



www.genera3d.com

www.mission-eyewear.com

GENERA.



Join the Revolution.

GENERA and Mission Eyewear.

At GENERA, our passion for 3D printing led us to reimagine the additive manufacturing process. Working with 3D printers daily, we recognized the need for better manufacturing solutions and conceived the idea for an In-Shop eyewear production.

That's why we created the G1/F1 system – a digital, fully automated 3D-production workflow explicitly designed for eyewear.

With our dedicated 3D printing workflow, you can expect reliable, clean, and fast production, providing you with the freedom to explore endless ideas and unleash your creativity.

The G1/F1 system seamlessly integrates printing and post-processing, ensuring improved and repeatable results.

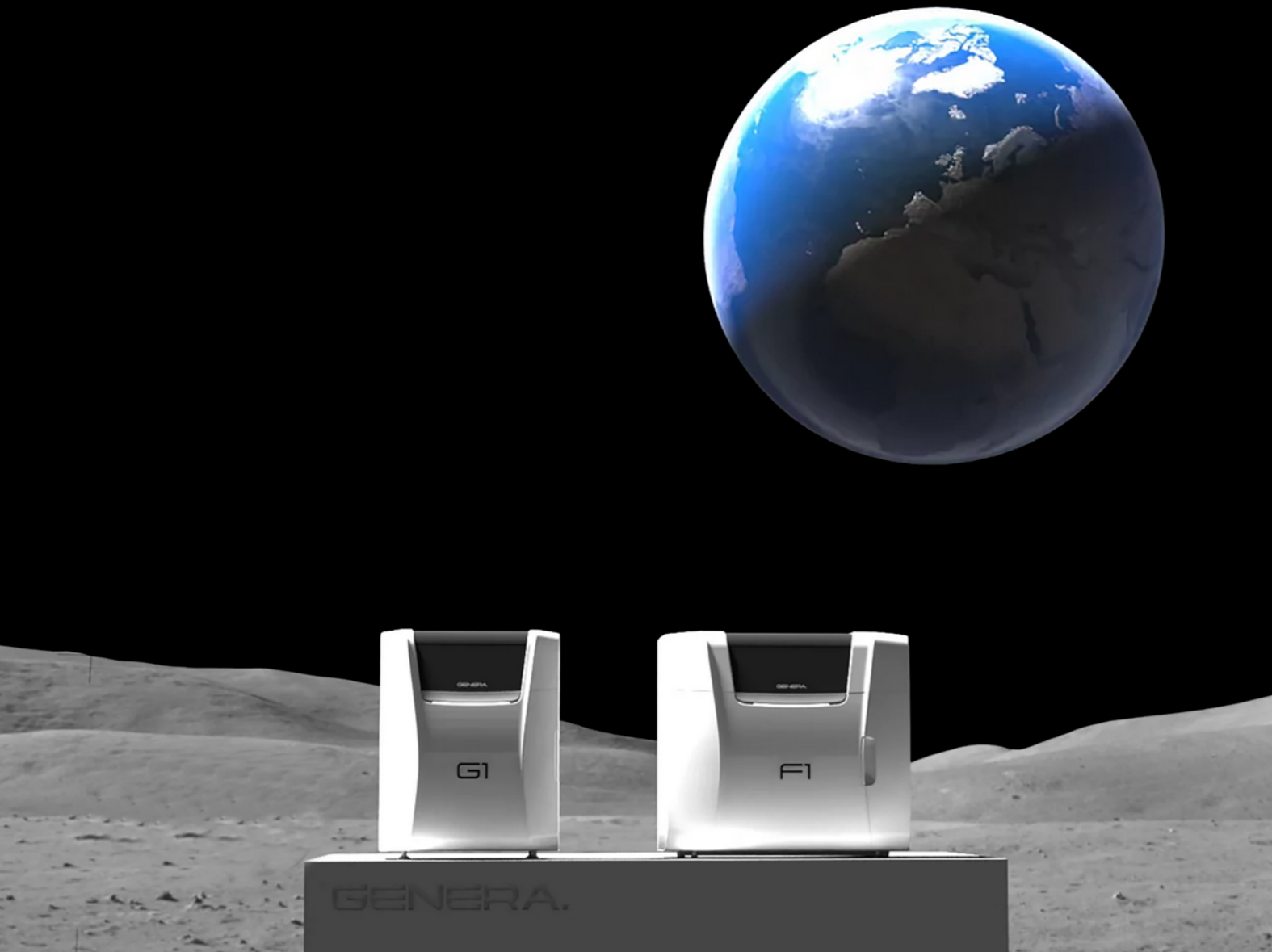
Join us in transforming the eyewear industry with our comprehensive and innovative approach to additive manufacturing.

Unlock new possibilities for your eyewear business.

GENERA,
Creation made reliable.

DI Dr. techn. Klaus Stadlmann,
Founder & Managing Director of GENERA.

GENERA Mission Eyewear.



The GENERA G1/F1 System.



EN

Mission Eyewear empowers opticians to provide personalized eyewear quickly and efficiently, transforming the eyewear industry through an automated workflow.

Opticians can download high-quality glasses frame designs and produce them on demand using the GENERA G1/F1 3D printing system. By decentralizing the production of 3D printed eyewear, opticians have greater control and flexibility in offering customers a wide range of customizable options, vibrant colors, and impeccable surfaces.

FR

Mission Eyewear est une plateforme qui vise à décentraliser la fabrication de lunettes en 3D. Elle permet aux opticiens de télécharger des modèles de montures de haute qualité et de les imprimer à la demande dans leurs magasins. Grâce à l'automatisation du système DLP G1/F1 de GENERA et aux résines liquides spécialement développées par Henkel. Les opticiens peuvent proposer aux clients un large assortiment d'options personnalisables, une large gamme de couleurs brillantes et de surfaces parfait.

IT

Mission Eyewear consente agli ottici di fornire occhiali personalizzati in modo rapido ed efficiente, trasformando il settore dell'occhialeria attraverso un flusso di lavoro automatizzato. Gli ottici possono scaricare progetti di montature per occhiali di alta qualità e produrli su richiesta utilizzando il sistema di stampa 3D GENERA G1/F1. Decentrando la produzione di occhiali stampati in 3D, gli ottici hanno maggiore controllo e flessibilità nell'offrire ai clienti un'ampia gamma di opzioni personalizzabili, colori vivaci e superfici impeccabili.

G1/F1

Desktop. Clean. Automated.

Experience the future of eyewear manufacturing with GENERA's G1/F1 System - Desktop, Clean, and Automated. Our innovative system combines the precision and reliability of our advanced industrial production systems (G2/F2 and G3) with the convenience of a compact desktop format, empowering your In-Shop eyewear production. With automation and user-friendly operation, the G1/F1 System elevates your eyewear business, allowing you to create personalized frames with ease. Utilizing cartridge-based material units and our patented shuttle technology, you can enjoy a clean and seamless workflow for exceptional results.

System Components.



G1
The 3D printer uses digital light processing (DLP) technology, where resins are polymerized using UV light, layer by layer.



F1
The post-processing unit where the printed frames are washed, dried, and light cured in a fully automated process.



Shuttle
This integrated transport box system (Shuttle) ensures a clean and safe application without direct contact with resin. The Shuttle holds the building platform and offers UV light protection to avoid any additional exposure.

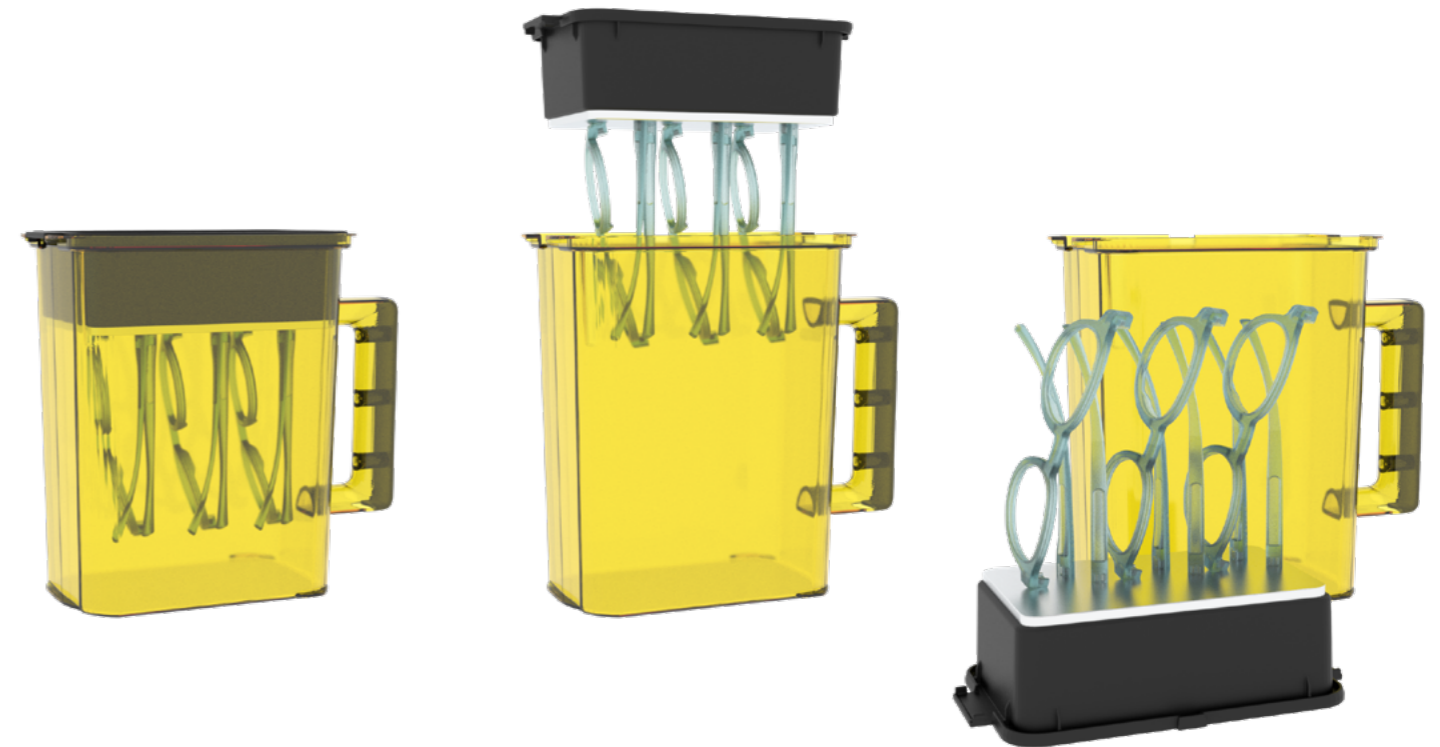


Cartridges and Material
The cartridge is inserted into the material unit and is automatically paired and identified by the G1/F1 system. All colors and transparent materials are possible.



Washing Containers
The F1 post-processing unit includes two washing containers to pre-wash and finally wash the printed object in isopropanol (IPA). Thanks to an RFID tag, the system automatically checks the fill level and condition of the contents.

The Shuttle.



Effortless production.

Our Shuttle travels from the G1 3D printer to the F1 post-processing unit throughout our workflow.

It allows you to handle and process the printed eyewear frames without dripping, contamination, or unwanted light influence. This means you can work with the frames efficiently and maintain a clean environment for optimal results.

The Shuttle also acts as a seamless link between the G1 3D printer and the F1 post-processing unit, ensuring traceability

and repeatability throughout the entire manufacturing process. GENERA's patented workflow leaves no support marks on the frames. Our Process Development Team has fine-tuned the printing and post-processing parameters for our unique materials to ensure reliable and consistent output, making G1/F1 ideal for In-Shop production. Whether you print one frame at a time or multiple frames at once, the quality is always the same as well as the printing speed.

The GENERA Mission Eyewear Process.

Step 1: Access or Create Digital Designs

You can download a digital production file from renowned eyewear labels by joining the Mission Eyewear platform and simply send it to the G1/F1 system.

Or design your own custom frames with the help of online tools and start making your own frames optimized for the needs of your client.

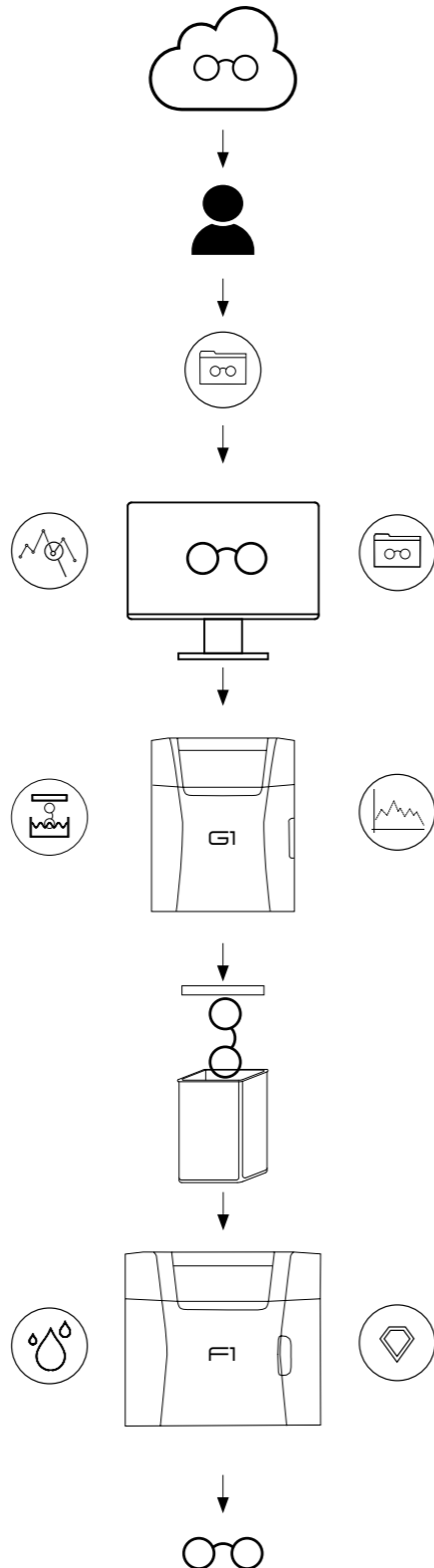
Step 2: 3D Printing in Your Store

With GENERA's G1/F1 system, you have the power to 3D print the frame right in your store.

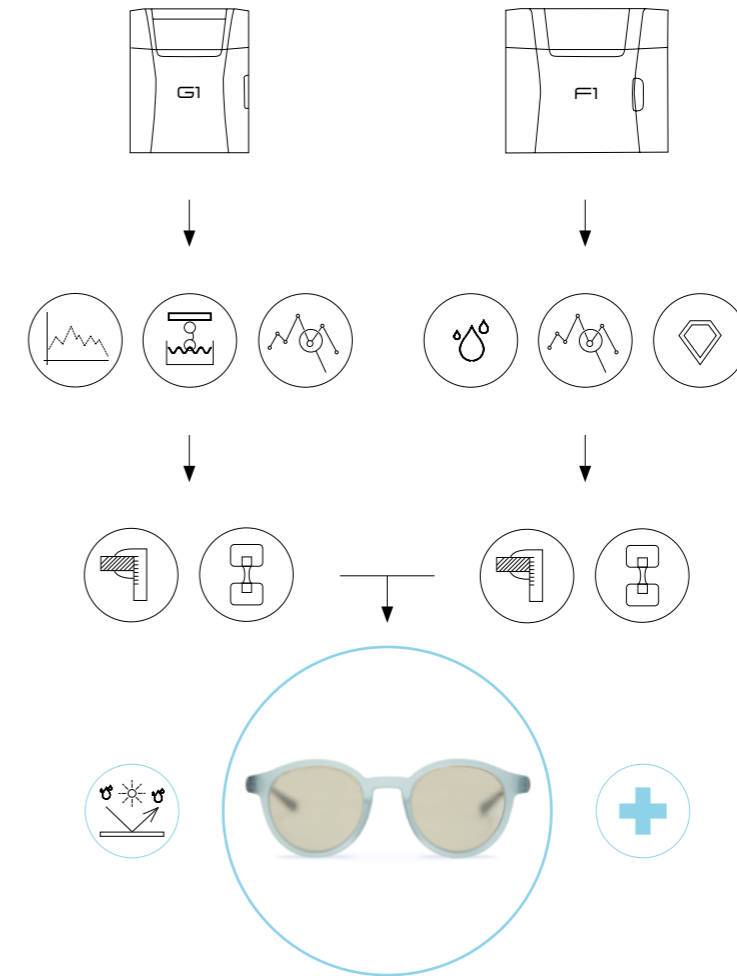
The system automatically identifies the material cartridge and color and selects the optimal production parameters accordingly.

Step 3: Automated Post-Processing

During printing and post-processing, the printed eyewear frame travels in the shuttle, from the G1 3D Printer to the F1 post-processing unit where the frame will be washed, dried and post cured with no user intervention.



The GENERA Material Validation Process.



ISO 12870 certified and tested.
ISO 10993-5:2009 cytotoxicity test passed.
Material aging tested in accordance with ASTM D4329.

Quality Assurance. Reliability. Safety.

Our materials undergo different testing procedures like ISO-12870, ASTM D4329 material aging tests and certification, ensuring top-notch quality and performance.

With the G1/F1 automated workflow we passed cytotoxicity tests (in vitro cytotoxicity) with the best possible results even after 48h of cell exposure. This study was conducted according to ISO 10993-5:2009 and is based on qualitative evaluation of the cells exposed to

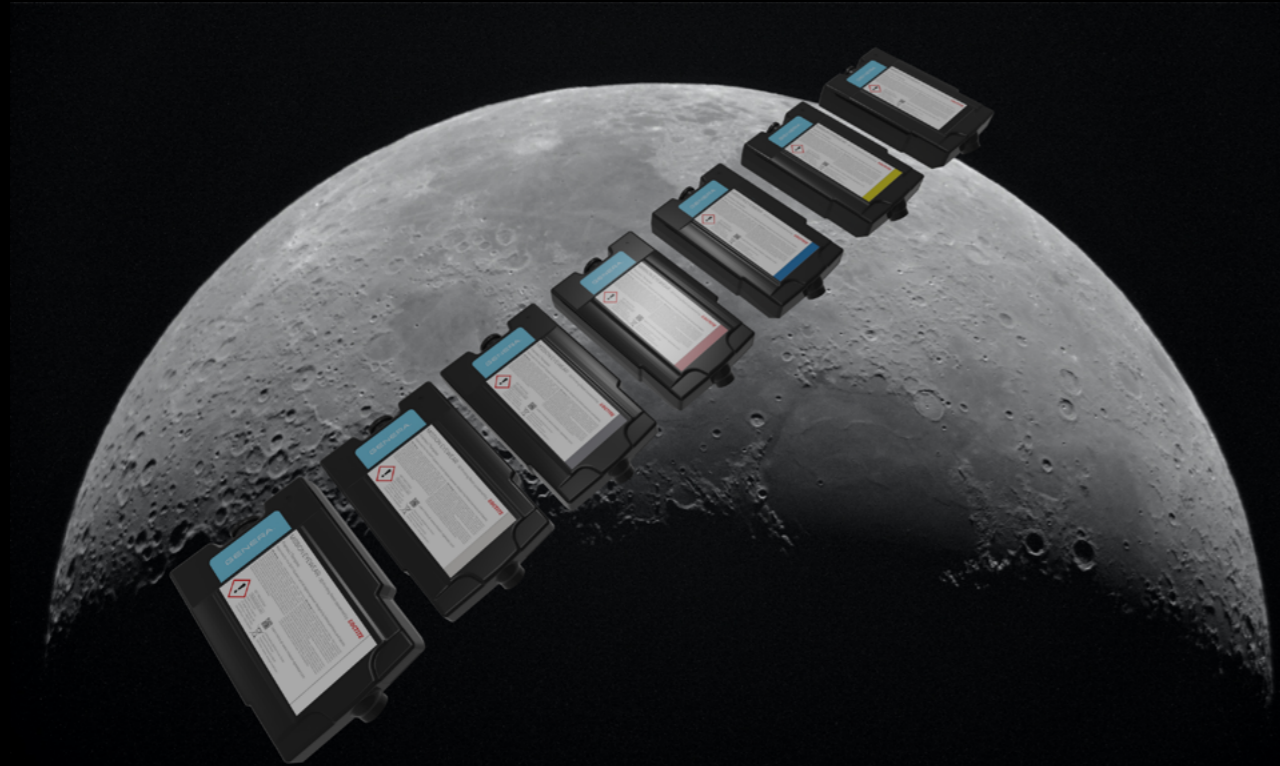
the test sample extract. Additionally, at GENERA we conduct thorough internal tests, including evaluation of UV stability and aging, to meet the highest industry standards and customer expectations. This validation process proves that our In-Shop 3D printing system sets a new industry standard.

To ensure the best results, our internal validation process begins with test prints and frame analysis to evaluate printing parameters. We optimize these parameters and print test bars, conduct

mechanical tests and measure for accuracy. The post-processing phase involves modifying parameters like washing and post-curing times for a variety of test parts and frames. The final test parts undergo mechanical testing and are compared to the material vendor's technical data sheet (TDS).

If the data matches, we proceed to a certified test lab for ISO-12870 testing, guaranteeing repeatable and reliable printing outcomes for our customers.

Digital Acetate. Cartridges.

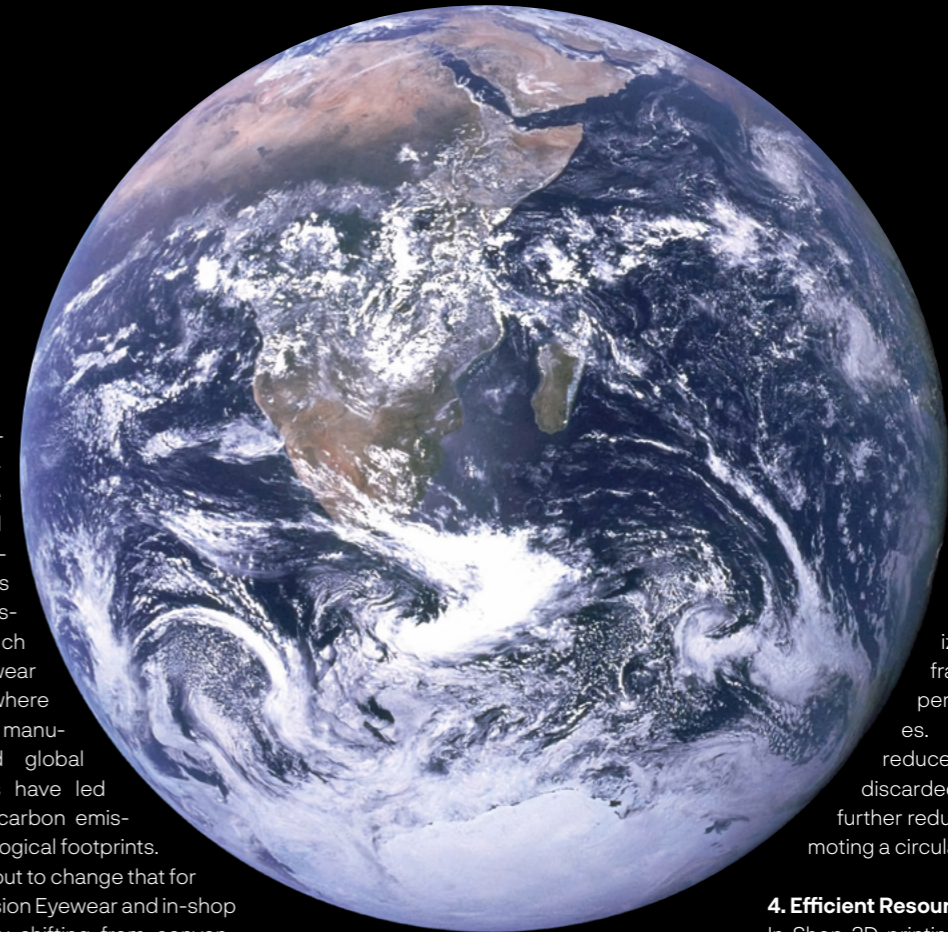


Easy Handling. Secure. All Colors.
Our commitment to innovation and collaboration drives continuous improvement, ensuring we offer our customers the best materials for eyewear applications. Developed exclusively for the G1/F1 system, our material Digital Acetate exhibits a remarkable memory effect, allowing deformation at a specific temperature and reverting to its original shape upon reheating. This material, formulated in collaboration

with Henkel Loctite for Mission Eyewear, sets new standards in transparency, translucency, and color brilliance, enhancing eyewear aesthetics. Our process development team fine-tunes printing and post-processing parameters, ensuring exceptional and repeatable results. Rigorous validation ensures optimized mechanical properties, biocompatibility, UV stability, and overall performance. In future we are expanding our materials library to include materials optimized for

hinges, cases, and other eyewear applications. By integrating advanced materials with GENERA's G1/F1 system, opticians can embark on a new era of In-Shop manufacturing.

Sustainability & Responsibility.



The world is increasingly recognizing the urgent need for sustainable practices across industries. One such area is eyewear production, where traditional manufacturing and global supply chains have led to significant carbon emissions and ecological footprints. GENERA is about to change that for good with Mission Eyewear and in-shop 3D printing. By shifting from conventional methods to localized production, the eyewear industry can significantly reduce its environmental impact and foster sustainability.

The Carbon Footprint Challenge:

Eyewear frames have traditionally been manufactured in centralized factories and then shipped globally to be sold in shops worldwide. This extensive transportation process contributes to substantial carbon emissions and ecological footprints. Freight transportation alone generates large amounts of greenhouse gas emissions, primarily due to burning fossil fuels in ships, planes, and trucks.

Advantages of In-Shop 3D Printing:

The advent of 3D printing technology has revolutionized various industries, and eyewear production is no exception. In-Shop 3D printing in the eyewear industry holds immense promise for

sustainability and reducing the ecological footprint associated with traditional manufacturing and global distribution.

1. Localized Production:

By integrating 3D printing technology directly into retail shops, eyewear frames can be produced on-site, eliminating the need for long-distance transportation. This localized approach significantly reduces carbon emissions by minimizing the transportation-related footprint associated with the shipping process.

2. Waste Reduction:

Traditional manufacturing methods often result in significant material waste due to inefficiencies and excess production. In contrast, 3D printing enables precise and customized manufacturing, minimizing waste generation. The additive manufacturing process of 3D printing builds products layer by layer, using only the necessary amount of material, thereby reducing environmental impact.

3. Flexibility:

3D printing allows for unparalleled design flexibility, empowering consumers to customize their eyewear frames according to personal preferences. This customization reduces the likelihood of discarded or unused frames, further reducing waste and promoting a circular economy.

4. Efficient Resource Utilization:

In-Shop 3D printing optimizes the use of resources by producing eyewear frames on demand. Unlike mass production, where excessive inventory is common, 3D printing ensures that products are manufactured precisely when needed. This approach minimizes resource consumption and helps to avoid overproduction and unnecessary waste.

In-Shop 3D printing in the eyewear industry holds immense promise for sustainability and reducing the ecological footprint associated with traditional manufacturing and global distribution. By localized production, we can drastically reduce carbon emissions, minimize waste generation, and offer personalized products to consumers. It is crucial for the industry to embrace and invest in these innovative and sustainable technologies to pave the way for a greener future in eyewear production. Together, we can shape a more environmentally conscious world, one frame at a time.

Transparent. Translucent. Vivid Colors.



Reproducible. Stable. Brilliant.

Whether you prefer bold and vibrant hues or subtle and sophisticated tones, Mission Eyewear has you covered. The color options provided by Mission Eyewear are not only visually appealing, but durable, long-lasting, and UV stable. The accuracy and surface quality of our frames set new standards for 3D printed eyewear.

All this with a just-in-time digital manufacturing, eliminating the need to keep large inventory.

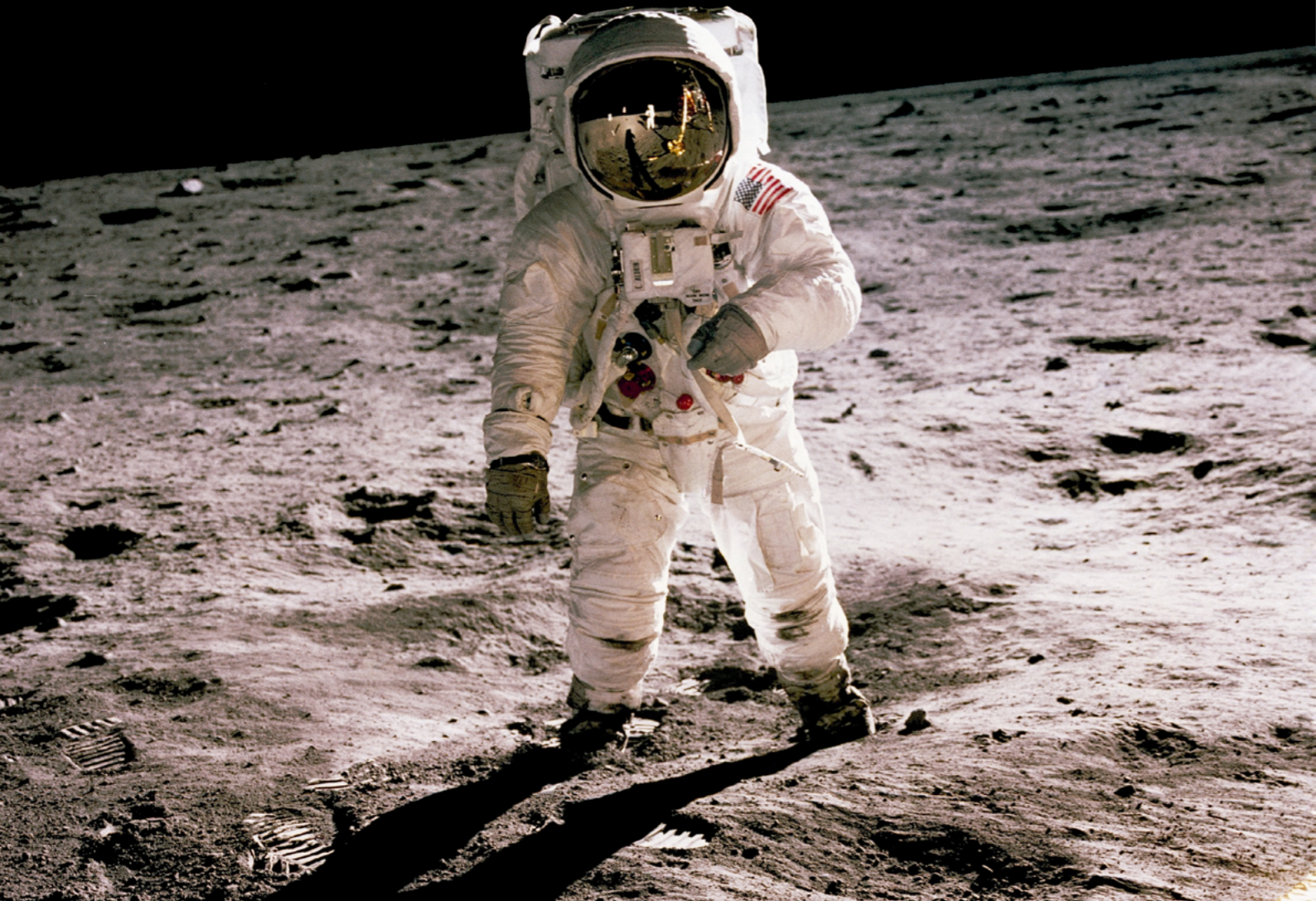
Customized, on demand, In-Shop, eyewear is finally here and it's here to stay. At GENERA, we believe in simplifying and automating the additive manufacturing process for eyewear with a streamlined workflow to maximize productivity and stability. That's why our G1/F1 system implements a RFID coded material cartridge, a safe and easy to use material unit, and the shuttle technology, which offers numerous advantages for a seamless 3D printing experience in your store.



Material Management:

The material cartridge, in combination with the material unit, allows for precise control over resin usage, colors and safety while minimizing material waste. This efficient management system optimizes material consumption, resulting in cost savings and reduced environmental impact.

Someone must be First. Starter Package.

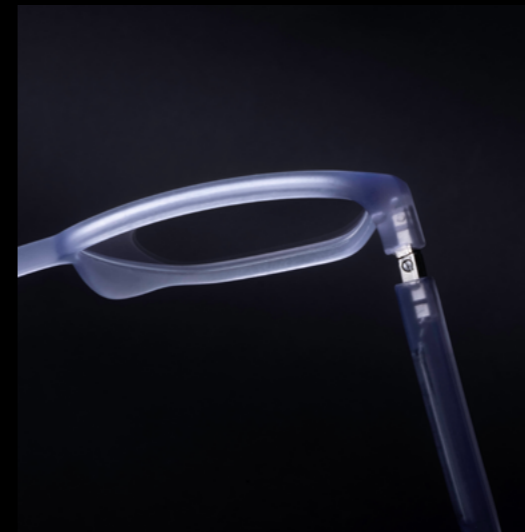
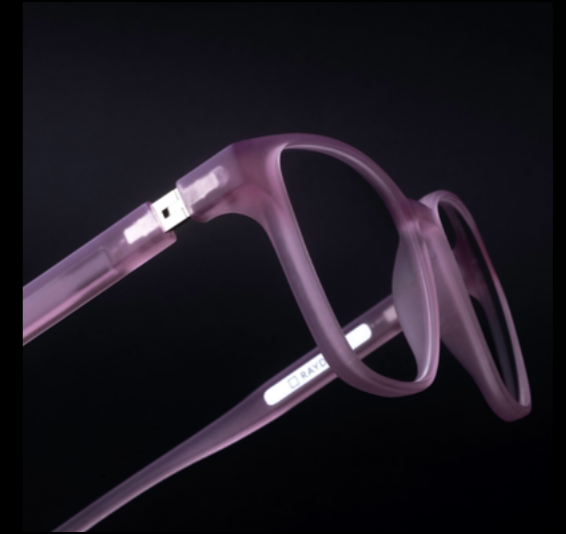
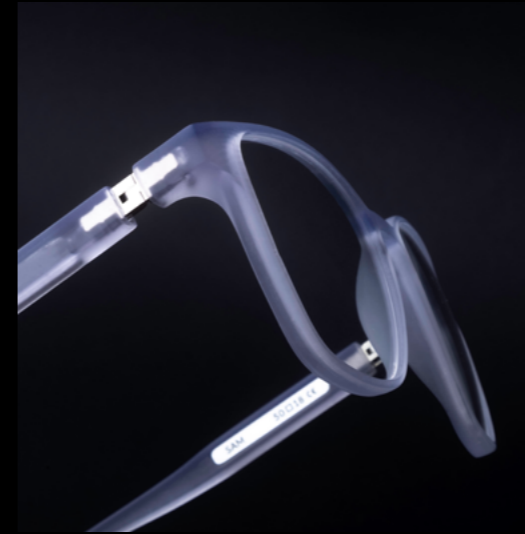


When you purchase the G1/F1 system, we provide you with a complimentary starter package that includes 5 free material cartridges, each containing 1kg of our dedicated eyewear material. With this exclusive package, you can confidently print over 200 frames, without any worries about material costs or failed prints as you familiarize yourself with this cutting-edge technology. But the starter package goes beyond that – it's a gateway to

accelerating your business. Easily recoup your machine costs in just a few months or less than a year by leveraging the G1/F1's remarkable ability to print 200+ frames within weeks. Additionally, you can transform your investment into a decentralized production system, securing your returns while expanding your direct sales to other opticians. Embrace new horizons and showcase your unique designs with this empowering starter package.

And that's not all – we're continually developing new materials to cater to diverse eyewear applications, from tools and hinges to customized cases. Mission Eyewear is set to make a significant impact on the industry, and we invite you to be part of this revolutionary journey. Join us now, because someone must be bold, and someone must be the first. With our starter package, you can take the lead and reshape the future of eyewear manufacturing.

Digital Collection. Digital Designs.



With each G1/F1 system, customers get a starter kit of free digital frame design files that are ready to print for your clients in any color currently supported at Mission Eyewear.

The G1/F1 system also gives you access to GENERA's network of independent designers and labels who offer frame styles in fixed sizes that can be downloaded for a fee and printed. Additionally, you get access to parametric frame model platforms from GENERA's tech forward design partners.

These platforms can be used to generate tailored frame models driven from a client's specific facial dimensions that can then be downloaded for a fee.

Of course, you can always use your own designs and print them as often as you want without paying any fee.

G1/F1

Desktop. Clean. Automated.

The G1/F1 brings the GENERA dedicated eyewear workflow and automation to your desktop. It uses validated material for eyewear production and a cartridge-based material unit to store the resin (Digital Acetate). The G1/F1 utilizes the GENERA shuttle technology for a clean and safe workflow. The F1 uses a mercury flash bulb for curing the parts in an inert atmosphere.

The frames are cleaned in two cleaning tanks specially designed for secure use with IPA.

The whole workflow is RFID tracked.

The material unit, combined with a material cartridge, ensures clean and safe handling. The material unit is automatically opened by the G1 and automatically dispensed. An integrated recoater helps to mix the resin within the resin vat to ensure consistent print results. The vat can be heated and tracks low resin levels as well as the film's lifetime. After the printing process the G1 automatically stores the part in the shuttle. The frames are then automatically post-processed by the F1.

HARD FACTS

Print volume

@70 µm

x: 134 mm

y: 76 mm

z: 150 mm

Wavelength

385 nm DLP

Full HD Resolution

(1920x1080)

Glove free process with shuttle technology and automated post-processing

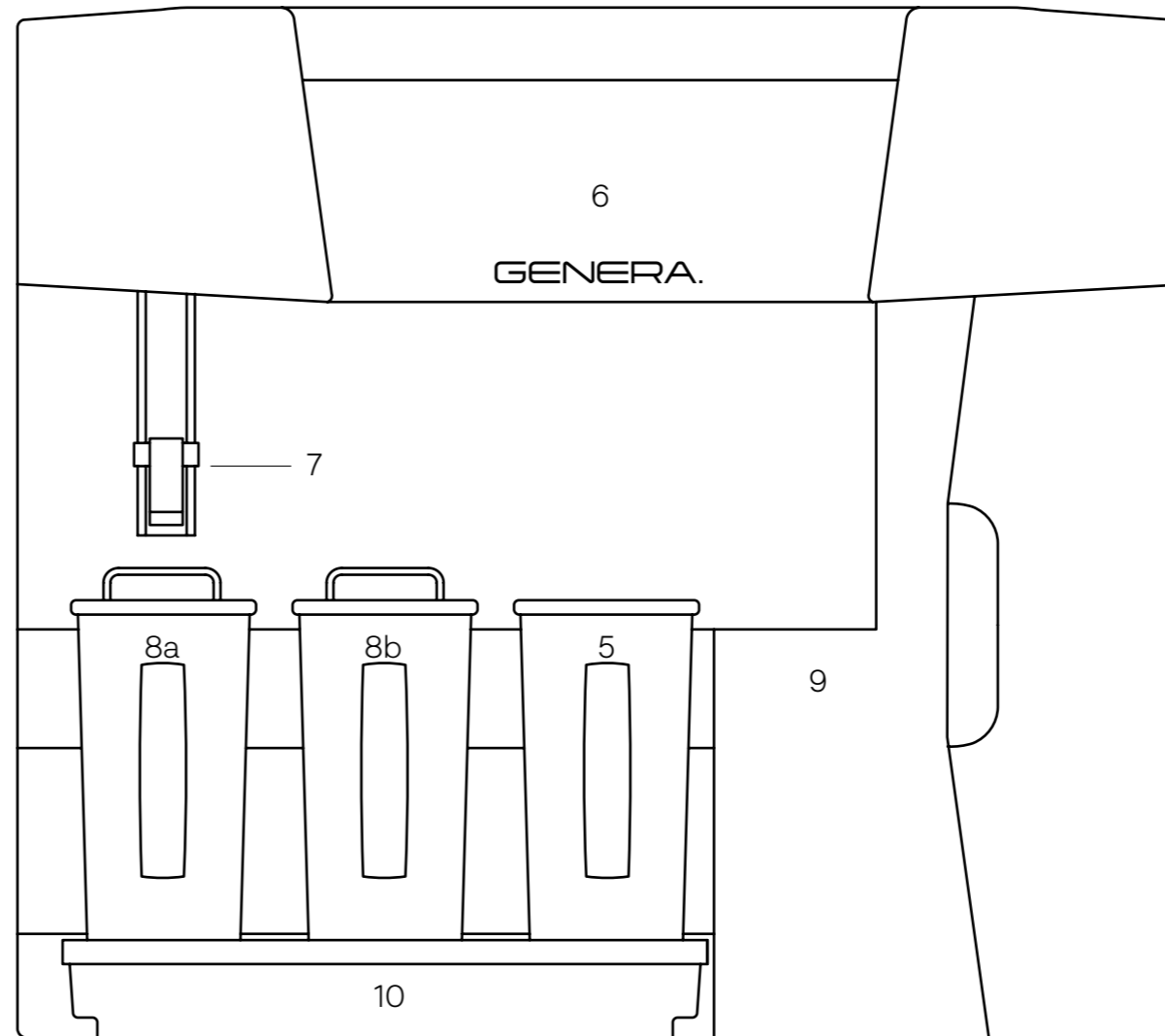
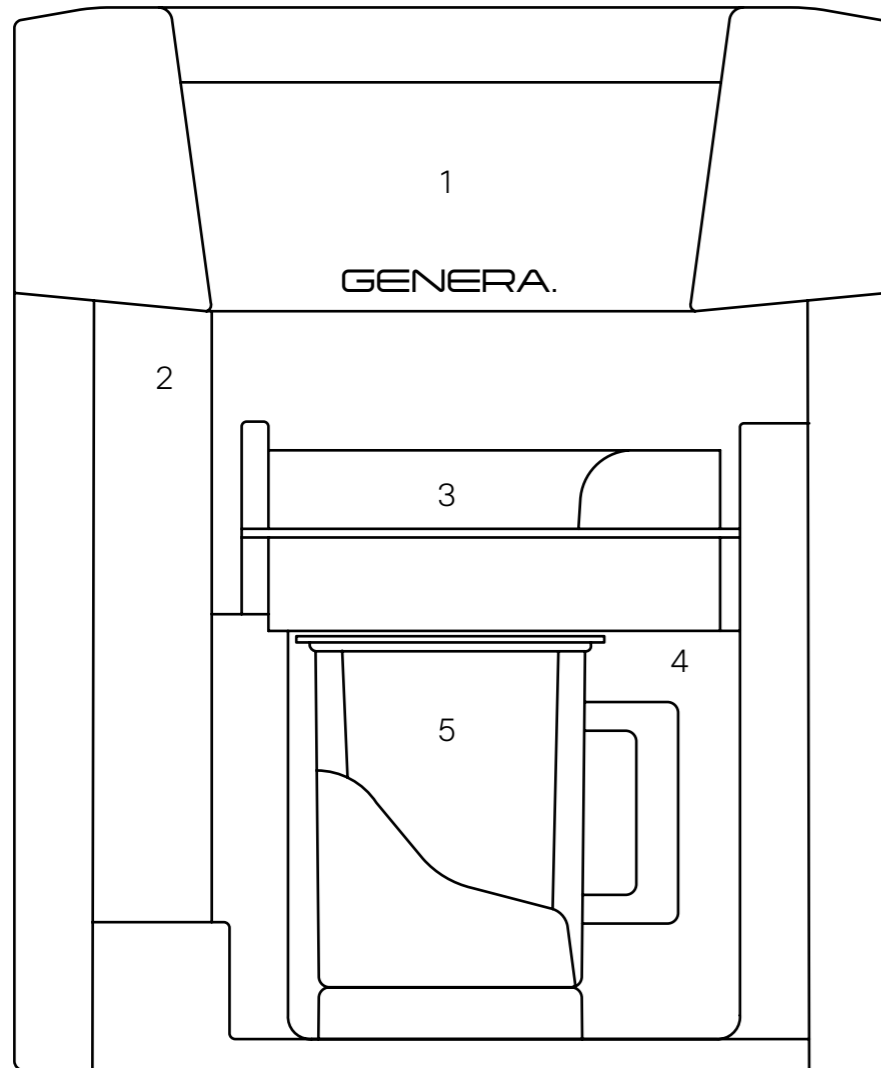
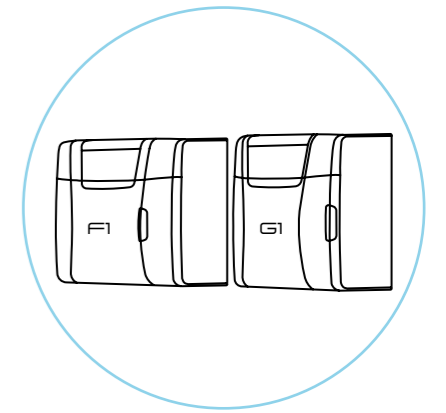
Material unit with cartridge for easy and secure resin handling

Active carbon filter for odor reduction

Post-curing in inert atmosphere

Documentation and traceability by RFID tag and database





SYSTEM COMPONENTS G1/F1

- 1 Human Machine Interface (HMI) with machine control, part preview and printing progress
- 2 Automatic handling system for platforms
- 3 Material unit and cartridge
- 4 385 nm DLP light engine with 70 µm pixel size
- 5 Glove-free process with RFID-tagged transport-shuttle for fully automated post-processing
- 6 Human Machine Interface (HMI) with machine control, part preview and status progress
- 7 Automatic handling system for platforms
- 8a, 8b Glove-free process with RFID-tagged pre- and post-washcontainer with integrated magnetic stirrer for fully automated washing
- 9 Post-curing chamber
 - o High-power mercury flash bulb
 - o Inert atmosphere
 - o Part drying
- 10 Overflow protection

Cabinet



Functional. Ergonomic.

The design team of Kappler and GENERA have collaborated to create a bespoke cabinet design, perfectly optimized for your G1/F1 system and your shop needs.

This cabinet provides dedicated space for storing all accessories, system equipment, and various material units and cartridges.

Additionally, the cabinet allows for tidy cable management, eliminating visible cables.

Small indentations, located on the upper surface of the cabinet, set the location of the G1/F1 system, and makes positioning during the installation process effortless. Moreover, all cabinet surfaces are easy to clean and chemical resistant, ensuring maximum convenience and durability. In combination with the cabinet, the G1/F1 system can be placed in the middle of your store and become a customer magnet while producing beautiful eyewear frames.

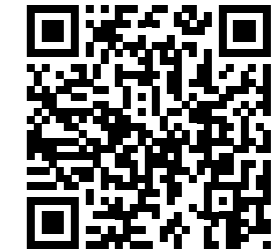
G1/F1 SYSTEM

G1/F1

GENERA.



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GENERAL

G1	
Description	DLP resin vat system with shuttle technology
Materials	Validated with all eyewear materials from GENERA
Build Volume (XYZ)	
@ 70 µm	134 × 76 × 150 mm (5.28 × 2.99 × 5.91 in)
Resolution	Full HD DLP (1920×1080)
Wavelength	385 nm
Regulatory Compliance	CE, FCC, IC (Canada)

F1	
Description	Post-Processing Unit optimized for use with the G1 Printer
Materials	Validated with all eyewear materials from GENERA
Washing Technology	Magnetic stirrer
Cleaning Fluid	IPA
Curing Chamber	Mercury flash bulb
Regulatory Compliance	CE, FCC, IC (Canada)

PHYSICAL FOOTPRINT

System Size (W × D × H)	G1 530 × 515 × 670 mm (20.9 × 20.3 × 26.4 in) / F1 730 × 515 × 670 mm (28.7 × 20.3 × 26.4 in)
System Weight	G1 41 kg (90.38 lb) / F1 50 kg (110.2 lb)

FACILITY REQUIREMENTS

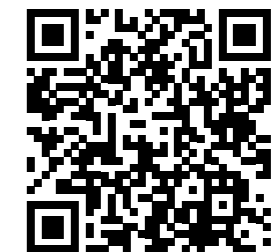
Power Requirements	AC 100-240 V, 50-60Hz, G1 2.0A-0.85A / F1 4.2-2.2 A
Network Connectivity	Ethernet
Nitrogen Connection	4-8 bar (58-116 psi)
Operating Conditions	+15 °C to +35 °C

SOFTWARE AND DESIGN TOOL

CAM	GENERA G1/F1 CAM
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