

عنوان مقاله:

Numerical Investigation of Heat Transfer in Circular Perforated Plates Exposed to Parallel Flow and Suction

محل انتشار:

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خلاصه مقاله:

Unglazed transpired solar collectors are widely used for heating outside air directly, these days. Pre-heating ventilation air for large spaces and heating air for crop drying, are some of the applications of these kinds of collectors. The outside air is drawn straight from ambient, uniformly through the whole surface of a perforated absorber (transpired, dark-colored plate) exposed to the sun. That helps the air to be heated. Performance of these collectors is dependent on various parameters, such as geometry and type of perforations, suction velocity and the wind. In this study the role that wind (with constant direction and parallel to the plate) plays in performance of an unglazed transpired collector, is investigated by employing a commercial computational fluid dynamics code. In this study, plates are perforated with circular holes on either a square or triangular layout, covering the practical range of independent parameters such as, suction velocity, porosity, plate thickness, plate conductivity and wind velocity. Effectiveness, efficiency and pressure drop of these collectors are determined and the variations of these parameters with respect to variations of independent parameters are analyzed. It is shown that the performance of collectors on .triangular layout, in similar conditions, is better than the same collector, on square layout

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