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Abstract

The purpose of this thesis is to study the effect of using packing in the force draft fan counter flow cooling tower at various operating conditions. The conditions are the water flow rate/air flow rate ratios, the inlet water temperatures and air temperatures, the sizes of packing. After that the tower characteristic equations are found and also the using of microcomputer to analyze the problems.

The testing are using 1 and 2 levels of packing, inlet water temperatures at 40°C and 45°C, inlet air wet-bulb temperatures at 26°C, 25°C, 24°C and 21°C and the water flow rate/air flow rate ratios are 0.97, 1.16, 1.3, 1.45 and 1.94 respectively.

The result show that when the water flow rate/air flow rate ratios and inlet water temperatures decreased, the KaV/L or NTU were increased. Decreasing the wet-bulb air temperatures, the range would be increased but decreased the NTU.

From this study the 2 tower characteristics equations are

$$\frac{KaV}{L} = (0.8692)\left(\frac{L}{G}\right)^{-0.19852} \qquad \text{for 2 levels of packing}$$

and $$\frac{KaV}{L} = (0.8362)\left(\frac{L}{G}\right)^{-0.2543} \qquad \text{for 1 level of packing}$$

where	G	Mass flow of air per unit plan area of packing.	$kg/m^2.s$
	K	Combined heat and mass transfer coefficient.	$kJ/s.m^2$
	L	Mass flow of water per unit plan area of packing.	$kg/m^2.s$
	V	Volume occupied by packing per unit plan area of packing.	m^3/m^2
	a	Actual physical area of contact between air and water per unit volume of packing.	m^2/m^3