

## **SIMULATION OF PERFORMANCE OF A MANTLE HEAT EXCHANGER-INFLUENCE OF PREHEATING AND MANTLE FLUID ENTRY**

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### **Abstract**

A mantle tank is a cylindrical storage tank surrounded by an annulus through which hot liquid from the collector flows thereby transferring energy to the tank contents. The separating wall is the heat exchange surface. Mantle heat exchangers are an interesting alternative to external heat exchangers because they reduce the complexity of the system by combining the heat exchanger and the storage unit in one element. In a mantle heat exchange system, fluid flow from the heat source does not pass through the tank. The performance of an innovative collector loop heat exchanger used in solar water heater is investigated experimentally. The heat exchanger evaluated in this work is a narrow gap mantle on a vertical tank. The heat exchanger is assessed for a range of operating conditions to quantify the mantle side and tank side heat transfer coefficients and the effect of thermal stratification in the tank.

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**Keywords:** innovative heat exchanger, vertical tank, overall heat exchanger coefficient- area product, mantle side and tank side heat transfer coefficients