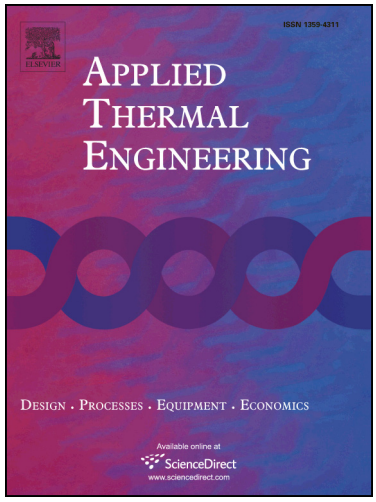

Performance enhancement of modified solar still using multi-groups of two co-axial pipes in basin

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Abstract

The new configuration of modified solar still with multi-groups of two coaxial pipes in basin have been experimentally investigated. The effects of the thickness of annular space between two coaxial pipes are investigated. Four types of the new configuration of modified stills (Types A, B, C and D) with different annular space between two coaxial pipes were studied. A comparison between the four types of modified still with multi-groups of two coaxial pipes in basin and the conventional still are investigated. The results of the experimental study show that, the modified solar still with multi-groups of two coaxial pipes in basin enhanced the distillate water productivity by 97.8%, 77.4%, 63.6% and 52.7% for Types A, B, C and D, respectively as compared to the conventional solar still. In the modified solar still for increase the thickness of annular space between two coaxial pipes from 5 to 14.5 mm, the daily efficiency decreases from 67.6% to 53.46%. The percentage increases in the daily efficiency for the modified solar still with multi-groups of two coaxial pipes in basin (Types A, B, C and D) are approximately 90.8%, 75.7%, 62.6%, and 52%, respectively as compared to the conventional solar still. The calculated cost of one liter of distillate water productivity reaches 0.02 $, 0.021 $, 0.023 $, 0.024 $ and 0.021 $ for modified stills (Types A, B, C and D) and conventional still, respectively.

Keywords: Solar desalination; Modified solar still; Two coaxial pipes; Productivity; Efficiency; Cost analysis.