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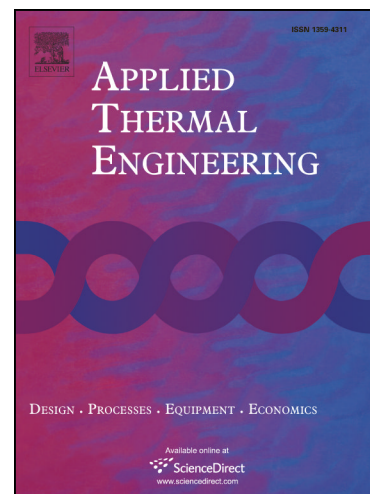
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# Coupling controlled environmental forcing and Transient Plane Source method: an innovative thermal characterization procedure for building insulation materials

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## Abstract

Thermal insulation materials can be considered as an effective strategy to decrease thermal losses through the building envelope. According to international standards, the thermal characterization of such materials is carried out at the mean temperature of 10°C in terms of thermal conductivity. However, realistic thermal profiles can significantly detach from such reference value, and consequently, the overall thermal behavior of the building envelope can seriously differ from the designed condition. In order to bridge this gap, any design condition in the range 0-30°C is generally evaluated according to acknowledged standards. In this work, environmental forcing and transient plane source method are simultaneously applied to define reliable temperature-dependent profiles in a relatively short timescale for three basic properties of thermal insulation materials, i.e. thermal conductivity, thermal diffusivity and volumetric specific heat. Results show that the proposed methodology can be considered as an effective tool for the realistic thermal characterization of building insulation materials.

*Keywords:* Insulation materials, thermal properties, transient profiles, dynamic conditions, transient plane source method

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