

The digital acetate, as seen in the model »M.E. 01« from MISSION EYEWEAR, brings colors to life with stunning transparency and brilliance.



photography : GENERA
stills : RAPHAEL SCHMITZ

GENERA — 3D PRINTED EYEWEAR FOR THE OPTICIAN

Next Generation Of Bespoke Eyewear

3D-printed eyewear has successfully established itself in the optics industry within just a few years, but the core value chain has remained unchanged: the manufacturer produces the physical product – the glasses – and delivers it to the optician. GENERA is now taking things a step further. With the G1/F1 system, opticians can print glasses on-site, tailored to the customer's preferences. To achieve this, GENERA provides opticians with base designs from its own brand, MISSION EYEWEAR. However, opticians can also create their own designs or – according to GENERA's vision – use designs from other eyewear labels under a licensing agreement. A tech talk with GENERA founder Dr. Klaus Stadlmann.



Klaus, when did you found GENERA and MISSION EYEWEAR, and what was your original intention?

I founded GENERA in 2015 with the goal of rethinking and revolutionizing 3D printing. That became the foundation for our products and systems, and ultimately for MISSION EYEWEAR as well.

What was the initial spark? Was there a specific moment when you thought “I have an idea for this”?

The idea came during a conversation with a friend who’s an optician. He said, “Build me a system that allows me to print glasses in my shop.” That set everything in motion.

Where does your expertise in such a highly complex field come from?

I studied mechanical engineering at TU Wien and went on to complete a doctorate in 3D printing. Even as a student, I was aware of the potential of this technology, but my focus was on simplifying and automating the process.

Your work is entirely centered around 3D-printed eyewear. What do you see as the key advantages of 3D printing?

The advantages are multifaceted, and not just in terms of production costs. We also generate up to 95 percent less CO2 emissions, and there’s no need for inventory since production can be done on-demand. Eyewear designs can



be easily created or downloaded and customized using a 3D scan.

Your larger production systems have been used in the industry for some time. Now you’ve developed the smaller G1/F1 system. Who is it designed for?

With the G1/F1 system, we’re providing opticians with a tool for in-shop production of eyewear frames and giving labels a platform. The system, consisting of the G1 (printer) and the F1 (post-processing unit), is an automated, user-friendly 3D printing system with a streamlined and elegant workflow.

So, the optician can now create

custom eyewear for their customers?

Exactly – and in a way that’s economical, flexible, environmentally friendly, on-demand, and available in all colors and shapes. With the help of an iPad, the optician can quickly and conveniently adapt designs to the customer using a 3D scan and send the file directly to the printer.

Doesn’t that require significant technical expertise?

Not at all! Our system is fully automated and easy to operate. A pair of glasses can be produced with just a few clicks.

What does the process look like in detail?

The optician needs a 3D model of the glasses. Our CAM software generates a specialized dataset from this model and sends it to the system – essentially just like printing a PDF. Then, a material cartridge is inserted into the G1 printer along with an empty shuttle. During the printing process, the liquid resin in the material unit is cured layer by layer, and the glasses emerge step by step from the liquid. Once printing is complete, the glasses are geometrically finished but still need to be washed and hardened in the F1 post-processing unit. This step is also fully automated. Afterward, the glasses are ready and can be removed.

How long does the process take?

In about two to three hours, the custo-

“I WAS VERY SURPRISED AT HOW EFFORTLESSLY AND EFFICIENTLY I CAN EASILY PRODUCE 6 PAIRS OF GLASSES A DAY WITH THE G1/F1 SYSTEM WITHOUT ADDITIONAL STAFF. THIS IS A REAL GAME CHANGER.”

Roland Bischel, Optician

mer can pick up their finished glasses.

Of course, the optician can also use our system to pre-produce frames. Multiple glasses can even be printed simultaneously, without increasing production time.

What makes your material so special?

What always bothered me about 3D-printed glasses made from “powder” was that they weren’t available in vibrant colors or transparent options. Our system uses liquid photopolymer resins, which offer numerous advantages. For one, the optician can mix any color they want, and the material can be adjusted with hot air. Our “Digital Acetate” meets all standards and is biocompatible. It can be sanded, polished, drilled, and more. The smooth surface is also easier to clean and more hygienic.

You call your material “Digital Acetate.” Why?

Our material and processes allow for the production of brilliant colors and even transparencies. Tactilely and visually, we’re operating on the same level as acetate, which is a true breakthrough.

Can the material match acetate functionally as well?

Yes, it can and must. Glasses are highly demanding and personal products. The material has to meet both mechanical and aesthetic requirements. We’re also developing new materials for silicone pads, cases, flexible frames (sports glasses,

kids’ glasses), and hinges.

How exactly does the color mixing work?

For this, we have the C1 Color-Mixing System, which combines various base colors to automatically mix almost any desired shade in the exact quantity needed.

Now for perhaps the most exciting question: Where do opticians get the eyewear designs?

When purchasing our system, we offer a special starter package. It includes five colored material cartridges and our MISSION EYEWEAR designs, allowing the optician to get started quickly and easily.

How many models are currently in the MISSION EYEWEAR collection?

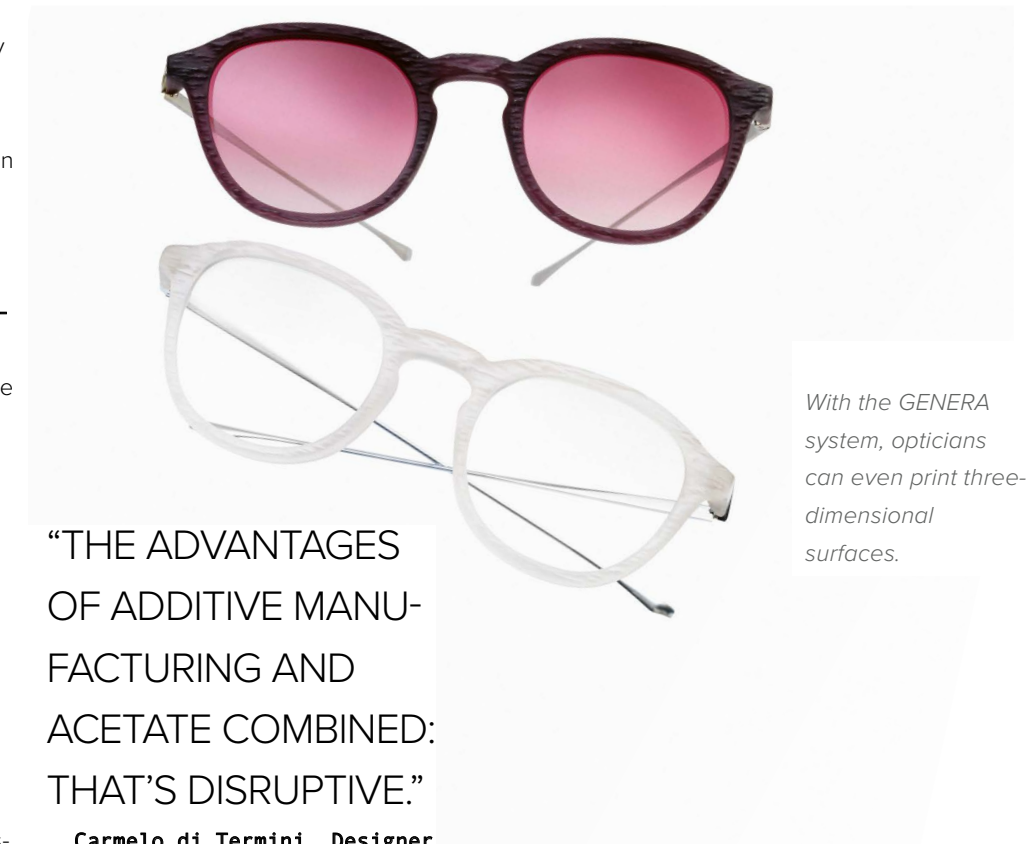
Currently, there are seven models, each available in three variants – that’s 21 different designs in three different sizes. To customize the designs to the customer using a 3D scan, the optician only needs an iPad and a specialized app.

Can opticians create their own eyewear designs?

Of course, opticians can create their own designs. I see this as a fantastic opportunity to position themselves locally as innovative opticians.

Step 1: Printing the frame in the G1 Unit (Printer)

Step 2: Post-processing in the F1 Unit (Post Processing Unit)



With the GENERA system, opticians can even print three-dimensional surfaces.

“THE ADVANTAGES OF ADDITIVE MANUFACTURING AND ACETATE COMBINED: THAT’S DISRUPTIVE.”

Carmelo di Termini, Designer



Dr. Klaus Stadlmann –
a PhD engineer and 3D
printing enthusiast –
founded GENERA back
in 2015.

How does that work technically?

To create their own designs, they need a 3D model. Opticians can collaborate with a designer to develop a collection or create the designs themselves using CAD software. There are also tools available that allow for easy design creation based on basic shapes, even without CAD experience. Depending on how deep they want to dive into the subject, there are various solutions. We're happy to provide advice and support.

You're taking things a step further, positioning yourselves not just as hardware manufacturers but also as a design-hosting platform, like Spotify or Apple Music. What does that look like?

A label can make its designs available to opticians on our platform for a download fee. This allows brands to establish a new digital business model alongside their traditional sales structure.

What are the advantages for brands?

Brands can quickly and easily implement new designs and establish a new line

without needing to maintain physical inventory. This eliminates collection risk and reduces the need for upfront financing. Another advantage is the significant reduction in CO2 emissions, as there's no need for physical shipping.

How do you ensure that brands are properly compensated for each pair of glasses sold?

Each download is encrypted and can only be printed once. This ensures a sustainable business model for the labels. Brands can even specify that their designs can only be printed in certain colors.

Doesn't this risk cannibalizing a brand's own collection?

Not at all – it's still their collection, but now it's also digitally available! It's a huge opportunity for labels to differentiate themselves and use a digital line to open up new markets. Brands can expand globally faster and scale more easily through digital distribution. They also have greater control over their designs and can see when and where a design was downloaded. Labels can even offer greater variety, introducing bolder designs exclusively as digital options at first.

What ready-to-use designs can opti-

cians currently access, aside from MISSION EYEWEAR?

We're working with various partners. I can already mention *Cabrio Eyewear*, *YourEyewear.com*, and *Raydiant*. There's a lot happening in this space!

Do you think the platform model – similar to streaming services – will establish itself in eyewear production as well?

Yes, because it offers so many advantages for both brands and opticians. A digital in-store production process enables possibilities that were previously unimaginable.

Doesn't the G1/F1 system require an investment that's unaffordable for most opticians?

The acquisition costs are comparable to those of a lens edging machine. The *G1/F1* system pays for itself after the optician uses up the 5 kg of complimentary material included in the starter package.

How many glasses would an optician need to sell to achieve that?

Five kilograms of material produce about 200 to 250 glasses. Our customers' experience shows that most opticians can easily reach this volume within a year.

Thank you very much. ▽

