

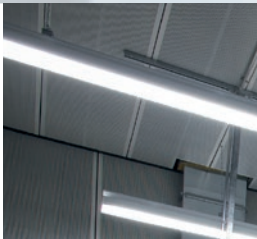
LASERTEC Shape – Series

Design offensive for demanding surface textures in injection moulds.

DMG MORI

LASERTEC Shape – References

The integrated, digital process chain.



LASERTEC 210 Shape at VW in Braunschweig:

The LASERTEC 210 Shape that has been installed in the main tool shop of VW in Braunschweig since May 2011 opens up new possibilities for structuring plastic injection moulds with demanding 3D surfaces for the vehicle interior. The first laser-structured components went into series production in 2012.

Standex ENGRAVING GROUP



The world's largest texturing service provider STANDEX invests in LASERTEC Shape technology:

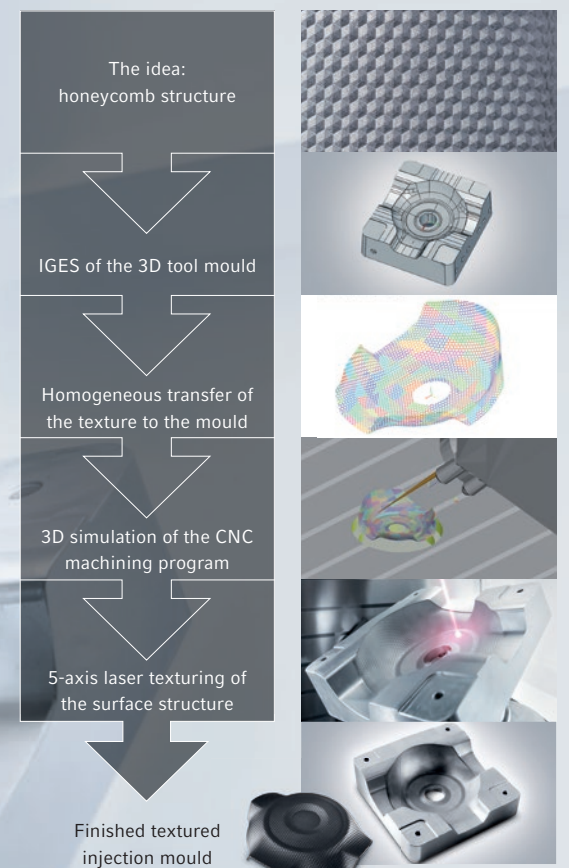
In December 2012 a LASERTEC 210 Shape was delivered to the world's largest provider of textured surfaces, STANDEX, at its northern branch office in Krefeld. The STANDEX network comprises a total of 32 branches, licensees and partners worldwide. (Front page: steering wheel injection mould manufactured by STANDEX)

Global unique selling point



Flexible integration of a laser scanning head in the 5-axis milling machine using the HSK interface. Benefits of the laser scanner:

- + Fitting the tool to the scanner within 10 minutes
- + Key features: water cooling, measurement sensors, cross jet
- + Use of different focal lengths
- + 3-axis scanner with focus control



DMG MORI

Three technologies in one machine

Repeat accuracy of 5-axis milling, laser texturing and laser coating ablation on one precision machine.

1 5-axis milling

Complete milling of the injection mould.

2 5-axis laser texturing

Laser texturing of defined surface structures.

3 5-axis laser ablation

Creating a texture by ablating the coating in a defined manner.

Design offensive for mould construction

Unlimited possibilities for individual 3D textures.

Machine highlights

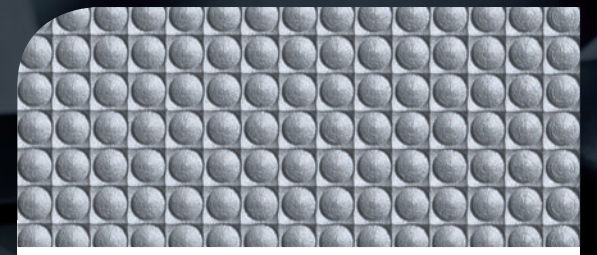
- + **Maximum stability** and **long-term accuracy** as a result of patented monoBLOCK® / PORTAL construction, cooled drive motors and direct distance measurement systems in all axes.
- + **Global unique selling point: Flexible LASERTEC technology integration** via HSK interface enables 5-axis milling and laser texturing on one machine.
- + **State-of-the-art CNC control:** SIEMENS 840D solutionline with user-friendly user interface.

LASER technology highlights

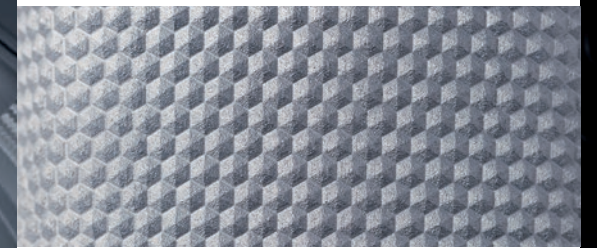
- + **Feasibility of individual demanding 3D textures in free-form surfaces of injection moulds.**
- + The high level of machine accuracy enables **excellent contour precision** and **optimum reproducibility** when laser machining.
- + Laser ablation of coating can be carried out with a **track width of up to 40 µm.**
- + **Highly dynamic, temperature-monitored precision scanner.**
- + **Fiber laser of up to 200 W;** further option of different focal lengths.
- + **Contour-parallel laser shaping:** Laser focus follows the 3D contour of the part.

Process highlights

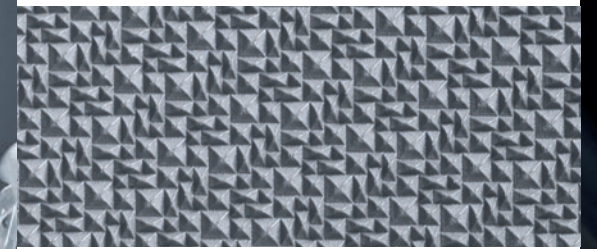
- + **The integrated, digital process chain:** From the idea – to the texture – to the finished structured plastic injection mould.
- + **Central provision of a global texturing network** with standard texturing data sets.



Studded structure



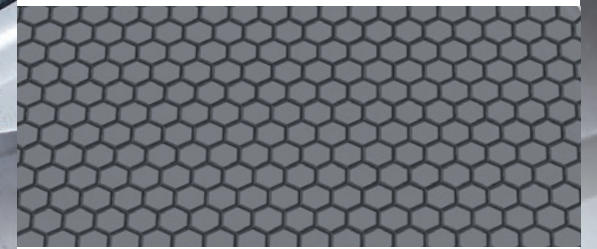
Honeycomb structure



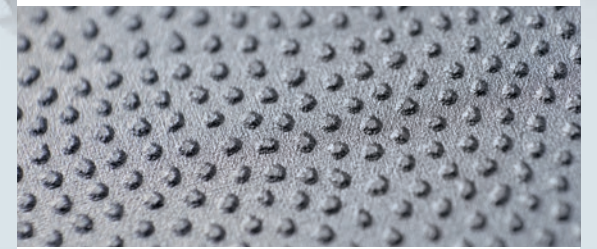
Ripple structure



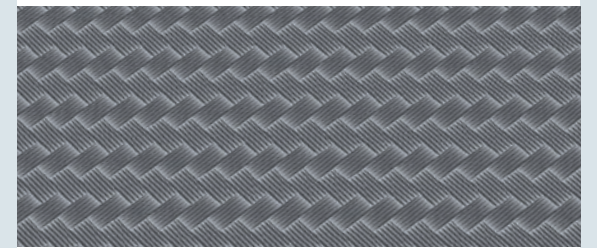
Circular groove structure



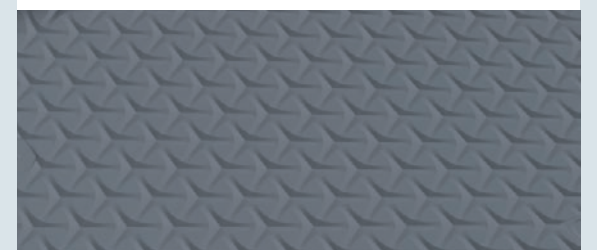
Hexagonal structure



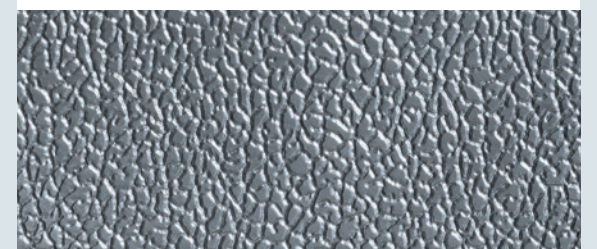
Cell structure



Carbon-fiber structure



Triangular structure



Leather structure

Design-offensive in injection mould construction. The key target market sectors.

Lasershaping – the fast route to achieving individual surface textures in plastic injection moulds.

The time of simple leather grains for automotive interiors has passed, just like that of standard textures of many consumer goods. Thanks to the innovative technology of 5-axis laser texturing on the **highly precise and long-term stable high-tech machines of the LASERTEC Shape series of DMG MORI**, designers of demanding exposed surfaces are no longer limited in what they can achieve.

Geometrically defined surface structures in 3D free-form areas, for example, for interior automotive components such as fittings, steering wheel caps or engine covers, can be manufactured **with the highest contour precision in reproducible quality**.

Global unique selling point

In addition, the **integration of the flexible LASERTEC technology** by means of the HSK interface in a 5-axis milling machine enables milling and laser texturing technology to be intelligently combined on one machine.

The interaction of laser power (fiber laser up to 200 W power output), **the possibility of contour-parallel laser shaping** (depending on the 3D contour of the component, the laser focus can be shifted extremely dynamically to the Z-axis), **and the quick surface calculation** of the software, enables unbeatably quick 5-axis laser machining.

Automotive



Steering wheel cap: honeycomb structure



Engine cover: pyramid structure



Tyre sidewall: carbon-fiber structure



Glove compartment cover: combined honeycomb / leather structure



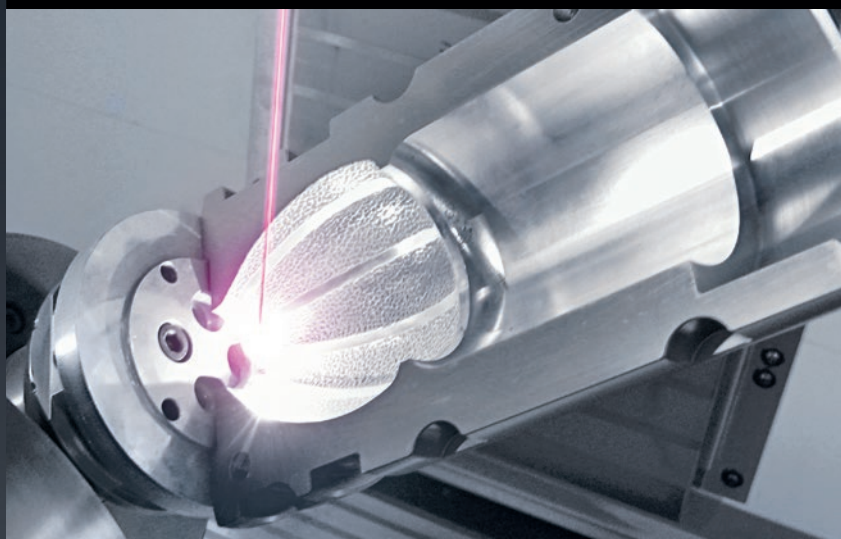
Piston rods: cell structure



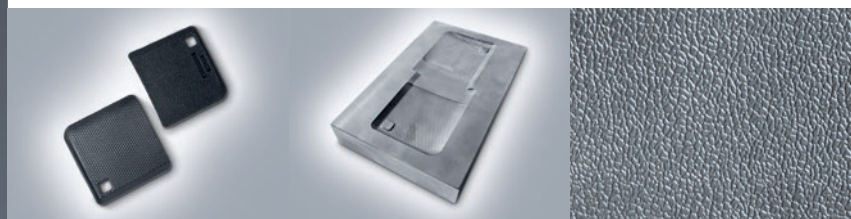
Consumer Electronics



Other mould constructions



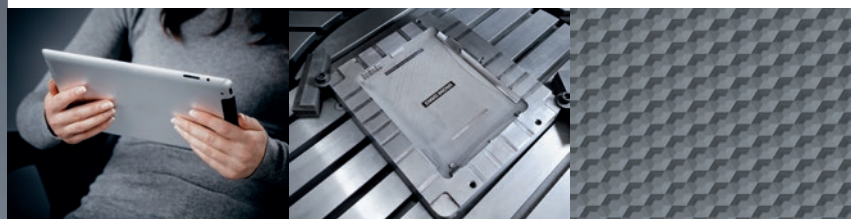
Mobile phone casing: leather structure



Blow moulding, PET bottle: studded structure



Back cover for tablet PC: honeycomb structure



Shoe sole: scale structure



PC mouse: fur structure



Healthcare and cosmetics, tooth brush: honeycomb structure



Camera housing: ribbing



Food industry: 3D engraving



Cordless drill housing: triangular / star structure

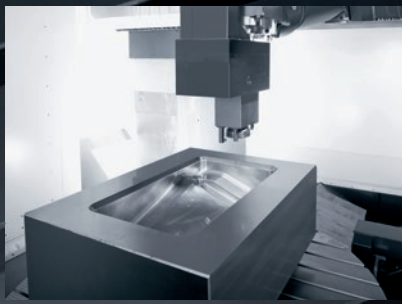
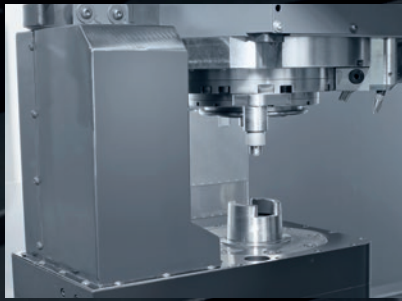
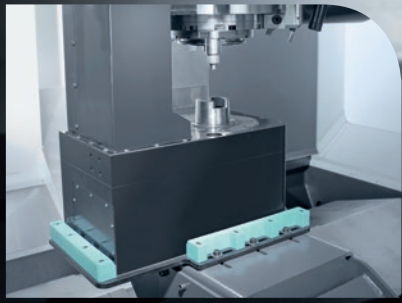


Plastic chair: wood grain



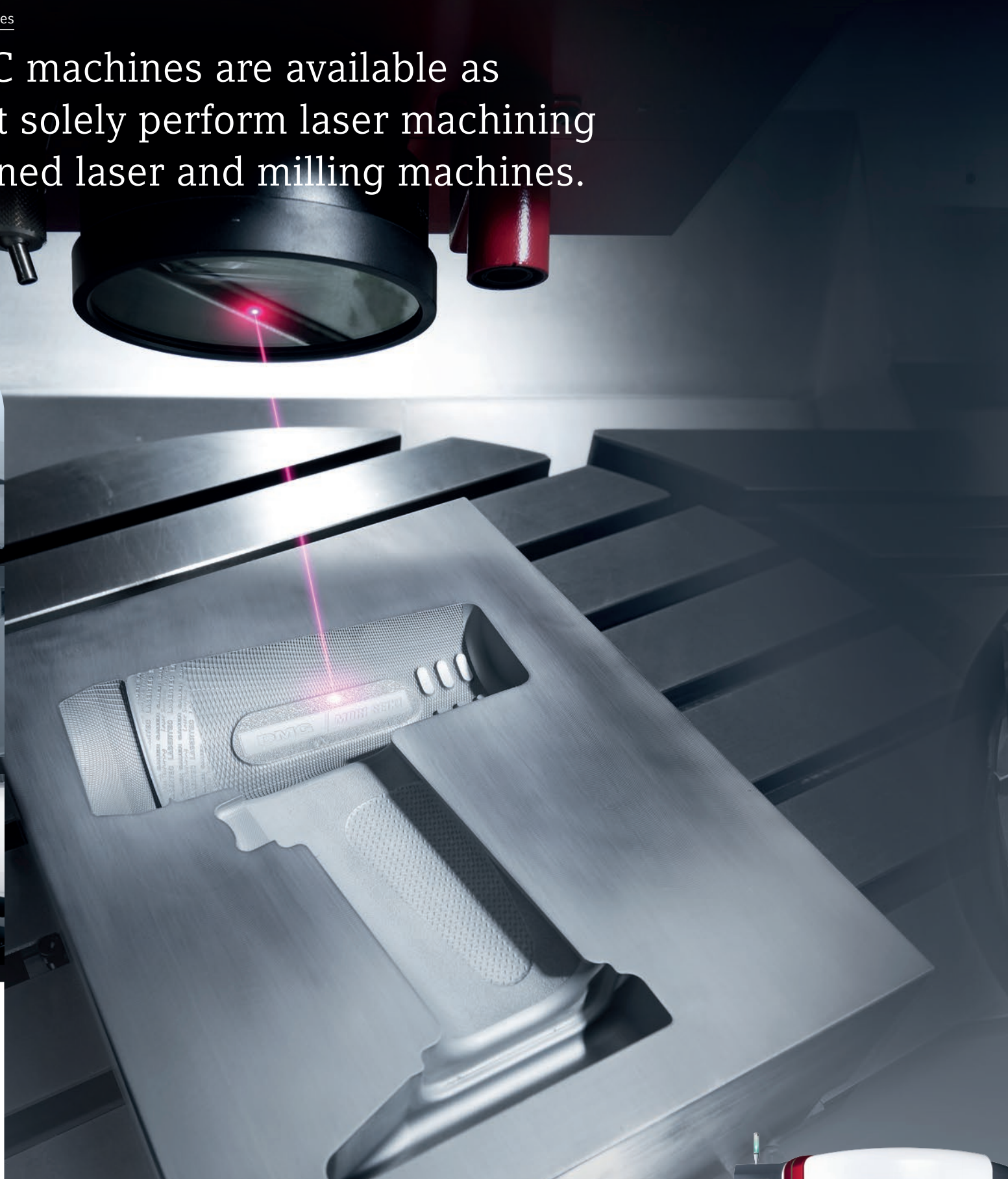
High-end 5-axis laser machining centres

All LASERTEC machines are available as machines that solely perform laser machining and as combined laser and milling machines.



Integration of the laser head (in the milling machine version)

Special external handling system to exchange the spindle head in the spindle via the HSK interface.

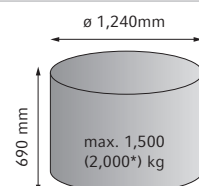
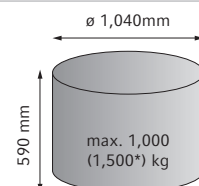
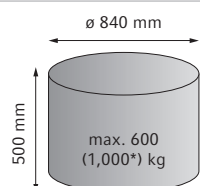


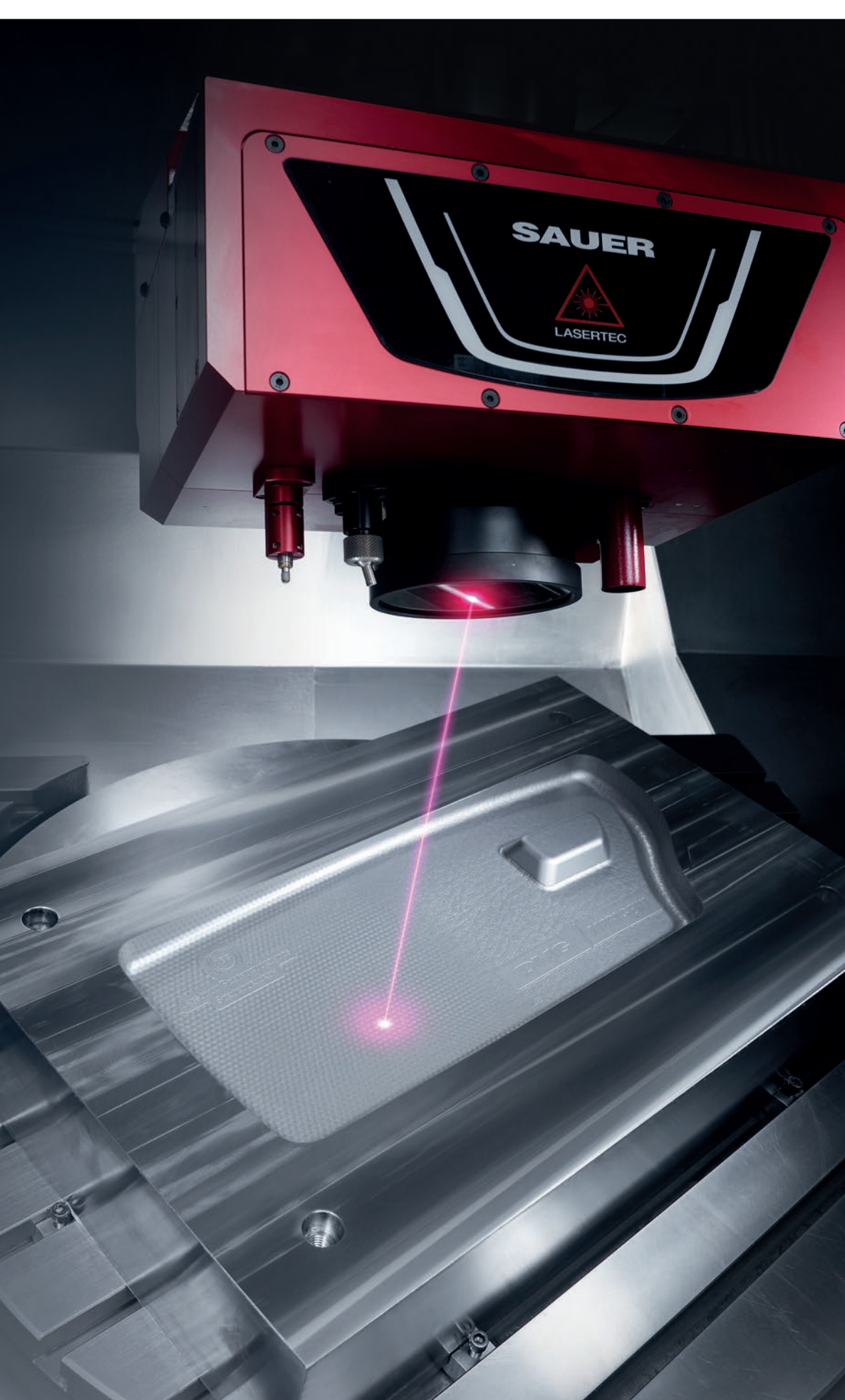
Technical data

		LASERTEC 65 Shape (monoBLOCK®)	LASERTEC 85 Shape (monoBLOCK®)	LASERTEC 105 Shape (monoBLOCK®)
Travel (X / Y / Z)	mm	650 / 650 / 560	850 / 850 / 650	1,050 / 1,050 / 750
Max. workpiece dimensions (5-axis)	mm	ø 840 × 500	ø 1,040 × 590	ø 1,240 × 690
Max. load weight (5-axis)	kg	600 (1,000*)	1,000 (1,500*)	1,500 (2,000*)
Min. installation area (just machine)	m/m ²	approx. 7.9	approx. 11.6	approx. 15
Control system	Type	SIEMENS 840D solutionline with ERGOline® control	SIEMENS 840D solutionline with ERGOline® control	SIEMENS 840D solutionline with ERGOline® control



Laser power: Fiber laser of up to a max. 200 W power output with different focal lengths.





Flexible technology integration

Global unique selling point of 5-axis milling and laser texturing on one machine.

+



Maximum stability/long-term accuracy

Patented monoBLOCK® / PORTAL construction, cooled drive motors in X and Z and direct distance measuring systems in all axes (10 µm positioning accuracy).

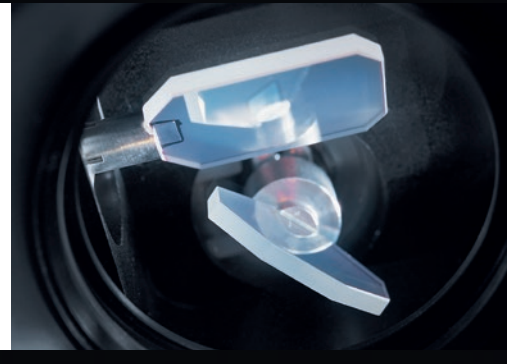
+



Precision

Highly dynamic, cooled precision scanner optics.

+



State-of-the-art CNC

High-performance and user-friendly CNC control system of the latest generation.

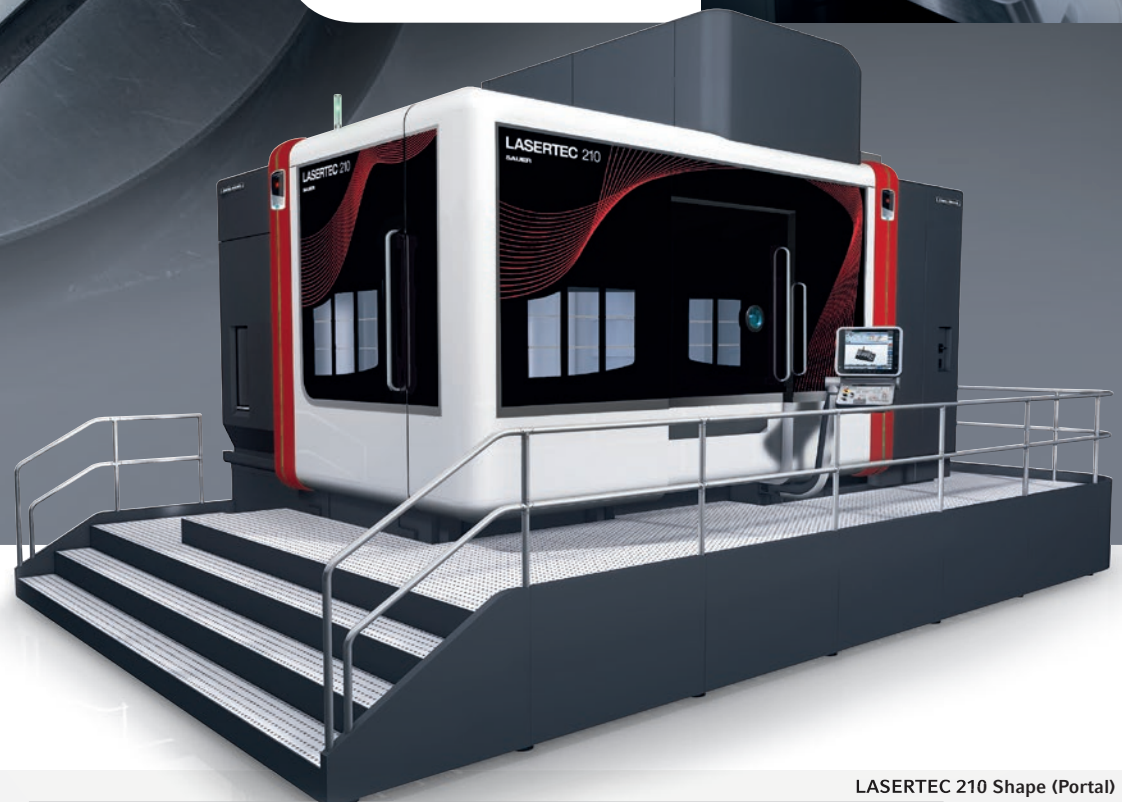
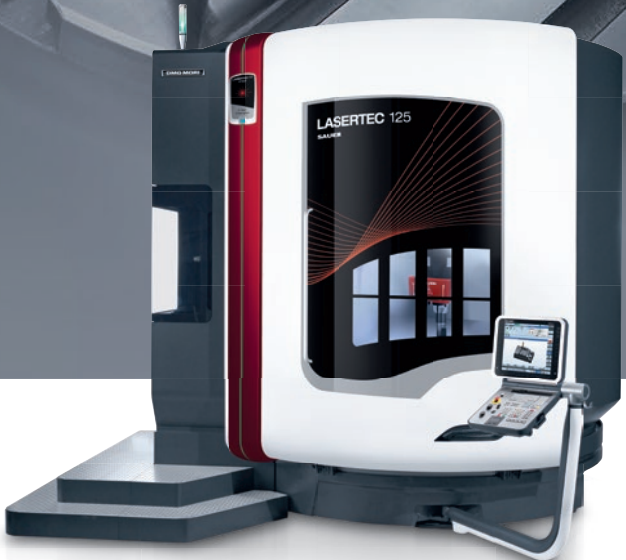
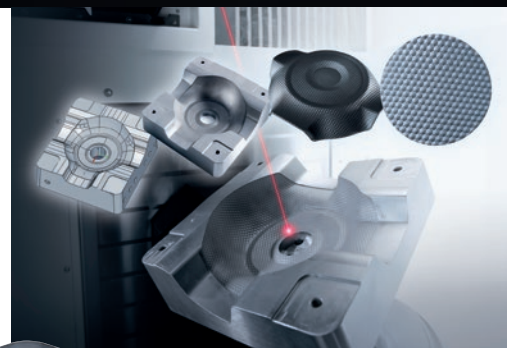
+



Integrated process chain

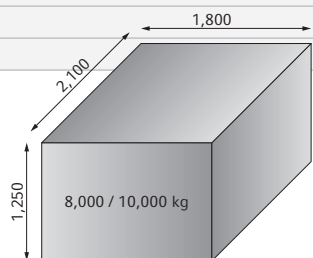
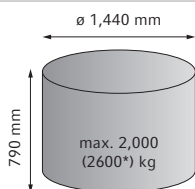
Highly flexible from the customer's specific idea – to the IGES of the mould – to the laser structured injection mould.

+



LASERTEC 125 Shape (monoBLOCK®)
1,250 / 1,250 / 900
ø 1,440 x 790
2,000 (2,600*)
approx. 20
SIEMENS 840D solutionline with ERGOline® control

LASERTEC 210 Shape (Portal)
1,800 / 2,100 / 1,250
ø 2,000
8,000 (option: 10,000)
approx. 44
SIEMENS 840D solutionline with ERGOline® control

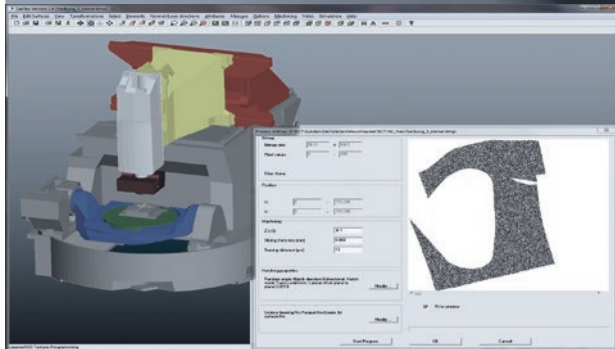


* solely laser machining machine

The integrated, digital process chain – from the idea to the finished textured injection moulded part.

Highlights

- + Cross-process LASERSOFT 3D texture: from the greyscale bitmap to the finished textured component.
- + Unlimited possibilities when designing individual structures.
- + Transition-free "patching" even of large exposed surfaces.
- + 3D simulation with accessibility verification and collision check.
- + Projection of the texture on free-form surfaces using standardised software tools.
- + Fully automatic generation of the 5-axis laser machining program.



LASERSOFT 3D texture

Several intelligent, application-specific software features such as the "variable patch area sizes" or "complete process simulations" guarantee optimum results.



Contour-parallel laser shaping

Depending on the 3D contour of the part, the laser focus can be shifted by means of a Z-shift extremely dynamically to the Z-axis. Not every track that is to be laser machined needs to be readjusted with the laser head or entire workpiece to the Z-axis, thus enabling faster laser machining.



Central provision of texturing data

The integrated, digital process chain makes it possible for central standard texturing data to be generated, which, in turn, can be distributed to branch offices, licensees and texturing partners. This means that the same part can be manufactured with the same texture across the world.



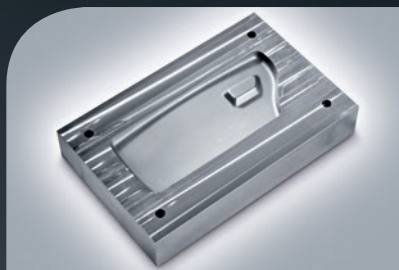
Three simple paths to an individual texture

1. Create the texture using a CAD program
2. Create the texture using a graphics program e.g. Photoshop, Gimp, etc.
3. Scan a real 3D object, for example, using a 3D scanner



5-axis milling combined with 5-axis laser texturing

EXAMPLE 1
Glove compartment cover (automotive)



EXAMPLE 2
Smartphone cover (electronics)



Milling the mould



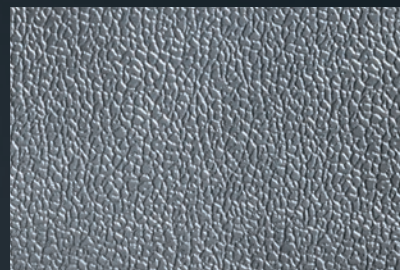
Solely 5-axis laser machining



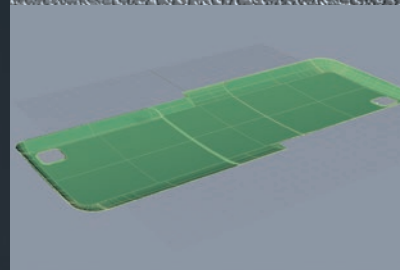
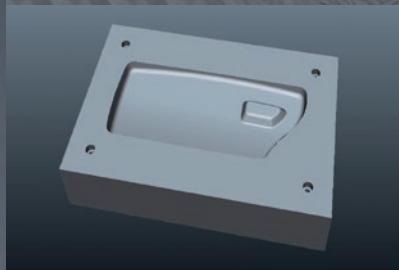
EXAMPLE 1

SHAPE PROCESS CHAIN

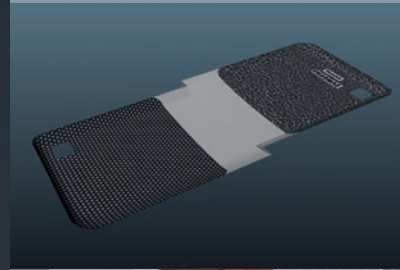
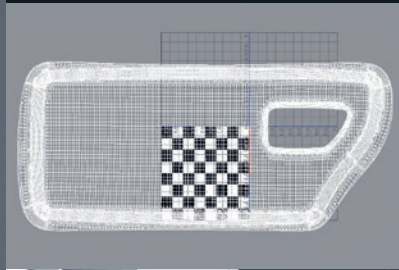
EXAMPLE 2



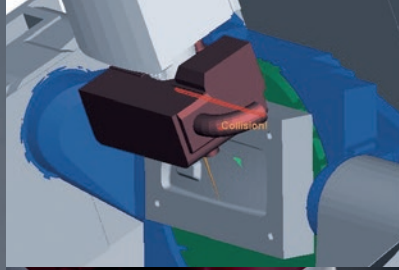
Texture that is to be structured



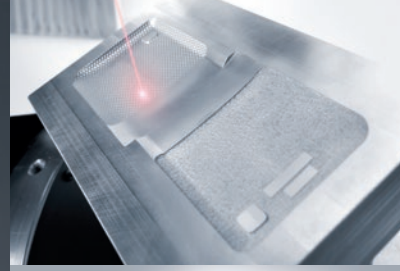
IGES of the 3D tool mould



Homogeneous transfer of the texture to the mould



3D simulation of the CNC machining program



5-axis laser texturing of the surface structure



Finished textured injection mould



Plastic injection mould parts