

## Parametric Analysis for Varying Packing Materials & Water Temperatures in a Humidifier

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**Abstract** – Consumption of energy by humans led to environmental problems like global warming and change in climate. Cooling of buildings is a main reason for the consumption of the energy in hot regions. The cooling system depends on the intensity of the sunshine in hot regions and a design of alternative means to minimize the energy consumption is utmost important. The present study, a comprehensive experimental parametric study is carried out for a new evaporative cooling pad made of coconut fibers. Fibers are arranged in the mesh to form a rigid element. The tests are carried out in a cross flow set up with evaporative cooling system by varying the air velocities as well as water temperatures. Performance parameters such as evaporation rate, pressure drop, specific cooling capacity, humidification efficiency, air temperature drop, and humidity rise are evaluated. The results are compared with the standard cooling pad material that is Cellulose or Celdek Packing. Results indicated that there is a rise in the coefficient of performance, cooling effect, humidification efficiency and evaporation rate with the air velocity. For the lower water temperature, the output parameters yielded highest value. The system yielded the humidification efficiency of 82% and the value of coefficient of performance obtained is 4.68.

**Keywords:** Coconut coir, Humidification efficiency, Evaporation rate, COP, Specific cooling capacity, Evaporative cooling pads.