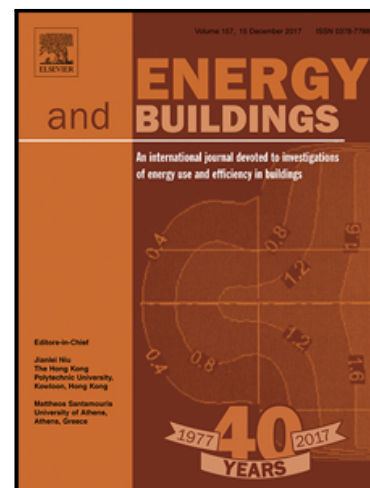


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DEVELOPMENT OF AN EXPERIMENTAL TEST RIG FOR THE EVALUATION OF THE THERMAL PERFORMANCE OF BUILDING ROOFS

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ABSTRACT

Reducing the thermal gain through the roof is one of the best approaches to decreasing energy consumption and to providing thermal comfort to the users of residential or commercial single-story buildings. In this context, this paper describes an experimental test rig for use in the field, which was employed to simultaneously evaluate the thermal performance of eight roofs in reduced scale in the city of Florianópolis, Santa Catarina State, southern Brazil. The experimental test rig is comprised of a temperature-controlled environment over which the roofs were constructed. All roofs have a trapezoidal air cavity with the same dimensions, in order to carry out the calibration of the test rig. In the calibration tests, the surface temperatures, the heat flow in the roofs and the thermal resistance for the upward and downward directions of heat flow were investigated. Furthermore, computer simulations and measurements of a roof with real dimensions were also carried out in order to verify whether the experimental test rig could provide results compatible with those obtained in a real situation. The calibration results show good agreement between the results obtained for the eight roofs, with a maximum

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