

Basis of Design

This section applies to the design and installation of steam and condensate systems.

Design Criteria

- Heat all buildings adjacent to the utility tunnel by steam from the power plant. Steam is available at 185 psig and/or 10 psig. Check with Campus Engineering on the availability of steam service. Use 10 psig steam when ever possible because it benefits the operation of the power plant turbine generator. The 185 psig steam is reserved for use in buildings distant from the power plant (i.e., Campus Parkway and South Campus) and laboratory buildings that need the higher pressure steam for laboratory or process use. Provide local building two-stage pressure reducing stations to reduce the 185 psig steam down to 15 psig for use on all building heating systems. Return the steam condensate to the Power Plant whenever possible. Radiant heating is not acceptable except for special applications.
- Convert Power Plant steam to hot water at all buildings to meet all heating requirements except one-way air (100% outside air) system preheat coils. Use steam in one-way air system preheat coils to prevent freeze damage to the system. Provide two-position control valves on preheat coils in one-way air systems. Use low pressure steam, no greater than 15 psig; size preheat coil and valve based on 7 psig steam to the valve.
- See Metering section for steam/condensate meter and monitoring requirements.

Design Evaluation

The following information is required to evaluate the design:

- Schematic Design Phase: Identify all systems, and include single line system flow diagrams, shaft locations, design calculations, and energy balances. Special occupancy zone requirements must be called out and systems identified.
- Design Development Phase: Provide updated single line system flow diagrams, equipment schedules, design calculations, and an outline of specifications.
- Construction Document Phase: Provide equipment access indications, final single line system flow diagrams, tunnel pipe supports design and calculations, equipment schedules, design calculations, and specifications.

Construction Submittals

- Provide industry standard submittal requirements.

Related Sections

- Facilities Services Design Guide – Mechanical - General Requirements
- Facilities Services Design Guide – Mechanical - Heating, Ventilating and Air Conditioning
 - Hydronic Heating
 - Air Handlers and Ventilation Fans
 - Coils

- HVAC and HVAC Piping Pressure Testing
- Facilities Services Design Guide – Mechanical - Piping, Valves & Accessories
- Facilities Services Design Guide – Mechanical - Hangers and Supports
- Facilities Services Design Guide – Mechanical - Metering and Gauges
- Facilities Services Design Guide – Mechanical - Nonstructural Component Seismic Design
- Facilities Services Design Guide – Mechanical - Identification
- Facilities Services Design Guide – Mechanical - Insulation
- Facilities Services Design Guide – Mechanical - Water Treatment and Flushing
- Facilities Services Design Guide – Mechanical - Noise and Vibration Control
- Facilities Services Design Guide – Mechanical - Environmental Control Systems
- Facilities Services Design Guide – Mechanical - Commissioning

Products, Material and Equipment

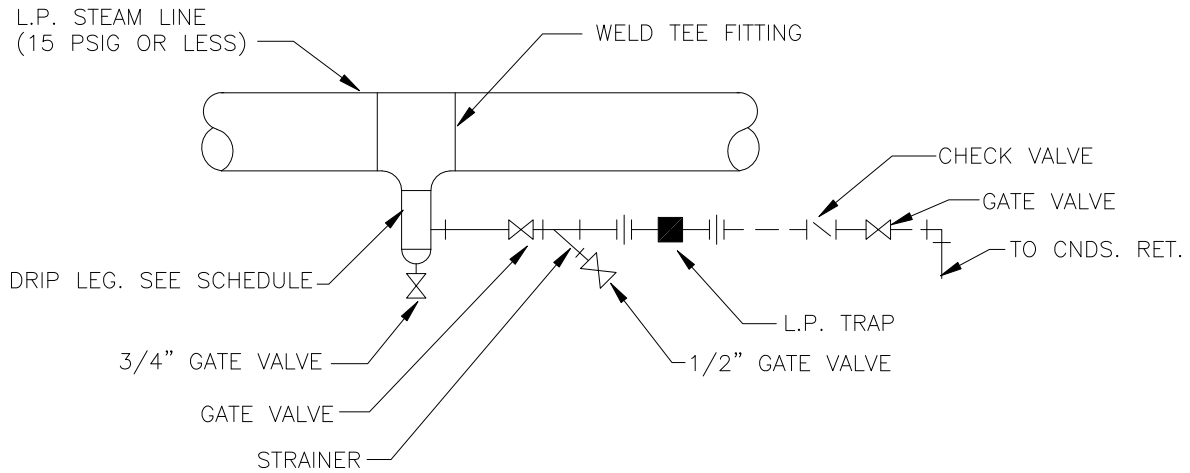
- For steam and condensate piping, see Piping, Valves & Accessories section.
- Provide inverted bucket-type traps at the end of high pressure steam mains. Provide float and thermostatic type traps for low pressure steam mains.
- Provide pneumatic rather than self-contained steam control valves on hot water converters.
- Hand valves for radiators or convectors should be packed type suitable for servicing.
- Converters must be ASME approved, stamped, and State Boiler Inspector's certificate forwarded to University. Use low pressure steam only (15 psig maximum) with capacity based on 7 psig steam to the control valve.
- See Steam Trap Assembly detail at the end of this section.

Installation, Fabrication, and Construction

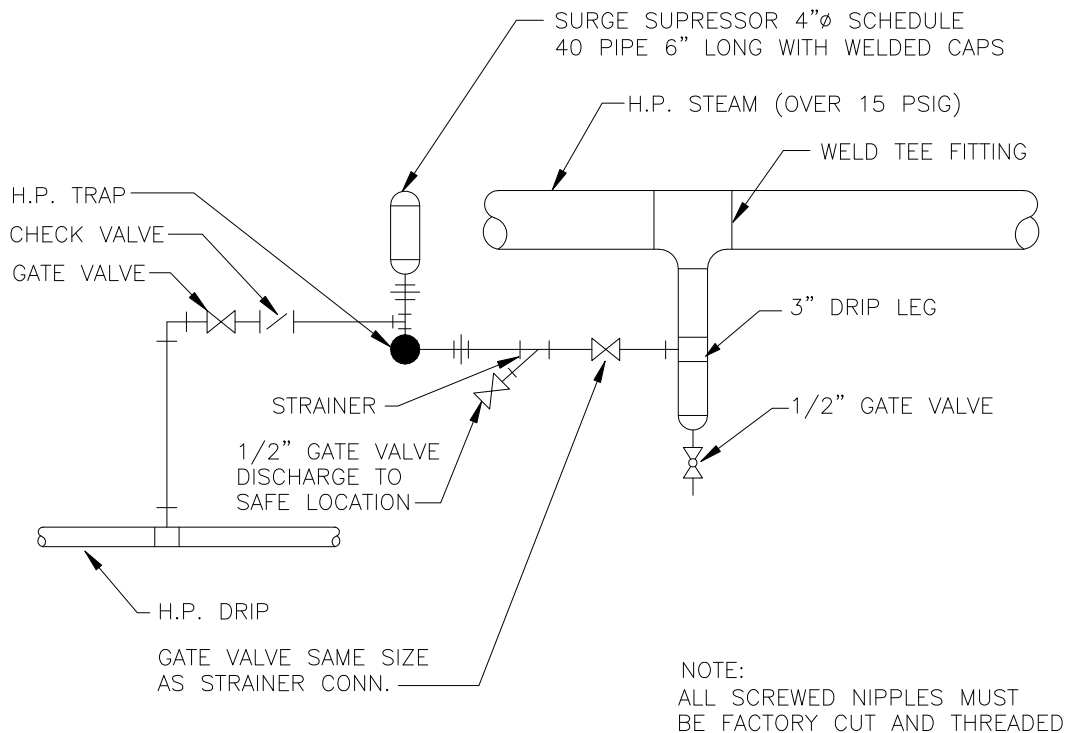
- Steam headers shall have valved branches to each specific load, hot water, storage heater, converter, heating coil, etc.
- Pressure reducing stations shall include at least two valves sized for $\frac{1}{3}$ - $\frac{2}{3}$ of total load. Show loads on drawings.
- Flash high pressure steam (185 psig) condensate in a flash tank to the low pressure steam system.
- Drip and trap all low and medium pressure steam (1 - 110 psig) supply main branches over 12 feet long.
- Provide strainers ahead of traps on coils, converters, or other heat exchangers. Provide adequate static head (minimum 12") above traps to insure proper operation.
- Do not attempt to lift condensate by steam pressure.
- Do not install steam or condensate piping below slabs on grade.

- Recommend AHU coil arrangement (heat recovery, steam preheat, heating water, and cooling coil). Discuss with Campus Engineering if different.

END OF DESIGN GUIDE SECTION



LOW PRESSURE STEAM



MEDIUM OR HIGH PRESSURE STEAM

Steam Trap Assembly

SD-M-16