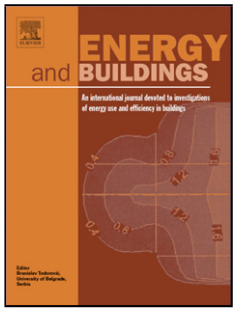

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Title

Desiccant wheels effectiveness parameters: correlations based on experimental data

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Abstract

Currently interest in desiccant evaporative cooling cycles is increasing due to the possibility of realizing low environmental impact and high energy efficiency systems. The analysis of air handling units based on this technology is quite difficult due to the lack of simple, fast and accurate models to predict the performance of desiccant wheels, which are the crucial component of the system. In this work a desiccant wheel is tested on a specific experimental facility in a wide range of operating conditions at low regeneration temperature (up to 80 °C). Accurate correlations based on experimental data to predict desiccant wheel outlet air conditions and pressure drop are proposed. The obtained correlations predict appropriately actual desiccant wheel performance and they are suitable to be used easily in energy simulation programs for building - HVAC systems.

Keywords

Desiccant wheels; effectiveness; experimental test; correlation; pressure drop

Highlights

- Effects of boundary conditions on effectiveness parameters are investigated.
- A desiccant wheel is tested in a wide range of operating conditions.
- Practical effectiveness and pressure drop correlations are proposed.
- The correlations can be easily integrated in energy systems simulation programs.