

Slot Die Coating

Principle and Application

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Abstract

The huge variety of different coating applications ranging from highly uniform optical films to mechanically rugged protection layers require coating thicknesses between some 10 nm up to some mm. No single coating technique other than slot die coating is fit to cover this full range of roughly a factor of 100 000. Though not perfect for each and every application, slot dies frequently replace other techniques because of their unique advantages to be a closed and premetered system. This article presents an overview over the various technical issues and solutions.

Unfortunately many coating liquids because of their rheological properties are coatable by slot dies within a rather small coating window only. Slight variations of the coating parameters over the coating width may cause an intolerable non-uniformity. Even highly sophisticated mathematical simulations do not really help to solve this problem.

To achieve a uniform layer with such a liquid usually requires a highly precise and expensive slot die. Furthermore some dies provide a locally adjustable slot width to improve the coating uniformity online in production. But still the possibly non constant gap between the die and the substrate may be a problem, if the coating window is too small. To solve this problem now a novel technique provides local adjustment of not only the slot but even the coating gap as well. The coating uniformity thereby is significantly improved.