

## Documents

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**Investigation on The Thermal Performance of Evacuated Glass-Thermal Absorber Tube Collector (EGATC) for Air Heating Application**

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**Abstract**

Existing design of Heat-Pipe Evacuated Tube Collector (HP ETC) for water heating require storage tank while additional heat exchanger require for air heating application which leads to the extra spacing and costing. HP ETC also need to be tilt at the correct angle to optimize the system performance. Furthermore, the installation also needs to be positioned either to south or north facing to ensure the maximum absorption of energy. These could lead to the design limitation. The aim of this research is to investigate on the thermal performance of Evacuated Glass-Thermal Absorber Tube Collector (EGATC) for air heating application. EGATC was developed from conventional Evacuated Tube Collector (ETC) and the comparative result between HP ETC performance were evaluated. The three days outdoor experimental results show EGATC (Day 1: 50.9 °C, Day 2: 53.9 °C, Day 3: 49.2 °C) performed better with slightly higher temperature at outlet temperature compare with HP ETC (Day 1: 46.7 °C, Day 2: 50.3 °C, Day 3: 46.9 °C). It is concluded that EGATC have better performance in term of temperature different and outlet temperature as compared to HP ETC. EGATC (Day 1: 53.6%, Day 2: 50.6%, Day 3: 49.8%) also have greater efficiency in term of heat storage capability as compared to HP ETC (Day 1: 42.7%, Day 2: 41.6%, Day 3: 41.1%). Regarding energy buffer storage, EGATC have better energy storage compared to HP ETC at sudden weather change such as clouds. The outlet temperature of EGATC (42.3 °C) was remained slightly higher compared to HP ETC (39.9 °C) at the beginning. The outlet temperature gradually drops slower during discharging period until the end of the experiment for 15 minutes towards outlet temperature 41.1 °C and 37.2 °C for both EGATC and HP ETC with temperature difference 1.2 °C and 2.7 °C respectively. © 2021. PENERBIT AKADEMIA BARU - All rights reserved.

**Author Keywords**

Direct-flow Evacuated Tube Collector (Direct-flow ETC); Evacuated Glass-Thermal Absorber Tube Collector (EGATC); Heat Pipe Evacuated Tube Collector (HP ETC); solar air heating application

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