

Bike Bling: 3D-Printed Metal Bicycle Accessories

Hex Components makes high-end bike accessories with metal binder jetting



**Customer**

Hex Components

Location

North Yorkshire, England

Industry

Bicycle components

Applications

Top cap, bar end, post clamp, lever, and seat post collar

Machine

Shop System™

Material

316L Stainless Steel

Website

www.hexcomponents.com

3D-Printing Service Bureau
EAC Innovation & Métal**Location**Bourg-de-Péage, Auvergne-Rhône-Alpes,
France**Website**

www.eacswimsources.com/fr



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Hex Components produces high-end bicycles accessories with metal binder jetting

Out of love for bikes

Hex Components is an English start-up that Ben Tew and his wife founded out of a love for bicycles, digital fabrication, and design. Specializing in 3D-printed bicycle components and accessories, Hex Components offers functional and stunning products to elevate the cycling experience of bike enthusiasts who want to add unique flair to their ride.

Focusing on detail and uniqueness, Tew carefully designs all products before producing them in the UK, France, the United States, and New Zealand. Tew's background in product and industrial design and affinity for bicycles enables him to design impressive top caps, bar ends, post clamps, levers, and seat post collars that excite bike lovers.

All parts are released in limited batches to ensure high quality, allow the company to release new designs often, and create an exclusive feeling among bike enthusiasts when they possess one.

Metal binder jetting: A perfect solution

Hex Components had pragmatic reasons for choosing additive manufacturing (AM) over other production methods to make its bike accessories. Tew, who has know-how in AM, was certain that only this production method could realize his vision. "I knew that only additive manufacturing could make small-batch parts with many different designs, and it wouldn't cost me a fortune," said Tew of Hex Components.

“So, when we set out with it, I intended to get them 3D printed. I already worked in AM, too, so I knew what I was getting into and what I could get out of it.”

Tew argues that making the parts using other manufacturing methods like CNC machining would not be feasible. “With CNC machining, you’ve got to create different tool paths over and over again and the set-up time is just ridiculous. The quality wouldn’t be so good, and it would cost way too much. You can’t make these parts to run a business at scale, either.”

Laser-based additive manufacturing of stainless-steel parts would not be as cost effective as with metal binder jetting. It would be more labor intensive, too.

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Desktop Metal Shop System at EAC Innovation and Métal



Of all the additive manufacturing methods, Tew was confident that metal binder jetting is the most feasible solution for his production needs. After seeing the Shop System, a metal binder jetting system from Desktop Metal, at a trade show in Germany in 2022, Tew believed that the Shop System could meet his production requirements. “As a start-up, I needed to figure out a smart way to enter the market. I knew what the Shop System could do. It would allow me to make some amazing things with a very low barrier to enter the market,” recalled Tew.

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Ben Tew, Founder, Hex Components

EAC Innovation and Métal: A perfect match

Tew felt lucky to be introduced to a reputable 3D printing service bureau from France, EAC Innovation and Métal, which quickly agreed to 3D print the bike components in small batches. Founded in 1992, this bureau is one of the early adopters of the Shop System in the European Union, showing its understanding and business potential of metal binder jetting.

Marouene Zouaoui, the Chief Additive Officer at EAC Innovation and Métal, also celebrated the business partnership with Hex Components. He recalled: “Once I saw the parts, I immediately thought that it was a perfect match. We wanted to print them because they could help our expand 3D printing business. I also believed that metal binder jetting could help him get the most details and high resolutions on his products.”

Moreover, Zouaoui was sure the Shop System was a good fit for what Hex Components needs. “Printing with the Shop System was very smooth. After printing, polishing also went well,” said Zouaoui.

Overall, Tew is satisfied with the partnership with EAC Innovation and Métal. “EAC has been unlike anybody else I’ve worked with. They’re very collaborative and super helpful. They’ve included me in designing parts for the Shop System and suggested what I should change. It’s not like I submit an STL file, and then they tell me how much it costs,” explained Tew.

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Clockwise from top left:
top cap, seat post clamp, bar end, brake lever



The benefits of metal binder jetting for both businesses

Hex Components and EAC Innovation and Métal are delighted with the quality of the bike components printed on the Shop System and the many benefits the metal binder jetting system offers.

Mystic sunset stainless steel top cap



Unmatched fine details

Hex Components aims to make parts with incredibly fine details. “Having parts with really fine details is really important to me. The level of detail I can get with the Shop System is just unmatched. As far as I know, it gives the highest-resolution prints on the market. You can do really beautiful things with it, like on the level of investment casting and jewelry making. Though I think the printer can give you finer details because you can get thinner wall thickness,” argued Tew of Hex Components.

Mass customization

Hex Components believes that its customers, “the bike nerds,” highly values customized bike accessories tailored to their tastes and needs. Hence, the company always makes several designs or patterns for each type of accessory. The top caps, for instance, have eight different beautiful patterns.

Unlike traditional manufacturing, which often requires specific molds or tooling for each design, metal binder jetting can produce different designs without any tooling, eliminating many steps and costs involved in toolmaking. As a result, it is much easier, faster, and more cost-effective to create customized parts using metal binder jetting.

Besides, its integration with digital design and further production processes enhances its suitability for producing customized products across various industries.

“The mass customization ability of metal binder jetting really excites me. I believe that metal binder jetting will enable a lot more customization. Some people will catch on to the idea that you can highly customize products and do short runs,” predicted Tew.

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Ben Tew, Founder, Hex Components



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 Various 3D printed premium polished stainless steel top caps
 Weight: Approx. 24g (0.8 oz)
 Diameter: Approx. 32.5mm (1.3 in)
 Regular price per piece: £60.00 GBP

Support-free metal additive manufacturing

In most metal AM processes, metal parts are attached to the build platform through support structures, adding considerable design and manufacturing constraints. The scrap rate and poor part quality are higher than in a process that would not require a removal of support structures. A part's design may need to be altered multiple times to prevent these issues.

However, the binder jetting process is notable for not requiring support structures during printing, enabling product designers like Tew to design many beautiful, intricate patterns without limit. "Support-less metal manufacturing is huge for me. I can develop my digital production workflow, which allows me to make beautiful patterns without limitation," said Tew of Hex Components.

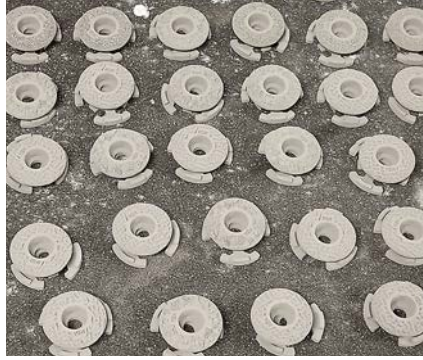
For EAC Innovation and Métal, the support-free binder jetting process simplifies printing, reduces material waste, and shortens post-processing time compared to laser-based additive production. Ultimately, both parties benefit from the efficiency, cost-effectiveness, and high quality of the metal binder jetting process.

The benefits of support-free metal additive manufacturing:

- No design limitation
- Reduce part damage
- Increase quality
- Increase repeatability
- Consistent finish
- Reduce processing cost
- Faster lead times



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Prepared green parts



Cost-effective and efficient production

Other significant benefits of metal binder jetting for Hex Components and EAC Innovation and Métal are cost-effective and efficient production. Tew of Hex Components argued: “I am not a multimillion-dollar company. Getting my stainless-steel parts printed using metal binder jetting is viable for us. I can order small quantities of parts with different designs without increasing my costs. The cooperation with EAC allows me to operate as a small company but leverage really high-tech stuff like the Shop System.”

Although Tew has yet to quantify the production costs of the stainless-steel bike parts using other AM processes, his know-how and longstanding experience in AM convinced him that metal binder jetting could save him money. “With metal binder jetting, it easily gets 25% cheaper than the laborious laser-based 3D printing that needs support structures,” said Tew.

Producing metal parts with the Shop System also enables EAC Innovation and Métal to offer good prices to its customers. Zouaoui explained the prototyping process of the bike components: “Tew wanted to get the most accurate parts with dimensional tightness. After receiving the STL file, we could easily optimize the part design for 3D printing to reduce production costs. Then, we printed 3-5 samples for every design. We also tested the finishing to achieve the desired surface and some simplified post-processing operations. It was great.”

When optimizing the design of the bike components for 3D printing, EAC Innovation and Métal undertakes the following measurements:

- Identify the part’s most sensitive geometrical feature to ensure its integrity during production
- Orient the part for safe handling during the depowdering process to minimize the risk of damage
- Optimize the design of the sintering setter, as its volume directly affects the amount of powder and binder consumed during printing
- Consider post-processing operations to ensure the part’s final quality and performance



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The bar end installed on a bike

Regarding the efficiency of metal binder jetting, Tew is excited about the production speed. “From my experience, getting a perfect sample within two or three weeks after I sent the design file is pretty good. So, it’s perfectly within my expectations. I got my raw laser-printed titanium parts within that time, too, but then there was a ton of labor for the support removal. Plus, I’ve got a lot of damaged parts. So, metal binder jetting has saved me weeks,” shared Tew.

Zouaoui of EAC Innovation and Métal is also pleased with the Shop System’s capability to produce metal parts efficiently. “There were many designs for the bike components, for example, 12 designs for the top caps. After choosing the best eight, Tew placed purchase orders with different designs and quantities. We could mix everything in a very dense print job and print up to 500 parts, which saved time and money. But if Tew only wanted 200 parts, we also did it,” explained Zouaoui.

Moreover, Zouaoui shared that the whole production process, which took around two weeks, looked like this: “First, we nested the part. It took one day to prepare everything, including the powder. We allocated one day for printing. The next day was curing and depowdering. Then, two days for sintering. Sandblasting took about one hour. Polishing, because of stainless steel, ran in big batches for around 30 hours. Sometimes, we mixed them with other printed parts that needed polishing. Then, we made the parts really shiny. Lastly, we sorted the parts for logistics to be sent to Tew.”

Localized and on-demand manufacturing

Tew of Hex Components also believes that metal binder jetting enables localized and on-demand manufacturing, from which many companies will profit significantly. “The technology will enable small businesses to make pretty cool stuff without big budgets and produce them in their own country. It’s a huge thing. It shortens the supply chain,” said Tew.

Metal binder jetting’s ability to produce complex, customized parts quickly and efficiently makes it an ideal technology for on-demand manufacturing. Tew is really pleased with the possibility of ordering parts whenever and how many he needs. “I can order as much as I think I can sell, or I’m willing to risk. It’s just really a pragmatic thing,” he pointed out.

With the Shop System in-house, EAC Innovation and Métal can respond rapidly to customer needs, produce tailored products, and operate more flexibly in dynamic markets. “If Tew only wants 50 parts and checks two or three designs first, I can simply squeeze them on another print job with other parts and send him his parts as soon as possible without interfering with my production lines,” explained Zouaoui of EAC Innovation and Métal which sales related to their binder jetting activities have increased by 50%.

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Top cap and socket cap head screw





About Hex Components

Hex Components is a start-up based in North Yorkshire, England, that makes beautiful and functional bicycle accessories in different patterns and limited batches. The components are designed in-house in the UK and manufactured in the UK, France, USA, New Zealand.

Learn more: www.hexcomponents.com

Instagram: www.instagram.com/hexcomponents



About EAC Innovation and Métal

Founded in 1992, EAC Innovation and Métal is a 3D printing service bureau based in Auvergne-Rhône-Alpes, France. Originally focusing on manufacturing metal accessories for the footwear and leather goods markets, the company is now increasingly repositioning itself in designing and manufacturing metal accessories for swimwear, lingerie, luxury leather goods, luxury packaging, cosmetics, and interior design. EAC Innovation and Métal is part of the Éphies Industries Group based in Bourg de Péage, France, specializing in electroplating and manufacturing of plastic and metal parts for luxury goods.

Learn more: www.eacswimsource.com/fr/

www.ephie-industries.com/



About Desktop Metal Inc.

Desktop Metal is driving Additive Manufacturing 2.0, a new era of on-demand, digital mass production of industrial, medical, and consumer products. Our innovative 3D printers, materials, and software deliver the speed, cost, and part quality required for this transformation. We're the original inventors and world leaders of the 3D printing methods we believe will empower this shift, binder jetting and digital light processing. Today, our systems print metal, polymer, sand and other ceramics, as well as foam and recycled wood. Manufacturers use our technology worldwide to save time and money, reduce waste, increase flexibility, and produce designs that solve the world's toughest problems and enable once-impossible innovations.

Learn more about Desktop Metal and our #TeamDM brands at

www.desktopmetal.com