

Cooling Towers in Parallel

When cooling towers with common supply and return piping are installed in parallel, special consideration should be given to the piping design in order to maintain balanced water flow through each tower. If the levels are not equal, one tower could overflow while the other tower will draw air through the circulating pump.

BAC recommends the following design guidelines when considering the layout of your cooling towers:

- A) All towers should be installed so that their overflow levels are at the same elevation.

- B) Design all supply and return piping between towers so that it is symmetrical. This helps to ensure balanced flows through each tower.

- C) Install valves at the inlet and outlet of each tower for final adjustment of water flow. These valves can also be used as shut-off valves to isolate each tower during maintenance. Make certain that the outlet valve is closed when the inlet valve is closed, and have both valves operate simultaneously if they are automatically controlled.

- D) Install equalizing lines with shut-off valves between tower basins in order to ensure the same water levels. Differences in water levels may arise due to dirty strainers, changes in valve position, and clogged nozzles.

Equalizers:

Equalizing lines serve to correct a difference between water levels that may develop during operation. Equalizers do not correct unbalanced flows.

Equalizers should be adequately sized so that a minimal water level differential exists between two cold water basins. Refer to Table 1 for recommended equalizer connection sizes.

Table 1: Equalizer Connection Sizes

Flow To Tower (GPM)	Equalizer Size IPS*
Up to 120	3"
121-240	4"
241-750	6"
751-1300	8"
1301-2300	10"
2301-3200	12"
3201-3700	14"
3701-3850	(2) 10" or (1) 16"
3851-5640	(2) 12" or (1) 18"
5641-6930	(2) 14" or (1) 20"
6931-7560	(3) 12" or (2) 16" or (1) 20"

* SCH 40 for 3" - 10", Std. Wt. for 12" and above



Table 2: Maximum Allowable Equalizer Connection Sizes and Locations

Type of Unit	End ¹	Back	Bottom ²
Series VTL VTL-016-E to VTL-272-P	6"	--	10"
Series VTO VTO-12-E to VTO-116-M VTO-132-L to VTO-176-0	4" 6"	6" 8"	-- --
Series VT1 VT1-N209-P to VT1-N510-P VT1-275-P to VT1-1335-S	12" 14"	12" 14"	-- 20"
Series 3000 3240C to 31301C	14"	--	14"
Series 1500 15146 to 15425	12"	12"	12"
FXT FXT-6 to FXT-11 FXT-16 to FXT-33 FXT-38 to FXT-95 FXT-115 to FXT-257	3" 4" 6" 8"	-- -- -- --	3" 4" 6" 8"

1. End equalizer connections on the Series VTO, VT1, and Series 3000 Cooling Towers must be located on the end of the tower, opposite the suction connection. The low operating level on Series VTL and Series 1500 Cooling Towers may restrict the use of the end equalizer connection. Consult your local BAC Representative for applications requiring end equalizers on these products.
2. Bottom connections for 8" through 20" will be a bolt circle for ASME Class 150 Flat Face Flange and 6" and smaller will be MPT. On model VTL Cooling Towers, all bottom connections will be a bolt circle for ASME Class 150 Flat Face Flange.

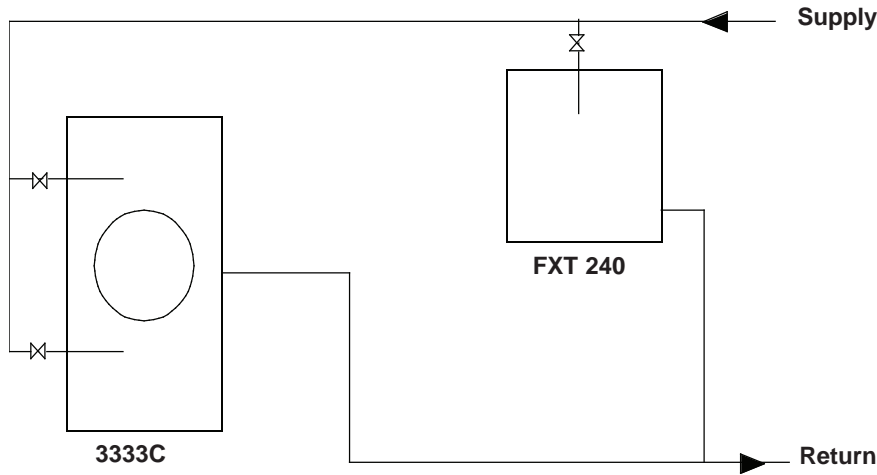
Caution:

Where bottom connections are employed, care must be taken to ensure that the supporting steel does not interfere with the proposed connection location.



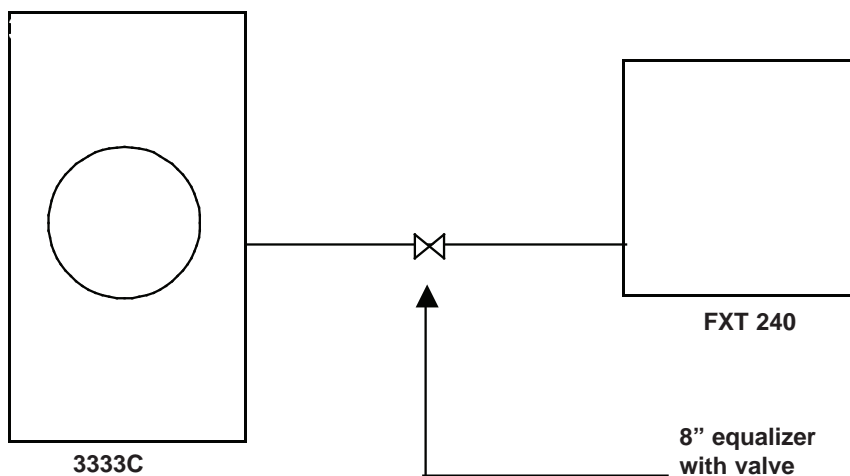
Example:

Given: A 3333C tower cooling 975 GPM from 95°F to 85°F at 78°F entering wet bulb is to be installed in parallel with an existing FXT-240 tower cooling 720 GPM from 95°F to 85°F at 78°F entering wet bulb. The towers will be arranged side-by-side as shown below:



Find: Determine the equalizer line size required between the two towers.

1. The larger flow rate is 975 GPM.
2. Entering Table 1, find an 8" equalizer is satisfactory for tower flow rates of 751 GPM to 1,300 GPM.
3. This connection can be located either on the ends or on the bottom of both units. With towers situated side-by-side, it is more convenient to locate the equalizer connections on the ends of both towers, as shown below.



NOTE: Refer to the Operation and Maintenance section of this handbook for more details.