

SIMULATION OF DRYING PROCESSES IN CONVENTIONAL AND IMPINGEMENT FREE CONVECTION DRYERS

Convective drying processes represent the most energy-intensive process step for most coating systems. For an efficient operation of such lines, understanding the physical processes and setting the ideal process parameters is essential.

For the mathematical description of the drying process the so-called heat transfer coefficient is an essential parameter. By means of numerical simulations, the flows in conventional slot nozzles of various designs, as used in industrial dryers, and impact-jet free nozzles were investigated at the University of Applied Sciences in Munich. Heat transfer coefficients could be determined from these simulations. The simulation results were validated by experimental investigations on a real scale coating line under production conditions.

Based on these heat transfer coefficients and various production parameters, the drying process of coating lines could be described in a mathematical model. The focus is on an exact but application-oriented modelling. Thus, the process parameters of the dryers can be optimized from an energy point of view, respectively higher production speeds can be achieved.