

DEVELOPMENT OF NEW PRODUCTS WITH OPTIMIZED DIES – PRACTICAL EXAMPLES

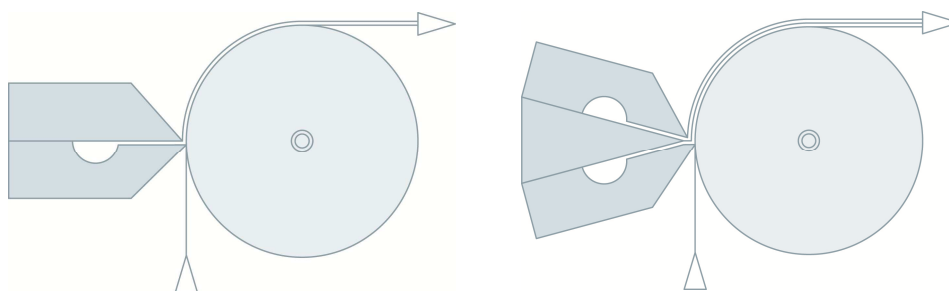
Harald Döll

*TSE Troller AG, Aareweg 6, CH-4853 Murgenthal, Switzerland
harald.doell@tse-coating.ch*

(Harald Döll as the Technical Director of TSE Troller AG is mainly involved in the optimization of the coating dies as well as feasibility studies with customers for coating of new products and commissioning of both, pilot and production dies)

Keywords: premetered coating, slot die, development

Premetered coating in the slot format is an attractive method to apply single or multilayer structures of functional layers to continuously running substrates.



The main advantages of premetered coating methods are the following:

- Coat weight or film thickness is specified within operating range of process
- Formulation changes do not affect average coat weight
- Reactive liquids (multi- component) systems can be coated
- Multiple layers coated simultaneously
- Excellent uniformity of coated film in both, cross-web and machine direction
- The coating process can be scaled up from R&D over pilot to full production scale

Modern product development (e.g. flexible electronics, polymer coatings) increasingly requires uniform thin layers to achieve both, product performance and small material consumption. Especially saving raw materials enables an economic development process. Using a R2R process like liquid coating with slot dies should be investigated from the beginning on as a manufacturing method for future production. The possibility to scale-up from the laboratory over pilot trials to future production is very important and confirmed in several examples.

Especially this last point is a very large advantage of premetered over other coating processes and helps to control the development cost. Some examples shall give an insight onto the opportunities of optimized premetered coating methods.

- It was very common in the photographic industry to start the development of new products in the 10cm range, first small-scale production in the 0.5m range before going into production in the 1.5m range. The most of such products have been coated with a multilayer structure simultaneously.
- Electronic layers (such as PEDOT:PSS or functional layers for OPV and OLED) have been coated in a very narrow scale in the range of a few centimetres, production ranges reach now widths in the range around half metre
- Inks with e.g. silver nanowires as substitutions for ITO or other connective layers have been coated successfully with slot coating, the orientation of the nanowires even on very narrow scale is fully comparable with later production scale.
- Glass plates have been coated on the TSE-TableCoater in the range of 20cm, first production machines run in the range between 1m and 1.5m

These and other examples will be explained more in detail.