

A-dec expands prototyping, production, and 3D color printing possibilities with HP Multi Jet Fusion technology



Data courtesy A-dec, Inc.

With the adoption of the HP Jet Fusion 580 Color 3D Printer, **A-dec** better serves its customers with quality medical equipment while also producing jigs and fixtures for their own machinery



Introduction

A-dec, Inc. is an Oregon-based manufacturer of dental office equipment such as dental chairs, stools, delivery systems, medical lighting, cabinetry, and other supplies.

Since its founding in 1964, A-dec has become one of the world's leading manufacturers of dental equipment by keeping up with industry evolution and collaborating with

associations around the world. A-dec serves customers through authorized dealers that showcase A-dec products and equipment at local showrooms around the world.

A-dec also helps schools, government institutions, and dental services organizations integrate new technology and maximize investment through innovative and long-lasting solutions.

- **Industry**

Healthcare

- **Sector**

Medical equipment

- **Objective**

To incorporate HP Multi Jet Fusion (MJF) technology throughout their facilities to produce high-quality, long-lasting, full-color prototypes and parts.

- **Approach**

With the HP Jet Fusion 580 Color 3D Printer, A-dec can produce assembly aids, spare parts, and jigs and fixtures for their prototyping and production needs.

- **Technology | Solution**

HP Multi Jet Fusion technology, HP Jet Fusion 580 Color 3D Printer

- **Material**

HP 3D High Reusability (HR)¹ CB PA 12

1. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability CB 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.



Challenge

“One of our big challenges is to design in such a manner that the dental team is practicing as ergonomically as possible,” said Jason Baker, Engineering Design Manager at A-dec.

A-dec had been operating two FDM printers around the clock but they still were not able to keep up with their R&D

needs. Therefore, they were forced to rely on outsourcing for prototyping, which ended up costing them thousands of dollars. Additional drawbacks included longer printing times, weak parts, and poor or no detail on their FDM-produced parts.

Solution

Upon learning about HP Multi Jet Fusion technology and the HP Jet Fusion 580 Color 3D Printer in June 2018, A-dec was intrigued as to whether the technology could help them make functional prototypes at faster speeds than their in-house technologies.

After an evaluation stage, A-dec purchased the HP Jet Fusion 580 Color 3D Printer and started diverting nearly all of their prototyping projects to this single device. The design team valued the surface quality, mechanical properties, and dimensional accuracy of the prototypes, and almost as importantly, they valued the quick turnaround time. What used to take a week or more could be produced in a day. As other departments within A-dec learned about the speed and part properties of HP Multi Jet Fusion, usage increased.

A main source of this increased production came from the manufacturing team looking for jigs, fixtures, and assembly aids for their machinery and operators. The model shop team found that the more parts they printed, the more it inspired the broader organization to dream up other uses.

After prototyping was in place, A-dec wanted to explore the possibility of producing end-use parts, such as a replacement

cover for a 20-year-old dental unit. Previously made by vacuum forming, the tool to create this part had been destroyed years prior, so A-dec produced a replacement using HP Multi Jet Fusion technology. They painted it and sent it to the customer, who was pleased with the end result.

“We initially thought that [HP MJF] would really just be for prototyping and in-house tooling, but what we’re finding is when we need to make small volumes of parts, this is a very efficient process for us to be able to do that, and do it creatively,” Baker said.

Another end-use product that A-dec conceptualized was a **customized hand tool** for a dental hygienist who suffers from carpal tunnel syndrome. The device would allow the hygienist to use dental equipment such as the air/water syringe to spray water into a patient’s mouth while keeping the hand and wrist in a stable and comfortable position. With HP Multi Jet Fusion, engineers no longer have design limitations for such parts, and therefore can design based on individual needs.

“Within 24 hours, we received the problem statement from the customer, designed a solution, printed it, and it was shipped to the customer for evaluation,” said Baker.

Since the introduction of the HP Jet Fusion 580 Color 3D Printer, A-dec's maintenance department has submitted jobs for spare parts to keep their subtractive machines up and running. With the ability to 3D print parts in full color, they can make parts and tooling more visible on the assembly line, making it easier for assemblers to identify them and use them properly. A-dec can foresee use of this technology to apply logos to parts, which would allow them to use branding to customize parts for customers.

"As we are starting to explore final part production with HP Multi Jet Fusion technology, we are realizing the ability to incorporate multiple factors into a single part," Baker said. "For example, a component that acts like a detent spring can now be printed with features to identify the part number and manufacture date, and poka-yoke assembly features."



Data courtesy A-dec, Inc.

Result

A-dec considers the HP Jet Fusion 580 Color 3D Printer to be a game-changer for their company and for the industry overall. The machine is so busy that it is producing more than 50% of the entire Model Shop output.

With traditional production methods, A-dec would have had to log substantial overtime hours to meet deadlines and parts would be available in about a week, but with HP Multi Jet Fusion technology, many components printed by A-dec's Model Shop team can be printed overnight, saving massive amounts of overtime and allowing the project to be released on time.

"Design iteration speed has increased such that as many as five significantly different iterations can be achieved and evaluated in a single week," Baker said, **"This has allowed us to meet major project milestones more effectively."**

In terms of costs, A-dec used to spend upwards of \$200,000 per year in outsourcing services. By bringing HP Multi Jet Fusion in house, this cost has been reduced to nearly \$0.

A-dec envisions the technology growing within their organization as a snowball effect: The more they use HP MJF technology for projects and purposes, the more visibility the machine and the parts receive, and thus the more engineers and customers start requesting it.

"It has definitely impacted our culture in that we're able to think about solutions that weren't ever possible before," Baker said. **"This has really changed the way that we think about product design and I'm really excited for where this is going to take us."**

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