

A Numerical and Experimental Analysis of the Performance of a Combined Solar Unit for Air Conditioning and Water Desalination

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Abstract : In this paper, a desiccant solar unit for air conditioning and desalination is presented first. Secondly, a dynamic modelling study of the desiccant wheel is developed. After that, a simulation study and an experimental investigation of the behaviour of desiccant wheel are developed. The experimental investigation is done in the chamber of commerce in Freiburg-Germany. Indeed, the variations of calculated and measured temperatures and specific humidity of dehumidified and rejected air are presented where a good agreement is found when comparing the model predictions with experimental data under the considered range of operating conditions. Finally, the study of the compartments of desalination and water condensation shows that the unit can produce an acceptable quantity of water at the same time of the air conditioning operation.

Keywords : air conditioning, desalination, condensation, design, desiccant wheel

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