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A shortcut approach to the design of once-through multi-stage flash desalination systems

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ABSTRACT

This paper introduces a shortcut method for the design of once-through multi-stage flash systems. The shortcut method is tailored to address the need for conceptual design studies and process synthesis and integration which require compact and computationally efficient models. The use of insightful assumptions leads to the decoupling of the mass balances from the heat balances and from the heat-transfer sizing equations. Such decoupling greatly simplifies the computations and significantly reduces the model size and complexity. Simplified enthalpy correlations are also derived and included in the shortcut method. Comparison with actual plant data shows that the results of the shortcut method compare favorably well with the design and operation data of the existing plant.

Keywords: Design; Process integration; Multi-stage flash; Shortcut