

Title: **Performance Study of Air-based Photovoltaic-thermal (PV/T) Collector with Different Designs of Heat Exchanger**

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Abstract

Three different designs of heat exchanger, V-groove, honeycomb and stainless steel wool had been tested to study their effectiveness in improving the overall performance of a photovoltaic/thermal (*PV/T*) air base solar collector. Heat exchangers were installed horizontally into the channel located at the back side of the *PV* module. The system was tested at irradiance of 828 W/m² with mass flow rate spanning from 0.02 kg/s to 0.13 kg/s. It was observed that at mass flow rate of 0.11 kg/s, the maximum thermal efficiency of the system with V-groove is 71%, stainless steel wool is 86% and honeycomb is 87%. The electrical efficiency of the systems is 7.04%, 6.88% and 7.13%, respectively. The experimental results showed that honeycomb design is the most efficient design as heat exchanger. The design which is simple and compact is suitable for building integration.