## Experimental Investigation of Air Gap Membrane Distillation System with Heat Recovery

Authors : Yasser Elhenaw, A. Farag, Mohamed El-Ghandour, M. Shatat, G. H. Moustafa

**Abstract :** This study investigates the performance of two spiral-wound Air Gap Membrane Distillation (AGMD) units. These units are connected in two different configurations in order to be tested and compared experimentally. In AGMD, the coolant water is used to condensate water vapor leaving membrane via condensing plate. The rejected cooling water has a relativity high temperature which can be used, depending on operation parameters, to increase the thermal efficiency and water productivity. In the first configuration, the seawater feed flows parallel and equally through both units then rejected. The coolant water is divided into the two units, and the heat source is divided into the two heat exchangers. In the second one, only the feed of the first unit is heated while the cooling rejected from the unit is used in heating the feed to the second. The performance of the system, estimated by the water productivity as well as the Gain Output Ratio (GOR), is measured for the two configurations at different feed flow rates, temperatures and salinities. The results show that at steady state condition, the heat recovery configurations lead to an increase in water productivity by 25%.

Keywords : membrane distillation, heat transfer, heat recovery, desalination

Conference Title : ICWEEM 2017 : International Conference on Water, Energy and Environmental Management

Conference Location : Madrid, Spain

Conference Dates : March 26-27, 2017

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ISNI:000000091950263