



Parametric equations for the variables of a steady-state model of a multi-effect desalination plant

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ABSTRACT

In this work a steady-state model is developed of an MED plant. Its development and validation have been carried out by experimental data obtained from an MED pilot plant located at the Plataforma Solar de Almería (PSA), in the southeast of Spain. It is a vertical arrangement forward-feed MED plant with preheaters, which uses hot water as the thermal energy source. In order to run the model, a series of parametric equations have been determined for the following variables: the overall heat transfer coefficient for the first effect (U_h), the overall heat transfer coefficient for the preheaters ($U_p(i)$), the vapor temperature inside the first effect ($T_v(1)$), and the cooling seawater outlet temperature (T_{cwout}). They have been obtained from a three-level factorial experimental design (3^k), performing a total of 81 experiments (3^4). The results obtained showed a good fit to the estimated models for the response variables.

Keywords: Solar desalination; Multi-effect distillation; Modeling

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