Element D Services

Heating, Ventilating, and Air Conditioning

D3020 TECO Heat Generating Systems

PART 1 - GENERAL

1.1 OVERVIEW

- A. For projects requiring new or modified heat generating systems via the Texas Medical Center Central Heating and Cooling Services Corporation (TECO), this section includes criteria for the design of building heat generating systems including all isolation valves and steam piping and fittings, steam specialties, control valves, steam pressure pumps and shell and tube heat exchangers.
- B. Prior to starting design and upon request of the owner, a life cycle cost analysis (LCCA) shall be provided comparing the use of TECO steam to generate hot water to generating hot water at the building.
- C. Refer to Design Guideline Element 3010, Energy Supply, for TECO requirements. Refer to Design Guideline Element D3044, for waterside distribution requirements.

PART 2 - DESIGN CRITERIA

2.1 TECO STEAM SERVICE

- A. TECO 225-275 psig steam service shall enter the building's main mechanical room, below the slab. The A/E shall indicate isolation valves at the building entrance for the steam and condensate piping.
- B. TECO 225-275 psig steam service shall be reduced to 15 to 20 psig at the individual heat exchangers, prior to the control valve. Provide minimum two-stage pressure reducing valve station.
- C. TECO steam will be used as a heating medium for the following applications:
 - 1. Heating Hot Water
 - 2. Food Service (non-contract, as applicable)
- D. Steam condensate will be collected and pumped back to the TECO plant.
- E. Design shall incorporate flash steam recovery where multiple steam pressures are used.

2.2 AUXILIARY EQUIPMENT

- A. Pressure reducing valves associated with the station reducing to 70 psig will be sized to provide the required capacity with inlet pressure varying between 125 psig and 300 psig. Pressure reducing valves associated with the station reducing to 15 psig will be sized to provide the required capacity with inlet pressure of 70 psig.
- B. Each steam pressure reducing station will have a minimum of two air loaded steam pressurereducing valves. One steam pressure-reducing valve will be sized to provide 1/3 of the required steam capacity and the second steam pressure-reducing valve will be sized to

Element DServicesHeating, Ventilating, and Air
ConditioningD3020 TECO Heat Generating
Systems

provide 2/3 of the required steam system capacity.

- C. The number of condensate pumping systems provided will be determined based on condensate loads. Condensate receiver tanks shall be sized to accommodate the full condensate load when the steam system is isolated shut.
- D. Heating hot water shall be produced by steam to hot water heat exchangers. The A/E shall allow for a minimum of two steam to hot water shell and tube heat exchangers to handle the heating hot water load. Each exchanger shall be capable of heating the hot water from 120 degrees F to 150 degrees F, at the required flow rate (gpm) to heat the building.
 - 1. Select equipment such that one heat exchanger provides N+1 redundant capacity based on peak design load.
- E. Each steam heat exchanger shall have two steam control valves. One valve will be sized to provide 1/3 of the steam capacity and the second to be sized to provide 2/3 of the steam capacity.
- F. Steam pipe shall be sized such that the steam velocity for low pressure steam shall not exceed 80 feet per second at peak load conditions and for medium pressure and high pressure steam the steam velocity shall not exceed 100 feet per second.
- G. Steam relief vents shall be extended to the highest building roof where possible. In all cases, terminate vents in locations where discharge will not create a hazard.
- H. Design steam distribution system for minimum ³/₄ inch pipe size. Design steam and condensate piping with loops, bends, and offsets to allow for thermal expansion and keep stresses within allowable limits of the piping material.
- I. Avoid using expansion joints or ball joints if possible.
- J. All steam-to-hot water converters shall be installed with a minimum of two (2) steam traps.
- K. Steam traps shall be readily available for ease of maintenance.
- L. All medium or high pressure condensate (31-300psi) shall be gravity drained to a flash tank and then to a condensate receiver before being lifted by a condensate pump.
- M. All low pressure condensate (5-30psi) shall be gravity drained to a condensate receiver before being lifted by a condensate pump.
- N. Steam pressure powered condensate pumps must be powered by a minimum of 45 psi medium pressure steam. Do not specify air powered pressure pumps to lift condensate.

PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS

3.1 GENERAL

A. The A/E shall include a schematic of the steam and hot water heat generating systems in the Contract Documents.

Element DServicesHeating, Ventilating, and Air
ConditioningD3020 TECO Heat Generating
Systems

B. Provide a separate room to house the steam TECO service entrance and pressure reducing station.

PART 4 - PRODUCTS

4.1 GENERAL

A. Refer to Owner's Master Construction Specifications. These are available on the Owner's Design Guidelines website: <u>http://www2.mdanderson.org/depts/cpm/standards/specs.html</u>

PART 5 - DOCUMENT REVISION HISTORY

Issue	Date	Revision Description	Reviser
	20190301	Original Issuance	
Rev. 1			

END OF ELEMENT D3020