High-resolution laser engraving of embossing rollers for functional 3D structures - Opportunities and Challenges

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Content

Embossed high-resolution structures can be used to alter the look and feel of surfaces used in many applications. This can be used to give materials such as leather, carbon-fibre and foils printed with a wood grain effect, a higher quality appearance. In the past years, immense leaps in quality have been achieved with the embossing of printed foils, that they now can hardly be distinguished from their natural equivalents. This has been made possible by the great advances achieved on the tooling side. In the field of rotary embossing dies, which enable a very efficient structuring of continuous materials, SWG has in recent years, significantly advanced the development of direct laser engraving, so that today it is possible to manufacture embossing cylinders with a resolution and geometric precision that had only previously been possible using highly accurate laboratory based processes such as nanolithography.

Despite the already diverse possibilities for the optical and haptic designs of foil-coated surfaces, the market is always demanding new embossing quality characteristics. However, these are no longer solely aimed at more demanding textures and higher imaging accuracy, but are increasingly focusing on incorporating additional functions into the surface texture. The lecture shows the potential chances of this new technology for the area of web-based substrates. However, it also outlines the challenges in both the manufacture of the tools and in the process integration in the respective application fields.

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