

NOTE: CONDENSER WATER CHEMICAL TREATMENT DRAWINGS PREVIOUSLY FOUND ON PAGES 15710-4 AND 5 ARE CURRENTLY UNDER REVIEW AND THEREFORE NOT INCLUDED HEREIN. CONSULT PROJECT COORDINATOR.

COOLING TOWERS

General

If a job requires a forced draft tower to be used, provide adequate space for fan shaft removal.

Design Requirements

Use 78°F for design wet bulb conditions.

Cross-flow and counter-flow type towers are preferred over forced-draft type towers due to their energy consumption and ease of maintenance.

The cold water basin shall be of 1 piece welded design with heavy, mill galvanized steel floor and sides. Basin should have a bottom outlet sump with strainer and anti-vortex baffle. Consider any special available coatings to increase tower life.

The cooling tower water make-up valve shall use a mechanical float. Fan controls shall be pneumatic.

Fill shall be light weight, non-combustible, and non-corrosive. Standard fill shall be 20 mill PVC. Drift eliminators shall be two-pass, non-corrosive, noncombustible honeycomb supported in steel frames. Drift loss shall be limited to 0.2 percent.

Fill shall be capable of withstanding a minimum water temperature of 130°F. Make provisions to protect the fill from higher temperatures on absorption chiller applications.

Fan(s) shall be of the propeller type with cast aluminum blades. Fan drive(s) shall be through drive shafts and gear reducers. Drive shafts shall be dynamically balanced and equipped with non-lubricating type flexible links, where required. The University discourages the use of V-belt drive, but if for reasons of serious cost constraints they are used, non-ferrous sleeves shall also be used. A tapered, hot dipped galvanized steel fan cylinder shall be provided to minimize fan tip loss. External oil lines and dip stick shall be provided. The motor shall be mounted outside of the air stream.

Access doors shall be provided on both endwalls for personnel access to the eliminator and plenum section. A hot dipped galvanized wire, grill type, fan guard shall be provided over each fan cylinder. Provide a perimeter handrail on top of the tower, and an enclosed OSHA approved ladder which extends from the tower deck to the roof deck or grade.

Provide vibration elimination devices to isolate the tower fan from both the structural steel and the piping system. Investigate manufacturer options that isolate fan assembly from the tower as opposed to isolating the entire tower from the building.

Provide a vibration switch for each motor/fan combination. The manual reset for the vibration switch shall be placed within direct earshot of the tower in a location that is easily accessible.

Cross-flow and counter-flow towers are also preferred for winter operation. Provide steam sump-heaters or indoor sump, and starters for reverse fan operation when used in this application.

All towers over 300 tons shall be tested in accordance with CTI code test with a formula to calculate the penalty imposed for inadequate capacity.

Chemical Treatment Systems

The University presently uses a blended condenser water treatment containing HEDP phosphonate, tolytriazole, molybdenum, and polymer. The primary biocide is chlorine.

The closed loop treatment contains sodium nitrite, tolytriazole, silicate/borate, and polymer.

The contractor shall be responsible for the treatment of open and closed systems before project acceptance. The contractor shall treat open condenser water systems for an additional year whenever the system is 500 tons or larger.

The conductivity blowdown controller measures the conductivity of the condenser water and opens the blowdown valve as needed to maintain a pre-set conductivity limit.

When the blowdown valve opens, the chemical feed pump comes on and feeds treatment to the system.

The biocide pump is operated by programmed settings in a 7 day/24 hour timer.

The blowdown controller and chemical pumps lose power when the condenser water pump stops running.

Chemical Feed/Control Equipment for Cooling Tower Systems

<u>Unit Description</u>	<u>Manufacturer</u>	<u>Model Number</u>
Chemical Feed Pump (for treatment and biocide)	Liquid Metronics	LMI-A-151-92S

Blowdown Controller with front mount calibration	Morr Controls Inc.	System "C"
Biocide Timer	Dayton	6X-761
Solenoid Valve (3/4 inch normally closed pneumatic valve)	Johnson Controls	V-3974-1004
<u>Unit Description</u>	<u>Manufacturer</u>	<u>Model Number</u>
Air Valve	Johnson Controls	V-11-HAA-100
Corrosion Coupon Holder	Metal Samples Inc.	2078N
Test Kit	Taylor	K-1563

System Description

The chemical feed and tower blowdown shall be of the equipment specified above. There are no acceptable substitutes from this list.

The Contractor shall be advised that if equipment supplied is not the model and manufacturer specified, the contractor will supply specified equipment at their cost.

The Plant Department must approve the site selected to install the chemical feed equipment before the system is installed. Coordinate this approval through the University Project Coordinator. The Contractor shall be advised that if the feed equipment is installed at a location deemed unacceptable by the Plant Department, the contractor will move the feed equipment at their cost.

The quantity of units required is 1 for each piece of equipment. The quantity of corrosion coupon holders is 2. The quantity of the chemical feed pumps is 2.

Chemical Treatment

Provide a phosphonate type water treatment with dual alternating biocides. The treatment will be added after the system is filled. Separate pH correction is not acceptable. The treatment must be pre-mixed without acid.

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