

Drying Kinetics of Natural Rubber Sheets by Using a Hybrid Solar-Electric Dryer with Force Convection

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Abstract

In this work, a hybrid solar-electrical dryer was constructed for studying the drying kinetics of natural rubber sheets. This system composed of the solar collector, which used to collect heat from the sun light. The hot air from solar collector was sent to the drying chamber, where an auxiliary heater can increase the temperature in the drying chamber in order to control the drying temperature. The rubber sheets were dried at the controlled temperature 40 50 and 60 °C. The moisture ratio of rubber sheets drying was investigated. Seven models were tested to fit with the experimental data. A modified Henderson and Pabis model was the best of curve fitting of the drying behavior of rubber sheets in these specific experimental conditions. Finally, the consumptions of electrical energy and solar energy were determined, which is found in the range of 15-32% of the solar energy used.

Keywords : rubber sheets, drying kinetics, solar dryer, hybrid system

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