

# **Bowman** set to disrupt bearing industry by producing bearings using HP Multi Jet Fusion and HP 3D HR PA 11



**Bowman's** adoption of HP Multi Jet Fusion technology and HP 3D HR PA 11 material has enabled production of a new industry-leading range of higher-performance bearings.



## Introduction

Bowman International is a leading manufacturer and supplier of plain bearings in the United Kingdom and throughout Europe. Established in 1974 in Oxford, Bowman offers a range of bearings and sintered parts for applications across all industries, from smaller projects

that require standard-size bearings to large, complex projects that call for bearings of different sizes. Bowman can also produce one-off bearings for specific projects to help manufacturers meet their individual production needs.

- **Industry**

Industrial

- **Sector**

Machinery and equipment

- **Objective**

To produce an industry-leading range of industrial Split Roller Bearings that are easier to assemble and exhibit significantly increased performance while remaining cost-competitive and to improve industrial processes across Europe and worldwide.

- **Approach**

Bowman explored the abilities of HP Multi Jet Fusion technology to optimize the design of their parts and make it easier for manufacturers to assemble, maintain, and repair bearings and seals.

- **Technology | Solution**

HP Multi Jet Fusion technology, HP Jet Fusion 3D Printing Solutions

- **Material**

HP 3D High Reusability<sup>1</sup> PA 11

1. Based on using recommended packing densities and compared to selective laser sintering (SLS) technology, offers excellent reusability without sacrificing mechanical performance. Tested according to ASTM D638, ASTM D256, ASTM D790, and ASTM D648 and using a 3D scanner for dimensional accuracy. Testing monitored using statistical process controls.



## Challenge

Bearing cages can be one of the most significant factors in bearing performance and they are also the most complex part of a bearing. As such, they are difficult to manufacture using traditional methods.

Bowman's standard range of cages—which are available on the market in 17 different sizes—would traditionally have been produced using steel, bronze, or aluminum, all of which can result in noise and vibration during operation, compromising the material's durability and, thus, the quality of the part. Extremely complex geometries made it

impossible for Bowman to use traditional processes like Injection Molding to produce the thousands of bearing cages they needed to manufacture per month.

Seals for split roller bearings were previously produced using aluminum, which can result in damage to the steel housings and made assembly and disassembly difficult to achieve. Operating in environments where parts must be regularly maintained and downtime is at a premium, the bearings require seals that can be assembled and reassembled easily and quickly.

## Solution

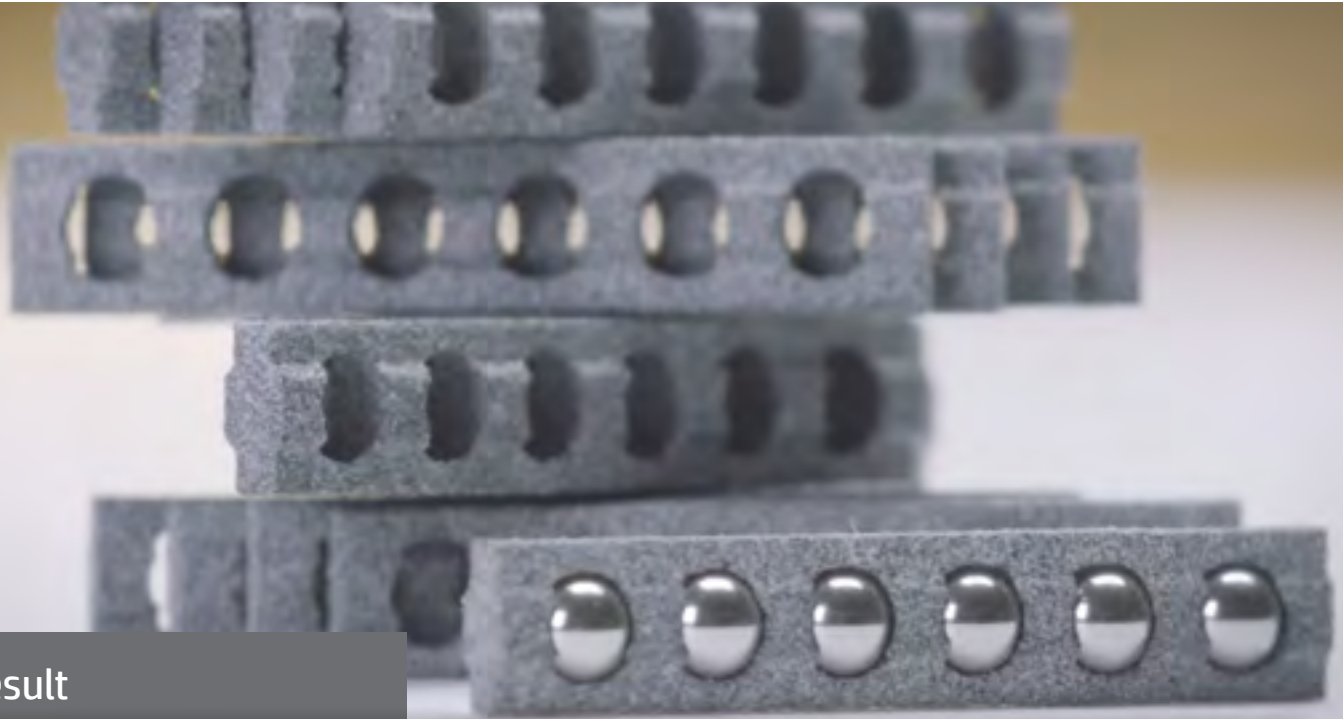
Bowman initially used SLS to develop its new products, but this technology increased the likelihood for warping and inconsistent mechanical properties in the final part, so it was not suitable to produce reliable production parts. Faced with this challenge, Bowman sought new ways to design and manufacture their parts and subsequently opted for HP Multi Jet Fusion (MJF) as the appropriate technology to take prototyping into production, and then on to volume production, particularly for bearing cages and seals.

Using the design capabilities available with 3D printing, specifically with HP Multi Jet Fusion technology, engineers at Bowman invented a new patent-pending design for bearing cages and seals, which allowed them to modify other aspects of the bearing that surround the 3D printed components.

**“Since creating a more complex design, this has allowed us to simplify the other components within the bearing assembly,”** says Chris Perry-Westlake, Production Engineer at Bowman. **“By doing this, we have been able to reduce the number of different components in stock by up to 75%.”**

Bowman noted that using HP 3D HR PA 11 (“HP PA 11”) material results in parts that offer better elongation at break, which is critical when assembling parts. Thanks to this improved performance, parts require less maintenance and fewer spare parts are needed.

The wear resistance offered by HP PA 11 makes it easier to assemble the seals and cheaper to manufacture them, which is a major advantage when used in a potentially harsh industrial environment. The material also offers excellent natural low-friction properties, which also lend themselves to this application.



## Result

Bowman chose HP MJF **“due to the fact that we could produce 5 to 7 times more components within the same time frame,”** says Perry-Westlake.

Traditionally manufacturing these parts required a lead time of 12 to 14 weeks, but using HP MJF technology results in a lead time of only one week.

By producing bearing cages with HP MJF technology, Jacob Turner, Head of Additive Production for Bowman, noted that **“we’re able to take the entire bearings load capacity to 30 or 40 or even 50% higher, extending the life of a traditional split bearing by 3 to 5 times.”**

The newly designed split roller bearing now features 3D printed bearing cages that not only increase the radial

load capacities by 70%, but also increase axial load by 1,000%, and 3D printed seals offer better wear properties and enhanced ease of use.

**“For us, Multi Jet Fusion was a massive step forward in terms of output, the number of parts we could make, and the isotropic properties,”** says Turner.

Bowman’s advanced design and manufacturing capabilities now focus on supplying JHB Split bearings to the global market and developing new applications within both Additive Manufacturing and bearing design.

**“We see an enormous future with MJF technology,”** Turner says. **“What we’re doing opens up a whole new world of possibilities.”**

Learn more about HP Multi Jet Fusion technology at [hp.com/go/3DPrint](https://hp.com/go/3DPrint)

Connect with an HP 3D Printing expert or sign up for the latest news about HP Jet Fusion 3D Printing [hp.com/go/3Dcontactus](https://hp.com/go/3Dcontactus)

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