

# CASE STUDY **PROGLOVE**

Short innovation cycles & quick market launches for industry 4.0 ready wearables

**DYE**  
**MANSION**



**PROGLOVE**

The Munich-based scale-up, ProGlove uses 3D-printing not only for prototyping, but also for series production. ProGlove benefits from a superior product quality & maximum flexibility in product design.

---

## ABOUT PROGLOVE

A young company taking a human-centric approach to innovation & shaping the future of smart wearables for industry 4.0

---



An interview with Konstantin Brunnbauer, VP of Production at ProGlove.

### WHAT IS THE IDEA BEHIND PROGLOVE?

We started a little more than five years ago - which is also where our journey with DyeMansion started. Back then, the barcode scanner was the number one digital device. We said: let's create a wearable barcode scanner and make it "smart". But our overarching vision is to connect the human worker to the IoT. Now that's the path we are on and we set the foundations with a large wearable portfolio and software products.



**FOUNDED** 2014  
**EMPLOYEES** >200  
**ACTIVE COUNTRIES** 32  
**LOCATIONS** MUNICH (GER), CHICAGO (US)

USED BY



Lufthansa Technik

**KUKA**

**FESTO**



### WHERE IS PROGLOVE NOW?

We have a great product fit for our MARK family, with different use cases in various industries like automotive, logistics or retail. Here in EMEA, but also in the US we are growing very fast. When it comes to our product portfolio, we have the MARK scanner, which consist of the scanner itself and the wearable glove, in three variants. Short range, mid-range and our latest product, the MARK Display. With this one we can provide more information to the user, like how many pieces they need to pick.

### YOU ARE NOT ONLY FOCUSING ON HARDWARE BUT ALSO ON SOFTWARE, RIGHT?

We started with an app to connect our products to the mobile devices that are used on the shopfloor. But the product we are working on right now is the cloud solution, that enables us to see usage data of the devices. It helps to improve the processes and make them more efficient.

---

**/// We said: let's create a wearable barcode scanner and make it "smart". Our bigger vision is really to connect worker and workforce to the industrial IoT. ///**

---

Konstantin Brunnbauer, VP of Production at PROGLOVE



---

## THE CHALLENGE

### Ready for more than prototyping?


---

#### WHEN AND WHY DID YOU DECIDE FOR 3D-PRINTING IN THE FIRST PLACE?

When we started, 3D-printing was a very hyped technology for prototyping. And that is what we used it for in the beginning. We started with FDM printers for early stage prototypes and at this time it was at a level where you could not use it for anything more than that. But when we really wanted to test or use parts, we went for SLS technology, which was more expensive. Anyways, at this point we were not able to use the parts as functional devices.

#### EVERY BEGINNING HAS ITS OWN DIFFICULTIES. WHAT CHALLENGES DID YOU ENCOUNTER?

We adapted our way of designing parts to SLS technology. Of course, it gives you a lot of opportunities. You have the freedom of design, which means we could do shapes even if they were difficult. It helped us to reduce the amount of parts needed. So that was really a benefit, but for sure there are also challenges. A big challenge is to have parts with mechanical performance that can be compared to injection molded parts.



It takes a lot of work and prototyping, for example to find the right wall thickness for different areas. Another problem was the white color. In the beginning the parts were spray painted afterwards, but the color faded during use. But once you have gained some experience, I think every challenge can be overcome. And in the end, we did.

---

**Another problem was the white color. In the beginning the parts were spray painted, but the color wore out during the use.**

---

Konstantin Brunnbauer, VP of Production at PROGLOVE



# THE SOLUTION

## Ready for series production thanks to reproducible and scalable processes

### HOW WERE YOU ABLE TO OVERCOME THE CHALLENGES THAT YOU EXPERIENCED IN THE BEGINNING?

When we really started using SLS, we were in the MakerSpace at the university. There we had one of the EOS Formiga printers. Back then we were not so experienced and moved to FORMRISE\*, which produced the parts for us. Together with DyeMansion they enabled us to really make use of the technology. The collaboration helped us to trust in this technology and to find the right way to design it in a way that we can use it.

### WHAT ROLE DID THE DYEMANSION TECHNOLOGY PLAY ON THE WAY TO SUCCESSFUL SERIAL PRODUCTION? WHICH TECHNOLOGY ARE YOU USING?

We improved a lot since we started five years ago. With the Print-to-Product workflow we saw the development to have competitive parts and to really use SLS for serial production. We have superior surfaces with PolyShot Surfacing. That was proven when we approached customers with injection molded parts, and they said they liked the PolyShot surface even better.

I think it is perceived as a premium compared to some of the injection molded parts. When it comes to color, the white parts would have been a no-go. We wanted to have this orange lighting signal. When we first started dyeing with the DyeMansion DM60 it was the standard Orange DyeMansion offered at this time. DyeMansion undertook some color development and now it is our ProGlove Orange - in addition, we use grey and are also working with some others.

\*Read more about FORMRISE on page 8.



## Print-to-Product workflow

1



### CLEANING POWERSHOT C

First the parts are being automatically cleaned from the powder in the Powershot C.



3-10 minutes

2



### POLYSHOT SURFACING POWERSHOT S

PolyShot Surfacing (PSS) provides a semi-glossy & scratch-resistant surface. It is key for maximum coloring results.



5-15 minutes

3



### DEEPLYE COLORING DM60

During the Deepdye Coloring (DDC) in the DM60, the dyestuff penetrates the part and evenly dyed, high-quality parts are being created.



2,5 hours





That is where we are now. We have reproducible processes, and every part looks the same. We have, a perfect coloring throughout the surface and these processes enable us to compete with traditional manufacturing technologies like injection molding. For the end user, the customer, there is no difference. And for us as a manufacturer, the reliable processes give us the freedom to develop and enhance steadily. We are a young company with a young product, and we have ongoing changes. We release new products on a yearly basis. So that really helps us to keep up to speed.

**YOU HAVE IMPLIED THAT 3D-PRINTING AND INJECTION MOLDING CAN GO HAND IN HAND. TO WHAT EXTENT ARE YOU USING SLS AND WHEN DOES INJECTION MOLDING COME INTO PLACE?**

We are using SLS for all our products and for serial production to some extent. In case of the charger, all changes are done, and the volumes and costs are now on a level that we can move to injection molding. But I think we will always use printing for the first thousand or even ten thousand pieces, depending on the product and size. Also, we use SLS and injection molding together in the same product and it depends on the flexibility we need.



DM GREY 02



DM ORANGE 11



---

**These post-processing processes enable us to compete with traditional manufacturing technologies like injection molding.**

---

Konstantin Brunnbauer, VP of Production at PROGLOVE





---

## THE BENEFITS AT A GLANCE

### From quick product launches to superior products

---

#### SHORT INNOVATION CYCLES & A MORE SUSTAINABLE PRODUCTION

3D-printing helps with frequent product customization and helps shorten innovation cycles. For example, a small amount of a product can be produced and tested. If there are adjustments, they can be made quickly, and new parts produced without wasting parts. The intermediate step of tool and mould production is not required. This also makes innovation cycles more sustainable.

#### SUPERIOR PRODUCTS WITH OPTIMIZED HAPTICS

Thanks to PolyShot Surfacing, the components not only achieve an ideal surface for subsequent coloring, but also a surface finish that is perceived as premium. This finish transforms the raw part into a scratch-resistant application that is suitable for daily use.

#### COLORS READY FOR THE DAILY USE

The original problem of color abrasion after painting the components no longer exists since the use of DyeMansion's DeepDye Coloring. During the process, the paint is absorbed deep enough into the part to withstand daily wear and tear, even if it is scratched. In addition, the paint does not lose its strength, even when the scanner is used for a long time.

#### INDUSTRIAL SCALE MANUFACTURING THROUGH REPRODUCIBLE PROCESSES

For ProGlove, large scale production of scanners is possible. Not only because of the SLS technology used, but also because of the reproducible processes of the print-to-product workflow. By using defined and consistent parameters for Cleaning & PolyShot Surfacing and the DM60's cartridge system, it can be ensured that every part looks the same.



---

## STARTUP MEETS STARTUP

About sharing a journey, experiences & night coloring sessions

---

### NOT ONLY HAS PROGLOVE GROWN AS A COMPANY, BUT SO HAS YOUR TEAM. HOW HAVE YOU CHANGED OVER THE LAST YEARS?

I think our spirit and our values stayed the same. And I think that is something we can be very proud of. Of course, by now we have a lot of very experienced people who are helping us take the company to the next level. For example our CEO Andreas König, who has been taking this journey some times before. And I think that's the right mix: keeping up the speed and the drive we have, plus learning from experienced people.

### VALUES THAT WE DEFINITELY SHARE AT DYEMANSION. DO YOU REMEMBER HOW PROGLOVE & DYEMANSION MET FOR THE FIRST TIME?

Sure. Back then we both had very small teams and one of our founders was in contact with Felix & Philipp, the DyeMansion founders. We knew that DyeMansion had technology that would help us to use SLS parts in serial production. So we visited and had a chat about it which then resulted in some test runs and late-night dyeing, because we had to meet a deadline the next day. DyeMansion would dye parts and place them in front of our office at night so we could assemble them the next day. That is how this partnership started.





Find out more about the project in our Coffee & Cases Interview with Konstantin Brunnbauer:

<https://youtu.be/FQu4xQtPuLo>



## WHAT'S NEXT?

### Ramping up and working on the cloud

#### FINALLY: WHAT'S NEXT?

We are working on bringing the MARK Display into volume now. We introduced it a few months ago and are ramping up at the moment. Also, we are working on some new products again with the support of DyeMansion. In addition, we will be working more intensely on our software and cloud products.

**/// We are working on some new products. Again with the support of DyeMansion. ///**

Konstantin Brunnbauer, VP of Production at PROGLOVE



#### ABOUT FORMRISE

The 3D-printing service provider from Töging, Bavaria, sees itself as a quality leader in industrial 3D-printing. The company has supported ProGlove from the very beginning in developing reproducible processes and preparing the products for serial production.

“Through direct and personal consultation, we were able to help ProGlove take their products from prototyping to production. The optimization of manufacturing parameters and materials in combination with our „Customer & Quality first“ maxim results in parts that withstand high load and breakage tests. In supporting ProGlove’s MARK product range, we’ve made it our priority to be flexible and agile. This has often enabled us to deliver within 24 hours of receiving an order. We were also able to ensure that the part orientation was maintained. This has allowed us to optimize processes. This resulted in parts with perfect surface and color quality.”

Robert Razavi, Co-Founder FORMRISE





# TRYMANSSION - TRY OUR TECHNOLOGY FREE OF CHARGE

Not familiar with DyeMansion technology yet? Feel free to test our finishing and coloring solutions with your own parts. Contact us for your first, free benchmark.



## YOUR SAMPLES

Send us your non-depowdered parts that were agreed with our team.

## CHOOSE FINISH

Choose between PolyShot Surfacing (PSS) or VaporFuse Surfacing (VFS). Our [guidelines](#) answer open questions and help to choose the right finish.

## CHOOSE COLOR

Following the surfacing process of your choice, the parts in the DM60 are dyed in your desired color. Click [here](#) for color options.

## GET SAMPLES

Receive your finished parts. Delivery date depends on scope of delivery and location.

### 1 CLEANING

### 2 SURFACING

### 3 COLORING





## DyeMansion GmbH

Robert-Koch-Straße 1  
82152 Planegg-München  
Germany

+49 89 4141705 00  
hallo@dyemansion.com

## DyeMansion North America Inc.

4020 S. Industrial Drive, #160  
Austin, TX, 78744  
USA

+1 616 92850 03  
hello@dyemansion.com

### For more information, visit:

[www.dyemansion.com](http://www.dyemansion.com)

### Follow us on:

 DyeMansion  DyeMansion  WeAreDyeMansion  WeAreDyeMansion  WeAreDyeMansion

### Feel free to contact us



#### EMEA

Maximilian Kraus  
Sales & Business Development EMEA  
maximilian@dyemansion.com  
+49 172 6929359



#### AMERICAS

Joe Dedvukaj  
Partner Sales, North America  
joe@dyemansion.com  
+1 586 2956802



#### APAC

Jingyi Yuan-Steiner  
Director Region APAC  
jingyi@dyemansion.com  
+49 170 2423375



#### MARKETING & PR INQUIRIES

Robert Simbeck  
Content Marketing Manager  
robert.simbeck@dyemansion.com  
+49 170 5547309

HOME OF A  
**COLORFUL**  
FUTURE.