

# Optimized Dies Pave the Way for New Products

*TSE Troller AG improved their die design especially for electronic applications. The advantages: when changing the product that needs to be coated, no adjustment is needed and only minimal liquid volume is required.*



Photo: TSE

## Internals of TSE die Plates.

Premetered coating in the slot format is an attractive method to apply single or multilayer structures of functional layers to continuously running substrates. Coating on sheet based substrates is possible, too, and gaining more and more interest especially in R&D environment. There are several advantages:

- 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 can be coated simultaneously
- Excellent uniformity of coated film in both, cross-web and machine direction

Harald Döll, Technical Director at TSE Troller AG, says: "Modern product development (e.g. batteries, flexible electronics, polymer coatings) increasingly requires uniform thin layers to achieve both, product performance and small material consumption." Döll goes on to explain further that saving raw materials especially enables an economical development process. Using an R2R process like liquid coating with slot dies should be investigated from the beginning as a manufacturing method for future production. Future scale-up from R&D and pilot facilities to production lines is confirmed, he says.

"The internal TSE-die design consists of a dual chamber fluid distribution system, which will be optimized for a wide range of applications or products", Harald Döll explains. Due to this



Photo: TSE

## Pilot slot die.

optimization work no adjustment is required on the dies when changing the product or operating conditions. Even during development stages with unknown future conditions an optimized die can be used with great success. "By pre-calculating the expected cross web uniformity of a new product, the properties can be optimized first before running expensive trials", Döll says.

"New product formulations are often very costly." The possibility of running trials with very low material consumption helps to reduce development costs significantly. A narrow slot die can be designed with lowest dead volume possible in order to maintain both good to excellent film thickness uniformity and low usage of expensive liquids with the optimization process, says Döll.

"Companies and institutes are able to mimic future production processes on a small scale with appropriate uniformity and functionality by utilizing TSE slot dies." Harald Döll mentions the TFT Thin Film Technology Institute at the KIT in Karlsruhe as an independent organization as one example. "As a recent example, electronic and optical layers with dry thicknesses far below 100nm have been coated successfully with TSE development and small scale dies." //

Harald Döll  
Technical Director  
TSE Troller AG  
[www.tse-coating.ch](http://www.tse-coating.ch)