

232223 STEAM CONDENSATE PUMPS

Part 1 – GENERAL

1.1 Description

A. This section details the guidelines and expectations for the design and installation of steam condensate pumps on Johns Hopkins University Homewood Campus. Project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification and approval from the JHFRE Engineering and Energy Department, it is expected that these guidelines will govern the design and specifications.

1.2 Submittals

N/A

1.3 Quality Assurance

A. Steam condensate receivers shall serve steam condensate low-pressure mains. The receiver shall not be used as a flash tank or have high or medium-pressure condensate directly piped, regardless of capacity. High and medium-pressure steam condensate return shall be piped to separate flash tanks. Condensate return units (CRUs) shall be duplex electric or steam powered.

Part 2 – PRODUCTS

2.1 Use Spirax-Sarco, non-electric, steam pressure powered condensate pumps.

2.2 Condensate Return Units (CRU)

A. Pump shall have Viton seals and stainless-steel shaft.

2.3 All water transport pumps shall be of centrifugal type and non-overloading over the entire pump curve. Pump motor shall have the required capacity to prevent overloading with pump operating at any point on its characteristic curve. Select pump in the middle diameter range of the largest to the smallest of the impeller ranges for the selected pump. Bearings shall be replaceable without complete disassembly of the pump.

2.4 Pump motors shall conform to NEMA MG 1, and have sufficient wattage horsepower for the service required. Pumps shall be selected at or within 5% of peak efficiency. Pump speed shall not exceed 3600rpm.

2.5 All penthouse pumps shall have drip pans, drain pans or troughs and shall have drain pipes installed to the nearest floor drain without being a tripping hazard. All pump performance curves shall be certified and comply with the Hydraulics Institute. Specify that the manufacturer's guidelines shall be adhered to for installation and operations.

2.6 Condensate Return Units (CRU)

A. Each pump shall have isolation valves on both the inlet and discharge lines to allow each pump to be taken out of service without removing the CRU from service.

B. Each condensate return unit shall be piped with a full-size bypass line to drain. The bypass shall serve as emergency manual drainage for condensate if the return unit is offline. The bypass shall be indirectly piped to the sanitary system and have a cooling trap to temper condensate down to a suitable temperature prior to discharge.

C. The condensate receiver shall be vented outdoor and independent of other steam relief vents. The CRU shall have fully packaged controls, starter, alternator, disconnect and high-level alarm. The high-level alarm shall be tied to the BAS.

D. Pump motor starter shall be clearly identified, and where practical, shall be mounted on a common panel.

E. If a duplex condensate pump is installed in a pit, the starter, disconnect switch and alternator shall be located above the pit where it is easily accessible. Locating any serviceable equipment in a confined space shall be avoided.

2.7 All steam and condensate pumps shall have:

A. Individual pressure gauge connections on each side of the pump using pump's housing gauge taps, and pet cocks with snubbers. Pumps on open systems shall have compound gauges rated for suction and discharge pressure of the system.

B. A replaceable bronze wear rings for pumps.

C. Hangers or ground supports shall independently support the suction and discharge pipes.

D. Pumps shall be mounted on a level plane.

E. Pumps and associated piping within three horizontal pipe hangers of pumps shall have spring vibration isolation.

2.8 Base mounted pumps shall have pump bearings that can be replaced without removing or disassembling the pump shaft seals. All base mounted pumps shall be coupled to their motor or prime mover with a maintenance-free rubber insert type coupling. At minimum, base mounted pump installations shall include the following:

A. Inertia pad to meet pump manufacturer's installation, operation, and maintenance guidelines for pump foundation requirements if it exceeds the 6" high requirement.

B. Installed to allow manufacturer's required clearances and access for inspection, maintenance and service.

C. Where packaged duplex or triplex (parallel) pumps are used, to the maximum extent practical, provide triple duty valves for each pump.

Part 3 – EXECUTION

3.1 In-line pumps shall only be used when a base mounted pump is not practical due to flow characteristics (low flows and/or low head) or the lack of floor space (e.g., substitution of vertical height or wall space for floor space). At a minimum, in-line pump installations shall include the following:

- A. Where insulation boxes are employed, extend pressure gauges beyond box.
- B. In-line pump shall be installed so that there is room for inspection, maintenance and service.

3.2 Condensate pumps shall be corrosion-resistant construction with automatic controls. Include a factory or field installed check valve. For condensate and sump pit pumps that have a field or factory installed check valve, install an isolation valve on the drain system (outlet) side of the check valve to allow servicing of the check valve without back draining pumped liquid from drain piping. Condensate pumps serving individual HVAC units shall be fed from the same electrical circuit as the unit.