

The Nelson Mandela African Institution of Science and Technology

<http://dspace.nm-aist.ac.tz>

Materials, Energy, Water and Environmental Sciences

Research Articles [MEWES]

2014-05-28

A review on opportunities for the development of heat pump drying systems in South Africa

Kivevele, Thomas

South African Journal of Science

<https://doi.org/10.1590/sajs.2014/20130236>

Downloaded from Nelson Mandela-AIST's institutional repository

A review on opportunities for the development of heat pump drying systems in South Africa

Thomas Kivevele, Zhongjie Huan

To download full text click that link

DOI: <https://doi.org/10.1590/sajs.2014/20130236>

Abstract

Recently, it has been discovered that heat pump drying is an efficient method of drying for drying industries. Heat pumps deliver more heat during the drying process than the work input to the compressor. Heat pump drying is a more advanced method than the traditional South African industrial and agricultural drying methods, such as direct/indirect sunlight, wood burning, fossil fuel burning, electrical heating and diesel engine heating. Heat pump dryers provide high energy efficiency with controllable temperature, air flow and air humidity and have significant energy-saving potential. In the last decade the market for heat pump systems for water heating and space cooling/heating has grown in South Africa, but the development of heat pumps for industrial and agricultural drying is very slow. As a result of high increases in fossil fuel prices and electricity in South Africa, as well as the problem of CO₂ emissions, green energy, energy saving and energy efficiency are imperative. The development of heat pump drying systems in South Africa is an efficient way to solve energy problems in drying applications as this technology is still in its infancy. We review studies on heat pump drying and compare the methods therein with the most common methods of drying in South Africa.

Keywords

Heat pump, drying, specific moisture extraction rate, coefficient of performance, energy efficiency