

Current Developments in Flat-Plate Vacuum Solar Thermal Collectors

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Abstract : Vacuum flat plate solar thermal collectors offer several advantages over other collectors namely the excellent optical and thermal characteristics they exhibit due to a combination of their wide surface area and high vacuum thermal insulation. These characteristics can offer a variety of applications for industrial process heat as well as for building integration as they are much thinner than conventional collectors making installation possible in limited spaces. However, many technical challenges which need to be addressed to enable wide scale adoption of the technology still remain. This paper will discuss the challenges, expectations and requirements for the flat-plate vacuum solar collector development. In addition, it will provide an overview of work undertaken in Ulster University, Loughborough University, and the University of Warwick on flat-plate vacuum solar thermal collectors. Finally, this paper will present a detailed experimental investigation on the development of a vacuum panel with a novel sealing method which will be used to accommodate a novel slim hydroformed solar absorber.

Keywords : hot box calorimeter, infrared thermography, solar thermal collector, vacuum insulation

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