

## **An Experimental Investigation of the Variation of Evaporator Efficiency According to Load Amount and Textile Type in Hybrid Heat Pump Dryers**

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**Abstract :** Nowadays, laundry dryers containing heaters and heat pumps are used to provide fast and efficient drying. In this system, as the drying capacity changes, the sensible and latent heat transfer rate in the evaporator changes. Therefore, the drying time measured for the unit capacity increases as the drying capacity decreases. The objective of this study is to investigate the evaporator efficiency according to load amount and textile type in hybrid heat pump dryers. Air side flow rate and system temperatures (air side and refrigeration side) were monitored instantly, and the specific moisture extraction rate (SMER), evaporator efficiency, and heat transfer mechanism between the textile and hybrid heat pump system were examined. Evaporator efficiency of heat pump dryers for cotton and synthetic based textile types in load amounts of 2, 5, 8 and 10 kg were investigated experimentally. As a result, the maximum evaporator efficiency (%72) was obtained in drying cotton and synthetic based textiles with a capacity of 5 kg; the minimum evaporator efficiency (%40) was obtained in drying cotton and synthetic based textiles with a capacity of 2 kg. The experimental study also reveals that capacity-dependent flow rate changes are the major factor for evaporator efficiency.

**Keywords :** evaporator, heat pump, hybrid, laundry dryer, textile

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