

Award Winning Metal AM Luxurious Stainless Steel Jewelry Printed on EOS M 400-4

Source: Václav Jirásek



3D lattice palms ready for
microwelding

Challenge

Bring a goldsmith's creation to life by printing an intricate and luxurious life-size 3D lattice face mask and palms, to which jewels could be micro welded

Solution

One3D AM Engineers
EOS M 400-4
EOS StainlessSteel 316L

Results

Design, print and post-processing of complex parts in just 5 days

Complete design freedom for artist and One3D engineers

Rapid printing of 207 cm³ build volume enabled highly detailed and considered post-processing

Award-winning Fine Art on the EOS M 400-4: Stainless Steel Design, Print and Post-processing in Just Five Days

When experimental goldsmith Zdeněk Vacek had a vision for a piece of jewelry that would embody and celebrate his mother's lifelong jewelry work, he wanted it to be intricate, luxurious, and breath-taking. The final piece was a stunning 1:1 scale model of her face and hands in stainless steel, decorated with Czech garnets. The piece won the Czech Grand Design award for 'best installation' at Designblok 21, the respected international design exhibition.

Central to creating the piece was the artist's work with One3D to develop the production process, select materials, produce prototypes of the complex free parts, and perform post-processing. The complexity of the design meant it could only be produced using additive manufacturing and DMLS technology, on an EOS M 400-4 industrial 3D printer.

Challenge

Creating a beautiful design is challenging enough, but bringing it to life while remaining true to the creative intention and detail, can be frustratingly difficult for any artist. To Zdeněk, it was clear that the intricate nature of his design could not be realized using any traditional manufacturing techniques, so he partnered with One3D to see how working together, engineers and goldsmiths could create something very special using additive manufacturing techniques.

There were several technical challenges in the project. The piece needed to be created in a metal that could support the micro welding of decorative stones during post-processing. Additionally, the contoured shape of the design pieces would require a special type of support to be developed by One3D engineers, that could be easily removed once a component left the 3D printing build space.

Time was also a challenge. Once appointed, One3D needed to produce the three stainless steel components

for the piece in just five days, so that the artist could then move on to the delicate application of the garnet stones and prepare the piece for exhibition.

Solution

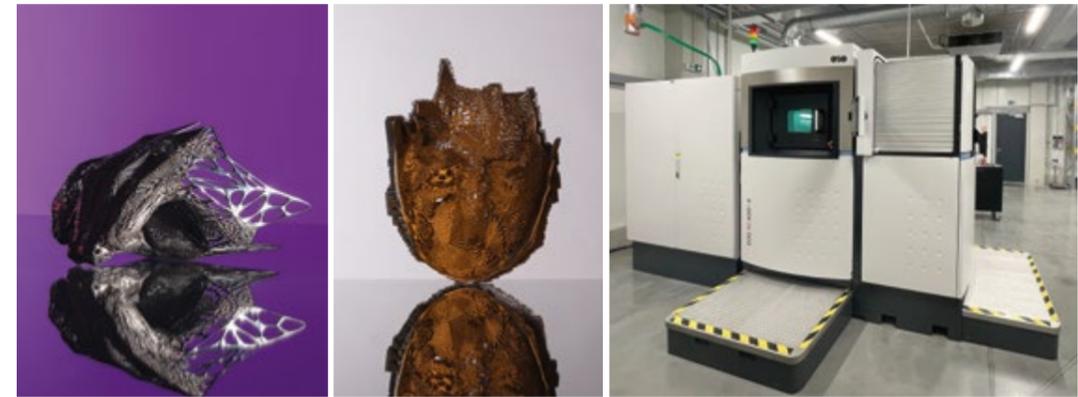
Achieving the properties desired for any 3D printed part, is a combination of material, process and system. For One3D, the design produced by Zdeněk had to have a beautiful and intricate stainless steel finish, the strength to support the garnets that would be applied, and withstand the micro-welding process needed to apply them. With this in mind, the team chose EOS StainlessSteel 316L for its appearance, high strength, ductility and toughness.

The One3D team knew they already had the perfect system and process for the project, using DMLS technology on their EOS M 400-4 industrial 3D printer. The printer has a huge 400x400x400 mm build area with four 400W lasers, which overlap one another enabling up to 4x productivity with reliable and

Short profile

One3D is a leader in additive production and post-processing of plastic and metal parts, based in the Czech Republic, with sites in Slovakia, Germany, Poland, Austria and Croatia. It uses innovative production methods for components in the automotive, engineering, defense and space sectors across Central and Eastern Europe.

Further information
<https://www.one3d.cz>



Left: post-processed 3D lattice palms

Middle: 3D lattice face mask with supports

Right: One3D production facility in Mohelnice with EOS M 400-4
(Source: Václav Jirásek, Václav Jirásek, One3D)

repeatable part quality. In One3D's opinion, no other system could have printed the parts quickly enough, or produced the thin lattice structures and complex shapes required.

Taking advantage of the large build space in the EOS M 400-4 and four lasers, gave the team complete design freedom to build the intricate designs in the most efficient way. One3D optimally oriented the mask design for the build space, and then designed the unique support system that would be constructed during printing. The supports not only had to carry each part, but also be easy to remove during manual post-processing. All with no impact on the aesthetic of the final piece, which was extremely important. The mask, hands, and stainless steel supports had a total part volume of 207 cm³ and a required production time of just 28 hours.

Result

One3D engineers were able to design, print and post-process the life-size stainless steel contour face mask and two palms clasped into a pinch, in just five days, with exceptional detail and a highly luxurious finish. Such a complex design could never have been produced in the time

scales required using conventional manufacturing techniques.

Prior to delivering the parts to the artist for the micro welding of garnet stones, the team at One3D completed a series of post-processing tasks on the printed parts. This included the removal of supports, grinding the printed parts and polishing each surface to a high gloss finish. The speed at which the EOS M 400-4 can print parts, gave the One3D team the opportunity to approach these critical stage with even more care and attention than would be normal.

The final piece of artwork displayed at the Designblok 21 exhibition, was breathtaking, and a source of exceptional pride for Jitka, Zdeněk's mother whose work it captured. Such was the impact of the piece, that it won the best installation category in the prestigious Designblok 21 competition.

"I like it when my work reflects handicrafts and current technologies at the same time. In the Jitka-PUK-3D-UPM project, my wish was to capture my mother Jitka's features futuristically and at the same time faithfully capture her work with a PUK micropoint welder, used for fixing precious stones. I wanted to pay tribute to the eight years she decorated jewelry with this method, which is a very absorbing, painful and demanding way to craft jewelry, requiring great patience. For me, Jitka's face and hands symbolize the places where the demands of work and the mission and virtues of my mother are most reflected." states experimental goldsmith Zdeněk Vacek.

"Due to the large time pressure and the seemingly insurmountable deadline, the EOS M 400-4 was the only solution we could use to get high quality parts."

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