

COOLING TOWERS

DESIGN GUIDELINES

1. General: This section is for packaged water cooling towers.
2. Location
 - a. Cooling Towers shall be located on building roofs and shall be architecturally screened, including safety rails and headers, in the design of the building.
 - b. The location of the cooling towers shall not be located above spaces sensitive to noise or vibration.
 - c. Cooling towers shall be directly attached to galvanized steel supports as designed and coordinated with the Structural Engineer. Product specific framing shall be coordinated with building and structure as designed by structural engineer of record.
 - d. Vibration isolation shall only be used where the designer demonstrates the need.
3. Layout Requirements
 - a. Layout shall be arranged to facilitate cooling tower maintenance and good airflow.
 - b. Where cooling tower connection sizes are smaller/larger than the line sizes associated with the system piping, a reducer/increaser shall be installed immediately at the cooling tower flanges to adapt to the indicated line size.
 - c. All specialties and service valves associated with the cooling tower shall be line size, and not cooling tower connection size.
 - d. Provide freezeproof hose bibs near the cooling towers to allow cleaning.
4. Design Cooling Tower selections for/with:
 - a. High Efficiency.
 - b. Low noise, maximum 65 dBA at the ground level and 50 dBA at the property line.
 - c. 81.0°F Ambient wet bulb.
 - d. 85.0°F leaving condenser water.
 - e. Service platforms, plenum walkways, ladders and guardrails.
 - f. Vibration switch
 - Manual re-set only.
 - BAS alarm notification.
 - g. Without makeup water valve and float assembly.
 - h. Non-winter Operation
 - Single modulating bypass shall be provided between condenser water supply and return piping configured to enable cold startup of the chilled water system.
 - In general, this control valve shall be located at an accessible location inside the chilled water plant.

- i. Winter Operation:
 - Cooling towers shall be designed with freeze protection. Consult Facilities Engineering to determine if heating will be by electric basin heaters and electric heat trace or by a side stream heat exchanger.
 - In addition to the inside bypass, a two position (non-modulating) bypass shall be installed to dump the flow capacity of one condenser water pump from the condenser water return to the common equalizer pipe. This valve is provided to allow for low load condenser water temperature control.
5. Multi-cell towers shall:
 - a. Be piped with an external equalizer line with valves in lieu of basin weir plate.
 - b. Equalizer lines shall have a maximum pressure drop of 3 in. w.c. under worst case operating condition.
 - c. Magnetostrictive type water level sensor located in the equalizer piping.
6. Capacity
 - a. Cooling towers shall be sized to serve the maximum rated capacity of all the connected chillers, (including chillers that are considered redundant).
 - b. One cooling tower cell shall serve a maximum of one chiller.
 - c. It is acceptable to use more than one cooling tower cell to serve a single chiller.
7. DDC controls shall control/monitor the following:
 - a. Fan speed control
 - b. Water level sensor
 - c. Modulating makeup water valve
 - d. Vibration alarm switch
8. Specifications
 - a. Specify that the contractor is responsible for installing all components shipped loose with the cooling tower.
 - b. Specify that the tower manufacturer shall provide a representative during start-up to program/lockout of tower natural frequencies.
 - c. Life cycle bidding is the preferred method of purchasing Loop cooling towers.

EQUIPMENT and PRODUCT REQUIREMENTS

1. Approved Manufacturers
 - a. Baltimore Air Coil
 - b. Marley
2. Cooling Towers
 - a. Inverters shall be used on cooling tower fans.

- b. Motors shall be inverter duty per NEMA MG-1, Part 31 (1600 volt peak, 0.1 microsecond rise time). TEFC motor outside of the air stream with a gear drive.
- c. Stainless steel or FRP hot and cold basins.
- d. Stainless steel structure and fasteners.

END OF SECTION

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