Experimental results of a seawater distiller utilizing waste heat of a portable electric generator

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ABSTRACT

We have designed an evaporation-type seawater distiller using waste heat of exhaust gas from a portable electric generator. Waste gas from the small generator commonly used in islands has not been utilized because of its low energy density, which may be used as heating source of a small-capacity distiller as well as an additional heat source for solar stills. The proposed distiller of a multiple-effect diffusion still type consists of a series of closely-spaced parallel partitions in contact with saline-soaked wicks. In the distiller, evaporation and condensation processes are repeated as much as its effect number to recycle the thermal energy, resulting in increasing the system thermal efficiency. Experimental results show that the proposed distiller can produce at least 6.7 kg/d of distilled water only with a one-effect still and is expected to produce 43 kg/d with a ten-effect still. This amount of distillate is 4 times larger than the maximum daily productivity of solar stills obtained by outdoor experiments.

Keywords: Electric generator; Waste heat; Evaporation chamber; Desalination; Multi-effect

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