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Parametric Study of Vertical Diffusion Stills for Water Desalination

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Abstract : Diffusion stills have been effective in water desalination. The present work represents a model of the distillation process by using vertical single-effect diffusion stills. A semi-analytical model has been developed to model the process. A software computer code using Engineering Equation Solver EES software has been developed to solve the equations of the developed model. An experimental setup has been constructed, and used for the validation of the model. The model is also validated against former literature results. The results obtained from the present experimental test rig, and the data from the literature, have been compared with the results of the code to find its best range of validity. In addition, a parametric analysis of the system has been developed using the model to determine the effect of operating conditions on the system's performance. The dominant parameters that affect the productivity of the still are the hot plate temperature that ranges from (55-90 °C) and feed flow rate in range of (0.00694-0.0211 kg/m2-s).

Keywords : analytical model, solar distillation, sustainable water systems, vertical diffusion still
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