

University Contact: Energy & Engineering Group

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## **SECTION 232214\_STEAM AND CONDENSATE SPECIALTIES**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Steam traps.
- B. Steam air vents.
- C. Flash Tanks.
- D. Pressure reducing valves.
- E. Steam vacuum breaker.
- E. Steam safety valves.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 23 07 19 - HVAC Piping Insulation.
- B. Section 23 22 13 - Steam and Condensate Heating Piping.

#### **1.03 REFERENCE STANDARDS**

- A. ASME (BPV VIII, 1) - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers; 2010.
- B. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2011 (ANSI/ASME B31.9).
- C. ASTM A126 - Standard Specification for Grey Iron Castings for Valves, Flanges, and Pipe Fittings; 2004 (Reapproved 2009).
- D. Use in conjunction with the following University of Delaware Standards:
  - 1. Common Work for HVAC Systems 23 05 00
  - 2. Common Requirements for HVAC Systems 23 05 01
  - 3. Steam and Condensate Valves 23 05 23
  - 4. HVAC Insulation 23 07 00
  - 5. Steam and Condensate Piping Systems Above Grade 23 22 13

6. Steam and Condensate Piping Systems Below Grade 23 22 13.1

1.04 SUBMITTALS

- A. Product Data:
  - 1. Provide for manufactured products and assemblies required for this project.
  - 2. Include 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 specialty.
  - 4. Include electrical characteristics and connection requirements.
- B. Manufacturer's Installation Instructions: Indicate application, selection, and hookup configuration. Include pipe and accessory elevations.
- C. Operation and Maintenance Data: Include installation instructions, servicing requirements, and recommended spare parts lists.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with State of Delaware standard for installation of boilers and pressure vessels. Maintain one copy of each document on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum three years of documented experience.
- C. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

**PART 2 - PRODUCTS**

2.01 STEAM TRAPS

- A. Manufacturers
  - 1. Spirax-Sarco
- B. Float and Thermostatic Traps: 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. Rating: 15 psi WSP. Sarco model FT-15 at low pressure drips 15 psi and less. Sarco FT/FTB Series for heat exchangers. No substitutes.

- C. Thermodynamic Traps: Thermodynamic type having stainless steel bodies with 3-hole flow pattern and screwed connections. They shall incorporate a stainless steel (anti-air-binding) disc, strainer screen and provide a tight shut-off. Integral blowdown valves shall be provided for on-line strainer cleaning. Sarco Model UTD-52L at medium pressure drips 16 psi and higher. No substitutes.
- D. Insulating covers shall be provided for any traps to be installed outdoors or in exposed positions.

## 2.02 STEAM AIR VENTS

- A. Manufacturers
  - 1. Spirax Sarco
- B. 125 psi WSP: Balanced pressure type; cast brass body and cover; access to internal parts without disturbing piping; stainless steel bellows, stainless steel valve and seat.

## 2.03 FLASH TANKS

- A. Manufacturers
  - 1. Spirax Sarco
  - 2. Armstrong
  - 3. Shippensburg
- B. Provide flash tanks as indicated on the drawings. Each tank shall be ASME rated. All seams shall be continuously welded.
- C. The minimum ASME rating shall be 125 PSIG unless scheduled greater.
- D. Tanks shall have A shop and a field coat of iron oxide primer. Provide tappings and supports as required and shown on the drawings. Tank shall have minimum 1/4" thick walls and shall be fully insulated.
- E. Provide trap arrangement, relief valve and vent (pipe to atmosphere) and connections to low pressure steam, as shown on the drawings.

## 2.04 PRESSURE REDUCING VALVES

- A. Manufacturer
  - 1. Leslie
- B. Air loaded pressure reducing valve. Bronze or cast iron body, stainless or chrome steel valve spring, stem, and trim, phosphor bronze diaphragm, pilot operated, threaded up to 2 inches, flanged over 2 inches. Leslie Model GPK with air loader - no substitutes

## 2.05 SAFETY RELIEF VALVES

- A. Manufacturers
  - 1. Spirax Sarco
  - 2. Consolidated
- B. Bronze body, stainless steel valve spring, stem, and trim, direct pressure actuated, capacities ASME certified and labelled.
- C. Provide drip pan elbow.

#### 2.07 VACUUM BREAKER

- A. Manufacturers
  - 1. Spirax Sarco
  - 2. Brass body and cap, stainless steel valve, valve seat and gasket, ½" NPT connection
  - 3. Maximum allowable temperature 500°F @ 100 psi. Spirax Sarco VB-14.

#### 2.06 STEAM SEPERATOR

- A. Manufacturers
  - 1. Spirax Sarco
  - 2. Penn Separator Corp.
  - 3. Armstrong
- B. Pressure rating ANSI class to match the service.
- C. Unit shall be a minimum of 99.0% efficient removing particulate and liquid 10 microns or larger in size.

#### 2.07 PRESSURE GAUGES

- A. Manufacturers
  - 1. Terrice
- B. Bourdon tube type, bronze movement, glycerin filled, ½" diameter lower mount, white dial with black figures, 4"-5" diameter type 304 stainless steel case, and polycarbonate window. Scale twice normal working pressure and accurate to within 1% of dial range. Range shall be such that the normal operating pressures in the center of the gauges and as indicated on the drawings. Gauges shall be provided with pressure snubbers. Terrice model 700SS4002LA with Terrice model 872-8 - no substitutes

#### 2.08 THERMOMETERS

- A. Manufacturers
  - 1. WIKA
- B. Thermometers shall be bi-metal design, shatterproof glass front, hermetic seal, external adjustment, 1% full span accuracy, all welded stainless steel construction, shatterproof glass. Dial shall be 3" diameter. Minimum stem length shall be 3". Thermowell. Dampened movement. Range as indicated on drawings. WIKA Model TI.32 or approved equal by Terrice.

2.09 STEAM PRESSURE POWERED CONDENSATE PUMP PACKAGE

- A. Manufacturers
  - 1. Spirax-Sarco
- B. Unit should be a pressure powered pump unit operated by steam to 125 psig, which does not require any electrical energy. The pump shall be supplied complete with vented receiver as a pre-piped packaged unit and shall include the Pressure Powered Pump with stainless steel check valves and include motive inlet and exhaust piping, trapped for efficient pump operation. The pump shall have a float operated snap-acting mechanism and hardened stainless steel mechanism bearing components with no external seals or packing. Provide overflow, inline strainer, pump cycle counter, sight glass, pressure gauges, pump drain and isolation. Pump body shall be ductile iron A395. Sarco PPEC / PTC - No Substitutes
- C. In buildings requiring 5,000 lbs./hr steam, provide duplex pumps with isolation valves to permit servicing the pump while the other pump remains in service.

2.10 STEAM PRESSURE POWERED PUMP TRAP PACKAGE

- A. Manufacturers
  - 1. Spirax Sarco
- B. The system shall be a complete pre-piped factory package requiring only service connections for a fully functional system. The receiver shall be constructed for 200 PSIG WP. The Pump/Trap shall be constructed of Ductile Iron with an allowable working pressure of no less than 200PSIG. The Pump/Trap shall be a unified system with stainless steel mechanism and no external glands or seals. Individual pump and trap systems will not be acceptable. The package shall be sized to meet (or exceed) the actual required condensate system load and shall include a Sarco APT pump trap, stainless steel receiver, end of line trap assembly and air vent. The package shall include a structural steel platform skid and painted with 1 coat enamel. Sarco Model SPT4/DPT4/PPEC-FT or PTC-FT-Pressure powered pump/trap system.

2.11 DIELECTRIC CONNECTIONS

- A. Dielectric connections shall be used when copper materials are connected to steel piping or other ferrous devices in the system. Di-electric unions shall not be used for di-electric isolation. Use di-electric nipples (Waterway nipple as manufactured by Victaulic) with brass unions on connections 2" and smaller and di-electric flange sets for connections larger than 2"

**PART 3 - EXECUTION**

3.01 INSTALLATION

- A. Install steam and steam condensate piping and specialties in accordance with ASME B31.1.
- C. Steam Trapping
  - 1. Piping 6" and smaller - Provide line size drip legs. Piping larger than 6" - Dirt legs shall be no less than one half the diameter of the main or branch. Dirt legs shall be minimum 18"

- long.
2. See dirt leg and heat exchanger piping detail for sizes and components on construction drawings.
  3. Purge valves on medium pressure steam shall be 2".
- D. 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.
- E. Provide drain valves for complete drainage of all systems. Locations of drain valves include low points of piping systems, equipment locations specified or detailed including reheat coils, other locations required for drainage of systems.
- F. Rate relief valves for pressure upstream of pressure reducing station, for full operating capacity. Set relief at maximum 20 percent above reduced pressure or no less than 10 psi.
- G. Terminate relief valve vents to outdoors. Provide drip pan elbow with drain connection to nearest floor drain.
- H. Terminate vents for condensate receivers with vent heads.
- I. Provide pressure gauges at the steam and condensate entries to all buildings. Mount pressure gauges in a ½" thread-o-let with a gate valve for isolation. Locate fittings for temperature and pressure gauges per the contract drawings, and oriented and angled so that they are clearly readable from the floor level without a ladder.
- K. Temperature wells shall be located in elbows to ensure they extend into the flow stream of the pipe, and must have Thermal Conducting Compound placed in the well.

**END OF SECTION**