SECTION 23 22 16

STEAM AND CONDENSATE PIPING SPECIALTIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Flexible connectors.
2. Heat consumption meters.
3. Pressure gages.
4. Pressure gage taps.
5. Strainers.
6. Steam traps.
7. Steam air vents.
8. Flash tanks.
9. Pressure-reducing valves.
10. Steam safety valves.
11. Steam condensate meters.

B. Related Sections:

1. Division 23 - Steam and Condensate Heating Piping: Execution requirements for piping connections to products specified by this section.
2. Division 23 - Steam Condensate Pumps: Execution requirements for piping connections to products specified by this section.

1.02 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 A105 - Standard Specification for Carbon Steel Forgings for Piping Applications.
2. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
4. ASTM A395 - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

C. Underwriters Laboratories Inc.:

1. UL 393 - Indicating Pressure Gauges for Fire-Protection Service.
2. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service.

1.03 PERFORMANCE REQUIREMENTS

A. Steam Traps:

1. Select to handle minimum of two times maximum condensate load of apparatus served.

1.04 SUBMITTALS

A. Division 01 - Submittal Procedures: Submittal procedures.

B. 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.

C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures, application, selection, and hookup configuration. Include pipe and accessory elevations.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.05 CLOSEOUT SUBMITTALS

A. Division 01 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of actual locations of components and instrumentation, flow controls and flow meters.

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

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of Project.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.07 PRE-INSTALLATION MEETINGS

A. Division 01 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Division 01 - Product Requirements: Product storage and handling requirements.

B. Accept piping specialties on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

D. 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.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Division 01 - Product Requirements.

B. Do not install instruments when areas are under construction, except rough in, taps, supports and test plugs.

1.10 FIELD MEASUREMENTS

A. Verify field measurements before fabrication.

1.11 WARRANTY

A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.

1.12 MAINTENANCE MATERIALS

A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance materials.

1.13 EXTRA MATERIALS

A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 PRODUCTS

2.01 FLEXIBLE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure 400 psig.

2.02 HEAT CONSUMPTION METERS

A. Meter: Brass body turbine meter with magnetic drive register, platinum temperature sensors.

2.03 PRESSURE GAGES

A. Manufacturers:

1. Ametek, U.S. Gauge Div.
2. Ashcroft Dresser Industries Instrument Div.
3. Marsh Instruments Co., Unit of General Signal
4. Marshalltown Instruments, Inc.
5. Miljoco Corp.
6. Trerice (H.O.) Corp.
7. Weiss Instruments, Inc.
8. Weksler Instruments Corp.
9. WIKA Instruments Corp.
10. Substitutions: Division 01 - Product Requirements.

B. Gage: ASME B40.1, UL 404 with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.

1. Case: Stainless steel.
2. Bourdon Tube: Type 316 stainless steel.
3. Dial Size: 4-1/2 inch diameter.
4. Mid-Scale Accuracy: One percent.
5. Scale: Psi.
6. Range: 0-150 Psi, 1 Psi graduation.

2.04 PRESSURE GAGE TAPS

A. Manufacturers:

1. Ametek, U.S. Gauge Div.
2. Ashcroft Dresser Industries Instrument Div.
3. Marsh Instruments Co., Unit of General Signal
4. Marshalltown Instruments, Inc.
5. Miljoco Corp.
6. Trerice (H.O.) Corp.
7. Weiss Instruments, Inc.
8. Weksler Instruments Corp.
9. WIKA Instruments Corp.
10. Substitutions: Division 01 - Product Requirements.

B. Ball Valve: Brass or Stainless Steel, 1/4 inch NPT for 250 psi.

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch NPT connections.

D. Siphon: Stainless Steel, 1/4 inch NPT angle or straight pattern.

2.05 STRAINERS

A. Size 2 inch and Smaller: Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

B. Size 2-1/2 inch to 4 inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.

C. Size 5 inch and Larger: Flanged iron body for 175 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

D. Use stainless steel for clean steam system.

2.06 INVERTED BUCKET TRAPS

A. Manufacturers:

1. Armstrong
2. Hoffman
3. Sarco
4. Substitutions: Division 01 - Product Requirements.

B. Trap:

1. Construction: ASTM A126, Cast iron or semi-steel body with bolted cover, stainless steel bucket, stainless steel seats and plungers, and stainless steel lever mechanism with knife edge operating surfaces.
2. Rating: 250 psig WSP.
3. Features: Access to internal parts without disturbing piping, top test plug, bottom drain plugs.
4. Accessories: Integral inlet strainer of stainless steel, integral inlet check valve, integral bimetal air vent.
5. Use all stainless steel for clean steam system.

2.07 FLOAT AND THERMOSTATIC TRAPS

A. Manufacturers:

1. Armstrong
2. Hoffman
3. Sarco
4. Substitutions: Division 01 - Product Requirements.

B. Trap:

1. Construction: ASTM A126, cast iron or semi-steel body and bolted cover, stainless steel or bronze bellows type air vent, stainless steel or copper float, stainless steel lever and valve assembly
2. Rating: 300 psig WSP.
3. Features: Access to internal parts without disturbing piping, bottom drain plug.
4. Accessories: Gage glass with shut-off cocks and support brackets.
5. Use stainless steel for clean steam system.

2.08 THERMODYNAMIC TRAPS

A. Manufacturers:

1. Armstrong
2. Hoffman
3. Sarco
4. Substitutions: Division 01 - Product Requirements.

B. Trap:

1. Construction: Stainless steel body, disc, and cap.
2. Rating: 300 psig WSP.
3. Features: Stainless steel insulating cap, 1/4 inch steel blow down valve, integral strainer.

2.09 STEAM AIR VENTS

A. Manufacturers:

1. Armstrong
2. Hoffman
3. Sarco
4. Substitutions: Division 01 - Product Requirements.

B. 125 psig WSP: Balanced Pressure Type: Cast brass body and cover; access to internal parts without disturbing piping; stainless steel bellows, stainless steel valve and seat.

C. 225 psig WSP: Balanced Pressure Type: ASTM A126 cast iron body and cover; access to internal parts without disturbing piping; phosphor bronze bellows, stainless steel valve and seat.

2.10 FLASH TANKS

A. Manufacturers:

1. Armstrong
2. Sarco
3. Substitutions: Division 01 - Product Requirements.

B. Tank:

1. Closed type, tested and stamped in accordance with ASME Section VIII, welded steel construction, cleaned, prime coated, and supplied with steel support legs.
2. Working Pressure: 125 psig.
3. Construct with nozzles and taps for installation of accessories and piping connections.

2.11 PRESSURE REDUCING VALVES

A. Manufacturers:

1. Spence
2. Armstrong
3. Sarco
4. Substitutions: Division 01 - Product Requirements.

B. Ductile iron, bronze or cast iron body, stainless or chrome steel valve spring, stem, and trim, stainless steel bronze diaphragm, externally acting, pilot operated, threaded 2 inches and smaller, flanged 2 inches and larger. The pilot assembly is to be integrally mounted on top of the cast iron main valve.

C. Provide all stainless steel pressure reducing valve for clean steam system.

2.12 AUTOMATIC PUMP STEAM TRAPS

A. Manufacturers:

1. Spirax Sarco , Model APT10-4.5 with DCV 10 stainless steel disc check valve

B. The pump trap shall be a Spirax Sarco automatic pump trap type APT10-4.5 operated by steam to 65 psig. No electrical energy shall be required. Body construction from SG iron ASTM A395 dual certified with DIN 1693 GGG 40.3 with a swing type inlet check valve and ball type outlet check valve. The internal trap mechanism shall contain a stainless steel float connected to an internal trap. The pump trap and check valve mechanisms shall be incorporated into the same body envelope with no external seals or glands and shall be capable of operating with a minimum 7.8 inches installation head from the base of the unit

2.13 SAFETY RELIEF VALVES

A. Manufacturers:

1. Knuckle, Model 6000 low capacity, 252 high capacity.
2. Sarco
3. Substitutions: Division 01 - Product Requirements.

B. Safety Relief Valves: 125 psig working pressure and 250 degree F maximum operating temperature; designed, manufactured, tested, and labeled in accordance with the requirements of Section IV of the ASME Boiler and Pressure Vessel Code. Valve body shall be cast iron, with all wetted internal working parts made of brass and rubber. Select valve to suit actual system pressure and BTU capacity.

C. Steam Pressure Reducing Valves: Spence, Armstrong, Charles Bailey, or Sarco. Valves shall be of the self-operated pilot controlled diaphragm type. The pilot assembly is to be integrally mounted on top of the cast iron main valve. Main valve shall be single seated with stainless steel trim.

D. Steam Traps: Armstrong, Hoffman, Sarco, Strong, or Weber, float or thermostatic type for low pressure steam heating equipment and thermostatic type low pressure steam drips, each complete with strainer. Provide bucket type steam traps, with strainers, for high pressure steam.

E. Steam Safety Valve: Knuckle Model 6000 or 253, Sarco or approved equal. Select steam safety valves for full relief of capacity of equipment served, in accordance with ASME Boiler and Pressure Vessel Code. Furnish complete with cast iron drip-pan elbow having threaded inlet and outlet with threads (FPT) conforming to ANSI B1.20.1; sized for full size of safety valve outlet connection.

F. Safety Valves: Cast bronze body or Cast-Iron, Class 250, with stainless steel disc and nozzle. Factory-set valves to relieve at 10 psi above operating pressure.

2.14 STEAM CONDENSATE METERS

A. Cast iron body, stainless steel rotor and gears, tungsten carbide bearings, bronze trim, vortex-type meter with vane type rotor.

B. Standard meter registers in gallons, calibrated for water at 200 degrees F, with temperature correction chart, maximum total 1,000,000 gallons.

PART 3 EXECUTION

3.01 INSTALLATION - GAGES

A. Install pressure gages with pulsation dampers. Provide ball valve to isolate each gage. Install siphon on gages in steam systems. Extend nipples and siphons to allow clearance from insulation.

B. Provide instruments with scale ranges selected according to service with largest appropriate scale.

C. Install gages in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

D. Adjust gages to final angle, clean windows and lenses, and calibrate to zero.

3.02 INSTALLATION - STEAM SYSTEM SPECIALTIES

A. Steam Traps:

1. Provide minimum 3/4 inch size on steam mains and branches.
2. Install with union or flanged connections at both ends.
3. Provide gate valve and strainer at inlet, and gate valve and check valve at discharge.
4. Provide minimum 10 inch long, line size dirt pocket between apparatus and trap.
5. Distance between steam traps shall be every 100ft, otherwise recommended by manufacture.

B. Install pressure-reducing stations with pressure reducing valve, bypass with valve, strainer and pressure gage on upstream side, relief valve and pressure gage on downstream side of pressure reducing valve.

C. Rate relief valves for pressure upstream of pressure reducing station, for full operating capacity. Set relief at maximum 20 percent above reduced pressure.

D. Terminate relief valves to outdoors 2 feet minimum above roof. Provide drip pan elbow with drain connection to nearest floor drain.

E. When connecting several relief valve vents to common header, size header cross Divisional equal to sum of individual vent outlet areas.

3.03 PROTECTION OF INSTALLED CONSTRUCTION

A. Division 01 - Execution and Closeout Requirements: Requirements for protecting installed construction.

B. Remove thermostatic elements from steam traps during temporary and trial usage, and until system has been operated and dirt pockets cleaned of sediment and scale.

C. Do not install steam pressure gauges until after systems are pressure tested.

END OF SECTION