

Heat and mass transfers during drying of colour receiver layers for ink-jet photo applications

Christoph Hunfeld

Abstract

Basing on a model of heat and mass transfer in the gaseous and liquid phase, an analysis of the drying process for colour receiver layers is undertaken. It considers the drying induced stresses and thus linking the drying conditions, production speed and product quality. The model equations were converted into a numerical computation program and used for extensive numerical experiments for different operation conditions. The heat and mass transfer in the gaseous phase were described in an integral way according to the relations for slot nozzles, whereas in the product the heat and mass transfer were considered either differentially or in integral form. For the solution of the governing equations in the shrinking product a finite difference procedure with coordinate transformation and a linear equation solver were used. The numerical results were compared with experiments conducted on a pilot plant under production conditions. In the dissertation the necessary model details are described and the numerical results presented and discussed. The model calculations revealed that a certain combination of the process parameters allows simultaneously a production increase and a higher product quality.