Retrofit of Conventional Side Stream Column to Dividing Wall Column with Mechanical Vapor Recompression for Improved Energy Efficiency

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A side distillation column is widely used for separating multicomponent mixtures into three products. Nevertheless, due to the nature of the distillation process, this sort of column consumes significant energy. This work investigates a novel way of retrofitting a side stream column for achieving considerable energy savings by combining the dividing wall column (DWC) and mechanical vapor recompression (MVR). The acetic acid purification process was illustrated to demonstrate the proposed methodology. Simulation of the proposed combined configuration showed that energy saving were achieved up to 100 and 89.97% in the reboiler and condenser, respectively, compared with a conventional column. Various configurations incorporating a heat pump were also analyzed. This study emphasizes the potential for retrofitting a side distillation column from a techno economic point of view.
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