

# Introducing the first mass produced 3D-printed putter

Cobra turns to HP Metal Jet technology to alter the future of golf forever



## Industry

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Consumer goods

## Sector

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Sporting goods

## Technology | Solution

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HP Metal Jet technology  
HP Metal Jet S100 Printing Solution

## Post processing

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Polishing, Machining, PVD

## Material

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HP Metal Jet SS 316L

## Objective

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Cobra's objective was to 3D print production parts at scale while meeting real-world pricing requirements.

## Approach

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Cobra leveraged Metal Jet's design freedom to optimize its putter and mass produce it for the golf market.



Data courtesy of Cobra

While the game of golf originated in the 15th century, it's still tremendously popular today. Twenty-four million people played golf in the United States alone last year. It's a precision sport that appeals to a multitude of perfectionists. And it's one of those games that blends tradition with modern technology. That's why it makes sense that HP Metal Jet technology has become instrumental in refining the design and manufacturing of clubs used in this historic game.

Cobra Golf, an industry-leading sports manufacturer of precision golf clubs, has been serving golf enthusiasts since the early 1970s. Committed to

continually fine-tuning the design of their clubs, the company has had its eye on additive manufacturing for quite some time. "We've been trying to create 3D-printed golf clubs for the mass public for many years," says Mike Yagley, VP of Innovation and A.I. at Cobra Golf. "Due to the limitations of previous technologies," he adds, "it's not been possible because of scalability."

HP Metal Jet technology, however, is changing the game. Cobra is able to use the technology not only to optimize the design of its putters, but to mass produce them as well.



## HP Metal Jet technology enables incredible design flexibility

In the past, design limitations have impeded innovation. This, too, is changing—as Cobra’s innovation engineers talk about the possibilities, and particularly the design freedom enabled by HP Metal Jet technology. “We were able to use HP’s 3D Metal Jet printing to make a structure that’s never been seen before,” says Cameron Day, Innovation Designer at Cobra Golf. HP Metal Jet technology offers “a whole new way of thinking about how we design, engineer, and fabricate the golf club.”

What’s revolutionary about Cobra’s new putter is the head itself. HP Metal Jet technology delivers freedoms that empower designers. “3D Metal Jet

printing has allowed us to think so differently about how we make a golf club,” says Yagley. “It allows us to put material where we need it to be to make the structure more resilient or to give a player the best mass properties.”

These freedoms contribute to design innovations that improve the way golfers golf. “We can put metal in the middle, which allows us to make the structure relatively stiff and sound good,” says Yagley. “At the same time, we can put metal on the perimeter, which gives a higher moment of inertia of that golf club head, which gives players forgiveness, which means they’re going to hit the ball farther or more consistently on off-center shots.”







Data courtesy of Cobra

## Speed matters

While design freedom is a key benefit of HP Metal Jet technology, design speed is another. “Metal Jet has allowed us to create designs quicker, innovate faster, go through that design cycle multiple times, as well as adapt the design through the process for manufacturability,” says Ryan Roach, Director of Innovation at Cobra Golf. This is very important from a business perspective. “For the business to keep up with the speed of the market,” Roach adds, “we must have the right product in the market at the right time.”

Rob Hall is the President at Parmatech Corporation, HP’s Metal Jet production partner.

He can attest to the speed of HP’s offering versus traditional methods. “Other fabrication methods would not have worked in this case,” he says. “When you look at machining, casting, molding, the cost to do iterations, the turn-around time just would not have met the tight timeline and the number of designs that we were looking for.”

HP Metal Jet technology, however, accelerates the pace of design prototyping, much to Cobra’s benefit. “If we can prototype faster, we can learn faster, we can evolve our design to the point where we can get it into production development faster,” adds Roach.



## Mass production becomes a reality

Production development is another factor that inspired Cobra to move forward with Metal Jet. “One of the things that sets Metal Jet apart is the ability to do this in a mass production case,” says Roach. “Additive technologies can create onesie-twosie prototypes, but we could never transfer that to production, due to limitations with

cost, time, or part quality.”

But HP Metal Jet technology has allowed Cobra to overcome many of these obstacles. Roach adds, “Working with HP and their production partner Parmatech, we’ve been able to prototype fast, and then immediately go into production.”







Data courtesy of Cobra

## Partnerships make it possible

Parmatech Corporation has been instrumental in applying HP Metal Jet technology for this specific use. The company has a long history performing high-volume manufacturing of precision metal components. According to Hall, however, the Cobra putter project is a first for Parmatech in introducing a new manufacturing process. “It’s the first time we’re going to have an additively manufactured metal putter in mass

production for the industry,” Hall says. “We’re breaking new ground here.”

From Cobra’s vantage, it’s equally historic. “The partnership with HP has allowed us to put the first 3D-printed golf putter to the market,” says Roach. “And that lines up perfectly with our vision of bringing innovative products to the marketplace that help golfers enjoy the game.”



## The future only looks bright

Whether we're talking about the future of the game, the future of HP Metal Jet technology, or future prospects for these respective businesses, all looks good moving forward. "I think 3D printing is going to become a big part of the golf industry," predicts Day. "It's just a better way to make a golf club."

Manufacturers like Parmatech Corporation are on the front lines of a manufacturing revolution. Rob Hall is excited about the future of Metal Jet at Parmatech. "Right now," he says, "we're just

scratching the surface" of what's possible.

For Cobra, HP Metal Jet opens up the possibility of making equipment they've only dreamt of making before. In the past, "we knew what the construction would look like, but we had no idea how we could fabricate it," admits Yagley. With the ability now to fabricate it, and not only make it once, but make it many times over, "we can bring products to market that 5 or 6 years ago we were just dreaming of." He adds, "Now we can do it for real."



For more information, please visit: [hp.com/go/3Dmetals](https://hp.com/go/3Dmetals)

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