

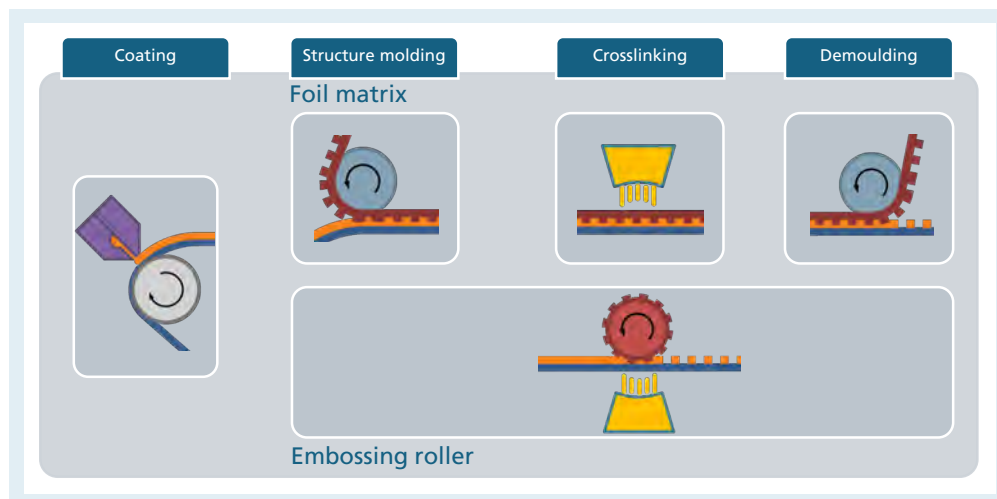
Innovative processes for structuring of surfaces

Manufacturing of Surface Feel, Decor, Microfluidics, Optics and more

What do peaches, butterfly wings, lotos leaves and privacy glass have in common? Their surface structure gives them unique properties. Its transfer to other materials is subject of current developments at the Fraunhofer FEP.

Using various processes, structures with lateral resolutions of millimetres down to a few tens of nanometres can be continuously transferred to flexible materials on large scale.

Specific resin formulations are used for this purpose, into which a die is continuously pressed. The resin is then cross-linked within milliseconds using electron beam irradiation. Die and structured material are separated in a final step. Depending on the thickness of the base material, two different types of matrices can be selected. The following diagram shows the process steps for the two types of matrices.



Process steps for lacquer crosslinking using electron beam irradiation

Contact

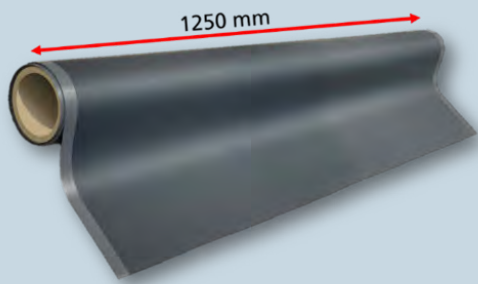
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At Fraunhofer FEP, we are investigating the influence of process parameters on structuring and reproducibility. Coating formulations are optimized regarding other properties such as scratch resistance or optical absorption.

Another focus is on the matrix, its material, production, e.g. also using 3D printing, and its stability. The consistent use of roll-to-roll processes for high productivity with material widths of up to 1250 mm and speeds of 10 to 100 m/min is another highlight of FEPs technology.

Structures are developed and produced to customer specifications. This is followed by the possibility of pilot production and technology transfer to customer systems.

Our offer

- Advice on structuring technology, matrix selection, coating formulation, structure design
- R&D services incl. sample production and process optimization
- Analytics:
 - Optics, weathering, abrasion resistance, etc.
 - 100% inspection regarding structure homogeneity, accuracy, replication quality
- Pilot production and assembly

Application examples

Fresnel structures on film for light focusing	Decorative surfaces for façade elements (Fig. 1) and privacy screen applications (Fig. 2)	Anti-fouling structures for maritime applications
Anti-glare surfaces for displays (Fig. 3)	Haptic structures for furniture	Flow-optimized structures for watercraft
Microfluidic structures for medical lab-on-chip devices	Anti-icing surfaces on wind turbines and wings	Holographic structures for security labels

Funding projects

Project name	Funding reference	Description
Convert2Green	101092347	NIL technology development
DesignPV	03EN1084A	Decorative-haptic structures on photovoltaic modules (BIPV)
PERSEUS	101147547	Optical elements on perovskite PV
FlexFunction2Sustain	862156	Non-reflective surfaces for car displays

- 1 *Decorative surface for façade elements*
- 2 *Surfaces for privacy screen applications*
- 3 *Anti-glare surfaces for displays*



We focus on quality and the ISO 9001.