Recent Advancements in Design of Flat Plate Solar Collectors

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Abstract:
Solar collector is an important technology for the effective utilisation of solar energy that the earth is blessed with. Flat plate solar collectors present a simple and easy to maintain design and thus are widely used for low and medium temperature applications. But being less efficient than alternatives, justifying the initial investment of flat plate solar collectors becomes difficult in the long run. This paper presents the efforts of researchers in the past five years to improve the efficiency of flat plate solar collectors through the improvement and optimization of the existing design. The range of research work covered gives a general idea of the variety of techniques being developed, analysed and tested to increase the efficiency of flat plate solar collector through means such as new absorber design, design of absorber tubes, new coatings on glass cover, and other means to reduce heat transfer losses, increase heat transfer from absorber to working fluid and absorbing and retaining direct as well as diffuse radiation. Design and efficiency improvement for better adoption of flat plate collectors in building facades has also been discussed. This paper will be beneficial for exploring the range of research avenues in the field of optimization and efficiency improvement of flat plate solar collectors.

Keywords: Flat Plate Solar Collector; Optimization; Design; Efficiency Improvement; Performance Enhancement.

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