
 - 12. Drip pan elbows.
 - 13. Steam and condensate meters.

1.3 DEFINITIONS AND CAMPUS STEAM SYSTEM INFORMATION

- A. HP Steam Systems: High-pressure piping operating at more than 15 psig as required by ASME B31.1.
- B. LP Steam Systems: Low-pressure piping operating at 15 psig or less as required by ASME B31.9.
- C. For the Evanston campus, central steam is distributed at 150 psig (known as the "Campus Line"), and at 230 psig. These are distinct piping systems but they both originate from the same high pressure header in the CUP. Steam is and needs to be metered and reduced in pressure after entrance of each building as required. On the condensate return side, there is high pressure condensate return and pumped condensate return.
- D. For the Chicago campus, central steam is distributed at 170 psig. Steam is and needs to be metered and reduced in pressure after entrance of each building as required.
- E. Both campus's utilize direct buried piping and piping run through tunnels.

1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressures and temperatures:
1. HP Steam Piping: **XXX** psig and **XXXF**.
 2. LP Steam Piping: **XX** psig and 300F.
 3. LP Condensate Piping: **XX** psig at 250 deg F.
 4. HP Condensate Piping: **XX** psig at **XXX** deg F.
 5. Blowdown-Drain Piping: Equal to pressure of the piping system to which it is attached.
 6. Air-Vent and Vacuum-Breaker Piping: Equal to pressure of the piping system to which it is attached.
 7. Safety Valve Inlet and Outlet Piping: Equal to pressure of the piping system to which it is attached.

1.5 SUBMITTALS

- A. Product Data: For each type of the following:
1. All valves and chainwheels.
 2. Steam traps.
 3. Air vents and vacuum breakers.
 4. Meters, gages, and gage attachments.
 5. Strainers.
 6. Condensate receiver sets.
 7. Drip pan elbows.
 8. Sound attenuators.
- B. Shop Drawings: Detail condensate receiver set installations, steam pressure reducing valve and station assemblies, and sound attenuator installations.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For all valves, steam traps, air vents, vacuum breakers, strainers, condensate receiver sets, sound attenuators, and meters to include in emergency, operation, and maintenance manuals.
- E. Coordination Drawings (For Use Amongst the Contractors and For Owner Reference, Not for Engineer Approval): Piping layout, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Other building services.
 2. Lighting.
 3. Structural members.
 4. Supports.
- F. Welding certificates (For Information).
- G. Field quality-control test reports (For Information).
- H. Delegated-

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h. Service: Bidirectional.

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2.3 CHAINWHEELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Babbitt Steam Specialty Co.
 - 2. Roto Hammer Industries.
 - 3. Trumbull Industries.

- B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
 - 1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
 - 2. Attachment: For connection to valve stems.
 - 3.

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1. ASME, Class 600, cast carbon steel or stainless steel with bolted bonnet, properly outfitted for the duty and with suitable end connections. ValvSource/Spence 150V2 or approved equal by Mueller or Sarco.

2.5 SAFETY VALVES

A. LP Bronze Safety Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Kunkle Valve; a Pentair Company; Fig.

2. ASME, cast steel or stainless steel, Series 300/600/900 by Kunkle, or equal form Sarco, properly outfitted for specific project duty.
3. Size and Capacity: As required for equipment according to ASME Boiler and Pressure Vessel Code.

2.6 PRESSURE REGULATING VALVES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Fisher 92B

B. Description: Single seated, normally closed, pilot operated, packless type, with stainless steel diaphragms, hardened seats and discs, and stainless steel stems.

C. Factory set for inlet and outlet pressures indicated.

D. Rated for specific project application as far as maximum working pressures and temperatures.

E. Limit inlet velocity to 10,000 FPM, and exit velocity to 30,000 FPM.

F. Maximum sound Pressure Level: 92 dBA.

G. Pilot: Externally-mounted for valves 6" and larger, and top or externally-mounted for 5" and smaller.

H.

- D. Muffling orifice(s): Consist of a steel plate with primary orifices to which is welded a stainless steel plate with secondary orifices.
- E. Acoustic blankets: Teflon coated fiberglass jacket with fiberglass insulation.

2.8 STEAM TRAPS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Armstrong.
- B. LP Float and Thermostatic Steam Traps:
 - 1. Cast iron body and cover, non-asbestos gasket, screwed ends, stainless steel heads, seats and thermostatic air vent.
 - 2. Basis of Design: Armstrong – Models as commonly used on campus. Confirm with EVENG shop.
- C. LP Inverted Bucket Steam Traps:
 - 1. Cast iron body and cover, threaded connections, stainless steel bucket, renewable hardened stainless steel head and seat.
 - 2. Basis of Design: Armstrong – Models as commonly used on campus. Confirm with EVENG shop.
- D. HP Float and Thermostatic Steam Traps:
 - 1. Cast steel body and cover, non-asbestos gasket, ends as needed, stainless steel heads, seats and thermostatic air vent.
 - 2. Basis of Design: Armstrong – Models as commonly used on campus. Confirm with EVENG shop.
- E. HP Inverted Bucket Steam Traps:
 - 1. Cast steel or stainless steel, connections as required, stainless steel bucket, renewable hardened stainless steel head and seat.
 - 2. Basis of Design: Armstrong models as commonly used on Campus, confirm with HVAC Shop.
- F. LP and HP Thermodynamic Traps (To be used to drip/drain all mains):
 - 1. ASTM A743 GR. CA40F 420F, stainless steel, 600 psig PMO, NPT connections.
 - 2. Spirax Sarco TD-52.

2.9 THERMOSTATIC AIR VENTS AND VACUUM BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong International, Inc.
 - 2. Hoffman Specialty; Division of ITT Industries.
 - 3. Spirax Sarco, Inc.
 - 4. Watson McDaniel.

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2.12 STEAM CONDENSATE RECEIVER SET WITH DUPLEX CENTRIFUGAL PUMPS AND FLOOR-MOUNTED RECEIVER (FOR NORMAL DUTY)

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. ITT Hoffman.

B. Description: Factory-fabricated, packaged, electric-driven pumps; with receiver, pumps, controls, low inlet, and accessories suitable for operation with steam condensate.

1. Electrical Components, Devices, and Accessorie.1(,)-10.568 Tw 0.337 0 Td [(dr.ao56.3(i)3.1(e.1(,)-10

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6. Output signal: Frequency output.
7. Wetted parts: Stainless steel.
8. Body: Carbon steel.
9. Connection: ANSI 300 flanged.
- 10.

- c. Mass Flow Accuracy for Steam and Gas: Within 1.5 percent of reading for Reynolds numbers 20000 and larger.
 - d. Repeatability: Within 0.1 percent.
 - e. Long-Term Stability: Within 0.1 percent per year.
 - f. Ambient Temperature: Minus 40 to plus 185 deg F.
 - g. Process Temperature: Minus 40 to plus 464 deg F.
 - h. Pressure: Equal to flange rating.
4. Output Signals:
- a. Analog Current Signal of Flow Rate:
 - 1) Two-wire, 4- to 20-mA dc current source.
 - 2) Signal capable of operating into 1000-ohm load.
 - b. Analog Current Signals for Pressure and Temperature: Separate 4- to 20-mA signals for gage pressure and temperature.
 - c. Digital Signal:
 - 1) Pulse output for flow totalization. Two wire, scaled pulse, 0.5 Hz, 100 mA at 30-V dc.
 - 2) Protocol: compatible with project DDC/BAS, see Section 25 0000.
5. Operator Interface:
- a. Keypad.
 - b. Digital Display: Two-line digital display of alphanumerical characters. The meter shall display flow rate, flow totalization, pressure, temperature, and support field programming of all parameters.
6. Construction:
- a. Material: Type 316L stainless steel.
 - b. Connection: Class 300 flange.
 - c. Enclosure:
 - 1) Epoxy-painted cast aluminum.
 - 2) Removable screw-on cover.
 - 3) NEMA 250, Type 6.
 - 4) Electrical Connection: Screw terminals.
 - 5) Conduit Connection: Two, 1/2-inch trade size.
7. Upstream Flow Straightener:
- a. Meter manufacturer shall provide flow straightener where required by installation to comply with manufacturer's installation recomqui

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PART 3 - EXECUTION

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- D. Install unions in piping, NPT 1-1/4 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
 - E. Install flanges in piping, NPS 1-1/2 and larger, at final connections of equipment and elsewhere as indicated.
 - F. Install shutoff valve immediately upstream of each dielectric fitting.
 - G. Install strainers on supply side of control valves, pressure-reducing valves, traps, and elsewhere as indicated. Install NPS 3/4 nipple and full port ball valve in blowdown connection of strainers NPS 2 and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2.
- 3.4 STEAM-TRAP INSTALLATION-19(0.6 3.446 0 Td (-)Tj ar)-6.3(b)e88J 0 Tc (0550 Td (.074 Tw 1.9 ())-6)Tj EMCf

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