

# The **HP Jet Fusion 5200 Series 3D Printing Solution** achieves industrial-level OEE\* numbers

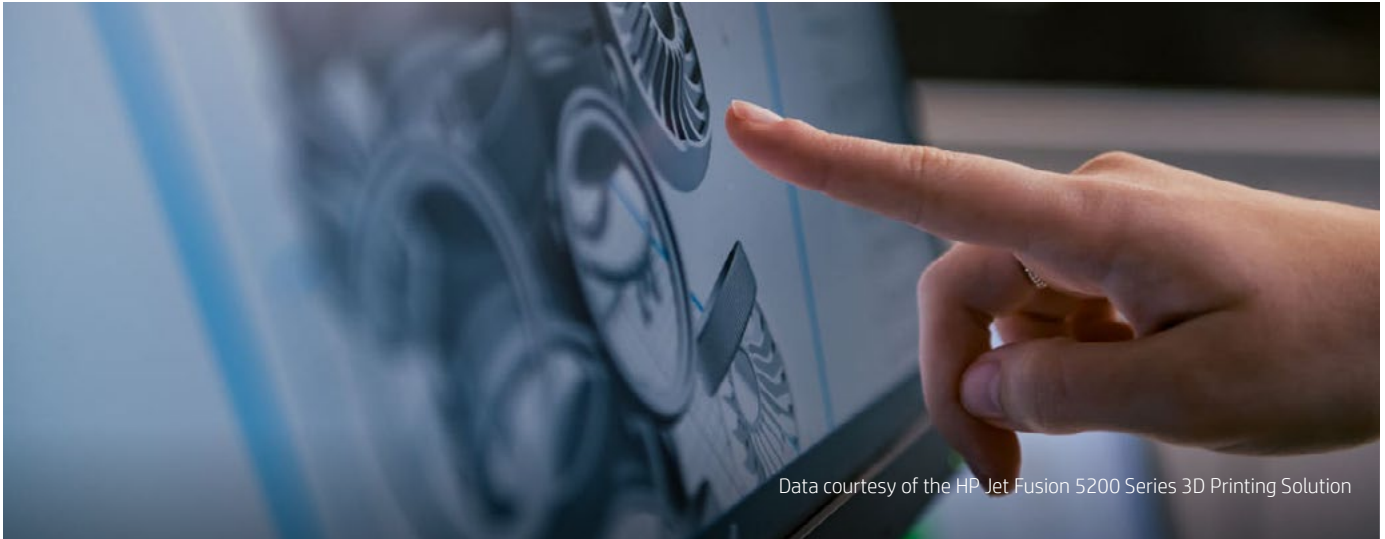


Data courtesy of the HP Jet Fusion 5200 Series 3D Printing Solution

\*Overall Equipment Effectiveness



# Prototyping and short-run production with the **HP Jet Fusion 5200 Series 3D Printing Solution** meet efficiency standards



Data courtesy of the HP Jet Fusion 5200 Series 3D Printing Solution

## Introduction

The HP 3D Printing internal printing factory runs around the clock (24x5), requiring efficient machinery to produce both unique samples in smaller batches as well as short production runs. This operation uses eight printers, five different materials, and produced nearly 60,000 parts in 2019.

### • Industry

Industrial

### • Sector

Machinery and equipment

### • Objective

To offer a reliable, high-volume production method and optimal operations in order to equip customers and marketing and sales representatives with quality parts.

### • Approach

By adopting the HP Jet Fusion 5200 Series 3D Printing Solution to add to its portfolio of HP Jet Fusion 3D Printing Solutions, HP can enable its staff and customers to reach industrial-level overall equipment effectiveness (OEE), produce functional parts in fine detail, and expand into new applications and markets.

### • Technology | Solution

HP Multi Jet Fusion technology, HP Jet Fusion 5200 Series 3D Printing, HP Jet Fusion 4200 3D Printing Solution

### • Material

HP 3D High Reusability (HR)<sup>1</sup> PA 11  
HP 3D High Reusability (HR)<sup>2</sup> PA 12  
HP 3D High Reusability (HR)<sup>3</sup> PA 12 GB  
BASF Ultrasint® TPU01<sup>4</sup>  
ESTANE® 3D TPU M95A<sup>5</sup>

1. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 11 provide up to 70% powder reusability ratio, producing functional parts batch after batch. For testing, material is aged in real printing conditions and powder is tracked by generations (worst case for reusability). Parts are then made from each generation and tested for mechanical properties and accuracies.  
2. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 12 provide up to 80% powder reusability ratio, producing functional parts batch after batch. For testing, material is aged in real printing conditions and powder is tracked by generations (worst case for reusability). Parts are then made from each generation and tested for mechanical properties and accuracy.  
3. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 12 Glass Beads provide up to 70% powder reusability ratio, producing functional parts batch after batch. For testing, material is aged in real printing conditions and powder is tracked by generations (worst case for reusability). Parts are then made from each generation and tested for mechanical properties and accuracy.  
4. Available for the HP Jet Fusion 5200 Series 3D Printing Solution.  
5. Available for the HP Jet Fusion 4200 3D Printing Solution.

## Challenge

Because of the high-volume output, the different materials and the need for high-quality parts for both customer testing and marketing samples, the process and parts must meet certain productivity and accuracy standards.

**“Efficiency is really a key factor for us, and the way we measure this high productivity is through Overall Equipment Efficiency (OEE),”** said Michael Nagl, Factory Manager.

OEE is a figure that represents availability (available time vs. production time), performance (production capacity vs. actual

production), and quality (actual production vs. the number of quality parts that are produced). The range of these percentages varies depending on the industry; for example, industrial devices are considered “good” if they have an OEE of at least 85%.

In order to meet these high standards, HP used the factory’s HP Jet Fusion 5200 Series 3D Printing Solution and the HP Jet Fusion 4200 3D Printing Solution for three different application samples: an air conditioning vent, a camera lens frame and cover, and a ball inception.

## Solution

The first part produced at this facility is an air conditioning vent for the automotive industry. The vent contains a central rotating mechanism, a feature that requires high dimensional accuracy (0.4 mm tolerance between parts). A strong material and a process that can create complex designs are also necessary, which can be achieved with the HP Jet Fusion 5200 Series 3D Printing Solution and HP 3D HR PA 12. The vent is made of two sub-parts that are printed separately and then manually assembled.

With HP 3D HR PA 11, engineers can expand to short runs of final parts, like a camera lens frame and cover. The material is strong, ductile, and able to handle complex designs, such as functional snap-fit mechanisms and textures that facilitate friction. The

dimensional accuracy capabilities of the HP Jet Fusion 5200 Series 3D Printing Solution allow the camera lens and frame cover to be printed separately and then easily and precisely fit into each other to form one cohesive part.

The ball inception is printed with ESTANE® 3D TPU M95A due to the material’s hard-flexible thermoplastic properties, which are ideal for high-impact absorption. The ball is meant to inspire customers and allow them to see, hold, and feel a design and concept prototype that exhibits the capabilities of the HP Jet Fusion 4200 3D Printing Solution with this material.



## Result

To achieve consistent OEE numbers of at least 90% for the availability and process parameter, HP engineers follow operating and maintenance guidelines, which instruct operators to perform post-job maintenance immediately after the jobs finish.

**“Having a multi-material system is very challenging,”** said Operations Manager Bárbara Córdova. **“We need to be very strict with our production plan because every material is different.”**

After each job, the build units are unpacked and reloaded with fresh material, ensuring the build units are always ready to use and have enough material for future jobs.

**“Even in this complex environment with very different parts and five different materials, we are right now reaching an OEE of 90%,”** Nagl said.

In terms of performance, engineers who have training in Design for Additive Manufacturing (DfAM) design the parts while the operators run the machines. Dividing the tasks in this way helps maximize productivity.

DfAM engineers also use their knowledge of the technology and DfAM (e.g., knowing how to position parts in the bucket) to get the best part quality.

**“[HP] Multi Jet Fusion has already brought many changes to the market, and there’s still more to come,”** Nagl added. **“The world is changing, and the digital technology drives another industrial revolution, and we at HP are already making it happen.”**



Data courtesy of the HP Jet Fusion 5200 Series 3D Printing Solution

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