

## ***STEAM DISTRIBUTION SYSTEM***

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***Campus Steam Distribution System:*** Both UNL city and east campuses are served by central utility plants operated by the Utility and Energy Management (UEM) department. These plants produce steam which is distributed to the campus via an underground distribution system.

***System Temperatures/Pressures:*** Steam temperature / pressure available at each plant are as follows:

City Campus:

35 PSIG, 325 Deg F

East Campus:

60 PSIG, 310 Deg F

Note that these values are valid at the plants or in close proximity. Contact UNL FMP Engineering for specific conditions that may be encountered in remote locations.

***Condensate Return System:*** A dedicated pumped condensate return system parallels the steam distribution system. The pressure in this system fluctuates a great deal. However, for the sake of consistency and interchangeability, a condensate system pressure of 20 PSIG shall be assumed. This represents the head that must be overcome after a branch condensate line enters the condensate main. Any pipe head losses from the receiver to the main should be added to this head.

All steam-utilizing systems/equipment on campus shall be designed and installed so as to return 100% of the condensate back to the power plant through the central condensate return system. Steam condensate is metered at each building.

***Distribution Piping:***

Within Tunnels

Steam – Schedule 40 black steel

Condensate – Schedule 80 black steel

Insulation – High density fiberglass or mineral wool (depending on location/application)

Direct Buried

Factory pre-insulated system (coordinate with FPC Engineering)

***Building Steam Service Entrance:*** A “stop valve” shall be installed in each steam/condensate line just inside each building at its service entrance.

***Steam or Condensate Meters:*** These are required at all steam services entrances buildings. See *Utility Metering* within these Design Guidelines for details.

***Tunnel System:*** Much of the older steam and condensate distribution piping on campus is installed within full size “walkable” utility tunnels. We prefer that walkable tunnels be provided in conjunction with large diameter steam lines (i.e. 12” or larger) and/or multiple steam lines. Anticipated future development of the system shall be considered when making this assessment. Buried steam / condensate conduits can be considered for a dedicated run-out to a single building.

All decisions regarding using tunnels versus direct buried steam/condensate lines shall be coordinated with UEM and FPC Engineering.

Within practical limits, each utility tunnel shall be sized and configured to accommodate the installation of larger or additional utility piping in the future. All tunnels shall be constructed to meet AASHTO HS20-44 truck load rating. Minimum cross sectional dimensions shall be 5’ x 7’

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(W x H). All electrical components within a tunnel system, including lighting, shall be designed for high temperature and humidity conditions. A man-entrance shall be provided at each point where a tunnel terminates at a building foundation wall.

**Drip Traps:** Drip trap assemblies shall be provided for condensate removal from distribution piping at intervals not to exceed 300 ft. as well at all locations where required by proper design practice. See *Drawing 33 63 00 - 01 Steam Distribution System Drip Trap Detail*.

**Steam Vaults:** See *General Utilities Guidelines* for specific information related to vault construction. Provide steam vault every 300 ft on direct buried installations for drip traps and associated valving.

**Tunnel / Vault Access:** Each tunnel/vault entrance shall incorporate a heavy duty lockable door such that access is limited to appropriate employees of FMP. Outside entrance doors shall be weatherproof and inside doors shall be insulated. The lock serving each door shall be keyed to the standard utility tunnel key. Permanent ladders shall be provided at vertical entrances.

**Distribution Valving:** An isolation valve shall be installed in each branch steam distribution or central condensate return line near the point where it connects to a main. Where a main connects to another main, or main branch (i.e. a branch that serves multiple facilities) connects to a main.

On isolation valves greater than 8", a separate "warm-up" line and isolation valve arrangement is required. See *Drawing XX XX XX-XX Steam Distribution System Warm-Up Line Detail*.

### **Expansion Compensation:**

#### Within Tunnels

Slip-type expansion joints (Adisco RJ or approved equivalent).

#### Direct Buried

Expansion loops or slip expansion joints where loops are not feasible. All expansion joints must be located within a vault.