

Media Release

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GF Machining Solutions' AgieCharmilles LASER S: a high-value asset for industrial designers in the quest for sustainability, functionality, productivity and quality

Sustainability, functionality and inspiration are the heart and soul of powerful industrial design, and GF Machining Solutions' new, fully digital AgieCharmilles LASER S Laser texturing series has proven itself as a high-value asset to industrial designers. The solution delivers flawless quality and unprecedented design freedom at a controlled cost due to an unprecedented machining efficiency.

Geneva, Switzerland-based creative studio and design consultancy Stojan+Voumard recently confirmed the five-axis LASER S series as a high-value asset for industrial designers. In a research collaboration with GF Machining Solutions, Stojan+Voumard Senior Designer and Computer-Generated Imagery (CGI) Team Manager Guido Lanari designed a concept product to put the series to the test.

"I see industrial design as a merger between art and technique," said Lanari, whose professional experience includes projects for Bulgari, Rolex Baselworld, SIG and KitchenAid. "We have solid knowledge in production processes and technical terms, but we also develop a sensitivity for aesthetics, user experience and communication in every aspect."

Conventional methods' challenges

Moreover, while there is solid evidence that design innovation results in better product market performance, existing surface texturing technologies such as chemical etching limit designers in terms of surface design predictability, and ecological sustainability targets. In the past Laser texturing generated high cost per part, but the LASER S changes the game because its efficiency makes the technology more affordable.

Chemical etching, the long-favored method of texturing high-value parts and tools like injection molds, involves the use of corrosives (acids) and time-consuming workpiece masking (selectivity) to carry out the layer-by-layer process. And, because the chemical etching process is a manual one, it is both labor-intensive and subject to human error. Additionally, because it depends on a chemical reaction, straightness and consistency of the pattern application can be difficult to achieve and maintain across production runs, and users may be forced to sacrifice dimensional tolerance. At the same time, emerging technologies are slow and do not deliver the high-quality finishes targeted by industrial designers and their customers.

Testing Laser texturing

To put the LASER S series to the test, GF Machining Solutions challenged Lanari to design a concept product integrating a variety of simple to complex surface characteristics. Lanari's design for a highly stylized 120 x 120 x 110 mm bird intentionally incorporated distinct machining challenges. These included a 30-degree undercut from the front of the design extending to the under- and inside of the workpiece, double curved surfaces, and difficult-to-achieve seamless transitions between elaborate surface geometries.

The form was first roughed from a 150 mm cube of aluminum, using GF Machining Solutions' Mikron MILL X 600 ultra-high-speed machining center. The machining strategy and cutting operation sequence were key to achieving the high workpiece quality targeted by Lanari: Ra 0.2 µm surface finishing and absolutely no chatter-induced marks on the surface.

Flawless finishing with Laser texturing

The AgieCharmilles LASER S 1000 U was chosen for the surface finishing operation. The machine's accuracy and optical focus point shifter (high-speed 3D scanning system) allowed it to follow the true surface of the part with the Laser focus, reducing overall machining time and eliminating the risk of quality deviations.

Challenges to the Laser texturing process ranged from extreme machining conditions to the complexity of geometrical surface textures—such as honeycomb—specified by the design, as well as Lanari's incorporation of a 30-degree undercut and a workpiece interior with a sandblasted appearance. The machine's all-in-one dedicated GF Laser workstation software—the most powerful on the market—made it possible to achieve these critical features. The digital solution allows in-depth job preparation control, so industrial designers can ensure flawless reproduction of their concepts, all the way through to UV mapping for applying textures and 3D simulation to achieve perfect reproduction with no surprises.

In total, Lanari's design incorporated three different textures, ranging from complex honeycomb geometry, as well as both organic and geometrical patterns and a sandblasted interior surface achieved with Laser blasting.

Geometrical patterns—which convey a modern, cutting edge image—are increasingly requested in the product design industry. However, geometrical grains mean complexity in execution with standard technology: a single deviation in the mapping process will be naturally seen by the end customer. That dilemma is solved by GF Machining Solutions' Laser technology, which masters such complexity and makes way for computer-aided design (CAD) and computer-aided manufacturing (CAM) levels in the manufacturing world. These game-changing characteristics account for the LASER S series' extreme performances in terms of quality of execution.

Matt product surfaces, which bring another dimension of touch and feel to future products, are another feature on product designers' wish lists. In the past, matt surfaces required techniques

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such as sandblasting or chemical etching—two manual methods posing a high risk of errors—or die-sinking Electrical Discharge Machining, a difficult process for large 3D areas. The LASER S series defeats all of these challenges and delivers perfect blasting operations in terms of grain position as well as homogeneity—even on the most complex 3D parts.

Executing fine patterns were another challenge that Lanari wanted to conquer with Laser technology. The reason? Perfectly precise application of such fine textures to complex shapes is yet another product design challenge that traditional and manual methods leave unresolved. The LASER S series performed well in executing perfect brush pattern designs with irreproachable reproducibility of the grain position.

“It is interesting to know that there are solutions out there that allow us to push the limits. As designers, we need technology in order to innovate, and the finishing of a product is an extremely important part of a design. The finishing is what conveys quality,” Lanari explained. “Laser texturing adds value and gives us more tools to apply graphic designs in three dimensions. Knowing that we can now apply any kind of pattern to any kind of shape definitely opens a lot of doors for creativity.”

With the new LASER S series, GF Machining Solutions enables more design possibilities at a controlled cost per part. Brands—and the product designers who serve them—now have access to the right technology to meet current and future demands.

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Picture caption:

This complex textured integrated into this highly stylized aluminum bird, designed by Stojan+Voumard's Guido Lanari, prove the AgieCharmilles LASER S texturing solution's position as a high-value asset to industrial designers.



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The LASER S 1000 U's accuracy and high-speed 3D scanning system made it possible to follow the true surface of the part with the Laser focus. The results were reduced overall machining time with no risk of quality deviations.

**Profile of GF Machining Solutions**

GF Machining Solutions is the world's leading provider of machine tools, diverse technical solutions and services to manufacturers of precision molds and tooling and of tight-tolerance, precision-machined components. The key segments we serve include the aerospace, automotive, medical, energy, information and communications technology (ICT) and electronics industries. Our extensive portfolio ranges from Electrical Discharge Machining (EDM) solutions, three- and five-axis Milling machines and Spindles, 3D Laser texturing machines, Additive Manufacturing and machines for Laser micromachining to solutions for Tooling, Automation, Software and Digitalization—all backed by unrivaled Customer Services and support. GF Machining Solutions is a globally acting Division of the Georg Fischer Group (Switzerland) and maintains a presence at 50 locations worldwide. Its 3,394 employees generated sales of CHF 1,066 million in 2018. More information can be found at www.gfms.com

