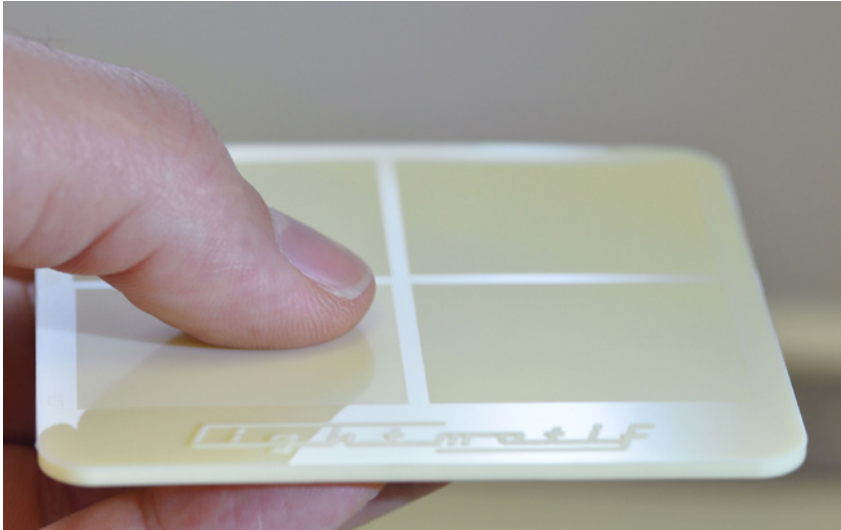


Soft-Touch demonstrator



- Reduced skin friction
- Velvet like surface finish
- One step fabrication method
- Applications for:
 - Automotive interior surfaces
 - Consumer products
 - Medical products

Soft-Touch surfaces

Micro-textures applied to plastic surfaces can reduce skin friction by reducing the skin contact area, leading to a very soft feeling surface. This soft-touch effect can for example be used to enhance the quality and perception of consumer products; or it could be applied to medical products to reduce skin friction and irritation.

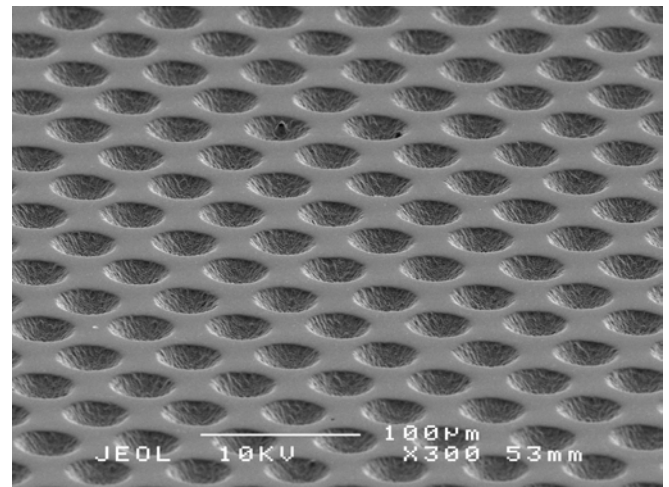
Lightmotif has developed a 3D mold texturing technology relying on ultrashort pulse laser ablation, which can be used to apply the negative of such textures to injection molds. The textured surface is copied to the injection molded products, leading to a one step fabrication of plastic surfaces with novel soft-touch properties.

The textures that are responsible for these properties consist of micro-bumps or pillars on the polymer surface. To create such a pillar texture, a negative dimple pattern is laser ablated into the mold surface, which replicates into the functional texture on the polymer product.

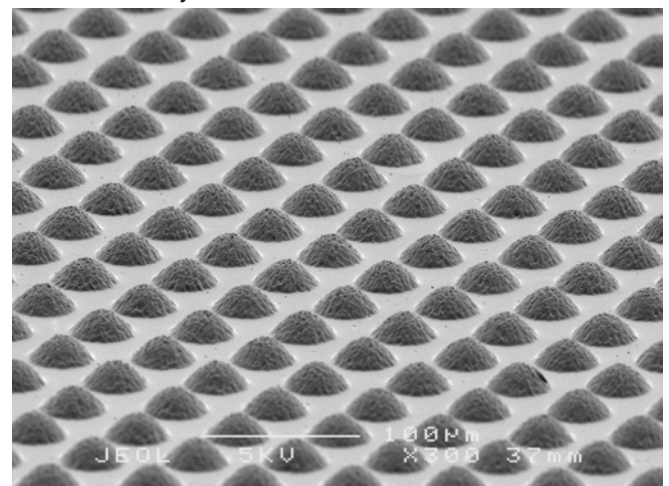
The pillar textures reduce the skin friction when touching the surface. However, when the surfaces are held tightly, the pillar textures can also result in an improved grip.

Besides soft-touch properties the textures also change the visual appearance. Dense pillar textures show diffuse reflection, resulting in a matte velvet-like surface finish.

Textured mold surface



Injection molded surface



Demonstrator textures

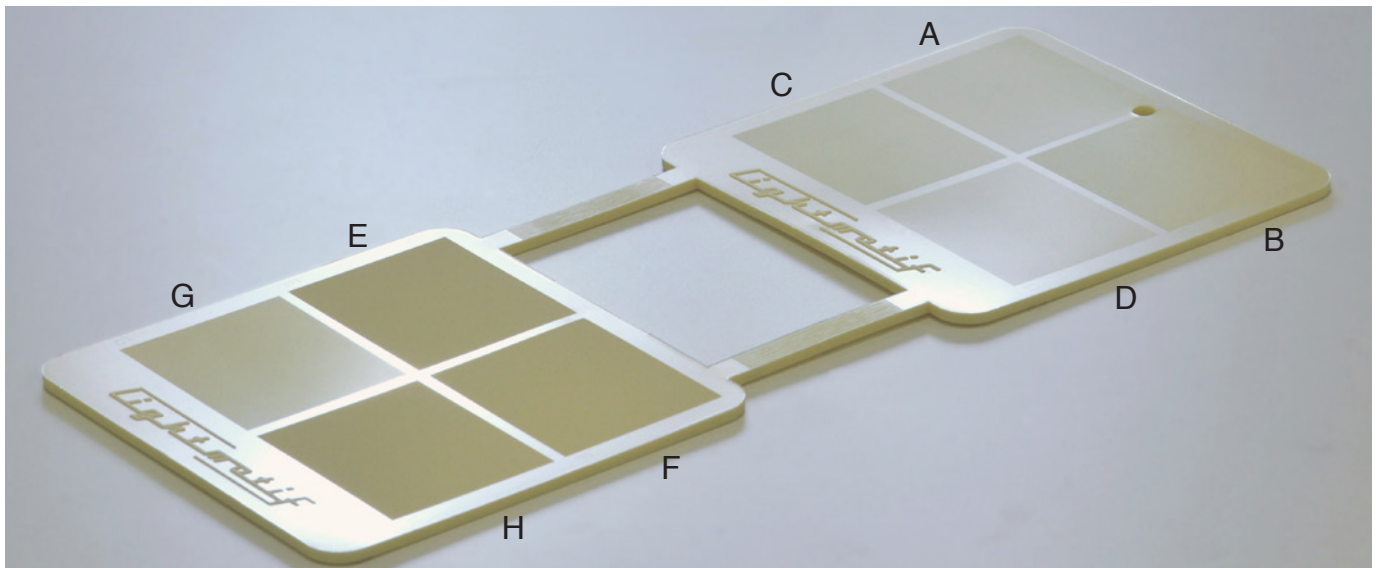
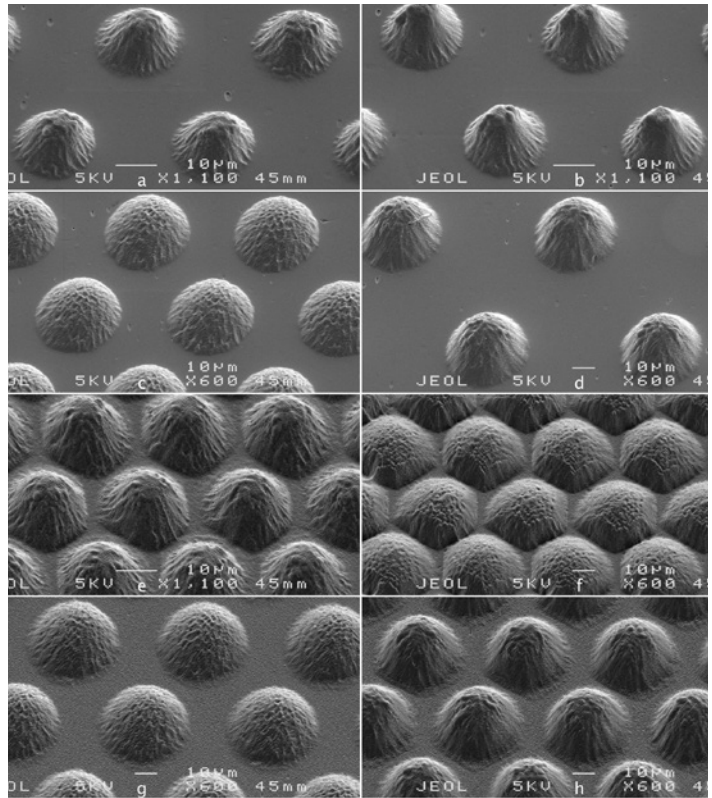
We have produced a demonstrator plaque by injection molding of TPU (thermoplastic polyurethane) into a laser textured mold, demonstrating soft-touch and anti-glare surfaces.

In total eight different textures have been produced. The SEM images to the right show all replicated pillars on textures A to H (from top left to bottom right). The first four textures (A–D) show a low pillar density, and a polished surface between the pillars. The next four textures are closer spaced and the surface between the dimples is nanotextured.

Due to these differences the surfaces show a different reflective behavior, which can be observed on the photograph of the demonstrator sample below.

The parameters that we use to describe the textures are the the pillar base diameter, the pillar height and the pitch. The parameters used on the demonstrator are listed below.

All eight textures exhibit similar soft-touch properties. The different pillar textures however each perform different for various other properties, for example for anti-glare, glossiness, wear resistance, resistance to soiling or anti-fingerprint properties. The variety of textures therefore can be used to obtain an understanding of which texture type is best suited for a given application.



Texture parameters

	A	B	C	D	E	F	G	H
Pillar diameter [μm]	20	20	40	40	20	40	40	40
Pillar height [μm]	10	15	10	20	10	10	10	20
Pillar pitch [μm]	40	40	60	80	25	40	60	50