

Influence of the mass flow ratio water-air on the volumetric mass transfer coefficient in a cooling tower

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Abstract: A laboratory scale mechanical draft cooling tower with acrylic film type packing was studied. The performance of the tower was assessed at different mass flow ratios of water to air L/G , maintaining constant the water and air inlet temperatures and the packing material. It was found that the relation of the volumetric mass transfer coefficient $k_y a$ versus the volumetric heat transfer coefficient $h_L a$ is not affected by the operating conditions. The small differences obtained are due to the experimental error. For all the value of the ratio L/G in the range of $k_y a/h_L a$ [3,25] the assumption of $k_y a/h_L a = \infty$ cannot be considered and the relation has the following expression $k_y a = 624.76(h_L a)^{0.34}$. However, for $k_y a/h_L a > 25$ the assumption of $-m = \infty$ is valid, and the value of $k_y a$ is approximately 2800 Kg/h.m³.
Keywords : Cooling tower, efficiency, tower packing, volumetric mass transfer coefficient.

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