

Coating of Narrow Stripes

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Abstract

Coating of narrow stripes has wide applications in pressure sensitive adhesive tape industry. Recently, it is considered as a potential means for the manufacture of color filters for liquid crystal display panels, because red, green and blue stripes on color filters may be coated directly without etching and other tedious steps.

An experimental study was carried out to examine the performance of stripe coating based on a modified slot die and a small circular nozzle. A shim that can deliver multiple stripes was constructed and was installed into a slot die. The quality of stripes coated was analyzed. Stripe width varied between 1.4cm and 0.1cm. It was found that the operating window of narrow stripes is smaller than that of conventional slot coating. Besides defects such ribbing and dripping commonly encountered in slot die coating, two defects, i.e., spreading and neck-in were observed.

Spreading appears at low coating speed, whereas neck-in appears at high coating speed. The causes of these two defects were studied and a universal correlation to predict the operating window was developed. A coated stripe with width around 200 μ m was developed by a small nozzle, it was found that by adjusting the strength of hydrogen bonding and different solvents, the shape of the cross-sectional area of the coated stripe can be manipulated.