COATING OF FLEXIBLE PRODUCTS

Advanced coatings on polymer films, flexible glass, thin metal foils, and textiles

Roll-to-roll coating of flexible materials

Roll-to-roll coating continues to be the most efficient way to coat flexible materials. The Fraunhofer FEP is a worldwide leader in research and development in coating of polymer films, thin metal foils, flexible glass and other flexible materials such as membranes, textiles, and paper. The coated flexible materials are used in a wide range of modern products such as:

- transparent barrier films for packaging
- high barrier and functional films for flexible electronics
- optical filters, optical films
- anti-counterfeiting labels
- batteries
- super-caps
- solar cells
- decorative films

Roll-to-roll coating technologies are capable of providing a variety of advanced surface properties. One of our research goals is the combination of multiple functionalities in one single layer.

Web coaters, equipment manufacturers and end users of coated webs need advanced research and development resources to keep pace with the rapidly developing and innovative web coating business. The Fraunhofer FEP is uniquely qualified to address this growing need. We have full in-house capability to take a project from concept through to a final industrial solution. Our service for contract pilot coating enables our clients to quickly enter the market with their new products before their own coating capabilities have been installed.

We are dedicated to developing new products and technologies that represent the state of the art in roll-to-roll coating.
Fraunhofer FEP offers and continuously develops innovative coating technologies. Our technologies include:

**Technologies**

- for vacuum roll-to-roll coating
  - pulse magnetron sputtering
  - high-rate plasma-enhanced CVD (PECVD)
  - high-rate evaporation
    (boat evaporation, thermal evaporation, and electron beam evaporation, optionally with plasma-activation)
- plasma and ion surface treatment
- in-line optical monitoring
- slot die coating
- electron beam curing

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**Our offer**

We have full in-house capability to take a project from concept through to a final industrial solution, including:

- feasibility studies
- development of layer systems, products, and coating technologies for roll-to-roll web coating
- scale-up of coating technologies to large web widths and high web speeds
- technology transfer and fitting web coating plants with key components (magnetrons, plasma sources, reactive gas systems, electron beam units, product and process monitoring systems)
- contract coating in the pilot phase of a product, which enables our clients to quickly enter the market with their new products before their own coating capabilities have been installed

**Shaping surface properties of flexible materials**

- homogeneity, uniformity, low defect rate, stability, low stress etc.
- permeation barrier
- biozide and antibacterial properties
- magnetic properties
- porosity
- chemical resistance
- conductivity
- optical properties: transmission, reflection, color
- lithium ion conductivity, lithium storage

**Electron beam roll-to-roll curing of lacquers**

- electron beam generator
- divergent electron beam
- beam exit window
- uncured lacquer
- cured lacquer
- product transport

**Vacuum roll-to-roll coating**

- winding system with substrate
- vacuum vessel
- cooling drum
- winding chamber
- process chamber
- process units