# Fizik Captures EUROBIKE Gold with Carbon’s 3D Printed Custom Saddles

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Rob Spiegel July 22, 2025

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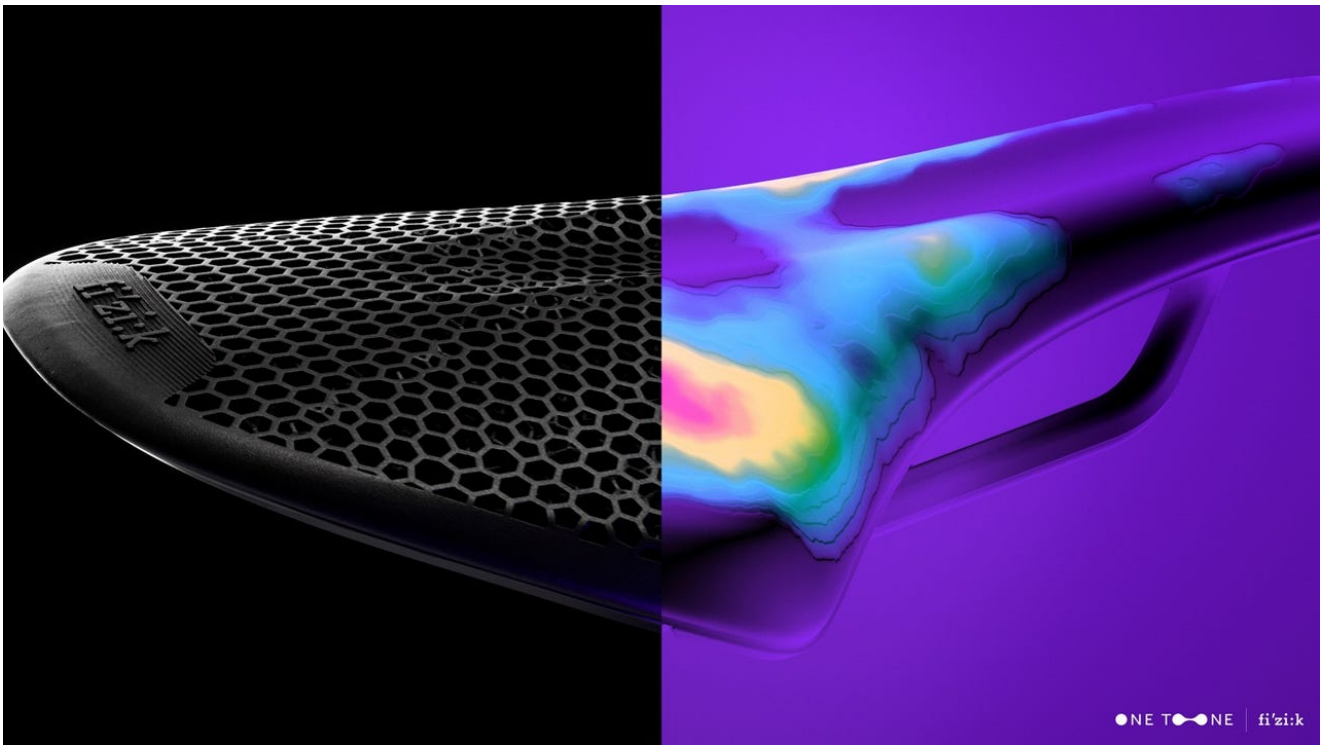


Carbon

## At a Glance

- Fizik's One-to-One program replaces traditional saddle fitting with dynamic pressure mapping.
- Carbon's 3D printing creates variable-density structures to provide support and pressure relief.
- The process combines GebioMized's biometric analysis with Carbon's integrated hardware, software, and materials expertise.

Fizik’s One-to-One custom saddle program has been awarded Gold in the Components category at the 2025 EUROBIKE Awards – one of the cycling industry’s most prestigious recognitions for innovation and design. Developed in partnership with bike-fit specialists GebioMized and powered by Carbon’s advanced 3D printing technology, the program delivers next-gen, fully bespoke saddles tailored and optimized for each rider’s unique pressure profile.

The process captures a rider's biometric data and pressure mapping through dynamic fit sessions, which is then used to design a saddle with precisely tuned comfort zones. Using Carbon's Digital Light Synthesis process, each saddle is 3D printed with complex lattice structures that enable rider-specific cushioning – firm where stability is needed, softer where pressure relief is critical. The result is measurable gains in support, pressure distribution, and overall performance. Fizik's saddle design replaces traditional trial-and-error saddle selection with a scientific, data-driven approach.


Image courtesy of Fizik.

## Carbon's additive manufacturing technology

Each Fizik saddle features an elastomeric lattice structure with varying densities. Thicker struts provide support where needed, while thinner sections offer greater comfort in pressure-sensitive areas. The entire process takes approximately four weeks from fitting to delivery.

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Carbon uses DLS (digital light synthesis) to produce the saddles. "DLS is the term used for the style of 3D printing our printers use," Andrew Sink, staff applications engineer at Carbon, told Design News. "The Carbon DLS process uses a cassette or vat of resin with an oxygen-

permeable film. We have a platform that lowers into the vat of resin, and then an image is projected from below. That image polymerizes a single layer, and then the platform retracts, allowing fresh resin to flow in and the object to continue growing."

As for materials, Carbon uses dual-cure resins. "We use thermoset resins that have a secondary part B that goes through a secondary bake cycle," said Sink. "Our parts come out of the printer and then go into an oven to fully polymerize and cure. The resins are very viscous, almost like honey. It's a much thicker resin than you would see in a one-part resin. Our process helps mitigate the suction force by using an oxygen-permeable layer that we call the dead zone."


Image courtesy of Fizik.

## The DLS process developed by Carbon

The DLS process was created by Carbon's original leader. "The founder of Carbon, Dr. Joe DeSimone, is the inventor of the DLS technology, along with a few other co-inventors," said Sink. "It was originally called CLIP (continuous liquid interface printing). The name changed, but the core technology is very similar."

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As well as developing the process, Carbon also originated the material. "The materials were also developed by Carbon, which gives us a lot of control over the full process," said Sink. "Our printers represent what we like to call hardware, software, and material science. We own all three legs of that stool. We build the machines, we develop the software (carbon design engine), and we focus on material science. We're not just using off-the-shelf materials."

## The backbone printer technology

For the custom saddles, Carbon uses its L1 printer. "One of the biggest improvements we've made in 3D printing is the Carbon L1 printer. We use it for saddles and shoes because the platform is very large," said Sink. "We use that printer because we discovered many of the improvements to print speed and dimensional stability are done in the scripting or pre-processing stage."

The printer is a closed-loop hardware mechanism with a motor and a platform that lifts. "We designed the printer to not only talk to itself but for us to listen in," said Sink. "We have sensor-rich printers. We monitor the force from the platforms lifting, the speed at which it moves, and keep a very close eye on how it's moving. Then we're able to iterate the scripting.

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## The software brains behind custom sports

The software used in the process is also a proprietary system developed by Carbon. "We use an in-house software called Carbon Design Engine. Carbon printers like the L1, M3, or M3 Max benefit from printing parts that have a lower cross-sectional area," said Sink. "When you have a projection coming from below to cure a layer, the larger that cured layer is, the more suction when you lift."

The software paves the way to a solution. "You can simulate the properties of a solid object by printing a lattice structure. A lattice structure is a 3D extruded pattern that moves in different directions," said Sink. "You get a part that has isotropic properties by default in the

material, but with the lattice, you can tune the parameters. You can have a lattice that's very stiff in one direction but very squishy in another, or maybe it shears but can't be compressed."

The Carbon Design Engine was created to provide a solution. "We developed this software because we needed a solution to create these lattice structures for products like shoes, bike saddles, and helmet padding," said Sink. "There weren't many off-the-shelf solutions for creating these structures."

## Custom football helmet liners

Carbon also works with the football helmet manufacturer, Riddell, to produce 3D printed football helmet liners. The two companies develop 3D-printed helmet liners contoured to the athlete's head. This collaboration recently saw a major milestone: Riddell's Axion 3D helmet was ranked #1 in the NFL's 2025 Helmet Laboratory Testing Performance Results, a program that evaluates which helmets best reduce head impact severity.


Image courtesy of Riddell.

Using DLS technology, Carbon engineers create lattice structures that outperform traditional foam padding in impact absorption and protection. The collaboration leverages Carbon's Design Engine software to create precisely tuned lattice patterns that respond differently to various impact forces. Each helmet liner contains multiple zones with customized densities and compression properties based on position-specific impact data collected from on-field collisions.

Carbon's elastomer materials help with the creation of complex, interconnected structures impossible to manufacture through traditional methods. The resulting Diamond helmet technology absorbs impacts more effectively while maintaining comfort and breathability.

## About the Author

Senior Editor, Design News

Rob Spiegel has covered technology since the dot com boom when he joined the thousands of journalists drinking from the firehose of upside-down business ideas. When the crash came, he moved to Electronic News and then its sister publication, Design News.

Rob now serves as a senior editor for Design News. He started with the magazine by running the RoHS Electronics Transition site. He went on to cover automation, manufacturing, 3D printing, robotics, and AI. When a new industrial technology shows up, Rob covers it.