New Extended Simulation Method at Out-Design Operating Conditions for Cooling Towers

Abstract

The present article describes an improved formulation of Arns and Klenke's Simplified Model, based on Merkel's Standard Model. The point of this is to enable better simulation of the performances for open counterflow cooling towers under operating conditions different from those set in the manufacturers' manuals. It aims to demonstrate that it is possible to improve Arns and Klenke's used models to simulate the cooling towers and enable these models to evaluate their performances in greater detail. To complement the comparative study of these two models, the Simplified Model has been extended to two new cases. Our contribution consists in proposing an innovative method that makes it possible on the one hand to compensate for the shortage of validation data since manuals do not mention all the necessary performances for simulation, and on the other hand to offer a new way of validating the obtained results. The suggested method is based on the use of the stationary operating states of the tower as a means to validate simulation. Numerical results have been successfully compared with those obtained by the Standard Method. The results are satisfactory, show the limitations of each model and open ways to further improvements.

Keywords

Cooling Tower; Heat Transfer; Modelling; Simulation; Heat Exchanger

New Extended Simulation Method at Out-Design Operating Conditions for Cooling Towers

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